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Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities 1990

Twenty-Third 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.

NUREG-0713 — Occupational Radiation Exposure At Commercial Nuclear Power Reactors and Other Facilities 1988, Vol. 10, U.S. Nuclear Regulatory Commission, July 1991.

NUREG-0713 — Occupational Radiation Exposure At Commercial Nuclear Power Reactors and Other Facilities 1989, Vol. 11, U.S. Nuclear Regulatory Commission, April 1992.

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 (NRC) Radiation Exposure Information and Reporting System (REIRS). The bulk of the information contained in the report was extracted from the 1990 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 1990 were received from a total of 443 NRC licensees, 116 of which were operators of nuclear power reactors. Compilations of the 443 reports indicated that 214,568 individuals were monitored, 110,204 of whom received a measurable dose (Table 3.1). The collective dose incurred by these individuals was calculated to be 39,739 person-rem (person-cSv)[2] which represents an increase of 652 person-rem (-cSv) from the 1989 value. The number of workers receiving a measurable dose increased slightly, and the collective dose increased slightly, resulting in the average measurable dose remaining at 0.36 rem (cSv) for 1990. The average measurable dose is defined to be the average dose to workers receiving a measurable dose.

A total of 113,361 termination reports (Table 5.1) were submitted to the NRC which contained personel identification and exposure information for 77,633 individuals who had completed their work assignment or employment with a covered category of NRC licensees during 1990. The total number of monitored individuals for whom personal identification and exposure information has been incorporated into REIRS during the 22 years that it has been operating is now 663,712, with 586,572 of those terminating from nuclear power facilities. Analyses of these termination data indicate that 11,083 individuals completed work assignments at two or more nuclear reactor facilities during calendar year 1990 and received an average dose of 0.67 rem (cSv). Approximately 3,786 of these individuals worked at two or more reactor facilities during one calendar quarter and received an average quarterly dose of 0.20 rem (cSv). The dose distributions reported by reactor licensees under 10 CFR § 20.407 are adjusted each year from termination data to account for the duplicate reporting of transient workers by multiple licensees. In 1990, the average measurable dose calculated from reported data was 0.34 rem (cSv). The corrected dose distribution resulted in an average measurable dose of 0.37 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

The NRC currently has a three-year contract with Science Applications International Corporation (SAIC) to assist the NRC Staff in the preparation of the NUREG-0713 series. Mr. Charles Hinson (NRR) assisted in the preparation of this NUREG, serving as the NRC Technical Reviewer. SAIC 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.

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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.

FOREWORD

NUREG-0713 presents a statistical analysis of information contained in the Radiation Exposure Information Reporting System (REIRS) database. It does not present staff positions or requirements. However, NRC staff believes that it can be a useful tool in evaluating the effectiveness of an ALARA program.

Over the next several years, as licensees implement the revised 10 CFR Part 20, NUREG-0713 will begin to look a bit different than it does today. The majority of the information we process to produce the NUREG today comes from annual statistical summaries submitted by licensees. Most of the analyses you see in this volume of NUREG-0713 are based on an extrapolation of termination data applied to these statistical analyses. In the future, we will receive specific data on all occupationally exposed workers for whom monitoring is required. Instead of extrapolating, we will have actual data on the numbers of workers in certain categories. So, this is the time to suggest new analyses you would like to see from the REIRS data.

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U. S. Nuclear Regulatory Commission

Occupational Radiation Exposure
at Commercial Nuclear Power Reactors and Other Facilities
Twenty-third Annual Report, 1990

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 rem (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. Comparison of calculated collective dose with actual reported TLD dose totals shows 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 licensees shown in this report may be as much as 10% higher than the sum of the actual individual doses. However, 85% of the nuclear power reactors reported the actual collective dose in 1990 so the total collective dose used in this report is more accurate than if the collective dose would have been calculated for each site.

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 again be 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. Approximately twice as many facilities are licensed to Agreement States than the number licensed by the NRC. This report also does not include non-occupational exposure such as medical x-rays, flouroscopy, and accelerators. Information shown for these categories does not reflect the total U.S. experience.

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-rem (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] rem 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 rem. 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 1990 is the sixth 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 (see Section 3.3 for a description of licensee categories). In nearly every category a large number of the doses are less than measurable, and very few doses exceed 4 or 5 rem (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 5 rem (cSv) are not necessarily classified as personnel overexposures. Although 1.25 rem (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 1 and 2 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
1981-1990

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	1990	258	6,523	4,458	2,120	0.33	0.48	0.42
	1989	276	6,745	4,352	2,067	0.31	0.47	0.42
	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
Manufacturing and Distribution	1990	55	4,195	2,272	693	0.17	0.31	0.55
	1989	48	4,554	2,345	770	0.17	0.33	0.53
	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
Low-Level Waste Disposal	1990	2	784	115	26	0.03	0.23	0.17
	1989	2	925	119	35	0.04	0.29	0.17
	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	1990	2	56	22	6	0.11	0.27	0.00
	1989	2	190	102	33	0.17	0.33	0.09
	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	1990	10	13,756	3,233	287	0.02	0.09	0.01
	1989	8	11,583	2,992	243	0.02	0.08	0.00
	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
Commercial Light Water Reactors***	1990	116	189,254**	100,104**	36,607	0.19	0.37	0.34
	1989	113	188,477**	100,080**	35,939	0.19	0.36	0.33
	1988	111	193,532**	96,653**	40,164	0.21	0.42	0.38
	1987	105	205,895**	97,992**	39,708	0.19	0.41	0.37
	1986	101	191,978**	96,535**	41,932	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
Grand Totals and Averages	1990	443	214,568**	110,204**	39,739	0.19	0.36	0.34
	1989	449	212,474**	109,990**	39,087	0.18	0.36	0.34
	1988	427	215,662**	105,841**	42,995	0.20	0.41	0.38
	1987	455	227,997**	108,994**	42,838	0.19	0.39	0.37
	1986	482	213,017**	107,727**	45,316	0.21	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

+ These categories consist only of NRC licensees. Agreement State licensed organizations do not report occupational exposure data to the NRC. (see Section 2 for categories)

*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 in commercial operation, although some of them may not have been in operation for a full year.

TABLE 3.2
DISTRIBUTION OF ANNUAL WHOLE BODY DOSES BY LICENSE CATEGORY
1990

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 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	7.00-8.00	8.00-9.00	9.00-12.00	>12.0			
INDUSTRIAL RADIOGRAPHY																			
Single Location (66)	528	194	79	20	6	4	1										832	304	41
Multiple Locations (192)	1,537	1,661	671	569	354	251	459	140	33	13	3						5,691	4,154	2,079
Total (258)	2,065	1,855	750	589	360	255	460	140	33	13	3						6,523	4,458	2,120
MANUFACTURING AND DISTRIBUTION																			
"A"-Broad (10)	1,229	1,227	243	106	56	31	97	59	37	6							3,091	1,862	655
Limited (45)	694	345	40	16	7	1			1								1,104	410	38
Total (55)	1,923	1,572	283	122	63	32	97	59	38	6							4,195	2,272	693
LOW-LEVEL WASTE DISPOSAL																			
Total (2)	669	74	10	19	2	4	6										784	115	26
INDEPENDENT SPENT FUEL STORAGE																			
Total (2)	34	2	12	6	2												56	22	6
FUEL FABRICATION																			
Total (10)	10,523	2,563	511	133	19	4	3										13,756	3,233	287
**COMMERCIAL POWER REACTORS																			
Boiling Water (38)	39,347	17,233	7,336	5,992	3,717	2,493	4,162	625	41	1							80,947	41,600	15,781
Pressurized Water (78)	58,733	29,988	13,051	10,750	5,759	3,384	4,712	607	43								127,027	68,294	20,826
GRAND TOTALS	113,294	53,287	21,953	17,611	9,922	6,172	9,440	1,431	155	20	3						233,288	119,994	39,739

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

**Includes all reactors in commercial operation, although some of them may not have been in 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 3 rem (cSv) per calendar quarter [up to 12 rem (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) rem (cSv), where N equals the individual's age in years. Although there is currently no annual limit, annual exposures that exceed 12 rem (cSv) indicate that an exposure in excess of regulatory limits has occurred.

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 2 rem (cSv) between 1967 and 1984. For the past 3 years the percentage of workers with less than 2 rem (cSv) has been greater than 98%. The number of individuals receiving an annual exposure in excess of 5 rem (cSv) has been gradually declining since 1971 and has been less than 0.01% since 1985.

3.2.1 Log Probability Plots

Since personnel monitoring data have 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 1990. 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.

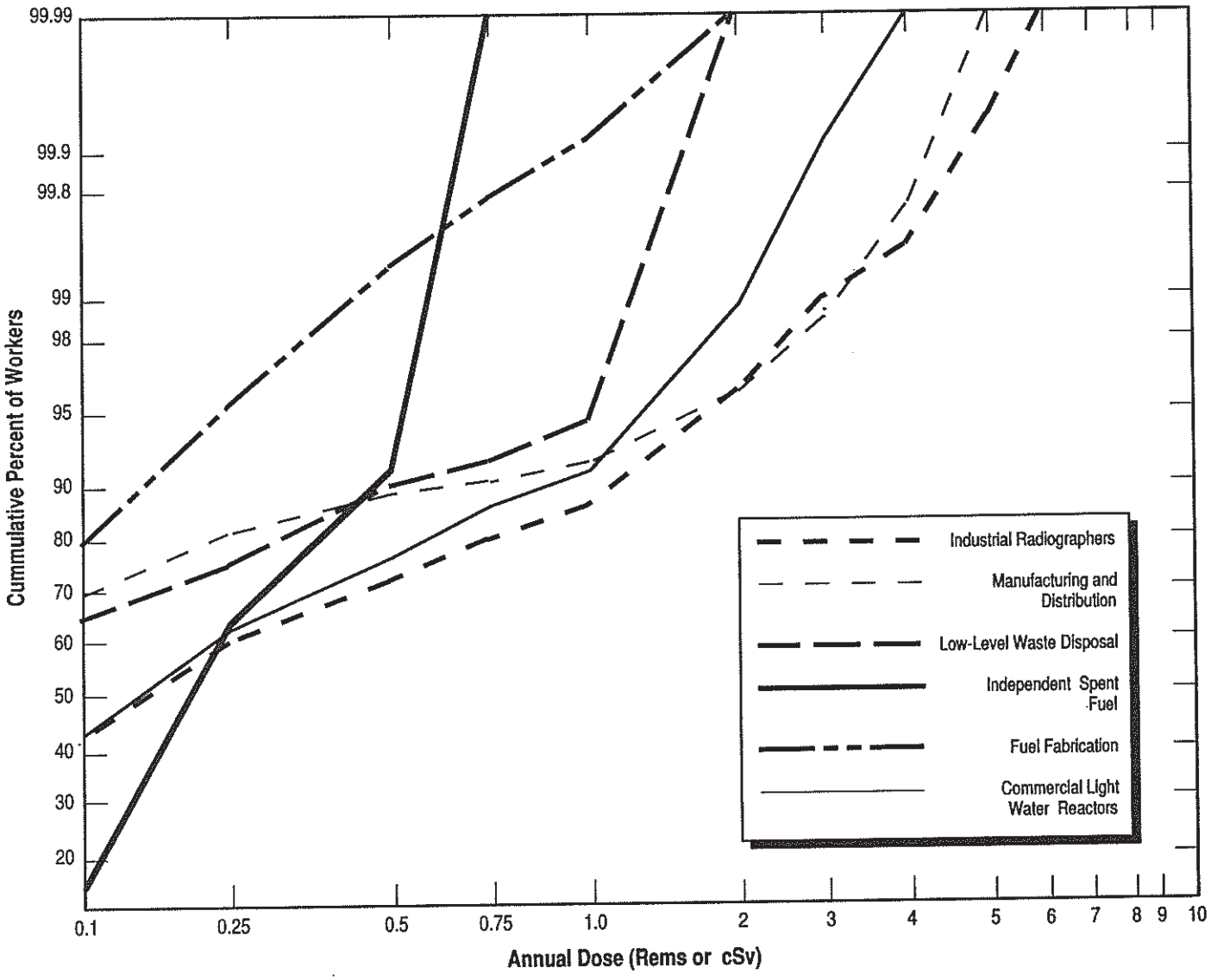
TABLE 3.3
SUMMARY OF ANNUAL DOSE DISTRIBUTIONS FOR CERTAIN NRC LICENSEES

1968-1990

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	181,627	168,899	95.1%	99.9%	0
1985	212,217	201,339	97.5%	>99.99%	2
1986	225,582	213,017	98.0%	>99.99%	0
1987	243,562	228,013	98.7%	>99.99%	1
1988	231,234	215,662	98.6%	>99.99%	0
1989	229,353	212,454	98.9%	>99.99%	1
1990	233,288	214,568	98.9%	>99.99%	0

* Data for 1977-1990 are based on the distribution of individual doses after adjusting for the multiple counting of transient reactor workers (see Section 5).

Figure 3.1
Annual Dose Distribution of Workers at Certain NRC Licensees 1990



License Category	Average Meas. Dose (Rem or cSv)	CR*
Industrial Radiographers	0.48	0.42
Manufacturing and Distribution	0.31	0.55
Low-Level Waste Disposal	0.23	0.17
Independent Spent Fuel	0.27	0.00
Fuel Fabrication	0.09	0.01
Commercial Light Water Reactors	0.33	0.27

*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.

Another feature of these types of graphs is that several comparisons of various dose distributions can be made quickly. For example, one can easily see in Figure 3.1 that in 1990 about 90% of the workers monitored by firms licensed for independent spent fuel storage received doses that were less than 0.50 rem (cSv), while all of the workers monitored at fuel-fabrication facilities received doses less than 2.00 rem (cSv). One should also note that the doses at which the 50 percentile line crosses the plot corresponds to the median dose, i.e. the dose below which half of the dose fell and above which half fell. For industrial radiography and commercial light water reactors, the median dose is near 0.10 rem (cSv), while for manufacturing and distribution, fuel fabrication facilities, and low-level waste disposal 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 1990 plots of the dose distribution of workers at fuel fabrication facilities and independent fuel storage 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 rem (cSv) in 1990 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 and low-level waste disposal facilities. The relatively low points on the curve between 0.10 and 0.25 rem (cSv) indicate a large percentage of individuals receiving dose in this range, while the curve takes a steep upwards turn at 0.50 rem (cSv) indicating tighter controls limiting exposure above this level. This distribution characteristic is further reflected in the relatively high average measurable dose of 0.27 rem (cSv), but a CR value of zero for these facilities.

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 258 radiography licensees in 1990, which is 18 less than those reporting in 1989.

Table 3.4 summarizes the reported data for the two types of radiography licenses for 1990 and for the previous two years for comparison purposes. For single location facilities, the table shows that in 1990, the number of

TABLE 3.4
ANNUAL EXPOSURE INFORMATION FOR INDUSTRIAL RADIOGRAPHERS

1988-1990

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)
1990	Single location	66	832	304	41	0.13
	Multiple locations	192	5,691	4,154	2,079	0.50
	Total	258	6,523	4,458	2,120	0.48
1989	Single location	72	989	324	38	0.12
	Multiple locations	204	5,756	4,028	1,990	0.50
	Total	276	6,745	4,352	2,028	0.47
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

workers receiving measurable doses (304) decreased by 6% over last year's value, while the collective dose increased to 41 person-rem (cSv). This resulted in the average measurable dose increasing from 0.12 in 1989 to 0.13 rem (cSv) in 1990.

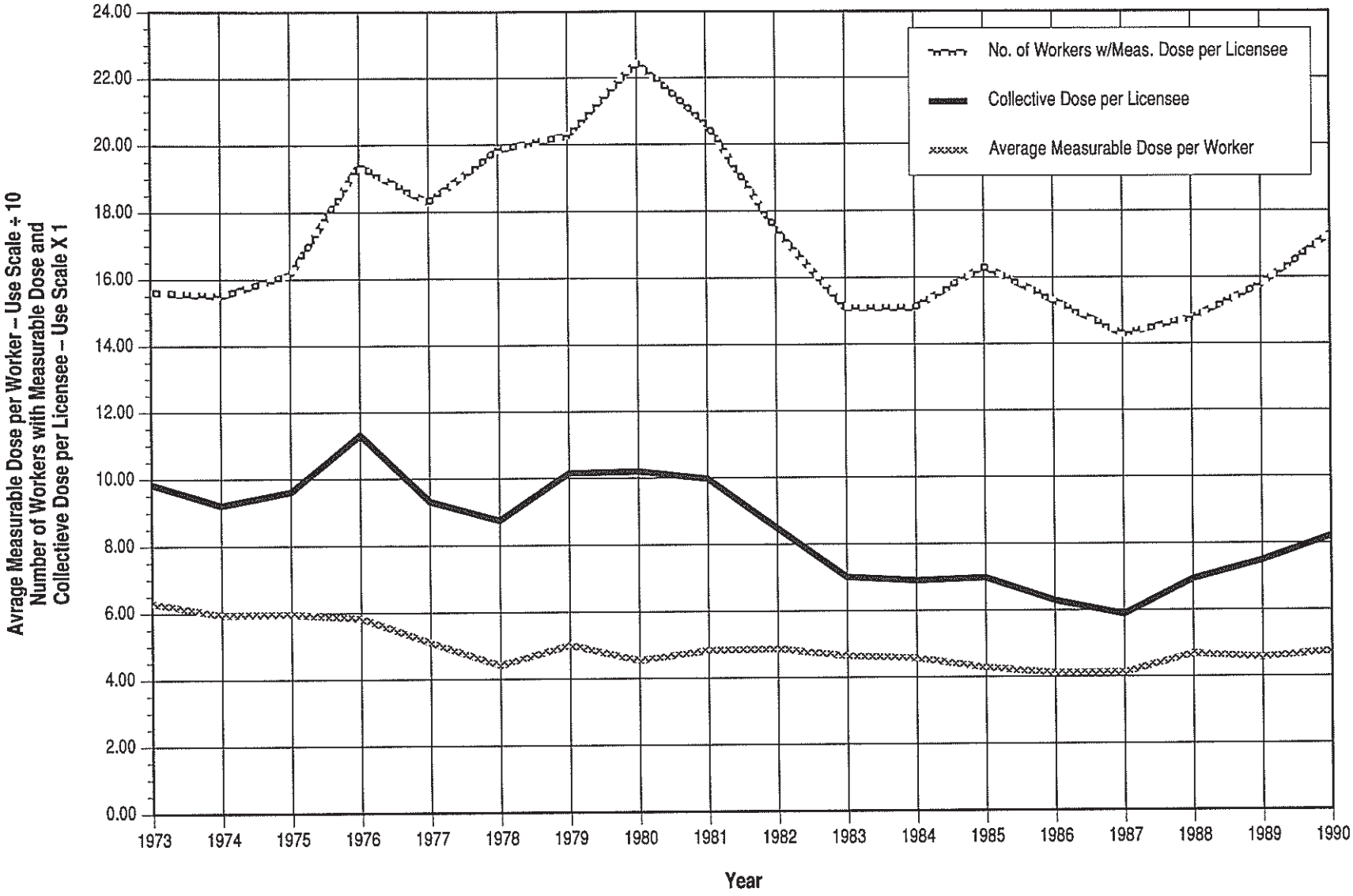
At firms having multiple-location licenses in 1990, the number of monitored workers with measurable dose increased by 3%, and the collective dose increased by 4% from the 1989 values. This resulted in the average measurable dose remaining at 0.50 rem (cSv) for the third straight year. However, the average dose for workers performing radiography at a single location was one-fourth 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 1990 is presented in Appendix A in descending order of average measurable dose.

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 1990. All three parameters have remained fairly stable since 1983 with the increase from 1987 through 1990 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, Type "A" 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. Type "A" 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

Figure 3.2
Average Annual Values at Industrial Radiography Facilities 1973 – 1990



and smoke detectors, and radiochemicals for non-medical 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 1990 and the previous two years. The total number of workers receiving measurable doses as reported by these types of licensees decreased by about 3% to 2,272 workers in 1990. The collective dose also decreased resulting in an average dose of 0.31 rem (cSv). Looking at the information shown separately for the Type "A" Broad and Limited licensees, one can see that the values of all of the parameters remain higher for the Broad licensees. 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.

TABLE 3.5
ANNUAL EXPOSURE INFORMATION FOR MANUFACTURERS AND DISTRIBUTORS

1988-1990

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)
1990	M & D-"A"-Broad	10	3,091	1,862	655	0.35
	M & D-Limited	45	1,104	410	38	0.09
	Total	55	4,195	2,272	693	0.31
1989	M & D-"A"-Broad	11	3,617	1,956	721	0.37
	M & D-Limited	37	937	389	49	0.13
	Total	48	4,554	2,345	770	0.33
1988	M & D-"A"-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

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 Type "A" Broad and Limited manufacturing and distribution facilities. While the collective dose per licensee has decreased considerably from a value of 62.5 person-rem (cSv) in 1975 to a value of 12.6 person-rem (cSv) in 1990, the number of workers with measurable dose per licensee has fluctuated greatly over the years with the largest yearly decrease occurring between 1987 and 1989. This value decreased in 1990 to a value of 41.3, which is the lowest value recorded since before 1973.

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 descending order of average measurable dose for 1990.

3.3.3 Low-Level Waste Disposal Licenses

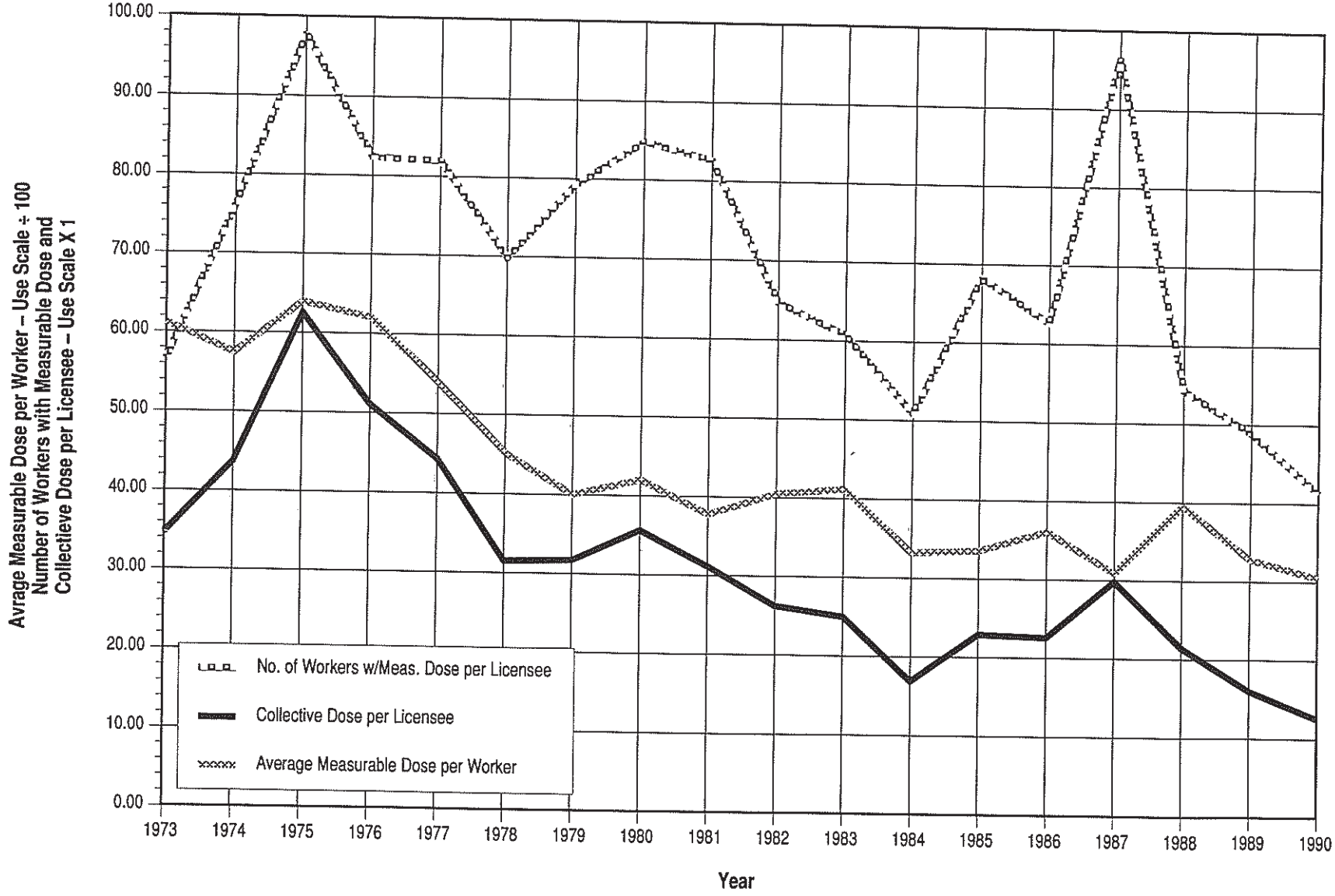
These licenses are issued to allow the receipt, possession, and disposal of low-level radioactive wastes at a land disposal facility. The licensee has the appropriate facilities to receive wastes from such places as hospitals and laboratories, store them for a short time, and dispose of them in a properly 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 1990.

In 1990, the number of workers receiving measurable doses (115) decreased slightly from last year (119), while the collective dose decreased from 35 to 26 person-rem (-cSv). The average measurable dose, therefore, decreased from 0.29 person-rem (-cSv) to 0.23 person-rem (-cSv). Appendix A summarizes the exposure information reported by these two licensees in 1990.

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 1990. As one would expect, since only two licensees have been involved in this activity over the

Figure 3.3
Average Annual Values at Manufacturing and Distribution Facilities 1973 – 1990



past six years, the numbers have remained fairly stable from 1984 through 1990.

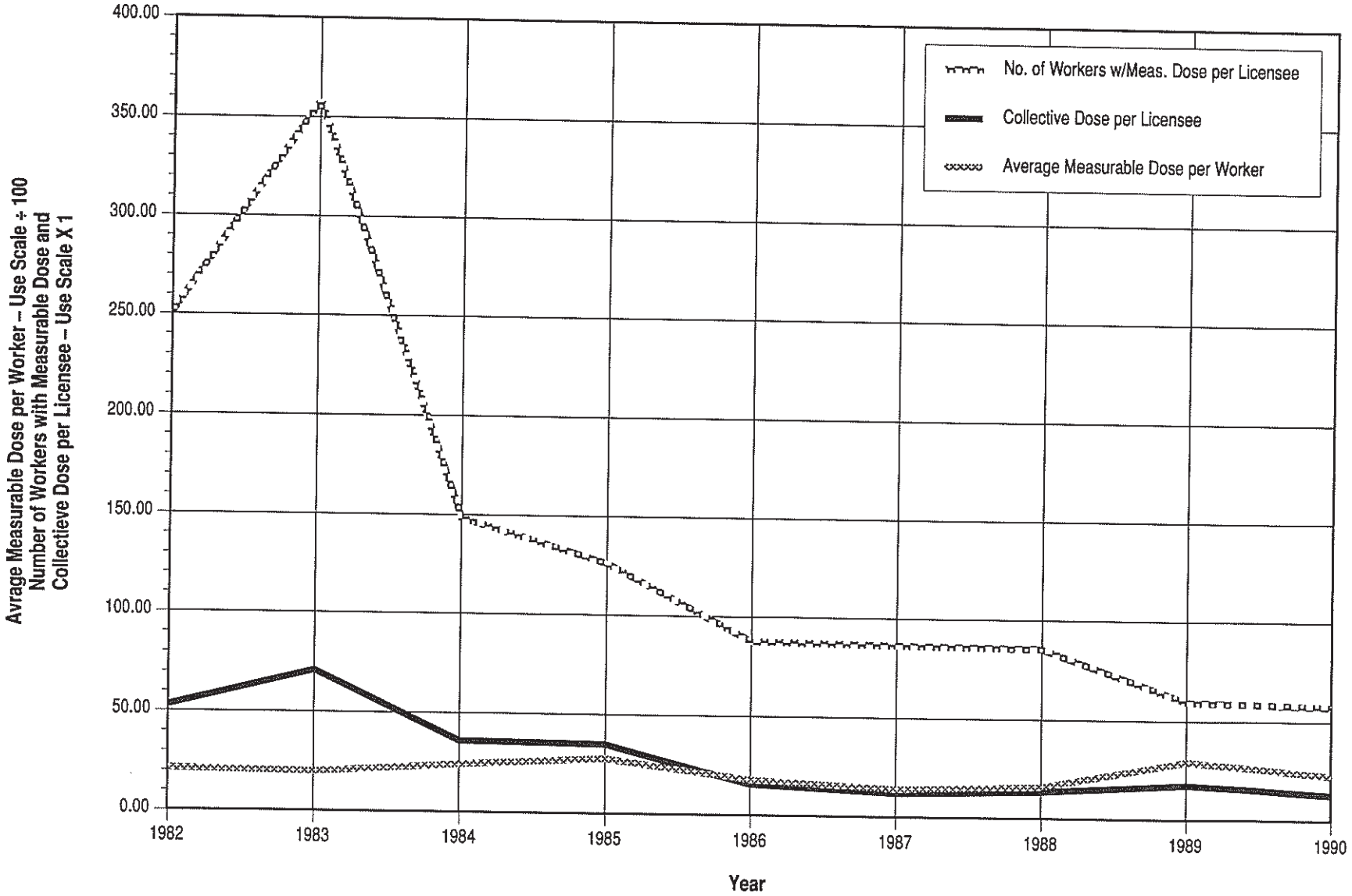
3.3.4 Independent Spent Fuel Storage Installation Licenses

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, 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, one reactor licensee began reporting 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 reported dose distribution information separately are included in this analysis of independent spent fuel storage installation facilities for 1990.

For 1982 through 1986, table 3.1 summarizes the data submitted by the only ISFSI that is separate from a nuclear power plant. For 1987 through 1990 this table also includes data from the ISFSI located at the power plant. The number of individuals receiving measurable dose in 1990 was 22, a significant decrease from the 102 individuals reported in 1989. The collective dose also decreased from a value of 30 person-rem (-cSv) in 1989 to a value of 6 person-rem (-cSv) in 1990. The average measurable dose decreased for the fourth year in a row to a value of 0.27 rem (cSv). The value of CR has also decreased to zero. A contributing factor to the relatively high average dose reported in previous years was that the licensees reported 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 had 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 per worker for independent spent fuel storage facilities. The values for all three of these parameters decreased in 1990. Appendix A summarizes the exposure information reported by the two installations that reported in 1990.

Figure 3.4
Average Annual Values at Low-Level Waste Disposal Facilities 1982 – 1990



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 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 there were 10 fuel fabrication facilities in 1990. 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 also shows that in 1990, the collective dose increased by about 18% to 287 person-rem (-cSv), up from 243 person-rem (-cSv) in 1989. The number of workers with measurable external doses decreased, resulting in the average measurable dose increasing slightly to 0.09 rem (cSv) in 1990.

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. For the past three years the number of personnel with measurable dose per licensee, collective dose per licensee, and average measurable dose has experienced a decreasing trend. Appendix A lists each of the eight licensees reporting in 1990, with the number of persons monitored, the number of workers receiving measurable external doses, and the collective dose for each licensee in descending order of average measurable dose.

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

Figure 3.5
Average Annual Values at Independent Spent Fuel Storage Facilities 1982 – 1990

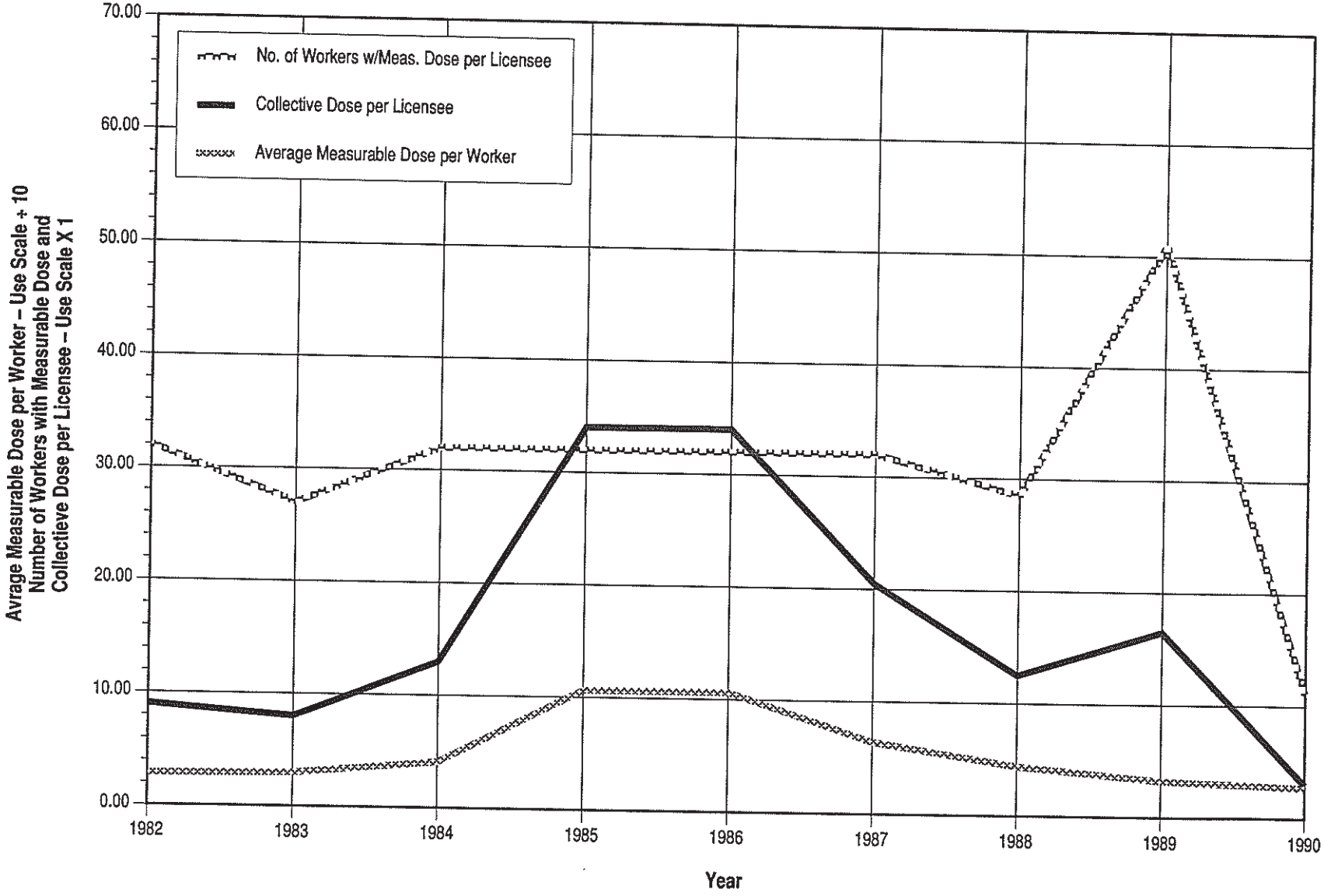


TABLE 3.6
ANNUAL EXPOSURE INFORMATION FOR FUEL FABRICATORS

1988-1990

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)
1990	Uranium Fuel Fab	10	13,756	3,233	287	0.09
1989	Uranium Fuel Fab	8	11,583	2,992	243	0.08
1988	Uranium Fuel Fab	10	11,994	3,869	455	0.12

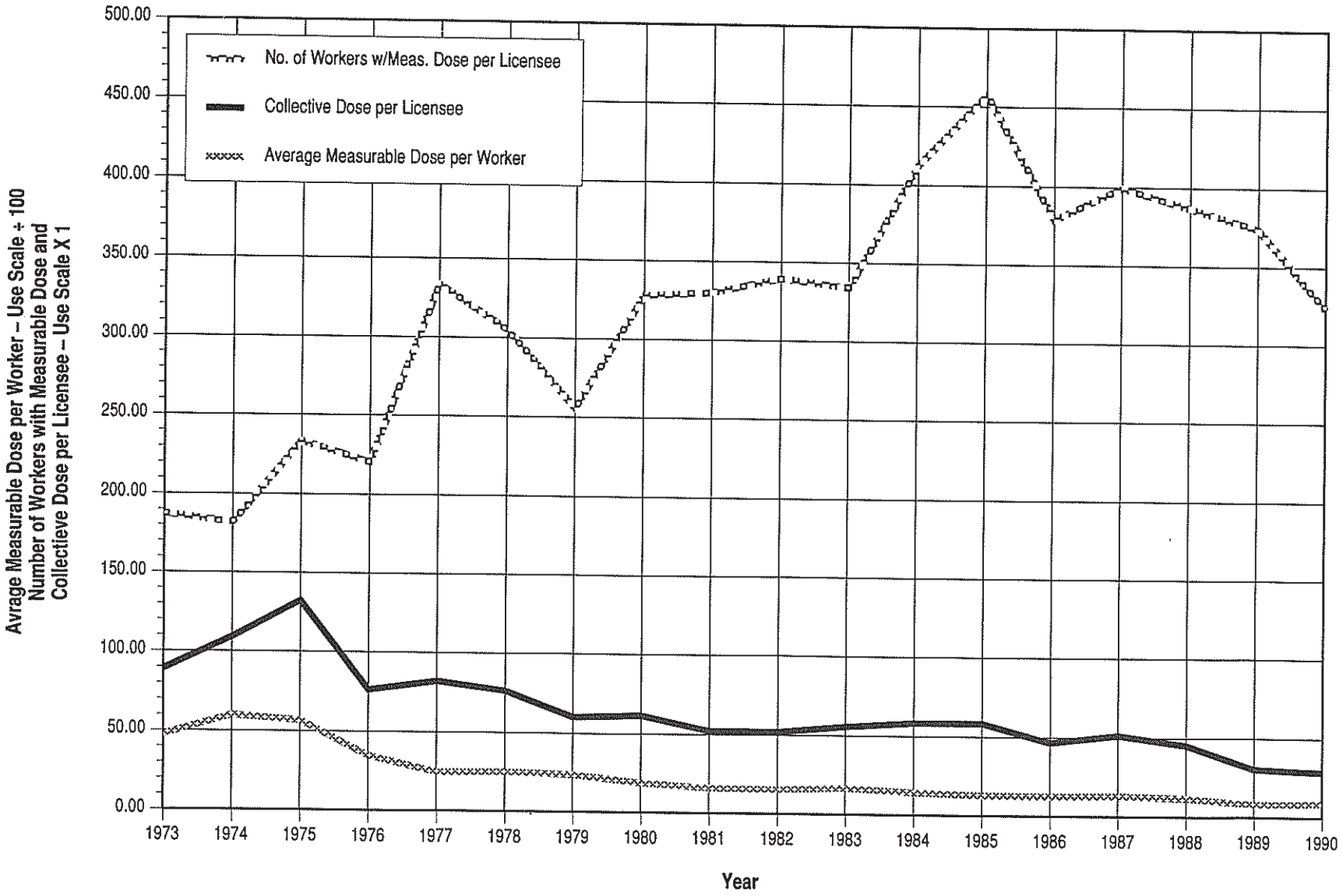
and control of the reprocessing facility to conduct waste solidification activities necessary for final decommissioning. During this period, the NRC license will, in effect, be suspended, and no reports will be filed with the NRC.

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 116 licensed LWRs where 189,254 individuals were monitored for exposure to radiation in 1990. Of this number, 100,104 workers received a measurable dose and incurred a collective dose of 36,607 person-rem (person-cSv). This is slight increase (<2%) over the collective dose of 35,939 reported for 1989. The number of workers with measurable doses has increased somewhat which has resulted in the average measurable dose increasing to 0.37 rem (cSv) in 1990. 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.

Figure 3.6
Average Annual Values at Fuel Fabrication and Processing Facilities 1973 – 1990



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. but has not been in commercial operation since 1989. 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 rem (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. Although the 1986 maintenance 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. In 1990 the number of workers with measurable doses was 30 with an average measurable dose of 0.02 rem.

TABLE 3.7
ANNUAL EXPOSURE INFORMATION FOR FORT ST. VRAIN

1974-1990

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
1989	316	47	6	2	371	2.7	0.0	0.05
1990	226	30	0	0	256	0.6	0.0	0.02

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 types of workers being exposed; and the sort of tasks being performed. Exposure data is then presented as a function of these data.

4.2 Definition 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 with measurable dose* 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.

In prior years Three Mile Island 2 has been included in the compilation of data for commercially operating reactors. The reactor has been shut down since the 1979 accident and has been in the process of defueling and decommissioning since that time. Three Mile Island 2 is not included in the data analysis for 1990, and will no longer be included in the operational data analysis presented in this report. Data for this reactor, however, will be listed in Appendices B, C, D and E for reference purposes.

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

TABLE 4.1

SUMMARY OF ANNUAL INFORMATION REPORTED BY COMMERCIAL BOILING WATER REACTORS+

1973-1990

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	22	12,300	16,604	8,137.9	0.74	559	755	1.5	370	630
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	19,349	37,928	12,102.1	0.51	645	1,264	1.6	403	786
1987	32***	16,717	41,737	15,109.0	0.40	522	1,304	1.1	472	832
1988	34	18,092	40,305	16,665.4	0.45	532	1,185	1.1	490	845
1989	36	15,558	44,360	17,543.5	0.35	432	1,232	0.9	487	857
1990	37	15,780	41,577	21,336.1	0.38	426	1,124	0.7	577	862

+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 no longer be 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 no longer be 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 no longer be included in the count of reactors.

TABLE 4.2

SUMMARY OF ANNUAL INFORMATION REPORTED BY COMMERCIAL PRESSURIZED WATER REACTORS+

1973-1990

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	60	23,032	62,995	33,593.0	0.37	384	1,050	0.7	560	878
1987	64	23,684	62,597	37,007.3	0.38	370	978	0.6	578	900
1988	68	22,786	62,921	42,929.7	0.36	335	925	0.5	631	885
1989	71	20,381	63,894	44,679.5	0.32	287	900	0.5	629	897
1990	73	20,812	68,073	46,955.6	0.31	285	933	0.4	643	907

+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+

1973-1990

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	52	26,107	34,192	21,462.9	0.76	502	658	1.2	413	671
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	90	42,381	100,923	45,695.1	0.42	471	1,121	0.9	508	847
1987	96	40,401	104,334	52,116.3	0.39	421	1,087	0.8	543	877
1988	102	40,878	103,226	59,595.1	0.40	401	1,012	0.7	584	871
1989	107	35,939	108,254	62,223.0	0.33	336	1,012	0.6	582	883
1990	110	36,592	109,650	68,291.7	0.33	333	997	0.5	621	892

+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.

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.

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 gross electric energy generated in megawatt-years and 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 as 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 1990. 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 1990 is shown in Appendix B. Table 4.4 shows the reported dose distributions corrected for the number of transient workers that were reported by more than one site (see Section 5). The table shows that the total number of individuals monitored increased every year since 1981 to a value of 184,604 in 1990. The number of individuals with measurable dose also decreased to a value of 99,860 in 1990. The total collective dose, after leveling off through the years 1980-1984, declined sharply in 1985. It has continued to exhibit a moderate decreasing trend since that time, but increased to a value of 36,592 person-rem (-cSv) in 1990. The value of CR (see Section 3.1.8) also increased slightly to a value of 0.34. This is the

TABLE 4.4

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

1977 - 1990

		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	67,701	41,467	14,570	11,842	7,016	4,693	10,241	3,062	868	146								161,606	93,905	42,381	0.45
1987	85,181	41,222	15,834	12,839	7,586	5,332	10,611	2,192	477	69								181,343	96,162	40,401	0.38
1988	87,254	40,225	15,913	13,153	7,903	5,461	10,310	2,442	511	26		1						183,199	95,945	40,878	0.39
1989	83,947	45,282	17,267	13,777	7,945	5,137	8,634	1,614	370	34								184,007	100,060	35,939	0.33
1990	84,744	42,851	17,664	14,407	8,427	5,408	8,985	1,785	312	21								184,604	99,860	36,592	0.34

*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).

**The collective dose, when not reported by the utilities, was 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.

sixth year in a row that the value of CR has been less than 0.50.

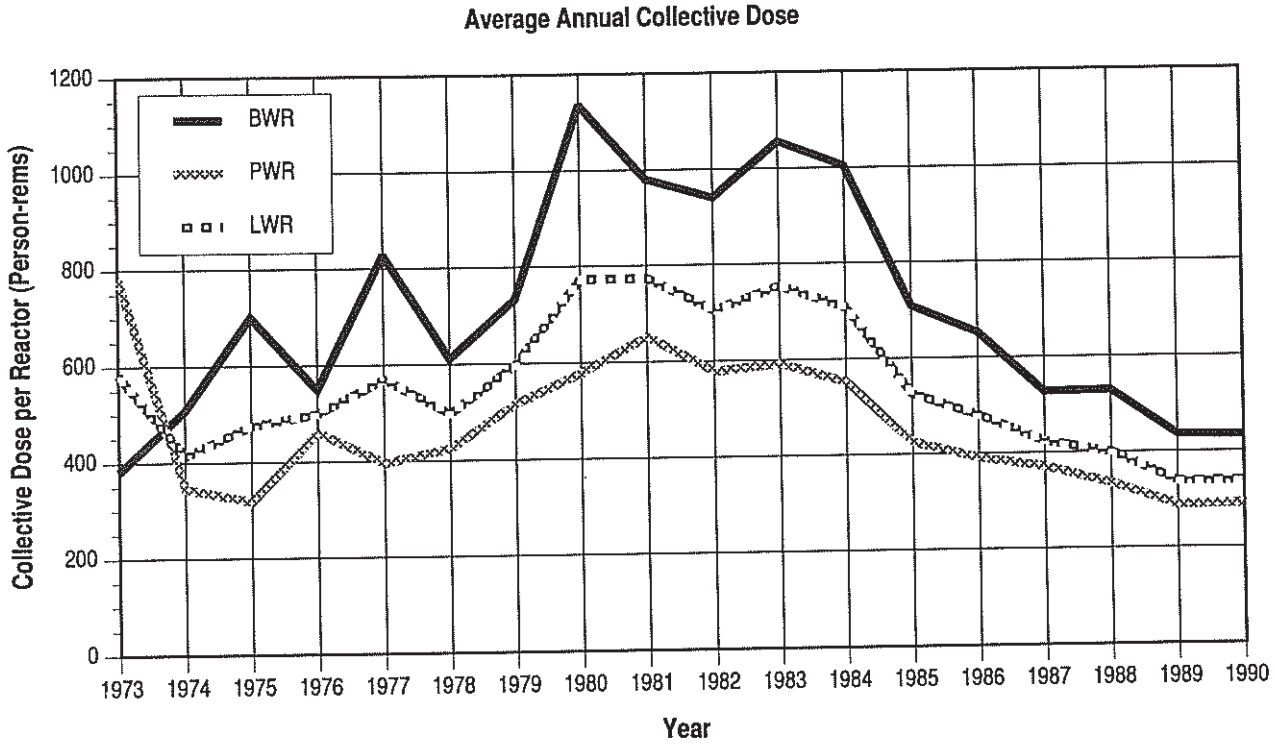
4.4 Average Annual Whole Body Doses

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. Between 1983 and 1989, the average collective dose per reactor dropped by 55%. In 1990, the collective dose per reactor for PWRs decreased slightly from 287 person-rem (-cSv) in 1989 to 285 person-rem (-cSv) in 1990. The collective dose per reactor for BWRs also decreased slightly to 426 person-rem (-cSv) in 1990, resulting in an overall increase for LWRs to 333 person-rem (-cSv) per reactor. The number of workers with measurable dose per reactor has decreased to 1124 for BWRs and increased to 933 for PWRs in 1990.

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 for all LWRs increased from a value of 35,939 person-rem (-cSv) in 1989 to 36,592 person-rem (-cSv) in 1990. Together with the increase in the number of workers with measurable dose, this resulted in the average measurable dose remaining at 0.33 rem (cSv) in 1990. Power generation indicators such as gross electricity and average maximum dependable capacity net continued to increase for the tenth straight year, while the average collective dose per megawatt-year dropped to less than half the 1980 values during the same time period.

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 most utilities have established programs to collect and share information relative to tasks, techniques, and exposures.

Figure 4.1
Average Collective Dose and Number of Workers per Reactor 1973 – 1990



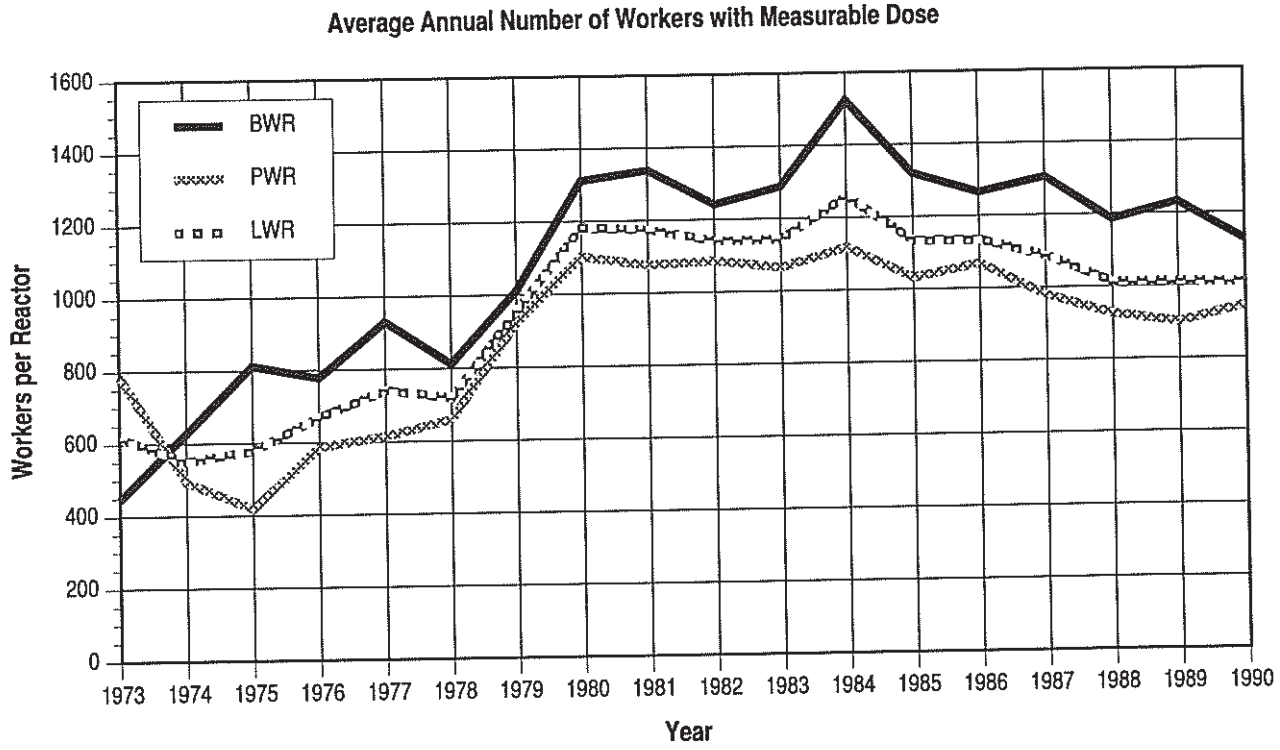
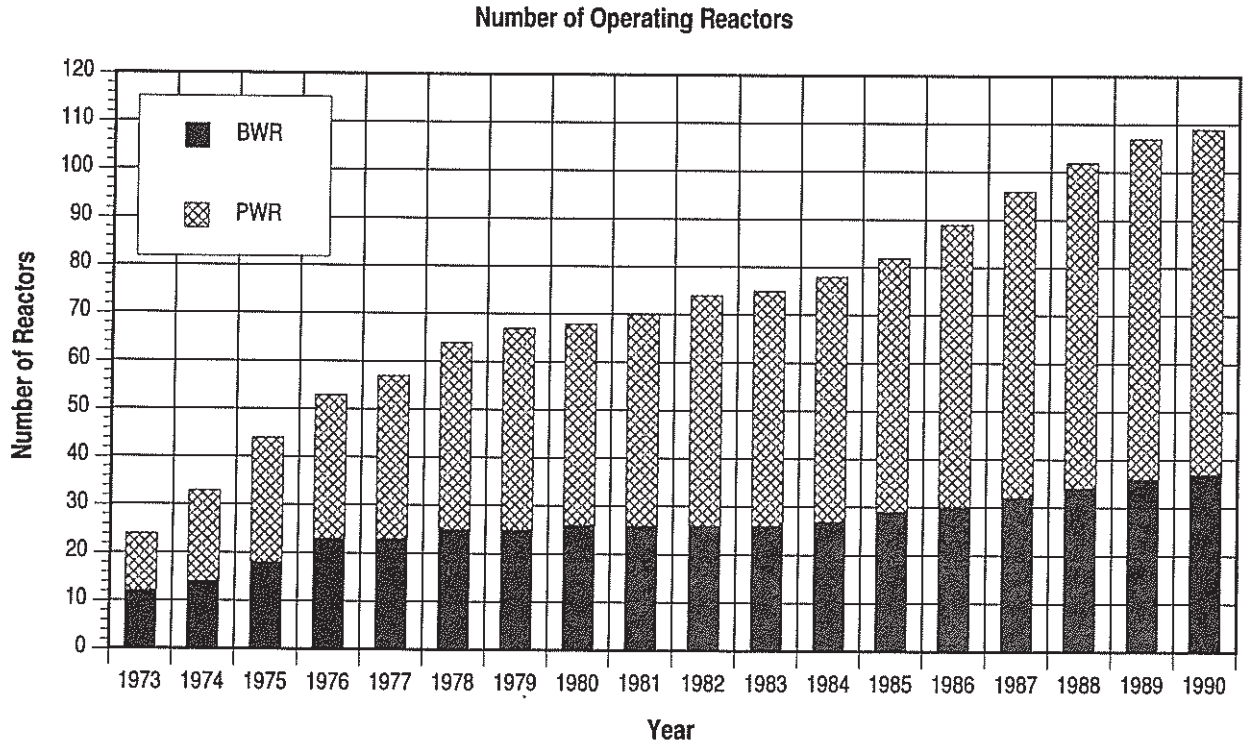


Figure 4.2
Number of Operating Reactors and Gross Electricity Generated 1973 – 1990



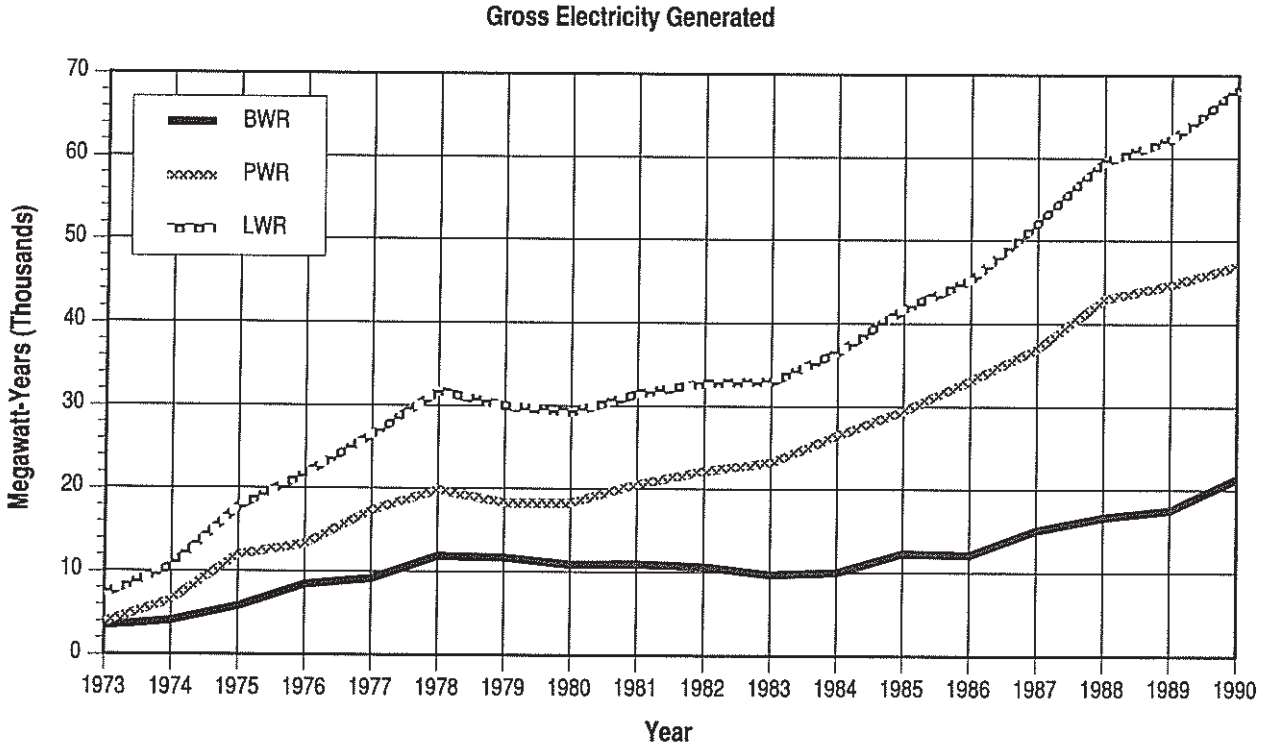
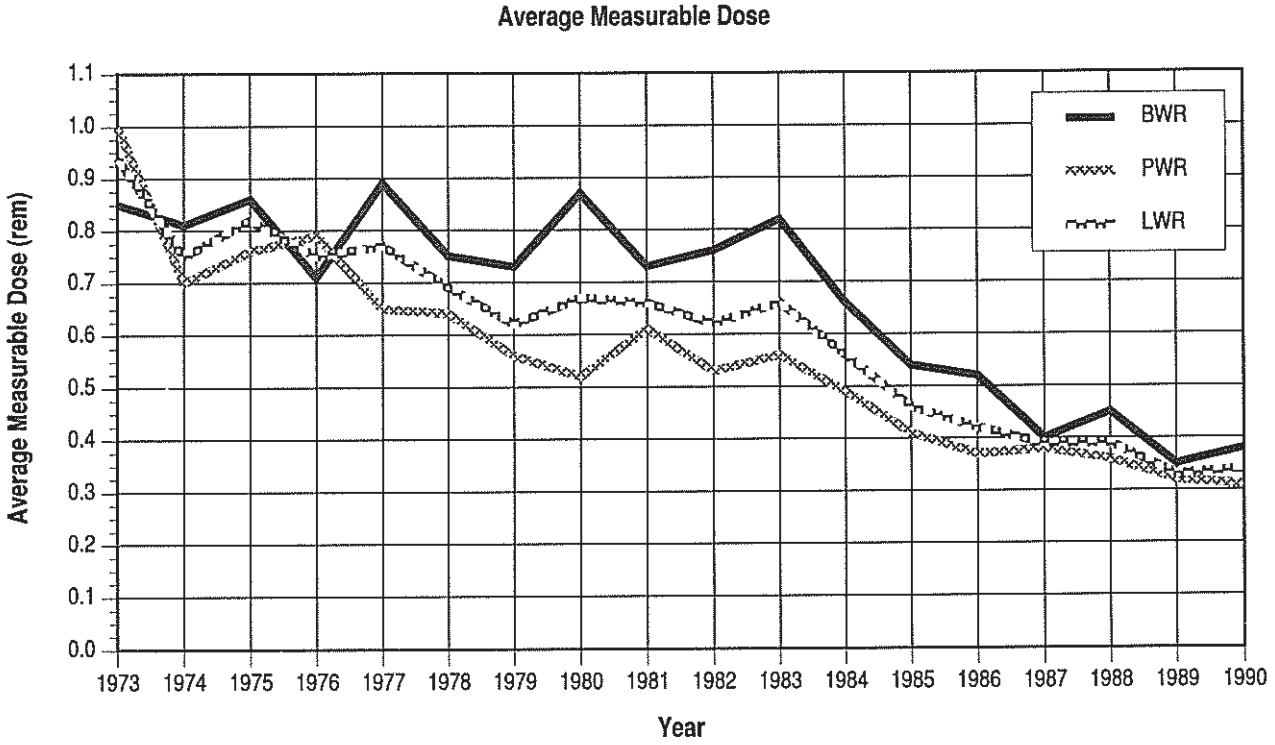
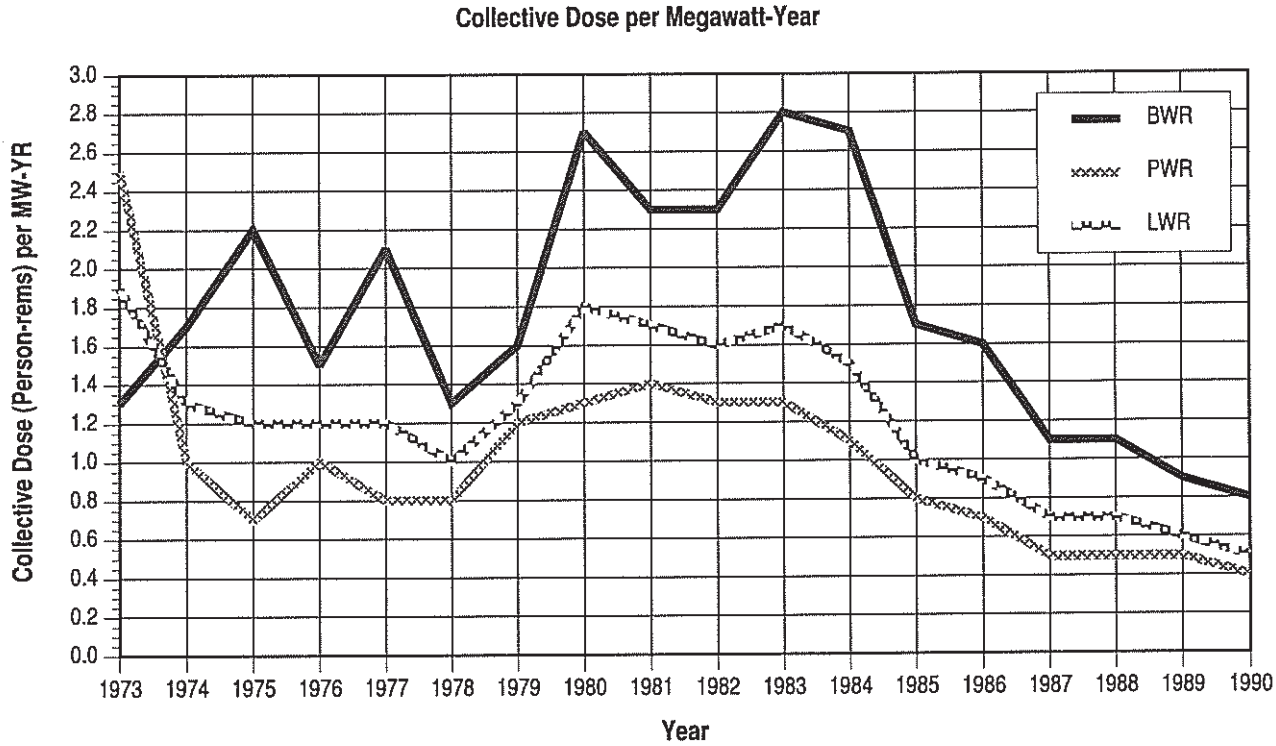


Figure 4.3
Average Measurable Dose and Collective Dose per Megawatt-Year 1973 – 1990





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 1990. The ranges of 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 an increase from 239 person-rem (-cSv) in 1989 to 288 person-rem (-cSv) in 1990. At BWRs the median fluctuates more from year to year, and in 1990 the median collective dose increased to 437 person-rem (-cSv). Figure 4.4 also shows that in 1990 50% of the PWRs reported collective doses between 162 and 365 person-rem (-cSv) while 50% of the BWRs reported collective doses between 220 and 553 person-rem (-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 1986 through 1990. The total collective dose per site is listed in the tables even though the dose per reactor was used for all ranking. Two other parameters, average measurable 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 as the ratio of the annual collective dose delivered at individual doses exceeding 1.5 rem (cSv) to the total annual collective dose. In 1990 the value of CR continued to decline for most plants, and the CR for all but two of the U.S. LWRs, one BWR and one PWR, fell between 0.05 to 0.50, the range recommended by the UNSCEAR [Ref. 10].

In 1990, the five BWR sites with the highest collective doses all exceeded 700 person-rem (person-cSv) per reactor (Table 4.5). Although the eight

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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 4.4
Average, Median and Extreme Values of the Collective Dose Per Reactor 1973 – 1990

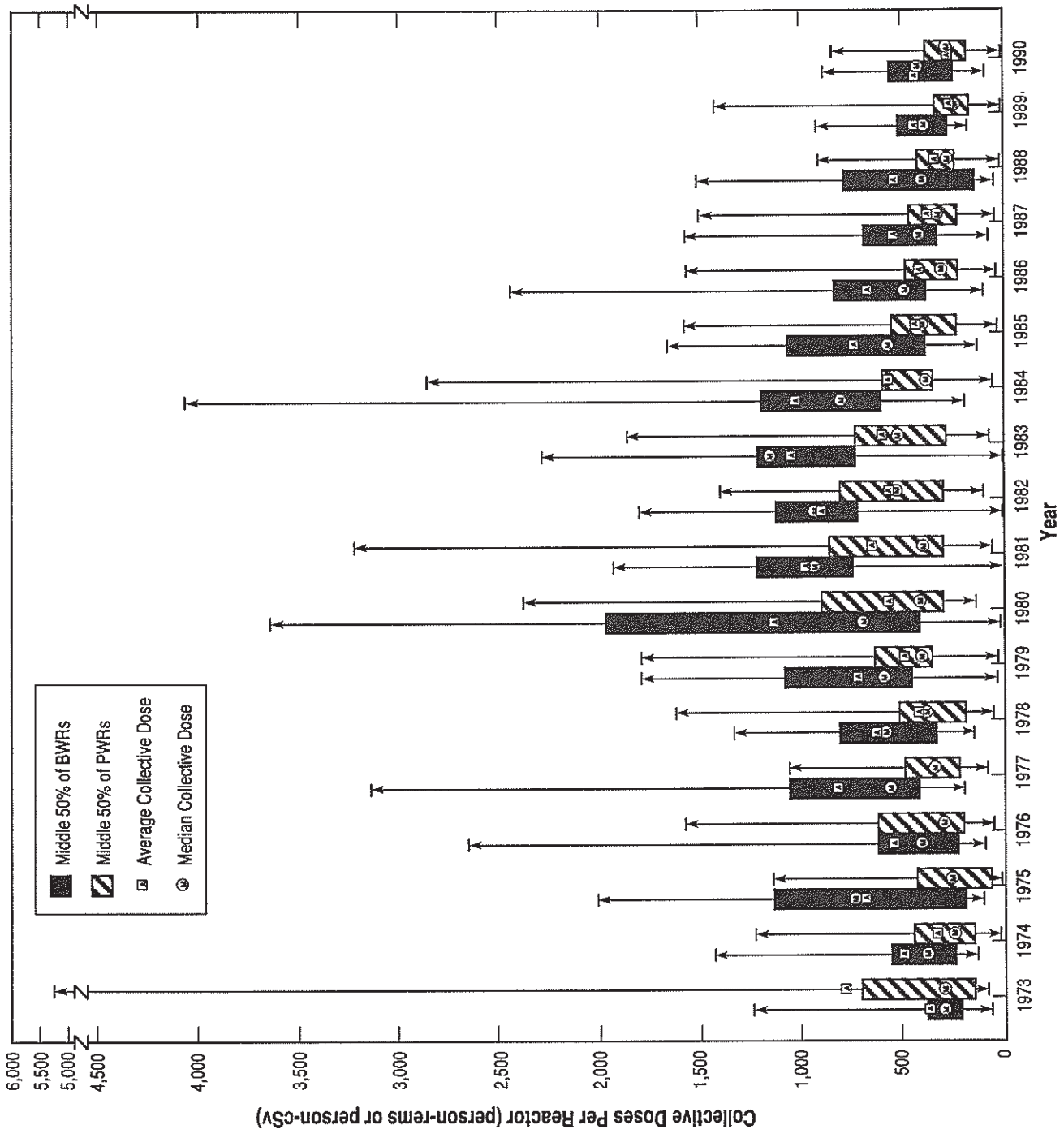


TABLE 4.5
BOILING WATER REACTORS LISTED IN ASCENDING ORDER OF COLLECTIVE DOSE PER REACTOR
1986-1990

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	898	0.56	1.0	0.39
Quad Cities 1,2	950	0.65	0.9	0.46
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	2,668	0.86	3.6	0.62
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
Quad Cities 1,2	720	0.50	0.6	0.34
River Bend 1	378	0.30	0.6	0.17
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	1,145	0.56	1.2	0.38
Duane Arnold	667	0.61	2.2	0.37
Millstone Point 1	684	0.43	1.3	0.28
La Salle 1,2	1,396	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	2,436	0.58	–	0.42
Lasalle 1,2	2,471	0.90	0.9	0.58
Oyster Creek	1,504	0.52	3.6	0.49

1989

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Big Rock Point	177	0.42	3.5	0.41
Duane Arnold	194	0.46	0.5	0.25
Pilgrim	207	0.12	1.0	0.05
Browns Ferry 1,2,3	656	0.24	–	0.15
Fermi 2	255	0.20	0.4	0.04
Limerick 1	266	0.15	0.4	0.04
Hatch 1,2	556	0.41	0.4	0.23
Nine Mile Point 1,2	564	0.21	1.1	0.27
Vermont Yankee	288	0.35	0.7	0.10
Cooper Station	343	0.29	0.6	0.19
Susquehanna 1,2	704	0.34	0.4	0.17
Peach Bottom 2, 3	738	0.32	1.5	0.18
Clinton	372	0.31	1.1	0.18
Fitzpatrick	377	0.37	0.5	0.28
Quad Cities 1, 2	900	0.52	0.8	0.34
Millstone Point 1	462	0.54	0.8	0.39
Hope Creek 1	465	0.25	0.6	0.21
Washington Nuclear 2	492	0.38	0.7	0.27
Grand Gulf	498	0.25	0.5	0.17
Monticello	507	0.46	1.6	0.31
River Bend 1	558	0.36	1.0	0.15
Dresden 2,3	1,130	0.50	1.0	0.34
Lasalle 1,2	1,386	0.56	0.9	0.41
Perry	767	0.41	1.2	0.18
Brunswick 1,2	1,786	0.46	1.8	0.45
Oyster Creek	910	0.38	3.2	0.43

1990

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Fermi 2	83	0.18	0.1	0.01
Limerick 1, 2	175	0.12	0.1	0.01
Monticello	94	0.28	0.2	0.19
Millstone Point 1	131	0.36	0.2	0.24
Peach Bottom 2, 3	377	0.24	0.2	0.11
Hope Creek 1	196	0.14	0.2	0.10
Susquehanna 1, 2	440	0.26	0.3	0.08
Pilgrim	225	0.12	0.4	0.07
Big Rock Point	232	0.66	4.5	0.62
Vermont Yankee	307	0.36	0.7	0.13
Oyster Creek	310	0.16	0.6	0.17
Nine Mile Point 1, 2	699	0.29	1.1	0.22
Cooper Station	379	0.32	0.6	0.20
Browns Ferry 1, 2, 3	1,310	0.48	—	0.40
Lasalle 1, 2	948	0.52	0.5	0.36
Grand Gulf	482	0.27	0.5	0.15
River Bend 1	489	0.30	0.7	0.11
Quad Cities 1, 2	1,028	0.47	0.9	0.29
Washington Nuclear 2	536	0.40	0.8	0.30
Clinton	553	0.40	1.3	0.22
Perry	638	0.42	0.8	0.18
Dresden 2, 3	1,400	0.63	1.3	0.46
Hatch 1,2	1,455	0.50	1.1	0.30
Brunswick 1, 2	1,548	0.49	1.6	0.49
Duane Arnold	861	0.59	2.3	0.31
Fitzpatrick	884	0.58	1.6	0.47

* 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

1986-1990

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
Byron 1	76	0.07	0.1	0.06
Maine Yankee	100	0.20	0.1	0.17
Davis-Besse	124	0.13	37.6	0.03
Prairie Island 1,2	255	0.31	0.3	0.27
Wolf Creek 1	143	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	474	0.49	0.3	0.29
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
Millstone Point 2,3	993	0.41	0.8	0.30
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
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	138	0.20	0.2	0.07
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
Zion 1,2	653	0.62	0.5	0.39
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
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	556	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
Cook 1,2	867	0.38	0.7	0.33
Diablo Canyon 1,2	877	0.48	0.6	0.33
Summer 1	511	0.45	0.8	0.26
Mcguire 1,2	1,104	0.39	0.6	0.28
Robinson 2	564	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

1989

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Wolf Creek 1	18	0.10	0.0	0.00
Vogtle 1	32	0.07	0.0	0.00
Davis-Besse	38	0.09	0.0	0.04
Prarie Island 1,2	99	0.21	0.1	0.04
Summer 1	52	0.14	0.1	0.01
Three Mile Island 1	54	0.08	0.1	0.10
Yankee-Rowe	62	0.13	0.4	0.11
Rancho Seco	81	0.13	0.5	0.06
Byron 1,2	172	0.16	0.1	0.03
Fort Calhoun	93	0.08	0.2	0.02
Maine Yankee	99	0.26	0.1	0.13
Braidwood 1,2	296	0.20	0.2	0.04
Harris	156	0.17	0.2	0.10
South Texas 1	161	0.16	0.2	0.02
Catawba 1,2	334	0.20	0.2	0.04
Salem 1,2	338	0.11	0.2	0.17
Calvert Cliffs 1,2	346	0.19	1.0	0.13
San Onofre 1,2,3	567	0.25	0.3	0.20
Robinson 2	195	0.18	0.6	0.10
Turkey Point 3,4	433	0.27	0.6	0.14
Oconee 1,2,3	684	0.31	0.3	0.19
Diablo Canyon 1,2	465	0.28	0.2	0.07
Crystal River 3	234	0.27	0.7	0.15
Kewaunee	239	0.42	0.5	0.21
Palo Verde 1,2,3	720	0.28	0.7	0.14
Cook 1,2	493	0.31	0.3	0.18
St. Lucie 1,2	495	0.35	0.3	0.19
Point Beach 1,2	504	0.68	0.6	0.47
Waterford 3	265	0.20	0.3	0.05
Callaway 1	283	0.27	0.3	0.09
McGuire 1,2	620	0.31	0.3	0.22
Palisades	314	0.31	0.7	0.15
Sequoyah 1,2	657	0.33	0.4	0.23
Zion 1,2	684	0.53	0.5	0.33
Arkansas 1,2	711	0.34	0.7	0.17
Farley 1,2	749	0.34	0.5	0.25
Surry 1,2	836	0.27	1.7	0.37
Trojan	421	0.31	0.6	0.23
Millstone Point 2,3	1,079	0.54	0.8	0.39
Haddam Neck	596	0.41	1.7	0.32
Ginna	605	0.48	1.6	0.33
Beaver Valley 1,2	1,378	0.59	1.4	0.47
North Anna 1,2	1,471	0.51	1.2	0.47
Indian Point 3	876	0.49	1.5	0.31
Indian Point 2	1,436	0.69	2.7	0.44

1990

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Rancho Seco	13	0.12	---	0.00
Waterford 3	47	0.11	0.0	0.00
Harris	85	0.19	0.1	0.09
Braidwood 1,2	186	0.17	0.1	0.01
Prairie Island 1,2	188	0.26	0.2	0.07
South Texas 1,2	206	0.18	0.1	0.02
Oconee 1,2,3	404	0.21	0.2	0.07
Salem 1,2	272	0.07	0.2	0.22
Kewaunee	145	0.30	0.3	0.12
Calvert Cliffs 1,2	304	0.15	1.9	0.12
Diablo Canyon 1,2	323	0.22	0.2	0.04
Palo Verde 1,2,3	499	0.22	0.2	0.15
Beaver Valley 1,2	348	0.21	0.3	0.07
Point Beach 1,2	378	0.61	0.4	0.43
Wolf Creek 1	195	0.24	0.2	0.05
Byron 1,2	434	0.31	0.3	0.21
Farley 1,2	457	0.27	0.3	0.25
Vogtle 1,2	466	0.29	0.3	0.12
Yankee-Rowe	246	0.35	2.4	0.19
Trojan	258	0.22	0.4	0.09
Three Mile Island 1	264	0.20	0.4	0.12
Surry 1,2	575	0.30	0.5	0.21
Cook 1,2	580	0.31	0.4	0.15
Fort Calhoun	290	0.38	1.0	0.21
North Anna 1,2	590	0.27	0.4	0.37
San Onofre 1,2,3	885	0.40	0.4	0.28
Millstone Point 2,3	593	0.36	0.4	0.24
Ginna	347	0.35	0.8	0.17
Zion 1,2	696	0.50	0.8	0.31
Indian Point 3	358	0.34	0.6	0.16
McGuire 1,2	727	0.32	0.5	0.20
Turkey Point 3,4	730	0.35	0.8	0.19
Summer 1	376	0.34	0.5	0.13
Arkansas 1,2	762	0.31	0.6	0.16
St. Lucie 1,2	777	0.41	0.7	0.27
Catawba 1,2	809	0.37	0.5	0.24
Haddam Neck	421	0.43	3.0	0.36
Robinson 2	437	0.27	1.1	0.14
Callaway 1	442	0.39	0.5	0.23
Crystal River 3	476	0.33	1.0	0.20
Davis-Besse	489	0.38	1.0	0.23
Indian Point 2	608	0.30	1.0	1.01
Maine Yankee	682	0.50	1.2	0.29
Palisades	766	0.32	2.1	0.28
Sequoyah 1,2	1,678	0.57	1.0	0.44

* 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.

reactors at these five sites represented only 22% of the 37 BWRs, they contributed 39% of the total collective dose incurred at BWRs in 1990. Some of the activities which contributed to the collective dose accumulated at the BWR site with the highest collective dose per reactor [884 person-rem (-cSv)] were in-service inspection and intergranular stress corrosion cracking repair, motor-operated valve related work, traversing in-core probe replacement, leak rate testing, and refueling activities.

At PWRs, the five sites with the highest collective doses all exceeded 480 person-rem (person-cSv) per reactor (Table 4.6). Although representing 8% of the 73 PWRs included in 1990, they contributed 20% of the total collective dose at PWRs. Much of the collective dose accumulated at the plant with the highest dose per reactor [839 person-rem (person-cSv)] in 1990 was attributed to steam generator maintenance including eddy current testing and sludge lancing, resistance temperature device piping removal, refueling activities, and hanger modifications.

Tables 4.7a&b list the sites that had been in commercial operation for at least five years as of December 31, 1990, 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 147 reactor-years of operation accumulated by the 30 BWRs listed, the average annual collective dose per reactor was found to be 536 person-rem (person-cSv), the average measurable dose was 0.44 rem (cSv), and the average collective dose per megawatt-year was 1.2.

Based on the 309 reactor-years of operation at the 63 PWRs listed, the average annual collective dose per reactor, average measurable dose, and average collective dose per megawatt-year were found to be 335 person-rem (person-cSv), 0.35 rem (cSv), and 0.6 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 1989.

In some cases, the plants having the lower values for most of the parameters shown in Tables 4.7a&b are the newer plants. Some of the older, smaller plants, such as Big Rock Point and Yankee-Rowe, also appear near the top of the listings since they report small collective doses. However, the ratio of collective dose to megawatt-years is generally higher for these plants due to their limited power generation capability. In 1990, there were some notable exceptions to these generalizations. Cooper Station and Millstone Point 1, both BWRs, each have a capacity greater than 500 MWe, have been in operation over 15 years, and are among the top four sites for this five-year summary. For PWRs that fall into this category of size and age, Prairie

TABLE 4.7a
FIVE-YEAR TOTALS AND AVERAGES LISTED IN ASCENDING ORDER OF COLLECTIVE DOSE PER BWR

1986 - 1990

*Site Name	Total Collective Dose per Reactor	Total Coll. Dose per Site	Workers with Meas. Doses	Avg. Meas. Dose (rem)	Total Mega-watt-years	Average Collective Dose per MW-Yr
BIG ROCK POINT	177	885	1,525	0.58	253.9	3.5
COOPER STATION	279	1,396	4,762	0.29	2,792.0	0.5
SUSQUEHANNA 1,2	311	3,109	11,202	0.28	8,104.7	0.4
MILLSTONE POINT 1	314	1,571	3,521	0.45	2,971.9	0.5
BROWNS FERRY 1,2,3	357	5,352	14,842	0.36	0.0	---
MONTICELLO	375	1,875	3,649	0.51	2,221.9	0.8
GRAND GULF	397	1,983	7,273	0.27	4,368.1	0.5
WASHINGTON NUCLEAR 2	402	2,009	5,911	0.34	3,374.6	0.6
VERMONT YANKEE	442	2,210	4,276	0.52	2,029.7	1.1
QUAD CITIES 1,2	443	4,425	8,273	0.53	5,738.7	0.8
NINE MILE POINT 1,2	505	3,533	10,836	0.33	2,097.3	1.7
DUANE ARNOLD	505	2,523	4,591	0.55	1,816.3	1.4
HATCH 1,2	573	5,725	12,449	0.46	5,707.9	1.0
PILGRIM	655	3,277	13,113	0.25	830.0	3.9
FITZPATRICK	680	3,398	6,879	0.49	2,992.7	1.1
PEACH BOTTOM 2,3	683	6,826	14,907	0.46	3,935.7	1.7
LASALLE 1,2	710	7,099	10,400	0.68	6,534.9	1.1
DRESDEN 2,3	775	7,752	12,071	0.64	4,981.1	1.6
BRUNSWICK 1,2	841	8,409	16,096	0.52	5,177.0	1.6
OYSTER CREEK	1,136	5,682	12,883	0.44	1,747.2	3.3
Totals and Averages		78,807	179,459	0.44	67,675.6	1.2
Averages per Reactor-Year		536	1,221		460.4	

*Sites where not all reactors had completed five full years of commercial operation as of 12/31/90 are not included.

TABLE 4.7b
FIVE-YEAR TOTALS AND AVERAGES LISTED IN ASCENDING ORDER OF COLLECTIVE DOSE PER PWR

1986 - 1990

*Site Name	Total Collective Dose per Reactor	Total Coll. Dose per Site	Workers with Meas. Doses	Avg. Meas. Dose (rem)	Total Mega-watt-years	Average Collective Dose per MW-Yr
PRAIRIE ISLAND 1,2	88	876	3,356	0.26	4,759.4	0.2
WOLF CREEK 1	158	791	3,351	0.24	4,454.9	0.2
YANKEE-ROWE	159	797	2,913	0.27	705.3	1.1
CALVERT CLIFFS 1,2	170	1,700	7,781	0.22	4,629.7	0.4
RANCHO SECO	175	874	4,453	0.20	535.7	1.6
THREE MILE ISLAND 1	178	890	5,620	0.16	3,373.7	0.3
WATERFORD 3	190	950	5,187	0.18	4,489.5	0.2
KEWAUNEE	198	989	3,022	0.33	2,327.1	0.4
DAVIS-BESSE	201	1,005	4,570	0.22	2,145.4	0.5
FORT CALHOUN	223	1,117	5,567	0.20	1,799.0	0.6
POINT BEACH 1,2	225	2,248	3,471	0.65	4,339.0	0.5
SALEM 1,2	231	2,312	14,286	0.16	7,592.1	0.3
BYRON 1,2	239	1,910	6,634	0.29	6,460.0	0.3
SAN ONOFRE 1,2,3	250	3,753	12,517	0.30	9,484.8	0.4
DIABLO CANYON 1,2	256	2,305	7,343	0.31	7,567.8	0.3
OCONEE 1,2,3	270	4,050	11,996	0.34	10,780.9	0.4
CATAWBA 1,2	270	2,434	9,432	0.26	7,315.2	0.3
CALLAWAY 1	274	1,370	4,676	0.29	4,654.4	0.3
SUMMER 1	304	1,522	4,058	0.38	3,460.1	0.4
FARLEY 1,2	321	3,214	9,931	0.32	7,213.7	0.4
ST. LUCIE 1,2	333	3,325	8,029	0.41	7,317.7	0.5
COOK 1,2	335	3,351	9,162	0.37	6,418.6	0.5
CRYSTAL RIVER 3	347	1,734	5,331	0.33	2,296.3	0.8
TROJAN	365	1,824	6,467	0.28	3,535.7	0.5
ZION 1,2	371	3,707	6,606	0.56	6,722.6	0.6
BEAVER VALLEY 1,2	387	3,093	8,645	0.36	4,939.9	0.6
GINNA	390	1,948	4,816	0.40	2,098.9	0.9
SEQUOYAH 1,2	396	3,959	11,195	0.35	4,005.1	1.0
MILLSTONE POINT 2,3	397	3,974	9,297	0.43	7,576.3	0.5
INDIAN POINT 3	406	2,029	5,213	0.39	3,205.5	0.6
TURKEY POINT 3,4	422	4,218	9,353	0.45	3,618.2	1.2
ARKANSAS 1,2	438	4,383	10,235	0.43	5,924.9	0.7
NORTH ANNA 1,2	442	4,416	11,469	0.39	7,187.0	0.6
ROBINSON 2	447	2,234	7,025	0.32	2,209.1	1.0
MCGUIRE 1,2	451	4,509	12,282	0.37	8,115.9	0.6
MAINE YANKEE	466	2,328	4,387	0.53	3,199.8	0.7
PALISADES	588	2,938	7,472	0.39	1,644.4	1.8
SURRY 1,2	602	6,021	14,669	0.41	4,729.3	1.3
HADDAM NECK	714	3,571	6,877	0.52	1,495.9	2.4
INDIAN POINT 2	949	4,746	8,942	0.53	2,938.7	1.6
Totals and Averages		103,415	297,636	0.35	187,267.5	0.6
Averages per Reactor-Year		335	963		606.0	

*Sites where not all reactors had completed five full years of commercial operation as of 12/31/90 are not included.

Island, Rancho Seco, Three Mile Island 1, and Kewaunee are among the top eight sites in the five-year summary.

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 1990 included recirculation pipe replacement/crack repair, valve repair and maintenance, intergranular stress corrosion cracking related in-service inspection, refueling work, and the installation and removal of scaffolding and shielding.

At PWR facilities, the major contributors to the collective dose were steam generator related work, refueling operations, resistance temperature device piping removal, and valve maintenance work. 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 through 4.13 summarize the 1990 data for BWRs, PWRs, and LWRs. Table 4.8 shows that at both BWRs and PWRs 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. In 1990, refueling activities at PWRs accounted for a larger percentage (10%) of the collective dose than for BWRs (4.2%). Reactor operations and surveillance at BWRs accounted for 15.8% as opposed to only 9.8% at PWRs.

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 specification 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

TABLE 4.8
ANNUAL COLLECTIVE DOSE
BY WORK FUNCTION AND PERSONNEL TYPE
1990

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	1,506	9.5%	51	0.3%	940	5.9%	2,497	15.8%
ROUTINE MAINTENANCE	3,051	19.3%	213	1.3%	3,184	20.2%	6,448	40.8%
IN-SERVICE INSPECTION	83	0.5%	70	0.4%	1,179	7.5%	1,332	8.4%
SPECIAL MAINTENANCE	897	5.7%	167	1.1%	3,330	21.1%	4,395	27.8%
WASTE PROCESSING	218	1.4%	5	0.0%	241	1.5%	464	2.9%
REFUELING	275	1.7%	23	0.1%	369	2.3%	667	4.2%
TOTAL	6,030	38.2%	528	3.3%	9,244	58.5%	15,803	100.0%
PRESSURIZED WATER REACTORS								
REACTOR OPS & SURV	1,146	5.3%	59	0.3%	895	4.2%	2,100	9.8%
ROUTINE MAINTENANCE	2,337	10.9%	606	2.8%	4,191	19.6%	7,134	33.3%
IN-SERVICE INSPECTION	280	1.3%	205	1.0%	1,472	6.9%	1,957	9.1%
SPECIAL MAINTENANCE	1,577	7.4%	495	2.3%	5,307	24.8%	7,379	34.4%
WASTE PROCESSING	267	1.2%	9	0.0%	376	1.8%	653	3.0%
REFUELING	752	3.5%	130	0.6%	1,322	6.2%	2,203	10.3%
TOTAL	6,359	29.7%	1,504	7.0%	13,564	63.3%	21,427	100.0%
ALL LIGHT WATER REACTORS								
REACTOR OPS & SURV	2,652	7.1%	110	0.3%	1,836	4.9%	4,598	12.3%
ROUTINE MAINTENANCE	5,388	14.5%	818	2.2%	7,376	19.8%	13,583	36.5%
IN-SERVICE INSPECTION	363	1.0%	275	0.7%	2,651	7.1%	3,289	8.8%
SPECIAL MAINTENANCE	2,474	6.6%	662	1.8%	8,637	23.2%	11,774	31.6%
WASTE PROCESSING	485	1.3%	15	0.0%	617	1.7%	1,116	3.0%
REFUELING	1,027	2.8%	152	0.4%	1,691	4.5%	2,870	7.7%
TOTAL	12,390	33.3%	2,032	5.5%	22,808	61.3%	37,230	100.0%

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 four 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 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 1986 through 1990 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 1990 at all LWRs among five occupational categories. As in past years, maintenance personnel incurred the majority (66%) of the collective dose with contractor maintenance personnel receiving about twice as much as the station and utility maintenance employees combined. In 1990, supervisory personnel received 3.3% of the dose, while workers in the remaining three occupations--operations, health physics, and engineering--received 7.5%, 14.0%, and 8.7% respectively, of the collective dose. None of these values changed significantly from those found for 1986 through 1989. 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.

TABLE 4.9

PERCENTAGES OF ANNUAL COLLECTIVE
DOSE AT LWRs BY WORK FUNCTION
1980 - 1990

WORK FUNCTION	PERCENTAGE OF COLLECTIVE DOSE EACH YEAR										
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
REACTOR OPERATIONS AND SURVEILLANCE	9.5%	8.9%	9.4%	10.1%	11.4%	12.8%	12.8%	11.9%	11.0%	12.2%	12.3%
ROUTINE MAINTENANCE	35.5%	36.1%	27.9%	29.7%	26.9%	34.6%	33.2%	35.0%	37.7%	36.2%	36.5%
INSERVICE INSPECTION	5.5%	5.3%	6.5%	7.6%	6.3%	8.6%	8.3%	8.0%	8.7%	9.5%	8.8%
SPECIAL MAINTENANCE	40.6%	40.5%	46.8%	43.9%	45.4%	32.5%	35.5%	33.2%	30.1%	31.3%	31.6%
WASTE PROCESSING	3.0%	4.2%	5.0%	4.6%	3.6%	5.1%	4.0%	3.9%	3.6%	3.4%	3.0%
REFUELING	6.1%	5.0%	4.4%	4.1%	6.4%	6.5%	6.2%	8.1%	8.8%	7.3%	7.7%

Figure 4.5
Collective Dose by Work Function and Personnel Type 1986 – 1990

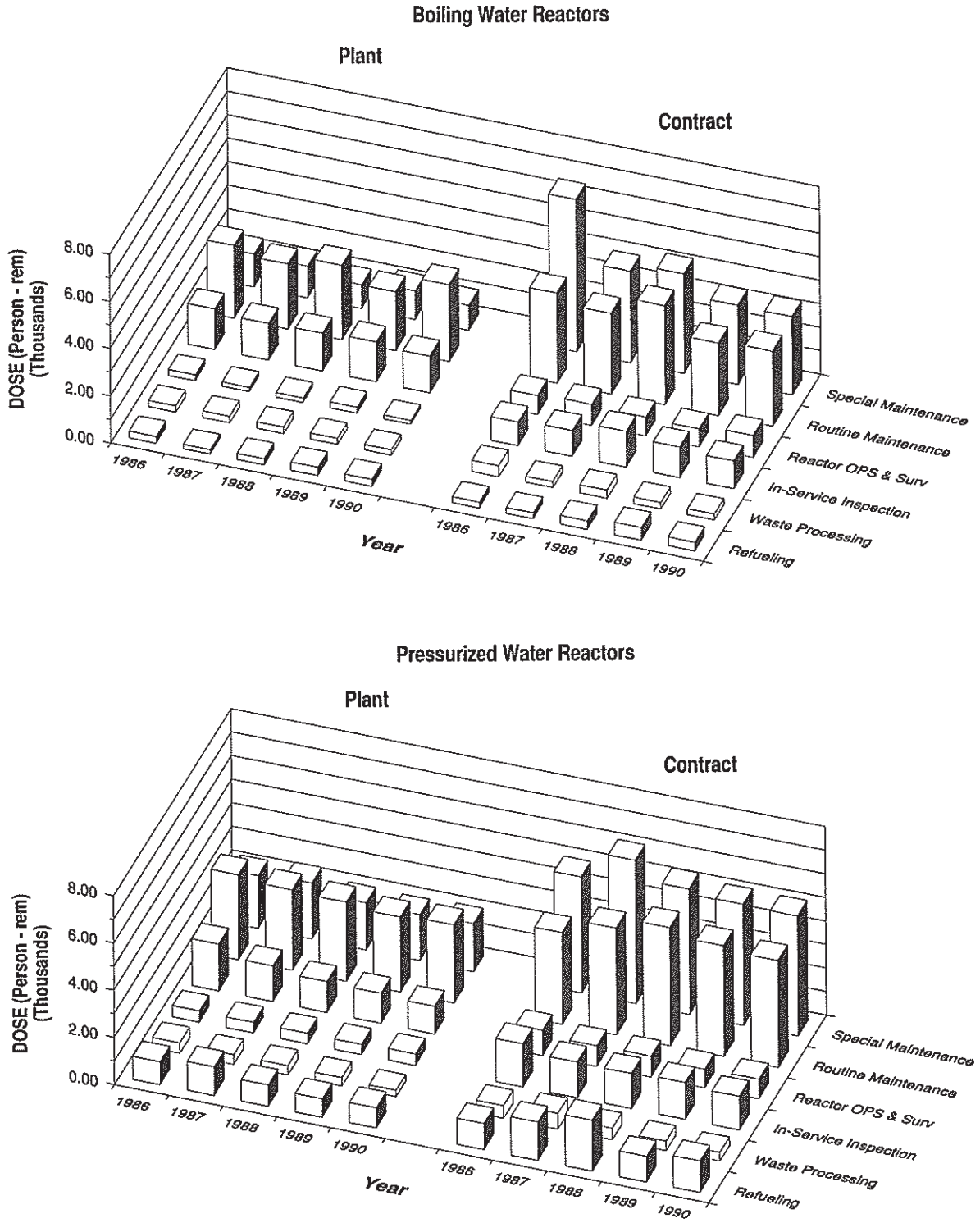


TABLE 4.10
ANNUAL COLLECTIVE DOSE
BY OCCUPATION AND PERSONNEL TYPE
1990

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	3,459	21.9%	404	2.6%	7,092	44.9%	10,955	69.3%
OPERATIONS	1,050	6.6%	13	0.1%	255	1.6%	1,318	8.3%
HEALTH PHYSICS	920	5.8%	6	0.0%	836	5.3%	1,762	11.1%
SUPERVISORY	335	2.1%	23	0.1%	210	1.3%	568	3.6%
ENGINEERING	265	1.7%	83	0.5%	852	5.4%	1,200	7.6%
TOTAL	6,030	38.2%	528	3.3%	9,244	58.5%	15,803	100.0%
PRESSURIZED WATER REACTORS								
MAINTENANCE	3,586	16.7%	1,120	5.2%	9,071	42.3%	13,777	64.3%
OPERATIONS	941	4.4%	101	0.5%	440	2.1%	1,482	6.9%
HEALTH PHYSICS	1,074	5.0%	41	0.2%	2,326	10.9%	3,442	16.1%
SUPERVISORY	298	1.4%	28	0.1%	349	1.6%	675	3.2%
ENGINEERING	460	2.1%	213	1.0%	1,377	6.4%	2,050	9.6%
TOTAL	6,359	29.7%	1,504	7.0%	13,564	63.3%	21,427	100.0%
ALL LIGHT WATER REACTORS								
MAINTENANCE	7,045	18.9%	1,524	4.1%	16,163	43.4%	24,732	66.4%
OPERATIONS	1,992	5.3%	114	0.3%	695	1.9%	2,800	7.5%
HEALTH PHYSICS	1,995	5.4%	47	0.1%	3,161	8.5%	5,203	14.0%
SUPERVISORY	633	1.7%	51	0.1%	559	1.5%	1,243	3.3%
ENGINEERING	725	1.9%	296	0.8%	2,230	6.0%	3,251	8.7%
TOTAL	12,390	33.3%	2,032	5.5%	22,808	61.3%	37,230	100.0%

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 10 CFR 20.407 annual report. This product is the collective dose shown in the column headed "Operations" in Appendix C.

(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 60% of the personnel performed routine or special maintenance functions, about 18% were involved with reactor operations and surveillance, and the remaining 22% were divided among the other three work functions.

TABLE 4.11
NUMBER OF PERSONNEL*
BY WORK FUNCTION AND PERSONNEL TYPE
1990

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	10,475	11.7%	921	1.0%	5,846	6.5%	17,242	19.3%
ROUTINE MAINTENANCE	14,526	16.2%	1,890	2.1%	21,335	23.8%	37,751	42.2%
IN-SERVICE INSPECTION	741	0.8%	301	0.3%	5,947	6.6%	6,989	7.8%
SPECIAL MAINTENANCE	3,917	4.4%	963	1.1%	12,039	13.4%	16,919	18.9%
WASTE PROCESSING	2,870	3.2%	263	0.3%	1,832	2.0%	4,965	5.5%
REFUELING	2,509	2.8%	391	0.4%	2,778	3.1%	5,678	6.3%
TOTAL	35,038	39.1%	4,729	5.3%	49,777	55.6%	89,544	100.0%
PRESSURIZED WATER REACTORS**								
REACTOR OPS & SURV	7,046	8.5%	1,740	2.1%	6,049	7.3%	14,835	17.9%
ROUTINE MAINTENANCE	9,802	11.8%	2,893	3.5%	14,799	17.9%	27,494	33.2%
IN-SERVICE INSPECTION	1,740	2.1%	808	1.0%	4,682	5.7%	7,230	8.7%
SPECIAL MAINTENANCE	5,979	7.2%	1,795	2.2%	13,286	16.1%	21,060	25.4%
WASTE PROCESSING	1,749	2.1%	247	0.3%	1,952	2.4%	3,948	4.8%
REFUELING	3,549	4.3%	615	0.7%	4,043	4.9%	8,207	9.9%
TOTAL	29,865	36.1%	8,098	9.8%	44,811	54.1%	82,774	100.0%
ALL LIGHT WATER REACTORS**								
REACTOR OPS & SURV	17,521	10.2%	2,661	1.5%	11,895	6.9%	32,077	18.6%
ROUTINE MAINTENANCE	24,328	14.1%	4,783	2.8%	36,134	21.0%	65,245	37.9%
IN-SERVICE INSPECTION	2,481	1.4%	1,109	0.6%	10,629	6.2%	14,219	8.3%
SPECIAL MAINTENANCE	9,896	5.7%	2,758	1.6%	25,325	14.7%	37,979	22.0%
WASTE PROCESSING	4,619	2.7%	510	0.3%	3,784	2.2%	8,913	5.2%
REFUELING	6,058	3.5%	1,006	0.6%	6,821	4.0%	13,885	8.1%
TOTAL	64,903	37.7%	12,827	7.4%	94,588	54.9%	172,318	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 (429 people), because the data were not submitted in the suggested format.

Table 4.12 shows the percentage of personnel in each of five occupational categories 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 60% 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% of the personnel were contractors, 37% were station employees, and 7% were utility employees in 1990.

Table 4.13 presents the average annual dose incurred by workers in the five occupational categories in 1990. 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 most instances, 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 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 series. Each page of Appendix E presents two types of graphs for one site. One graph plots certain dose- performance indicators from 1973 through 1990, and the other indicates the collective dose by job function for 1978 through 1990. 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 collective 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 1990. However, any data reported prior to 1973 are not included. The three-year average collective 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

TABLE 4.12
NUMBER OF PERSONNEL*
BY OCCUPATION AND PERSONNEL TYPE
1990

OCCUPATION	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								
MAINTENANCE	8,335	18.2%	1,793	3.9%	17,444	38.1%	27,572	60.2%
OPERATIONS	3,236	7.1%	110	0.2%	1,462	3.2%	4,808	10.5%
HEALTH PHYSICS	2,339	5.1%	79	0.2%	2,526	5.5%	4,944	10.8%
SUPERVISORY	1,559	3.4%	327	0.7%	1,037	2.3%	2,923	6.4%
ENGINEERING	1,633	3.6%	1,143	2.5%	2,752	6.0%	5,528	12.1%
TOTAL	17,102	37.4%	3,452	7.5%	25,221	55.1%	45,775	100.0%
PRESSURIZED WATER REACTORS								
MAINTENANCE	10,817	16.7%	2,002	3.1%	22,776	35.2%	35,595	55.1%
OPERATIONS	4,503	7.0%	368	0.6%	2,041	3.2%	6,912	10.7%
HEALTH PHYSICS	3,000	4.6%	253	0.4%	6,749	10.4%	10,002	15.5%
SUPERVISORY	2,556	4.0%	455	0.7%	1,852	2.9%	4,863	7.5%
ENGINEERING	2,511	3.9%	1,514	2.3%	3,220	5.0%	7,245	11.2%
TOTAL	23,387	36.2%	4,592	7.1%	36,638	56.7%	64,617	100.0%
ALL LIGHT WATER REACTORS								
MAINTENANCE	19,152	17.3%	3,795	3.4%	40,220	36.4%	63,167	57.2%
OPERATIONS	7,739	7.0%	478	0.4%	3,503	3.2%	11,720	10.6%
HEALTH PHYSICS	5,339	4.8%	332	0.3%	9,275	8.4%	14,946	13.5%
SUPERVISORY	4,115	3.7%	782	0.7%	2,889	2.6%	7,786	7.1%
ENGINEERING	4,144	3.8%	2,657	2.4%	5,972	5.4%	12,773	11.6%
TOTAL	40,489	36.7%	8,044	7.3%	61,859	56.0%	110,392	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*
1990

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	3,459	8,335	0.42	404	1,793	0.23	7,092	17,444	0.41	10,955	27,572	0.40
OPERATIONS	1,050	3,236	0.32	13	110	0.12	255	1,462	0.17	1,318	4,808	0.27
HEALTH PHYSICS	920	2,339	0.39	6	79	0.08	836	2,526	0.33	1,762	4,944	0.36
SUPERVISORY	335	1,559	0.21	23	327	0.07	210	1,037	0.20	568	2,923	0.19
ENGINEERING	265	1,633	0.16	83	1,143	0.07	852	2,752	0.31	1,200	5,528	0.22
TOTAL	6,030	17,102	0.35	528	3,452	0.15	9,244	25,221	0.37	15,803	45,775	0.35
PRESSURIZED WATER REACTORS												
MAINTENANCE	3,586	10,817	0.33	1,120	2,002	0.56	9,071	22,776	0.40	13,777	35,595	0.39
OPERATIONS	941	4,503	0.21	101	368	0.27	440	2,041	0.22	1,482	6,912	0.21
HEALTH PHYSICS	1,074	3,000	0.36	41	253	0.16	2,326	6,749	0.34	3,442	10,002	0.34
SUPERVISORY	298	2,556	0.12	28	455	0.06	349	1,852	0.19	675	4,863	0.14
ENGINEERING	460	2,511	0.18	213	1,514	0.14	1,377	3,220	0.43	2,050	7,245	0.28
TOTAL	6,359	23,387	0.27	1,504	4,592	0.33	13,564	36,638	0.37	21,427	64,617	0.33
ALL LIGHT WATER REACTORS												
MAINTENANCE	7,045	19,152	0.37	1,524	3,795	0.40	16,163	40,220	0.40	24,732	63,167	0.39
OPERATIONS	1,992	7,739	0.26	114	478	0.24	695	3,503	0.20	2,800	11,720	0.24
HEALTH PHYSICS	1,995	5,339	0.37	47	332	0.14	3,161	9,275	0.34	5,203	14,946	0.35
SUPERVISORY	633	4,115	0.15	51	782	0.06	559	2,889	0.19	1,243	7,786	0.16
ENGINEERING	725	4,144	0.18	296	2,657	0.11	2,230	5,972	0.37	3,251	12,773	0.25
TOTAL	12,390	40,489	0.31	2,032	8,044	0.25	22,808	61,859	0.37	37,230	110,392	0.34

* 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.

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 on annual doses of refueling operations (usually a three-year cycle) and occasional high-dose maintenance activities, and gives a better idea of collective dose trends over the life of the plant. One should 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 1990. 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

Studies of populations chronically exposed to low levels of radiation delivered over protracted periods have not shown consistent or conclusive evidence of an associated increase in the risk of cancer. Thus there is no evidence that the doses to workers recorded here cause harm.

The risk estimates presented below are based on extensive studies of Japanese A-bomb survivors and other populations exposed to large doses of radiation delivered in short periods of time. This information is supplemented by animal and *in vitro* studies, such as irradiation of cell cultures. These studies have confirmed that human cells have mechanisms that repair damaged chromosomes. The existence of this repair helps to explain the finding that lower doses of radiation delivered at lower dose rates produce less of an effect on a cell per unit dose than high-dose, high-dose-rate irradiations. Thus the estimates of risks to radiation workers are likely to be conservative.

Health effects due to radiation exposure fall into three groups: carcinogenic effects, genetic effects, and mental retardation. Mental retardation has been observed only in Japanese A-bomb survivors exposed at 8-15 weeks gestational age, and is consequently not applicable to the workplace except in the case of

a pregnant female worker. Genetic effects have never been observed in man, though they have been observed in mice.

Risk of cancer induction is known to increase with increasing dose, but is hard to quantify as the risk varies with the site of the cancer, the age and sex of the exposed individual, the energy and nature of the radiation, the magnitude and duration of the dose, and exposure to other carcinogens. Since nearly 20% of all deaths in the United States occur from cancer, the estimated number of cancers attributable to occupational radiation exposure is a small fraction of the total number that occur. (Those who do not succumb to cancer will perforce succumb to some other cause and in essentially the same time frame.)

The Committee on the Biological Effects of Ionizing Radiations (BEIR) of the National Academy of Sciences (NAS) National Research Council has been conducting an ongoing study of the health effects of ionizing radiation. Its latest report, BEIR V, was published in 1990. Based on this report, the 110,204 workers receiving the average dose of 0.36 rem (cSv) or the maximum accidental dose of 24 rem (cSv) to the whole body during 1990 (see Section 6) might expect an increased cancer death risk of about 11 chances in a thousand for the average dose and 18 chances per thousand for the maximum dose.[10] Should a worker receive 0.36 rem (cSv) 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 5%. Since the American Cancer Society estimates that an individual's risk of dying of cancer is about 20% (one in five), the risk to an individual receiving 0.36 rem (cSv) would be approximately 21%.

The potential genetic effects from a worker population receiving 39,739 person-rem (person-cSv) (Table 3.1) are small compared to genetic damages that normally occur spontaneously in a population of this size. Approximately 110,204 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 110,791 exposed workers would, according to the report NUREG/CR-4214 [Ref. 17], be an increase of about 1.2 cases (approximately

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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 acute 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)

0.01%) 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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Assuming that, on the average, each exposed person will have one live-born child in the future, i.e., children born to this worker population.

5 TERMINATION DATA SUBMITTED PURSUANT TO 10 CFR § 20.408

5.1 Termination Reports, 1969-1990

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 allow statistical analysis of the data as well as the tracing of individual dose histories. During the years that this information has been collected, nearly 1.7 million reports have been received for the 663,712 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 22 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. The number of individuals terminating employment or work assignments at nuclear power plants has decreased by 17% since 1987 to a value of 74,488 in 1990. However, the 1990 data are subject to revision as more termination reports covering this period are received and processed into REIRS. For this reason, each year that this report is produced, the previous year's termination data are revised to reflect all of the reports that have been processed to date.

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

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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.

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 that is 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

TABLE 5.1
TERMINATION REPORTS SUBMITTED TO THE NRC

1969 - 1990

YEAR	All Covered Categories*		Power Reactor Licensees	
	Number of Reports Submitted	Number of Terminating Individuals	Number of Reports Submitted	Number of Terminating Individuals
1969	4,194	3,917	576	531
1970	6,520	5,828	1,995	1,807
1971	8,872	8,181	2,070	1,938
1972	10,633	9,599	4,051	3,364
1973	17,366	15,240	9,533	7,860
1974	26,347	21,729	19,963	15,727
1975	36,154	27,680	30,632	22,680
1976	52,865	39,274	47,623	34,630
1977	56,516	41,885	50,807	37,209
1978	61,121	44,020	55,063	38,570
1979	78,176	57,903	71,802	52,432
1980	100,344	72,475	93,515	66,816
1981	107,592	74,510	101,656	69,115
1982	108,309	68,809	103,810	64,779
1983	114,997	78,089	110,982	74,510
1984	113,745	80,958	121,474	77,708
1985	117,264	81,605	112,831	77,742
1986	113,745	83,459	109,548	79,736
1987	127,842	92,492	124,592	89,636
1988	116,697	83,558	113,398	80,832
1989	115,729	80,468	112,050	77,446
1990	113,361	77,633	109,418	74,488

* 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.

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 source of error in any statistics developed from the termination data.

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 as 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 who 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 at all licensees has increased during the past ten years from 2,344 in 1981 to 3,859 in 1990. The average individual dose (which is approximately equal to a quarterly dose for these workers) has decreased over these years to an all-time low of 0.20 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 decreased from 0.40 rem (cSv) in 1981 to a value of 0.21 rem (cSv) in 1990. The average dose incurred by persons terminated by three licensees decreased to an all-time low value of 0.15 rem (cSv) in 1990. 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 5 rem 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 nine years in which a worker exceeded the quarterly limit of 3 rem (cSv) as a result of

TABLE 5.2
TRANSIENT WORKERS PER CALENDAR QUARTER
1981 - 1990

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)
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	3,840	1,019	0.27	1988	3,799	1,011	0.27
1989	3,649	768	0.21	1989	3,604	762	0.21
1990	3,859	769	0.20	1990	3,786	751	0.20

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
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	3,081	826	0.27	573	162	0.28	145	23	0.16
1989	2,967	620	0.21	504	109	0.22	133	33	0.25
1990	3,126	656	0.21	516	76	0.15	144	19	0.13

working at two or more different licensed facilities within one calendar quarter. 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 3 rem 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 1981 through 1990. The number of these individuals increased from 5,425 in 1981 to 11,083 in 1990. 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 increased from a value of 0.64 rem (cSv) in 1989 to a value of 0.67 rem (cSv) in 1990.

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).

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 problems mentioned in Section 2). Table 5.4a shows the correct distribution of transient worker doses as determined from the above-mentioned termination

TABLE 5.3

TRANSIENT WORKERS PER CALENDAR YEAR AT NUCLEAR POWER FACILITIES

1981 - 1990

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)
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	9,295	5,875	0.63
1989	107	10,509	6,776	0.64
1990	109	11,083	7,382	0.67

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
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	5,889	2,880	0.49	1,899	1,529	0.81	1,507	1,465	0.97
1989	6,721	3,362	0.50	2,111	1,738	0.82	1,677	1,676	1.00
1990	6,772	3,452	0.51	2,444	2,032	0.83	1,867	1,897	1.02

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 2.6 times so that in 1990, the 11,083 transients would have been counted as 29,803 individuals. This was not surprising because some individuals were reported by as many as 24 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 1984 through 1990. 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 1990, Table 5.4b shows that the summation of annual reports indicated that 109,650 workers received a measurable dose (203,324 monitored minus 93,674 with no measurable exposure), 1,317 of whom received doses greater than 2 rem (cSv). After accounting for those individuals who were reported more than once, the corrected distribution indicated that there were really only 99,860 workers who received a measurable dose and that 2,118 of them received doses greater than 2 rem (cSv). Thus, 2.1% of the workers with measurable dose received an annual dose greater than 2 rem rather than 1.2% that would have been computed from the "Reported Statistical Distribution" shown in the first row of Table 5.4b for 1990.

Since the number of transient workers receiving measurable doses and the collective dose they receive are only about 9% and 20% of the total number of workers and of the total collective dose, respectively, for 1990, 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 4 rem (cSv) is usually about two to three times the number found in the reported statistical distribution. But there is still a clear trend for the number of higher doses to decrease; in 1990, there were only 333 annual doses that exceeded 3 rem, which is less than the number for 1989 (404). Table 5.5 shows that no doses greater than 5 rem were reported in 1990 and that since

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 - 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	2,601	1,276	866	900	679	610	1,544	628	174	17							9,295	5,875	0.63	0.88
Reported Distribution of Transients - 1988	10,892	4,272	2,703	2,616	1,650	1,087	1,498	144	5								24,867	5,875	0.24	0.42
Correct Distribution of Transients - 1989	2,544	1,640	1,009	1,128	933	665	1,621	659	278	24							10,501	6,776	0.65	0.85
Reported Distribution of Transients - 1989	11,249	5,120	3,220	3,010	1,802	1,069	1,688	234	7	1							27,400	6,776	0.25	0.42
Correct Distribution of Transients - 1990	2,443	1,554	1,129	1,268	988	796	1,930	719	236	20							11,083	7,382	0.67	0.85
Reported Distribution of Transients - 1990	11,373	5,704	3,831	3,600	2,037	1,265	1,819	166	8								29,803	7,382	0.25	0.40

*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)																**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	Total Individuals			
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	73,469	44,899	15,997	13,121	7,780	5,180	10,678	2,670	593	75							174,462	42,383	0.24	0.42
**Correct Statistical Distribution - 1986	67,922	41,533	14,574	11,842	7,016	4,693	10,241	3,062	868	146							161,897	42,383	0.26	0.45
Reported Statistical Distribution - 1987	92,559	44,782	17,823	14,567	8,599	5,825	10,765	1,711	241	22							196,894	40,402	0.21	0.39
**Correct Statistical Distribution - 1987	85,182	41,223	15,834	12,839	7,586	5,332	10,611	2,192	477	69							181,345	40,402	0.22	0.42
Reported Statistical Distribution - 1988	95,783	43,245	17,750	14,869	8,874	5,938	10,264	1,958	342	9		1					199,033	40,879	0.21	0.40
**Correct Statistical Distribution - 1988	87,492	40,249	15,913	13,153	7,903	5,461	10,310	2,442	511	26		1					183,461	40,879	0.22	0.43
Reported Statistical Distribution - 1989	92,968	48,809	19,484	15,661	8,814	5,541	8,701	1,189	99	11							201,277	35,942	0.18	0.33
**Correct Statistical Distribution - 1989	84,263	45,329	17,273	13,779	7,945	5,137	8,634	1,614	370	34							184,378	35,942	0.19	0.36
Reported Statistical Distribution - 1990	93,674	47,001	20,366	16,739	9,476	5,877	8,874	1,232	84	1							203,324	36,592	0.18	0.33
**Correct Statistical Distribution - 1990	84,744	42,851	17,664	14,407	8,427	5,408	8,985	1,785	312	21							184,604	36,592	0.20	0.37

*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.

1985, there have been no additional transient workers identified as having received a dose of greater than 5 rem that would not have appeared on the annual reports received by the Commission. This reflects the industry's continuing concerted efforts to keep the total annual doses of all workers under 5 rem and shows that such reductions can be accomplished without increasing the collective dose.

TABLE 5.5

ANNUAL WHOLE BODY DOSES EXCEEDING 5 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
1989	0	0	0
1990	0	0	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 60% between 1978 and 1990 while the number of reactors increased by 70% during this time. The number of temporary workers receiving a measurable dose, however, increased by only 38%. The collective dose reached a high of

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	67	38,347	21,491	9,488	0.25	0.44
1980	68	48,383	28,305	16,168	0.33	0.57
1981	70	48,265	28,675	16,755	0.35	0.58
1982	74	44,503	25,646	14,266	0.32	0.56
1983	75	50,903	26,682	16,007	0.31	0.60
1984	78	53,438	29,988	15,856	0.30	0.52
1985	82	48,678	24,991	10,418	0.21	0.42
1986	90	47,108	22,911	8,014	0.17	0.35
1987	96	51,365	22,433	8,303	0.16	0.37
1988	102	44,812	20,575	7,618	0.17	0.37
1989	107	47,041	22,252	7,134	0.15	0.32
1990	110	46,303	23,544	8,270	0.18	0.35

nearly 17,000 person-rem (person-cSv) in the early eighties, but has decreased to 8,270 person-rem (person-cSv) in 1990. The average measurable dose remained at about 0.6 rem during the early eighties, but in 1985, all of the parameters listed in Table 5.6, except for the number of reactors, decreased significantly. In 1990, the average measurable dose for these workers increased slightly to a value of 0.35 rem (cSv).

One apparent discrepancy in the above analysis of termination data is that not all of the individuals who terminated during each of the calendar years 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 are 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 begin and end 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 1990, for example, one finds that the number of individuals not included in these analyses is approximately 17,000. However, there is no indication that the exclusion of these individuals significantly impacts the statistics presented here.

6 EXPOSURES TO PERSONNEL IN EXCESS OF REGULATORY LIMITS

6.1 Control Levels

10 CFR 20.101 and 20.104, and 20.103, limit the external and internal exposure, respectively, of workers to ionizing radiation from licensed material and other sources of radiation within the licensee's control.[13] Section 20.101 sets limits on whole body, skin, and extremity exposures. Section 20.104 sets limits on exposures to minors. Whole-body dose is generally limited to 1.25 rem per calendar quarter. Licensees are permitted to allow workers to be exposed to doses not exceeding 3 rem per calendar quarter if they can show that the worker's cumulative dose since age 18 will not exceed 5 rem multiplied by the worker's age since his/her eighteenth birthday. [Cumulative dose <5(N-18) where N is the worker's age.] Form NRC-4 or its equivalent is used to record determinations of prior dose.

Exposures in excess of regulatory limits are sometimes referred to as "overexposures." The phrase "exposures in excess of regulatory limits" is preferred to "overexposures" because the latter suggests that a worker has been subjected to an unacceptable biological risk, which may not be the case.

10 CFR 20.103 places a regulatory limit on the amount of internal exposure to radioactive material a worker may sustain in a calendar quarter. It is based on the intake a worker would experience if he/she breathed air containing the maximum permissible concentration (MPC) of a radionuclide for 13 40-hour work weeks, using the breathing rate for moderate activity. (Note that the rule refers to the quantity of material taken in, not the amount retained.) The MPCs are listed in Appendix B, Table I, Column 1, of 10 CFR Part 20. Because there are 520 hours in 13 40-hour work weeks, the limit is frequently expressed in terms of an intake of 520 MPC-hours. If more than one radionuclide is taken in, the sum of the MPC-hours for all radionuclides must be less than 520. This rule applies regardless of the route of intake (inhalation, ingestion, trans-dermal, wound, etc.).

[13] These are the section numbers before they were changed by the revision of Part 20, 56 FR 23360, May 21, 1991.

10 CFR 20.403 and 20.405 require that all persons licensed by the NRC submit reports of all occurrences involving personnel radiation exposures that exceed certain control levels, thus providing for investigations and corrective actions as necessary. 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 rem (cSv) or more; exposure to the skin of the whole body of any individual to 150 rem (cSv) or more; or exposure of the extremities (feet, ankles, hands or forearms) of any individual to 375 rem (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 rem (cSv) or more; exposure of the skin of the whole body of any individual to 30 rem (cSv) or more; or exposure of the extremities to 75 rem (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, 20.104(b), 20.103(a)(1), or 20.103(a)(2)] 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 rem (cSv), or that exceed 3 rem (cSv), as discussed in § 3.2 of this document. Reports of skin exposures that exceed 7.5 rem (cSv) and extremity exposures that exceed 18.75 rem (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 (internal exposures) usually fall into this category as well. These reports must be submitted to the Commission in writing within thirty days of the occurrence. Written reports of events required to be reported under Category A or B must also be submitted within 30 days.

6.2 Summary of Exposures In Excess of Regulatory Limits

Table 6.1 summarizes all of the occupational exposures in excess of regulatory limits to external sources of radiation as reported by Commission licensees pursuant to §§ 20.403 and 20.405 during the years 1982 through 1990. For 1987 through 1990 it shows the number of individuals who exceeded various limits while employed by one of several types of licensees. For the years 1982 through 1986, only the exposures in excess of regulatory limits 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 1990, thirteen individuals received external doses that exceeded applicable quarterly limits with the highest external whole body dose being 24 rem (cSv). In each of the years from 1985 through 1990, the highest external whole body dose was 27.0, 4.2, 7.5, 14, 93, and 24 rem (cSv), respectively.

In 1990 there were four incidents in which external exposures of the magnitude described as Category A or B were received by five individuals. Brief descriptions of these incidents follow:

A radiographer located the radiography exposure device on the step of a ladder during the exposure. The device began to tip when the radiographer, who had not made a survey, tried to lock the camera in the safe position. The radiographer grasped the guide tube containing the partially exposed source to steady the device and received a dose of 111 rem to his hand.

A radiographer's assistant carried a guide tube containing an 80-Ci ^{192}Ir source draped over his neck for 2-5 minutes. Both the radiographer and the radiographer's assistant were exposed. No surveys were conducted and no film badges were worn. The radiographer's assistant received a whole-body dose determined by cytogenetic dosimetry of 24 rem and an estimated dose to the skin of the back of the neck of 6000 rem. The radiographer received a whole-body dose of 17 rem also determined by cytogenetic dosimetry.

A radiographer was exposed to an 80-Ci ^{192}Ir source as a result of moving the guide tube with the source partially exposed. The radiographer deliberately removed personal dosimeters during the procedure. The source was recovered by the manufacturer of the radiography exposure device. The radiographer received a whole-body dose of 8.9 rem.

An assistant radiographer exposed his hand and whole body while holding the guide tube directly over the exposed source. The assistant radiographer, who was working without the supervision of the radiographer, failed to make a

TABLE 6.1
OCCUPATIONAL EXPOSURES IN EXCESS OF REGULATORY LIMITS
1982 - 1990

YEAR	LICENSE CATEGORY	PERSONS AND DOSES (REM)	TYPES OF EXPOSURES 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)
1990	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	3	3[a,b]				1[a]		1	2[a]
		SUM OF DOSES	7.2	49.9				6000		111	3962
	POWER REACTORS	NO. OF PERSONS							1		
		SUM OF DOSES							48.8		
	MEDICAL FACILITIES	NO. OF PERSONS	3[c]								
		SUM OF DOSES	8.9								
	MARKETING & MANUFACT.	NO. OF PERSONS									
		SUM OF DOSES									
	OTHER	NO. OF PERSONS	1								
		SUM OF DOSES	2.3								
1989	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	3		1				1		
		SUM OF DOSES	8.1		93				72		
	POWER REACTORS	NO. OF PERSONS							1		
		SUM OF DOSES							55		
	MEDICAL FACILITIES	NO. OF PERSONS	3						1		
		SUM OF DOSES	5.3						50		
	MARKETING & MANUFACT.	NO. OF PERSONS									
		SUM OF DOSES									
	OTHER	NO. OF PERSONS	1			1				1	
		SUM OF DOSES	1.3			9.2				178	
1988	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	3	1						1	
		SUM OF DOSES	8.1	6.1						118	
	POWER REACTORS	NO. OF PERSONS	6			3	1	1[d]			
		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								
	ALL OTHER	NO. OF PERSONS	3						1	1	2
		SUM OF DOSES	9.6						41.2	115	930
1985	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	6	3	1					1	
		SUM OF DOSES	16.7	32.6	27.0					288	
	ALL OTHER	NO. OF PERSONS	7						3	1	
		SUM OF DOSES	11.8						60.2	93	
1984	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	3	1		1	1		3		
		SUM OF DOSES	12.5	8.2		10.8	38.0		127.9		
	ALL OTHER	NO. OF PERSONS	6	1					5		
		SUM OF DOSES	15.0	5.2					110.7		[e]
1983	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	1								1
		SUM OF DOSES	4.7								650
	ALL OTHER	NO. OF PERSONS	11	1[f]					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[g]	1					15	2	
		SUM OF DOSES	12.5	9.4					569	206	

[a]This individual received a whole-body dose of 24 rem in addition to a 6000 rem skin dose.
[b]One of these individuals received a 9 rem whole-body dose in addition to a 1070 rem extremity dose.
[c]One of these persons exceeded the quarterly whole-body dose limits three times in one calendar year.
[d]This person simultaneously received an extremity exposure of 61 rems (cSv) that is not shown.
[e]One of these persons simultaneously received skin exposure of 15.2 rems (cSv) that is not shown.

survey following the exposure and disregarded the reading of his pocket dosimeter. Tissue damage (approximately a second-degree burn) was observed on the exposed hand. The assistant radiographer's whole-body dose was estimated at 0.4 rem and a hand dose of 2892 rem. The violations were judged to be willful. The NRC ordered the licensee's General License to perform radiography in non-Agreement States suspended for three years and the NRC license to perform radiography in non-Agreement States was terminated at the request of the licensee.

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APPENDIX A

Listing of Annual Exposure Data Compiled for Certain NRC Licensees In Descending Order of Average Measurable Dose

1990

APPENDIX A

INDUSTRIAL RADIOGRAPHERS Single Location - 1990

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)
BRIGHTON CORP.		34-21480-01	6	3	2.800	0.93
MAYNARD ELECTRIC STEEL CASTING CO.		48-07080-01	5	3	2.500	0.83
WISCONSIN CENTRIFUGAL, INC.		48-11641-01	5	5	2.025	0.41
SOUTHWESTERN ENGINEERING CO.		24-19500-01	4	2	0.750	0.38
MINNESOTA VALLEY ENGINEERING		22-24393-01	7	3	0.800	0.27
STRUTHERS WELLS CORPORATION		37-11152-01	16	4	1.025	0.26
LUCIUS PITKIN INC.		29-27816-01	18	10	2.550	0.26
THIOKOL CORPORATION		01-00856-02	40	11	2.575	0.23
MANOIR - ELECTRO ALLOYS, INC.		34-24346-01	15	11	2.450	0.22
LYNCHBURG FOUNDRY COMPANY		45-17464-01	9	9	1.975	0.22
AIR PRODUCTS AND CHEMICALS, INC.		37-05105-05	18	2	0.350	0.18
COPES-VULCAN		37-19530-01	1	1	0.175	0.18
TRANS WORLD AIRLINES, INC.		24-05151-05	61	6	1.050	0.18
CONNEX PIPE SYSTEMS		34-00850-02	5	4	0.650	0.16
HARRISON STEEL CASTINGS COMPANY		13-02141-01	5	3	0.400	0.13
QUAKER ALLOY		37-03671-01	11	7	0.925	0.13
NAVY, DEPT. OF THE		28-00102-A1NP	42	41	5.175	0.13
DURALOY COMPANY (THE)		37-02279-02	9	7	0.850	0.12
NAVY, DEPT. OF THE		59-45249-A1NP	18	13	1.475	0.11
AMERICAN FOUNDRY, NUCLEAR DIV.		35-26893-01	6	4	0.450	0.11
DURIRON CO., INC FOUNDRY DIV.		34-06398-01	4	4	0.450	0.11
P. X. ENGINEERING COMPANY INC.		20-15102-01	5	3	0.275	0.09
REFINERY PRODUCTS CORPORATION		48-03665-02	5	3	0.275	0.09
CARONDELET FOUNDRY COMPANY		24-26136-01	9	8	0.725	0.09
NAVY, DEPT. OF THE		37-00151-A1NP	52	21	1.675	0.08
ATLANTIC RESEARCH CORPORATION		45-02808-04	26	26	2.050	0.08
NATIONAL AERONAUTICS AND SPACE ADMIN.		34-00507-04	31	6	0.425	0.07
ABEX CORP. WAUKESHA FOUNDRY DIV.		48-13776-01	7	1	0.050	0.05
ARROW TANK & ENGINEERING COMPANY		22-13253-01	5	2	0.100	0.05
BABCOCK & WILCOX COMPANY		34-02160-03	51	17	0.850	0.05
BUCKEYE STEEL CASTINGS		34-06627-01	2	1	0.050	0.05
CONNECTICUT, STATE OF		06-06472-03	23	1	0.050	0.05
DRESSER IND., WORTHINGTON PUMP DIV.		29-02210-02	3	3	0.150	0.05
EMPIRE STEEL CASTINGS, INC.		37-02448-01	5	2	0.100	0.05
GENERAL ELECTRIC CO.		45-24957-01	34	1	0.050	0.05
GTE LABS, INC.		20-15610-02	4	4	0.200	0.05
HIGH STEEL STRUCTURES, INC.		37-17534-01	16	8	0.400	0.05
INGERSOLL-RAND COMPANY		29-02015-02	2	2	0.100	0.05
MASON & HANGER-SILAS CO., INC.		14-24479-01	7	3	0.150	0.05
MORTON THIOKOL		17-16380-01	43	5	0.250	0.05
NAVY, DEPT. OF THE		04-60258-A1NP	11	11	0.550	0.05
NAVY, DEPT. OF THE		46-00253-A1NP	4	2	0.100	0.05

APPENDIX A (cont.)

INDUSTRIAL RADIOGRAPHERS Single Location - 1990

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)
NAVY, DEPT. OF THE		39-52903-A1NP	13	5	0.250	0.05
NAVY, DEPT. OF THE		45-32732-A1NP	13	2	0.100	0.05
NAVY, DEPT. OF THE		59-45255-A1NP	5	2	0.100	0.05
SAWYER RESEARCH PRODUCTS, INC.		34-02044-01	5	3	0.150	0.05
SHAFER VALVE CO.		34-21198-01	4	2	0.100	0.05
ST. LOUIS STEEL CASTING, INC.		24-01587-01	4	4	0.200	0.05
TAYLOR AND FENN COMPANY		06-02024-01	2	2	0.100	0.05
WILLIAM POWELL COMPANY (THE)		34-02963-01	6	1	0.050	0.05
ARMY, DEPT. OF THE		13-18235-01	10	0	0.000	0.00
ARMY, DEPT. OF THE		35-19189-02	35	0	0.000	0.00
DAY & ZIMMERMAN, INC.		42-15051-02	4	0	0.000	0.00
E.I. DUPONT DE NEMOURS & CO.		07-00455-30	0	0	0.000	0.00
GENERAL MOTORS CORPORATION		21-02392-01	3	0	0.000	0.00
IONICS INC		37-20757-02	9	0	0.000	0.00
MISSOURI PRECISION CASTINGS, INC		24-15152-01	5	0	0.000	0.00
MISSOURI STEEL CASTINGS CO.		25-15152-01	5	0	0.000	0.00
NAVY, DEPT. OF THE		19-0464A-A1NP	4	0	0.000	0.00
NILES STEEL TANK COMPANY		21-04741-01	4	0	0.000	0.00
NORTHWEST AIRLINES INC.		22-12080-01	31	0	0.000	0.00
PELTON CASTEEL INC		48-02669-02	4	0	0.000	0.00
PRYOR FOUNDRY, INC.		35-18099-01	3	0	0.000	0.00
VOLLRATH COMPANY, FOUNDRY DIV.		48-05395-01	3	0	0.000	0.00
WESTINGHOUSE ELECTRIC CORPORATION		37-05809-02	10	0	0.000	0.00
WORD INDUSTRIES PIPE FABRICATING INC.		35-15458-01	0	0	0.000	0.00
			832	304	41.025	0.13

APPENDIX A (cont.)

INDUSTRIAL RADIOGRAPHERS Multiple Location - 1990

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)
CTL ENGINEERING, INC.		34-08331-01	2	2	4.000	2.00
CAPITAL X-RAY SERVICE, INC.		35-11114-01	24	24	38.900	1.62
H&H X-RAY SERVICES INC.		17-19236-01	8	8	12.750	1.59
H&G INSPECTION CO., INC.		42-26838-01	9	9	13.925	1.55
TRI-STATE INSPECTION & CONSULTANTS		37-19640-01	4	3	4.500	1.50
INDEPENDENT INSPECTION CORP. INC.		35-26824-01	5	5	7.250	1.45
TULSA GAMMA RAY, INC.		35-17178-01	36	35	49.250	1.41
BARNETT INDUSTRIAL X-RAY		35-26953-01	8	8	10.875	1.36
QUALITY ENGINEERING SERV.& TESTS.		35-26815-01	11	8	10.875	1.36
TRI STATE ASSOCIATES, INC.		45-24967-01	8	7	9.350	1.34
INTERMOUNTAIN TESTING COMPANY		05-07872-01	18	18	23.100	1.28
PIPELINE INSPECTION & ENGINEERING		21-26060-01	10	10	12.625	1.26
BILL MILLER, INC.		35-19048-01	45	41	51.275	1.25
HIGH MOUNTAIN INSPECTION SERV., INC.		49-26808-01	104	78	91.425	1.17
WESTERN X-RAY COMPANY		35-19993-01	16	16	18.475	1.15
TECHNICAL WELDING & INSPECTION SERV.		16-24812-01	4	4	4.500	1.13
CLEVELAND X-RAY INSPECTION, INC.		35-15205-01	124	119	132.200	1.11
O'CONNELL LIMITED PARTNERSHIP		35-13735-01	4	4	4.350	1.09
MIDWEST INSPECTION SERVICES		35-27005-01	29	29	29.675	1.02
FROEHLING & ROBERTSON INC.		45-08890-01	11	11	10.925	0.99
NONDESTRUCTIVE INSPECTION SERVICE		47-11883-01	5	5	4.925	0.99
SCIENTIFIC INSPECTION TECH., INC.		41-25027-01	44	41	38.950	0.95
MET-CHEM TESTING LABS OF UTAH, INC.		43-26821-01	32	32	30.350	0.95
NORTH AMERICAN INSPECTION, INC.		37-23370-01	64	64	60.475	0.94
COLBY & THIELMEIER TESTING CO		24-13737-01	9	9	8.100	0.90
D & S TESTING, INC.		34-21458-01	11	9	7.925	0.88
MATTINGLY TESTING SERVICES, INC.		25-21479-01	9	8	6.925	0.87
INSPECTION SERVICES & TESTING		50-23257-01	33	32	27.450	0.86
GLOBE X-RAY SERVICES, INC.		35-15194-01	40	37	31.225	0.84
PENN INSPECTION CO.		35-21144-01	16	15	12.575	0.84
EDWARDS PIPELINE TESTING, INC.		35-23193-01	101	101	83.675	0.83
CENTURY INSPECTION, INC.		42-08456-02	96	89	73.525	0.83
TWIN PORTS TESTING, INC.		48-23476-01	39	26	21.475	0.83
CONSOLIDATED NDE, INC.		29-21452-01	126	122	98.575	0.81
QUALITY SYSTEMS NDE, LTD.		37-28085-01	21	18	14.425	0.80
ST. LOUIS TESTING LABORATORIES INC.		24-00188-02	16	15	11.850	0.79
ARROW NDE CO, INC.		35-23198-01	4	4	3.100	0.78
FEWELL GEOTECHNICAL ENGINEER., LTD.		53-23288-01	2	2	1.550	0.78
PROFESSIONAL SERVICES INDUSTRIES, INC.		37-00276-25	20	15	11.375	0.76
TEI ANALYTICAL SERVICES, INC.		37-28004-01	61	57	41.200	0.72
JAN X-RAY SERVICE INC		21-16560-01	53	48	34.150	0.71
ALLIED INSPECTION SERVICES INC.		21-18428-01	8	5	3.550	0.71

APPENDIX A (cont.)

INDUSTRIAL RADIOGRAPHERS Multiple Location - 1990

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)
ALLEGHENY LABS.		37-20734-01	10	7	4.825	0.69
AKRON INDUSTRIAL SERVICE, INC.		34-24673-01	4	4	2.700	0.68
ADVEX CORPORATION		45-16452-01	13	11	7.125	0.65
CALUMET TESTING SERVICES INC.		13-16347-01	40	25	15.740	0.63
HOUSTON INSPECTION, INC.		42-26962-01	3	3	1.850	0.62
WISCONSIN INDUSTRIAL TESTING INC.		48-17480-01	80	75	46.100	0.61
SIERRA TESTING, INC.		35-26950-01	64	61	37.400	0.61
TESTMASTER INSPECTION CO., INC.		34-24872-01	11	10	5.975	0.60
ALASKA INDUSTRIAL X-RAY		50-16084-01	10	8	4.725	0.59
AMERICAN INSPECTION CO. INC.		12-24801-01	94	85	49.725	0.59
SPEC CONSULTANTS, INC.		37-27891-01	14	11	6.325	0.58
X-RAY, INC.		46-03414-03	31	30	17.250	0.58
CTI, INC.		50-19202-01	70	55	30.700	0.56
EASTERN TESTING AND INSPECTION, INC.		29-09814-01	26	22	12.000	0.55
COMO TECH INSPECTION		15-26978-01	5	5	2.650	0.53
SAMSON INSPECTION TECHNICAL SERVICES, INC.		34-25898-01	27	22	11.625	0.53
LEHIGH TESTING LABORATORIES, INC.		07-01173-03	5	4	2.050	0.51
H. R. INSPECTION SERVICE INC.		15-06209-01	10	9	4.525	0.50
NDT SPECIALISTS, INC.		48-25917-01	2	2	1.000	0.50
TWIN CITY TESTING AND ENGINEERING LAB.		22-01376-02	26	23	11.450	0.50
MQS INSPECTION		12-00622-07	620	494	244.575	0.50
TESTING TECHNOLOGIES, INC.		45-25007-01	12	11	5.375	0.49
HUNTINGTON TESTING LAB, INC.		47-23076-01	31	31	15.125	0.49
TUMBLEWEED X-RAY CO.		03-23185-01	51	38	18.050	0.48
PROGRESS SERVICES,INC.		34-19592-01	16	13	6.150	0.47
BASIN SERVICES, INC		33-27023-01	23	21	9.725	0.46
INDUSTRIAL NDT SERVICES DIVISION		13-06147-04	16	12	5.500	0.46
WALASHEK ENTERPRISES, INC.		53-23225-01	12	10	4.500	0.45
SPACE SCIENCE SERVICES, INC.		09-07550-01	104	74	31.490	0.43
PROFESSIONAL WELDING ASSOC., INC.		48-25806-01	10	10	4.250	0.43
MIDWEST INSPECTION SERVICE LTD		48-16296-01	17	10	4.200	0.42
JACKSONVILLE SHIPYARDS INC.		09-15611-01	7	2	0.800	0.40
OLD DOMINION FABRICATORS		45-15581-01	6	6	2.400	0.40
GLITSCH FIELD SERVICES/NDE, INC		34-14071-01	51	36	14.075	0.39
MONTANA X-RAY INC.		25-21134-01	4	4	1.550	0.39
MATERIALS TESTING LABORATORIES, INC.		45-17151-01	12	10	3.800	0.38
ELPASO NATURAL GAS COMPANY		42-03201-02	7	7	2.650	0.38
CARROLL ENGINEERS, INC.		20-13042-02	4	1	0.375	0.38
LABARGE PIPE & STEEL CO.		35-26836-01	4	2	0.750	0.38
WOS TESTING CO.		12-24959-01	2	1	0.375	0.38
CONAM INSPECTION, INC		12-16559-01	80	52	19.400	0.37
N.V. ENTERPRISES		49-26888-01	7	7	2.450	0.35

APPENDIX A (cont.)

INDUSTRIAL RADIOGRAPHERS Multiple Location - 1990

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)
CONSTRUCTION ENGINEERING CONSULTANT		37-18456-01	50	37	12.625	0.34
QUALITY ASSURANCE LABORATORIES, INC.		18-19078-01	8	5	1.675	0.34
Q.C. LABORATORIES, INC.		09-11579-03	28	25	8.350	0.33
INDUSTRIAL METAL TREATING CORPORATION		07-28478-01	13	4	1.300	0.33
WESTERN STRESS, INC.		42-26900-01	80	46	14.600	0.32
SCIENTIFIC TECHNICAL, INC.		45-24882-01	6	5	1.525	0.31
PITT-DES MOINES, INC.		37-27878-01	24	23	6.975	0.30
AMERICAN OIL COMPANY (THE) (AMOCO)		13-00155-10	27	24	7.275	0.30
INDUSTRIAL NDT CO., INC.		39-24888-01	48	39	10.725	0.28
INSPECTION SERVICE CORP		37-11636-01	3	3	0.800	0.27
BRANCH RADIOGRAPHIC LABORATORIES, INC.		29-03405-02	22	22	5.550	0.25
ABC TESTING		20-19778-01	7	6	1.450	0.24
RELIANCE TESTING LABORATORIES INC.		19-17176-01	28	21	4.825	0.23
NAVY, DEPT. OF THE		59-20635-A1NP	11	8	1.825	0.23
ACCU-TECH EVALUATION SERVICES INC		29-28358-01	18	13	2.950	0.23
NDE SERVICES, INC.		05-19821-01	8	7	1.575	0.23
STANDARD TESTING & ENGINEERING CO.		35-17054-02	4	4	0.900	0.23
VENEGAS INDUSTRIAL TESTING		28-14847-02	4	4	0.900	0.23
CBI INDUSTRIES, INC.		42-13553-02	168	129	27.700	0.21
S&ME, INC./AIRPORT STA.		41-24965-01	32	19	4.050	0.21
ANR PIPELINE CO, LABORATORY SERVICES		21-24502-01	6	2	0.425	0.21
INDESERV, INC		45-25074-01	8	8	1.625	0.20
ATEC ASSOC. OF VA., INC.		45-16546-03	11	6	1.200	0.20
TENNESSEE VALLEY AUTHORITY		41-06832-06	27	17	3.390	0.20
INSPECTION SERVICES, INC.		41-21154-01	21	10	1.950	0.20
X-R-I TESTING		21-05472-01	160	60	11.625	0.19
UNIVERSAL TECHNICAL TESTING, INC.		37-00453-03	19	14	2.700	0.19
NAVY, DEPT. OF THE, (USS CANOPUS)		59-04720-A1NP	16	11	2.025	0.18
CRAMER & LINDELL ENGINEERS, INC.		06-20794-01	22	21	3.800	0.18
PLANT INSPECTION CO		04-21032-01	12	7	1.250	0.18
NONDESTRUCTIVE TESTING CORP		29-19742-01	22	15	2.550	0.17
NEWPORT NEWS SHIPBUILDING AND DRY DOCK		45-09428-02	82	71	11.875	0.17
NOVA DATA TESTING LABS, INC.		45-24872-01	12	10	1.650	0.17
DAYTON X-RAY COMPANY		34-06943-01	10	8	1.300	0.16
ASTROTECH, INC.		37-09928-01	11	10	1.600	0.16
CONSUMERS POWER COMPANY		21-08606-03	18	14	2.225	0.16
HERRON TESTING LABORATORY INC.		34-00681-03	14	11	1.700	0.15
ARNOLD GREENE TESTING LABORATORIES		20-01074-02	30	18	2.700	0.15
PARKER INDUSTRIAL X-RAY LABORATORY CORP.		06-01337-03	13	9	1.350	0.15
ANCHOR/DARLING VALVE COMPANY		37-15476-01	8	6	0.800	0.13
MAGNA CHEK, INC.		21-19111-02	31	17	2.250	0.13
AMERICON, INC.		34-02160-04	43	9	1.150	0.13

APPENDIX A (cont.)

INDUSTRIAL RADIOGRAPHERS Multiple Location - 1990

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)
NOOTER CORPORATION		24-03783-01	18	7	0.800	0.11
NAVY, DEPT. OF THE		59-05851-A1NP	12	9	1.025	0.11
EBASCO SERVICES, INC.		29-07056-03	15	6	0.675	0.11
FOSTER WHEELER CONSTRUCTORS,INC.		29-28016-01	6	2	0.225	0.11
NAVY, DEPT. OF THE		59-04697-A1NP	13	10	1.125	0.11
POWER PIPING COMPANY		37-09945-01	7	4	0.450	0.11
QC SERVICES		04-14875-02	24	8	0.900	0.11
NAVY, DEPT. OF THE		46-00251-A1NP	65	64	6.900	0.11
NAVY, DEPT. OF THE		59-04696-A1NP	16	13	1.400	0.11
NAVY, DEPT. OF THE		04-00221-A1NP	27	22	2.350	0.11
NAVY, DEPT. OF THE		39-00191-A1NP	64	60	6.250	0.10
ALONSO & CARUS IRON WORKS, INC.		52-21350-01	7	5	0.500	0.10
NAVY, DEPT. OF THE		06-68316-A1NP	21	19	1.850	0.10
BAKER TESTING SERVICES INC.		20-19067-01	12	8	0.775	0.10
NORFOLK SHIPBUILDING AND DRYDOCK CORP.		45-12042-01	16	15	1.375	0.09
PUBLIC SERVICE OF INDIANA		13-15544-06	5	3	0.275	0.09
COLUMBIA GAS TRANSMISSION CORPORATION		47-16060-01	5	4	0.325	0.08
NAVY, DEPT. OF THE		45-00181-A1NP	73	69	5.300	0.08
BATH IRON WORKS CORPORATION		18-00828-04	21	5	0.375	0.08
BRIGGS ASSOCIATES INC.		20-16401-01	32	14	0.950	0.07
EG & G FLORIDA, INC., BOC-005		09-21233-01	40	17	1.100	0.06
NAVY, DEPT. OF THE		53-00311-A1NP	31	28	1.650	0.06
STONE & WEBSTER ENGINEERING CORP.		20-05600-02	24	14	0.825	0.06
HUTCHINSON AREA VO-TECH INSTITUTE		22-15554-01	304	167	9.300	0.06
AMERICAN AIRLINES, INC		35-13964-01	51	5	0.250	0.05
AMOCO OIL COMPANY		45-01378-02	18	1	0.050	0.05
ARMY, DEPT. OF THE		30-02405-05	4	2	0.100	0.05
C & R LABORATORIES		53-19179-01	3	3	0.150	0.05
CENTERIOR SERVICE CO		34-23406-01	5	3	0.150	0.05
FACTORY MUTUAL RESEARCH CORPORATION		20-04007-02	5	3	0.150	0.05
FOSTER WHEELER ENERGY CORP.		31-01776-05	12	7	0.350	0.05
INTERNATIONAL TESTING LAB.		29-14027-01	6	6	0.300	0.05
NAVY, DEPT. OF THE		38-68829-A1NP	12	5	0.250	0.05
NAVY, DEPT. OF THE		82-62770-A1NP	13	6	0.300	0.05
NAVY, DEPT. OF THE		53-00314-A1NP	15	3	0.150	0.05
NAVY, DEPT. OF THE		04-68828-A1NP	6	3	0.150	0.05
NAVY, DEPT. OF THE		04-0581A-A1NP	88	12	0.600	0.05
NAVY, DEPT. OF THE		53-68251-A1NP	13	6	0.300	0.05
NAVY, DEPT. OF THE		04-65918-A1NP	26	22	1.100	0.05
NAVY, DEPT. OF THE		45-32770-A1NP	31	3	0.150	0.05
NAVY, DEPT. OF THE		46-68438-A1NP	41	24	1.200	0.05
NAVY, DEPT. OF THE		59-21047-A1NP	26	26	1.300	0.05

APPENDIX A (cont.)

INDUSTRIAL RADIOGRAPHERS Multiple Location - 1990

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		59-21063-A1NP	21	9	0.450	0.05
NAVY, DEPT. OF THE		59-20132-A1NP	18	7	0.350	0.05
NAVY, DEPT. OF THE		59-45247-A1NP	16	6	0.300	0.05
NAVY, DEPT. OF THE		59-68780-A1NP	13	10	0.500	0.05
NAVY, DEPT. OF THE		59-04628-A1NP	14	7	0.350	0.05
NAVY, DEPT. OF THE		59-04620-A1NP	14	9	0.450	0.05
NAVY, DEPT. OF THE		59-04629-A1NP	13	6	0.300	0.05
NAVY, DEPT. OF THE		59-04648-A1NP	20	5	0.250	0.05
NAVY, DEPT. OF THE		59-21098-A1NP	12	3	0.150	0.05
NAVY, DEPT. OF THE		59-04638-A1NP	6	4	0.200	0.05
NAVY, DEPT. OF THE		59-08808-A1NP	10	1	0.050	0.05
NAVY, DEPT. OF THE		59-21046-A1NP	10	2	0.100	0.05
NAVY, DEPT. OF THE		59-04639-A1NP	10	1	0.050	0.05
PIPING SPECIALISTS		24-24826-01	2	2	0.100	0.05
SPECTRUM LABORATORIES, INC.		29-07266-01	5	4	0.200	0.05
UNIVERSAL TESTING LABORATORIES, INC		41-25097-01	19	2	0.100	0.05
PRECISION COMPONENTS CORPORATION		37-16280-01	68	30	1.270	0.04
VOITH HYDRO, INC.		37-16280-03	21	18	0.570	0.03
ANVIL CORP		46-23236-01	0	0	0.000	0.00
BMY, DIV. OF HARSCO CORP.		37-20684-02	6	0	0.000	0.00
INDUSTRIAL TESTING LAB. SERVICES CORP		37-16406-01	11	0	0.000	0.00
NAVY, DEPT. OF THE		04-60036-A1NP	0	0	0.000	0.00
NAVY, DEPT. OF THE		59-08810-A1NP	19	0	0.000	0.00
NAVY, DEPT. OF THE		59-05837-A1NP	14	0	0.000	0.00
			5,691	4,154	2,079.035	0.50

APPENDIX A (cont.)

MANUFACTURERS AND DISTRIBUTORS - 1990

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)
MALLINCKRODT, INC.	A-BROAD	03211	24-04206-01	300	164	222.475	1.36
ADVANCED MEDICAL SYS, INC	A-BROAD	03211	34-19089-01	9	5	2.975	0.60
MINNESOTA MINING & MANUFACTURING CO.	A-BROAD	03211	22-00057-06	123	58	29.100	0.50
E. I. DUPONT DE NEMOURS & CO., INC.	A-BROAD	03211	20-00320-21	1,098	885	319.625	0.36
AMERSHAM CORP	A-BROAD	03211	20-12836-01	62	43	13.150	0.31
TEXAS NUCLEAR CORPORATION	A-BROAD	03211	42-01485-04	120	71	15.375	0.22
E. R. SQUIBB AND SONS, INC.	A-BROAD	03211	29-00139-02	939	425	40.875	0.10
COMBUSTION ENGINEERING	A-BROAD	03211	34-00255-03	359	206	11.425	0.06
ENGLEHARD CORPORATION	A-BROAD	03211	34-06558-05	42	1	0.050	0.05
NUCLEAR RESEARCH CORPORATION	A-BROAD	03211	29-04236-01	39	4	0.200	0.05
				3,091	1,862	655.250	0.35
BEST IND, INC	B-BROAD	03212	45-19757-01	65	15	3.625	0.24
OHMART CORPORATION	B-BROAD	03212	34-00639-01	89	56	8.050	0.14
FRONTIER TECHNOLOGY CORP	B-BROAD	03212	SNM-1957	17	5	0.625	0.13
REUTER-STOKES INSTRUMENTS, INC	B-BROAD	03212	34-18233-01	33	20	1.125	0.06
NORLAND CORP	B-BROAD	03212	48-13403-01	39	13	0.650	0.05
CENTOCOR, INC	B-BROAD	03212	37-19413-01	194	47	1.750	0.04
FISCHER TECHNOLOGY, INC	B-BROAD	03212	06-19165-01	11	0	0.000	0.00
LEAR SIEGLER, INC	B-BROAD	03212	21-07265-01	12	0	0.000	0.00
STEWART EQUIPMENT CO	B-BROAD	03212	35-23115-02	1	0	0.000	0.00
				461	156	15.825	0.10
SEAMAN NUCLEAR CORP	OTHER	03214	48-12016-01	14	13	2.950	0.23
MICRO-DYNAMICS, INC	OTHER	03214	20-13270-01	13	4	0.850	0.21
QUAL-X	OTHER	03214	34-16907-02	9	1	0.175	0.18
RTS TECHNOLOGY, INC.	OTHER	03214	20-27966-01	3	1	0.175	0.18
THERATRONICS INTERNATIONAL LTD	OTHER	03214	54-28315-01	42	42	6.500	0.15
MIE, INC	OTHER	03214	20-07875-01	6	2	0.225	0.11
SCAN TECHNOLOGIES INC	OTHER	03214	37-20807-01	3	2	0.225	0.11
PYROTRONICS	OTHER	03214	29-08864-03	17	9	0.775	0.09
NORDION INTERNATIONAL INC	OTHER	03214	54-28275-01	8	7	0.475	0.07
BINAX, INC	OTHER	03214	18-28167-01	19	19	1.075	0.06
ACKER DRILL COMPANY INC	OTHER	03214	37-28241-01	7	7	0.350	0.05
ADVANCED MAGNETICS	OTHER	03214	20-20526-01	28	4	0.200	0.05
BRISTOL-MYERS SQUIBB	OTHER	03214	13-00772-02	52	1	0.050	0.05
DIAMED, INC	OTHER	03214	18-20907-01	7	6	0.300	0.05
FENWAL INC	OTHER	03214	20-15285-01	24	2	0.100	0.05
LIXI, INC	OTHER	03214	12-18215-01	15	15	0.750	0.05
NUCLEAR RESEARCH CORP	OTHER	03214	37-02401-01	45	20	1.000	0.05
OUTOKUMPU ELECTRONICS, INC	OTHER	03214	37-28461-01	12	2	0.100	0.05
RADIATION MONITORING DEVICES, INC	OTHER	03214	20-16325-01	23	2	0.100	0.05

APPENDIX A (cont.)

MANUFACTURERS AND DISTRIBUTORS - 1990

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)
STOCKER & YALE, INC	OTHER	03214	20-16532-01	46	46	2.300	0.05
VARIAN/BEVERLY MICROWAVE DIV.	OTHER	03214	20-02237-04	18	1	0.050	0.05
BIOQUANT, INC	OTHER	03214	21-25897-02	9	0	0.000	0.00
DISPLAYS INC	OTHER	03214	37-19629-04	3	0	0.000	0.00
ENSECO INCORPORATED	OTHER	03214	29-09801-02	2	0	0.000	0.00
GENERAL NUCLEONICS, INC	OTHER	03214	04-12071-02	12	0	0.000	0.00
LASERMIKE, INC	OTHER	03214	34-25899-01	18	0	0.000	0.00
PHARMACIA, INC	OTHER	03214	29-13915-05	14	0	0.000	0.00
WING CORPORATION	OTHER	03214	29-13180-01	16	0	0.000	0.00
				485	206	18.725	0.09
SYNCOR CORPORATION	PHARMACIES	02500	34-16654-01MD	27	10	1.200	0.12
SYNCOR CORPORATION	PHARMACIES	02500	45-17769-01MD	14	6	0.425	0.07
SYNCOR CORPORATION	PHARMACIES	02500	34-18484-01MD	20	7	0.390	0.06
MPI PHARMACY SERVICES, INC	PHARMACIES	02500	34-26239-01MD	9	2	0.100	0.05
NUCLEAR PHARMACY, INC.	PHARMACIES	02500	20-21227-01MD	19	5	0.250	0.05
RADIOPHARMACY INCORPORATED	PHARMACIES	02500	13-26246-01MD	5	1	0.050	0.05
SYNCOR CORPORATION	PHARMACIES	02500	29-19608-01MD	55	15	0.750	0.05
SYNCOR CORPORATION	PHARMACIES	02500	35-19583-01MD	9	2	0.100	0.05
				158	48	3.265	0.07

FUEL FABRICATORS AND PROCESSORS - 1990

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)
ROCKWELL INTERNATIONAL CORP		SNM-0021	78	34	13.450	0.40
COMBUSTION ENGINEERING, INC.		SNM-0033	111	74	10.150	0.14
GENERAL ELECTRIC CO.		SNM-1097	1,028	588	76.125	0.13
BABCOCK AND WILCOX FUEL CO.		SNM-1168	172	124	14.250	0.11
ADVANCED NUCLEAR FUELS CORP.		SNM-1227	468	364	41.700	0.11
GENERAL ATOMICS		SNM-0696	925	84	7.750	0.09
COMBUSTION ENGINEERING INC.		SNM-1067	260	103	8.825	0.09
NUCLEAR FUEL SERVICES INC,		SNM-0124	7,373	739	46.025	0.06
BABCOCK AND WILCOX CO.		SNM-0042	3,118	1,070	66.275	0.06
UNITED NUCLEAR CORPORATION, INC.		SNM-0368	223	53	2.775	0.05
			13,756	3,233	287.325	0.09

INDEPENDENT SPENT FUEL STORAGE INSTALLATION - 1990

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)
GENERAL ELECTRIC COMPANY		SNM-2500	38	22	5.700	0.26
CAROLINA POWER AND LIGHT CO.		SNM-2502	18	0	0.000	0.00
VIRGINIA ELECTRIC POWER*		SNM-2501	0	0	0.000	0.00
			56	22	5.700	0.26

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

LOW LEVEL WASTE DISPOSAL FACILITIES - 1990

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	217	27	4.600	0.17
CHEM-NUCLEAR SYSTEMS		12-13536-01	567	88	21.725	0.25
			784	115	26.325	0.23

APPENDIX B

Annual Whole Body Doses at Licensed Nuclear Power Facilities

1990

APPENDIX B
ANNUAL WHOLE BODY DOSES AT LICENSED NUCLEAR POWER FACILITIES
CY 1990

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			
ARKANSAS 1,2	PWR	1,924	968	544	454	236	130	160	1							4,417	2,493	762 **
BEAVER VALLEY 1,2	PWR	1,277	815	382	279	119	46	34								2,952	1,675	348 **
BIG ROCK POINT	BWR	83	168	31	33	18	15	49	22	15						434	351	232
BRAIDWOOD 1,2	PWR	1,385	500	309	208	48	13	3								2,466	1,081	186 **
BROWNS FERRY 1,2,3	BWR	2,644	823	592	456	260	167	304	111	4						5,361	2,717	1,310 **
BRUNSWICK 1,2	BWR	1,076	1,432	415	350	248	136	426	175							4,258	3,182	1,548 **
BYRON 1,2	PWR	1,838	557	325	222	108	79	99	6							3,234	1,396	434 **
CALLAWAY 1	PWR	743	374	212	237	125	67	111	8							1,877	1,134	442 **
CALVERT CLIFFS 1,2	PWR	1,220	1,346	290	210	79	46	48								3,239	2,019	304 **
CATAWBA 1,2	PWR	1,224	853	383	350	216	138	224	10							3,398	2,174	809 **
CLINTON	BWR	1,537	449	256	209	220	117	130	9							2,927	1,390	553 **
COOK 1,2	PWR	1,178	694	388	350	202	110	103	4							3,029	1,851	580 **
COOPER STATION	BWR	2,852	479	245	180	94	73	103								4,026	1,174	379 **
CRYSTAL RIVER 3	PWR	1,047	525	332	266	111	89	113	5							2,488	1,441	476 **
DAVIS-BESSE	PWR	1,106	542	285	174	131	92	153								2,483	1,377	489 **
DIABLO CANYON 1,2	PWR	2,019	648	344	294	100	39	16								3,460	1,441	323
DRESDEN 2,3	BWR	1,379	569	387	359	195	129	493	91	12						3,614	2,235	1,400 **
DUANE ARNOLD	BWR	2,083	309	205	237	215	172	306	16							3,543	1,460	861 **
FARLEY 1,2	PWR	519	796	364	263	144	42	65	26							2,219	1,700	457 **
FERMI 2	BWR	1,632	247	106	58	32	18	1								2,094	462	83 **
FITZPATRICK	BWR	703	597	193	132	124	117	298	70	5						2,239	1,536	884 **
FORT CALHOUN	PWR	854	295	149	120	74	44	76	2							1,614	760	290
GINNA	PWR	903	349	183	201	125	62	67	4							1,894	991	347 **
GRAND GULF	BWR	1,852	760	366	320	155	83	75	6							3,617	1,765	482 **
HADDAM NECK	PWR	731	392	167	131	82	64	118	25							1,710	979	421 **
HARRIS	PWR	979	252	89	61	31	10	10								1,432	453	85 **
HATCH 1,2	BWR	1,160	829	492	438	315	317	484	22	4	1					4,062	2,902	1,455 **
HOPE CREEK 1	BWR	1,039	949	194	140	67	19	25								2,433	1,394	196 **
INDIAN POINT 2	PWR	1,295	482	274	298	222	182	501	90	4						3,348	2,053	608 **
INDIAN POINT 3	PWR	765	391	248	197	104	60	61	5							1,831	1,066	358
KEWAUNEE	PWR	388	180	117	91	50	28	24								878	490	145 **
LASALLE 1,2	BWR	1,058	630	274	194	200	176	312	44							2,888	1,830	948 **
LIMERICK 1,2*	BWR	2,568	876	336	160	43	5	2								3,990	1,422	175 **
MAINE YANKEE	PWR	482	374	212	234	178	135	209	16	1						1,841	1,359	682 **
MCGUIRE 1,2	PWR	1,656	898	468	437	226	116	121	23							3,945	2,289	727 **

* Indicates plants counted for the first time in 1990 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
CY 1990

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			
MILLSTONE POINT 1	BWR	283	160	63	59	32	16	32	3							648	365	131
MILLSTONE POINT 2,3	PWR	1,279	722	287	269	143	71	146	14							2,931	1,652	593
MONTICELLO	BWR	1,390	157	61	55	22	22	17	2							1,726	336	94 **
NINE MILE POINT 1,2	BWR	1,603	1,148	416	356	196	104	177	8							4,008	2,405	699 **
NORTH ANNA 1,2	PWR	1,172	1,304	267	195	131	96	117	46	5						3,333	2,161	590 **
OCONEE 1,2,3	PWR	1,440	885	485	392	112	41	31	2							3,388	1,948	404 **
OYSTER CREEK	BWR	205	1,362	199	158	96	67	55	4							2,146	1,941	310 **
PALISADES	PWR	574	1,179	359	330	203	128	186	27	2						2,988	2,414	766 **
PALO VERDE 1,2,3	PWR	2,842	1,179	476	310	119	50	102								5,078	2,236	499 **
PEACH BOTTOM 2,3	BWR	3,741	681	392	264	141	55	51	1							5,326	1,585	377 **
PERRY	BWR	1,000	402	282	363	206	134	148	2							2,537	1,537	638 **
PILGRIM	BWR	1,869	1,425	198	152	70	33	20								3,767	1,898	225 **
POINT BEACH 1,2	PWR	383	186	86	100	66	44	101	34							1,000	617	378
PRAIRIE ISLAND 1,2	PWR	632	276	200	135	78	31	17								1,369	737	188 **
QUAD CITIES 1,2	BWR	1,333	669	460	291	188	205	360	13							3,519	2,186	1,028 **
RANCHO SECO	PWR	555	73	27	8	3										666	111	13
RIVER BEND 1	BWR	1,273	643	355	287	182	80	69								2,889	1,616	489
ROBINSON 2	PWR	967	739	302	277	124	104	80								2,593	1,626	437 **
SALEM 1,2	PWR	2,160	3,033	353	144	49	14	28	15							5,796	3,636	272 **
SAN ONOFRE 1,2,3	PWR	1,968	849	381	313	258	192	187	44							4,192	2,224	885 **
SEQUOYAH 1,2	PWR	1,929	777	531	507	353	197	405	134	30						4,863	2,934	1,678 **
SOUTH TEXAS 1,2*	PWR	1,704	562	268	205	77	18	6								2,840	1,136	206 **
ST. LUCIE 1,2	PWR	1,201	667	383	346	157	94	206	23							3,077	1,876	777
SUMMER 1	PWR	1,037	320	242	261	134	67	66								2,127	1,090	376 **
SURRY 1,2	PWR	1,749	913	333	286	189	97	115	14							3,696	1,947	575 **
SUSQUEHANNA 1,2	BWR	2,062	684	368	328	189	77	45								3,753	1,691	440 **
THREE MILE ISLAND 1	PWR	435	685	294	195	60	41	44								1,754	1,319	264 **
TROJAN	PWR	1,228	555	254	199	85	44	32								2,397	1,169	258 **
TURKEY POINT 3,4	PWR	2,199	781	406	365	219	153	172	3							4,298	2,099	730 **
VERMONT YANKEE	BWR	985	230	224	204	84	57	48	2							1,834	849	307
VOGTLE 1,2*	PWR	1,272	569	407	314	165	74	71	2							2,874	1,602	466 **
WASHINGTON NUCLEAR 2	BWR	1,692	532	226	209	125	99	132	24	1						3,040	1,348	536 **
WATERFORD 3	PWR	1,068	304	96	22	9	1									1,500	432	47
WOLF CREEK 1	PWR	759	324	216	157	58	30	13								1,557	798	195
YANKEE-ROWE	PWR	549	246	126	148	81	49	47	5							1,251	702	246 **

* Indicates plants counted for the first time in 1990 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
CY 1990

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			
ZION 1,2	PWR	1,937	432	186	192	175	156	224	19	1						3,322	1,385	696 **
TOTALS: 73 PWRs		54,572	29,791	13,030	10,747	5,759	3,384	4,712	607	43						122,645	68,073	20,812
TOTALS: 37 BWRs		39,102	17,210	7,336	5,992	3,717	2,493	4,162	625	41	1					80,679	41,577	15,780
TOTALS: 110 LWRs		93,674	47,001	20,366	16,739	9,476	5,877	8,874	1,232	84	1					203,324	109,650	36,592

* Indicates plants counted for the first time in 1990 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
CY 1990

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	11														11	0	0
COMANCHE PEAK	PWR	2,706	124	10	1											2,841	135	8
FORT ST. VRAIN *	HTGR	226	30													256	30	1 **
LACROSSE *	BWR	506	25	12	12	2										557	51	9
SEABROOK	PWR	1,334	73	11	2											1,420	86	6
SHOREHAM	BWR	245	23													268	23	1
THREE MILE ISLAND 2*	PWR	168	265	48	45	51	28	47								652	484	136 **
WATTS BAR 1,2	PWR	110														110	0	0
TOTALS: 9		5,306	540	81	60	53	28	47								6,115	809	161

* 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

1969-1990

* 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, 50-368; 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	96	1,301	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	62	224	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	88.9	1,123	382	92	290	205	177	0.34	0.3
	1988	1,070.3	69.4	2,421	1,387	138	1,249	1,094	293	0.57	1.3
	1989	1,066.3	72.0	2,063	711	36	675	522	189	0.34	0.7
	1990	1,351.9	84.2	2,493	762	32	730	625	137	0.31	0.6
BEAVER VALLEY 1,2	1977	355.6	57.0	331	87	8	79	58	29	0.26	0.2
Docket 50-334, 50-412; DPR-66, NPF-73	1978	304.2	40.8	646	190	11	179	151	39	0.29	0.6
1st commercial operation 10/76, 11/87	1979	221.0	40.0	704	132	22	110	67	65	0.19	0.6
Type - PWRs	1980	39.8	6.8	1,817	553	76	477	477	76	0.30	13.9
Capacity - 810, 820	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	124	380	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	83.8	1,282	210	43	167	137	73	0.16	0.3
	1988	1,386.1	87.4	1,764	530	90	440	438	92	0.30	0.4
	1989	1,017.4	69.6	2,349	1,378	197	1,181	1,151	227	0.59	1.4
	1990	1,271.0	85.3	1,675	348	33	315	268	80	0.21	0.3
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 - 67 MWe	1973	50.9		241	285			119	166	1.18	5.6
	1974	40.7	70.3	281	276	54	222	42	234	6.8	
	1975	35.1	59.8	300	180	58	122	20	160	5.1	

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		
BIG ROCK POINT (Continued)	1976	29.5	50.1	488	289	82	207	105	184	0.59	9.8
	1977	43.6	73.4	465	334	94	240	60	274	0.72	7.7
	1978	48.5	77.9	285	175	93	82	9	166	0.61	3.6
	1979	13.0	23.5	623	455	89	366	102	353	0.73	35.0
	1980	48.9	79.0	599	354	91	263	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	67	261	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	21	134	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	71.0	251	222	45	177	35	187	0.88	4.9
	1988	46.1	72.8	303	170	34	136	25	145	0.56	3.7
	1989	50.2	79.0	418	177	38	139	32	145	0.42	3.5
	1990	51.3	77.2	351	232	33	199	45	187	0.66	4.5
BRAIDWOOD 1,2 Docket 50-456, 50-457; NPF-72, NPF-77 1st commercial operation 7/88, 10/88 Type - PWRs Capacity - 1120, 1120 MWe	1989	1,381.8	75.4	1,460	296	7	289	198	98	0.20	0.2
	1990	1,740.2	84.1	1,081	176	10	186	107	79	0.17	0.1
BROWNS FERRY 1,2,3 Docket 50-259, 50-260, 50-296 DPR - 33, - 52, - 68 1st commercial operation 8/74, 3/75, 3/77 Type - BWRs Capacity - 1065,1065,1065 MWe	1975	161.7	17.8	2,380	325					0.14	2.0
	1976	337.6	26.9	2,207	234					0.11	0.7
	1977	1,327.5	73.7	1,858	863	60	803	249	614	0.46	0.7
	1978	1,992.1	73.5	2,376	1,792	4	1,788	261	1,531	0.75	0.9
	1979	2,393.0	79.1	2,689	1,667	0	1,667	289	1,378	0.62	0.7
	1980	2,182.1	73.6	2,712	1,826	4	1,822	50	1,776	0.67	0.8
	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	909	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	196	854	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	---
	1989	0.0	0.0	2,683	656	97	559	131	525	0.24	---
	1990	0.0	0.0	2,717	1,310	64	1,246	68	1,242	0.48	---

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	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
	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	120	2,684	2,077	727	0.69	3.4
	1986	1,051.3	69.1	3,370	1,909	97	1,812	1,273	636	0.57	1.8
	1987	1,152.4	80.6	3,052	1,419	144	1,275	861	558	0.46	1.2
	1988	990.8	70.1	2,648	1,747	219	1,528	1,051	696	0.66	1.8
	1989	990.9	65.8	3,844	1,786	181	1,605	1,295	491	0.46	1.8
	1990	991.6	67.8	3,182	1,548	152	1,396	1,156	392	0.49	1.6
BYRON 1,2	1986	894.5	88.6	1,081	76	12	64	47	29	.07	0.1
Docket 50-454, 50-455; NPF-37, NPF-66	1987	650.9	70.9	1,826	769	11	758	667	102	0.42	1.2
1st commercial operation 9/85,8/87	1988	1,534.7	86.3	1,222	459	0	459	333	126	0.38	0.3
Type - PWRS	1989	1,812.6	90.2	1,109	172	21	151	105	67	0.16	0.1
Capacity - 1105, 1105	1990	1,567.3	78.8	1,396	434	38	396	266	168	0.31	0.3
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	71.1	1,082	393	89	304	249	144	0.36	0.5
Type - PWR	1988	1,069.2	93.4	353	27	12	15	2	25	0.08	0.0
Capacity - 1125 MWe	1989	1,000.3	85.4	1,055	283	46	237	191	92	0.27	0.3
	1990	960.7	84.1	1,134	442	50	392	332	110	0.39	0.5
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	32	773	426	379	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	79	400	0.35	0.3
	1985	1,189.8	68.4	1,598	694	69	625	144	550	0.43	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		
CALVERT CLIFFS 1,2 (Continued)	1986	1,530.0	87.2	1,296	347	2	345	101	246	0.27	0.2
	1987	1,207.3	71.8	1,384	412	29	383	110	302	0.30	0.3
	1988	1,397.7	81.0	1,296	291	30	261	90	201	0.22	0.2
	1989	333.6	20.1	1,786	346	11	335	216	130	0.19	1.0
	1990	161.1	11.0	2,019	304	12	292	203	101	0.15	1.9
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	75.9	1,865	449	32	417	161	288	0.24	0.3
1st commercial operation 6/85, 8/86	1988	1,675.2	77.2	2,009	556	71	485	200	356	0.28	0.3
Type - PWR	1989	1,733.6	79.5	1,660	334	48	286	110	224	0.20	0.2
Capacity - 1129, 1129 MWe	1990	1,616.3	70.8	2,174	809	58	751	292	517	0.37	0.5
CLINTON	1988	701.3	84.2	769	130	48	82	64	66	0.17	0.2
Docket 50-461; NPF-62	1989	348.3	48.5	1,196	372	91	281	261	111	0.31	1.1
1st commercial operation 11/87	1990	435.8	55.1	1,390	553	407	146	438	115	0.40	1.3
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	608	443	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	43	719	597	165	0.49	0.5
	1985	925.4	47.6	1,984	945	92	853	758	187	0.48	1.0
	1986	1,307.1	73.4	1,774	745	64	681	585	160	0.42	0.6
	1987	1,199.5	70.2	1,696	666	79	587	525	141	0.39	0.6
	1988	1,160.4	63.5	2,266	867	52	815	762	105	0.38	0.7
	1989	1,433.1	72.8	1,575	493	50	443	421	72	0.31	0.3
	1990	1,318.5	67.9	1,851	580	87	493	504	76	0.31	0.4

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		
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	90	131	0.52	0.4
	1980	448.3	71.2	785	859	71	788	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
	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	96.2	549	103	26	77	11	92	0.19	0.2
	1988	493.4	67.9	942	251	40	211	118	133	0.27	0.5
	1989	564.3	76.2	1,202	343	40	303	228	115	0.29	0.6
	1990	602.0	79.4	1,174	379	34	345	265	114	0.32	0.6
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	390	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	44	645	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	60.9	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
	1989	352.8	48.8	880	234	5	229	128	106	0.27	0.7
	1990	497.8	63.8	1,441	476	8	468	318	158	0.33	1.0
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 7/78	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 - 874 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	5	66	44	27	0.10	0.3
	1986	3.3	1.3	981	124	22	102	103	21	0.13	37.6

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		
DAVIS-BESSE 1 (Continued)	1987	618.0	89.6	625	47	11	36	27	20	0.08	0.1
	1988	144.1	27.1	1,183	307	36	271	255	52	0.26	2.1
	1989	880.0	98.6	404	38	5	33	5	33	0.09	0.0
	1990	500.0	56.7	1,377	489	14	475	414	75	0.36	1.0
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	83.0	1,170	336	5	331	226	110	0.29	0.2
1st commercial operation 5/85, 3/86	1988	1,386.1	67.6	1,826	877	4	873	593	284	0.48	0.6
Type - PWRs	1989	1,899.0	87.5	1,646	465	3	462	329	136	0.28	0.2
Capacity - 1073, 1087 MWe	1990	1,952.6	91.0	1,441	323	1	322	220	103	0.22	0.2
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, 6/70,	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	359	1,170	619	1,529	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	1.20	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	815	959	0.78	2.2
	1985	903.0	64.5	2,817	1,686	474	1,212	879	807	0.60	1.9
	1986	740.5	52.6	3,111	2,668	268	2,400	2,009	659	0.86	3.6
	1987	933.9	74.0	2,052	1,145	241	904	593	552	0.56	1.2
	1988	1,014.7	75.8	2,414	1,409	215	1,194	808	601	0.58	1.4
	1989	1,184.2	83.1	2,259	1,130	154	976	641	489	0.50	1.0
	1990	1,107.8	76.6	2,235	1,400	176	1,224	753	647	0.63	1.3

*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		
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 - 538 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	28	161	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	64.7	1,094	667	241	426	478	189	0.61	2.2
	1988	386.5	75.2	1,136	614	71	543	416	198	0.54	1.6
	1989	388.5	79.0	425	194	49	145	58	136	0.46	0.5
	1990	367.4	75.8	1,460	861	126	735	644	217	0.59	2.3
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	416	270	242	0.38	1.7
Capacity - 824, 828 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	178	724	505	397	0.44	0.6
	1985	1,368.2	81.1	2,551	799	158	641	442	357	0.31	0.6
	1986	1,409.4	83.8	2,314	858	148	710	464	394	0.37	0.6
	1987	1,369.7	84.7	1,871	598	105	493	347	251	0.32	0.4
	1988	1,567.7	92.3	1,840	552	74	478	340	212	0.30	0.4
	1989	1,402.9	84.6	2,206	749	88	661	516	233	0.34	0.5
	1990	1,464.0	86.7	1,700	457	47	410	342	115	0.27	0.3
FERMI 2	1989	624.0	68.5	1,270	255	35	220	182	73	0.20	0.4
Docket 50-341; NPF-43	1990	848.2	84.7	462	83	31	52	14	69	0.18	0.1
1st commercial operation 1/88											
Type - BWR											
Capacity - 1047 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		
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 - 782 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	863	327	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	85	966	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	70.3	1,578	940	164	776	616	324	0.60	1.9
	1988	514.0	69.0	1,553	786	162	624	506	280	0.51	1.5
	1989	727.5	92.3	1,027	377	58	319	191	186	0.37	0.5
	1990	543.8	72.6	1,536	884	92	792	557	327	0.58	1.6
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 6/74	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	45	172	102	115	0.36	0.5
	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	75.4	1,247	388	78	310	226	162	0.31	1.1
	1988	315.5	74.1	1,594	272	74	198	173	99	0.17	0.9
	1989	395.7	89.2	1,210	93	31	62	50	43	0.08	0.2
	1990	290.0	64.2	760	290	30	260	160	130	0.38	1.0
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

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		
GINNA (Continued)	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	206	386	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	321	334	0.71	1.6
	1982	289.0	58.8	1,117	1,140	80	1,060	471	669	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	58	337	195	200	0.55	1.0
	1985	436.7	87.9	845	426	89	337	183	243	0.50	1.0
	1986	433.3	87.4	901	357	45	312	107	250	0.40	0.8
	1987	459.0	91.5	773	344	35	309	151	193	0.45	0.7
	1988	423.1	87.4	897	295	37	258	114	181	0.33	0.7
	1989	369.2	75.9	1,254	605	57	548	172	433	0.48	1.6
	1990	414.3	84.4	991	347	38	309	207	140	0.35	0.8
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	82.2	1,358	420	106	314	303	117	0.31	0.5
1st commercial operation 7/85	1988	1,136.6	96.7	692	147	57	90	52	95	0.21	0.1
Type - BWR	1989	932.6	80.0	1,972	498	93	405	333	165	0.25	0.5
Capacity - 1142 MWe	1990	883.5	78.9	1,765	482	52	430	321	161	0.27	0.5
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	1972	515.6		355	325			181	144	0.91	0.6
Capacity - 565 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	74	1,088	783	379	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	107	1,277	1,022	362	0.84	3.1
	1984	404.0	71.7	1,430	1,216	154	1,062	803	413	0.85	3.0

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 (Continued)	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	54.0	1,763	750	99	651	553	197	0.43	0.5
	1988	397.4	70.3	735	237	43	194	107	130	0.32	0.6
	1989	356.4	67.2	1,455	596	68	528	472	124	0.41	1.7
	1990	142.7	32.2	979	421	75	346	268	153	0.43	3.0
HARRIS 1	1988	652.9	75.0	721	169	29	140	118	51	0.23	0.3
Docket 50-400; NPF-63	1989	690.6	79.5	929	156	32	124	85	71	0.17	0.2
1st commercial operation 5/87	1990	776.4	89.6	453	85	13	72	47	38	0.19	0.1
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	381	201	0.27	1.5
Type - BWRs	1980	1,008.7	70.9	1,930	449	143	306	163	286	0.23	0.4
Capacity - 753, 766 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
	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	508	310	0.29	0.7
	1986	872.0	64.8	3,486	1,497	347	1,150	1,107	390	0.43	1.7
	1987	1,295.4	89.7	2,202	816	207	609	435	381	0.37	0.6
	1988	1,001.4	70.4	2,509	1,401	275	1,126	927	474	0.56	1.4
	1989	1,271.1	87.1	1,350	556	154	402	305	251	0.41	0.4
	1990	1,268.0	83.5	2,902	1,455	224	1,231	1,074	381	0.50	1.1
HOPE CREEK 1	1987	869.2	86.4	589	117	21	96	40	77	0.20	0.1
Docket 50-354; NPF-57	1988	832.7	80.7	1,734	287	38	249	163	124	0.17	0.3
1st commercial operation 12/86	1989	791.1	77.8	1,873	465	40	425	292	173	0.25	0.6
Type - BWR	1990	966.4	91.6	1,394	196	26	170	89	107	0.14	0.2
Capacity - 1031 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		
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	3	6	3	6	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	---
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, 8/74,	1972	142.3			967						6.8
8/76	1973	0.0		2,998	5,262	709	4,553	2,847	2,415	1.76	---
Type - PWR	1974	556.1	59.4	1,019	910					0.89	1.6
Capacity - 0, 939, 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

* 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.

** 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 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	304	667	6	965	0.62	1.9
	1981	367.5	46.0	2,595	2,731	237	2,494	1,595	1,136	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	202	284	219	267	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 8/74	1986	457.5	56.2	1,926	1,250	350	900	349	901	0.65	2.7
Type - PWR	1987	611.4	73.4	1,980	1,217	128	1,089	805	412	0.61	2.0
Capacity - 939 MWe	1988	719.3	86.9	890	235	51	184	117	118	0.26	0.3
	1989	532.5	64.6	2,093	1,436	208	1,228	813	623	0.69	2.7
	1990	618.0	66.6	2,053	608	66	542	450	158	0.30	1.0
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	1,093	133	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	62.7	1,308	500	84	416	365	135	0.38	0.9
	1988	792.5	83.3	451	93	41	52	39	54	0.21	0.1
	1989	587.8	61.1	1,800	876	130	746	776	100	0.49	1.5
	1990	595.3	62.9	1,066	358	69	289	230	128	0.34	0.6
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	89	50	0.29	0.3

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		
KEWAUNEE (Continued)	1985	443.1	82.4	519	176	9	167	114	62	0.34	0.4
	1986	461.7	85.8	502	169	8	161	111	58	0.34	0.4
	1987	480.0	89.7	755	226	8	218	173	53	0.30	0.5
	1988	467.5	88.3	705	210	6	204	165	45	0.30	0.4
	1989	449.1	84.9	570	239	10	229	179	60	0.42	0.5
	1990	468.8	87.9	490	145	5	140	112	33	0.30	0.3
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
	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	19.9
	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	29	223	88	164	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, 6/84	1986	929.5	50.6	1,614	898	143	755	527	371	0.56	1.0
Type - BWR	1987	1,030.0	59.3	1,744	1,396	217	1,179	989	407	0.80	1.4
Capacity - 1036, 1036 MWe	1988	1,317.6	71.6	2,737	2,471	253	2,218	1,978	493	0.90	1.9
	1989	1,503.5	73.1	2,475	1,386	138	1,248	853	533	0.56	0.9
	1990	1,754.3	84.6	1,830	948	130	818	503	445	0.52	0.5

* 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		
LIMERICK 1, 2	1987	636.1	70.2	2,156	174	7	167	114	60	0.08	0.3
Docket 50-352, 50-353; NPF-39,-85	1988	794.9	96.5	950	52	20	32	23	29	0.05	0.1
1st commercial operation 2/86, 1/90	1989	628.4	66.0	1,818	266	70	196	156	110	0.15	0.4
Type - BWRs	1990	1,527.7	78.2	1,422	175	37	138	78	97	0.12	0.1
Capacity - 1055, 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 - 830 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
	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	165	41	124	72	93	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	34	66	14	86	0.20	0.1
	1987	478.1	65.3	1,100	722	39	683	531	191	0.66	1.5
	1988	591.9	79.1	1,058	725	52	673	576	149	0.69	1.2
	1989	819.2	93.7	375	99	38	61	25	74	0.26	0.1
	1990	573.0	71.0	1,359	682	146	536	547	135	0.50	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	35	472	106	401	0.30	0.7
Type - PWRS	1985	808.4	77.0	2,217	771	92	679	277	494	0.35	1.0
Capacity - 1129, 1129 MWe	1986	1,360.0	60.1	2,326	1,015	47	968	389	626	0.44	0.7
	1987	1,774.7	79.2	2,865	1,043	38	1,005	510	533	0.36	0.6
	1988	1,830.7	80.2	2,808	1,104	65	1,039	592	512	0.39	0.6
	1989	1,810.2	80.8	1,994	620	44	576	252	368	0.31	0.3
	1990	1,340.3	61.3	2,289	727	63	664	288	439	0.32	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		
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	160	1,256	1,036	380	1.02	2.5
	1979	505.0	77.3	2,001	1,795	198	1,597	1,327	468	0.90	3.6
	1980	405.8	69.0	3,024	2,157	100	2,057	1,863	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	531	305	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	47	103	53	97	0.39	0.2
	1987	523.4	79.6	1,588	684	56	628	523	161	0.43	1.3
	1988	658.8	98.6	327	144	31	113	60	84	0.44	0.2
	1989	554.6	84.2	852	462	40	422	334	128	0.54	0.8
	1990	608.3	91.6	365	131	42	89	58	73	0.36	0.2
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	65	1,379	1,366	78	1.02	2.7
Type - PWR	1979	520.0	62.8	525	471	81	390	304	167	0.90	0.9
Capacity - 863, 1137 MWe	1980	579.3	69.2	893	637	76	561	515	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	1,256	325	0.83	3.8
	1986	1,313.8	80.4	2,393	993	27	966	784	209	0.41	0.8
	1987	1,624.5	84.1	1,441	505	19	486	370	135	0.35	0.3
	1988	1,594.8	83.2	1,827	804	31	773	523	281	0.44	0.5
	1989	1,428.3	72.9	1,984	1,079	44	1,035	877	202	0.54	0.8
	1990	1,614.9	87.1	1,652	593	35	558	491	102	0.36	0.4

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		
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	52	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	52	105	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	114	482	0.67	1.5
	1987	422.5	81.9	941	568	102	466	115	453	0.60	1.3
	1988	542.5	99.8	375	110	40	70	10	100	0.29	0.2
	1989	318.2	76.2	1,102	507	99	408	113	394	0.46	1.6
	1990	536.0	96.9	336	94	42	52	11	83	0.28	0.2
NINE MILE POINT 1,2	1970	227.0		821	44	12	32	17	27	0.05	0.2
Docket 50-220, 50-410; DPR-63, NPF-69	1971	346.5		1,006	195	43	152	63	132	0.19	0.6
1st commercial operation 12/69, 4/88	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 - 615, 1090 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	61	204	43	222	0.26	0.5
	1986	371.0	65.3	1,878	1,275	38	1,237	730	545	0.68	3.4
	1987	542.6	93.3	1,190	141	35	106	39	102	0.12	0.3

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		
NINE MILE POINT 1,2 (Continued)	1988	0.0	0.0	2,626	854	33	821	509	345	0.33	---
	1989	527.5	29.7	2,737	564	53	511	382	182	0.21	1.1
	1990	656.2	46.6	2,405	699	85	614	467	232	0.29	1.1
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 - 911, 909 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	155	1,790	1,417	528	0.64	1.9
	1985	1,516.9	86.1	2,436	838	141	697	501	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	67.8	2,624	1,521	60	1,461	1,075	446	0.58	1.4
	1988	1,772.7	96.7	992	112	28	84	19	93	0.11	0.1
	1989	1,226.8	72.5	2,861	1,471	36	1,435	1,159	312	0.51	1.2
	1990	1,590.4	90.5	2,161	590	12	578	433	157	0.27	0.4
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	1,329	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 - 846, 846, 846 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	144	1,160	378	926	0.48	0.6
	1986	1,995.6	79.0	2,499	949	36	913	261	688	0.38	0.5
	1987	1,962.6	82.4	2,672	1,142	51	1,091	376	766	0.43	0.6
	1988	2,228.9	87.2	2,672	871	51	820	317	554	0.33	0.4
	1989	2,188.6	85.4	2,205	684	53	631	200	484	0.31	0.3
	1990	2,405.2	91.4	1,948	404	36	368	132	272	0.21	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		
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	1,183	550	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	1,537	517	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	64.2	1,932	522	112	410	211	311	0.27	1.4
	1988	419.6	65.9	2,875	1,504	135	1,369	1,232	272	0.52	3.6
	1989	287.5	57.3	2,395	910	138	772	566	344	0.38	3.2
	1990	511.8	89.1	1,941	310	76	234	131	179	0.16	0.6
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	57	367	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	239	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	48.2	1,122	456	85	371	216	240	0.41	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		
PALISADES (Continued)	1988	413.4	56.8	1,472	730	138	592	466	264	0.50	1.8
	1989	442.8	69.1	1,026	314	70	244	190	124	0.31	0.7
	1990	366.7	58.7	2,414	766	109	657	629	137	0.32	2.1
PALO VERDE 1,2,3	1987	1,638.1	66.1	1,792	669	101	568	437	232	0.37	0.4
Docket 50-528, 50-529; 50-530;	1988	1,700.9	65.5	2,173	688	77	611	472	216	0.32	0.4
NPF-41, NPF-51, NPF-74	1989	965.3	26.5	2,615	720	87	633	559	161	0.28	0.7
1st commercial operation 1/86, 9/86, 1/88	1990	2,500.9	67.5	2,236	499	68	431	373	126	0.22	0.2
Type - PWRs											
Capacity - 1221, 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 - 1055, 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	1,348	629	0.72	1.2
	1983	824.7	41.0	3,107	2,963	331	2,632	2,422	541	0.95	3.6
	1984	1,165.8	57.5	3,313	2,450	225	2,225	2,045	405	0.74	2.1
	1985	682.7	37.5	4,209	3,354	395	2,959	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	20.3	4,363	2,195	178	2,017	1,712	483	0.50	6.0
	1988	0.0	0.0	4,204	2,436	119	2,317	2,120	316	0.58	---
	1989	491.0	35.0	2,301	738	248	490	362	376	0.32	1.5
	1990	1,684.0	85.7	1,585	377	99	278	179	198	0.24	0.2
PERRY	1988	869.3	79.0	782	105	34	71	36	69	0.13	0.1
Docket 50-440; NPF-58	1989	642.2	57.0	1,883	767	113	654	604	163	0.41	1.2
1st commercial operation 11/87	1990	792.7	67.1	1,537	638	51	587	494	144	0.42	0.8
Type - BWR											
Capacity - 1141 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		
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	130	885	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	866	776	386	0.50	2.1
	1984	1.4	0.4	4,542	4,082	647	3,435	3,767	315	0.90	15.7
	1985	587.3	91.5	2,209	893	13	880	739	154	0.40	1.5
	1986	121.9	18.8	2,635	874	110	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	---
	1989	204.6	64.1	1,797	207	137	70	40	167	0.12	1.0
	1990	503.5	82.1	1,898	225	112	113	68	157	0.12	0.4
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, 10/72	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
	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	448	196	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	1,184	219	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	85.5	720	554	55	499	369	185	0.77	0.6
	1988	899.3	88.6	734	410	64	346	235	175	0.56	0.5
	1989	847.8	85.5	736	504	77	427	284	220	0.68	0.6
	1990	875.5	86.5	617	378	53	325	161	217	0.61	0.4

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		
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, 12/74	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	37	292	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	18	237	80	175	0.31	0.3
	1987	969.6	91.6	593	135	9	126	51	84	0.23	0.1
	1988	932.0	89.1	732	199	17	182	62	137	0.27	0.2
	1989	1,001.8	94.7	476	99	10	89	28	71	0.21	0.1
	1990	925.4	89.2	737	188	8	180	74	114	0.26	0.2
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	358	1,260	722	1,618	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	4,838	291	4,547	3,657	1,181	1.57	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	168	2,323	1,898	593	1.38	2.3
	1984	994.6	65.7	1,678	1,579	122	1,457	1,075	504	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	950	128	822	568	382	0.65	0.9
	1987	1,126.6	75.3	1,429	720	79	641	435	285	0.50	0.6
	1988	1,173.7	84.1	1,486	827	136	691	545	282	0.56	0.7
	1989	1,196.3	85.9	1,721	900	143	757	616	284	0.52	0.8
	1990	1,148.9	77.8	2,186	1,028	183	845	713	315	0.47	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		
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	136	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	36	366	277	125	0.27	---
	1987	0.0	0.0	1,533	300	52	248	216	84	0.20	---
	1988	355.8	63.1	693	78	13	65	33	45	0.11	0.2
	1989	179.9	54.7	603	81	9	72	19	62	0.13	0.5
	1990	0.0	0.0	111	13	4	9	2	11	0.12	---
RIVER BEND 1	1987	605.2	68.4	1,268	378	70	308	249	129	0.30	0.6
Docket 50-458; NPF-47	1988	880.7	94.3	513	107	30	77	34	73	0.21	0.1
1st commercial operation 6/86	1989	584.5	69.1	1,566	558	44	514	412	146	0.36	1.0
Type - BWR	1990	682.2	78.0	1,616	489	49	440	348	141	0.30	0.7
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	164	147	0.23	0.5
	1986	577.1	80.3	1,571	539	46	493	340	199	0.34	0.9
	1987	510.1	72.5	1,379	499	54	445	313	186	0.36	1.0

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		
ROBINSON 2 (Continued)	1988	385.0	65.9	1,351	564	44	520	370	194	0.42	1.5
	1989	336.6	48.7	1,098	195	31	164	88	107	0.18	0.6
	1990	400.3	64.8	1,626	437	33	404	356	81	0.27	1.1
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 - 1106, 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	59	145	54	150	0.18	0.1
	1986	1,484.3	70.4	3,554	599	10	589	459	140	0.17	0.4
	1987	1,478.2	73.3	2,543	600	8	592	433	167	0.24	0.4
	1988	1,591.6	73.6	1,609	503	1	502	329	174	0.31	0.3
	1989	1,675.4	79.5	2,944	338	4	334	209	129	0.11	0.2
	1990	1,362.6	65.1	3,636	272	6	266	188	84	0.07	0.2
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	2,167	2,017	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	730	102	0.27	13.5
	1983	0.0	0.0	1,701	155	31	124	113	42	0.09	---
	1984	670.4	68.30	7,514	986	105	881	831	155	0.27	1.5
	1985	1,381.8	132.90	5,742	722	16	173	151	38	0.24	15.50
	1986	1,698.2	61.1	3,594	824	86	738	574	250	0.24	1.10
	1987	1,983.0	78.8	2,138	696	113	583	408	288	0.33	0.4
	1988	1,982.3	68.4	2,324	781	99	682	518	263	0.34	0.4

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		
SAN ONOFRE 1,2,3 (Continued)	1989	1,840.8	64.9	2,237	567	23	544	357	210	0.25	0.3
	1990	1,980.5	69.1	2,224	885	109	776	693	192	0.40	0.4
SEQUOYAH 1,2	1982	583.5	52.8	1,965	570	73	497	61	509	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	152	965	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	31.8	2,439	678	73	605	115	563	0.28	1.4
	1989	1,851.7	85.7	2,007	657	71	586	140	517	0.33	0.4
	1990	1,662.6	77.2	2,934	1,678	102	1,576	352	1,326	0.57	1.0
SOUTH TEXAS 1, 2	1989	769.3	65.6	989	161	10	151	114	47	0.16	0.2
Docket 50-498, 50-499; NPF -76,-80	1990	1,504.1	65.9	1,136	206	18	188	126	80	0.18	0.1
1st commercial operation 8/88, 6/89											
Type - PWRs											
Capacity - 1251, 1251 MWe											
ST. LUCIE 1,2	1977	649.1	84.7	445	152	26	126	92	60	0.34	0.2
Docket 50-335, -389; DPR-67; NPF-16	1978	606.4	76.5	797	337	15	322	140	197	0.42	0.6
1st commercial operation 12/76, 8/83	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 - 839, 839 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	40	1,223	807	456	0.60	1.1
	1985	1,445.8	82.5	1,971	1,344	294	1,050	810	534	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	81.9	2,012	951	1	950	560	391	0.47	0.7
	1988	1,639.7	93.0	1,448	611	54	557	371	240	0.42	0.4
	1989	1,493.1	85.1	1,414	495	24	471	298	197	0.35	0.3
	1990	1,188.4	70.0	1,876	777	83	694	482	295	0.41	0.7

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		
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	71.0	1,075	560	34	526	454	106	0.52	0.9
Capacity - 885 MWe	1988	605.3	69.1	1,127	511	35	476	403	108	0.45	0.8
	1989	652.4	83.1	374	52	11	41	27	25	0.14	0.1
	1990	730.0	83.9	1,090	376	29	347	322	54	0.34	0.5
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, 781 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	1,837	530	1,307	1,248	589	0.83	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	3,836	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	1,490	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	509	1,306	1,232	583	0.57	1.6
	1986	1,080.5	69.0	3,763	2,356	430	1,926	1,677	679	0.63	2.2
	1987	1,132.7	72.7	2,675	712	192	520	325	387	0.27	0.6
	1988	750.4	50.0	3,184	1,542	68	1,474	1,117	425	0.48	2.1
	1989	489.3	33.0	3,100	836	27	809	530	306	0.27	1.7
	1990	1,276.4	83.9	1,947	575	53	522	389	186	0.30	0.5
SUSQUEHANNA 1,2	1984	719.9	72.6	2,827	308	74	234	127	181	0.11	0.4
Docket 50-387, 50-388; NPF-14; NPF-22	1985	1,452.2	76.4	3,669	1,106	78	1,028	790	316	0.30	0.8
1st commercial operation 6/83, 2/85	1986	1,344.8	67.0	2,996	828	50	778	402	426	0.28	0.6
Type - BWR	1987	1,749.5	85.3	2,548	621	36	585	341	280	0.24	0.4
Capacity - 1033, 1039 MWe	1988	1,691.0	83.5	1,904	516	52	464	281	235	0.27	0.3
	1989	1,572.5	77.1	2,063	704	32	672	332	372	0.34	0.4
	1990	1,746.9	85.4	1,691	440	30	410	179	261	0.26	0.3

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		
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	32	472	235	269	0.26	0.7
Capacity - 808, 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	239	155	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	85	1,074	633	526	0.73	---
	1984	0.0	0.0	1,079	688	50	638	330	358	0.64	---
	1985	103.6	10.6	1,890	857	230	627	266	591	0.45	8.3
THREE MILE ISLAND 1*	1986	585.2	70.9	1,360	213	44	169	89	124	0.16	0.4
Docket 50-289; DPR-50	1987	610.7	73.6	1,259	149	40	109	50	99	0.12	0.2
1st commercial operation 9/74	1988	661.0	77.8	1,012	210	40	170	88	122	0.21	0.3
Type - PWR	1989	871.3	100.0	670	54	22	32	3	51	0.08	0.1
Capacity - 808 MWe	1990	645.5	84.6	1,319	264	53	211	121	143	0.20	0.4
THREE MILE ISLAND 2**	1986	0.0	0.0	1,497	915	97	818	615	300	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	26	891	691	226	0.74	---
Type - PWR	1989	0.0	0.0	1,014	639	88	551	382	257	0.63	---
Capacity - 880 MWE	1990	0.0	0.0	484	136	25	111	50	86	0.28	---
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	83	236	125	194	0.45	1.6
1st commercial operation 5/76	1979	631.0	58.1	736	258	74	184	113	145	0.35	0.4
Type - PWR	1980	727.5	72.5	1,159	421	77	344	305	116	0.36	0.6
Capacity - 1095 MWe	1981	775.6	74.1	1,311	609	113	496	363	246	0.46	0.8

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

**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		
TROJAN (Continued)	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	41	392	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	54.0	1,209	363	66	297	266	97	0.30	0.7
	1988	758.6	67.5	1,408	401	108	293	311	90	0.28	0.5
	1989	666.8	61.9	1,360	421	37	384	317	104	0.31	0.6
	1990	732.4	66.3	1,169	258	9	249	185	73	0.22	0.4
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
	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	36.6	1,980	1,371	79	1,292	987	384	0.69	3.2
	1988	809.8	59.5	1,841	738	18	720	523	215	0.40	0.9
	1989	689.9	56.8	1,625	433	25	408	281	152	0.27	0.6
	1990	933.1	69.0	2,099	730	140	590	475	255	0.35	0.8
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

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		
VERMONT YANKEE (Continued)	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	83	543	318	308	0.66	1.6
	1985	361.4	71.8	1,392	1,051	163	888	898	153	0.76	2.9
	1986	248.1	48.9	1,389	1,188	44	1,144	1,091	97	0.86	4.8
	1987	423.6	84.2	827	303	37	266	226	77	0.37	0.7
	1988	492.1	95.7	379	124	27	97	67	57	0.33	0.3
	1989	432.8	84.7	832	288	43	245	220	68	0.35	0.7
	1990	433.1	85.9	849	307	37	270	236	71	0.36	0.7
VOGTLE 1,2	1988	820.4	77.7	1,108	138	13	125	107	31	0.12	0.2
Docket 50-424, 50-425; NPF-68, -81	1989	1,045.8	96.0	427	32	7	25	14	18	0.07	0.0
1st commercial operation 6/87, 5/89	1990	1,710.9	82.7	1,602	466	89	377	323	143	0.29	0.3
Type - PWRs											
Capacity - 1079, 1110 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	74.4	1,013	222	56	166	70	152	0.22	0.4
1st commercial operation 12/84	1987	639.0	70.8	1,201	406	95	311	143	263	0.34	0.6
Type - BWR	1988	707.7	71.8	1,050	353	81	272	93	260	0.34	0.5
Capacity - 1095 MWe	1989	727.2	78.3	1,299	492	161	331	216	276	0.38	0.7
	1990	684.7	67.5	1,348	536	121	415	209	327	0.40	0.8
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	82.5	959	156	33	123	106	50	0.16	0.2
1st commercial operation 9/85	1988	784.3	75.4	1,246	259	79	180	207	52	0.21	0.3
Type - PWR	1989	909.8	82.6	1,306	265	70	195	231	34	0.20	0.3
Capacity - 1075 MWe	1990	1,027.9	92.8	432	47	0	47	24	23	0.11	0.0
WOLF CREEK 1	1986	832.8	73.3	682	143	27	116	78	65	0.21	0.2
Docket 50-482; NPF-42	1987	778.8	71.1	675	138	26	112	82	56	0.20	0.2
1st commercial operation 9/85	1988	794.7	70.7	1,010	297	62	235	177	120	0.29	0.4
Type - PWR	1989	1,108.4	99.5	186	18	4	14	8	10	0.10	0.0
Capacity - 1135 MWe	1990	940.2	81.0	798	195	29	166	130	65	0.24	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		
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	89.8	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	24	258	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	7	467	215	259	0.58	4.4
	1983	163.5	91.4	395	68	18	50	7	61	0.17	0.4
	1984	124.8	71.4	654	348	15	333	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	82.7	593	217	37	180	126	91	0.37	1.6
	1988	136.4	85.2	738	227	35	192	148	79	0.31	1.7
	1989	159.4	92.9	496	62	20	42	19	43	0.12	0.4
	1990	101.1	61.5	702	246	32	214	170	76	0.35	2.4
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	294	723	418	1,017	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	107	813	560	360	0.67	0.7
	1981	1,366.9	72.3	1,754	1,720	50	1,670	1,155	565	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	39	1,127	787	379	0.78	1.0
	1986	1,462.0	73.2	967	474	21	453	330	144	0.49	0.3

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		
ZION 1,2 (Continued)	1987	1,337.0	71.0	1,046	653	38	615	432	221	0.62	0.5
	1988	1,549.1	78.3	1,926	1,260	38	1,222	1,045	215	0.65	0.8
	1989	1,514.1	77.6	1,282	624	21	603	392	232	0.49	0.4
	1990	860.4	46.9	1,385	696	19	677	492	204	0.50	0.8

APPENDIX D

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

1990

APPENDIX D

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

1990

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	4	1	16	21	0.472	0.160	2.537	3.169
OPERATIONS PERSONNEL	26	0	0	26	8.345	0.000	0.000	8.345
HEALTH PHYSICS PERSONNEL	30	2	36	68	6.685	0.280	8.345	15.310
SUPERVISORY PERSONNEL	1	0	0	1	0.165	0.000	0.000	0.165
ENGINEERING PERSONNEL	3	0	3	6	1.161	0.000	0.480	1.641
TOTAL	64	3	55	122	16.828	0.440	11.362	28.630
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	102	5	306	413	28.290	0.856	71.859	101.005
OPERATIONS PERSONNEL	20	0	0	20	4.124	0.000	0.000	4.124
HEALTH PHYSICS PERSONNEL	29	4	81	114	7.215	0.635	26.962	34.812
SUPERVISORY PERSONNEL	1	0	1	2	0.315	0.000	0.130	0.445
ENGINEERING PERSONNEL	0	0	6	6	0.000	0.000	1.147	1.147
TOTAL	152	9	394	555	39.944	1.491	100.098	141.533
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	4	0	28	32	2.095	0.000	6.223	8.318
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	1	2	0.145	0.000	0.180	0.325
ENGINEERING PERSONNEL	2	2	20	24	0.297	0.905	6.326	7.528
TOTAL	7	2	49	58	2.537	0.905	12.729	16.171
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	83	6	519	608	19.662	1.054	193.845	214.561
OPERATIONS PERSONNEL	2	0	1	3	0.973	0.000	0.105	1.078
HEALTH PHYSICS PERSONNEL	28	4	95	127	12.285	1.210	33.054	46.549
SUPERVISORY PERSONNEL	4	0	3	7	1.005	0.000	1.386	2.391
ENGINEERING PERSONNEL	4	0	22	26	0.560	0.000	7.397	7.957
TOTAL	121	10	640	771	34.485	2.264	235.787	272.536
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	11	12	0.505	0.000	1.846	2.351
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	16	1	15	32	5.224	0.175	3.300	8.699
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	17	1	26	44	5.729	0.175	5.146	11.050
REFUELING								
MAINTENANCE PERSONNEL	22	1	340	363	4.122	0.210	155.973	160.305
OPERATIONS PERSONNEL	1	0	2	3	0.135	0.000	1.210	1.345
HEALTH PHYSICS PERSONNEL	29	1	72	102	12.213	0.920	28.031	41.164
SUPERVISORY PERSONNEL	2	0	3	5	0.830	0.000	1.153	1.983
ENGINEERING PERSONNEL	2	1	35	38	0.475	0.307	15.085	15.867
TOTAL	56	3	452	511	17.775	1.437	201.452	220.664
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	216 (136)	13 (8)	1220 (831)	1449 (975)	55.146	2.280	432.283	489.709
OPERATIONS PERSONNEL	49 (43)	0 (0)	3 (3)	52 (46)	13.577	0.000	1.315	14.892
HEALTH PHYSICS PERSONNEL	132 (52)	12 (4)	299 (154)	443 (210)	43.622	3.220	99.692	146.534
SUPERVISORY PERSONNEL	9 (7)	0 (0)	8 (5)	17 (12)	2.460	0.000	2.849	5.309
ENGINEERING PERSONNEL	11 (10)	3 (3)	86 (69)	100 (82)	2.493	1.212	30.435	34.140
GRAND TOTALS	417 (248)	28 (15)	1616 (1062)	2061(1325)	117.298	6.712	566.574	690.584

*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

1990

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	5	0	10	15	1.330	0.000	2.655	3.985
OPERATIONS PERSONNEL	33	0	0	33	7.640	0.000	0.000	7.640
HEALTH PHYSICS PERSONNEL	19	0	13	32	4.515	0.000	4.710	9.225
SUPERVISORY PERSONNEL	16	0	6	22	3.275	0.000	1.305	4.580
ENGINEERING PERSONNEL	7	0	0	7	1.290	0.000	0.000	1.290
TOTAL	80	0	29	109	18.050	0.000	8.670	26.720
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	113	0	91	204	28.385	0.000	30.035	58.420
OPERATIONS PERSONNEL	5	0	0	5	1.005	0.000	0.000	1.005
HEALTH PHYSICS PERSONNEL	12	0	40	52	3.150	0.000	14.510	17.660
SUPERVISORY PERSONNEL	6	0	14	20	0.930	0.000	2.830	3.760
ENGINEERING PERSONNEL	2	0	0	2	0.205	0.000	0.000	0.205
TOTAL	138	0	145	283	33.675	0.000	47.375	81.050
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	54	54	0.025	0.000	28.595	28.620
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	17	17	0.015	0.000	7.030	7.045
SUPERVISORY PERSONNEL	2	0	17	19	0.515	0.000	6.150	6.665
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	2	0	88	90	0.555	0.000	41.775	42.330
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	3	0	196	199	0.705	0.000	84.410	85.115
OPERATIONS PERSONNEL	0	0	1	1	0.000	0.000	0.150	0.150
HEALTH PHYSICS PERSONNEL	1	0	22	23	0.115	0.000	10.340	10.455
SUPERVISORY PERSONNEL	5	0	27	32	1.225	0.000	7.885	9.110
ENGINEERING PERSONNEL	2	0	0	2	0.385	0.000	0.000	0.385
TOTAL	11	0	246	257	2.430	0.000	102.785	105.215
WASTE PROCESSING								
MAINTENANCE PERSONNEL	6	0	1	7	1.400	0.000	0.395	1.795
OPERATIONS PERSONNEL	5	0	0	5	2.925	0.000	0.000	2.925
HEALTH PHYSICS PERSONNEL	3	0	15	18	0.890	0.000	3.200	4.090
SUPERVISORY PERSONNEL	2	0	0	2	0.700	0.000	0.000	0.700
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	16	0	16	32	5.915	0.000	3.595	9.510
REFUELING								
MAINTENANCE PERSONNEL	11	0	17	28	2.450	0.000	6.595	9.045
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	6	6	0.075	0.000	2.175	2.250
SUPERVISORY PERSONNEL	4	0	6	10	0.830	0.000	1.255	2.085
ENGINEERING PERSONNEL	1	0	0	1	0.430	0.000	0.000	0.430
TOTAL	16	0	29	45	3.785	0.000	10.025	13.810
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	138	0	369	507	34.295	0.000	152.685	186.980
OPERATIONS PERSONNEL	43	0	1	44	11.570	0.000	0.150	11.720
HEALTH PHYSICS PERSONNEL	35	0	113	148	8.760	0.000	41.965	50.725
SUPERVISORY PERSONNEL	35	0	70	105	7.475	0.000	19.425	26.900
ENGINEERING PERSONNEL	12	0	0	12	2.310	0.000	0.000	2.310
GRAND TOTALS	263	0	553	816	64.410	0.000	214.225	278.635

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	1	2	0.400	0.062	0.698	1.160
OPERATIONS PERSONNEL	32	1	0	33	21.258	0.182	0.085	21.525
HEALTH PHYSICS PERSONNEL	12	0	3	15	5.697	0.000	0.807	6.504
SUPERVISORY PERSONNEL	4	0	0	4	1.456	0.095	0.000	1.551
ENGINEERING PERSONNEL	1	0	0	1	0.124	0.000	0.000	0.124
TOTAL	50	1	4	55	28.935	0.339	1.590	30.864
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	23	0	0	23	6.323	0.104	0.221	6.648
OPERATIONS PERSONNEL	1	0	0	1	0.457	0.037	0.000	0.494
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.397	0.000	0.134	0.531
SUPERVISORY PERSONNEL	0	0	0	0	0.046	0.002	0.000	0.048
ENGINEERING PERSONNEL	0	0	0	0	0.056	0.000	0.000	0.056
TOTAL	24	0	0	24	7.279	0.143	0.355	7.777
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	18	11	29	0.137	24.059	8.004	32.200
OPERATIONS PERSONNEL	0	1	0	1	0.003	0.482	0.034	0.519
HEALTH PHYSICS PERSONNEL	6	0	8	14	1.743	0.076	3.354	5.173
SUPERVISORY PERSONNEL	0	0	0	0	0.085	0.101	0.000	0.186
ENGINEERING PERSONNEL	2	0	0	2	1.396	0.000	0.000	1.396
TOTAL	8	19	19	46	3.364	24.718	11.392	39.474
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	30	33	24	87	38.227	39.907	18.048	96.182
OPERATIONS PERSONNEL	7	2	4	13	2.287	1.642	1.438	5.367
HEALTH PHYSICS PERSONNEL	11	0	11	22	10.692	0.000	8.237	18.929
SUPERVISORY PERSONNEL	7	3	0	10	2.179	3.183	0.000	5.362
ENGINEERING PERSONNEL	2	0	1	3	1.027	0.000	0.205	1.232
TOTAL	57	38	40	135	54.412	44.732	27.928	127.072
WASTE PROCESSING								
MAINTENANCE PERSONNEL	9	0	0	9	3.336	0.150	0.014	3.500
OPERATIONS PERSONNEL	1	0	0	1	0.780	0.062	0.000	0.842
HEALTH PHYSICS PERSONNEL	5	0	0	5	1.549	0.000	0.122	1.671
SUPERVISORY PERSONNEL	0	0	1	1	0.010	0.000	0.347	0.357
ENGINEERING PERSONNEL	0	0	0	0	0.009	0.000	0.000	0.009
TOTAL	15	0	1	16	5.684	0.212	0.483	6.379
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.243	0.004	0.000	0.247
OPERATIONS PERSONNEL	19	0	0	19	4.506	0.018	0.000	4.524
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.142	0.000	0.221	0.363
SUPERVISORY PERSONNEL	0	0	0	0	0.003	0.000	0.000	0.003
ENGINEERING PERSONNEL	2	0	2	4	0.433	0.000	0.436	0.869
TOTAL	21	0	3	24	5.327	0.022	0.657	6.006
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	63	51	36	150	48.666	64.286	26.985	139.937
OPERATIONS PERSONNEL	60	4	4	68	29.291	2.423	1.557	33.271
HEALTH PHYSICS PERSONNEL	34	0	23	57	20.220	0.076	12.875	33.171
SUPERVISORY PERSONNEL	11	3	1	15	3.779	3.381	0.347	7.507
ENGINEERING PERSONNEL	7	0	3	10	3.045	0.000	0.641	3.686
GRAND TOTALS	175	58	67	300	105.001	70.166	42.405	217.572

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	7	2	18	1.532	0.052	0.232	1.816
OPERATIONS PERSONNEL	83	0	61	144	5.074	0.000	0.607	5.681
HEALTH PHYSICS PERSONNEL	3	0	0	3	1.224	0.000	0.004	1.228
SUPERVISORY PERSONNEL	14	0	0	14	0.497	0.000	0.000	0.497
ENGINEERING PERSONNEL	22	2	0	24	0.818	0.005	0.007	0.830
TOTAL	131	9	63	203	9.145	0.057	0.850	10.052
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	119	20	607	746	20.965	0.148	58.182	79.295
OPERATIONS PERSONNEL	136	0	81	217	8.299	0.000	0.805	9.104
HEALTH PHYSICS PERSONNEL	30	0	83	113	10.668	0.000	11.286	21.954
SUPERVISORY PERSONNEL	173	27	106	306	6.205	0.058	17.215	23.478
ENGINEERING PERSONNEL	91	165	59	315	3.439	0.476	3.748	7.663
TOTAL	549	212	936	1697	49.576	0.682	91.236	141.494
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	77	77	0.019	0.000	7.370	7.389
OPERATIONS PERSONNEL	0	0	0	0	0.005	0.000	0.006	0.011
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.007	0.000	0.086	0.093
SUPERVISORY PERSONNEL	0	0	0	0	0.005	0.000	0.009	0.014
ENGINEERING PERSONNEL	8	0	0	8	0.294	0.002	0.004	0.300
TOTAL	8	0	78	86	0.330	0.002	7.475	7.807
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	13	0	37	50	2.318	0.000	3.506	5.824
OPERATIONS PERSONNEL	16	0	2	18	0.999	0.000	0.022	1.021
HEALTH PHYSICS PERSONNEL	1	0	4	5	0.361	0.000	0.543	0.904
SUPERVISORY PERSONNEL	19	18	0	37	0.678	0.037	0.000	0.715
ENGINEERING PERSONNEL	1	5	0	6	0.030	0.013	0.000	0.043
TOTAL	50	23	43	116	4.386	0.050	4.071	8.507
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	1	1	0.033	0.000	0.110	0.143
OPERATIONS PERSONNEL	12	0	157	169	0.705	0.000	1.562	2.267
HEALTH PHYSICS PERSONNEL	3	0	0	3	1.048	0.000	0.035	1.083
SUPERVISORY PERSONNEL	17	0	0	17	0.599	0.000	0.000	0.599
ENGINEERING PERSONNEL	0	0	0	0	0.006	0.000	0.017	0.023
TOTAL	32	0	158	190	2.391	0.000	1.724	4.115
REFUELING								
MAINTENANCE PERSONNEL	46	0	27	73	8.139	0.000	2.540	10.679
OPERATIONS PERSONNEL	24	0	0	24	1.434	0.000	0.000	1.434
HEALTH PHYSICS PERSONNEL	3	0	3	6	0.979	0.000	0.366	1.345
SUPERVISORY PERSONNEL	53	0	2	55	1.903	0.000	0.312	2.215
ENGINEERING PERSONNEL	5	10	0	15	0.209	0.028	0.000	0.237
TOTAL	131	10	32	173	12.664	0.028	3.218	15.910
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	187	27	751	965	33.006	0.200	71.940	105.146
OPERATIONS PERSONNEL	271	0	301	572	16.516	0.000	3.002	19.518
HEALTH PHYSICS PERSONNEL	40	0	91	131	14.287	0.000	12.320	26.607
SUPERVISORY PERSONNEL	276	45	108	429	9.887	0.095	17.536	27.518
ENGINEERING PERSONNEL	127	182	59	368	4.796	0.524	3.776	9.096
GRAND TOTALS	901	254	1310	2465	78.492	0.819	108.574	187.885

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	711	9	6	726	9.427	0.135	0.041	9.603
OPERATIONS PERSONNEL	24	4	1	29	2.685	0.008	0.005	2.698
HEALTH PHYSICS PERSONNEL	96	11	0	107	37.927	0.067	0.000	37.994
SUPERVISORY PERSONNEL	21	0	2	23	0.250	0.000	0.023	0.273
ENGINEERING PERSONNEL	77	9	58	144	3.108	0.039	1.795	4.942
TOTAL	929	33	67	1029	53.397	0.249	1.864	55.510
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	1317	10	44	1371	854.334	2.881	20.213	877.428
OPERATIONS PERSONNEL	23	1	1	25	0.556	0.000	0.097	0.653
HEALTH PHYSICS PERSONNEL	115	4	1	120	9.000	0.000	0.087	9.087
SUPERVISORY PERSONNEL	34	0	4	38	5.964	0.000	0.556	6.520
ENGINEERING PERSONNEL	116	12	101	229	16.712	1.602	33.062	51.376
TOTAL	1605	27	151	1783	886.566	4.483	54.015	945.064
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	17	0	0	17	0.601	0.000	0.000	0.601
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	22	0	0	22	0.069	0.000	0.000	0.069
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	3	2	0	5	0.132	0.055	0.000	0.187
TOTAL	42	2	0	44	0.802	0.055	0.000	0.857
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	866	2	12	880	126.569	0.074	0.288	126.931
OPERATIONS PERSONNEL	2	0	0	2	0.025	0.000	0.000	0.025
HEALTH PHYSICS PERSONNEL	77	1	0	78	1.313	0.015	0.000	1.328
SUPERVISORY PERSONNEL	27	0	1	28	1.614	0.000	0.030	1.644
ENGINEERING PERSONNEL	69	8	55	132	3.027	0.219	3.241	6.487
TOTAL	1041	11	68	1120	132.548	0.308	3.559	136.415
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	5	0	0	5	0.088	0.000	0.000	0.088
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	8	0	0	8	0.463	0.000	0.000	0.463
TOTAL	13	0	0	13	0.551	0.000	0.000	0.551
REFUELING								
MAINTENANCE PERSONNEL	29	0	0	29	0.214	0.000	0.000	0.214
OPERATIONS PERSONNEL	7	0	0	7	0.279	0.000	0.000	0.279
HEALTH PHYSICS PERSONNEL	16	0	0	16	0.202	0.000	0.000	0.202
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	3	0	0	3	0.003	0.000	0.000	0.003
TOTAL	55	0	0	55	0.698	0.000	0.000	0.698
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	2940	21	62	3023	991.145	3.090	20.542	1014.777
OPERATIONS PERSONNEL	56	5	2	63	3.545	0.008	0.102	3.655
HEALTH PHYSICS PERSONNEL	331	16	1	348	48.599	0.082	0.087	48.768
SUPERVISORY PERSONNEL	82	0	7	89	7.828	0.000	0.609	8.437
ENGINEERING PERSONNEL	276	31	214	521	23.445	1.915	38.098	63.458
GRAND TOTALS	3685	73	286	4044	1074.562	5.095	59.438	1139.095

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	3	0	7	10	1.800	0.170	2.152	4.122
OPERATIONS PERSONNEL	89	0	39	128	58.277	0.000	19.632	77.909
HEALTH PHYSICS PERSONNEL	65	1	79	145	40.484	0.160	37.963	78.607
SUPERVISORY PERSONNEL	18	0	0	18	6.436	0.015	0.125	6.576
ENGINEERING PERSONNEL	0	1	5	6	0.975	0.150	1.806	2.931
TOTAL	175	2	130	307	107.972	0.495	61.678	170.145
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	205	63	410	678	163.994	37.422	230.912	432.328
OPERATIONS PERSONNEL	0	0	17	17	1.064	0.005	10.062	11.131
HEALTH PHYSICS PERSONNEL	25	1	15	41	10.890	0.529	5.283	16.702
SUPERVISORY PERSONNEL	16	1	11	28	6.121	0.550	4.133	10.804
ENGINEERING PERSONNEL	58	6	118	182	21.104	3.511	67.545	92.160
TOTAL	304	71	571	946	203.173	42.017	317.935	563.125
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	4	9	12	25	1.702	3.215	4.850	9.767
OPERATIONS PERSONNEL	1	0	0	1	0.127	0.000	0.005	0.132
HEALTH PHYSICS PERSONNEL	1	0	1	2	0.209	0.000	0.205	0.414
SUPERVISORY PERSONNEL	2	0	1	3	0.590	0.000	1.041	1.631
ENGINEERING PERSONNEL	5	2	38	45	2.422	0.559	28.478	31.459
TOTAL	13	11	52	76	5.050	3.774	34.579	43.403
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	55	32	542	629	17.348	12.918	645.292	675.558
OPERATIONS PERSONNEL	0	0	11	11	0.085	0.000	3.980	4.065
HEALTH PHYSICS PERSONNEL	13	0	33	46	6.192	0.040	27.208	33.440
SUPERVISORY PERSONNEL	3	1	33	37	0.951	0.185	27.729	28.865
ENGINEERING PERSONNEL	21	4	171	196	7.303	0.839	125.730	133.872
TOTAL	92	37	790	919	31.879	13.982	829.939	875.800
WASTE PROCESSING								
MAINTENANCE PERSONNEL	15	0	13	28	8.166	0.425	5.087	13.678
OPERATIONS PERSONNEL	0	0	0	0	0.015	0.000	0.080	0.095
HEALTH PHYSICS PERSONNEL	6	0	4	10	1.610	0.000	0.930	2.540
SUPERVISORY PERSONNEL	0	0	0	0	0.054	0.000	0.010	0.064
ENGINEERING PERSONNEL	0	0	0	0	0.120	0.010	0.140	0.270
TOTAL	21	0	17	38	9.965	0.435	6.247	16.647
REFUELING								
MAINTENANCE PERSONNEL	20	0	72	92	17.058	0.080	29.034	46.172
OPERATIONS PERSONNEL	0	0	1	1	0.410	0.000	0.215	0.625
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.215	0.000	0.330	0.545
SUPERVISORY PERSONNEL	0	0	0	0	0.450	0.000	0.055	0.505
ENGINEERING PERSONNEL	0	0	25	25	0.520	0.025	9.889	10.434
TOTAL	20	0	99	119	18.653	0.105	39.523	58.281
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	302	104	1056	1462	210.068	54.230	917.327	1181.625
OPERATIONS PERSONNEL	90	0	68	158	59.978	0.005	33.974	93.957
HEALTH PHYSICS PERSONNEL	110	2	133	245	59.600	0.729	71.919	132.248
SUPERVISORY PERSONNEL	39	2	45	86	14.602	0.750	33.093	48.445
ENGINEERING PERSONNEL	84	13	357	454	32.444	5.094	233.588	271.126
GRAND TOTALS	625	121	1659	2405	376.692	60.808	1289.901	1727.401

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	2	1	2	5	0.051	0.009	0.302	0.362
OPERATIONS PERSONNEL	90	0	221	311	14.345	0.000	0.346	14.691
HEALTH PHYSICS PERSONNEL	27	0	34	61	12.102	0.000	6.486	18.588
SUPERVISORY PERSONNEL	44	12	0	56	2.282	0.013	0.000	2.295
ENGINEERING PERSONNEL	26	12	5	43	1.910	0.073	0.248	2.231
TOTAL	189	25	262	476	30.690	0.095	7.382	38.167
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	136	19	659	814	66.557	0.266	130.420	197.243
OPERATIONS PERSONNEL	62	0	1	63	9.671	0.000	0.002	9.673
HEALTH PHYSICS PERSONNEL	20	0	97	117	8.926	0.000	18.576	27.502
SUPERVISORY PERSONNEL	250	72	66	388	12.983	0.075	1.712	14.770
ENGINEERING PERSONNEL	18	97	49	164	1.319	0.583	2.316	4.218
TOTAL	486	188	872	1546	99.456	0.924	153.026	253.406
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	188	189	0.203	0.000	24.284	24.487
OPERATIONS PERSONNEL	1	0	0	1	0.113	0.000	0.000	0.113
HEALTH PHYSICS PERSONNEL	1	0	1	2	0.465	0.000	0.018	0.483
SUPERVISORY PERSONNEL	33	10	1	44	1.747	0.010	0.082	1.839
ENGINEERING PERSONNEL	21	8	16	45	1.528	0.052	0.767	2.347
TOTAL	57	18	206	281	4.056	0.062	25.151	29.269
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	19	2	276	297	9.351	0.026	54.068	63.445
OPERATIONS PERSONNEL	12	0	0	12	1.929	0.000	0.000	1.929
HEALTH PHYSICS PERSONNEL	6	0	1	7	2.435	0.000	0.037	2.472
SUPERVISORY PERSONNEL	65	0	54	119	3.392	0.000	1.072	4.464
ENGINEERING PERSONNEL	10	20	15	45	0.708	0.120	0.771	1.599
TOTAL	112	22	346	480	17.815	0.146	55.948	73.909
WASTE PROCESSING								
MAINTENANCE PERSONNEL	3	0	176	179	0.231	0.000	22.604	22.835
OPERATIONS PERSONNEL	4	0	82	86	1.243	0.000	0.131	1.374
HEALTH PHYSICS PERSONNEL	2	0	0	2	0.191	0.000	0.000	0.191
SUPERVISORY PERSONNEL	3	0	2	5	0.149	0.000	0.010	0.159
ENGINEERING PERSONNEL	2	48	2	52	0.166	0.290	0.098	0.554
TOTAL	14	48	262	324	1.980	0.290	22.843	25.113
REFUELING								
MAINTENANCE PERSONNEL	13	0	5	18	6.508	0.000	0.929	7.437
OPERATIONS PERSONNEL	12	0	0	12	1.934	0.000	0.000	1.934
HEALTH PHYSICS PERSONNEL	1	0	2	3	0.298	0.000	0.010	0.308
SUPERVISORY PERSONNEL	41	0	2	43	2.106	0.000	0.098	2.204
ENGINEERING PERSONNEL	9	41	1	51	0.671	0.248	0.067	0.986
TOTAL	76	41	10	127	11.517	0.248	1.104	12.869
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	174	22	1306	1502	82.901	0.301	232.607	315.809
OPERATIONS PERSONNEL	181	0	304	485	29.235	0.000	0.479	29.714
HEALTH PHYSICS PERSONNEL	57	0	135	192	24.417	0.000	25.127	49.544
SUPERVISORY PERSONNEL	436	94	125	655	22.659	0.098	2.974	25.731
ENGINEERING PERSONNEL	86	226	88	400	6.302	1.366	4.267	11.935
GRAND TOTALS	934	342	1958	3234	165.514	1.765	265.454	432.733

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	5	0	43	48	1.741	0.000	10.189	11.930
OPERATIONS PERSONNEL	60	0	5	65	17.900	0.044	1.125	19.069
HEALTH PHYSICS PERSONNEL	24	0	27	51	5.705	0.000	9.625	15.330
SUPERVISORY PERSONNEL	3	1	0	4	2.321	0.140	0.000	2.461
ENGINEERING PERSONNEL	0	0	0	0	0.482	0.000	0.326	0.808
TOTAL	92	1	75	168	28.149	0.184	21.265	49.598
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	98	0	216	314	33.771	0.000	99.948	133.719
OPERATIONS PERSONNEL	21	0	2	23	8.105	0.202	0.848	9.155
HEALTH PHYSICS PERSONNEL	7	0	3	10	1.560	0.000	0.827	2.387
SUPERVISORY PERSONNEL	9	2	0	11	2.450	0.584	0.000	3.034
ENGINEERING PERSONNEL	10	0	3	13	2.553	0.022	1.113	3.688
TOTAL	145	2	224	371	48.439	0.808	102.736	151.983
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	3	0	59	62	0.742	0.000	25.523	26.265
OPERATIONS PERSONNEL	8	0	4	12	3.498	0.000	1.342	4.840
HEALTH PHYSICS PERSONNEL	3	0	12	15	1.041	0.000	4.701	5.742
SUPERVISORY PERSONNEL	4	0	0	4	1.660	0.032	0.000	1.692
ENGINEERING PERSONNEL	3	0	34	37	0.841	0.000	21.557	22.398
TOTAL	21	0	109	130	7.782	0.032	53.123	60.937
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	7	0	119	126	2.060	0.000	59.497	61.557
OPERATIONS PERSONNEL	13	0	1	14	5.590	0.000	0.160	5.750
HEALTH PHYSICS PERSONNEL	0	0	4	4	0.000	0.000	1.760	1.760
SUPERVISORY PERSONNEL	0	3	0	3	0.046	2.332	0.000	2.378
ENGINEERING PERSONNEL	2	1	56	59	1.394	0.588	61.528	63.510
TOTAL	22	4	180	206	9.090	2.920	122.945	134.955
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.060	0.000	0.188	0.248
OPERATIONS PERSONNEL	17	0	2	19	4.891	0.000	0.493	5.384
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.498	0.000	0.229	0.727
SUPERVISORY PERSONNEL	1	0	0	1	0.249	0.000	0.000	0.249
ENGINEERING PERSONNEL	0	0	0	0	0.029	0.000	0.157	0.186
TOTAL	18	0	2	20	5.727	0.000	1.067	6.794
REFUELING								
MAINTENANCE PERSONNEL	13	0	50	63	3.199	0.000	25.629	28.828
OPERATIONS PERSONNEL	3	0	0	3	2.399	0.000	0.207	2.606
HEALTH PHYSICS PERSONNEL	0	0	12	12	0.133	0.000	3.424	3.557
SUPERVISORY PERSONNEL	1	0	0	1	0.513	0.000	0.000	0.513
ENGINEERING PERSONNEL	3	0	2	5	0.957	0.000	1.268	2.225
TOTAL	20	0	64	84	7.201	0.000	30.528	37.729
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	126 (108)	0 (0)	487 (314)	613 (422)	41.573	0.000	220.974	262.547
OPERATIONS PERSONNEL	122 (113)	0 (0)	14 (11)	136 (124)	42.383	0.246	4.175	46.804
HEALTH PHYSICS PERSONNEL	34 (26)	0 (0)	58 (50)	92 (76)	8.937	0.000	20.566	29.503
SUPERVISORY PERSONNEL	18 (19)	6 (4)	0 (0)	24 (23)	7.239	3.088	0.000	10.327
ENGINEERING PERSONNEL	18 (19)	1 (1)	95 (95)	114 (115)	6.256	0.610	85.949	92.815
GRAND TOTALS	318 (285)	7 (5)	654 (470)	979 (760)	106.388	3.944	331.664	441.996

*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

1990

PLANT: *CALVERT CLIFFS 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	21	0	0	21	2.966	0.000	0.000	2.966
HEALTH PHYSICS PERSONNEL	4	0	30	34	0.717	0.000	6.163	6.880
SUPERVISORY PERSONNEL	1	0	0	1	0.144	0.000	0.000	0.144
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	26	0	30	56	3.827	0.000	6.163	9.990
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	5	0	16	21	1.227	0.000	2.616	3.843
OPERATIONS PERSONNEL	0	0	1	1	0.000	0.000	0.201	0.201
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	0.108	0.108
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	5	0	18	23	1.227	0.000	2.925	4.152
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	6	15	19	40	0.793	5.916	5.539	12.248
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	1	0	7	8	0.118	0.000	1.416	1.534
SUPERVISORY PERSONNEL	0	1	1	2	0.000	0.446	0.114	0.560
ENGINEERING PERSONNEL	2	0	0	2	0.684	0.000	0.000	0.684
TOTAL	9	16	27	52	1.595	6.362	7.069	15.026
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	80	37	237	354	28.036	13.236	99.475	140.747
OPERATIONS PERSONNEL	11	0	3	14	2.528	0.000	0.489	3.017
HEALTH PHYSICS PERSONNEL	12	0	60	72	3.890	0.000	14.384	18.274
SUPERVISORY PERSONNEL	1	0	19	20	0.112	0.000	6.555	6.667
ENGINEERING PERSONNEL	6	0	14	20	1.260	0.000	3.814	5.074
TOTAL	110	37	333	480	35.826	13.236	124.717	173.779
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	7	9	0.340	0.000	1.135	1.475
OPERATIONS PERSONNEL	0	0	1	1	0.000	0.000	0.116	0.116
HEALTH PHYSICS PERSONNEL	15	0	30	45	3.557	0.000	6.617	10.174
SUPERVISORY PERSONNEL	1	0	0	1	0.155	0.000	0.000	0.155
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	18	0	38	56	4.052	0.000	7.868	11.920
REFUELING								
MAINTENANCE PERSONNEL	17	6	12	35	9.769	2.033	3.519	15.321
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	9	0	49	58	2.387	0.000	11.367	13.754
SUPERVISORY PERSONNEL	2	0	0	2	1.331	0.000	0.000	1.331
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	28	6	61	95	13.487	2.033	14.886	30.406
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	110 (108)	58 (51)	291 (262)	459 (421)	40.165	21.185	112.284	173.634
OPERATIONS PERSONNEL	32 (35)	0 (0)	5 (8)	37 (43)	5.494	0.000	0.806	6.300
HEALTH PHYSICS PERSONNEL	41 (31)	0 (0)	176 (128)	217 (159)	10.669	0.000	39.947	50.616
SUPERVISORY PERSONNEL	5 (5)	1 (1)	21 (22)	27 (28)	1.742	0.446	6.777	8.965
ENGINEERING PERSONNEL	8 (10)	0 (0)	14 (17)	22 (27)	1.944	0.000	3.814	5.758
GRAND TOTALS	196 (189)	59 (52)	507 (437)	762 (678)	60.014	21.631	163.628	245.273

*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

1990

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	245	449	254	948	4.600	3.906	2.615	11.121
OPERATIONS PERSONNEL	66	1	39	106	20.850	0.000	1.385	22.235
HEALTH PHYSICS PERSONNEL	46	2	139	187	10.560	0.000	15.654	26.214
SUPERVISORY PERSONNEL	0	0	4	4	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	97	19	13	129	6.910	0.015	0.245	7.170
TOTAL	454	471	449	1374	42.920	3.921	19.899	66.740
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	246	436	210	892	104.278	161.832	83.773	349.883
OPERATIONS PERSONNEL	62	1	46	109	1.425	0.200	29.215	30.840
HEALTH PHYSICS PERSONNEL	47	1	137	185	12.030	0.150	34.293	46.473
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	89	15	4	108	17.195	1.160	3.530	21.885
TOTAL	444	453	397	1294	134.928	163.342	150.811	449.081
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	80	209	82	371	4.530	42.227	20.445	67.202
OPERATIONS PERSONNEL	56	0	23	79	8.967	0.000	2.545	11.512
HEALTH PHYSICS PERSONNEL	16	0	69	85	1.645	0.000	15.965	17.610
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	65	15	16	96	20.830	15.110	7.675	43.615
TOTAL	217	224	190	631	35.972	57.337	46.630	139.939
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	207	400	145	752	19.460	123.412	91.930	234.802
OPERATIONS PERSONNEL	24	1	27	52	0.465	0.010	1.870	2.345
HEALTH PHYSICS PERSONNEL	36	0	105	141	3.505	0.000	20.876	24.381
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	53	6	4	63	5.105	0.265	0.040	5.410
TOTAL	320	407	281	1008	28.535	123.687	114.716	266.938
WASTE PROCESSING								
MAINTENANCE PERSONNEL	14	37	3	54	0.010	0.070	0.000	0.080
OPERATIONS PERSONNEL	2	1	42	45	0.000	0.000	2.135	2.135
HEALTH PHYSICS PERSONNEL	26	0	21	47	1.005	0.000	0.630	1.635
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	19	0	0	19	0.725	0.000	0.000	0.725
TOTAL	61	38	66	165	1.740	0.070	2.765	4.575
REFUELING								
MAINTENANCE PERSONNEL	37	37	11	85	2.155	0.065	0.170	2.390
OPERATIONS PERSONNEL	8	0	3	11	0.280	0.000	0.140	0.420
HEALTH PHYSICS PERSONNEL	9	0	26	35	0.025	0.000	0.080	0.105
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	17	1	1	19	0.040	0.000	0.000	0.040
TOTAL	71	38	41	150	2.500	0.065	0.390	2.955
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	829 (247)	1568 (456)	705 (268)	3102 (971)	135.033	331.512	198.933	665.478
OPERATIONS PERSONNEL	218 (66)	4 (1)	180 (47)	402 (114)	31.987	0.210	37.290	69.487
HEALTH PHYSICS PERSONNEL	180 (47)	3 (1)	497 (138)	680 (186)	28.770	0.150	87.498	116.418
SUPERVISORY PERSONNEL	0 (0)	0 (0)	4 (0)	4 (0)	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	340 (97)	56 (19)	38 (18)	434 (134)	50.805	16.550	11.490	78.845
GRAND TOTALS	1567 (457)	1631 (477)	1424 (471)	4622(1405)	246.595	348.422	335.211	930.228

*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

1990

PLANT: *CLINTON

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	94	0	422	516	27.503	0.000	235.352	262.855
OPERATIONS PERSONNEL	34	0	31	65	13.031	0.000	12.026	25.057
HEALTH PHYSICS PERSONNEL	40	0	81	121	19.275	0.000	42.452	61.727
SUPERVISORY PERSONNEL	13	0	38	51	3.487	0.000	9.196	12.683
ENGINEERING PERSONNEL	3	0	57	60	0.919	0.000	31.200	32.119
TOTAL	184	0	629	813	64.215	0.000	330.226	394.441
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	10	0	31	41	5.042	0.000	10.622	15.664
OPERATIONS PERSONNEL	2	0	0	2	0.687	0.000	0.028	0.715
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.470	0.000	0.899	1.369
SUPERVISORY PERSONNEL	0	0	0	0	0.072	0.000	0.060	0.132
ENGINEERING PERSONNEL	0	0	2	2	0.104	0.000	0.489	0.593
TOTAL	12	0	34	46	6.375	0.000	12.098	18.473
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	8	9	0.241	0.000	3.757	3.998
OPERATIONS PERSONNEL	0	0	1	1	0.039	0.000	0.267	0.306
HEALTH PHYSICS PERSONNEL	3	0	0	3	0.748	0.000	0.346	1.094
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.125	0.125
ENGINEERING PERSONNEL	0	0	8	8	0.082	0.000	1.750	1.832
TOTAL	4	0	17	21	1.110	0.000	6.245	7.355
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	72	0	160	232	26.292	0.055	61.686	88.033
OPERATIONS PERSONNEL	9	0	4	13	2.235	0.000	0.886	3.121
HEALTH PHYSICS PERSONNEL	23	0	24	47	7.406	0.000	7.832	15.238
SUPERVISORY PERSONNEL	0	0	1	1	0.184	0.000	0.506	0.690
ENGINEERING PERSONNEL	3	0	1	4	1.132	0.000	0.303	1.435
TOTAL	107	0	190	297	37.249	0.055	71.213	108.517
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	2	2	0.661	0.000	1.823	2.484
OPERATIONS PERSONNEL	0	0	0	0	0.189	0.000	0.000	0.189
HEALTH PHYSICS PERSONNEL	2	0	0	2	0.587	0.000	0.046	0.633
SUPERVISORY PERSONNEL	0	0	0	0	0.017	0.000	0.000	0.017
ENGINEERING PERSONNEL	0	0	1	1	0.000	0.000	0.350	0.350
TOTAL	2	0	3	5	1.454	0.000	2.219	3.673
REFUELING								
MAINTENANCE PERSONNEL	0	0	3	3	0.702	0.000	2.420	3.122
OPERATIONS PERSONNEL	0	0	0	0	0.119	0.000	0.029	0.148
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.058	0.000	0.167	0.225
SUPERVISORY PERSONNEL	0	0	0	0	0.094	0.000	0.143	0.237
ENGINEERING PERSONNEL	0	0	0	0	0.022	0.000	0.270	0.292
TOTAL	0	0	3	3	0.995	0.000	3.029	4.024
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	177	0	626	803	60.441	0.055	315.660	376.156
OPERATIONS PERSONNEL	45	0	36	81	16.300	0.000	13.236	29.536
HEALTH PHYSICS PERSONNEL	68	0	106	174	28.544	0.000	51.742	80.286
SUPERVISORY PERSONNEL	13	0	39	52	3.854	0.000	10.030	13.884
ENGINEERING PERSONNEL	6	0	69	75	2.259	0.000	34.362	36.621
GRAND TOTALS	309	0	876	1185	111.398	0.055	425.030	536.483

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	9	1	56	66	1.169	0.098	9.833	11.100
OPERATIONS PERSONNEL	67	1	14	82	13.600	0.401	3.468	17.469
HEALTH PHYSICS PERSONNEL	22	0	93	115	5.182	0.000	36.847	42.029
SUPERVISORY PERSONNEL	1	0	0	1	0.167	0.000	0.000	0.167
ENGINEERING PERSONNEL	7	0	1	8	2.068	0.000	0.086	2.154
TOTAL	106	2	164	272	22.186	0.499	50.234	72.919
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	83	1	362	446	24.680	0.346	142.976	168.002
OPERATIONS PERSONNEL	10	2	20	32	2.380	0.596	7.820	10.796
HEALTH PHYSICS PERSONNEL	9	0	34	43	1.405	0.000	8.427	9.832
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	5	0	2	7	0.936	0.000	0.308	1.244
TOTAL	107	3	418	528	29.401	0.942	159.531	189.874
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	9	0	146	155	1.164	0.000	51.425	52.589
OPERATIONS PERSONNEL	3	1	12	16	0.544	0.117	5.440	6.101
HEALTH PHYSICS PERSONNEL	1	0	8	9	0.226	0.000	2.253	2.479
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	13	1	166	180	1.934	0.117	59.118	61.169
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	8	0	307	315	1.418	0.000	90.081	91.499
OPERATIONS PERSONNEL	2	0	12	14	0.728	0.000	2.313	3.041
HEALTH PHYSICS PERSONNEL	2	0	4	6	0.242	0.000	0.453	0.695
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.097	0.097
ENGINEERING PERSONNEL	4	4	9	17	0.604	0.635	1.545	2.784
TOTAL	16	4	333	353	2.992	0.635	94.489	98.116
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	73	73	0.000	0.000	20.635	20.635
OPERATIONS PERSONNEL	1	0	10	11	0.136	0.000	3.059	3.195
HEALTH PHYSICS PERSONNEL	4	0	16	20	0.427	0.000	3.856	4.283
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	0	0	1	0.194	0.000	0.000	0.194
TOTAL	6	0	99	105	0.757	0.000	27.550	28.307
REFUELING								
MAINTENANCE PERSONNEL	7	0	50	57	0.852	0.000	9.668	10.520
OPERATIONS PERSONNEL	7	0	57	64	2.687	0.000	14.881	17.568
HEALTH PHYSICS PERSONNEL	2	0	23	25	0.212	0.000	5.269	5.481
SUPERVISORY PERSONNEL	1	0	0	1	0.098	0.000	0.000	0.098
ENGINEERING PERSONNEL	1	0	2	3	0.223	0.000	0.261	0.484
TOTAL	18	0	132	150	4.072	0.000	30.079	34.151
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	116 (93)	2 (2)	994 (700)	1112 (795)	29.283	0.444	324.618	354.345
OPERATIONS PERSONNEL	90 (81)	4 (3)	125 (105)	219 (189)	20.075	1.114	36.981	58.170
HEALTH PHYSICS PERSONNEL	40 (25)	0 (0)	178 (126)	218 (151)	7.694	0.000	57.105	64.799
SUPERVISORY PERSONNEL	2 (2)	0 (0)	1 (1)	3 (3)	0.265	0.000	0.097	0.362
ENGINEERING PERSONNEL	18 (17)	4 (4)	14 (13)	36 (34)	4.025	0.635	2.200	6.860
GRAND TOTALS	266 (218)	10 (9)	1312 (945)	1588(1172)	61.342	2.193	421.001	484.536

*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

1990

PLANT: *COOPER STATION

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	6	0	7	13	0.151	0.000	0.660	0.811
OPERATIONS PERSONNEL	49	0	0	49	18.115	0.000	0.000	18.115
HEALTH PHYSICS PERSONNEL	20	0	15	35	6.057	0.000	0.484	6.541
SUPERVISORY PERSONNEL	3	0	2	5	0.163	0.000	0.422	0.585
ENGINEERING PERSONNEL	18	4	13	35	4.717	0.033	1.319	6.069
TOTAL	96	4	37	137	29.203	0.033	2.885	32.121
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	75	0	403	478	43.412	0.000	221.639	265.051
OPERATIONS PERSONNEL	4	0	0	4	0.051	0.000	0.000	0.051
HEALTH PHYSICS PERSONNEL	20	0	30	50	13.504	0.000	12.325	25.829
SUPERVISORY PERSONNEL	5	0	1	6	0.459	0.000	0.001	0.460
ENGINEERING PERSONNEL	6	25	32	63	0.799	13.240	9.755	23.794
TOTAL	110	25	466	601	58.225	13.240	243.720	315.185
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	17	17	0.000	0.000	4.627	4.627
OPERATIONS PERSONNEL	1	0	0	1	0.054	0.000	0.000	0.054
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	0.050	0.000	0.000	0.050
TOTAL	2	0	17	19	0.104	0.000	4.627	4.731
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	1	0	5	6	0.092	0.000	1.057	1.149
OPERATIONS PERSONNEL	2	0	0	2	0.036	0.000	0.000	0.036
HEALTH PHYSICS PERSONNEL	9	0	3	12	1.198	0.000	0.324	1.522
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	4	0	2	6	0.328	0.000	0.238	0.566
TOTAL	16	0	10	26	1.654	0.000	1.619	3.273
WASTE PROCESSING								
MAINTENANCE PERSONNEL	5	0	0	5	0.042	0.000	0.000	0.042
OPERATIONS PERSONNEL	6	0	0	6	2.936	0.000	0.000	2.936
HEALTH PHYSICS PERSONNEL	12	0	4	16	2.223	0.000	0.197	2.420
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	0	0	1	0.115	0.000	0.000	0.115
TOTAL	24	0	4	28	5.316	0.000	0.197	5.513
REFUELING								
MAINTENANCE PERSONNEL	0	0	3	3	0.000	0.000	0.254	0.254
OPERATIONS PERSONNEL	30	0	0	30	1.083	0.000	0.000	1.083
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.055	0.000	0.000	0.055
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	4	0	0	4	0.309	0.000	0.000	0.309
TOTAL	35	0	3	38	1.447	0.000	0.254	1.701
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	87 (75)	0 (0)	435 (420)	522 (495)	43.697	0.000	228.237	271.934
OPERATIONS PERSONNEL	92 (52)	0 (0)	0 (0)	92 (52)	22.275	0.000	0.000	22.275
HEALTH PHYSICS PERSONNEL	62 (25)	0 (0)	52 (30)	114 (55)	23.037	0.000	13.330	36.367
SUPERVISORY PERSONNEL	8 (6)	0 (0)	3 (2)	11 (8)	0.622	0.000	0.423	1.045
ENGINEERING PERSONNEL	34 (20)	29 (25)	47 (37)	110 (82)	6.318	13.273	11.312	30.903
GRAND TOTALS	283 (178)	29 (25)	537 (489)	849 (692)	95.949	13.273	253.302	362.524

*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

1990

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	5	1	2	8	3.465	1.146	0.635	5.246
OPERATIONS PERSONNEL	0	0	0	0	0.009	0.000	0.000	0.009
HEALTH PHYSICS PERSONNEL	2	0	0	2	1.845	0.000	0.162	2.007
SUPERVISORY PERSONNEL	0	1	0	1	0.198	0.146	0.360	0.704
ENGINEERING PERSONNEL	0	0	0	0	0.039	0.000	0.007	0.046
TOTAL	7	2	2	11	5.556	1.292	1.164	8.012
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	137	112	303	552	42.340	51.607	173.256	267.203
OPERATIONS PERSONNEL	39	0	0	39	9.329	0.000	0.057	9.386
HEALTH PHYSICS PERSONNEL	45	0	121	166	27.656	0.080	71.204	98.940
SUPERVISORY PERSONNEL	5	1	21	27	2.734	0.626	6.652	10.012
ENGINEERING PERSONNEL	1	5	33	39	0.420	3.221	16.743	20.384
TOTAL	227	118	478	823	82.479	55.534	267.912	405.925
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	1	17	18	0.291	1.659	6.242	8.192
OPERATIONS PERSONNEL	2	0	0	2	1.619	0.000	0.000	1.619
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.059	0.000	0.354	0.413
SUPERVISORY PERSONNEL	0	1	4	5	0.071	0.150	1.971	2.192
ENGINEERING PERSONNEL	0	0	6	6	0.000	0.075	3.057	3.132
TOTAL	2	2	27	31	2.040	1.884	11.624	15.548
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	1	1	1.114	0.000	0.801	1.915
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	2	2	1.550	0.000	1.172	2.722
SUPERVISORY PERSONNEL	0	0	0	0	0.351	0.000	0.000	0.351
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	3	3	3.015	0.000	1.973	4.988
REFUELING								
MAINTENANCE PERSONNEL	3	3	30	36	2.530	2.734	26.995	32.259
OPERATIONS PERSONNEL	0	0	0	0	0.036	0.000	0.000	0.036
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.221	0.000	1.991	2.212
SUPERVISORY PERSONNEL	0	0	3	3	0.071	0.145	1.115	1.331
ENGINEERING PERSONNEL	0	0	4	4	0.000	0.102	5.581	5.683
TOTAL	3	3	37	43	2.858	2.981	35.682	41.521
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	145	117	353	615	49.740	57.146	207.929	314.815
OPERATIONS PERSONNEL	41	0	0	41	10.993	0.000	0.057	11.050
HEALTH PHYSICS PERSONNEL	47	0	123	170	31.331	0.080	74.883	106.294
SUPERVISORY PERSONNEL	5	3	28	36	3.425	1.067	10.098	14.590
ENGINEERING PERSONNEL	1	5	43	49	0.459	3.398	25.388	29.245
GRAND TOTALS	239	125	547	911	95.948	61.691	318.355	475.994

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	8	0	134	142	0.096	0.000	0.609	0.705
OPERATIONS PERSONNEL	49	0	0	49	10.564	0.000	0.000	10.564
HEALTH PHYSICS PERSONNEL	39	0	6	45	1.515	0.000	0.036	1.551
SUPERVISORY PERSONNEL	2	0	2	4	0.009	0.000	0.088	0.097
ENGINEERING PERSONNEL	28	0	17	45	0.434	0.000	0.135	0.569
TOTAL	126	0	159	285	12.618	0.000	0.868	13.486
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	83	0	332	415	3.031	0.000	17.984	21.015
OPERATIONS PERSONNEL	5	0	0	5	0.105	0.000	0.000	0.105
HEALTH PHYSICS PERSONNEL	40	0	96	136	9.168	0.000	27.788	36.956
SUPERVISORY PERSONNEL	3	0	1	4	0.076	0.000	0.017	0.093
ENGINEERING PERSONNEL	23	0	4	27	0.661	0.000	0.204	0.865
TOTAL	154	0	433	587	13.041	0.000	45.993	59.034
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	30	0	320	350	0.232	0.000	78.747	78.979
OPERATIONS PERSONNEL	14	0	1	15	0.100	0.000	0.747	0.847
HEALTH PHYSICS PERSONNEL	16	0	28	44	0.652	0.000	1.602	2.254
SUPERVISORY PERSONNEL	1	0	2	3	0.020	0.000	0.039	0.059
ENGINEERING PERSONNEL	11	0	16	27	0.781	0.000	5.840	6.621
TOTAL	72	0	367	439	1.785	0.000	86.975	88.760
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	84	0	504	588	17.821	0.000	203.729	221.550
OPERATIONS PERSONNEL	24	0	0	24	0.118	0.000	0.000	0.118
HEALTH PHYSICS PERSONNEL	40	0	87	127	12.874	0.000	24.970	37.844
SUPERVISORY PERSONNEL	3	0	2	5	0.649	0.000	0.315	0.964
ENGINEERING PERSONNEL	26	0	17	43	5.061	0.000	5.632	10.693
TOTAL	177	0	610	787	36.523	0.000	234.646	271.169
WASTE PROCESSING								
MAINTENANCE PERSONNEL	5	0	2	7	0.002	0.000	0.039	0.041
OPERATIONS PERSONNEL	15	0	0	15	0.005	0.000	0.000	0.005
HEALTH PHYSICS PERSONNEL	28	0	39	67	5.575	0.000	1.471	7.046
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	48	0	41	89	5.582	0.000	1.510	7.092
REFUELING								
MAINTENANCE PERSONNEL	30	0	208	238	1.057	0.000	36.593	37.650
OPERATIONS PERSONNEL	36	0	0	36	1.430	0.000	0.000	1.430
HEALTH PHYSICS PERSONNEL	28	0	29	57	1.369	0.000	3.536	4.905
SUPERVISORY PERSONNEL	2	0	1	3	0.010	0.000	0.020	0.030
ENGINEERING PERSONNEL	16	0	8	24	0.736	0.000	0.852	1.588
TOTAL	112	0	246	358	4.602	0.000	41.001	45.603
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	240	0	1500	1740	22.239	0.000	337.701	359.940
OPERATIONS PERSONNEL	143	0	1	144	12.322	0.000	0.747	13.069
HEALTH PHYSICS PERSONNEL	191	0	285	476	31.153	0.000	59.403	90.556
SUPERVISORY PERSONNEL	11	0	8	19	0.764	0.000	0.479	1.243
ENGINEERING PERSONNEL	104	0	62	166	7.673	0.000	12.663	20.336
GRAND TOTALS	689	0	1856	2545	74.151	0.000	410.993	485.144

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	4	0	0	4	0.404	0.000	0.000	0.404
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.097	0.000	0.000	0.097
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	0.501	0.000	0.000	0.501
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	5	1	3	9	0.688	0.119	0.312	1.119
OPERATIONS PERSONNEL	4	0	2	6	0.486	0.000	0.246	0.732
HEALTH PHYSICS PERSONNEL	27	1	9	37	3.813	0.141	1.005	4.959
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	36	2	14	52	4.987	0.260	1.563	6.810
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	3	6	11	20	1.584	2.064	4.702	8.350
OPERATIONS PERSONNEL	4	0	0	4	0.678	0.000	0.000	0.678
HEALTH PHYSICS PERSONNEL	0	0	2	2	0.000	0.000	0.268	0.268
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	0	4	5	0.211	0.000	1.521	1.732
TOTAL	8	6	17	31	2.473	2.064	6.491	11.028
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	46	14	205	265	11.732	2.840	66.143	80.715
OPERATIONS PERSONNEL	11	0	11	22	1.647	0.000	2.323	3.970
HEALTH PHYSICS PERSONNEL	49	1	64	114	14.003	0.282	17.734	32.019
SUPERVISORY PERSONNEL	1	0	1	2	0.106	0.000	0.515	0.621
ENGINEERING PERSONNEL	2	3	12	17	0.282	0.398	4.308	4.988
TOTAL	109	18	293	420	27.770	3.520	91.023	122.313
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	1	1	0.000	0.000	0.106	0.106
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	3	1	2	6	0.752	0.172	1.238	2.162
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	1	3	7	0.752	0.172	1.344	2.268
REFUELING								
MAINTENANCE PERSONNEL	58	14	175	247	21.558	2.864	42.390	66.812
OPERATIONS PERSONNEL	10	0	7	17	1.727	0.000	1.298	3.025
HEALTH PHYSICS PERSONNEL	15	0	42	57	4.448	0.000	9.943	14.391
SUPERVISORY PERSONNEL	0	0	3	3	0.000	0.000	0.592	0.592
ENGINEERING PERSONNEL	4	1	13	18	0.752	0.242	3.012	4.006
TOTAL	87	15	240	342	28.485	3.106	57.235	88.826
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	112 (97)	35 (34)	395 (401)	542 (532)	35.562	7.887	113.653	157.102
OPERATIONS PERSONNEL	33 (42)	0 (1)	20 (20)	53 (63)	4.942	0.000	3.867	8.809
HEALTH PHYSICS PERSONNEL	95 (69)	3 (2)	119 (102)	217 (173)	23.113	0.595	30.188	53.896
SUPERVISORY PERSONNEL	1 (1)	0 (0)	4 (4)	5 (5)	0.106	0.000	1.107	1.213
ENGINEERING PERSONNEL	7 (9)	4 (5)	29 (31)	40 (45)	1.245	0.640	8.841	10.726
GRAND TOTALS	248 (218)	42 (42)	567 (558)	857 (818)	64.968	9.122	157.656	231.746

*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

1990

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	38	41	39	118	29.600	1.522	15.792	46.914
OPERATIONS PERSONNEL	132	0	118	250	64.525	0.000	14.936	79.461
HEALTH PHYSICS PERSONNEL	8	0	10	18	10.990	0.000	2.283	13.273
SUPERVISORY PERSONNEL	54	32	0	86	18.012	0.351	0.000	18.363
ENGINEERING PERSONNEL	33	45	18	96	8.262	1.538	7.926	17.726
TOTAL	265	118	185	568	131.389	3.411	40.937	175.737
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	329	77	620	1026	257.229	2.890	252.811	512.930
OPERATIONS PERSONNEL	69	0	48	117	33.632	0.000	6.086	39.718
HEALTH PHYSICS PERSONNEL	40	0	21	61	54.110	0.000	5.052	59.162
SUPERVISORY PERSONNEL	205	55	0	260	67.673	0.609	0.000	68.282
ENGINEERING PERSONNEL	80	168	67	315	20.339	5.698	29.349	55.386
TOTAL	723	300	756	1779	432.983	9.197	293.298	735.478
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	465	465	0.088	0.000	189.305	189.393
OPERATIONS PERSONNEL	1	0	3	4	0.339	0.000	0.356	0.695
HEALTH PHYSICS PERSONNEL	0	0	4	4	0.379	0.000	0.972	1.351
SUPERVISORY PERSONNEL	1	7	0	8	0.459	0.074	0.000	0.533
ENGINEERING PERSONNEL	2	56	312	370	0.415	1.905	136.289	138.609
TOTAL	4	63	784	851	1.680	1.979	326.922	330.581
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	46	186	232	0.139	1.726	75.925	77.790
OPERATIONS PERSONNEL	0	0	5	5	0.088	0.000	0.614	0.702
HEALTH PHYSICS PERSONNEL	3	0	7	10	3.370	0.000	1.593	4.963
SUPERVISORY PERSONNEL	1	0	0	1	0.204	0.000	0.000	0.204
ENGINEERING PERSONNEL	0	6	0	6	0.014	0.189	0.172	0.375
TOTAL	4	52	198	254	3.815	1.915	78.304	84.034
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	1	20	22	0.297	0.012	7.953	8.262
OPERATIONS PERSONNEL	3	0	36	39	1.595	0.000	4.611	6.206
HEALTH PHYSICS PERSONNEL	2	0	0	2	3.105	0.000	0.000	3.105
SUPERVISORY PERSONNEL	4	0	0	4	1.264	0.000	0.000	1.264
ENGINEERING PERSONNEL	0	1	0	1	0.000	0.027	0.031	0.058
TOTAL	10	2	56	68	6.261	0.039	12.595	18.895
REFUELING								
MAINTENANCE PERSONNEL	36	0	0	36	28.243	0.000	0.154	28.397
OPERATIONS PERSONNEL	36	0	0	36	17.864	0.000	0.032	17.896
HEALTH PHYSICS PERSONNEL	2	1	0	3	2.963	0.000	0.000	2.963
SUPERVISORY PERSONNEL	16	1	0	17	5.342	0.014	0.000	5.356
ENGINEERING PERSONNEL	1	1	1	3	0.188	0.044	0.073	0.305
TOTAL	91	3	1	95	54.600	0.058	0.259	54.917
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	404	165	1330	1899	315.596	6.150	541.940	863.686
OPERATIONS PERSONNEL	241	0	210	451	118.043	0.000	26.635	144.678
HEALTH PHYSICS PERSONNEL	55	1	42	98	74.917	0.000	9.900	84.817
SUPERVISORY PERSONNEL	281	95	0	376	92.954	1.048	0.000	94.002
ENGINEERING PERSONNEL	116	277	398	791	29.218	9.401	173.840	212.459
GRAND TOTALS	1097	538	1980	3615	630.728	16.599	752.315	1399.642

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	12	18	61	91	7.369	13.475	58.399	79.243
OPERATIONS PERSONNEL	29	0	1	30	26.819	0.000	0.225	27.044
HEALTH PHYSICS PERSONNEL	7	0	12	19	4.520	0.000	5.159	9.679
SUPERVISORY PERSONNEL	3	0	1	4	0.773	0.000	0.171	0.944
ENGINEERING PERSONNEL	7	2	6	15	2.732	0.885	2.911	6.528
TOTAL	58	20	81	159	42.213	14.360	66.865	123.438
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	96	5	237	338	93.708	3.669	223.134	320.511
OPERATIONS PERSONNEL	3	0	0	3	2.008	0.000	0.192	2.200
HEALTH PHYSICS PERSONNEL	8	0	40	48	6.086	0.000	34.833	40.919
SUPERVISORY PERSONNEL	6	0	4	10	2.658	0.201	1.189	4.048
ENGINEERING PERSONNEL	15	1	16	32	6.764	0.531	13.022	20.317
TOTAL	128	6	297	431	111.224	4.401	272.370	387.995
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2	2	29	33	2.128	1.450	26.604	30.182
OPERATIONS PERSONNEL	0	0	0	0	0.143	0.000	0.000	0.143
HEALTH PHYSICS PERSONNEL	2	0	2	4	1.820	0.000	1.167	2.987
SUPERVISORY PERSONNEL	0	0	2	2	0.024	0.000	1.200	1.224
ENGINEERING PERSONNEL	2	0	3	5	1.599	0.000	2.071	3.670
TOTAL	6	2	36	44	5.714	1.450	31.042	38.206
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	9	7	235	251	7.773	5.666	203.421	216.860
OPERATIONS PERSONNEL	1	0	0	1	0.284	0.000	0.182	0.466
HEALTH PHYSICS PERSONNEL	1	0	9	10	0.748	0.000	5.027	5.775
SUPERVISORY PERSONNEL	2	1	4	7	0.690	0.425	3.412	4.527
ENGINEERING PERSONNEL	5	1	13	19	1.835	0.196	10.956	12.987
TOTAL	18	9	261	288	11.330	6.287	222.998	240.615
WASTE PROCESSING								
MAINTENANCE PERSONNEL	8	0	2	10	4.664	0.044	6.476	11.184
OPERATIONS PERSONNEL	3	0	2	5	1.777	0.000	2.295	4.072
HEALTH PHYSICS PERSONNEL	3	0	1	4	3.347	0.000	1.097	4.444
SUPERVISORY PERSONNEL	0	0	1	1	0.067	0.005	2.521	2.593
ENGINEERING PERSONNEL	0	0	0	0	0.170	0.000	0.040	0.210
TOTAL	14	0	6	20	10.025	0.049	12.429	22.503
REFUELING								
MAINTENANCE PERSONNEL	5	0	23	28	3.426	0.056	21.940	25.422
OPERATIONS PERSONNEL	2	0	0	2	0.976	0.000	0.000	0.976
HEALTH PHYSICS PERSONNEL	1	0	4	5	0.839	0.000	2.322	3.161
SUPERVISORY PERSONNEL	0	0	1	1	0.091	0.000	0.294	0.385
ENGINEERING PERSONNEL	2	0	5	7	0.570	0.000	2.932	3.502
TOTAL	10	0	33	43	5.902	0.056	27.488	33.446
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	132 (132)	32 (32)	587 (587)	751 (751)	119.068	24.360	539.974	683.402
OPERATIONS PERSONNEL	38 (40)	0 (0)	3 (3)	41 (43)	32.007	0.000	2.894	34.901
HEALTH PHYSICS PERSONNEL	22 (22)	0 (0)	68 (69)	90 (91)	17.360	0.000	49.605	66.965
SUPERVISORY PERSONNEL	11 (11)	1 (1)	13 (12)	25 (24)	4.303	0.631	8.787	13.721
ENGINEERING PERSONNEL	31 (30)	4 (4)	43 (45)	78 (79)	13.670	1.612	31.932	47.214
GRAND TOTALS	234 (235)	37 (37)	714 (716)	985 (988)	186.408	26.603	633.192	846.203

*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

1990

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	36	1	55	92	0.625	0.008	2.576	3.209
OPERATIONS PERSONNEL	141	0	2	143	15.431	0.000	0.114	15.545
HEALTH PHYSICS PERSONNEL	56	0	95	151	8.487	0.000	14.785	23.272
SUPERVISORY PERSONNEL	28	8	7	43	1.037	0.173	0.139	1.349
ENGINEERING PERSONNEL	34	5	53	92	0.673	0.115	2.858	3.646
TOTAL	295	14	212	521	26.253	0.296	20.472	47.021
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	174	22	208	404	10.750	0.602	14.866	26.218
OPERATIONS PERSONNEL	40	0	4	44	3.645	0.000	0.089	3.734
HEALTH PHYSICS PERSONNEL	55	0	77	132	9.137	0.000	3.339	12.476
SUPERVISORY PERSONNEL	5	3	1	9	0.185	0.053	0.010	0.248
ENGINEERING PERSONNEL	20	1	26	47	0.488	0.001	1.090	1.579
TOTAL	294	26	316	636	24.205	0.656	19.394	44.255
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	4	2	68	74	0.020	0.062	4.231	4.313
OPERATIONS PERSONNEL	2	0	4	6	0.005	0.000	0.087	0.092
HEALTH PHYSICS PERSONNEL	6	0	12	18	0.245	0.000	0.188	0.433
SUPERVISORY PERSONNEL	2	1	2	5	0.017	0.008	0.030	0.055
ENGINEERING PERSONNEL	10	3	20	33	0.371	0.021	2.928	3.320
TOTAL	24	6	106	136	0.658	0.091	7.464	8.213
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	173	19	718	910	30.163	0.721	267.397	298.281
OPERATIONS PERSONNEL	48	0	7	55	2.456	0.000	1.055	3.511
HEALTH PHYSICS PERSONNEL	69	0	91	160	11.403	0.000	16.913	28.316
SUPERVISORY PERSONNEL	10	6	3	19	0.280	1.096	0.221	1.597
ENGINEERING PERSONNEL	20	7	47	74	0.895	0.162	2.392	3.449
TOTAL	320	32	866	1218	45.197	1.979	287.978	335.154
WASTE PROCESSING								
MAINTENANCE PERSONNEL	29	2	15	46	0.769	0.012	0.173	0.954
OPERATIONS PERSONNEL	15	0	1	16	0.401	0.000	0.005	0.406
HEALTH PHYSICS PERSONNEL	54	0	22	76	6.853	0.000	1.826	8.679
SUPERVISORY PERSONNEL	1	0	0	1	0.293	0.000	0.000	0.293
ENGINEERING PERSONNEL	2	0	2	4	0.003	0.000	0.015	0.018
TOTAL	101	2	40	143	8.319	0.012	2.019	10.350
REFUELING								
MAINTENANCE PERSONNEL	48	3	14	65	6.415	0.074	0.955	7.444
OPERATIONS PERSONNEL	14	0	16	30	0.582	0.000	2.410	2.992
HEALTH PHYSICS PERSONNEL	8	0	12	20	0.249	0.000	0.320	0.569
SUPERVISORY PERSONNEL	4	0	3	7	0.040	0.000	0.090	0.130
ENGINEERING PERSONNEL	7	1	8	16	0.171	0.002	0.749	0.922
TOTAL	81	4	53	138	7.457	0.076	4.524	12.057
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	464	49	1078	1591	48.742	1.479	290.198	340.419
OPERATIONS PERSONNEL	260	0	34	294	22.520	0.000	3.760	26.280
HEALTH PHYSICS PERSONNEL	248	0	309	557	36.374	0.000	37.371	73.745
SUPERVISORY PERSONNEL	50	18	16	84	1.852	1.330	0.490	3.672
ENGINEERING PERSONNEL	93	17	156	266	2.601	0.301	10.032	12.934
GRAND TOTALS	1115	84	1593	2792	112.089	3.110	341.851	457.050

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	7	0	0	7	2.551	0.002	0.164	2.717
OPERATIONS PERSONNEL	46	0	0	46	12.575	0.000	0.257	12.832
HEALTH PHYSICS PERSONNEL	25	0	17	42	7.353	0.000	3.431	10.784
SUPERVISORY PERSONNEL	4	0	0	4	1.263	0.013	0.523	1.799
ENGINEERING PERSONNEL	9	0	0	9	2.355	0.192	0.458	3.005
TOTAL	91	0	17	108	26.097	0.207	4.833	31.137
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	10	0	0	10	4.835	0.000	0.698	5.533
OPERATIONS PERSONNEL	2	0	0	2	0.392	0.000	0.000	0.392
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.022	0.000	0.042	0.064
SUPERVISORY PERSONNEL	0	0	0	0	0.064	0.000	0.000	0.064
ENGINEERING PERSONNEL	0	0	0	0	0.161	0.003	0.005	0.169
TOTAL	12	0	0	12	5.474	0.003	0.745	6.222
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	1	1	0.117	0.000	0.139	0.256
OPERATIONS PERSONNEL	0	0	0	0	0.009	0.000	0.000	0.009
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.119	0.000	0.000	0.119
SUPERVISORY PERSONNEL	0	0	0	0	0.009	0.000	0.000	0.009
ENGINEERING PERSONNEL	0	0	0	0	0.017	0.000	0.005	0.022
TOTAL	0	0	1	1	0.271	0.000	0.144	0.415
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	69	0	15	84	28.309	0.017	5.337	33.663
OPERATIONS PERSONNEL	6	0	6	12	2.205	0.000	1.138	3.343
HEALTH PHYSICS PERSONNEL	15	0	0	15	3.172	0.000	0.359	3.531
SUPERVISORY PERSONNEL	3	0	0	3	1.045	0.000	0.018	1.063
ENGINEERING PERSONNEL	4	0	0	4	1.429	0.136	0.000	1.565
TOTAL	97	0	21	118	36.160	0.153	6.852	43.165
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.009	0.009
OPERATIONS PERSONNEL	0	0	1	1	0.035	0.000	0.460	0.495
HEALTH PHYSICS PERSONNEL	3	0	3	6	0.888	0.000	0.959	1.847
SUPERVISORY PERSONNEL	0	0	0	0	0.070	0.000	0.000	0.070
ENGINEERING PERSONNEL	0	0	0	0	0.042	0.000	0.000	0.042
TOTAL	3	0	4	7	1.035	0.000	1.428	2.463
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	0.042	0.000	0.003	0.045
SUPERVISORY PERSONNEL	0	0	0	0	0.001	0.000	0.000	0.001
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.009	0.009
TOTAL	0	0	0	0	0.043	0.000	0.012	0.055
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	86	0	16	102	35.812	0.019	6.347	42.178
OPERATIONS PERSONNEL	54	0	7	61	15.216	0.000	1.855	17.071
HEALTH PHYSICS PERSONNEL	43	0	20	63	11.596	0.000	4.794	16.390
SUPERVISORY PERSONNEL	7	0	0	7	2.452	0.013	0.541	3.006
ENGINEERING PERSONNEL	13	0	0	13	4.004	0.331	0.477	4.812
GRAND TOTALS	203	0	43	246	69.080	0.363	14.014	83.457

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	85	28	27	140	11.813	0.426	0.255	12.494
OPERATIONS PERSONNEL	118	7	2	127	49.396	0.161	0.035	49.592
HEALTH PHYSICS PERSONNEL	49	8	60	117	11.032	0.008	12.109	23.149
SUPERVISORY PERSONNEL	22	8	21	51	0.562	0.349	0.384	1.295
ENGINEERING PERSONNEL	11	8	13	32	1.858	0.173	1.161	3.192
TOTAL	285	59	123	467	74.661	1.117	13.944	89.722
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	128	55	453	636	83.918	0.738	79.532	164.188
OPERATIONS PERSONNEL	58	8	19	85	4.901	0.000	0.889	5.790
HEALTH PHYSICS PERSONNEL	46	8	83	137	22.874	0.000	20.405	43.279
SUPERVISORY PERSONNEL	31	9	57	97	1.496	0.111	5.654	7.261
ENGINEERING PERSONNEL	24	13	42	79	1.766	0.160	2.412	4.338
TOTAL	287	93	654	1034	114.955	1.009	108.892	224.856
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	68	11	300	379	6.545	0.152	57.398	64.095
OPERATIONS PERSONNEL	30	2	15	47	2.623	0.000	2.520	5.143
HEALTH PHYSICS PERSONNEL	32	6	52	90	2.517	0.000	3.468	5.985
SUPERVISORY PERSONNEL	18	6	70	94	0.377	0.335	18.922	19.634
ENGINEERING PERSONNEL	18	17	34	69	2.207	0.636	1.943	4.786
TOTAL	166	42	471	679	14.269	1.123	84.251	99.643
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	121	37	503	661	39.641	0.584	272.423	312.648
OPERATIONS PERSONNEL	43	4	17	64	2.019	0.000	0.757	2.776
HEALTH PHYSICS PERSONNEL	37	7	65	109	7.992	0.000	10.475	18.467
SUPERVISORY PERSONNEL	25	9	75	109	1.128	0.247	19.639	21.014
ENGINEERING PERSONNEL	29	13	43	85	3.967	0.586	3.865	8.418
TOTAL	255	70	703	1028	54.747	1.417	307.159	363.323
WASTE PROCESSING								
MAINTENANCE PERSONNEL	85	68	212	365	23.781	0.022	12.053	35.856
OPERATIONS PERSONNEL	19	7	12	38	7.387	0.000	2.180	9.567
HEALTH PHYSICS PERSONNEL	28	8	41	77	2.971	0.000	1.348	4.319
SUPERVISORY PERSONNEL	9	6	19	34	0.147	0.107	0.161	0.415
ENGINEERING PERSONNEL	6	1	5	12	0.062	0.000	0.059	0.121
TOTAL	147	90	289	526	34.348	0.129	15.801	50.278
REFUELING								
MAINTENANCE PERSONNEL	79	19	91	189	11.393	0.068	6.321	17.782
OPERATIONS PERSONNEL	50	5	16	71	3.793	0.029	2.284	6.106
HEALTH PHYSICS PERSONNEL	28	6	27	61	5.181	0.000	2.850	8.031
SUPERVISORY PERSONNEL	13	4	26	43	0.140	0.031	0.432	0.603
ENGINEERING PERSONNEL	2	11	4	17	0.020	0.205	0.032	0.257
TOTAL	172	45	164	381	20.527	0.333	11.919	32.779
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	566	218	1586	2370	177.091	1.990	427.982	607.063
OPERATIONS PERSONNEL	318	33	81	432	70.119	0.190	8.665	78.974
HEALTH PHYSICS PERSONNEL	220	43	328	591	52.567	0.008	50.655	103.230
SUPERVISORY PERSONNEL	118	42	268	428	3.850	1.180	45.192	50.222
ENGINEERING PERSONNEL	90	63	141	294	9.880	1.760	9.472	21.112
GRAND TOTALS	1312	399	2404	4115	313.507	5.128	541.966	860.601

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	2	0	2	4	1.040	0.215	0.660	1.915
OPERATIONS PERSONNEL	25	0	2	27	8.944	0.000	0.305	9.249
HEALTH PHYSICS PERSONNEL	10	0	12	22	11.545	0.000	6.954	18.499
SUPERVISORY PERSONNEL	3	0	0	3	1.145	0.000	0.000	1.145
ENGINEERING PERSONNEL	3	0	1	4	1.380	0.010	0.360	1.750
TOTAL	43	0	17	60	24.054	0.225	8.279	32.558
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	28	15	52	95	14.858	9.010	32.467	56.335
OPERATIONS PERSONNEL	1	0	1	2	0.235	0.000	0.440	0.675
HEALTH PHYSICS PERSONNEL	6	0	26	32	6.210	0.000	20.063	26.273
SUPERVISORY PERSONNEL	3	0	0	3	0.490	0.000	0.000	0.490
ENGINEERING PERSONNEL	8	0	6	14	2.250	0.010	4.210	6.470
TOTAL	46	15	85	146	24.043	9.020	57.180	90.243
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	6	4	33	43	3.421	2.000	36.467	41.888
OPERATIONS PERSONNEL	2	0	0	2	0.275	0.000	0.060	0.335
HEALTH PHYSICS PERSONNEL	2	0	4	6	3.485	0.000	4.205	7.690
SUPERVISORY PERSONNEL	0	0	0	0	0.030	0.000	0.000	0.030
ENGINEERING PERSONNEL	2	0	10	12	0.710	0.010	9.572	10.292
TOTAL	12	4	47	63	7.921	2.010	50.304	60.235
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	22	8	44	74	17.240	5.370	28.412	51.022
OPERATIONS PERSONNEL	3	0	0	3	1.079	0.000	0.070	1.149
HEALTH PHYSICS PERSONNEL	6	0	5	11	6.860	0.000	4.380	11.240
SUPERVISORY PERSONNEL	3	0	0	3	0.855	0.000	0.000	0.855
ENGINEERING PERSONNEL	4	0	10	14	2.195	0.080	7.440	9.715
TOTAL	38	8	59	105	28.229	5.450	40.302	73.981
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	1	0	1	0.080	0.005	0.015	0.100
OPERATIONS PERSONNEL	0	0	0	0	0.170	0.000	0.000	0.170
HEALTH PHYSICS PERSONNEL	5	0	6	11	3.655	0.000	4.220	7.875
SUPERVISORY PERSONNEL	1	0	0	1	0.175	0.000	0.000	0.175
ENGINEERING PERSONNEL	0	0	0	0	0.005	0.000	0.000	0.005
TOTAL	6	1	6	13	4.085	0.005	4.235	8.325
REFUELING								
MAINTENANCE PERSONNEL	15	17	14	46	12.598	16.906	8.445	37.949
OPERATIONS PERSONNEL	5	0	1	6	0.930	0.000	0.460	1.390
HEALTH PHYSICS PERSONNEL	2	0	3	5	2.455	0.000	2.900	5.355
SUPERVISORY PERSONNEL	2	0	0	2	0.365	0.000	0.000	0.365
ENGINEERING PERSONNEL	3	0	1	4	1.165	0.000	0.135	1.300
TOTAL	27	17	19	63	17.513	16.906	11.940	46.359
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	73	45	145	263	49.237	33.506	106.466	189.209
OPERATIONS PERSONNEL	36	0	4	40	11.633	0.000	1.335	12.968
HEALTH PHYSICS PERSONNEL	31	0	56	87	34.210	0.000	42.722	76.932
SUPERVISORY PERSONNEL	12	0	0	12	3.060	0.000	0.000	3.060
ENGINEERING PERSONNEL	20	0	28	48	7.705	0.110	21.717	29.532
GRAND TOTALS	172	45	233	450	105.845	33.616	172.240	311.701

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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

1990

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	36	84	205	325	1.641	0.401	1.261	3.303
OPERATIONS PERSONNEL	30	0	2	32	6.990	0.000	0.822	7.812
HEALTH PHYSICS PERSONNEL	14	4	53	71	2.669	0.265	16.935	19.869
SUPERVISORY PERSONNEL	16	9	35	60	2.462	1.000	1.901	5.363
ENGINEERING PERSONNEL	0	2	9	11	0.000	0.000	0.223	0.223
TOTAL	96	99	304	499	13.762	1.666	21.142	36.570
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	37	158	264	459	4.340	12.416	48.354	65.110
OPERATIONS PERSONNEL	21	0	2	23	1.074	0.000	0.000	1.074
HEALTH PHYSICS PERSONNEL	14	4	50	68	5.046	0.186	10.180	15.412
SUPERVISORY PERSONNEL	16	7	30	53	0.549	0.654	4.769	5.972
ENGINEERING PERSONNEL	0	2	8	10	0.000	0.197	1.170	1.367
TOTAL	88	171	354	613	11.009	13.453	64.473	88.935
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	20	28	48	96	0.176	0.803	1.007	1.986
OPERATIONS PERSONNEL	1	0	0	1	0.063	0.000	0.000	0.063
HEALTH PHYSICS PERSONNEL	2	0	9	11	0.181	0.000	0.064	0.245
SUPERVISORY PERSONNEL	8	6	14	28	0.318	0.127	0.710	1.155
ENGINEERING PERSONNEL	0	0	4	4	0.000	0.000	0.202	0.202
TOTAL	31	34	75	140	0.738	0.930	1.983	3.651
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	39	158	285	482	7.026	69.228	80.819	157.073
OPERATIONS PERSONNEL	22	0	2	24	1.519	0.000	0.017	1.536
HEALTH PHYSICS PERSONNEL	10	3	43	56	1.288	0.011	3.127	4.426
SUPERVISORY PERSONNEL	16	9	42	67	2.263	3.547	7.787	13.597
ENGINEERING PERSONNEL	0	2	9	11	0.000	0.108	1.120	1.228
TOTAL	87	172	381	640	12.096	72.894	92.870	177.860
WASTE PROCESSING								
MAINTENANCE PERSONNEL	6	9	28	43	0.035	0.011	1.131	1.177
OPERATIONS PERSONNEL	3	0	2	5	0.035	0.000	0.020	0.055
HEALTH PHYSICS PERSONNEL	3	2	15	20	1.244	0.098	1.806	3.148
SUPERVISORY PERSONNEL	3	2	2	7	0.117	0.003	0.006	0.126
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	15	13	47	75	1.431	0.112	2.963	4.506
REFUELING								
MAINTENANCE PERSONNEL	13	23	83	119	1.477	1.123	13.181	15.781
OPERATIONS PERSONNEL	13	0	1	14	2.267	0.000	0.003	2.270
HEALTH PHYSICS PERSONNEL	4	1	11	16	1.034	0.012	1.703	2.749
SUPERVISORY PERSONNEL	3	3	4	10	0.443	0.153	0.187	0.783
ENGINEERING PERSONNEL	0	0	2	2	0.000	0.000	0.216	0.216
TOTAL	33	27	101	161	5.221	1.288	15.290	21.799
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	151 (37)	460 (161)	913 (277)	1524 (475)	14.695	83.982	145.753	244.430
OPERATIONS PERSONNEL	90 (30)	0 (0)	9 (2)	99 (32)	11.948	0.000	0.862	12.810
HEALTH PHYSICS PERSONNEL	47 (14)	14 (4)	181 (55)	242 (73)	11.462	0.572	33.815	45.849
SUPERVISORY PERSONNEL	62 (16)	36 (9)	127 (37)	225 (62)	6.152	5.484	15.360	26.996
ENGINEERING PERSONNEL	0 (0)	6 (2)	32 (10)	38 (12)	0.000	0.305	2.931	3.236
GRAND TOTALS	350 (97)	516 (176)	1262 (381)	2128 (654)	44.257	90.343	198.721	333.321

*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

1990

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	16	0	17	33	0.179	0.000	0.696	0.875
OPERATIONS PERSONNEL	72	1	19	92	28.934	0.303	0.878	30.115
HEALTH PHYSICS PERSONNEL	39	0	36	75	15.231	0.000	4.129	19.360
SUPERVISORY PERSONNEL	18	0	46	64	1.531	0.000	1.680	3.211
ENGINEERING PERSONNEL	24	0	15	39	2.387	0.000	0.774	3.161
TOTAL	169	1	133	303	48.262	0.303	8.157	56.722
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	155	0	610	765	86.396	0.000	175.906	262.302
OPERATIONS PERSONNEL	24	1	32	57	5.137	0.425	16.679	22.241
HEALTH PHYSICS PERSONNEL	35	0	36	71	14.637	0.000	13.322	27.959
SUPERVISORY PERSONNEL	14	0	37	51	3.701	0.000	8.072	11.773
ENGINEERING PERSONNEL	20	0	15	35	3.926	0.000	2.318	6.244
TOTAL	248	1	730	979	113.797	0.425	216.297	330.519
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	21	0	164	185	1.686	0.000	61.638	63.324
OPERATIONS PERSONNEL	1	0	4	5	0.140	0.000	0.630	0.770
HEALTH PHYSICS PERSONNEL	4	0	3	7	0.066	0.000	0.050	0.116
SUPERVISORY PERSONNEL	10	0	61	71	0.581	0.000	15.388	15.969
ENGINEERING PERSONNEL	2	0	8	10	0.410	0.000	8.250	8.660
TOTAL	38	0	240	278	2.883	0.000	85.956	88.839
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	64	0	36	100	3.281	0.000	2.144	5.425
OPERATIONS PERSONNEL	1	0	2	3	0.005	0.000	1.177	1.182
HEALTH PHYSICS PERSONNEL	8	0	2	10	1.072	0.000	1.147	2.219
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	73	0	40	113	4.358	0.000	4.468	8.826
REFUELING								
MAINTENANCE PERSONNEL	59	0	117	176	1.090	0.000	14.037	15.127
OPERATIONS PERSONNEL	12	0	46	58	0.505	0.000	20.720	21.225
HEALTH PHYSICS PERSONNEL	23	0	16	39	2.869	0.000	2.009	4.878
SUPERVISORY PERSONNEL	10	0	2	12	0.467	0.000	0.139	0.606
ENGINEERING PERSONNEL	8	0	1	9	1.655	0.000	0.035	1.690
TOTAL	112	0	182	294	6.586	0.000	36.940	43.526
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	315	0	944	1259	92.632	0.000	254.421	347.053
OPERATIONS PERSONNEL	110	2	103	215	34.721	0.728	40.084	75.533
HEALTH PHYSICS PERSONNEL	109	0	93	202	33.875	0.000	20.657	54.532
SUPERVISORY PERSONNEL	52	0	146	198	6.280	0.000	25.279	31.559
ENGINEERING PERSONNEL	54	0	39	93	8.378	0.000	11.377	19.755
GRAND TOTALS	640	2	1325	1967	175.886	0.728	351.818	528.432

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	5	6	16	2.200	2.050	4.330	8.580
OPERATIONS PERSONNEL	39	3	0	42	22.600	1.280	0.270	24.150
HEALTH PHYSICS PERSONNEL	18	1	21	40	9.930	0.300	24.890	35.120
SUPERVISORY PERSONNEL	1	0	0	1	0.160	0.000	0.000	0.160
ENGINEERING PERSONNEL	4	8	9	21	1.150	4.650	3.740	9.540
TOTAL	67	17	36	120	36.040	8.280	33.230	77.550
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	50	26	119	195	37.790	12.550	65.200	115.540
OPERATIONS PERSONNEL	1	0	1	2	0.630	0.000	0.480	1.110
HEALTH PHYSICS PERSONNEL	12	1	20	33	7.060	0.160	11.990	19.210
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	5	21	27	0.590	1.970	10.000	12.560
TOTAL	64	32	161	257	46.070	14.680	87.670	148.420
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	10	0	7	17	6.330	0.100	2.860	9.290
OPERATIONS PERSONNEL	0	0	0	0	0.150	0.000	0.000	0.150
HEALTH PHYSICS PERSONNEL	2	1	1	4	1.250	0.230	0.300	1.780
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	3	3	10	16	1.180	1.240	4.880	7.300
TOTAL	15	4	18	37	8.910	1.570	8.040	18.520
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	16	24	114	154	9.010	11.320	62.960	83.290
OPERATIONS PERSONNEL	3	0	1	4	1.030	0.020	2.160	3.210
HEALTH PHYSICS PERSONNEL	8	0	17	25	2.850	0.010	4.470	7.330
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	2	50	52	0.060	0.840	37.130	38.030
TOTAL	27	26	182	235	12.950	12.190	106.720	131.860
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	10	1	11	0.320	2.800	0.560	3.680
OPERATIONS PERSONNEL	0	0	0	0	0.130	0.000	0.060	0.190
HEALTH PHYSICS PERSONNEL	13	2	29	44	11.430	0.430	13.810	25.670
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.130	0.360	0.490
TOTAL	13	12	30	55	11.880	3.360	14.790	30.030
REFUELING								
MAINTENANCE PERSONNEL	3	0	29	32	1.250	0.000	10.960	12.210
OPERATIONS PERSONNEL	0	0	2	2	0.150	0.000	1.270	1.420
HEALTH PHYSICS PERSONNEL	5	0	12	17	1.560	0.000	3.270	4.830
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	26	26	0.070	0.000	12.740	12.810
TOTAL	8	0	69	77	3.030	0.000	28.240	31.270
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	84	65	276	425	56.900	28.820	146.870	232.590
OPERATIONS PERSONNEL	43	3	4	50	24.690	1.300	4.240	30.230
HEALTH PHYSICS PERSONNEL	58	5	100	163	34.080	1.130	58.730	93.940
SUPERVISORY PERSONNEL	1	0	0	1	0.160	0.000	0.000	0.160
ENGINEERING PERSONNEL	8	18	116	142	3.050	8.830	68.850	80.730
GRAND TOTALS	194	91	496	781	118.880	40.080	278.690	437.650

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	0	0	1	1	0.221	0.000	0.475	0.696
OPERATIONS PERSONNEL	14	0	1	15	4.954	0.000	1.067	6.021
HEALTH PHYSICS PERSONNEL	19	0	13	32	5.317	0.000	3.841	9.158
SUPERVISORY PERSONNEL	0	0	0	0	0.125	0.010	0.010	0.145
ENGINEERING PERSONNEL	0	0	0	0	0.789	0.180	0.207	1.176
TOTAL	33	0	15	48	11.406	0.190	5.600	17.196
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	4	1	19	24	2.916	0.180	6.233	9.329
OPERATIONS PERSONNEL	0	0	1	1	0.005	0.000	0.230	0.235
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.194	0.000	0.296	0.490
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.182	0.005	0.084	0.271
TOTAL	4	1	20	25	3.297	0.185	6.843	10.325
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2	0	0	2	0.694	0.000	0.431	1.125
OPERATIONS PERSONNEL	1	0	2	3	0.218	0.000	0.570	0.788
HEALTH PHYSICS PERSONNEL	0	0	2	2	0.280	0.000	0.683	0.963
SUPERVISORY PERSONNEL	0	0	0	0	0.010	0.000	0.000	0.010
ENGINEERING PERSONNEL	0	0	0	0	0.092	0.020	0.075	0.187
TOTAL	3	0	4	7	1.294	0.020	1.759	3.073
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	38	1	74	113	16.847	0.533	32.652	50.032
OPERATIONS PERSONNEL	5	0	2	7	2.661	0.000	0.500	3.161
HEALTH PHYSICS PERSONNEL	18	0	23	41	7.067	0.000	7.945	15.012
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.025	0.025
ENGINEERING PERSONNEL	8	1	13	22	3.568	0.145	3.710	7.423
TOTAL	69	2	112	183	30.143	0.678	44.832	75.653
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.485	0.000	0.175	0.660
OPERATIONS PERSONNEL	1	0	0	1	0.225	0.000	0.000	0.225
HEALTH PHYSICS PERSONNEL	4	0	2	6	1.291	0.000	0.541	1.832
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	1	1	0.010	0.000	0.135	0.145
TOTAL	5	0	3	8	2.011	0.000	0.851	2.862
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	44	2	94	140	21.163	0.713	39.966	61.842
OPERATIONS PERSONNEL	21	0	6	27	8.063	0.000	2.367	10.430
HEALTH PHYSICS PERSONNEL	41	0	40	81	14.149	0.000	13.306	27.455
SUPERVISORY PERSONNEL	0	0	0	0	0.135	0.010	0.035	0.180
ENGINEERING PERSONNEL	8	1	14	23	4.641	0.350	4.211	9.202
GRAND TOTALS	114	3	154	271	48.151	1.073	59.885	109.109

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

PLANT: *HATCH 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	84	0	280	364	40.382	0.181	88.958	129.521
OPERATIONS PERSONNEL	57	0	1	58	25.235	0.069	0.220	25.524
HEALTH PHYSICS PERSONNEL	44	1	34	79	26.657	0.289	14.202	41.148
SUPERVISORY PERSONNEL	48	2	2	52	12.106	1.497	1.658	15.261
ENGINEERING PERSONNEL	16	2	15	33	6.223	0.833	5.497	12.553
TOTAL	249	5	332	586	110.603	2.869	110.535	224.007
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	122	1	437	560	47.815	0.628	162.741	211.184
OPERATIONS PERSONNEL	17	1	0	18	8.185	0.217	0.003	8.405
HEALTH PHYSICS PERSONNEL	39	0	66	105	26.299	0.072	28.274	54.645
SUPERVISORY PERSONNEL	14	2	5	21	5.142	0.964	1.769	7.875
ENGINEERING PERSONNEL	4	1	23	28	2.014	0.238	9.954	12.206
TOTAL	196	5	531	732	89.455	2.119	202.741	294.315
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	27	0	343	370	13.342	0.137	141.367	154.846
OPERATIONS PERSONNEL	0	0	0	0	0.054	0.000	0.003	0.057
HEALTH PHYSICS PERSONNEL	8	0	16	24	7.942	0.021	7.447	15.410
SUPERVISORY PERSONNEL	4	0	1	5	1.781	0.063	0.687	2.531
ENGINEERING PERSONNEL	2	0	17	19	1.990	0.057	6.578	8.625
TOTAL	41	0	377	418	25.109	0.278	156.082	181.469
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	118	4	710	832	57.906	3.750	347.326	408.982
OPERATIONS PERSONNEL	51	0	0	51	22.102	0.076	0.031	22.209
HEALTH PHYSICS PERSONNEL	31	5	88	124	17.612	1.862	48.110	67.584
SUPERVISORY PERSONNEL	19	9	14	42	6.952	6.930	7.789	21.671
ENGINEERING PERSONNEL	19	3	61	83	7.174	1.453	28.910	37.537
TOTAL	238	21	873	1132	111.746	14.071	432.166	557.983
WASTE PROCESSING								
MAINTENANCE PERSONNEL	20	0	223	243	7.712	0.137	58.804	66.653
OPERATIONS PERSONNEL	1	0	0	1	0.197	0.000	0.003	0.200
HEALTH PHYSICS PERSONNEL	9	0	16	25	4.280	0.021	5.917	10.218
SUPERVISORY PERSONNEL	2	0	1	3	0.760	0.063	0.969	1.792
ENGINEERING PERSONNEL	1	0	5	6	0.477	0.057	1.331	1.865
TOTAL	33	0	245	278	13.426	0.278	67.024	80.728
REFUELING								
MAINTENANCE PERSONNEL	14	0	301	315	4.966	0.137	94.099	99.202
OPERATIONS PERSONNEL	9	0	0	9	2.831	0.046	0.003	2.880
HEALTH PHYSICS PERSONNEL	3	0	15	18	1.884	0.021	5.399	7.304
SUPERVISORY PERSONNEL	4	0	4	8	1.004	0.094	1.693	2.791
ENGINEERING PERSONNEL	1	0	8	9	0.406	0.057	3.809	4.272
TOTAL	31	0	328	359	11.091	0.355	105.003	116.449
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	385	5	2294	2684	172.123	4.970	893.295	1070.388
OPERATIONS PERSONNEL	135	1	1	137	58.604	0.408	0.263	59.275
HEALTH PHYSICS PERSONNEL	134	6	235	375	84.674	2.286	109.349	196.309
SUPERVISORY PERSONNEL	91	13	27	131	27.745	9.611	14.565	51.921
ENGINEERING PERSONNEL	43	6	129	178	18.284	2.695	56.079	77.058
GRAND TOTALS	788	31	2686	3505	361.430	19.970	1073.551	1454.951

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	5	0	9	14	3.336	0.249	3.507	7.092
OPERATIONS PERSONNEL	40	2	0	42	10.812	0.778	0.145	11.735
HEALTH PHYSICS PERSONNEL	19	1	6	26	4.170	0.282	2.162	6.614
SUPERVISORY PERSONNEL	0	0	0	0	0.035	0.011	0.022	0.068
ENGINEERING PERSONNEL	2	0	0	2	0.657	0.077	0.005	0.739
TOTAL	66	3	15	84	19.010	1.397	5.841	26.248
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	1.978	0.043	1.448	3.469
OPERATIONS PERSONNEL	3	0	0	3	0.890	0.074	0.037	1.001
HEALTH PHYSICS PERSONNEL	12	1	0	13	3.185	0.177	0.563	3.925
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.058	0.058
ENGINEERING PERSONNEL	0	0	0	0	0.096	0.023	0.031	0.150
TOTAL	15	1	0	16	6.149	0.317	2.137	8.603
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	1	1	0.052	0.005	0.227	0.284
OPERATIONS PERSONNEL	0	0	0	0	0.004	0.000	0.000	0.004
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.082	0.000	0.000	0.082
SUPERVISORY PERSONNEL	0	0	0	0	0.004	0.000	0.000	0.004
ENGINEERING PERSONNEL	0	0	0	0	0.060	0.019	0.000	0.079
TOTAL	0	0	1	1	0.202	0.024	0.227	0.453
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	94	2	132	228	35.783	0.580	48.805	85.168
OPERATIONS PERSONNEL	3	0	1	4	1.998	0.027	0.223	2.248
HEALTH PHYSICS PERSONNEL	34	0	9	43	14.930	0.007	3.158	18.095
SUPERVISORY PERSONNEL	1	1	1	3	0.424	0.167	0.703	1.294
ENGINEERING PERSONNEL	3	3	2	8	1.117	4.020	0.399	5.536
TOTAL	135	6	145	286	54.252	4.801	53.288	112.341
WASTE PROCESSING								
MAINTENANCE PERSONNEL	3	0	7	10	1.756	0.031	3.512	5.299
OPERATIONS PERSONNEL	5	0	0	5	1.595	0.001	0.005	1.601
HEALTH PHYSICS PERSONNEL	21	0	0	21	9.406	0.008	0.200	9.614
SUPERVISORY PERSONNEL	0	0	0	0	0.134	0.002	0.059	0.195
ENGINEERING PERSONNEL	0	0	0	0	0.360	0.000	0.000	0.360
TOTAL	29	0	7	36	13.251	0.042	3.776	17.069
REFUELING								
MAINTENANCE PERSONNEL	8	0	52	60	4.098	0.144	20.587	24.829
OPERATIONS PERSONNEL	2	0	1	3	0.819	0.047	0.209	1.075
HEALTH PHYSICS PERSONNEL	6	0	11	17	1.572	0.000	2.483	4.055
SUPERVISORY PERSONNEL	0	0	1	1	0.012	0.004	0.131	0.147
ENGINEERING PERSONNEL	0	0	0	0	0.136	0.029	0.000	0.165
TOTAL	16	0	65	81	6.637	0.224	23.410	30.271
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	110	2	201	313	47.003	1.052	78.086	126.141
OPERATIONS PERSONNEL	53	2	2	57	16.118	0.927	0.619	17.664
HEALTH PHYSICS PERSONNEL	92	2	26	120	33.345	0.474	8.566	42.385
SUPERVISORY PERSONNEL	1	1	2	4	0.609	0.184	0.973	1.766
ENGINEERING PERSONNEL	5	3	2	10	2.426	4.168	0.435	7.029
GRAND TOTALS	261	10	233	504	99.501	6.805	88.679	194.985

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

PLANT: *INDIAN POINT 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	56	13	171	240	13.402	0.453	28.669	42.524
OPERATIONS PERSONNEL	49	0	0	49	22.265	0.000	0.000	22.265
HEALTH PHYSICS PERSONNEL	16	0	10	26	4.944	0.000	0.000	4.944
SUPERVISORY PERSONNEL	11	0	0	11	2.391	0.000	0.000	2.391
ENGINEERING PERSONNEL	12	1	1	14	2.289	0.131	0.771	3.191
TOTAL	144	14	182	340	45.291	0.584	29.440	75.315
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	46	15	30	91	4.034	0.392	1.625	6.051
OPERATIONS PERSONNEL	8	0	0	8	0.683	0.000	0.000	0.683
HEALTH PHYSICS PERSONNEL	6	0	0	6	0.335	0.000	0.000	0.335
SUPERVISORY PERSONNEL	2	0	1	3	0.235	0.000	0.005	0.240
ENGINEERING PERSONNEL	5	0	0	5	0.140	0.000	0.000	0.140
TOTAL	67	15	31	113	5.427	0.392	1.630	7.449
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	57	40	92	189	2.974	9.861	10.240	23.075
OPERATIONS PERSONNEL	7	0	0	7	0.972	0.000	0.000	0.972
HEALTH PHYSICS PERSONNEL	6	0	2	8	0.638	0.000	0.040	0.678
SUPERVISORY PERSONNEL	2	1	2	5	0.385	0.855	0.774	2.014
ENGINEERING PERSONNEL	7	2	1	10	0.122	0.595	0.005	0.722
TOTAL	79	43	97	219	5.091	11.311	11.059	27.461
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	92	81	392	565	36.743	34.515	408.914	480.172
OPERATIONS PERSONNEL	32	0	0	32	2.847	0.000	0.000	2.847
HEALTH PHYSICS PERSONNEL	9	0	4	13	3.182	0.000	0.000	3.182
SUPERVISORY PERSONNEL	9	1	1	11	1.795	0.084	0.341	2.220
ENGINEERING PERSONNEL	19	2	1	22	3.364	1.300	2.170	6.834
TOTAL	161	84	398	643	47.931	35.899	411.425	495.255
WASTE PROCESSING								
MAINTENANCE PERSONNEL	47	14	154	215	8.732	0.542	49.000	58.274
OPERATIONS PERSONNEL	14	0	0	14	0.202	0.000	0.000	0.202
HEALTH PHYSICS PERSONNEL	16	0	11	27	3.920	0.000	2.545	6.465
SUPERVISORY PERSONNEL	11	0	2	13	2.335	0.000	0.608	2.943
ENGINEERING PERSONNEL	13	1	2	16	1.694	0.030	0.180	1.904
TOTAL	101	15	169	285	16.883	0.572	52.333	69.788
REFUELING								
MAINTENANCE PERSONNEL	22	2	33	57	2.786	1.971	4.205	8.962
OPERATIONS PERSONNEL	12	0	0	12	1.551	0.000	0.000	1.551
HEALTH PHYSICS PERSONNEL	10	0	8	18	0.850	0.000	0.869	1.719
SUPERVISORY PERSONNEL	4	2	0	6	0.336	1.190	0.000	1.526
ENGINEERING PERSONNEL	7	0	1	8	1.191	0.000	0.065	1.256
TOTAL	55	4	42	101	6.714	3.161	5.139	15.014
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	320 (106)	165 (92)	872 (442)	1357 (640)	68.671	47.734	502.653	619.058
OPERATIONS PERSONNEL	122 (53)	0 (0)	0 (0)	122 (53)	28.520	0.000	0.000	28.520
HEALTH PHYSICS PERSONNEL	63 (17)	0 (0)	35 (11)	98 (28)	13.869	0.000	3.454	17.323
SUPERVISORY PERSONNEL	39 (16)	4 (3)	6 (3)	49 (22)	7.477	2.129	1.728	11.334
ENGINEERING PERSONNEL	63 (23)	6 (3)	6 (2)	75 (28)	8.800	2.056	3.191	14.047
GRAND TOTALS	607 (215)	175 (98)	919 (458)	1701 (771)	127.337	51.919	511.026	690.282

*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

1990

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	3	0	10	13	0.300	0.000	1.390	1.690
OPERATIONS PERSONNEL	55	0	4	59	11.750	0.000	0.480	12.230
HEALTH PHYSICS PERSONNEL	26	0	57	83	18.200	0.000	20.960	39.160
SUPERVISORY PERSONNEL	6	0	0	6	1.320	0.000	0.000	1.320
ENGINEERING PERSONNEL	5	0	1	6	0.990	0.000	0.220	1.210
TOTAL	95	0	72	167	32.560	0.000	23.050	55.610
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	9	0	11	20	1.090	0.000	2.260	3.350
OPERATIONS PERSONNEL	17	0	15	32	2.750	0.000	2.460	5.210
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	2	0	0	2	0.510	0.000	0.000	0.510
ENGINEERING PERSONNEL	5	0	3	8	0.820	0.000	0.350	1.170
TOTAL	33	0	29	62	5.170	0.000	5.070	10.240
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	65	65	0.000	0.000	17.110	17.110
OPERATIONS PERSONNEL	11	0	10	21	2.990	0.000	2.450	5.440
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.000	0.000	0.690	0.690
SUPERVISORY PERSONNEL	2	0	0	2	0.820	0.000	0.000	0.820
ENGINEERING PERSONNEL	1	0	0	1	0.190	0.000	0.000	0.190
TOTAL	14	0	76	90	4.000	0.000	20.250	24.250
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	63	2	272	337	31.360	0.700	78.670	110.730
OPERATIONS PERSONNEL	25	4	32	61	6.750	0.670	6.180	13.600
HEALTH PHYSICS PERSONNEL	6	0	2	8	1.180	0.000	0.440	1.620
SUPERVISORY PERSONNEL	14	0	3	17	3.910	0.000	0.930	4.840
ENGINEERING PERSONNEL	3	1	5	9	0.750	0.140	2.270	3.160
TOTAL	111	7	314	432	43.950	1.510	88.490	133.950
WASTE PROCESSING								
MAINTENANCE PERSONNEL	14	0	76	90	8.790	0.000	37.180	45.970
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	2	2	0.000	0.000	0.350	0.350
SUPERVISORY PERSONNEL	3	0	2	5	0.970	0.000	0.320	1.290
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	17	0	80	97	9.760	0.000	37.850	47.610
REFUELING								
MAINTENANCE PERSONNEL	9	0	21	30	1.130	0.000	9.500	10.630
OPERATIONS PERSONNEL	2	0	2	4	0.990	0.000	0.450	1.440
HEALTH PHYSICS PERSONNEL	7	0	3	10	1.350	0.000	0.330	1.680
SUPERVISORY PERSONNEL	5	0	1	6	1.830	0.000	0.810	2.640
ENGINEERING PERSONNEL	2	1	0	3	0.510	0.120	0.000	0.630
TOTAL	25	1	27	53	5.810	0.120	11.090	17.020
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	98	2	455	555	42.670	0.700	146.110	189.480
OPERATIONS PERSONNEL	110	4	63	177	25.230	0.670	12.020	37.920
HEALTH PHYSICS PERSONNEL	39	0	65	104	20.730	0.000	22.770	43.500
SUPERVISORY PERSONNEL	32	0	6	38	9.360	0.000	2.060	11.420
ENGINEERING PERSONNEL	16	2	9	27	3.260	0.260	2.840	6.360
GRAND TOTALS	295	8	598	901	101.250	1.630	185.800	288.680

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	10	0	6	16	0.483	0.000	0.244	0.727
OPERATIONS PERSONNEL	21	0	0	21	3.150	0.000	0.000	3.150
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	4	3	1	8	0.301	0.074	0.105	0.480
ENGINEERING PERSONNEL	8	2	0	10	0.271	0.163	0.000	0.434
TOTAL	43	5	7	55	4.205	0.237	0.349	4.791
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	37	2	44	83	3.466	0.121	9.419	13.006
OPERATIONS PERSONNEL	10	0	10	20	0.665	0.000	1.752	2.417
HEALTH PHYSICS PERSONNEL	18	0	25	43	6.069	0.000	9.607	15.676
SUPERVISORY PERSONNEL	1	0	1	2	0.000	0.000	0.213	0.213
ENGINEERING PERSONNEL	1	1	4	6	0.000	0.012	0.223	0.235
TOTAL	67	3	84	154	10.200	0.133	21.214	31.547
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	5	0	32	37	0.132	0.000	9.413	9.545
OPERATIONS PERSONNEL	0	0	8	8	0.000	0.000	3.650	3.650
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	3	0	1	4	0.347	0.000	0.294	0.641
TOTAL	8	0	41	49	0.479	0.000	13.357	13.836
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	33	2	132	167	7.967	0.413	60.612	68.992
OPERATIONS PERSONNEL	2	0	3	5	0.356	0.000	0.330	0.686
HEALTH PHYSICS PERSONNEL	10	0	0	10	0.486	0.000	0.000	0.486
SUPERVISORY PERSONNEL	2	2	1	5	0.247	0.050	0.000	0.297
ENGINEERING PERSONNEL	7	5	3	15	1.270	1.883	0.409	3.562
TOTAL	54	9	139	202	10.326	2.346	61.351	74.023
WASTE PROCESSING								
MAINTENANCE PERSONNEL	15	2	7	24	0.172	0.011	0.049	0.232
OPERATIONS PERSONNEL	1	0	1	2	0.592	0.000	0.040	0.632
HEALTH PHYSICS PERSONNEL	5	0	2	7	0.727	0.000	0.113	0.840
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	21	2	10	33	1.491	0.011	0.202	1.704
REFUELING								
MAINTENANCE PERSONNEL	14	1	16	31	1.061	0.000	6.733	7.794
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	0.072	0.000	0.000	0.072
ENGINEERING PERSONNEL	1	0	0	1	0.057	0.000	0.000	0.057
TOTAL	16	1	16	33	1.190	0.000	6.733	7.923
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	114	7	237	358	13.281	0.545	86.470	100.296
OPERATIONS PERSONNEL	34	0	22	56	4.763	0.000	5.772	10.535
HEALTH PHYSICS PERSONNEL	33	0	27	60	7.282	0.000	9.720	17.002
SUPERVISORY PERSONNEL	8	5	3	16	0.620	0.124	0.318	1.062
ENGINEERING PERSONNEL	20	8	8	36	1.945	2.058	0.926	4.929
GRAND TOTALS	209	20	297	526	27.891	2.727	103.206	133.824

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	31	29	60	120	30.876	0.634	27.264	58.774
OPERATIONS PERSONNEL	77	0	11	88	30.702	0.000	1.114	31.816
HEALTH PHYSICS PERSONNEL	22	0	0	22	15.916	0.000	0.134	16.050
SUPERVISORY PERSONNEL	42	12	2	56	11.518	0.068	0.134	11.720
ENGINEERING PERSONNEL	52	19	16	87	8.921	0.370	0.986	10.277
TOTAL	224	60	89	373	97.933	1.072	29.632	128.637
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	113	79	489	681	113.412	1.737	222.320	337.469
OPERATIONS PERSONNEL	72	0	5	77	29.203	0.000	0.582	29.785
HEALTH PHYSICS PERSONNEL	35	0	39	74	25.526	0.000	15.111	40.637
SUPERVISORY PERSONNEL	148	54	74	276	40.695	0.308	5.594	46.597
ENGINEERING PERSONNEL	64	145	47	256	11.065	2.858	2.920	16.843
TOTAL	432	278	654	1364	219.901	4.903	246.527	471.331
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	193	193	0.229	0.000	87.859	88.088
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	1	0	2	3	0.869	0.000	0.622	1.491
SUPERVISORY PERSONNEL	0	0	13	13	0.079	0.000	0.969	1.048
ENGINEERING PERSONNEL	4	4	11	19	0.775	0.072	0.645	1.492
TOTAL	5	4	219	228	1.952	0.072	90.095	92.119
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	5	65	180	250	5.402	1.441	81.982	88.825
OPERATIONS PERSONNEL	1	0	0	1	0.300	0.000	0.000	0.300
HEALTH PHYSICS PERSONNEL	5	0	5	10	3.877	0.000	1.887	5.764
SUPERVISORY PERSONNEL	24	0	29	53	6.566	0.000	2.168	8.734
ENGINEERING PERSONNEL	2	52	1	55	0.264	1.015	0.081	1.360
TOTAL	37	117	215	369	16.409	2.456	86.118	104.983
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	35	40	76	0.400	0.774	18.103	19.277
OPERATIONS PERSONNEL	58	0	180	238	23.136	0.000	18.680	41.816
HEALTH PHYSICS PERSONNEL	11	0	0	11	8.118	0.000	0.010	8.128
SUPERVISORY PERSONNEL	14	0	0	14	3.657	0.000	0.050	3.707
ENGINEERING PERSONNEL	1	2	21	24	0.191	0.035	1.296	1.522
TOTAL	85	37	241	363	35.502	0.809	38.139	74.450
REFUELING								
MAINTENANCE PERSONNEL	42	2	18	62	42.034	0.042	8.250	50.326
OPERATIONS PERSONNEL	13	0	0	13	5.264	0.000	0.000	5.264
HEALTH PHYSICS PERSONNEL	5	0	0	5	3.490	0.000	0.000	3.490
SUPERVISORY PERSONNEL	25	0	1	26	6.866	0.000	0.047	6.913
ENGINEERING PERSONNEL	9	45	0	54	1.585	0.873	0.005	2.463
TOTAL	94	47	19	160	59.239	0.915	8.302	68.456
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	192	210	980	1382	192.353	4.628	445.778	642.759
OPERATIONS PERSONNEL	221	0	196	417	88.605	0.000	20.376	108.981
HEALTH PHYSICS PERSONNEL	79	0	46	125	57.796	0.000	17.764	75.560
SUPERVISORY PERSONNEL	253	66	119	438	69.381	0.376	8.962	78.719
ENGINEERING PERSONNEL	132	267	96	495	22.801	5.223	5.933	33.957
GRAND TOTALS	877	543	1437	2857	430.936	10.227	498.813	939.976

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

PLANT: *LIMERICK 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	125	114	281	520	6.146	2.582	7.401	16.129
OPERATIONS PERSONNEL	159	16	40	215	9.515	0.475	1.253	11.243
HEALTH PHYSICS PERSONNEL	53	1	35	89	4.873	0.005	1.854	6.732
SUPERVISORY PERSONNEL	1	0	4	5	0.016	0.000	0.088	0.104
ENGINEERING PERSONNEL	40	7	21	68	1.910	0.131	0.382	2.423
TOTAL	378	138	381	897	22.460	3.193	10.978	36.631
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	121	131	412	664	10.788	10.369	17.490	38.647
OPERATIONS PERSONNEL	141	13	59	213	3.576	0.587	1.511	5.674
HEALTH PHYSICS PERSONNEL	45	1	41	87	2.416	0.005	1.867	4.288
SUPERVISORY PERSONNEL	1	2	4	7	0.002	0.126	0.059	0.187
ENGINEERING PERSONNEL	28	6	43	77	0.670	0.177	0.518	1.365
TOTAL	336	153	559	1048	17.452	11.264	21.445	50.161
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	23	8	23	54	0.242	0.027	0.171	0.440
OPERATIONS PERSONNEL	25	1	5	31	0.359	0.005	0.143	0.507
HEALTH PHYSICS PERSONNEL	22	0	7	29	0.486	0.000	0.241	0.727
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	2	1	4	0.011	0.007	0.007	0.025
TOTAL	71	11	36	118	1.098	0.039	0.562	1.699
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	33	35	127	195	1.415	0.533	2.834	4.782
OPERATIONS PERSONNEL	68	1	20	89	0.586	0.017	0.424	1.027
HEALTH PHYSICS PERSONNEL	36	1	24	61	0.463	0.005	0.220	0.688
SUPERVISORY PERSONNEL	1	0	3	4	0.000	0.000	0.117	0.117
ENGINEERING PERSONNEL	7	0	10	17	0.113	0.000	0.823	0.936
TOTAL	145	37	184	366	2.577	0.555	4.418	7.550
WASTE PROCESSING								
MAINTENANCE PERSONNEL	114	24	84	222	0.297	0.214	1.533	2.044
OPERATIONS PERSONNEL	133	5	24	162	0.686	0.023	2.596	3.305
HEALTH PHYSICS PERSONNEL	41	0	19	60	1.112	0.000	0.701	1.813
SUPERVISORY PERSONNEL	2	0	1	3	0.002	0.000	0.155	0.157
ENGINEERING PERSONNEL	31	0	2	33	0.077	0.000	0.002	0.079
TOTAL	321	29	130	480	2.174	0.237	4.987	7.398
REFUELING								
MAINTENANCE PERSONNEL	138	149	348	635	7.212	16.489	26.955	50.656
OPERATIONS PERSONNEL	163	13	55	231	5.402	0.923	3.434	9.759
HEALTH PHYSICS PERSONNEL	56	0	45	101	2.729	0.000	1.987	4.716
SUPERVISORY PERSONNEL	2	2	8	12	0.043	0.195	0.574	0.812
ENGINEERING PERSONNEL	44	12	46	102	1.862	0.647	2.952	5.461
TOTAL	403	176	502	1081	17.248	18.254	35.902	71.404
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	554 (138)	461 (164)	1275 (482)	2290 (784)	26.100	30.214	56.384	112.698
OPERATIONS PERSONNEL	689 (163)	49 (17)	203 (83)	941 (263)	20.124	2.030	9.361	31.515
HEALTH PHYSICS PERSONNEL	253 (56)	3 (1)	171 (49)	427 (106)	12.079	0.015	6.870	18.964
SUPERVISORY PERSONNEL	7 (2)	4 (2)	20 (9)	31 (13)	0.063	0.321	0.993	1.377
ENGINEERING PERSONNEL	151 (44)	27 (12)	123 (56)	301 (112)	4.643	0.962	4.684	10.289
GRAND TOTALS	1654 (403)	544 (196)	1792 (679)	3990(1278)	63.009	33.542	78.292	174.843

*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

1990

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	16	0	10	26	5.050	0.000	4.836	9.886
OPERATIONS PERSONNEL	50	0	0	50	28.460	0.000	0.000	28.460
HEALTH PHYSICS PERSONNEL	29	0	157	186	15.940	0.000	91.368	107.308
SUPERVISORY PERSONNEL	1	0	8	9	0.520	0.000	3.755	4.275
ENGINEERING PERSONNEL	16	0	2	18	7.952	0.000	1.250	9.202
TOTAL	112	0	177	289	57.922	0.000	101.209	159.131
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	50	0	275	325	31.236	0.000	169.417	200.653
OPERATIONS PERSONNEL	5	0	1	6	2.893	0.000	0.445	3.338
HEALTH PHYSICS PERSONNEL	16	0	27	43	4.042	0.000	13.899	17.941
SUPERVISORY PERSONNEL	2	0	42	44	1.240	0.000	16.052	17.292
ENGINEERING PERSONNEL	7	0	18	25	2.534	0.000	6.861	9.395
TOTAL	80	0	363	443	41.945	0.000	206.674	248.619
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	13	13	0.085	0.000	11.879	11.964
OPERATIONS PERSONNEL	0	0	0	0	0.015	0.000	0.065	0.080
HEALTH PHYSICS PERSONNEL	0	0	5	5	0.005	0.000	3.440	3.445
SUPERVISORY PERSONNEL	0	0	5	5	0.000	0.000	2.700	2.700
ENGINEERING PERSONNEL	1	0	40	41	0.330	0.000	19.955	20.285
TOTAL	1	0	63	64	0.435	0.000	38.039	38.474
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	18	0	78	96	10.402	0.000	30.320	40.722
OPERATIONS PERSONNEL	14	0	0	14	4.087	0.000	0.050	4.137
HEALTH PHYSICS PERSONNEL	18	0	42	60	4.817	0.000	11.815	16.632
SUPERVISORY PERSONNEL	1	0	53	54	0.475	0.000	38.456	38.931
ENGINEERING PERSONNEL	10	0	156	166	5.225	0.000	121.368	126.593
TOTAL	61	0	329	390	25.006	0.000	202.009	227.015
WASTE PROCESSING								
MAINTENANCE PERSONNEL	6	0	5	11	2.415	0.000	3.090	5.505
OPERATIONS PERSONNEL	8	0	0	8	1.866	0.000	0.000	1.866
HEALTH PHYSICS PERSONNEL	5	0	9	14	2.795	0.000	3.498	6.293
SUPERVISORY PERSONNEL	0	0	4	4	0.040	0.000	1.058	1.098
ENGINEERING PERSONNEL	0	0	0	0	0.020	0.000	0.145	0.165
TOTAL	19	0	18	37	7.136	0.000	7.791	14.927
REFUELING								
MAINTENANCE PERSONNEL	18	0	71	89	7.950	0.000	33.378	41.328
OPERATIONS PERSONNEL	14	0	5	19	4.502	0.000	1.285	5.787
HEALTH PHYSICS PERSONNEL	0	0	2	2	0.035	0.000	0.935	0.970
SUPERVISORY PERSONNEL	1	0	4	5	0.220	0.000	1.979	2.199
ENGINEERING PERSONNEL	3	0	7	10	1.520	0.000	1.725	3.245
TOTAL	36	0	89	125	14.227	0.000	39.302	53.529
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	108	0	452	560	57.138	0.000	252.920	310.058
OPERATIONS PERSONNEL	91	0	6	97	41.823	0.000	1.845	43.668
HEALTH PHYSICS PERSONNEL	68	0	242	310	27.634	0.000	124.955	152.589
SUPERVISORY PERSONNEL	5	0	116	121	2.495	0.000	64.000	66.495
ENGINEERING PERSONNEL	37	0	223	260	17.581	0.000	151.304	168.885
GRAND TOTALS	309	0	1039	1348	146.671	0.000	595.024	741.695

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	215	394	302	911	6.975	1.845	0.530	9.350
OPERATIONS PERSONNEL	72	2	55	129	21.608	0.820	3.760	26.188
HEALTH PHYSICS PERSONNEL	51	2	136	189	15.243	0.840	17.586	33.669
SUPERVISORY PERSONNEL	3	0	0	3	0.245	0.000	0.000	0.245
ENGINEERING PERSONNEL	85	19	10	114	3.755	1.220	0.125	5.100
TOTAL	426	417	503	1346	47.826	4.725	22.001	74.552
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	226	422	396	1044	72.742	169.028	103.577	345.347
OPERATIONS PERSONNEL	61	5	57	123	0.915	0.015	38.938	39.868
HEALTH PHYSICS PERSONNEL	50	2	135	187	15.255	0.000	32.275	47.530
SUPERVISORY PERSONNEL	3	0	0	3	0.415	0.000	0.000	0.415
ENGINEERING PERSONNEL	79	21	12	112	25.505	5.945	1.243	32.693
TOTAL	419	450	600	1469	114.832	174.988	176.033	465.853
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	41	131	161	333	0.335	14.345	16.440	31.120
OPERATIONS PERSONNEL	12	1	10	23	0.245	0.015	0.200	0.460
HEALTH PHYSICS PERSONNEL	13	0	78	91	0.965	0.000	7.707	8.672
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	45	5	5	55	2.990	0.315	0.505	3.810
TOTAL	111	137	254	502	4.535	14.675	24.852	44.062
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	190	365	318	873	7.390	102.697	81.185	191.272
OPERATIONS PERSONNEL	31	1	38	70	0.430	0.030	1.491	1.951
HEALTH PHYSICS PERSONNEL	37	0	118	155	2.585	0.000	18.783	21.368
SUPERVISORY PERSONNEL	1	0	0	1	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	59	14	7	80	2.720	0.590	0.585	3.895
TOTAL	318	380	481	1179	13.125	103.317	102.044	218.486
WASTE PROCESSING								
MAINTENANCE PERSONNEL	3	21	9	33	0.000	0.180	0.020	0.200
OPERATIONS PERSONNEL	2	0	42	44	0.010	0.000	1.090	1.100
HEALTH PHYSICS PERSONNEL	24	0	18	42	0.585	0.000	0.080	0.665
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	12	0	0	12	0.515	0.000	0.000	0.515
TOTAL	41	21	69	131	1.110	0.180	1.190	2.480
REFUELING								
MAINTENANCE PERSONNEL	69	145	91	305	3.300	32.280	4.956	40.536
OPERATIONS PERSONNEL	10	0	35	45	0.515	0.000	2.850	3.365
HEALTH PHYSICS PERSONNEL	17	0	65	82	0.825	0.000	6.085	6.910
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	36	2	3	41	0.890	0.020	0.000	0.910
TOTAL	132	147	194	473	5.530	32.300	13.891	51.721
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	744 (227)	1478 (427)	1277 (454)	3499(1108)	90.742	320.375	206.708	617.825
OPERATIONS PERSONNEL	188 (71)	9 (2)	237 (63)	434 (136)	23.723	0.880	48.329	72.932
HEALTH PHYSICS PERSONNEL	192 (52)	4 (2)	550 (137)	746 (191)	35.458	0.840	82.516	118.814
SUPERVISORY PERSONNEL	7 (3)	0 (0)	0 (0)	7 (3)	0.660	0.000	0.000	0.660
ENGINEERING PERSONNEL	316 (86)	61 (21)	37 (12)	414 (119)	36.375	8.090	2.458	46.923
GRAND TOTALS	1447 (439)	1552 (452)	2101 (666)	5100(1557)	186.958	330.185	340.011	857.154

*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

1990

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	11	0	7	18	3.320	0.020	2.080	5.420
OPERATIONS PERSONNEL	36	0	1	37	14.130	0.070	1.570	15.770
HEALTH PHYSICS PERSONNEL	22	0	3	25	6.190	0.000	0.930	7.120
SUPERVISORY PERSONNEL	0	0	0	0	0.020	0.000	0.010	0.030
ENGINEERING PERSONNEL	1	1	0	2	0.490	0.920	0.220	1.630
TOTAL	70	1	11	82	24.150	1.010	4.810	29.970
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	8	0	3	11	2.780	0.000	1.100	3.880
OPERATIONS PERSONNEL	2	0	1	3	0.650	0.000	0.190	0.840
HEALTH PHYSICS PERSONNEL	3	0	2	5	1.170	0.000	0.580	1.750
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.130	0.090	0.050	0.270
TOTAL	13	0	6	19	4.730	0.090	1.920	6.740
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.010	0.000	0.010
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	1	0	0	1	0.250	0.030	0.010	0.290
TOTAL	1	0	0	1	0.250	0.040	0.010	0.300
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	41	0	59	100	12.130	0.060	24.690	36.880
OPERATIONS PERSONNEL	2	0	0	2	0.910	0.000	0.180	1.090
HEALTH PHYSICS PERSONNEL	10	0	4	14	2.640	0.000	0.860	3.500
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	6	6	0.340	0.380	2.490	3.210
TOTAL	53	0	69	122	16.020	0.440	28.220	44.680
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	3	3	0.190	0.000	0.990	1.180
OPERATIONS PERSONNEL	1	0	1	2	0.840	0.000	0.140	0.980
HEALTH PHYSICS PERSONNEL	14	0	15	29	4.780	0.020	5.240	10.040
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	1	1	0.030	0.170	0.250	0.450
TOTAL	15	0	20	35	5.840	0.190	6.620	12.650
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	60	0	72	132	18.420	0.090	28.860	47.370
OPERATIONS PERSONNEL	41	0	3	44	16.530	0.070	2.080	18.680
HEALTH PHYSICS PERSONNEL	49	0	24	73	14.780	0.020	7.610	22.410
SUPERVISORY PERSONNEL	0	0	0	0	0.020	0.000	0.010	0.030
ENGINEERING PERSONNEL	2	1	7	10	1.240	1.590	3.020	5.850
GRAND TOTALS	152	1	106	259	50.990	1.770	41.580	94.340

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	9	0	9	18	3.110	0.000	3.000	6.110
OPERATIONS PERSONNEL	35	0	0	35	11.710	0.000	0.080	11.790
HEALTH PHYSICS PERSONNEL	14	1	37	52	4.260	0.450	11.890	16.600
SUPERVISORY PERSONNEL	0	0	0	0	0.010	0.000	0.020	0.030
ENGINEERING PERSONNEL	2	1	0	3	0.890	0.460	0.330	1.680
TOTAL	60	2	46	108	19.980	0.910	15.320	36.210
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	46	4	191	241	18.830	2.010	70.850	91.690
OPERATIONS PERSONNEL	9	0	7	16	2.570	0.020	2.950	5.540
HEALTH PHYSICS PERSONNEL	11	0	22	33	4.190	0.220	6.810	11.220
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.140	0.140
ENGINEERING PERSONNEL	3	2	17	22	1.250	1.330	5.940	8.520
TOTAL	69	6	238	313	26.840	3.580	86.690	117.110
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	3	0	163	166	0.840	0.020	79.320	80.180
OPERATIONS PERSONNEL	0	0	1	1	0.000	0.010	0.560	0.570
HEALTH PHYSICS PERSONNEL	5	0	13	18	1.680	0.010	3.560	5.250
SUPERVISORY PERSONNEL	0	0	2	2	0.000	0.000	0.590	0.590
ENGINEERING PERSONNEL	1	1	30	32	0.360	0.410	23.670	24.440
TOTAL	9	1	209	219	2.880	0.450	107.700	111.030
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	27	0	227	254	8.520	0.020	185.380	193.920
OPERATIONS PERSONNEL	7	0	5	12	1.980	0.100	4.070	6.150
HEALTH PHYSICS PERSONNEL	11	0	29	40	3.960	0.000	9.450	13.410
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	3	6	54	63	3.170	2.450	45.720	51.340
TOTAL	48	6	315	369	17.630	2.570	244.620	264.820
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	21	21	0.330	0.010	5.180	5.520
OPERATIONS PERSONNEL	0	0	0	0	0.280	0.000	0.030	0.310
HEALTH PHYSICS PERSONNEL	18	0	20	38	5.140	0.030	7.340	12.510
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.030	0.190	0.110	0.330
TOTAL	18	0	41	59	5.780	0.230	12.660	18.670
REFUELING								
MAINTENANCE PERSONNEL	21	3	35	59	16.260	0.630	26.460	43.350
OPERATIONS PERSONNEL	18	0	1	19	4.550	0.000	0.560	5.110
HEALTH PHYSICS PERSONNEL	5	0	12	17	1.490	0.000	3.960	5.450
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.030	0.030
ENGINEERING PERSONNEL	1	0	6	7	0.510	0.170	3.110	3.790
TOTAL	45	3	54	102	22.810	0.800	34.120	57.730
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	106	7	646	759	47.890	2.690	370.190	420.770
OPERATIONS PERSONNEL	69	0	14	83	21.090	0.130	8.250	29.470
HEALTH PHYSICS PERSONNEL	64	1	133	198	20.720	0.710	43.010	64.440
SUPERVISORY PERSONNEL	0	0	3	3	0.010	0.000	0.780	0.790
ENGINEERING PERSONNEL	10	10	107	127	6.210	5.010	78.880	90.100
GRAND TOTALS	249	18	903	1170	95.920	8.540	501.110	605.570

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	28	6	0	34	5.681	1.727	0.113	7.521
OPERATIONS PERSONNEL	40	0	1	41	17.119	0.000	0.523	17.642
HEALTH PHYSICS PERSONNEL	20	0	1	21	8.481	0.000	0.501	8.982
SUPERVISORY PERSONNEL	11	1	3	15	2.912	0.512	1.310	4.734
ENGINEERING PERSONNEL	9	0	0	9	2.457	0.011	0.000	2.468
TOTAL	108	7	5	120	36.650	2.250	2.447	41.347
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	36	10	3	49	14.640	3.177	3.951	21.768
OPERATIONS PERSONNEL	2	0	0	2	0.693	0.000	0.000	0.693
HEALTH PHYSICS PERSONNEL	7	0	0	7	2.112	0.000	0.062	2.174
SUPERVISORY PERSONNEL	3	0	1	4	1.345	0.032	0.395	1.772
ENGINEERING PERSONNEL	0	0	0	0	0.109	0.000	0.000	0.109
TOTAL	48	10	4	62	18.899	3.209	4.408	26.516
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	21	4	3	28	5.820	2.614	0.736	9.170
OPERATIONS PERSONNEL	6	0	0	6	1.961	0.000	0.000	1.961
HEALTH PHYSICS PERSONNEL	8	0	0	8	2.111	0.000	0.000	2.111
SUPERVISORY PERSONNEL	5	1	3	9	1.347	0.500	1.137	2.984
ENGINEERING PERSONNEL	0	0	0	0	0.221	0.000	0.000	0.221
TOTAL	40	5	6	51	11.460	3.114	1.873	16.447
WASTE PROCESSING								
MAINTENANCE PERSONNEL	14	2	0	16	4.138	0.343	0.000	4.481
OPERATIONS PERSONNEL	0	0	0	0	0.161	0.000	0.000	0.161
HEALTH PHYSICS PERSONNEL	5	0	0	5	2.045	0.000	0.013	2.058
SUPERVISORY PERSONNEL	0	0	1	1	0.005	0.000	2.118	2.123
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	19	2	1	22	6.349	0.343	2.131	8.823
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.015	0.000	0.000	0.015
OPERATIONS PERSONNEL	0	0	0	0	0.127	0.000	0.000	0.127
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.066	0.007	0.000	0.073
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.208	0.007	0.000	0.215
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	99	22	6	127	30.294	7.861	4.800	42.955
OPERATIONS PERSONNEL	48	0	1	49	20.061	0.000	0.523	20.584
HEALTH PHYSICS PERSONNEL	40	0	1	41	14.749	0.000	0.576	15.325
SUPERVISORY PERSONNEL	19	2	8	29	5.675	1.051	4.960	11.686
ENGINEERING PERSONNEL	9	0	0	9	2.787	0.011	0.000	2.798
GRAND TOTALS	215	24	16	255	73.566	8.923	10.859	93.348

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

PLANT: *NINE MILE POINT 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	1173	46	308	1527	15.146	0.376	5.161	20.683
OPERATIONS PERSONNEL	2112	0	1169	3281	30.871	0.000	4.815	35.686
HEALTH PHYSICS PERSONNEL	1389	4	62	1455	10.594	0.016	10.663	21.273
SUPERVISORY PERSONNEL	172	0	65	237	2.667	0.000	0.430	3.097
ENGINEERING PERSONNEL	164	16	274	454	1.685	0.325	4.518	6.528
TOTAL	5010	66	1878	6954	60.963	0.717	25.587	87.267
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	4073	27	7497	11597	78.531	0.375	145.603	224.509
OPERATIONS PERSONNEL	726	0	100	826	18.654	0.000	1.306	19.960
HEALTH PHYSICS PERSONNEL	2013	1	2280	4294	25.153	0.010	32.570	57.733
SUPERVISORY PERSONNEL	243	1	404	648	4.425	0.010	6.052	10.487
ENGINEERING PERSONNEL	527	80	1884	2491	7.381	1.610	45.228	54.219
TOTAL	7582	109	12165	19856	134.144	2.005	230.759	366.908
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	12	1	1924	1937	0.110	0.004	57.739	57.853
OPERATIONS PERSONNEL	22	0	1	23	0.265	0.000	0.010	0.275
HEALTH PHYSICS PERSONNEL	20	0	88	108	0.432	0.000	1.077	1.509
SUPERVISORY PERSONNEL	5	0	54	59	0.042	0.000	1.145	1.187
ENGINEERING PERSONNEL	52	7	697	756	1.017	0.095	27.034	28.146
TOTAL	111	8	2764	2883	1.866	0.099	87.005	88.970
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	297	1	3828	4126	5.840	0.005	97.033	102.878
OPERATIONS PERSONNEL	11	0	30	41	0.254	0.000	0.412	0.666
HEALTH PHYSICS PERSONNEL	41	0	171	212	0.884	0.000	2.506	3.390
SUPERVISORY PERSONNEL	9	0	125	134	0.051	0.000	2.809	2.860
ENGINEERING PERSONNEL	43	45	649	737	1.465	1.802	13.820	17.087
TOTAL	401	46	4803	5250	8.494	1.807	116.580	126.881
WASTE PROCESSING								
MAINTENANCE PERSONNEL	41	0	0	41	0.350	0.000	0.000	0.350
OPERATIONS PERSONNEL	1302	0	80	1382	8.622	0.000	0.741	9.363
HEALTH PHYSICS PERSONNEL	122	0	35	157	0.847	0.000	0.370	1.217
SUPERVISORY PERSONNEL	15	0	1	16	0.050	0.000	0.003	0.053
ENGINEERING PERSONNEL	10	0	9	19	0.066	0.000	0.040	0.106
TOTAL	1490	0	125	1615	9.935	0.000	1.154	11.089
REFUELING								
MAINTENANCE PERSONNEL	447	0	291	738	11.585	0.000	5.407	16.992
OPERATIONS PERSONNEL	100	0	1	101	0.548	0.000	0.005	0.553
HEALTH PHYSICS PERSONNEL	349	0	116	465	3.669	0.000	1.504	5.173
SUPERVISORY PERSONNEL	118	0	25	143	0.900	0.000	0.248	1.148
ENGINEERING PERSONNEL	164	0	529	693	0.934	0.000	10.949	11.883
TOTAL	1178	0	962	2140	17.636	0.000	18.113	35.749
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	6043 (392)	75	(9)13848	(680)19966(1081)	111.562	0.760	310.943	423.265
OPERATIONS PERSONNEL	4273 (174)	0	(0) 1381	(61) 5654 (235)	59.214	0.000	7.289	66.503
HEALTH PHYSICS PERSONNEL	3934 (164)	5	(3) 2752	(115) 6691 (282)	41.579	0.026	48.690	90.295
SUPERVISORY PERSONNEL	562 (89)	1	(1) 674	(75) 1237 (165)	8.135	0.010	10.687	18.832
ENGINEERING PERSONNEL	960 (202)	148	(49) 4042	(410) 5150 (661)	12.548	3.832	101.589	117.969
GRAND TOTALS	15772 (1021)	229	(62)22697	(1341)38698(2424)	233.038	4.628	479.198	716.864

*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

1990

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	46	0	29	75	0.419	0.000	0.495	0.914
OPERATIONS PERSONNEL	115	4	2	121	10.379	0.001	0.000	10.380
HEALTH PHYSICS PERSONNEL	26	0	26	52	0.298	0.000	0.176	0.474
SUPERVISORY PERSONNEL	33	9	9	51	0.586	0.001	0.000	0.587
ENGINEERING PERSONNEL	13	1	3	17	0.045	0.001	0.021	0.067
TOTAL	233	14	69	316	11.727	0.003	0.692	12.422
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	276	6	786	1068	79.910	0.004	140.664	220.578
OPERATIONS PERSONNEL	247	7	40	294	19.408	0.040	0.138	19.586
HEALTH PHYSICS PERSONNEL	108	16	243	367	20.043	0.089	71.629	91.761
SUPERVISORY PERSONNEL	105	19	7	131	2.157	0.025	0.001	2.183
ENGINEERING PERSONNEL	125	74	104	303	4.112	0.438	4.255	8.805
TOTAL	861	122	1180	2163	125.630	0.596	216.687	342.913
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	35	0	166	201	4.952	0.000	49.761	54.713
OPERATIONS PERSONNEL	20	0	0	20	1.293	0.000	0.000	1.293
HEALTH PHYSICS PERSONNEL	10	0	78	88	0.482	0.000	7.145	7.627
SUPERVISORY PERSONNEL	3	0	0	3	0.012	0.000	0.000	0.012
ENGINEERING PERSONNEL	21	0	18	39	1.582	0.000	14.222	15.804
TOTAL	89	0	262	351	8.321	0.000	71.128	79.449
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	87	0	421	508	1.252	0.000	118.679	119.931
OPERATIONS PERSONNEL	17	0	0	17	0.280	0.000	0.000	0.280
HEALTH PHYSICS PERSONNEL	21	0	96	117	0.253	0.000	4.767	5.020
SUPERVISORY PERSONNEL	6	0	1	7	0.028	0.000	0.000	0.028
ENGINEERING PERSONNEL	19	0	14	33	0.200	0.000	0.081	0.281
TOTAL	150	0	532	682	2.013	0.000	123.527	125.540
WASTE PROCESSING								
MAINTENANCE PERSONNEL	78	0	53	131	2.627	0.000	0.067	2.694
OPERATIONS PERSONNEL	45	0	2	47	1.003	0.000	0.012	1.015
HEALTH PHYSICS PERSONNEL	44	0	37	81	3.063	0.000	0.875	3.938
SUPERVISORY PERSONNEL	9	1	0	10	0.622	0.000	0.000	0.622
ENGINEERING PERSONNEL	2	0	1	3	0.000	0.000	0.000	0.000
TOTAL	178	1	93	272	7.315	0.000	0.954	8.269
REFUELING								
MAINTENANCE PERSONNEL	17	0	86	103	0.982	0.000	26.899	27.881
OPERATIONS PERSONNEL	54	3	0	57	3.570	0.059	0.000	3.629
HEALTH PHYSICS PERSONNEL	25	1	129	155	0.367	0.018	7.515	7.900
SUPERVISORY PERSONNEL	11	1	0	12	0.485	0.112	0.000	0.597
ENGINEERING PERSONNEL	4	6	5	15	0.397	0.221	0.079	0.697
TOTAL	111	11	220	342	5.801	0.410	34.493	40.704
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	539	6	1541	2086	90.142	0.004	336.565	426.711
OPERATIONS PERSONNEL	498	14	44	556	35.933	0.100	0.150	36.183
HEALTH PHYSICS PERSONNEL	234	17	609	860	24.506	0.107	92.107	116.720
SUPERVISORY PERSONNEL	167	30	17	214	3.890	0.138	0.001	4.029
ENGINEERING PERSONNEL	184	81	145	410	6.336	0.660	18.658	25.654
GRAND TOTALS	1622	148	2356	4126	160.807	1.009	447.481	609.297

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

PLANT: *OCONEE 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	222	174	142	538	2.485	2.615	0.300	5.400
OPERATIONS PERSONNEL	86	38	25	149	11.850	0.240	0.205	12.295
HEALTH PHYSICS PERSONNEL	47	30	149	226	3.495	0.295	14.555	18.345
SUPERVISORY PERSONNEL	4	2	0	6	0.370	0.000	0.000	0.370
ENGINEERING PERSONNEL	56	80	6	142	3.870	1.465	0.315	5.650
TOTAL	415	324	322	1061	22.070	4.615	15.375	42.060
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	248	193	151	592	93.455	52.925	37.690	184.070
OPERATIONS PERSONNEL	90	42	52	184	13.625	10.835	28.235	52.695
HEALTH PHYSICS PERSONNEL	48	33	160	241	7.103	0.856	32.690	40.649
SUPERVISORY PERSONNEL	4	3	0	7	0.390	0.945	0.000	1.335
ENGINEERING PERSONNEL	57	92	9	158	11.230	25.210	2.955	39.395
TOTAL	447	363	372	1182	125.803	90.771	101.570	318.144
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	23	49	58	130	0.965	4.555	6.275	11.795
OPERATIONS PERSONNEL	2	8	0	10	0.005	0.590	0.000	0.595
HEALTH PHYSICS PERSONNEL	13	8	69	90	0.160	0.595	2.770	3.525
SUPERVISORY PERSONNEL	2	1	0	3	0.170	0.020	0.000	0.190
ENGINEERING PERSONNEL	31	26	2	59	5.330	1.265	0.330	6.925
TOTAL	71	92	129	292	6.630	7.025	9.375	23.030
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	135	124	82	341	9.555	15.065	9.650	34.270
OPERATIONS PERSONNEL	34	31	41	106	1.725	1.645	3.620	6.990
HEALTH PHYSICS PERSONNEL	29	21	72	122	3.330	2.835	10.600	16.765
SUPERVISORY PERSONNEL	5	2	0	7	0.000	0.020	0.000	0.020
ENGINEERING PERSONNEL	51	60	2	113	2.440	8.275	0.005	10.720
TOTAL	254	238	197	689	17.050	27.840	23.875	68.765
WASTE PROCESSING								
MAINTENANCE PERSONNEL	21	21	2	44	0.455	0.200	0.000	0.655
OPERATIONS PERSONNEL	35	8	44	87	3.610	0.695	3.245	7.550
HEALTH PHYSICS PERSONNEL	34	1	13	48	1.685	0.145	0.000	1.830
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	3	9	0	12	0.010	0.030	0.000	0.040
TOTAL	93	39	59	191	5.760	1.070	3.245	10.075
REFUELING								
MAINTENANCE PERSONNEL	55	16	8	79	3.480	1.060	0.800	5.340
OPERATIONS PERSONNEL	74	5	3	82	4.330	0.290	0.060	4.680
HEALTH PHYSICS PERSONNEL	32	5	21	58	1.040	0.175	0.415	1.630
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	25	10	5	40	0.545	0.275	0.110	0.930
TOTAL	186	36	37	259	9.395	1.800	1.385	12.580
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	704 (249)	577 (200)	443 (163)	1724 (612)	110.395	76.420	54.715	241.530
OPERATIONS PERSONNEL	321 (97)	132 (42)	165 (53)	618 (192)	35.145	14.295	35.365	84.805
HEALTH PHYSICS PERSONNEL	203 (48)	98 (33)	484 (161)	785 (242)	16.813	4.901	61.030	82.744
SUPERVISORY PERSONNEL	15 (5)	8 (3)	0 (0)	23 (8)	0.930	0.985	0.000	1.915
ENGINEERING PERSONNEL	223 (65)	277 (100)	24 (15)	524 (180)	23.425	36.520	3.715	63.660
GRAND TOTALS	1466 (464)	1092 (378)	1116 (392)	3674(1234)	186.708	133.121	154.825	474.654

*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

1990

PLANT: *OYSTER CREEK

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	160	0	45	205	15.481	0.000	1.313	16.794
OPERATIONS PERSONNEL	146	0	9	155	38.110	0.000	3.125	41.235
HEALTH PHYSICS PERSONNEL	86	0	103	189	12.144	0.000	18.967	31.111
SUPERVISORY PERSONNEL	25	0	4	29	0.753	0.000	0.083	0.836
ENGINEERING PERSONNEL	32	1	6	39	0.958	0.000	0.086	1.044
TOTAL	449	1	167	617	67.446	0.000	23.574	91.020
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	363	8	420	791	63.641	0.002	25.796	89.439
OPERATIONS PERSONNEL	259	3	104	366	17.175	0.013	1.216	18.404
HEALTH PHYSICS PERSONNEL	70	0	76	146	3.729	0.000	3.399	7.128
SUPERVISORY PERSONNEL	123	2	73	198	3.383	0.002	0.679	4.064
ENGINEERING PERSONNEL	160	3	95	258	3.557	0.002	2.527	6.086
TOTAL	975	16	768	1759	91.485	0.019	33.617	125.121
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	63	0	33	96	0.657	0.000	4.801	5.458
OPERATIONS PERSONNEL	35	0	0	35	0.680	0.000	0.000	0.680
HEALTH PHYSICS PERSONNEL	11	0	17	28	0.102	0.000	1.120	1.222
SUPERVISORY PERSONNEL	1	0	2	3	0.026	0.000	0.083	0.109
ENGINEERING PERSONNEL	9	0	3	12	0.218	0.000	0.035	0.253
TOTAL	119	0	55	174	1.683	0.000	6.039	7.722
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	173	0	293	466	33.794	0.000	73.641	107.435
OPERATIONS PERSONNEL	62	0	20	82	5.410	0.000	0.109	5.519
HEALTH PHYSICS PERSONNEL	29	0	57	86	3.360	0.000	5.093	8.453
SUPERVISORY PERSONNEL	22	0	14	36	1.488	0.000	0.978	2.466
ENGINEERING PERSONNEL	29	0	25	54	3.102	0.000	1.618	4.720
TOTAL	315	0	409	724	47.154	0.000	81.439	128.593
WASTE PROCESSING								
MAINTENANCE PERSONNEL	107	0	74	181	1.722	0.000	4.493	6.215
OPERATIONS PERSONNEL	67	1	6	74	3.757	0.000	3.631	7.388
HEALTH PHYSICS PERSONNEL	23	0	50	73	0.997	0.000	2.920	3.917
SUPERVISORY PERSONNEL	2	0	1	3	0.126	0.000	0.017	0.143
ENGINEERING PERSONNEL	7	0	5	12	0.065	0.000	0.301	0.366
TOTAL	206	1	136	343	6.667	0.000	11.362	18.029
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	866 (366)	8 (8)	865 (480)	1739 (854)	115.295	0.002	110.044	225.341
OPERATIONS PERSONNEL	569 (305)	4 (3)	139 (112)	712 (420)	65.132	0.013	8.081	73.226
HEALTH PHYSICS PERSONNEL	219 (110)	0 (0)	303 (126)	522 (236)	20.332	0.000	31.499	51.831
SUPERVISORY PERSONNEL	173 (133)	2 (2)	94 (75)	269 (210)	5.776	0.002	1.840	7.618
ENGINEERING PERSONNEL	237 (167)	4 (4)	134 (101)	375 (272)	7.900	0.002	4.567	12.469
GRAND TOTALS	2064 (1081)	18 (17)	1535 (894)	3617(1992)	214.435	0.019	156.031	370.485

*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

1990

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	5	3	27	35	2.533	0.735	8.784	12.052
OPERATIONS PERSONNEL	45	0	1	46	15.148	0.057	2.820	18.025
HEALTH PHYSICS PERSONNEL	21	0	163	184	8.084	0.000	61.539	69.623
SUPERVISORY PERSONNEL	5	1	3	9	2.599	0.190	1.111	3.900
ENGINEERING PERSONNEL	5	1	3	9	2.292	0.341	2.522	5.155
TOTAL	81	5	197	283	30.656	1.323	76.776	108.755
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	70	0	159	229	52.285	0.854	81.591	134.730
OPERATIONS PERSONNEL	0	0	4	4	0.423	0.000	1.307	1.730
HEALTH PHYSICS PERSONNEL	5	0	27	32	1.516	0.000	9.760	11.276
SUPERVISORY PERSONNEL	2	0	2	4	0.968	0.009	3.373	4.350
ENGINEERING PERSONNEL	1	5	11	17	0.735	2.738	7.972	11.445
TOTAL	78	5	203	286	55.927	3.601	104.003	163.531
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	38	38	0.256	0.000	21.987	22.243
OPERATIONS PERSONNEL	0	0	1	1	0.000	0.000	0.341	0.341
HEALTH PHYSICS PERSONNEL	0	0	3	3	0.091	0.000	0.678	0.769
SUPERVISORY PERSONNEL	0	0	1	1	0.020	0.003	0.182	0.205
ENGINEERING PERSONNEL	0	5	19	24	0.117	5.192	7.254	12.563
TOTAL	0	5	62	67	0.484	5.195	30.442	36.121
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	8	17	425	450	3.932	4.518	289.841	298.291
OPERATIONS PERSONNEL	0	0	16	16	0.168	0.042	8.493	8.703
HEALTH PHYSICS PERSONNEL	7	0	153	160	1.732	0.000	45.861	47.593
SUPERVISORY PERSONNEL	1	0	9	10	0.384	0.037	2.844	3.265
ENGINEERING PERSONNEL	0	4	101	105	0.289	0.900	57.753	58.942
TOTAL	16	21	704	741	6.505	5.497	404.792	416.794
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.184	0.004	0.177	0.365
OPERATIONS PERSONNEL	0	0	0	0	0.193	0.000	0.007	0.200
HEALTH PHYSICS PERSONNEL	10	0	0	10	4.931	0.000	1.081	6.012
SUPERVISORY PERSONNEL	0	0	0	0	0.096	0.003	0.000	0.099
ENGINEERING PERSONNEL	0	0	0	0	0.010	0.000	0.145	0.155
TOTAL	10	0	0	10	5.414	0.007	1.410	6.831
REFUELING								
MAINTENANCE PERSONNEL	5	28	0	33	1.657	17.788	0.147	19.592
OPERATIONS PERSONNEL	5	0	0	5	1.870	0.000	0.093	1.963
HEALTH PHYSICS PERSONNEL	0	0	4	4	0.043	0.000	1.584	1.627
SUPERVISORY PERSONNEL	0	0	0	0	0.301	0.040	0.018	0.359
ENGINEERING PERSONNEL	1	0	16	17	0.420	0.000	10.369	10.789
TOTAL	11	28	20	59	4.291	17.828	12.211	34.330
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	88	48	649	785	60.847	23.899	402.527	487.273
OPERATIONS PERSONNEL	50	0	22	72	17.802	0.099	13.061	30.962
HEALTH PHYSICS PERSONNEL	43	0	350	393	16.397	0.000	120.503	136.900
SUPERVISORY PERSONNEL	8	1	15	24	4.368	0.282	7.528	12.178
ENGINEERING PERSONNEL	7	15	150	172	3.863	9.171	86.015	99.049
GRAND TOTALS	196	64	1186	1446	103.277	33.451	629.634	766.362

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

PLANT: *PALO VERDE 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	0	0	0	0	1.232	0.000	2.357	3.589
OPERATIONS PERSONNEL	57	0	0	57	17.213	0.000	1.213	18.426
HEALTH PHYSICS PERSONNEL	45	0	106	151	11.489	0.000	30.052	41.541
SUPERVISORY PERSONNEL	1	0	0	1	0.700	0.000	0.030	0.730
ENGINEERING PERSONNEL	1	0	6	7	1.014	0.000	2.101	3.115
TOTAL	104	0	112	216	31.648	0.000	35.753	67.401
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	122	0	265	387	45.842	0.000	117.023	162.865
OPERATIONS PERSONNEL	3	0	22	25	2.649	0.000	5.035	7.684
HEALTH PHYSICS PERSONNEL	48	0	114	162	15.635	0.000	37.486	53.121
SUPERVISORY PERSONNEL	0	0	2	2	0.225	0.000	0.490	0.715
ENGINEERING PERSONNEL	5	0	16	21	2.829	0.000	7.812	10.641
TOTAL	178	0	419	597	67.180	0.000	167.846	235.026
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	9	0	112	121	3.273	0.000	60.482	63.755
OPERATIONS PERSONNEL	0	0	5	5	0.160	0.000	1.565	1.725
HEALTH PHYSICS PERSONNEL	7	0	36	43	1.738	0.000	11.553	13.291
SUPERVISORY PERSONNEL	0	0	2	2	0.090	0.000	2.184	2.274
ENGINEERING PERSONNEL	6	0	28	34	1.715	0.000	11.005	12.720
TOTAL	22	0	183	205	6.976	0.000	86.789	93.765
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	4	0	11	15	1.249	0.000	3.870	5.119
OPERATIONS PERSONNEL	0	0	0	0	0.010	0.000	0.010	0.020
HEALTH PHYSICS PERSONNEL	0	0	2	2	0.010	0.000	0.685	0.695
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	0	0	1	0.350	0.000	0.000	0.350
TOTAL	5	0	13	18	1.619	0.000	4.565	6.184
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	1	1	0.030	0.000	0.865	0.895
OPERATIONS PERSONNEL	0	0	1	1	0.220	0.000	0.845	1.065
HEALTH PHYSICS PERSONNEL	17	0	18	35	5.507	0.000	6.189	11.696
SUPERVISORY PERSONNEL	0	0	1	1	0.030	0.000	0.110	0.140
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	17	0	21	38	5.787	0.000	8.009	13.796
REFUELING								
MAINTENANCE PERSONNEL	19	0	102	121	6.829	0.000	50.508	57.337
OPERATIONS PERSONNEL	2	0	3	5	1.500	0.000	1.288	2.788
HEALTH PHYSICS PERSONNEL	6	0	61	67	2.678	0.000	16.842	19.520
SUPERVISORY PERSONNEL	2	0	1	3	0.645	0.000	0.230	0.875
ENGINEERING PERSONNEL	1	0	0	1	0.440	0.000	0.905	1.345
TOTAL	30	0	167	197	12.092	0.000	69.773	81.865
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	154	0	491	645	58.455	0.000	235.105	293.560
OPERATIONS PERSONNEL	62	0	31	93	21.752	0.000	9.956	31.708
HEALTH PHYSICS PERSONNEL	123	0	337	460	37.057	0.000	102.807	139.864
SUPERVISORY PERSONNEL	3	0	6	9	1.690	0.000	3.044	4.734
ENGINEERING PERSONNEL	14	0	50	64	6.348	0.000	21.823	28.171
GRAND TOTALS	356	0	915	1271	125.302	0.000	372.735	498.037

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	134	197	328	659	4.124	3.918	8.784	16.826
OPERATIONS PERSONNEL	134	29	105	268	20.594	1.475	9.039	31.108
HEALTH PHYSICS PERSONNEL	104	3	65	172	34.276	0.632	8.228	43.136
SUPERVISORY PERSONNEL	4	3	13	20	0.069	0.018	0.337	0.424
ENGINEERING PERSONNEL	49	29	32	110	3.827	1.864	1.359	7.050
TOTAL	425	261	543	1229	62.890	7.907	27.747	98.544
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	122	210	382	714	17.799	6.035	19.840	43.674
OPERATIONS PERSONNEL	44	24	83	151	1.991	0.681	4.220	6.892
HEALTH PHYSICS PERSONNEL	68	3	48	119	5.075	0.067	3.351	8.493
SUPERVISORY PERSONNEL	3	2	6	11	0.108	0.013	0.183	0.304
ENGINEERING PERSONNEL	36	26	23	85	1.989	0.480	0.296	2.765
TOTAL	273	265	542	1080	26.962	7.276	27.890	62.128
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	22	30	77	129	0.125	0.122	1.807	2.054
OPERATIONS PERSONNEL	4	2	7	13	0.018	0.002	0.417	0.437
HEALTH PHYSICS PERSONNEL	6	1	3	10	0.097	0.017	0.308	0.422
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	5	2	1	8	0.137	0.029	0.007	0.173
TOTAL	37	35	88	160	0.377	0.170	2.539	3.086
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	130	231	482	843	30.558	28.002	86.720	145.280
OPERATIONS PERSONNEL	73	30	139	242	4.761	1.995	16.024	22.780
HEALTH PHYSICS PERSONNEL	93	3	60	156	13.240	0.397	5.176	18.813
SUPERVISORY PERSONNEL	4	3	12	19	0.238	0.183	1.270	1.691
ENGINEERING PERSONNEL	44	27	32	103	3.270	1.775	1.994	7.039
TOTAL	344	294	725	1363	52.067	32.352	111.184	195.603
WASTE PROCESSING								
MAINTENANCE PERSONNEL	63	84	121	268	2.206	1.187	3.758	7.151
OPERATIONS PERSONNEL	15	10	20	45	0.158	0.149	1.272	1.579
HEALTH PHYSICS PERSONNEL	52	1	22	75	1.716	0.002	0.994	2.712
SUPERVISORY PERSONNEL	1	0	3	4	0.007	0.000	0.038	0.045
ENGINEERING PERSONNEL	9	0	4	13	0.152	0.000	0.030	0.182
TOTAL	140	95	170	405	4.239	1.338	6.092	11.669
REFUELING								
MAINTENANCE PERSONNEL	27	97	103	227	0.254	1.704	2.025	3.983
OPERATIONS PERSONNEL	8	7	15	30	0.027	0.163	0.448	0.638
HEALTH PHYSICS PERSONNEL	19	0	18	37	0.200	0.000	0.688	0.888
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.006	0.006
ENGINEERING PERSONNEL	7	5	3	15	0.113	0.136	0.076	0.325
TOTAL	61	109	140	310	0.594	2.003	3.243	5.840
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	498 (138)	849 (233)	1493 (517)	2840 (888)	55.066	40.968	122.934	218.968
OPERATIONS PERSONNEL	278 (136)	102 (30)	369 (164)	749 (330)	27.549	4.465	31.420	63.434
HEALTH PHYSICS PERSONNEL	342 (104)	11 (3)	216 (69)	569 (176)	54.604	1.115	18.745	74.464
SUPERVISORY PERSONNEL	12 (4)	8 (3)	35 (17)	55 (24)	0.422	0.214	1.834	2.470
ENGINEERING PERSONNEL	150 (51)	89 (33)	95 (41)	334 (125)	9.488	4.284	3.762	17.534
GRAND TOTALS	1280 (433)	1059 (302)	2208 (808)	4547(1543)	147.129	51.046	178.695	376.870

*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

1990

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	139	4	278	421	1.421	0.055	11.669	13.145
OPERATIONS PERSONNEL	75	2	1	78	13.616	0.000	0.000	13.616
HEALTH PHYSICS PERSONNEL	50	0	121	171	15.369	0.000	13.436	28.805
SUPERVISORY PERSONNEL	0	0	2	2	0.000	0.000	0.060	0.060
ENGINEERING PERSONNEL	19	11	18	48	0.257	0.105	0.283	0.645
TOTAL	283	17	420	720	30.663	0.160	25.448	56.271
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	150	5	587	742	7.950	0.502	125.662	134.114
OPERATIONS PERSONNEL	72	2	2	76	3.694	0.125	0.025	3.844
HEALTH PHYSICS PERSONNEL	46	0	155	201	5.683	0.000	54.402	60.085
SUPERVISORY PERSONNEL	0	0	2	2	0.000	0.000	0.070	0.070
ENGINEERING PERSONNEL	19	15	35	69	1.574	1.117	3.810	6.501
TOTAL	287	22	781	1090	18.901	1.744	183.969	204.614
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	9	0	189	198	0.020	0.000	12.318	12.338
OPERATIONS PERSONNEL	8	0	0	8	0.061	0.000	0.000	0.061
HEALTH PHYSICS PERSONNEL	5	0	30	35	0.571	0.000	0.665	1.236
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	8	8	29	45	0.232	0.135	0.747	1.114
TOTAL	30	8	248	286	0.884	0.135	13.730	14.749
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	151	6	646	803	52.790	2.930	242.085	297.805
OPERATIONS PERSONNEL	81	2	4	87	18.424	0.085	1.115	19.624
HEALTH PHYSICS PERSONNEL	48	0	152	200	14.406	0.000	24.851	39.257
SUPERVISORY PERSONNEL	0	0	2	2	0.000	0.000	0.085	0.085
ENGINEERING PERSONNEL	20	16	38	74	3.120	1.721	8.200	13.041
TOTAL	300	24	842	1166	88.740	4.736	276.336	369.812
WASTE PROCESSING								
MAINTENANCE PERSONNEL	63	0	162	225	0.945	0.000	11.870	12.815
OPERATIONS PERSONNEL	30	1	1	32	3.485	0.150	1.565	5.200
HEALTH PHYSICS PERSONNEL	34	0	101	135	4.180	0.000	6.075	10.255
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	2	4	4	10	0.000	0.020	0.000	0.020
TOTAL	129	5	268	402	8.610	0.170	19.510	28.290
REFUELING								
MAINTENANCE PERSONNEL	50	0	156	206	0.540	0.000	18.950	19.490
OPERATIONS PERSONNEL	39	1	1	41	0.405	0.000	0.010	0.415
HEALTH PHYSICS PERSONNEL	23	0	28	51	1.500	0.000	2.215	3.715
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.050	0.050
ENGINEERING PERSONNEL	7	7	8	22	0.035	0.305	0.480	0.820
TOTAL	119	8	194	321	2.480	0.305	21.705	24.490
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	562	15	2018	2595	63.666	3.487	422.554	489.707
OPERATIONS PERSONNEL	305	8	9	322	39.685	0.360	2.715	42.760
HEALTH PHYSICS PERSONNEL	206	0	587	793	41.709	0.000	101.644	143.353
SUPERVISORY PERSONNEL	0	0	7	7	0.000	0.000	0.265	0.265
ENGINEERING PERSONNEL	75	61	132	268	5.218	3.403	13.520	22.141
GRAND TOTALS	1148	84	2753	3985	150.278	7.250	540.698	698.226

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	88	3	25	116	21.743	0.707	6.924	29.374
OPERATIONS PERSONNEL	62	1	28	91	26.049	0.269	10.109	36.427
HEALTH PHYSICS PERSONNEL	32	0	1	33	11.808	0.000	0.558	12.366
SUPERVISORY PERSONNEL	30	1	9	40	11.233	0.400	3.350	14.983
ENGINEERING PERSONNEL	20	2	5	27	8.251	0.393	2.231	10.875
TOTAL	232	7	68	307	79.084	1.769	23.172	104.025
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	92	3	73	168	32.244	0.765	26.456	59.465
OPERATIONS PERSONNEL	10	1	0	11	3.678	0.113	0.056	3.847
HEALTH PHYSICS PERSONNEL	29	0	4	33	9.882	0.000	1.691	11.573
SUPERVISORY PERSONNEL	20	0	11	31	5.668	0.027	3.850	9.545
ENGINEERING PERSONNEL	7	0	3	10	2.391	0.017	0.916	3.324
TOTAL	158	4	91	253	53.863	0.922	32.969	87.754
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	11	11	0.049	0.000	2.262	2.311
OPERATIONS PERSONNEL	0	0	0	0	0.015	0.000	0.000	0.015
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.137	0.000	0.050	0.187
SUPERVISORY PERSONNEL	0	0	6	6	0.000	0.000	1.660	1.660
ENGINEERING PERSONNEL	0	0	0	0	0.250	0.000	0.085	0.335
TOTAL	0	0	17	17	0.451	0.000	4.057	4.508
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	12	12	0.277	0.000	2.710	2.987
OPERATIONS PERSONNEL	1	0	0	1	1.002	0.003	0.000	1.005
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.201	0.000	0.005	0.206
SUPERVISORY PERSONNEL	0	0	0	0	0.081	0.000	0.015	0.096
ENGINEERING PERSONNEL	0	0	0	0	0.241	0.000	0.013	0.254
TOTAL	1	0	12	13	1.802	0.003	2.743	4.548
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.775	0.021	0.005	0.801
OPERATIONS PERSONNEL	9	1	0	10	4.363	0.447	0.023	4.833
HEALTH PHYSICS PERSONNEL	7	0	0	7	2.343	0.000	0.050	2.393
SUPERVISORY PERSONNEL	2	0	0	2	0.915	0.000	0.008	0.923
ENGINEERING PERSONNEL	0	0	0	0	0.097	0.000	0.000	0.097
TOTAL	18	1	0	19	8.493	0.468	0.086	9.047
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	180	6	121	307	55.088	1.493	38.357	94.938
OPERATIONS PERSONNEL	82	3	28	113	35.107	0.832	10.188	46.127
HEALTH PHYSICS PERSONNEL	68	0	5	73	24.371	0.000	2.354	26.725
SUPERVISORY PERSONNEL	52	1	26	79	17.897	0.427	8.883	27.207
ENGINEERING PERSONNEL	27	2	8	37	11.230	0.410	3.245	14.885
GRAND TOTALS	409	12	188	609	143.693	3.162	63.027	209.882

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	1.750	0.840	2.590
OPERATIONS PERSONNEL	0	0	0	0	14.180	0.000	0.000	14.180
HEALTH PHYSICS PERSONNEL	0	0	0	0	30.840	0.000	0.000	30.840
SUPERVISORY PERSONNEL	0	0	0	0	0.500	0.000	0.000	0.500
ENGINEERING PERSONNEL	0	0	0	0	0.260	0.000	0.000	0.260
TOTAL	0	0	0	0	45.780	1.750	0.840	48.370
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	42.090	16.510	0.000	58.600
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	2.210	0.000	0.000	2.210
TOTAL	0	0	0	0	44.300	16.510	0.000	60.810
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	2.860	4.010	35.370	42.240
OPERATIONS PERSONNEL	0	0	0	0	17.750	0.000	0.000	17.750
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.040	0.000	0.000	0.040
ENGINEERING PERSONNEL	0	0	0	0	4.530	0.000	0.000	4.530
TOTAL	0	0	0	0	25.180	4.010	35.370	64.560
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	8.290	3.070	109.380	120.740
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	8.290	3.070	109.380	120.740
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	2.890	2.890
OPERATIONS PERSONNEL	0	0	0	0	0.800	0.000	0.000	0.800
HEALTH PHYSICS PERSONNEL	0	0	0	0	4.640	0.000	0.000	4.640
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	5.440	0.000	2.890	8.330
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	28.650	11.430	0.000	40.080
OPERATIONS PERSONNEL	0	0	0	0	3.020	0.000	0.000	3.020
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.280	0.000	0.000	0.280
ENGINEERING PERSONNEL	0	0	0	0	1.980	0.000	0.000	1.980
TOTAL	0	0	0	0	33.930	11.430	0.000	45.360
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	0 (48)	0 (34)	0 (219)	0 (301)	81.890	36.770	148.480	267.140
OPERATIONS PERSONNEL	0 (58)	0 (0)	0 (0)	0 (58)	35.750	0.000	0.000	35.750
HEALTH PHYSICS PERSONNEL	0 (40)	0 (0)	0 (0)	0 (40)	35.480	0.000	0.000	35.480
SUPERVISORY PERSONNEL	0 (3)	0 (0)	0 (0)	0 (3)	0.820	0.000	0.000	0.820
ENGINEERING PERSONNEL	0 (27)	0 (0)	0 (0)	0 (27)	8.980	0.000	0.000	8.980
GRAND TOTALS	0 (176)	0 (34)	0 (219)	0 (429)	162.920	36.770	148.480	348.170

*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

1990

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	2	0	0	2	2.067	0.000	0.000	2.067
OPERATIONS PERSONNEL	2	0	0	2	1.435	0.613	0.133	2.181
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.383	0.127	0.265	0.775
SUPERVISORY PERSONNEL	5	0	1	6	1.756	0.000	0.816	2.572
ENGINEERING PERSONNEL	0	0	0	0	0.108	0.000	0.000	0.108
TOTAL	10	0	1	11	5.749	0.740	1.214	7.703
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	0.033	0.000	0.000	0.033
OPERATIONS PERSONNEL	19	26	3	48	5.878	10.090	1.414	17.382
HEALTH PHYSICS PERSONNEL	7	0	10	17	1.424	0.080	3.202	4.706
SUPERVISORY PERSONNEL	0	0	0	0	0.071	0.000	0.135	0.206
ENGINEERING PERSONNEL	9	1	0	10	1.853	0.182	0.020	2.055
TOTAL	35	27	13	75	9.259	10.352	4.771	24.382
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	6	29	39	74	2.249	12.576	19.276	34.101
HEALTH PHYSICS PERSONNEL	1	0	22	23	0.530	0.055	9.159	9.744
SUPERVISORY PERSONNEL	1	0	16	17	0.210	0.000	3.933	4.143
ENGINEERING PERSONNEL	0	0	0	0	0.048	0.000	0.000	0.048
TOTAL	8	29	77	114	3.037	12.631	32.368	48.036
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	10	0	0	10	3.256	0.000	0.000	3.256
OPERATIONS PERSONNEL	33	103	17	153	8.913	34.860	4.112	47.885
HEALTH PHYSICS PERSONNEL	8	1	46	55	2.335	0.302	21.185	23.822
SUPERVISORY PERSONNEL	10	0	35	45	2.375	0.000	9.125	11.500
ENGINEERING PERSONNEL	2	0	1	3	0.755	0.023	0.157	0.935
TOTAL	63	104	99	266	17.634	35.185	34.579	87.398
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.118	0.000	0.000	0.118
OPERATIONS PERSONNEL	2	0	0	2	1.011	0.327	0.002	1.340
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.006	0.000	0.000	0.006
SUPERVISORY PERSONNEL	3	0	1	4	1.248	0.000	0.304	1.552
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	5	0	1	6	2.383	0.327	0.306	3.016
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.936	0.000	0.000	0.936
OPERATIONS PERSONNEL	24	25	0	49	7.888	7.370	0.000	15.258
HEALTH PHYSICS PERSONNEL	2	0	0	2	0.851	0.016	0.138	1.005
SUPERVISORY PERSONNEL	0	0	1	1	0.049	0.000	0.266	0.315
ENGINEERING PERSONNEL	0	0	0	0	0.158	0.000	0.000	0.158
TOTAL	26	25	1	52	9.882	7.386	0.404	17.672
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	12	0	0	12	6.410	0.000	0.000	6.410
OPERATIONS PERSONNEL	86	183	59	328	27.374	65.836	24.937	118.147
HEALTH PHYSICS PERSONNEL	19	1	78	98	5.529	0.580	33.949	40.058
SUPERVISORY PERSONNEL	19	0	54	73	5.709	0.000	14.579	20.288
ENGINEERING PERSONNEL	11	1	1	13	2.922	0.205	0.177	3.304
GRAND TOTALS	147	185	192	524	47.944	66.621	73.642	188.207

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	16	10	110	136	16.255	0.128	46.123	62.506
OPERATIONS PERSONNEL	145	0	223	368	42.178	0.000	17.427	59.605
HEALTH PHYSICS PERSONNEL	24	0	15	39	20.830	0.000	6.072	26.902
SUPERVISORY PERSONNEL	96	28	5	129	16.574	0.395	0.957	17.926
ENGINEERING PERSONNEL	43	61	83	187	5.306	2.075	8.003	15.384
TOTAL	324	99	436	859	101.143	2.598	78.582	182.323
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	99	132	563	794	99.104	1.700	237.176	337.980
OPERATIONS PERSONNEL	32	0	2	34	9.177	0.000	0.127	9.304
HEALTH PHYSICS PERSONNEL	18	0	36	54	15.069	0.000	13.933	29.002
SUPERVISORY PERSONNEL	96	51	17	164	16.692	0.727	3.394	20.813
ENGINEERING PERSONNEL	32	74	45	151	3.956	2.539	4.268	10.763
TOTAL	277	257	663	1197	143.998	4.966	258.898	407.862
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2	0	227	229	1.517	0.000	95.563	97.080
OPERATIONS PERSONNEL	0	0	1	1	0.088	0.000	0.034	0.122
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.405	0.000	0.574	0.979
SUPERVISORY PERSONNEL	1	1	7	9	0.220	0.011	1.404	1.635
ENGINEERING PERSONNEL	25	52	11	88	3.067	1.765	1.022	5.854
TOTAL	28	53	247	328	5.297	1.776	98.597	105.670
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	6	75	540	621	5.647	0.971	227.217	233.835
OPERATIONS PERSONNEL	2	0	1	3	0.534	0.000	0.108	0.642
HEALTH PHYSICS PERSONNEL	3	0	19	22	2.646	0.000	7.258	9.904
SUPERVISORY PERSONNEL	18	3	116	137	3.129	0.040	23.500	26.669
ENGINEERING PERSONNEL	11	55	158	224	1.350	1.866	15.195	18.411
TOTAL	40	133	834	1007	13.306	2.877	273.278	289.461
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.001	0.000	0.134	0.135
OPERATIONS PERSONNEL	15	0	25	40	4.376	0.000	1.954	6.330
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.801	0.000	0.025	0.826
SUPERVISORY PERSONNEL	19	0	0	19	3.315	0.000	0.000	3.315
ENGINEERING PERSONNEL	0	0	0	0	0.002	0.011	0.000	0.013
TOTAL	35	0	25	60	8.495	0.011	2.113	10.619
REFUELING								
MAINTENANCE PERSONNEL	19	0	0	19	19.399	0.000	0.192	19.591
OPERATIONS PERSONNEL	17	0	0	17	4.869	0.000	0.005	4.874
HEALTH PHYSICS PERSONNEL	3	0	0	3	2.114	0.000	0.000	2.114
SUPERVISORY PERSONNEL	20	0	0	20	3.492	0.003	0.000	3.495
ENGINEERING PERSONNEL	3	3	3	9	0.455	0.115	0.314	0.884
TOTAL	62	3	3	68	30.329	0.118	0.511	30.958
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	142	217	1440	1799	141.923	2.799	606.405	751.127
OPERATIONS PERSONNEL	211	0	252	463	61.222	0.000	19.655	80.877
HEALTH PHYSICS PERSONNEL	49	0	71	120	41.865	0.000	27.862	69.727
SUPERVISORY PERSONNEL	250	83	145	478	43.422	1.176	29.255	73.853
ENGINEERING PERSONNEL	114	245	300	659	14.136	8.371	28.802	51.309
GRAND TOTALS	766	545	2208	3519	302.568	12.346	711.979	1026.893

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	1	0	0	1	0.002	0.000	0.000	0.002
OPERATIONS PERSONNEL	4	0	0	4	0.245	0.000	0.000	0.245
HEALTH PHYSICS PERSONNEL	13	0	6	19	1.814	0.000	0.698	2.512
SUPERVISORY PERSONNEL	1	0	0	1	0.012	0.000	0.000	0.012
ENGINEERING PERSONNEL	1	0	0	1	0.007	0.000	0.000	0.007
TOTAL	20	0	6	26	2.080	0.000	0.698	2.778
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	10	0	0	10	0.513	0.000	0.000	0.513
OPERATIONS PERSONNEL	1	0	0	1	0.150	0.000	0.000	0.150
HEALTH PHYSICS PERSONNEL	9	0	2	11	0.158	0.000	0.016	0.174
SUPERVISORY PERSONNEL	1	0	0	1	0.007	0.000	0.000	0.007
ENGINEERING PERSONNEL	1	0	0	1	0.008	0.000	0.000	0.008
TOTAL	22	0	2	24	0.836	0.000	0.016	0.852
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	2	0	0	2	0.142	0.000	0.000	0.142
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	4	0	0	4	0.025	0.000	0.000	0.025
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	0	0	1	0.023	0.000	0.000	0.023
TOTAL	7	0	0	7	0.190	0.000	0.000	0.190
WASTE PROCESSING								
MAINTENANCE PERSONNEL	3	0	0	3	0.188	0.000	0.000	0.188
OPERATIONS PERSONNEL	3	0	0	3	0.106	0.000	0.000	0.106
HEALTH PHYSICS PERSONNEL	12	0	3	15	2.635	0.000	0.844	3.479
SUPERVISORY PERSONNEL	1	0	0	1	0.158	0.000	0.000	0.158
ENGINEERING PERSONNEL	1	0	0	1	0.019	0.000	0.000	0.019
TOTAL	20	0	3	23	3.106	0.000	0.844	3.950
REFUELING								
MAINTENANCE PERSONNEL	9	0	0	9	1.261	0.000	0.000	1.261
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	6	0	2	8	0.120	0.000	0.010	0.130
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	0	0	1	0.078	0.000	0.000	0.078
TOTAL	16	0	2	18	1.459	0.000	0.010	1.469
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	25	0	0	25	2.106	0.000	0.000	2.106
OPERATIONS PERSONNEL	8	0	0	8	0.501	0.000	0.000	0.501
HEALTH PHYSICS PERSONNEL	44	0	13	57	4.752	0.000	1.568	6.320
SUPERVISORY PERSONNEL	3	0	0	3	0.177	0.000	0.000	0.177
ENGINEERING PERSONNEL	5	0	0	5	0.135	0.000	0.000	0.135
GRAND TOTALS	85	0	13	98	7.671	0.000	1.568	9.239

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	6	0	8	14	2.696	0.000	3.023	5.719
OPERATIONS PERSONNEL	46	0	1	47	24.824	0.000	0.160	24.984
HEALTH PHYSICS PERSONNEL	17	0	12	29	12.058	0.000	4.561	16.619
SUPERVISORY PERSONNEL	1	3	0	4	0.080	0.710	0.045	0.835
ENGINEERING PERSONNEL	2	2	3	7	0.396	0.375	1.420	2.191
TOTAL	72	5	24	101	40.054	1.085	9.209	50.348
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	20	0	79	99	10.162	0.000	38.698	48.860
OPERATIONS PERSONNEL	6	0	2	8	1.920	0.000	0.280	2.200
HEALTH PHYSICS PERSONNEL	3	0	5	8	1.961	0.000	2.710	4.671
SUPERVISORY PERSONNEL	0	0	2	2	0.010	0.005	0.510	0.525
ENGINEERING PERSONNEL	3	2	18	23	0.755	0.335	10.050	11.140
TOTAL	32	2	106	140	14.808	0.340	52.248	67.396
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2	0	73	75	1.005	0.000	45.539	46.544
OPERATIONS PERSONNEL	1	0	0	1	0.340	0.000	0.000	0.340
HEALTH PHYSICS PERSONNEL	2	0	4	6	1.760	0.000	2.490	4.250
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.145	0.145
ENGINEERING PERSONNEL	5	2	36	43	2.785	0.437	28.860	32.082
TOTAL	10	2	114	126	5.890	0.437	77.034	83.361
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	74	0	248	322	54.785	0.000	149.743	204.528
OPERATIONS PERSONNEL	10	0	2	12	5.985	0.000	0.355	6.340
HEALTH PHYSICS PERSONNEL	19	0	34	53	14.241	0.000	23.826	38.067
SUPERVISORY PERSONNEL	1	0	0	1	0.090	0.085	0.000	0.175
ENGINEERING PERSONNEL	9	4	24	37	2.390	0.980	12.383	15.753
TOTAL	113	4	308	425	77.491	1.065	186.307	264.863
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	14	14	0.005	0.000	6.299	6.304
OPERATIONS PERSONNEL	0	0	4	4	0.120	0.000	1.813	1.933
HEALTH PHYSICS PERSONNEL	1	0	1	2	0.720	0.000	0.450	1.170
SUPERVISORY PERSONNEL	0	0	0	0	0.050	0.000	0.000	0.050
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	1	0	19	20	0.895	0.000	8.562	9.457
REFUELING								
MAINTENANCE PERSONNEL	0	0	30	30	0.108	0.000	12.517	12.625
OPERATIONS PERSONNEL	4	0	1	5	0.735	0.000	0.220	0.955
HEALTH PHYSICS PERSONNEL	1	0	3	4	1.045	0.000	1.636	2.681
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	2	0	19	21	0.390	0.020	7.497	7.907
TOTAL	7	0	53	60	2.278	0.020	21.870	24.168
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	102	0	452	554	68.761	0.000	255.819	324.580
OPERATIONS PERSONNEL	67	0	10	77	33.924	0.000	2.828	36.752
HEALTH PHYSICS PERSONNEL	43	0	59	102	31.785	0.000	35.673	67.458
SUPERVISORY PERSONNEL	2	3	3	8	0.230	0.800	0.700	1.730
ENGINEERING PERSONNEL	21	10	100	131	6.716	2.147	60.210	69.073
GRAND TOTALS	235	13	624	872	141.416	2.947	355.230	499.593

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	6	0	2	8	2.920	0.100	2.270	5.290
OPERATIONS PERSONNEL	29	0	0	29	9.385	0.000	0.280	9.665
HEALTH PHYSICS PERSONNEL	7	0	40	47	2.860	0.040	16.355	19.255
SUPERVISORY PERSONNEL	0	0	0	0	0.210	0.065	0.050	0.325
ENGINEERING PERSONNEL	3	0	4	7	2.400	0.300	2.320	5.020
TOTAL	45	0	46	91	17.775	0.505	21.275	39.555
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	25	11	52	88	10.045	2.940	19.690	32.675
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.050	0.050
HEALTH PHYSICS PERSONNEL	1	0	5	6	0.530	0.000	1.370	1.900
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	0	12	13	0.450	0.000	3.530	3.980
TOTAL	27	11	69	107	11.025	2.940	24.640	38.605
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	4	2	38	44	1.610	1.220	15.400	18.230
OPERATIONS PERSONNEL	3	0	0	3	1.620	0.000	0.000	1.620
HEALTH PHYSICS PERSONNEL	1	0	7	8	0.490	0.000	1.980	2.470
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	6	0	32	38	1.880	0.140	12.400	14.420
TOTAL	14	2	77	93	5.600	1.360	29.780	36.740
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	52	9	383	444	23.471	2.230	211.732	237.433
OPERATIONS PERSONNEL	24	0	41	65	5.277	0.000	20.460	25.737
HEALTH PHYSICS PERSONNEL	33	0	41	74	11.117	0.040	13.045	24.202
SUPERVISORY PERSONNEL	0	0	3	3	0.090	0.040	0.870	1.000
ENGINEERING PERSONNEL	14	3	98	115	5.982	1.070	36.422	43.474
TOTAL	123	12	566	701	45.937	3.380	282.529	331.846
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	1	55	57	0.380	0.780	18.780	19.940
OPERATIONS PERSONNEL	0	0	1	1	0.020	0.000	0.280	0.300
HEALTH PHYSICS PERSONNEL	1	0	8	9	0.625	0.080	3.400	4.105
SUPERVISORY PERSONNEL	0	1	0	1	0.000	0.160	0.000	0.160
ENGINEERING PERSONNEL	0	0	0	0	0.040	0.040	0.330	0.410
TOTAL	2	2	64	68	1.065	1.060	22.790	24.915
REFUELING								
MAINTENANCE PERSONNEL	15	0	30	45	5.465	0.040	9.180	14.685
OPERATIONS PERSONNEL	1	0	0	1	0.540	0.000	0.040	0.580
HEALTH PHYSICS PERSONNEL	1	0	15	16	0.365	0.000	4.625	4.990
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.020	0.020
ENGINEERING PERSONNEL	3	2	64	69	0.810	0.385	34.760	35.955
TOTAL	20	2	109	131	7.180	0.425	48.625	56.230
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	103	23	560	686	43.891	7.310	277.052	328.253
OPERATIONS PERSONNEL	57	0	42	99	16.842	0.000	21.110	37.952
HEALTH PHYSICS PERSONNEL	44	0	116	160	15.987	0.160	40.775	56.922
SUPERVISORY PERSONNEL	0	1	3	4	0.300	0.265	0.940	1.505
ENGINEERING PERSONNEL	27	5	210	242	11.562	1.935	89.762	103.259
GRAND TOTALS	231	29	931	1191	88.582	9.670	429.639	527.891

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	1	1	0.226	0.511	0.511	1.248
OPERATIONS PERSONNEL	1	0	0	1	1.809	0.084	0.084	1.977
HEALTH PHYSICS PERSONNEL	1	0	2	3	1.069	0.799	0.799	2.667
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.005	0.005	0.010
ENGINEERING PERSONNEL	0	0	0	0	0.036	0.000	0.000	0.036
TOTAL	2	0	3	5	3.140	1.399	1.399	5.938
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	6	0	7	13	6.430	0.099	6.265	12.794
OPERATIONS PERSONNEL	0	0	0	0	2.943	0.000	0.158	3.101
HEALTH PHYSICS PERSONNEL	10	0	2	12	3.671	0.070	1.842	5.583
SUPERVISORY PERSONNEL	0	0	0	0	0.009	0.248	0.003	0.260
ENGINEERING PERSONNEL	1	0	0	1	0.541	0.009	0.000	0.550
TOTAL	17	0	9	26	13.594	0.426	8.268	22.288
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.079	0.000	0.257	0.336
OPERATIONS PERSONNEL	0	0	0	0	0.002	0.000	0.000	0.002
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.015	0.000	0.032	0.047
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	0.096	0.000	0.289	0.385
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	19	0	33	52	7.481	0.030	13.170	20.681
OPERATIONS PERSONNEL	0	0	0	0	4.690	0.000	0.019	4.709
HEALTH PHYSICS PERSONNEL	1	0	2	3	1.264	0.004	0.872	2.140
SUPERVISORY PERSONNEL	0	0	0	0	0.002	0.122	0.021	0.145
ENGINEERING PERSONNEL	0	0	0	0	0.241	0.034	0.005	0.280
TOTAL	20	0	35	55	13.678	0.190	14.087	27.955
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	1	1	0.026	0.000	0.210	0.236
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	6	0	1	7	1.854	0.000	0.273	2.127
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.070	0.000	0.070
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	6	0	2	8	1.880	0.070	0.483	2.433
REFUELING								
MAINTENANCE PERSONNEL	88	1	235	324	36.474	0.489	145.377	182.340
OPERATIONS PERSONNEL	5	0	0	5	3.230	0.000	0.179	3.409
HEALTH PHYSICS PERSONNEL	25	1	42	68	7.973	0.277	20.415	28.665
SUPERVISORY PERSONNEL	0	0	0	0	0.084	0.665	0.061	0.810
ENGINEERING PERSONNEL	3	0	0	3	1.315	0.194	0.269	1.778
TOTAL	121	2	277	400	49.076	1.625	166.301	217.002
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	113	1	277	391	50.716	1.129	165.790	217.635
OPERATIONS PERSONNEL	6	0	0	6	12.674	0.084	0.440	13.198
HEALTH PHYSICS PERSONNEL	43	1	49	93	15.846	1.150	24.233	41.229
SUPERVISORY PERSONNEL	0	0	0	0	0.095	1.110	0.090	1.295
ENGINEERING PERSONNEL	4	0	0	4	2.133	0.237	0.274	2.644
GRAND TOTALS	166	2	326	494	81.464	3.710	190.827	276.001

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	72	9	143	224	3.730	0.100	13.121	16.951
OPERATIONS PERSONNEL	44	1	4	49	9.824	0.088	0.528	10.440
HEALTH PHYSICS PERSONNEL	53	0	122	175	14.895	0.000	51.840	66.735
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.855	0.855
ENGINEERING PERSONNEL	44	4	56	104	3.433	0.362	6.242	10.037
TOTAL	213	14	326	553	31.882	0.550	72.586	105.018
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	137	23	581	741	50.648	8.371	254.686	313.705
OPERATIONS PERSONNEL	36	1	4	41	2.120	0.021	0.271	2.412
HEALTH PHYSICS PERSONNEL	68	2	206	276	15.513	0.727	46.288	62.528
SUPERVISORY PERSONNEL	5	1	6	12	1.667	0.115	1.407	3.189
ENGINEERING PERSONNEL	71	8	146	225	16.704	1.422	33.020	51.146
TOTAL	317	35	943	1295	86.652	10.656	335.672	432.980
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	1	38	40	0.064	0.006	4.816	4.886
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	2	2	0.000	0.000	0.053	0.053
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	6	1	8	15	0.371	0.346	1.728	2.445
TOTAL	7	2	48	57	0.435	0.352	6.597	7.384
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	101	19	380	500	19.244	3.581	131.355	154.180
OPERATIONS PERSONNEL	4	1	3	8	0.058	0.010	0.799	0.867
HEALTH PHYSICS PERSONNEL	36	2	113	151	6.661	0.556	28.317	35.534
SUPERVISORY PERSONNEL	2	0	3	5	0.248	0.000	1.038	1.286
ENGINEERING PERSONNEL	39	2	102	143	6.609	0.142	37.987	44.738
TOTAL	182	24	601	807	32.820	4.289	199.496	236.605
WASTE PROCESSING								
MAINTENANCE PERSONNEL	9	4	11	24	0.502	0.222	1.255	1.979
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	22	1	62	85	2.753	0.004	4.680	7.437
SUPERVISORY PERSONNEL	1	0	0	1	0.027	0.000	0.000	0.027
ENGINEERING PERSONNEL	1	0	12	13	0.033	0.000	1.830	1.863
TOTAL	33	5	85	123	3.315	0.226	7.765	11.306
REFUELING								
MAINTENANCE PERSONNEL	18	1	111	130	5.516	0.008	36.717	42.241
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	9	2	43	54	0.527	0.087	3.333	3.947
SUPERVISORY PERSONNEL	3	1	0	4	1.340	0.621	0.000	1.961
ENGINEERING PERSONNEL	27	1	23	51	5.040	0.071	4.712	9.823
TOTAL	57	5	177	239	12.423	0.787	44.762	57.972
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	338 (138)	57 (23)	1264 (608)	1659 (769)	79.704	12.288	441.950	533.942
OPERATIONS PERSONNEL	84 (44)	3 (1)	11 (5)	98 (50)	12.002	0.119	1.598	13.719
HEALTH PHYSICS PERSONNEL	188 (72)	7 (2)	548 (212)	743 (286)	40.349	1.374	134.511	176.234
SUPERVISORY PERSONNEL	11 (5)	2 (1)	10 (7)	23 (13)	3.282	0.736	3.300	7.318
ENGINEERING PERSONNEL	188 (74)	16 (8)	347 (175)	551 (257)	32.190	2.343	85.519	120.052
GRAND TOTALS	809 (333)	85 (35)	2180 (1007)	3074(1375)	167.527	16.860	666.878	851.265

*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

1990

PLANT: *SEABROOK

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		0		2		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	7		0		0		7		0.380	0.000	0.000	0.380
SUPERVISORY PERSONNEL	2		0		0		2		0.130	0.000	0.000	0.130
ENGINEERING PERSONNEL	0		0		1		1		0.000	0.000	0.025	0.025
TOTAL	11		0		1		12		0.510	0.000	0.025	0.535
ROUTINE MAINTENANCE												
MAINTENANCE PERSONNEL	2		0		0		2		0.500	0.000	0.000	0.500
OPERATIONS PERSONNEL	0		0		0		0		0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	7		0		0		7		0.345	0.000	0.000	0.345
SUPERVISORY PERSONNEL	2		0		0		2		0.115	0.000	0.000	0.115
ENGINEERING PERSONNEL	0		0		1		1		0.000	0.000	0.185	0.185
TOTAL	11		0		1		12		0.960	0.000	0.185	1.145
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	4		0		0		4		0.010	0.000	0.000	0.010
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	4		0		0		4		0.010	0.000	0.000	0.010
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	4		0		0		4		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	4		0		0		4		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	4	(2)	0	(0)	0	(0)	4	(2)	0.500	0.000	0.000	0.500
OPERATIONS PERSONNEL	0	(0)	0	(0)	0	(0)	0	(0)	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	22	(7)	0	(0)	0	(0)	22	(7)	0.735	0.000	0.000	0.735
SUPERVISORY PERSONNEL	4	(2)	0	(0)	0	(0)	4	(2)	0.245	0.000	0.000	0.245
ENGINEERING PERSONNEL	0	(0)	0	(0)	2	(1)	2	(1)	0.000	0.000	0.210	0.210
GRAND TOTALS	30	(11)	0	(0)	2	(1)	32	(12)	1.480	0.000	0.210	1.690

*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

1990

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	636	9	38	683	20.317	0.314	0.707	21.338
OPERATIONS PERSONNEL	63	10	0	73	14.415	5.954	0.000	20.369
HEALTH PHYSICS PERSONNEL	41	32	97	170	13.945	5.845	22.545	42.335
SUPERVISORY PERSONNEL	102	4	39	145	10.730	0.042	2.883	13.655
ENGINEERING PERSONNEL	126	53	39	218	7.836	3.637	0.854	12.327
TOTAL	968	108	213	1289	67.243	15.792	26.989	110.024
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	1105	14	55	1174	310.375	0.626	7.026	318.027
OPERATIONS PERSONNEL	60	10	0	70	1.170	0.812	0.000	1.982
HEALTH PHYSICS PERSONNEL	38	27	85	150	8.290	1.935	5.539	15.764
SUPERVISORY PERSONNEL	99	15	50	164	7.789	1.014	2.297	11.100
ENGINEERING PERSONNEL	203	60	102	365	10.954	6.087	45.710	62.751
TOTAL	1505	126	292	1923	338.578	10.474	60.572	409.624
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	281	3	20	304	42.935	0.048	0.782	43.765
OPERATIONS PERSONNEL	3	0	1	4	0.005	0.000	0.441	0.446
HEALTH PHYSICS PERSONNEL	30	17	50	97	9.920	2.667	18.757	31.344
SUPERVISORY PERSONNEL	33	6	19	58	6.500	1.750	2.417	10.667
ENGINEERING PERSONNEL	40	80	116	236	2.826	60.499	105.636	168.961
TOTAL	387	106	206	699	62.186	64.964	128.033	255.183
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	1208	8	49	1265	508.144	1.653	13.418	523.215
OPERATIONS PERSONNEL	19	6	1	26	1.351	0.542	0.003	1.896
HEALTH PHYSICS PERSONNEL	41	34	88	163	8.001	7.418	17.909	33.328
SUPERVISORY PERSONNEL	94	11	55	160	16.808	0.253	15.615	32.676
ENGINEERING PERSONNEL	315	37	135	487	91.904	7.277	74.267	173.448
TOTAL	1677	96	328	2101	626.208	17.143	121.212	764.563
WASTE PROCESSING								
MAINTENANCE PERSONNEL	215	0	16	231	24.321	0.000	2.384	26.705
OPERATIONS PERSONNEL	4	0	2	6	0.062	0.000	3.487	3.549
HEALTH PHYSICS PERSONNEL	31	15	38	84	3.713	0.835	4.034	8.582
SUPERVISORY PERSONNEL	9	0	1	10	0.345	0.000	0.029	0.374
ENGINEERING PERSONNEL	7	4	0	11	0.010	0.042	0.000	0.052
TOTAL	266	19	57	342	28.451	0.877	9.934	39.262
REFUELING								
MAINTENANCE PERSONNEL	786	3	27	816	158.412	0.545	6.238	165.195
OPERATIONS PERSONNEL	51	9	1	61	0.845	0.268	0.290	1.403
HEALTH PHYSICS PERSONNEL	26	19	40	85	8.842	5.892	10.130	24.864
SUPERVISORY PERSONNEL	53	2	29	84	5.215	0.985	4.158	10.358
ENGINEERING PERSONNEL	80	49	52	181	3.588	8.668	11.152	23.408
TOTAL	996	82	149	1227	176.902	16.358	31.968	225.228
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	4231	37	205	4473	1064.504	3.186	30.555	1098.245
OPERATIONS PERSONNEL	200	35	5	240	17.848	7.576	4.221	29.645
HEALTH PHYSICS PERSONNEL	207	144	398	749	52.711	24.592	78.914	156.217
SUPERVISORY PERSONNEL	390	38	193	621	47.387	4.044	27.399	78.830
ENGINEERING PERSONNEL	771	283	444	1498	117.118	86.210	237.619	440.947
GRAND TOTALS	5799	537	1245	7581	1299.568	125.608	378.708	1803.884

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

PLANT: *SOUTH TEXAS 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	2	1	3	0.587	1.071	0.738	2.396
OPERATIONS PERSONNEL	9	0	0	9	3.261	0.000	0.000	3.261
HEALTH PHYSICS PERSONNEL	24	0	13	37	6.124	0.000	4.929	11.053
SUPERVISORY PERSONNEL	3	0	0	3	0.947	0.117	0.000	1.064
ENGINEERING PERSONNEL	0	0	0	0	0.246	0.000	0.023	0.269
TOTAL	36	2	14	52	11.165	1.188	5.690	18.043
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	60	1	39	100	15.298	0.352	12.719	28.369
OPERATIONS PERSONNEL	0	0	0	0	0.340	0.000	0.016	0.356
HEALTH PHYSICS PERSONNEL	20	0	26	46	5.492	0.000	7.886	13.378
SUPERVISORY PERSONNEL	6	0	0	6	2.149	0.017	0.000	2.166
ENGINEERING PERSONNEL	1	0	1	2	0.381	0.000	0.424	0.805
TOTAL	87	1	66	154	23.660	0.369	21.045	45.074
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	9	0	24	33	2.743	0.259	9.273	12.275
OPERATIONS PERSONNEL	0	0	0	0	0.020	0.000	0.000	0.020
HEALTH PHYSICS PERSONNEL	2	0	0	2	0.481	0.000	0.246	0.727
SUPERVISORY PERSONNEL	3	0	0	3	1.177	0.053	0.000	1.230
ENGINEERING PERSONNEL	7	0	2	9	1.698	0.000	0.446	2.144
TOTAL	21	0	26	47	6.119	0.312	9.965	16.396
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	27	3	130	160	7.051	0.921	47.967	55.939
OPERATIONS PERSONNEL	1	0	0	1	0.280	0.000	0.003	0.283
HEALTH PHYSICS PERSONNEL	11	0	12	23	3.716	0.000	4.826	8.542
SUPERVISORY PERSONNEL	8	0	1	9	2.442	0.114	0.185	2.741
ENGINEERING PERSONNEL	0	0	27	27	0.180	0.000	9.305	9.485
TOTAL	47	3	170	220	13.669	1.035	62.286	76.990
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	2	2	0.025	0.115	1.048	1.188
OPERATIONS PERSONNEL	0	0	0	0	0.003	0.000	0.000	0.003
HEALTH PHYSICS PERSONNEL	3	0	53	56	1.302	0.000	15.597	16.899
SUPERVISORY PERSONNEL	1	0	0	1	0.293	0.000	0.000	0.293
ENGINEERING PERSONNEL	0	0	0	0	0.003	0.000	0.025	0.028
TOTAL	4	0	55	59	1.626	0.115	16.670	18.411
REFUELING								
MAINTENANCE PERSONNEL	32	3	28	63	10.518	0.902	7.217	18.637
OPERATIONS PERSONNEL	9	0	0	9	3.772	0.000	0.318	4.090
HEALTH PHYSICS PERSONNEL	4	0	5	9	1.398	0.000	1.627	3.025
SUPERVISORY PERSONNEL	5	0	0	5	2.175	0.153	0.000	2.328
ENGINEERING PERSONNEL	3	0	3	6	0.920	0.000	0.679	1.599
TOTAL	53	3	36	92	18.783	1.055	9.841	29.679
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	128	9	224	361	36.222	3.620	78.962	118.804
OPERATIONS PERSONNEL	19	0	0	19	7.676	0.000	0.337	8.013
HEALTH PHYSICS PERSONNEL	64	0	109	173	18.513	0.000	35.111	53.624
SUPERVISORY PERSONNEL	26	0	1	27	9.183	0.454	0.185	9.822
ENGINEERING PERSONNEL	11	0	33	44	3.428	0.000	10.902	14.330
GRAND TOTALS	248	9	367	624	75.022	4.074	125.497	204.593

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

PLANT: *ST. LUCIE 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	17	1	8	26	7.365	0.485	4.491	12.341
OPERATIONS PERSONNEL	52	3	9	64	27.184	1.340	8.025	36.549
HEALTH PHYSICS PERSONNEL	27	0	59	86	17.985	0.000	20.237	38.222
SUPERVISORY PERSONNEL	14	1	5	20	4.268	0.695	1.949	6.912
ENGINEERING PERSONNEL	6	2	7	15	1.707	0.725	2.308	4.740
TOTAL	116	7	88	211	58.509	3.245	37.010	98.764
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	180	6	242	428	64.535	1.485	118.305	184.325
OPERATIONS PERSONNEL	39	3	31	73	14.762	1.110	10.964	26.836
HEALTH PHYSICS PERSONNEL	21	0	25	46	8.915	0.000	9.221	18.136
SUPERVISORY PERSONNEL	12	0	14	26	4.461	0.245	4.410	9.116
ENGINEERING PERSONNEL	0	0	3	3	0.710	0.248	2.035	2.993
TOTAL	252	9	315	576	93.383	3.088	144.935	241.406
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	24	5	106	135	8.670	2.450	53.687	64.807
OPERATIONS PERSONNEL	1	2	16	19	0.605	0.570	5.460	6.635
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.100	0.000	0.050	0.150
SUPERVISORY PERSONNEL	10	2	4	16	3.785	0.675	1.930	6.390
ENGINEERING PERSONNEL	4	1	20	25	1.255	0.515	8.245	10.015
TOTAL	39	10	146	195	14.415	4.210	69.372	87.997
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	142	6	321	469	96.025	2.820	142.012	240.857
OPERATIONS PERSONNEL	6	5	90	101	3.300	3.135	82.479	88.914
HEALTH PHYSICS PERSONNEL	17	0	83	100	9.985	0.000	32.806	42.791
SUPERVISORY PERSONNEL	17	4	25	46	5.750	1.920	9.234	16.904
ENGINEERING PERSONNEL	5	1	35	41	1.285	0.550	25.110	26.945
TOTAL	187	16	554	757	116.345	8.425	291.641	416.411
WASTE PROCESSING								
MAINTENANCE PERSONNEL	14	0	2	16	7.084	0.000	1.280	8.364
OPERATIONS PERSONNEL	5	0	24	29	0.880	0.000	6.865	7.745
HEALTH PHYSICS PERSONNEL	2	0	14	16	1.662	0.000	7.368	9.030
SUPERVISORY PERSONNEL	1	0	4	5	0.690	0.050	1.750	2.490
ENGINEERING PERSONNEL	0	0	0	0	0.020	0.010	0.000	0.030
TOTAL	22	0	44	66	10.336	0.060	17.263	27.659
REFUELING								
MAINTENANCE PERSONNEL	63	0	2	65	27.550	0.140	1.470	29.160
OPERATIONS PERSONNEL	19	1	6	26	5.763	0.130	1.445	7.338
HEALTH PHYSICS PERSONNEL	4	0	23	27	4.135	0.000	10.417	14.552
SUPERVISORY PERSONNEL	3	0	1	4	0.890	0.105	0.270	1.265
ENGINEERING PERSONNEL	1	0	4	5	0.433	0.090	0.620	1.143
TOTAL	90	1	36	127	38.771	0.465	14.222	53.458
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	440 (206)	18 (11)	681 (486)	1139 (703)	211.229	7.380	321.245	539.854
OPERATIONS PERSONNEL	122 (72)	14 (7)	176 (125)	312 (204)	52.494	6.285	115.238	174.017
HEALTH PHYSICS PERSONNEL	71 (27)	0 (0)	204 (125)	275 (152)	42.782	0.000	80.099	122.881
SUPERVISORY PERSONNEL	57 (37)	7 (5)	53 (35)	117 (77)	19.844	3.690	19.543	43.077
ENGINEERING PERSONNEL	16 (14)	4 (1)	69 (55)	89 (70)	5.410	2.138	38.318	45.866
GRAND TOTALS	706 (356)	43 (24)	1183 (826)	1932(1206)	331.759	19.493	574.443	925.695

*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

1990

PLANT: *SUMMER 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	7	0	3	10	2.150	0.000	2.440	4.590
OPERATIONS PERSONNEL	35	0	1	36	9.695	0.010	1.005	10.710
HEALTH PHYSICS PERSONNEL	8	0	35	43	2.485	0.000	10.965	13.450
SUPERVISORY PERSONNEL	0	0	1	1	0.810	0.000	0.190	1.000
ENGINEERING PERSONNEL	1	0	4	5	0.370	0.000	1.285	1.655
TOTAL	51	0	44	95	15.510	0.010	15.885	31.405
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	17	0	43	60	5.780	0.000	15.430	21.210
OPERATIONS PERSONNEL	1	2	9	12	1.087	0.415	2.910	4.412
HEALTH PHYSICS PERSONNEL	2	0	40	42	0.555	0.000	14.670	15.225
SUPERVISORY PERSONNEL	0	0	0	0	0.405	0.000	0.040	0.445
ENGINEERING PERSONNEL	0	0	1	1	0.290	0.000	0.850	1.140
TOTAL	20	2	93	115	8.117	0.415	33.900	42.432
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	4	0	45	49	1.520	0.000	11.675	13.195
OPERATIONS PERSONNEL	7	0	4	11	2.365	0.000	1.505	3.870
HEALTH PHYSICS PERSONNEL	0	0	5	5	0.175	0.000	2.360	2.535
SUPERVISORY PERSONNEL	0	0	0	0	0.015	0.000	0.100	0.115
ENGINEERING PERSONNEL	0	0	2	2	0.000	0.000	0.685	0.685
TOTAL	11	0	56	67	4.075	0.000	16.325	20.400
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	39	0	234	273	14.300	0.000	134.170	148.470
OPERATIONS PERSONNEL	15	1	18	34	4.625	0.500	4.550	9.675
HEALTH PHYSICS PERSONNEL	5	0	102	107	1.745	0.000	40.915	42.660
SUPERVISORY PERSONNEL	2	0	0	2	1.485	0.000	4.000	5.485
ENGINEERING PERSONNEL	5	0	110	115	1.385	0.000	63.140	64.525
TOTAL	66	1	464	531	23.540	0.500	246.775	270.815
WASTE PROCESSING								
MAINTENANCE PERSONNEL	39	0	1	40	0.140	0.000	0.425	0.565
OPERATIONS PERSONNEL	15	0	0	15	0.030	0.025	0.465	0.520
HEALTH PHYSICS PERSONNEL	5	0	1	6	0.755	0.000	1.025	1.780
SUPERVISORY PERSONNEL	2	0	0	2	0.055	0.000	0.000	0.055
ENGINEERING PERSONNEL	5	0	0	5	0.010	0.000	0.000	0.010
TOTAL	66	0	2	68	0.990	0.025	1.915	2.930
REFUELING								
MAINTENANCE PERSONNEL	0	0	29	29	3.060	0.000	10.050	13.110
OPERATIONS PERSONNEL	0	0	2	2	1.045	0.030	1.170	2.245
HEALTH PHYSICS PERSONNEL	3	0	28	31	0.960	0.000	8.985	9.945
SUPERVISORY PERSONNEL	0	0	0	0	0.200	0.000	0.000	0.200
ENGINEERING PERSONNEL	0	0	16	16	0.085	0.000	16.880	16.965
TOTAL	3	0	75	78	5.350	0.030	37.085	42.465
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	106 (76)	0 (0)	355 (355)	461 (431)	26.950	0.000	174.190	201.140
OPERATIONS PERSONNEL	73 (60)	3 (3)	34 (34)	110 (97)	18.847	0.980	11.605	31.432
HEALTH PHYSICS PERSONNEL	23 (21)	0 (0)	211 (211)	234 (232)	6.675	0.000	78.920	85.595
SUPERVISORY PERSONNEL	4 (2)	0 (0)	1 (1)	5 (3)	2.970	0.000	4.330	7.300
ENGINEERING PERSONNEL	11 (6)	0 (0)	133 (133)	144 (139)	2.140	0.000	82.840	84.980
GRAND TOTALS	217 (165)	3 (3)	734 (734)	954 (902)	57.582	0.980	351.885	410.447

*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

1990

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	177	2	588	767	3.202	0.000	1.165	4.367
OPERATIONS PERSONNEL	351	42	127	520	17.338	0.061	0.639	18.038
HEALTH PHYSICS PERSONNEL	84	11	128	223	16.075	0.074	5.415	21.564
SUPERVISORY PERSONNEL	149	8	65	222	2.823	0.003	1.018	3.844
ENGINEERING PERSONNEL	88	33	97	218	1.022	0.026	0.463	1.511
TOTAL	849	96	1005	1950	40.460	0.164	8.700	49.324
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	165	0	740	905	54.109	0.000	140.604	194.713
OPERATIONS PERSONNEL	185	10	111	306	20.976	0.077	8.130	29.183
HEALTH PHYSICS PERSONNEL	77	1	188	266	23.317	0.021	53.305	76.643
SUPERVISORY PERSONNEL	97	2	56	155	6.417	0.010	8.946	15.373
ENGINEERING PERSONNEL	75	33	70	178	3.412	0.248	1.599	5.259
TOTAL	599	46	1165	1810	108.231	0.356	212.584	321.171
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	132	133	0.015	0.000	16.242	16.257
OPERATIONS PERSONNEL	32	4	28	64	0.352	0.021	1.688	2.061
HEALTH PHYSICS PERSONNEL	21	0	16	37	0.463	0.000	1.387	1.850
SUPERVISORY PERSONNEL	6	0	6	12	0.007	0.000	0.975	0.982
ENGINEERING PERSONNEL	5	4	51	60	1.093	0.107	11.500	12.700
TOTAL	65	8	233	306	1.930	0.128	31.792	33.850
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	63	0	628	691	1.325	0.000	70.435	71.760
OPERATIONS PERSONNEL	37	0	50	87	0.956	0.000	2.605	3.561
HEALTH PHYSICS PERSONNEL	45	0	89	134	6.722	0.000	7.839	14.561
SUPERVISORY PERSONNEL	23	0	52	75	0.774	0.000	5.532	6.306
ENGINEERING PERSONNEL	22	3	57	82	0.444	0.000	1.143	1.587
TOTAL	190	3	876	1069	10.221	0.000	87.554	97.775
WASTE PROCESSING								
MAINTENANCE PERSONNEL	15	0	21	36	0.019	0.000	0.110	0.129
OPERATIONS PERSONNEL	22	0	1	23	3.083	0.000	0.003	3.086
HEALTH PHYSICS PERSONNEL	42	1	8	51	1.553	0.000	0.381	1.934
SUPERVISORY PERSONNEL	12	0	8	20	2.165	0.000	0.320	2.485
ENGINEERING PERSONNEL	0	0	1	1	0.000	0.000	0.164	0.164
TOTAL	91	1	39	131	6.820	0.000	0.978	7.798
REFUELING								
MAINTENANCE PERSONNEL	40	0	109	149	1.993	0.000	18.091	20.084
OPERATIONS PERSONNEL	23	6	13	42	0.954	0.096	0.394	1.444
HEALTH PHYSICS PERSONNEL	28	0	49	77	1.408	0.000	1.358	2.766
SUPERVISORY PERSONNEL	14	0	10	24	0.643	0.000	0.970	1.613
ENGINEERING PERSONNEL	3	2	8	13	0.008	0.094	0.195	0.297
TOTAL	108	8	189	305	5.006	0.190	21.008	26.204
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	461	2	2218	2681	60.663	0.000	246.647	307.310
OPERATIONS PERSONNEL	650	62	330	1042	43.659	0.255	13.459	57.373
HEALTH PHYSICS PERSONNEL	297	13	478	788	49.538	0.095	69.685	119.318
SUPERVISORY PERSONNEL	301	10	197	508	12.829	0.013	17.761	30.603
ENGINEERING PERSONNEL	193	75	284	552	5.979	0.475	15.064	21.518
GRAND TOTALS	1902	162	3507	5571	172.668	0.838	362.616	536.122

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	69	0	4	73	24.376	0.000	1.037	25.413
HEALTH PHYSICS PERSONNEL	8	0	5	13	3.532	0.000	0.960	4.492
SUPERVISORY PERSONNEL	0	1	0	1	0.000	0.201	0.000	0.201
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	77	1	9	87	27.908	0.201	1.997	30.106
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	83	221	160	464	44.364	90.243	66.064	200.671
OPERATIONS PERSONNEL	40	1	10	51	13.328	0.130	4.951	18.409
HEALTH PHYSICS PERSONNEL	23	1	133	157	17.991	0.595	63.239	81.825
SUPERVISORY PERSONNEL	11	0	0	11	2.560	0.000	0.000	2.560
ENGINEERING PERSONNEL	7	2	6	15	1.217	0.222	1.983	3.422
TOTAL	164	225	309	698	79.460	91.190	136.237	306.887
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	36	55	91	0.000	32.637	22.153	54.790
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	0.565	0.000	0.000	0.565
ENGINEERING PERSONNEL	0	3	0	3	0.000	0.371	0.000	0.371
TOTAL	1	39	55	95	0.565	33.008	22.153	55.726
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	3	52	20	75	0.955	27.704	9.117	37.776
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	1	1	5	7	0.822	0.505	1.613	2.940
SUPERVISORY PERSONNEL	2	1	0	3	0.295	0.210	0.000	0.505
ENGINEERING PERSONNEL	4	0	14	18	0.768	0.000	5.819	6.587
TOTAL	10	54	39	103	2.840	28.419	16.549	47.808
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	1	1	3	0.110	0.405	0.125	0.640
OPERATIONS PERSONNEL	0	0	2	2	0.000	0.000	1.400	1.400
HEALTH PHYSICS PERSONNEL	3	0	9	12	1.225	0.000	3.479	4.704
SUPERVISORY PERSONNEL	1	0	1	2	0.220	0.000	0.620	0.840
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	5	1	13	19	1.555	0.405	5.624	7.584
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	3	0	0	3	0.423	0.000	0.000	0.423
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	0	3	0.423	0.000	0.000	0.423
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	87	310	236	633	45.429	150.989	97.459	293.877
OPERATIONS PERSONNEL	112	1	16	129	38.127	0.130	7.388	45.645
HEALTH PHYSICS PERSONNEL	35	2	152	189	23.570	1.100	69.291	93.961
SUPERVISORY PERSONNEL	15	2	1	18	3.640	0.411	0.620	4.671
ENGINEERING PERSONNEL	11	5	20	36	1.985	0.593	7.802	10.380
GRAND TOTALS	260	320	425	1005	112.751	153.223	182.560	448.534

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	199	7	73	279	12.471	0.040	1.395	13.906
OPERATIONS PERSONNEL	100	3	1	104	18.904	0.055	0.000	18.959
HEALTH PHYSICS PERSONNEL	83	15	31	129	19.942	0.023	4.560	24.525
SUPERVISORY PERSONNEL	154	21	31	206	4.018	0.039	0.409	4.466
ENGINEERING PERSONNEL	57	17	23	97	1.988	0.115	0.608	2.711
TOTAL	593	63	159	815	57.323	0.272	6.972	64.567
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	229	9	491	729	22.865	0.193	67.683	90.741
OPERATIONS PERSONNEL	34	3	6	43	0.191	0.003	0.068	0.262
HEALTH PHYSICS PERSONNEL	35	6	18	59	0.538	0.002	0.138	0.678
SUPERVISORY PERSONNEL	222	48	68	338	2.844	0.199	5.042	8.085
ENGINEERING PERSONNEL	90	25	50	165	1.636	0.201	2.544	4.381
TOTAL	610	91	633	1334	28.074	0.598	75.475	104.147
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	45	9	96	150	0.395	0.069	5.275	5.739
OPERATIONS PERSONNEL	16	2	1	19	0.204	0.005	0.018	0.227
HEALTH PHYSICS PERSONNEL	11	0	3	14	0.109	0.000	0.233	0.342
SUPERVISORY PERSONNEL	69	3	28	100	1.459	0.012	1.472	2.943
ENGINEERING PERSONNEL	49	14	25	88	1.229	0.101	1.773	3.103
TOTAL	190	28	153	371	3.396	0.187	8.771	12.354
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	195	6	249	450	32.280	0.059	39.739	72.078
OPERATIONS PERSONNEL	27	0	1	28	0.982	0.000	0.109	1.091
HEALTH PHYSICS PERSONNEL	36	0	17	53	4.595	0.000	1.411	6.006
SUPERVISORY PERSONNEL	51	1	33	85	3.861	0.000	1.571	5.432
ENGINEERING PERSONNEL	26	5	20	51	3.136	0.068	1.708	4.912
TOTAL	335	12	320	667	44.854	0.127	44.538	89.519
WASTE PROCESSING								
MAINTENANCE PERSONNEL	51	1	22	74	3.418	0.000	6.452	9.870
OPERATIONS PERSONNEL	82	0	3	85	21.098	0.000	0.392	21.490
HEALTH PHYSICS PERSONNEL	52	7	14	73	3.368	0.004	0.348	3.720
SUPERVISORY PERSONNEL	49	9	8	66	2.092	0.003	1.396	3.491
ENGINEERING PERSONNEL	5	9	3	17	0.136	0.017	0.001	0.154
TOTAL	239	26	50	315	30.112	0.024	8.589	38.725
REFUELING								
MAINTENANCE PERSONNEL	64	1	20	85	3.932	0.056	0.931	4.919
OPERATIONS PERSONNEL	66	2	2	70	2.388	0.033	0.029	2.450
HEALTH PHYSICS PERSONNEL	15	0	3	18	0.495	0.000	0.200	0.695
SUPERVISORY PERSONNEL	29	1	1	31	1.424	0.001	0.000	1.425
ENGINEERING PERSONNEL	6	6	8	20	0.072	0.145	0.499	0.716
TOTAL	180	10	34	224	8.311	0.235	1.659	10.205
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	783 (250)	33 (21)	951 (527)	1767 (798)	75.361	0.417	121.475	197.253
OPERATIONS PERSONNEL	325 (131)	10 (5)	14 (8)	349 (144)	43.767	0.096	0.616	44.479
HEALTH PHYSICS PERSONNEL	232 (87)	28 (20)	86 (35)	346 (142)	29.047	0.029	6.890	35.966
SUPERVISORY PERSONNEL	574 (278)	83 (68)	169 (90)	826 (436)	15.698	0.254	9.890	25.842
ENGINEERING PERSONNEL	233 (107)	76 (58)	129 (65)	438 (230)	8.197	0.647	7.133	15.977
GRAND TOTALS	2147 (853)	230 (172)	1349 (725)	3726(1750)	172.070	1.443	146.004	319.517

*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

1990

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	33	0	54	87	1.376	0.000	8.426	9.802
OPERATIONS PERSONNEL	52	0	1	53	9.761	0.000	0.020	9.781
HEALTH PHYSICS PERSONNEL	66	3	22	91	3.519	0.000	3.097	6.616
SUPERVISORY PERSONNEL	46	16	21	83	1.324	0.411	0.952	2.687
ENGINEERING PERSONNEL	14	1	4	19	0.100	0.022	0.094	0.216
TOTAL	211	20	102	333	16.080	0.433	12.589	29.102
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	57	1	31	89	1.493	0.002	0.943	2.438
OPERATIONS PERSONNEL	70	0	4	74	3.638	0.000	0.080	3.718
HEALTH PHYSICS PERSONNEL	60	5	4	69	1.501	0.002	0.070	1.573
SUPERVISORY PERSONNEL	83	20	15	118	0.684	0.011	0.287	0.982
ENGINEERING PERSONNEL	29	7	15	51	0.113	0.002	0.012	0.127
TOTAL	299	33	69	401	7.429	0.017	1.392	8.838
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2	3	1	6	0.000	0.000	0.020	0.020
OPERATIONS PERSONNEL	3	4	1	8	0.047	0.000	0.030	0.077
HEALTH PHYSICS PERSONNEL	21	0	6	27	0.406	0.000	0.224	0.630
SUPERVISORY PERSONNEL	98	19	10	127	1.346	0.580	0.471	2.397
ENGINEERING PERSONNEL	10	1	5	16	0.361	0.027	0.145	0.533
TOTAL	134	27	23	184	2.160	0.607	0.890	3.657
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	36	1	92	129	30.971	0.005	29.252	60.228
OPERATIONS PERSONNEL	49	1	8	58	18.716	0.000	0.298	19.014
HEALTH PHYSICS PERSONNEL	27	0	18	45	10.191	0.000	5.712	15.903
SUPERVISORY PERSONNEL	16	1	23	40	2.748	0.048	4.234	7.030
ENGINEERING PERSONNEL	9	0	17	26	1.770	0.000	2.663	4.433
TOTAL	137	3	158	298	64.396	0.053	42.159	106.608
WASTE PROCESSING								
MAINTENANCE PERSONNEL	26	0	6	32	2.033	0.000	0.004	2.037
OPERATIONS PERSONNEL	54	1	7	62	2.910	0.002	0.020	2.932
HEALTH PHYSICS PERSONNEL	39	0	10	49	2.466	0.000	0.352	2.818
SUPERVISORY PERSONNEL	23	5	8	36	0.429	0.003	0.051	0.483
ENGINEERING PERSONNEL	9	0	3	12	0.064	0.000	0.006	0.070
TOTAL	151	6	34	191	7.902	0.005	0.433	8.340
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	154 (58)	5 (4)	184 (107)	343 (169)	35.873	0.007	38.645	74.525
OPERATIONS PERSONNEL	228 (73)	6 (5)	21 (10)	255 (88)	35.072	0.002	0.448	35.522
HEALTH PHYSICS PERSONNEL	213 (71)	8 (8)	60 (22)	281 (101)	18.083	0.002	9.455	27.540
SUPERVISORY PERSONNEL	266 (167)	61 (44)	77 (37)	404 (248)	6.531	1.053	5.995	13.579
ENGINEERING PERSONNEL	71 (34)	9 (8)	44 (30)	124 (72)	2.408	0.051	2.920	5.379
GRAND TOTALS	932 (403)	89 (69)	386 (206)	1407 (678)	97.967	1.115	57.463	156.545

*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

1990

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	1	0	0	1	0.770	0.010	0.680	1.460
OPERATIONS PERSONNEL	5	0	0	5	1.940	0.000	0.000	1.940
HEALTH PHYSICS PERSONNEL	15	0	5	20	3.200	0.000	2.240	5.440
SUPERVISORY PERSONNEL	0	0	0	0	0.700	0.000	0.980	1.680
ENGINEERING PERSONNEL	0	0	0	0	0.600	0.000	0.150	0.750
TOTAL	21	0	5	26	7.210	0.010	4.050	11.270
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	131	3	134	268	39.040	0.920	63.510	103.470
OPERATIONS PERSONNEL	10	0	0	10	3.050	0.000	0.000	3.050
HEALTH PHYSICS PERSONNEL	61	1	59	121	19.090	0.470	37.310	56.870
SUPERVISORY PERSONNEL	9	0	25	34	3.440	0.100	7.040	10.580
ENGINEERING PERSONNEL	11	0	81	92	3.340	0.000	62.310	65.650
TOTAL	222	4	299	525	67.960	1.490	170.170	239.620
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	2	0	32	34	0.430	0.070	13.000	13.500
OPERATIONS PERSONNEL	0	0	0	0	0.010	0.000	0.000	0.010
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.250	0.050	0.910	1.210
SUPERVISORY PERSONNEL	0	0	0	0	0.110	0.000	0.200	0.310
ENGINEERING PERSONNEL	0	0	0	0	0.110	0.000	0.140	0.250
TOTAL	2	0	33	35	0.910	0.120	14.250	15.280
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.090	0.000	0.280	0.370
OPERATIONS PERSONNEL	0	0	0	0	0.420	0.000	0.000	0.420
HEALTH PHYSICS PERSONNEL	10	0	2	12	3.110	0.060	0.420	3.590
SUPERVISORY PERSONNEL	0	0	0	0	0.040	0.000	0.010	0.050
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	10	0	2	12	3.660	0.060	0.710	4.430
REFUELING								
MAINTENANCE PERSONNEL	14	1	42	57	4.070	0.260	32.070	36.400
OPERATIONS PERSONNEL	3	0	0	3	0.930	0.000	0.000	0.930
HEALTH PHYSICS PERSONNEL	9	0	15	24	2.180	0.000	6.070	8.250
SUPERVISORY PERSONNEL	0	0	1	1	0.610	0.000	0.360	0.970
ENGINEERING PERSONNEL	2	0	5	7	0.600	0.010	1.190	1.800
TOTAL	28	1	63	92	8.390	0.270	39.690	48.350
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	148 (121)	4 (3)	208 (176)	360 (300)	44.400	1.260	109.540	155.200
OPERATIONS PERSONNEL	18 (13)	0 (0)	0 (0)	18 (13)	6.350	0.000	0.000	6.350
HEALTH PHYSICS PERSONNEL	95 (67)	1 (1)	82 (80)	178 (148)	27.830	0.580	46.950	75.360
SUPERVISORY PERSONNEL	9 (12)	0 (0)	26 (22)	35 (34)	4.900	0.100	8.590	13.590
ENGINEERING PERSONNEL	13 (4)	0 (0)	86 (85)	99 (89)	4.650	0.010	63.790	68.450
GRAND TOTALS	283 (217)	5 (4)	402 (363)	690 (584)	88.130	1.950	228.870	318.950

*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

1990

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	98	1	107	206	30.970	0.340	38.025	69.335
OPERATIONS PERSONNEL	62	0	0	62	24.780	0.000	0.010	24.790
HEALTH PHYSICS PERSONNEL	60	0	59	119	32.515	0.030	18.050	50.595
SUPERVISORY PERSONNEL	21	0	11	32	6.295	0.150	3.545	9.990
ENGINEERING PERSONNEL	13	2	19	34	4.170	0.605	9.305	14.080
TOTAL	254	3	196	453	98.730	1.125	68.935	168.790
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	171	2	295	468	71.660	1.090	116.395	189.145
OPERATIONS PERSONNEL	14	0	0	14	4.430	0.000	0.000	4.430
HEALTH PHYSICS PERSONNEL	37	0	39	76	11.825	0.000	11.835	23.660
SUPERVISORY PERSONNEL	11	0	15	26	3.615	0.030	3.890	7.535
ENGINEERING PERSONNEL	6	0	7	13	2.340	0.065	4.685	7.090
TOTAL	239	2	356	597	93.870	1.185	136.805	231.860
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	199	199	0.530	0.000	86.955	87.485
OPERATIONS PERSONNEL	0	0	0	0	0.170	0.000	0.000	0.170
HEALTH PHYSICS PERSONNEL	14	0	7	21	2.930	0.000	2.285	5.215
SUPERVISORY PERSONNEL	2	1	11	14	0.525	0.655	2.945	4.125
ENGINEERING PERSONNEL	0	2	4	6	0.095	0.970	1.310	2.375
TOTAL	16	3	221	240	4.250	1.625	93.495	99.370
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	85	2	336	423	29.425	0.765	141.580	171.770
OPERATIONS PERSONNEL	6	0	0	6	2.370	0.000	0.000	2.370
HEALTH PHYSICS PERSONNEL	19	0	14	33	5.265	0.000	4.215	9.480
SUPERVISORY PERSONNEL	18	1	35	54	8.635	0.285	14.080	23.000
ENGINEERING PERSONNEL	4	2	41	47	2.030	0.495	15.340	17.865
TOTAL	132	5	426	563	47.725	1.545	175.215	224.485
WASTE PROCESSING								
MAINTENANCE PERSONNEL	18	0	4	22	5.220	0.000	2.610	7.830
OPERATIONS PERSONNEL	0	0	0	0	0.100	0.000	0.000	0.100
HEALTH PHYSICS PERSONNEL	10	0	3	13	5.045	0.000	1.005	6.050
SUPERVISORY PERSONNEL	0	0	0	0	0.105	0.000	0.020	0.125
ENGINEERING PERSONNEL	1	0	0	1	0.150	0.000	0.095	0.245
TOTAL	29	0	7	36	10.620	0.000	3.730	14.350
REFUELING								
MAINTENANCE PERSONNEL	77	3	141	221	32.780	1.295	73.565	107.640
OPERATIONS PERSONNEL	15	0	0	15	4.925	0.000	0.000	4.925
HEALTH PHYSICS PERSONNEL	15	0	15	30	3.680	0.000	4.530	8.210
SUPERVISORY PERSONNEL	5	1	16	22	1.815	0.115	4.805	6.735
ENGINEERING PERSONNEL	2	1	18	21	1.585	0.390	12.840	14.815
TOTAL	114	5	190	309	44.785	1.800	95.740	142.325
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	449 (229)	8 (4)	1082 (671)	1539 (904)	170.585	3.490	459.130	633.205
OPERATIONS PERSONNEL	97 (81)	0 (0)	0 (0)	97 (81)	36.775	0.000	0.010	36.785
HEALTH PHYSICS PERSONNEL	155 (66)	0 (0)	137 (101)	292 (167)	61.260	0.030	41.920	103.210
SUPERVISORY PERSONNEL	57 (31)	3 (2)	88 (59)	148 (92)	20.990	1.235	29.285	51.510
ENGINEERING PERSONNEL	26 (17)	7 (5)	89 (57)	122 (79)	10.370	2.525	43.575	56.470
GRAND TOTALS	784 (424)	18 (11)	1396 (888)	2198(1323)	299.980	7.280	573.920	881.180

*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

1990

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	17	0	26	43	4.549	0.000	9.697	14.246
OPERATIONS PERSONNEL	33	0	4	37	12.659	0.000	1.488	14.147
HEALTH PHYSICS PERSONNEL	17	0	1	18	4.691	0.000	0.877	5.568
SUPERVISORY PERSONNEL	0	0	0	0	0.211	0.000	0.109	0.320
ENGINEERING PERSONNEL	1	0	1	2	0.385	0.000	0.215	0.600
TOTAL	68	0	32	100	22.495	0.000	12.386	34.881
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	36	0	207	243	15.844	0.100	73.862	89.806
OPERATIONS PERSONNEL	18	0	6	24	3.401	0.000	1.107	4.508
HEALTH PHYSICS PERSONNEL	9	0	25	34	3.588	0.000	7.509	11.097
SUPERVISORY PERSONNEL	1	0	0	1	0.190	0.000	0.091	0.281
ENGINEERING PERSONNEL	1	0	1	2	0.270	0.000	0.237	0.507
TOTAL	65	0	239	304	23.293	0.100	82.806	106.199
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	77	78	0.305	0.000	31.000	31.305
OPERATIONS PERSONNEL	0	0	0	0	0.066	0.000	0.000	0.066
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.005	0.000	0.231	0.236
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.111	0.000	0.060	0.171
TOTAL	1	0	77	78	0.487	0.000	31.291	31.778
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	23	0	207	230	6.454	0.085	78.414	84.953
OPERATIONS PERSONNEL	6	0	0	6	1.726	0.000	0.013	1.739
HEALTH PHYSICS PERSONNEL	10	0	11	21	2.773	0.000	3.638	6.411
SUPERVISORY PERSONNEL	0	0	0	0	0.005	0.000	0.000	0.005
ENGINEERING PERSONNEL	1	0	1	2	0.392	0.000	0.165	0.557
TOTAL	40	0	219	259	11.350	0.085	82.230	93.665
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	5	6	0.414	0.000	1.569	1.983
OPERATIONS PERSONNEL	1	0	0	1	0.871	0.000	0.027	0.898
HEALTH PHYSICS PERSONNEL	8	0	1	9	3.103	0.000	1.219	4.322
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.002	0.000	0.000	0.002
TOTAL	10	0	6	16	4.390	0.000	2.815	7.205
REFUELING								
MAINTENANCE PERSONNEL	0	0	8	8	0.475	0.000	2.884	3.359
OPERATIONS PERSONNEL	5	0	0	5	1.615	0.000	0.131	1.746
HEALTH PHYSICS PERSONNEL	5	0	16	21	2.431	0.000	7.968	10.399
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	2	0	0	2	0.418	0.000	0.040	0.458
TOTAL	12	0	24	36	4.939	0.000	11.023	15.962
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	78	0	530	608	28.041	0.185	197.426	225.652
OPERATIONS PERSONNEL	63	0	10	73	20.338	0.000	2.766	23.104
HEALTH PHYSICS PERSONNEL	49	0	54	103	16.591	0.000	21.442	38.033
SUPERVISORY PERSONNEL	1	0	0	1	0.406	0.000	0.200	0.606
ENGINEERING PERSONNEL	5	0	3	8	1.578	0.000	0.717	2.295
GRAND TOTALS	196	0	597	793	66.954	0.185	222.551	289.690

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

PLANT: *VOGTLE 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	58	0	74	132	24.024	0.016	34.283	58.323
OPERATIONS PERSONNEL	6	1	1	8	2.544	0.266	0.663	3.473
HEALTH PHYSICS PERSONNEL	3	0	42	45	1.154	0.000	17.773	18.927
SUPERVISORY PERSONNEL	4	0	10	14	0.809	0.000	4.028	4.837
ENGINEERING PERSONNEL	3	0	4	7	0.792	0.002	2.420	3.214
TOTAL	74	1	131	206	29.323	0.284	59.167	88.774
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	13	0	31	44	5.212	0.016	12.415	17.643
OPERATIONS PERSONNEL	21	0	1	22	5.386	0.053	0.135	5.574
HEALTH PHYSICS PERSONNEL	15	1	46	62	4.646	0.173	16.166	20.985
SUPERVISORY PERSONNEL	4	0	9	13	2.239	0.100	2.479	4.818
ENGINEERING PERSONNEL	0	0	4	4	0.138	0.002	1.136	1.276
TOTAL	53	1	91	145	17.621	0.344	32.331	50.296
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	16	0	58	74	7.238	0.016	27.602	34.856
OPERATIONS PERSONNEL	7	0	1	8	2.580	0.000	0.186	2.766
HEALTH PHYSICS PERSONNEL	5	0	17	22	1.183	0.000	6.580	7.763
SUPERVISORY PERSONNEL	2	1	3	6	0.432	0.423	1.320	2.175
ENGINEERING PERSONNEL	5	0	1	6	1.281	0.002	0.595	1.878
TOTAL	35	1	80	116	12.714	0.441	36.283	49.438
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	81	0	188	269	24.640	0.016	81.116	105.772
OPERATIONS PERSONNEL	18	0	0	18	4.584	0.053	0.021	4.658
HEALTH PHYSICS PERSONNEL	22	0	46	68	9.550	0.049	20.007	29.606
SUPERVISORY PERSONNEL	0	0	14	14	0.250	0.012	5.917	6.179
ENGINEERING PERSONNEL	5	0	19	24	1.856	0.002	8.495	10.353
TOTAL	126	0	267	393	40.880	0.132	115.556	156.568
WASTE PROCESSING								
MAINTENANCE PERSONNEL	9	0	17	26	3.495	0.016	6.562	10.073
OPERATIONS PERSONNEL	0	0	0	0	0.668	0.000	0.128	0.796
HEALTH PHYSICS PERSONNEL	6	0	21	27	1.859	0.000	6.444	8.303
SUPERVISORY PERSONNEL	0	0	1	1	0.042	0.000	0.514	0.556
ENGINEERING PERSONNEL	0	0	1	1	0.151	0.002	0.463	0.616
TOTAL	15	0	40	55	6.215	0.018	14.111	20.344
REFUELING								
MAINTENANCE PERSONNEL	35	0	56	91	18.795	0.016	22.339	41.150
OPERATIONS PERSONNEL	17	0	0	17	5.671	0.000	0.091	5.762
HEALTH PHYSICS PERSONNEL	15	0	69	84	8.199	0.000	36.794	44.993
SUPERVISORY PERSONNEL	4	0	7	11	1.170	0.000	2.523	3.693
ENGINEERING PERSONNEL	1	0	8	9	0.422	0.002	3.402	3.826
TOTAL	72	0	140	212	34.257	0.018	65.149	99.424
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	212	0	424	636	83.404	0.096	184.317	267.817
OPERATIONS PERSONNEL	69	1	3	73	21.433	0.372	1.224	23.029
HEALTH PHYSICS PERSONNEL	66	1	241	308	26.591	0.222	103.764	130.577
SUPERVISORY PERSONNEL	14	1	44	59	4.942	0.535	16.781	22.258
ENGINEERING PERSONNEL	14	0	37	51	4.640	0.012	16.511	21.163
GRAND TOTALS	375	3	749	1127	141.010	1.237	322.597	464.844

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	43	1	13	57	28.336	0.374	9.008	37.718
OPERATIONS PERSONNEL	48	1	0	49	42.304	0.163	0.000	42.467
HEALTH PHYSICS PERSONNEL	30	0	15	45	20.230	0.000	5.793	26.023
SUPERVISORY PERSONNEL	12	1	0	13	4.370	0.231	0.000	4.601
ENGINEERING PERSONNEL	5	9	2	16	1.104	3.142	0.525	4.771
TOTAL	138	12	30	180	96.344	3.910	15.326	115.580
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	174	0	187	361	141.120	0.060	106.110	247.290
OPERATIONS PERSONNEL	3	0	0	3	2.795	0.014	0.000	2.809
HEALTH PHYSICS PERSONNEL	9	0	42	51	10.130	0.000	30.539	40.669
SUPERVISORY PERSONNEL	13	2	2	17	6.147	0.536	0.498	7.181
ENGINEERING PERSONNEL	21	18	27	66	7.671	6.607	8.894	23.172
TOTAL	220	20	258	498	167.863	7.217	146.041	321.121
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	3	4	0.638	0.000	2.164	2.802
OPERATIONS PERSONNEL	0	0	0	0	0.009	0.000	0.000	0.009
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.409	0.000	0.363	0.772
SUPERVISORY PERSONNEL	0	1	0	1	0.023	0.163	0.061	0.247
ENGINEERING PERSONNEL	2	1	9	12	0.479	0.553	2.133	3.165
TOTAL	3	2	12	17	1.558	0.716	4.721	6.995
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	15	0	65	80	16.121	0.005	24.446	40.572
OPERATIONS PERSONNEL	0	0	0	0	0.053	0.000	0.000	0.053
HEALTH PHYSICS PERSONNEL	1	0	3	4	1.106	0.000	2.253	3.359
SUPERVISORY PERSONNEL	1	1	1	3	0.314	0.191	0.149	0.654
ENGINEERING PERSONNEL	1	4	6	11	0.367	1.147	1.323	2.837
TOTAL	18	5	75	98	17.961	1.343	28.171	47.475
WASTE PROCESSING								
MAINTENANCE PERSONNEL	9	0	4	13	5.905	0.000	1.562	7.467
OPERATIONS PERSONNEL	0	0	0	0	0.164	0.000	0.000	0.164
HEALTH PHYSICS PERSONNEL	3	0	2	5	2.799	0.000	3.131	5.930
SUPERVISORY PERSONNEL	0	0	0	0	0.037	0.000	0.000	0.037
ENGINEERING PERSONNEL	0	0	0	0	0.037	0.046	0.033	0.116
TOTAL	12	0	6	18	8.942	0.046	4.726	13.714
REFUELING								
MAINTENANCE PERSONNEL	2	0	0	2	1.634	0.000	0.009	1.643
OPERATIONS PERSONNEL	3	0	0	3	3.317	0.000	0.000	3.317
HEALTH PHYSICS PERSONNEL	1	0	0	1	1.431	0.000	0.015	1.446
SUPERVISORY PERSONNEL	1	0	0	1	0.270	0.000	0.000	0.270
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.019	0.076	0.095
TOTAL	7	0	0	7	6.652	0.019	0.100	6.771
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	244	1	272	517	193.754	0.439	143.299	337.492
OPERATIONS PERSONNEL	54	1	0	55	48.642	0.177	0.000	48.819
HEALTH PHYSICS PERSONNEL	44	0	62	106	36.105	0.000	42.094	78.199
SUPERVISORY PERSONNEL	27	5	3	35	11.161	1.121	0.708	12.990
ENGINEERING PERSONNEL	29	32	44	105	9.658	11.514	12.984	34.156
GRAND TOTALS	398	39	381	818	299.320	13.251	199.085	511.656

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

PLANT: *WATERFORD 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	0	0	0.028	0.000	0.128	0.156
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.061	0.061
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.055	0.055
SUPERVISORY PERSONNEL	0	0	0	0	0.002	0.000	0.000	0.002
ENGINEERING PERSONNEL	0	0	0	0	0.006	0.000	0.000	0.006
TOTAL	0	0	0	0	0.036	0.000	0.244	0.280
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	1	1	0.002	0.000	0.183	0.185
OPERATIONS PERSONNEL	0	0	0	0	0.632	0.000	0.120	0.752
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.298	0.000	0.150	0.448
SUPERVISORY PERSONNEL	0	0	0	0	0.009	0.000	0.012	0.021
ENGINEERING PERSONNEL	0	0	0	0	0.139	0.000	0.002	0.141
TOTAL	1	0	1	2	1.080	0.000	0.467	1.547
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	7	7	1.219	0.000	3.970	5.189
OPERATIONS PERSONNEL	2	0	0	2	2.103	0.000	0.471	2.574
HEALTH PHYSICS PERSONNEL	5	0	4	9	1.654	0.000	1.663	3.317
SUPERVISORY PERSONNEL	0	0	0	0	0.036	0.000	0.014	0.050
ENGINEERING PERSONNEL	0	0	0	0	0.231	0.000	0.039	0.270
TOTAL	7	0	11	18	5.243	0.000	6.157	11.400
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	7	7	1.265	0.000	3.407	4.672
OPERATIONS PERSONNEL	1	0	0	1	1.725	0.000	0.376	2.101
HEALTH PHYSICS PERSONNEL	7	0	2	9	2.045	0.000	0.721	2.766
SUPERVISORY PERSONNEL	0	0	0	0	0.036	0.000	0.037	0.073
ENGINEERING PERSONNEL	0	0	0	0	0.236	0.000	0.023	0.259
TOTAL	8	0	9	17	5.307	0.000	4.564	9.871
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	6	6	0.878	0.000	3.554	4.432
OPERATIONS PERSONNEL	0	0	0	0	0.638	0.000	0.162	0.800
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.305	0.000	0.353	0.658
SUPERVISORY PERSONNEL	0	0	0	0	0.036	0.000	0.037	0.073
ENGINEERING PERSONNEL	0	0	0	0	0.236	0.000	0.039	0.275
TOTAL	1	0	6	7	2.093	0.000	4.145	6.238
REFUELING								
MAINTENANCE PERSONNEL	0	0	6	6	1.201	0.000	3.594	4.795
OPERATIONS PERSONNEL	1	0	0	1	1.707	0.000	0.370	2.077
HEALTH PHYSICS PERSONNEL	6	0	2	8	2.191	0.000	0.701	2.892
SUPERVISORY PERSONNEL	0	0	0	0	0.036	0.000	0.033	0.069
ENGINEERING PERSONNEL	0	0	0	0	0.192	0.000	0.039	0.231
TOTAL	7	0	8	15	5.327	0.000	4.737	10.064
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	0	0	27	27	4.593	0.000	14.836	19.429
OPERATIONS PERSONNEL	4	0	0	4	6.805	0.000	1.560	8.365
HEALTH PHYSICS PERSONNEL	20	0	8	28	6.493	0.000	3.643	10.136
SUPERVISORY PERSONNEL	0	0	0	0	0.155	0.000	0.133	0.288
ENGINEERING PERSONNEL	0	0	0	0	1.040	0.000	0.142	1.182
GRAND TOTALS	24	0	35	59	19.086	0.000	20.314	39.400

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

PLANT: *WOLF CREEK 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	9	0	20	29	3.514	0.015	7.883	11.412
OPERATIONS PERSONNEL	9	0	0	9	2.588	0.129	0.714	3.431
HEALTH PHYSICS PERSONNEL	11	0	11	22	3.333	0.100	4.536	7.969
SUPERVISORY PERSONNEL	4	1	1	6	1.630	0.147	0.497	2.274
ENGINEERING PERSONNEL	1	0	3	4	0.849	0.053	1.085	1.987
TOTAL	34	1	35	70	11.914	0.444	14.715	27.073
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	28	0	76	104	8.204	0.079	19.774	28.057
OPERATIONS PERSONNEL	1	0	1	2	1.518	0.062	0.927	2.507
HEALTH PHYSICS PERSONNEL	8	0	31	39	2.328	0.026	7.603	9.957
SUPERVISORY PERSONNEL	7	0	2	9	2.720	0.012	0.674	3.406
ENGINEERING PERSONNEL	2	0	18	20	0.924	0.151	4.300	5.375
TOTAL	46	0	128	174	15.694	0.330	33.278	49.302
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	5	0	44	49	2.470	0.067	15.911	18.448
OPERATIONS PERSONNEL	0	0	1	1	0.328	0.028	0.715	1.071
HEALTH PHYSICS PERSONNEL	0	0	7	7	0.407	0.014	3.183	3.604
SUPERVISORY PERSONNEL	1	0	0	1	0.712	0.000	0.274	0.986
ENGINEERING PERSONNEL	0	0	15	15	0.336	0.021	3.901	4.258
TOTAL	6	0	67	73	4.253	0.130	23.984	28.367
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	22	1	43	66	6.688	0.175	13.539	20.402
OPERATIONS PERSONNEL	0	0	1	1	0.502	0.051	0.848	1.401
HEALTH PHYSICS PERSONNEL	5	0	10	15	1.533	0.010	4.165	5.708
SUPERVISORY PERSONNEL	0	0	0	0	1.325	0.069	0.407	1.801
ENGINEERING PERSONNEL	0	0	9	9	0.464	0.026	3.215	3.705
TOTAL	27	1	63	91	10.512	0.331	22.174	33.017
WASTE PROCESSING								
MAINTENANCE PERSONNEL	8	0	32	40	3.620	0.021	11.486	15.127
OPERATIONS PERSONNEL	0	0	2	2	0.764	0.049	0.753	1.566
HEALTH PHYSICS PERSONNEL	9	0	7	16	3.218	0.033	4.063	7.314
SUPERVISORY PERSONNEL	3	0	2	5	0.982	0.028	0.370	1.380
ENGINEERING PERSONNEL	0	0	10	10	0.325	0.127	2.452	2.904
TOTAL	20	0	53	73	8.909	0.258	19.124	28.291
REFUELING								
MAINTENANCE PERSONNEL	26	0	17	43	6.277	0.000	5.891	12.168
OPERATIONS PERSONNEL	0	0	0	0	0.647	0.000	0.090	0.737
HEALTH PHYSICS PERSONNEL	1	0	2	3	0.379	0.001	0.886	1.266
SUPERVISORY PERSONNEL	0	0	0	0	0.500	0.000	0.058	0.558
ENGINEERING PERSONNEL	0	1	1	2	0.198	0.239	0.435	0.872
TOTAL	27	1	20	48	8.001	0.240	7.360	15.601
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	98 (68)	1 (2)	232 (163)	331 (233)	30.773	0.357	74.484	105.614
OPERATIONS PERSONNEL	10 (25)	0 (1)	5 (13)	15 (39)	6.347	0.319	4.047	10.713
HEALTH PHYSICS PERSONNEL	34 (23)	0 (1)	68 (83)	102 (107)	11.198	0.184	24.436	35.818
SUPERVISORY PERSONNEL	15 (27)	1 (1)	5 (6)	21 (34)	7.869	0.256	2.280	10.405
ENGINEERING PERSONNEL	3 (12)	1 (1)	56 (46)	60 (59)	3.096	0.617	15.388	19.101
GRAND TOTALS	160 (155)	3 (6)	366 (311)	529 (472)	59.283	1.733	120.635	181.651

*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

1990

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	3	0	5	8	1.881	0.066	4.797	6.744
OPERATIONS PERSONNEL	43	0	0	43	12.966	0.025	1.217	14.208
HEALTH PHYSICS PERSONNEL	10	0	5	15	3.095	0.000	3.142	6.237
SUPERVISORY PERSONNEL	0	0	0	0	0.597	0.000	0.000	0.597
ENGINEERING PERSONNEL	3	4	1	8	1.479	1.775	0.678	3.932
TOTAL	59	4	11	74	20.018	1.866	9.834	31.718
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	30	0	96	126	17.686	0.096	45.029	62.811
OPERATIONS PERSONNEL	6	0	3	9	3.053	0.000	0.547	3.600
HEALTH PHYSICS PERSONNEL	9	0	46	55	3.233	0.000	26.656	29.889
SUPERVISORY PERSONNEL	3	0	0	3	1.088	0.000	0.000	1.088
ENGINEERING PERSONNEL	8	3	2	13	4.116	1.452	0.724	6.292
TOTAL	56	3	147	206	29.176	1.548	72.956	103.680
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	1	43	44	0.516	0.889	21.063	22.468
OPERATIONS PERSONNEL	1	0	0	1	0.840	0.000	0.000	0.840
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.013	0.000	0.327	0.340
SUPERVISORY PERSONNEL	0	0	0	0	0.027	0.000	0.000	0.027
ENGINEERING PERSONNEL	2	5	3	10	0.982	1.517	1.781	4.280
TOTAL	3	6	46	55	2.378	2.406	23.171	27.955
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	1	0	77	78	0.140	0.018	33.980	34.138
OPERATIONS PERSONNEL	1	0	0	1	0.128	0.000	0.016	0.144
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.000	0.000	1.009	1.009
SUPERVISORY PERSONNEL	0	0	0	0	0.027	0.000	0.000	0.027
ENGINEERING PERSONNEL	0	1	2	3	0.116	0.702	0.383	1.201
TOTAL	2	1	80	83	0.411	0.720	35.388	36.519
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	0	1	0.442	0.000	0.329	0.771
OPERATIONS PERSONNEL	4	0	0	4	1.298	0.000	0.000	1.298
HEALTH PHYSICS PERSONNEL	4	0	30	34	3.641	0.000	11.382	15.023
SUPERVISORY PERSONNEL	0	0	0	0	0.004	0.000	0.000	0.004
ENGINEERING PERSONNEL	1	0	0	1	0.569	0.080	0.080	0.729
TOTAL	10	0	30	40	5.954	0.080	11.791	17.825
REFUELING								
MAINTENANCE PERSONNEL	20	0	40	60	5.670	0.035	10.873	16.578
OPERATIONS PERSONNEL	11	0	6	17	2.895	0.000	1.423	4.318
HEALTH PHYSICS PERSONNEL	1	0	19	20	0.346	0.000	4.491	4.837
SUPERVISORY PERSONNEL	2	0	0	2	1.114	0.000	0.000	1.114
ENGINEERING PERSONNEL	3	0	0	3	1.109	0.089	0.000	1.198
TOTAL	37	0	65	102	11.134	0.124	16.787	28.045
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	55	1	261	317	26.335	1.104	116.071	143.510
OPERATIONS PERSONNEL	66	0	9	75	21.180	0.025	3.203	24.408
HEALTH PHYSICS PERSONNEL	24	0	101	125	10.328	0.000	47.007	57.335
SUPERVISORY PERSONNEL	5	0	0	5	2.857	0.000	0.000	2.857
ENGINEERING PERSONNEL	17	13	8	38	8.371	5.615	3.646	17.632
GRAND TOTALS	167	14	379	560	69.071	6.744	169.927	245.742

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1990

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	0	1	2	0.772	0.000	0.488	1.260
OPERATIONS PERSONNEL	118	0	197	315	8.352	0.000	0.331	8.683
HEALTH PHYSICS PERSONNEL	1	0	6	7	0.686	0.000	1.829	2.515
SUPERVISORY PERSONNEL	42	16	1	59	5.800	0.018	0.054	5.872
ENGINEERING PERSONNEL	12	1	2	15	0.767	0.024	0.002	0.793
TOTAL	174	17	207	398	16.377	0.042	2.704	19.123
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	115	2	680	797	62.518	0.000	279.437	341.955
OPERATIONS PERSONNEL	63	0	41	104	4.458	0.000	0.070	4.528
HEALTH PHYSICS PERSONNEL	29	0	215	244	25.820	0.000	69.427	95.247
SUPERVISORY PERSONNEL	166	87	413	666	23.170	0.098	28.394	51.662
ENGINEERING PERSONNEL	83	250	44	377	5.203	8.649	0.042	13.894
TOTAL	456	339	1393	2188	121.169	8.747	377.370	507.286
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	5	0	174	179	2.605	0.000	71.527	74.132
OPERATIONS PERSONNEL	3	0	0	3	0.238	0.000	0.000	0.238
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.334	0.000	0.190	0.524
SUPERVISORY PERSONNEL	5	9	109	123	0.666	0.010	7.521	8.197
ENGINEERING PERSONNEL	13	9	1	23	0.849	0.318	0.001	1.168
TOTAL	26	18	285	329	4.692	0.328	79.239	84.259
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	4	0	55	59	2.368	0.000	22.751	25.119
OPERATIONS PERSONNEL	5	0	0	5	0.345	0.000	0.001	0.346
HEALTH PHYSICS PERSONNEL	0	0	6	6	0.282	0.000	1.940	2.222
SUPERVISORY PERSONNEL	7	0	7	14	0.996	0.000	0.492	1.488
ENGINEERING PERSONNEL	2	7	0	9	0.104	0.229	0.000	0.333
TOTAL	18	7	68	93	4.095	0.229	25.184	29.508
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	5	5	0.040	0.000	2.240	2.280
OPERATIONS PERSONNEL	18	0	0	18	1.241	0.000	0.000	1.241
HEALTH PHYSICS PERSONNEL	1	0	6	7	0.545	0.000	2.039	2.584
SUPERVISORY PERSONNEL	3	0	1	4	0.368	0.000	0.078	0.446
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.004	0.000	0.004
TOTAL	22	0	12	34	2.194	0.004	4.357	6.555
REFUELING								
MAINTENANCE PERSONNEL	51	2	3	56	27.720	0.000	1.376	29.096
OPERATIONS PERSONNEL	65	0	0	65	4.585	0.000	0.000	4.585
HEALTH PHYSICS PERSONNEL	3	0	1	4	2.417	0.000	0.417	2.834
SUPERVISORY PERSONNEL	57	0	16	73	7.995	0.000	1.084	9.079
ENGINEERING PERSONNEL	4	73	0	77	0.274	2.516	0.000	2.790
TOTAL	180	75	20	275	42.991	2.516	2.877	48.384
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	176 (177)	4 (4)	918 (920)	1098(1101)	96.023	0.000	377.819	473.842
OPERATIONS PERSONNEL	272 (272)	0 (0)	238 (239)	510 (511)	19.219	0.000	0.402	19.621
HEALTH PHYSICS PERSONNEL	34 (34)	0 (0)	235 (234)	269 (268)	30.084	0.000	75.842	105.926
SUPERVISORY PERSONNEL	280 (280)	112 (112)	547 (547)	939 (939)	38.995	0.126	37.623	76.744
ENGINEERING PERSONNEL	114 (114)	340 (340)	47 (47)	501 (501)	7.197	11.740	0.045	18.982
GRAND TOTALS	876 (877)	456 (456)	1985 (1987)	3317(3320)	191.518	11.866	491.731	695.115

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

APPENDIX E

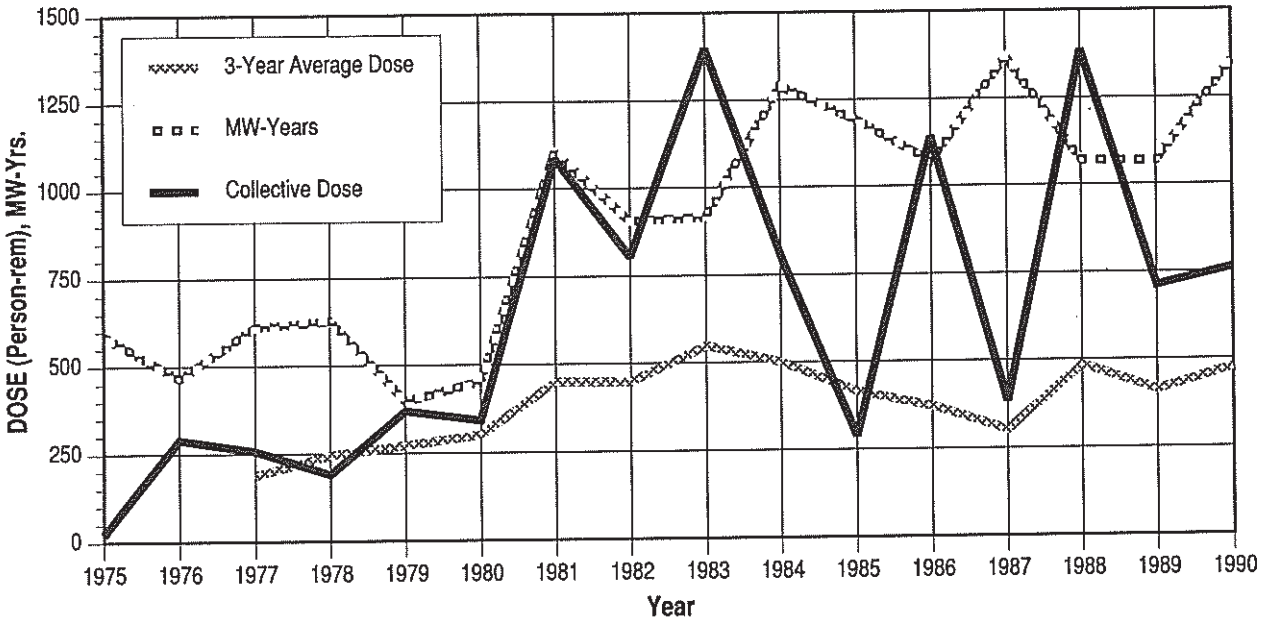
Graphical Representation of Collective Dose Trends by Year and Job Function for Each Site

1973-1990

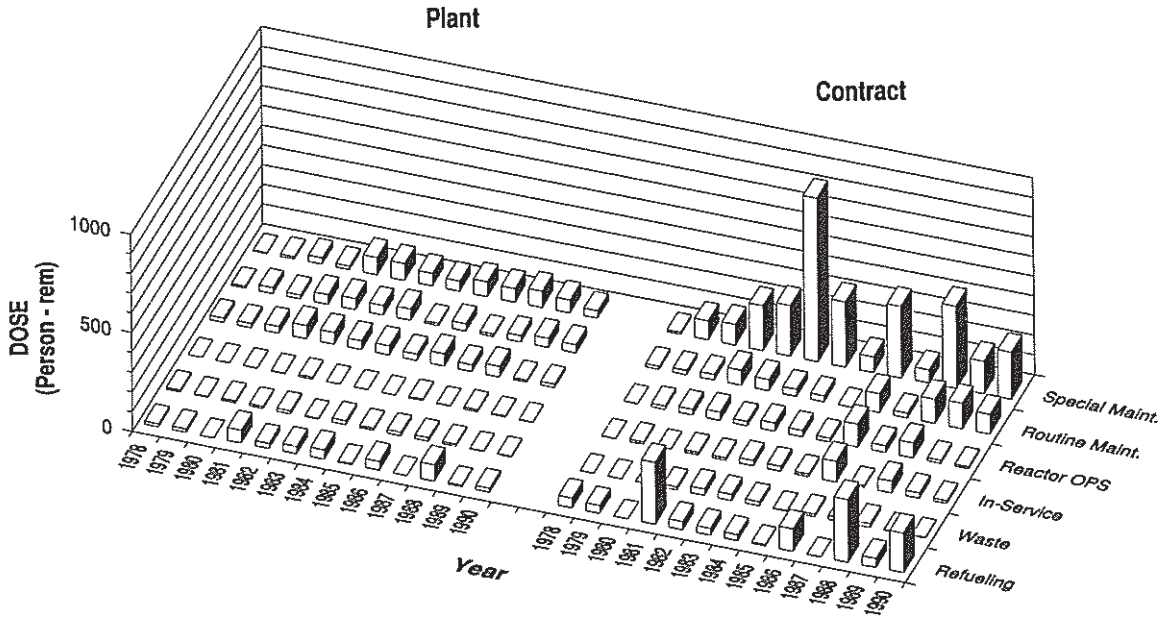
APPENDIX E

ARKANSAS 1, 2

Dose-Performance Indicators **PWR**



Breakdown by Job Function

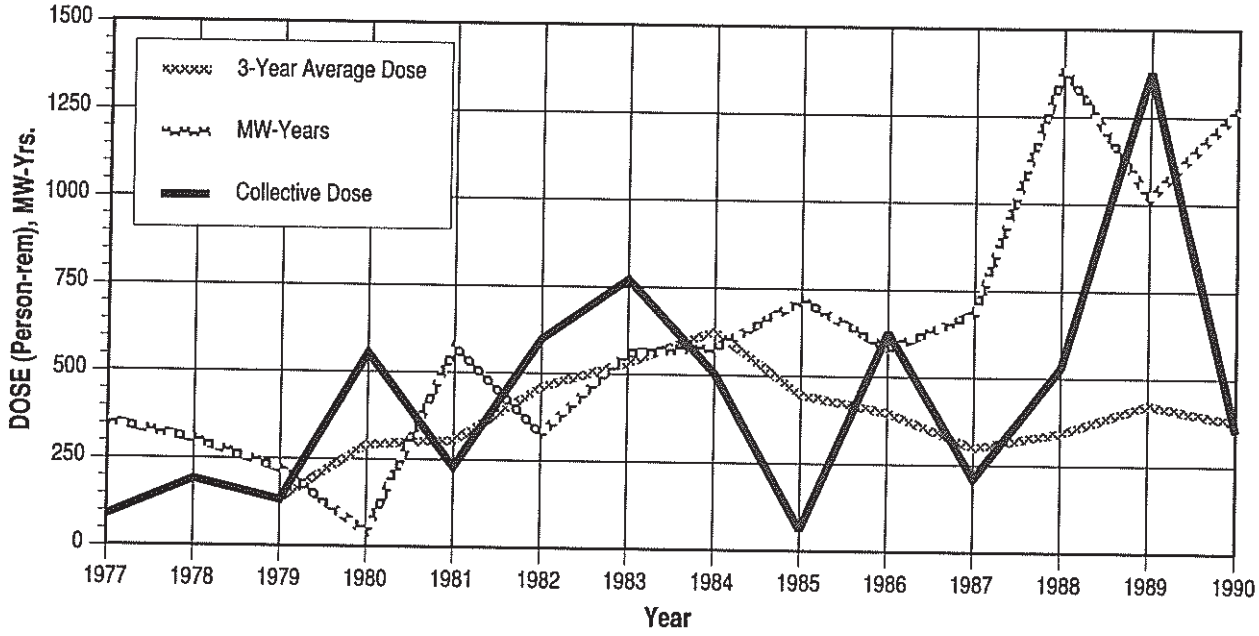


APPENDIX E (continued)

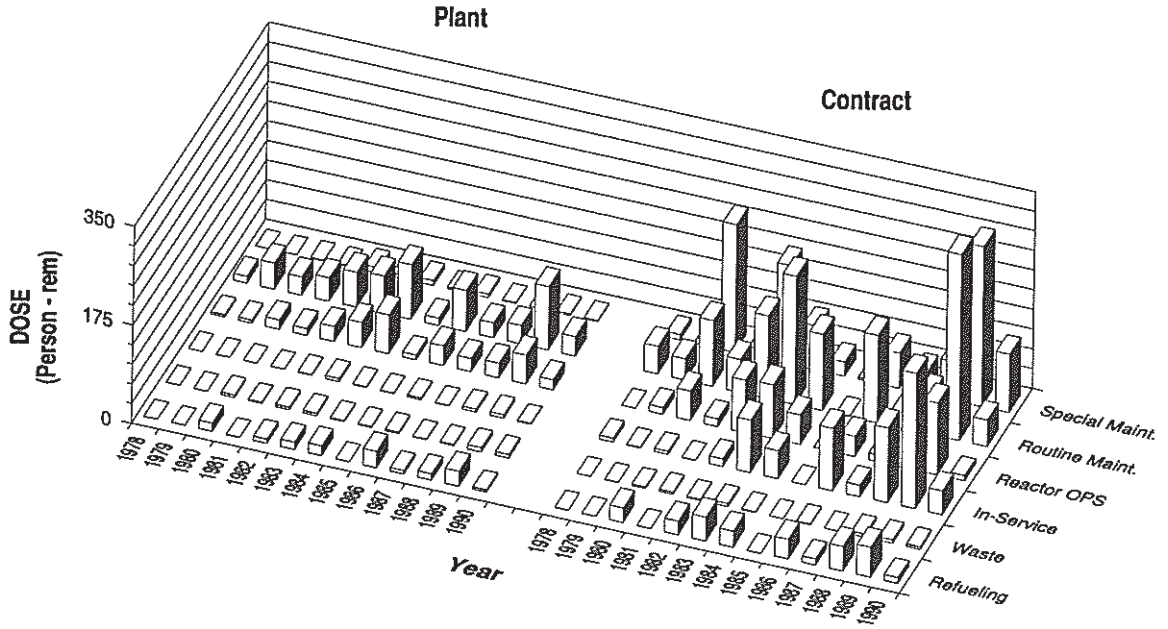
BEAVER VALLEY 1, 2

Dose-Performance Indicators

PWR



Breakdown by Job Function

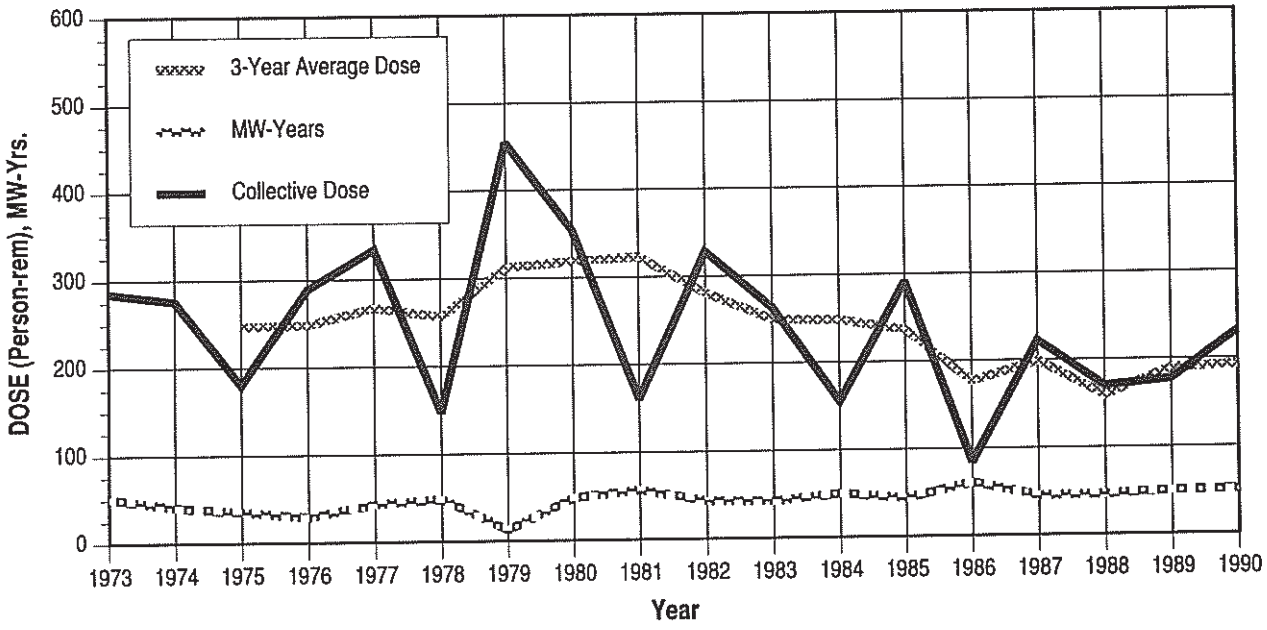


APPENDIX E (continued)

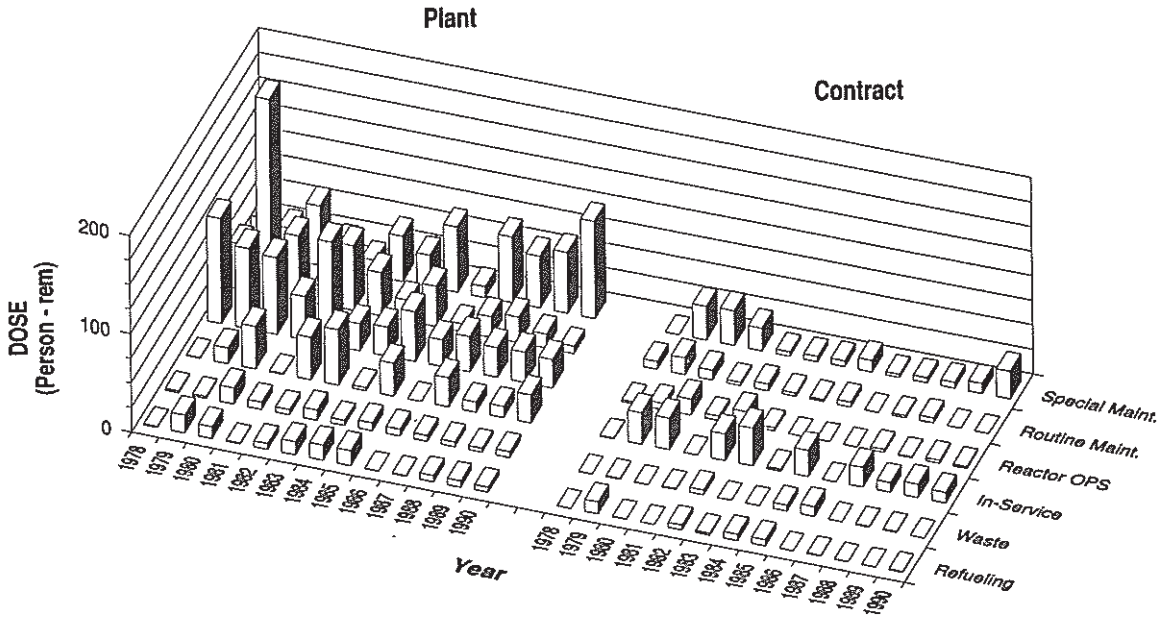
BIG ROCK POINT

Dose-Performance Indicators

BWR



Breakdown by Job Function

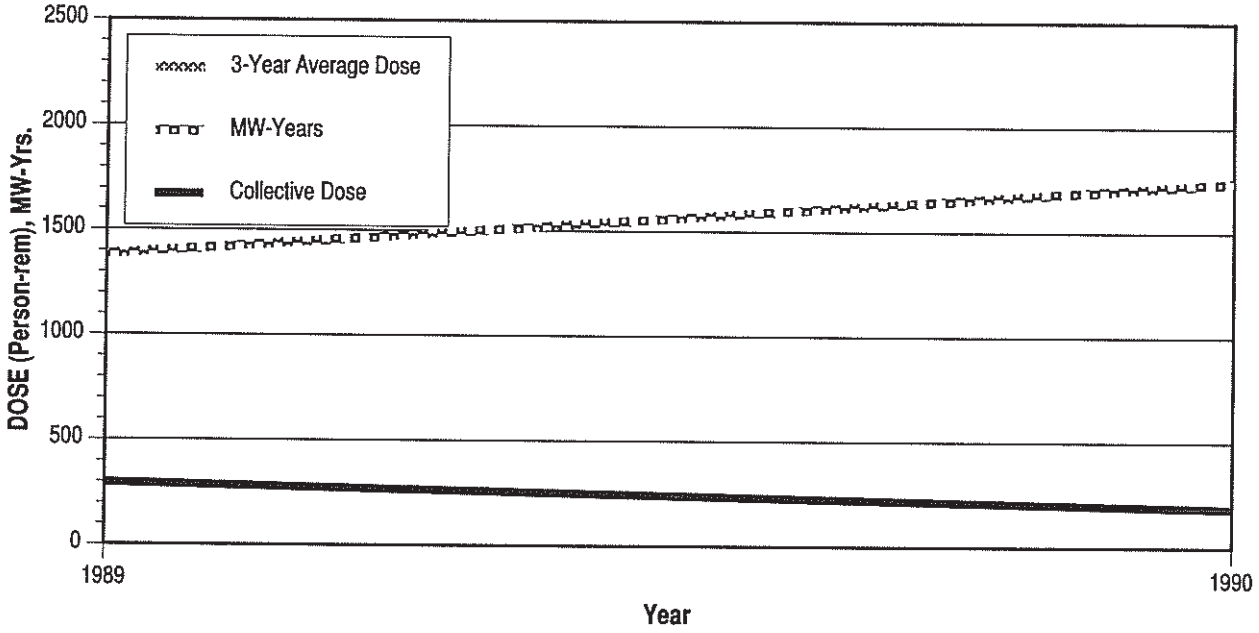


APPENDIX E (continued)

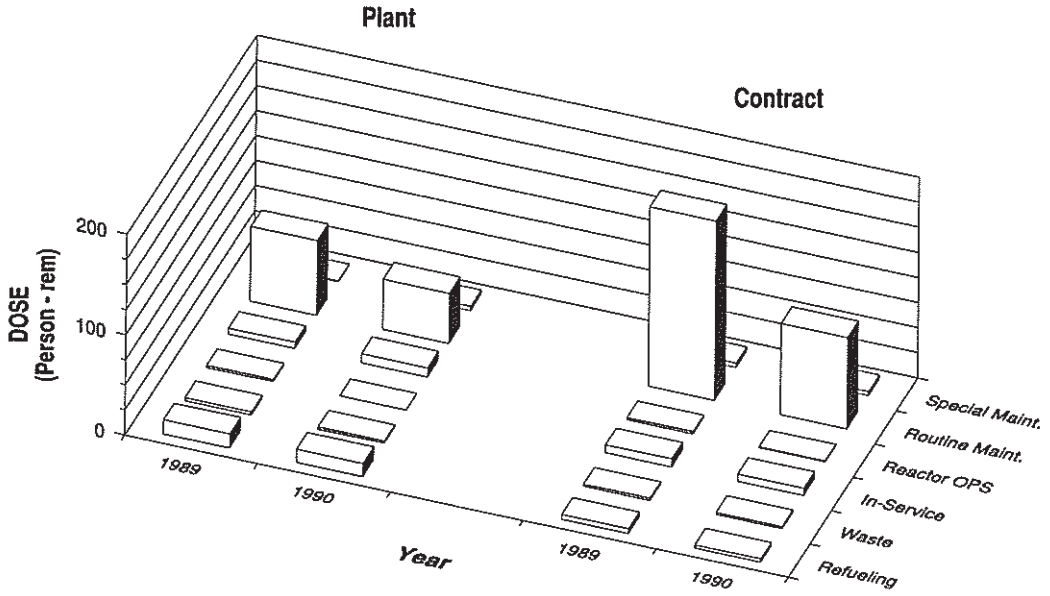
BRAIDWOOD 1, 2

Dose-Performance Indicators

PWR



Breakdown by Job Function

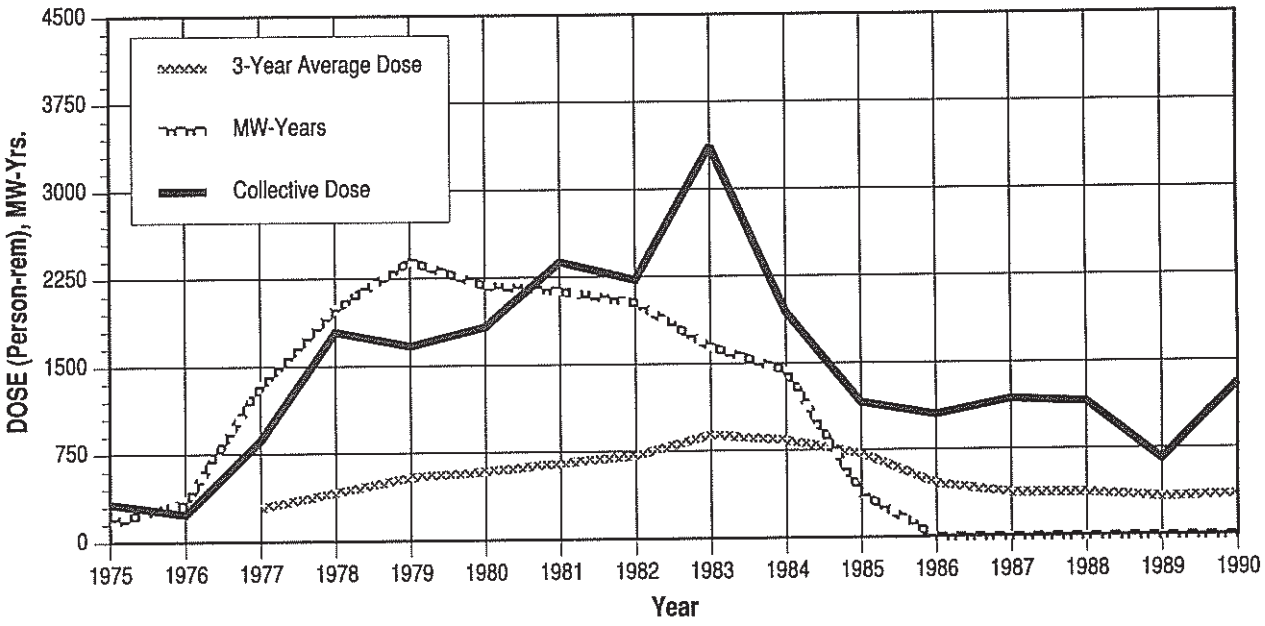


APPENDIX E (continued)

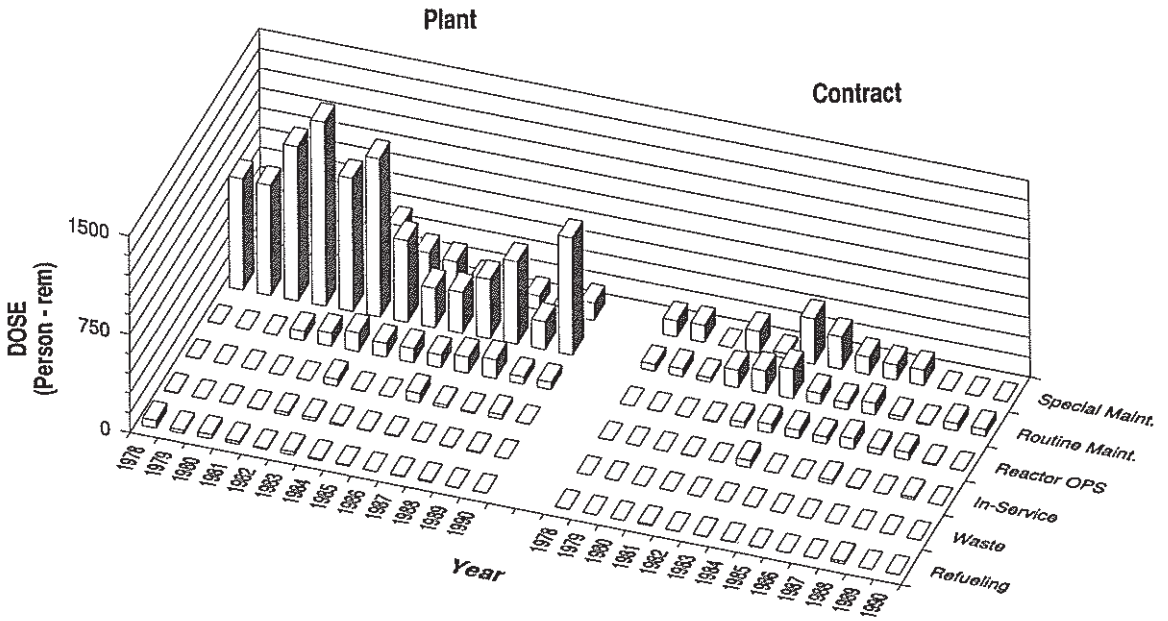
BROWNS FERRY 1, 2, 3

Dose-Performance Indicators

BWR



Breakdown by Job Function

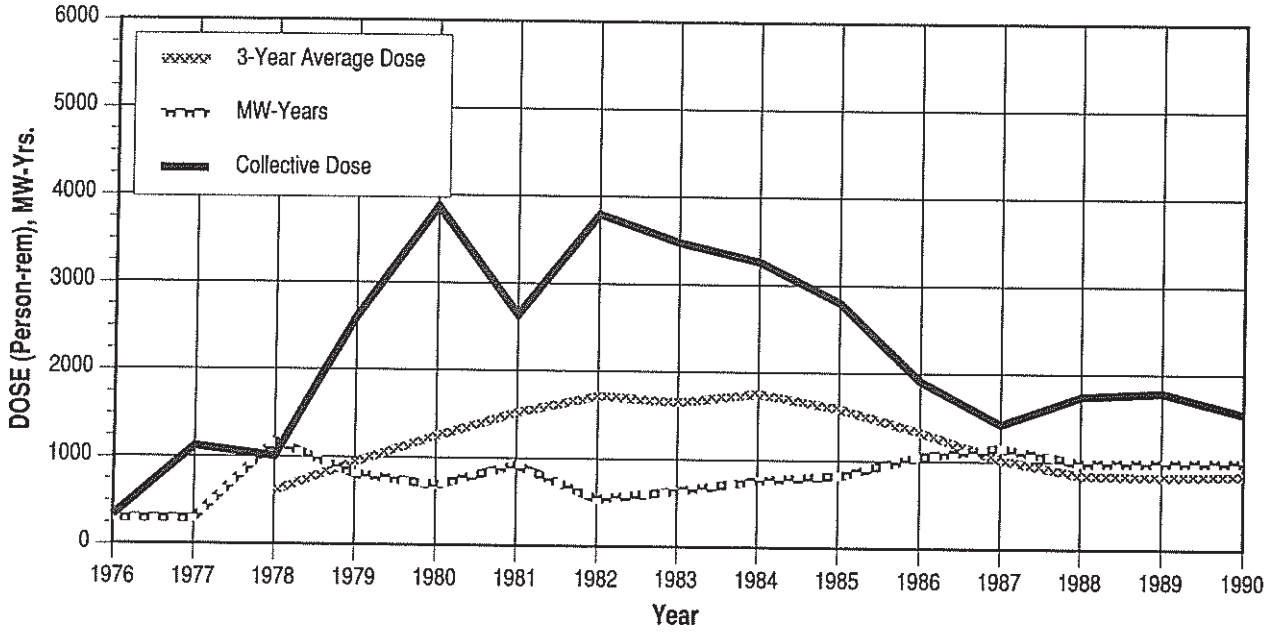


APPENDIX E (continued)

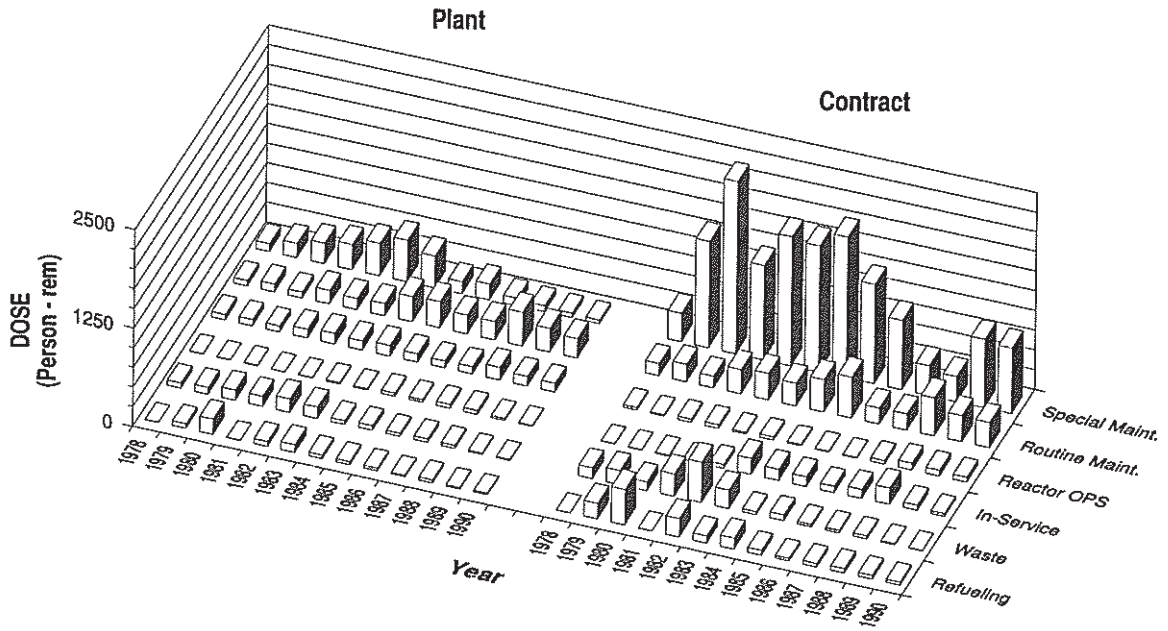
BRUNSWICK 1, 2

Dose-Performance Indicators

BWR



Breakdown by Job Function

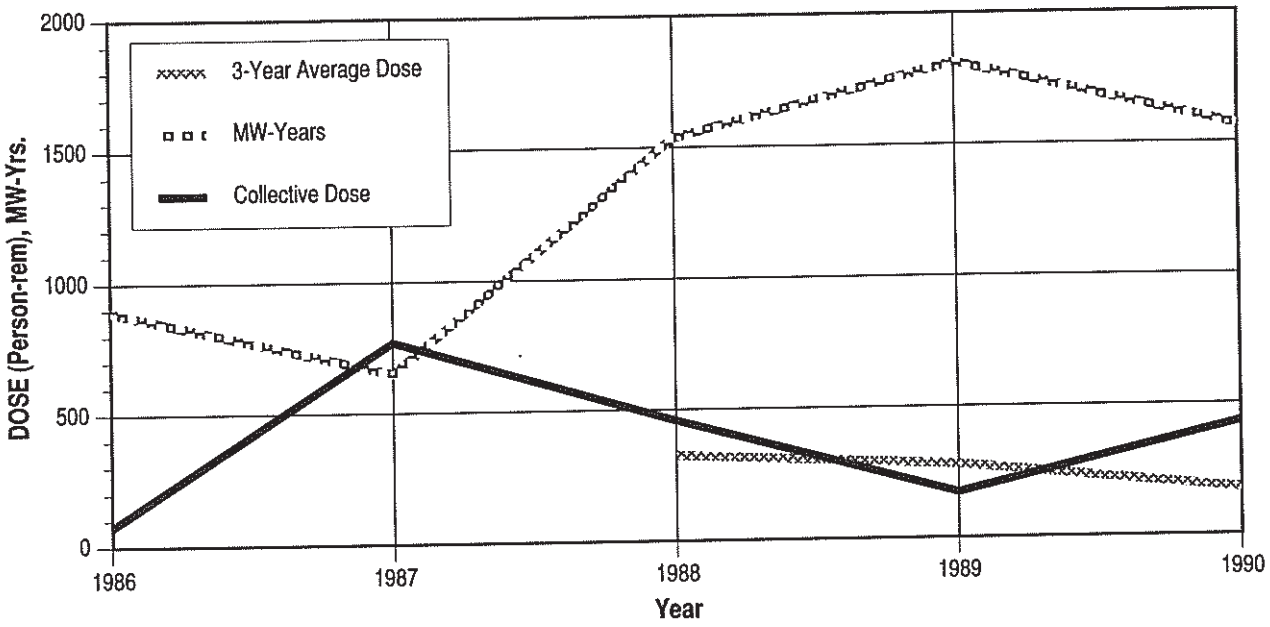


APPENDIX E (continued)

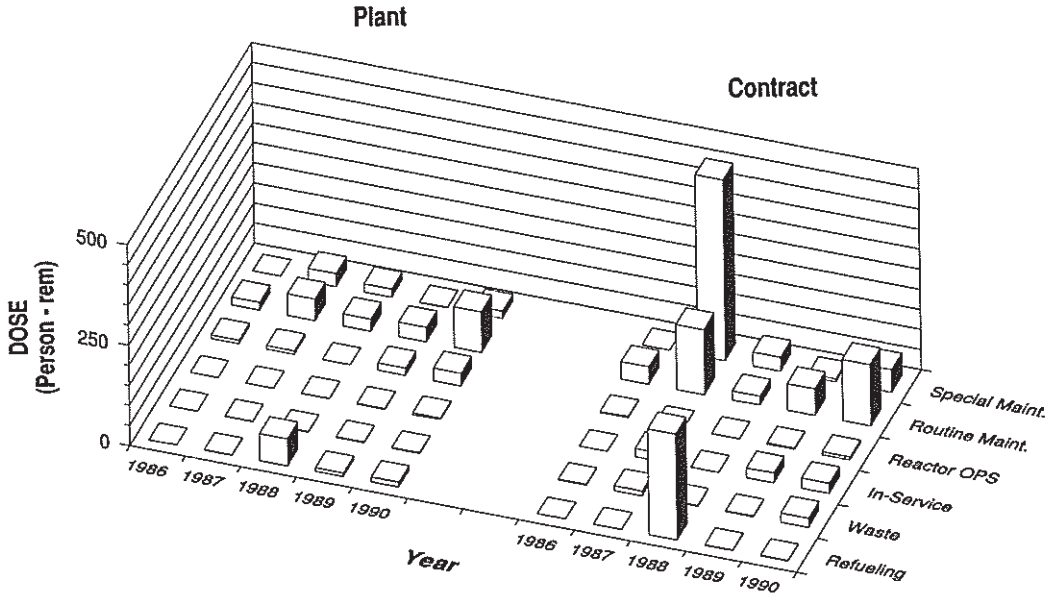
BYRON 1, 2

Dose-Performance Indicators

PWR



Breakdown by Job Function

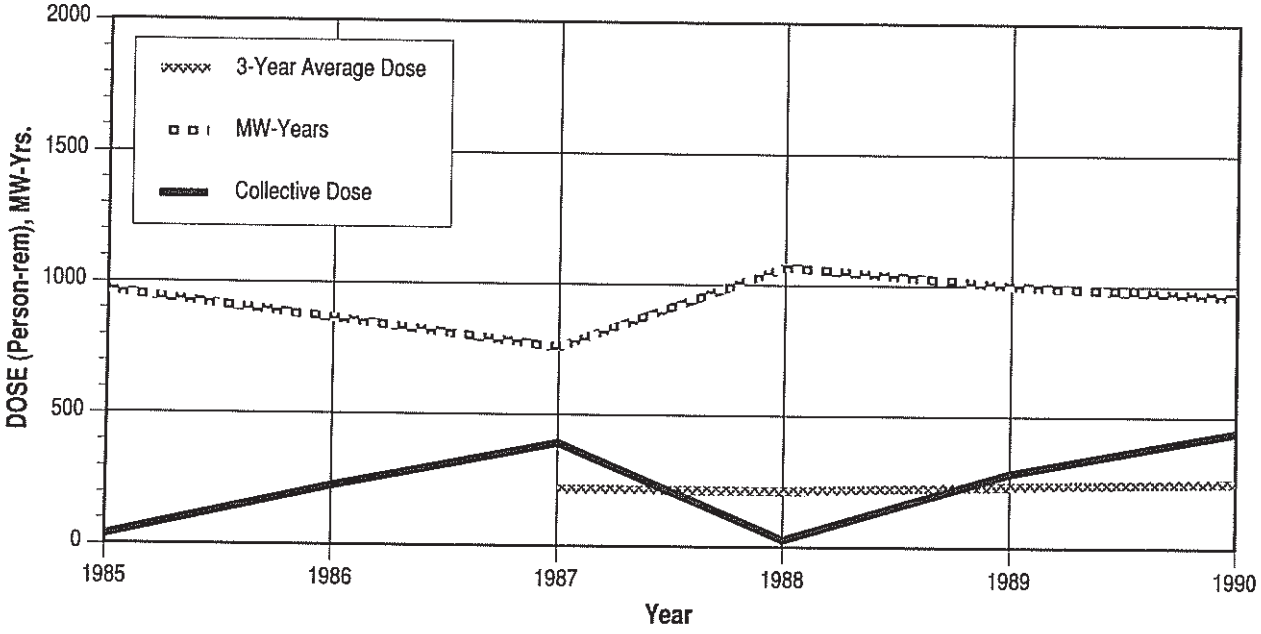


APPENDIX E (continued)

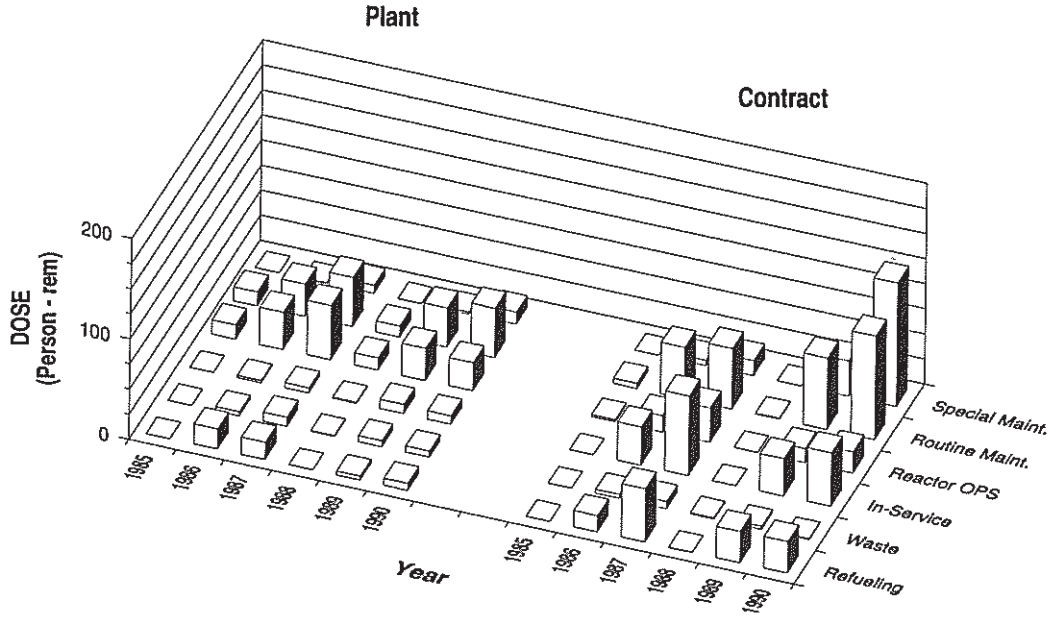
CALLAWAY 1

Dose-Performance Indicators

PWR



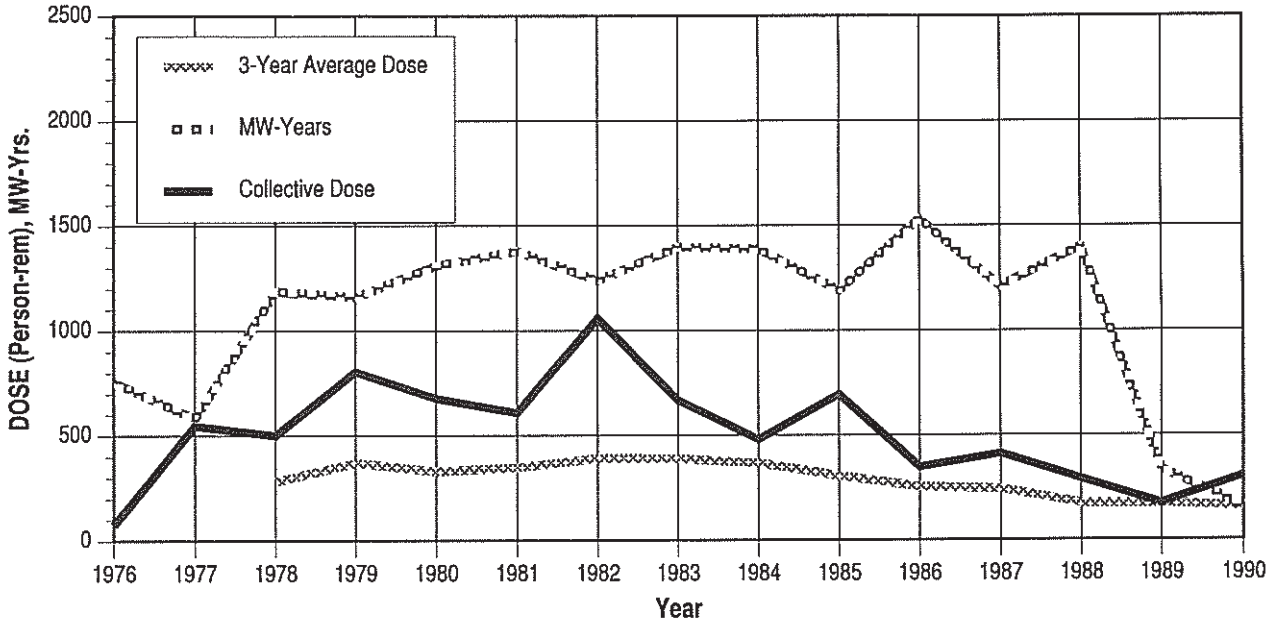
Breakdown by Job Function



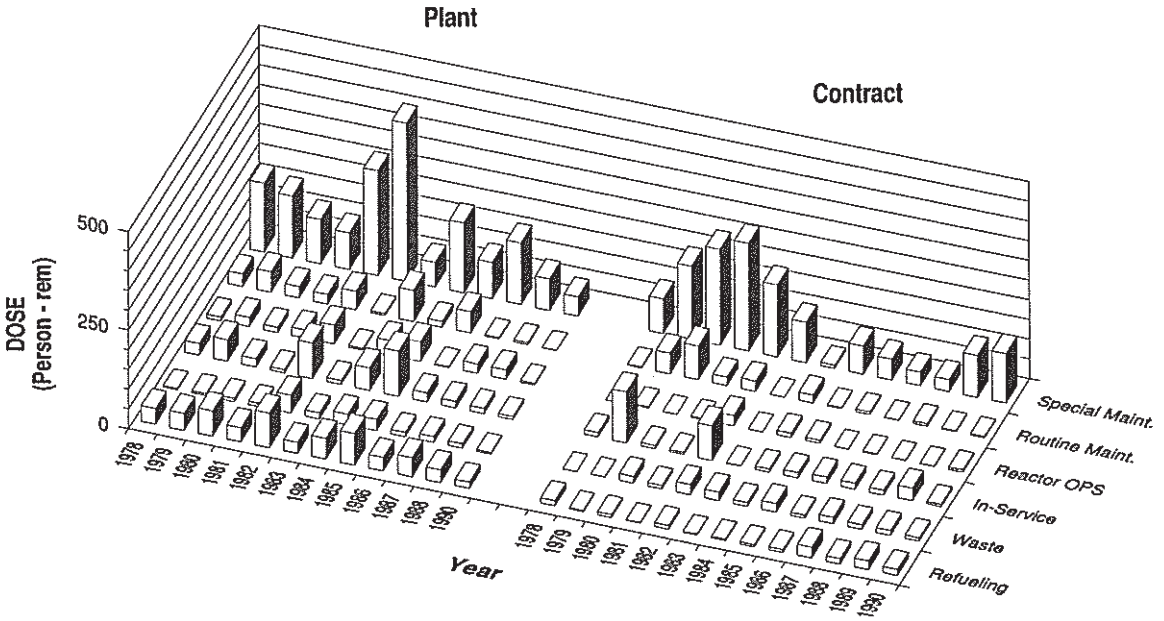
APPENDIX E (continued)

CALVERT CLIFFS 1, 2

Dose-Performance Indicators **PWR**



Breakdown by Job Function

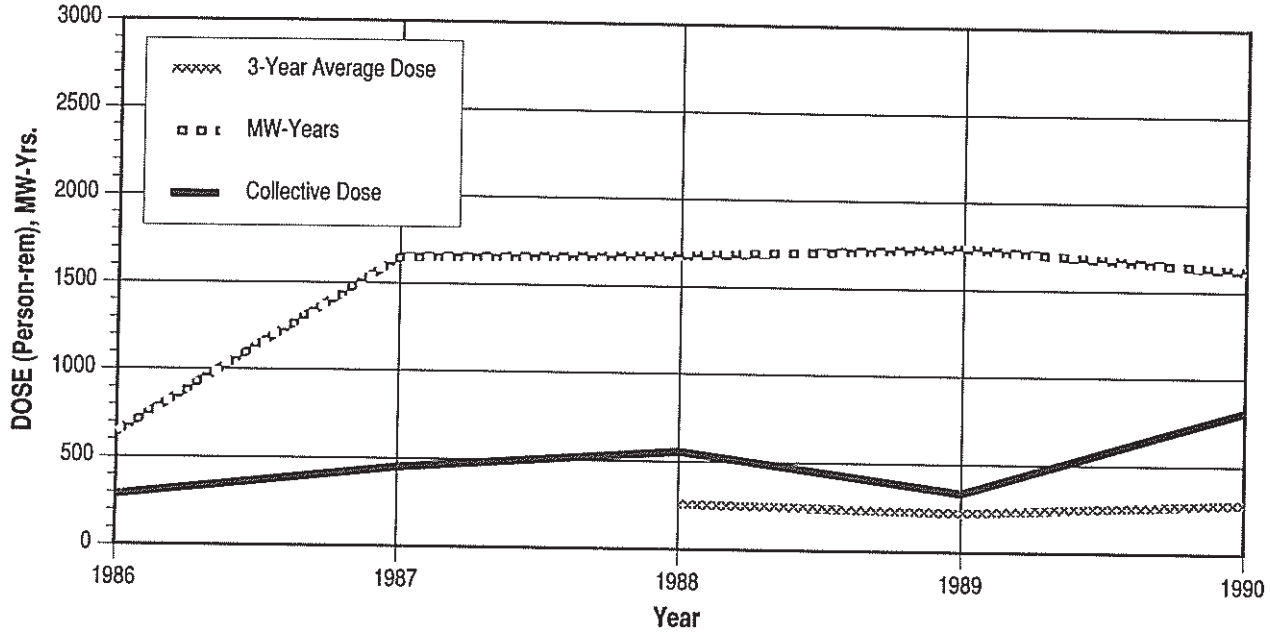


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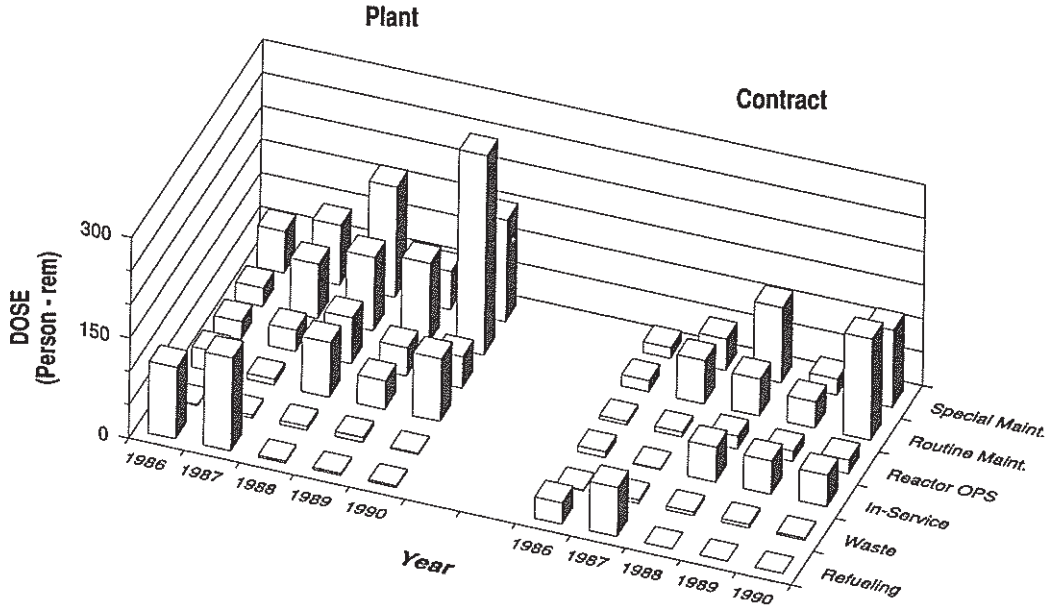
CATAWBA 1, 2

Dose-Performance Indicators

PWR



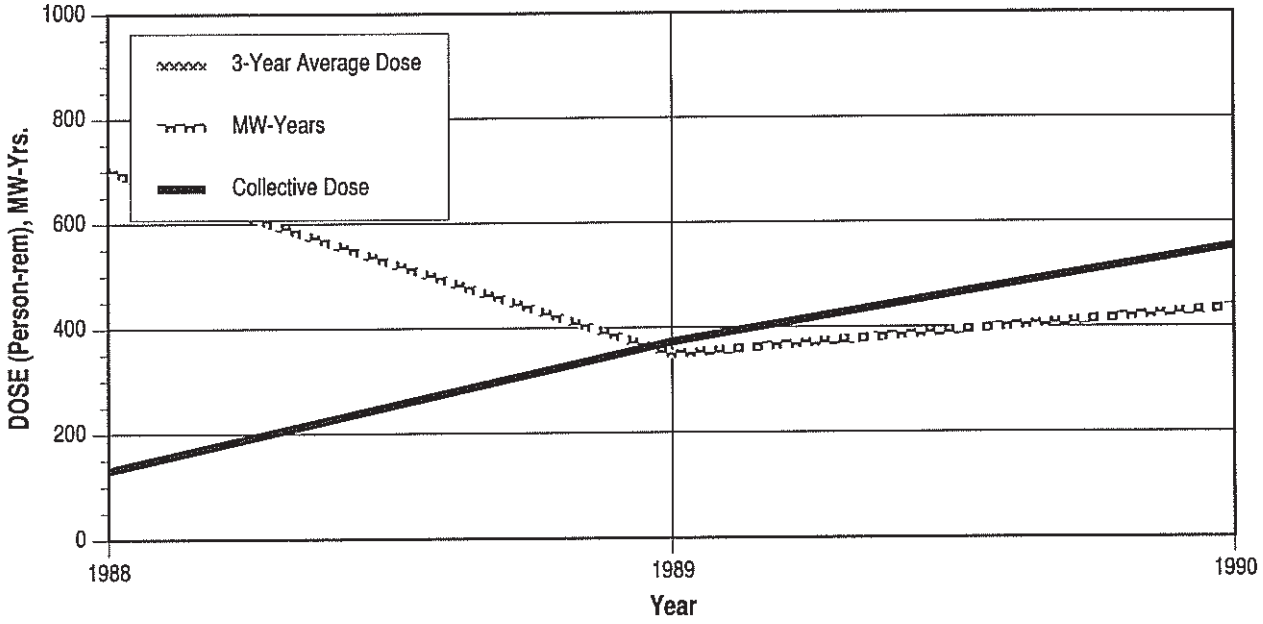
Breakdown by Job Function



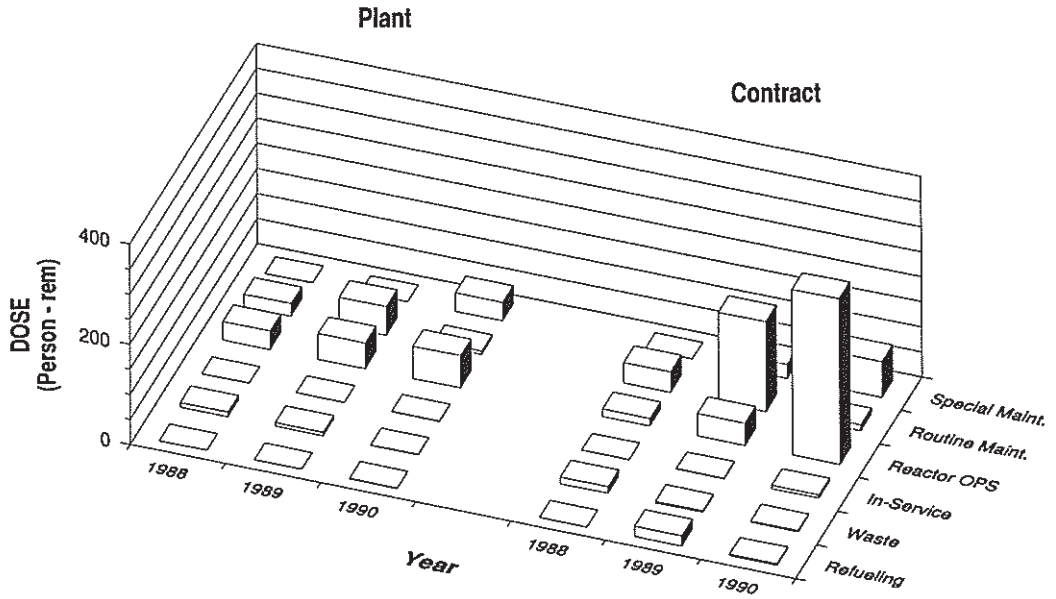
APPENDIX E (continued)

CLINTON

Dose-Performance Indicators **BWR**



Breakdown by Job Function

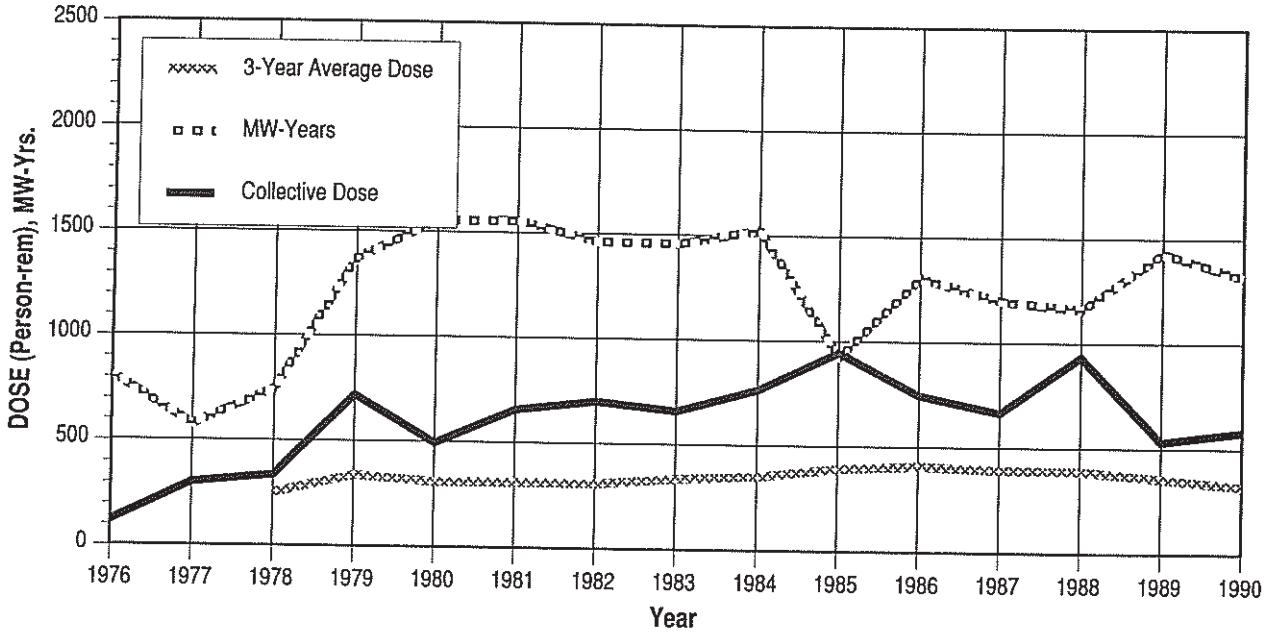


APPENDIX E (continued)

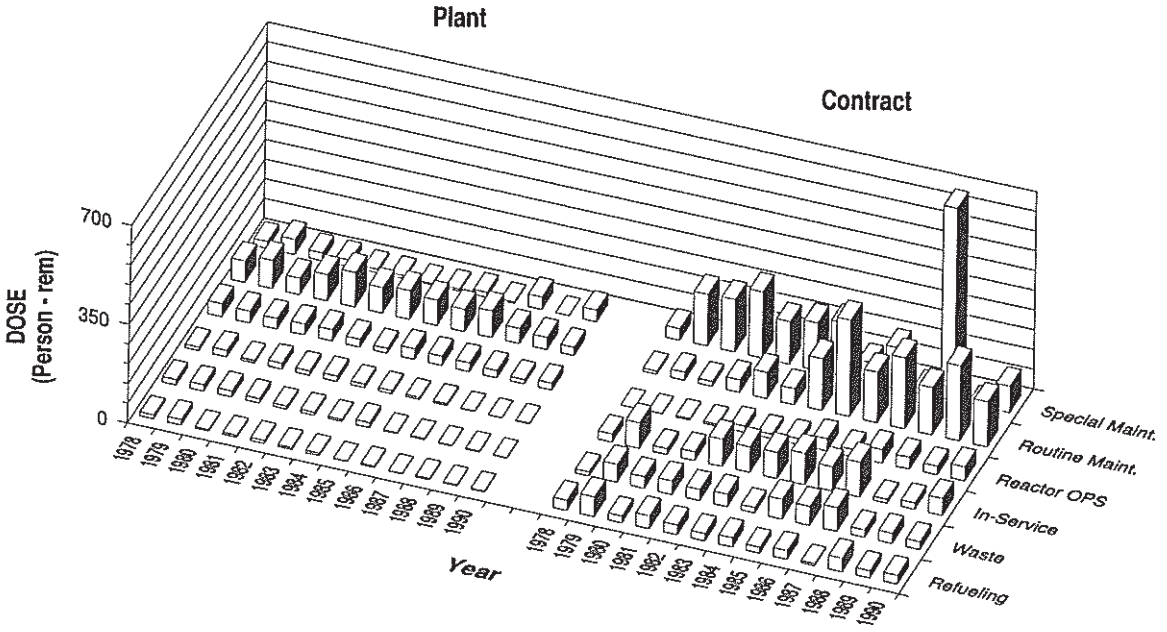
COOK 1, 2

Dose-Performance Indicators

PWR



Breakdown by Job Function

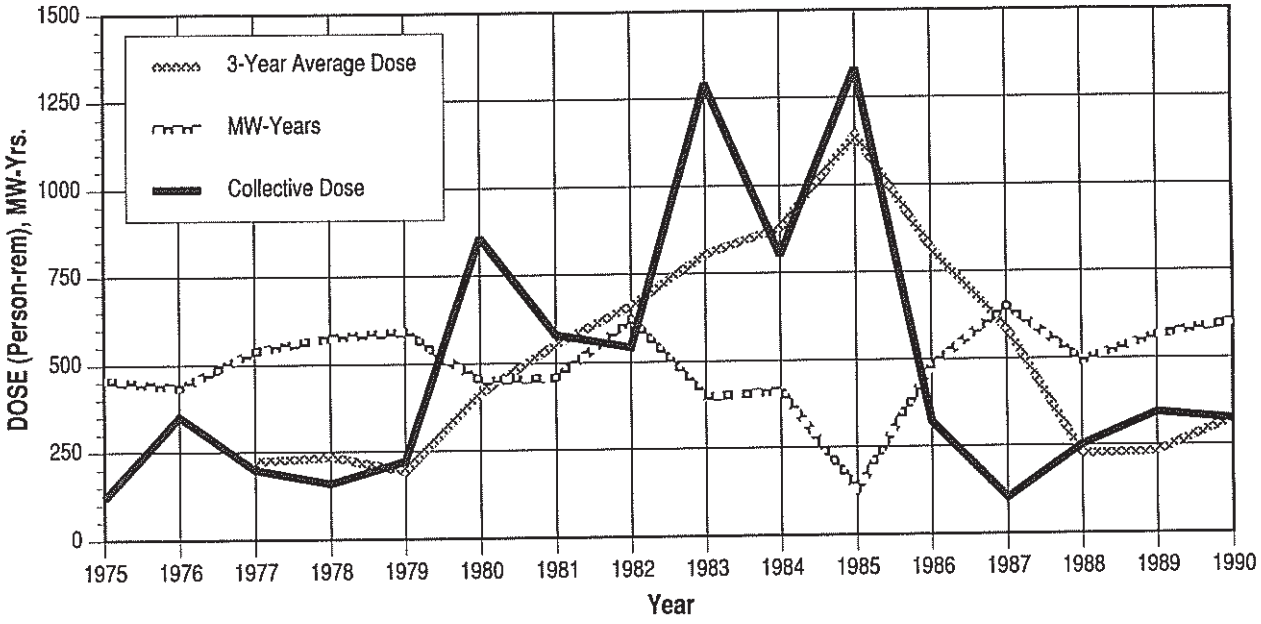


APPENDIX E (continued)

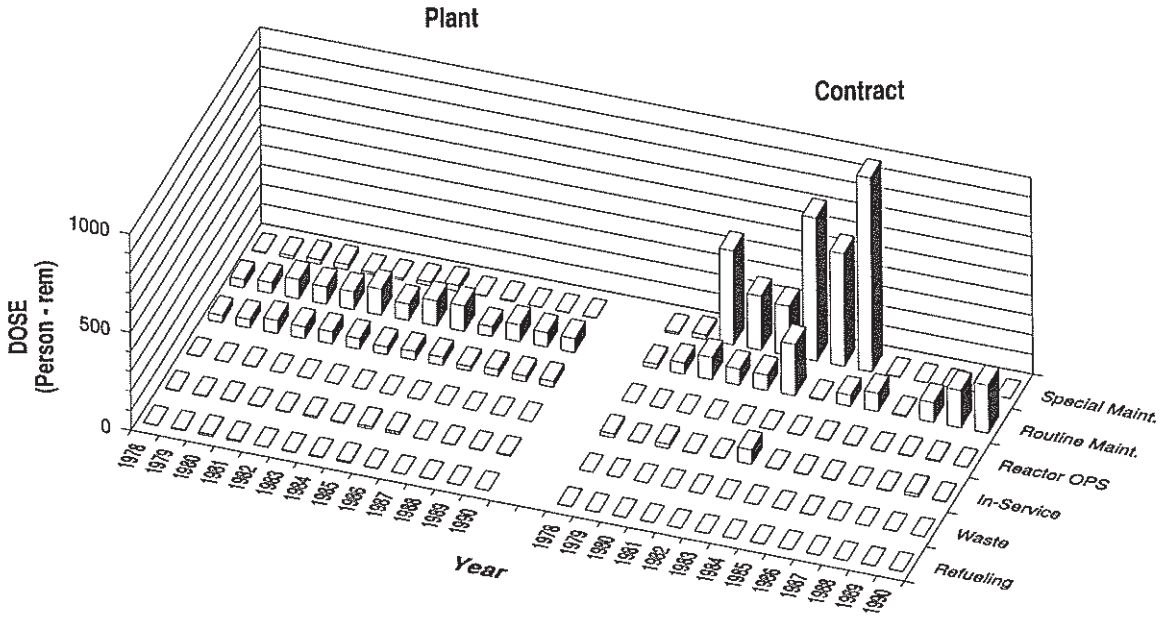
COOPER STATION

Dose-Performance Indicators

BWR



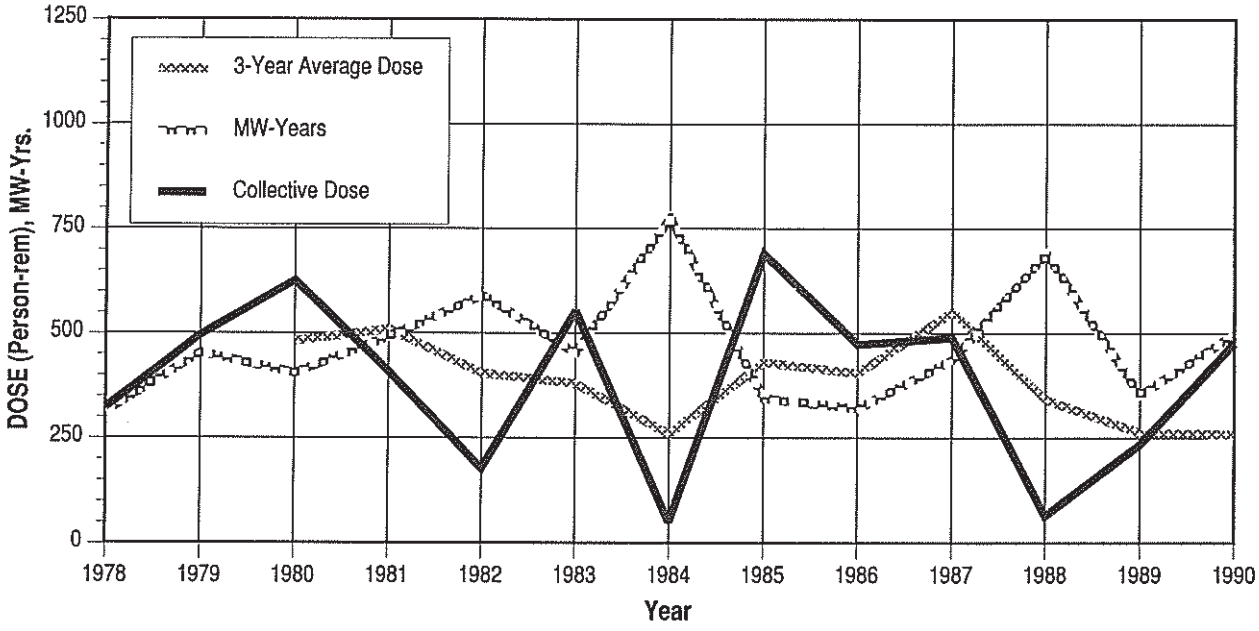
Breakdown by Job Function



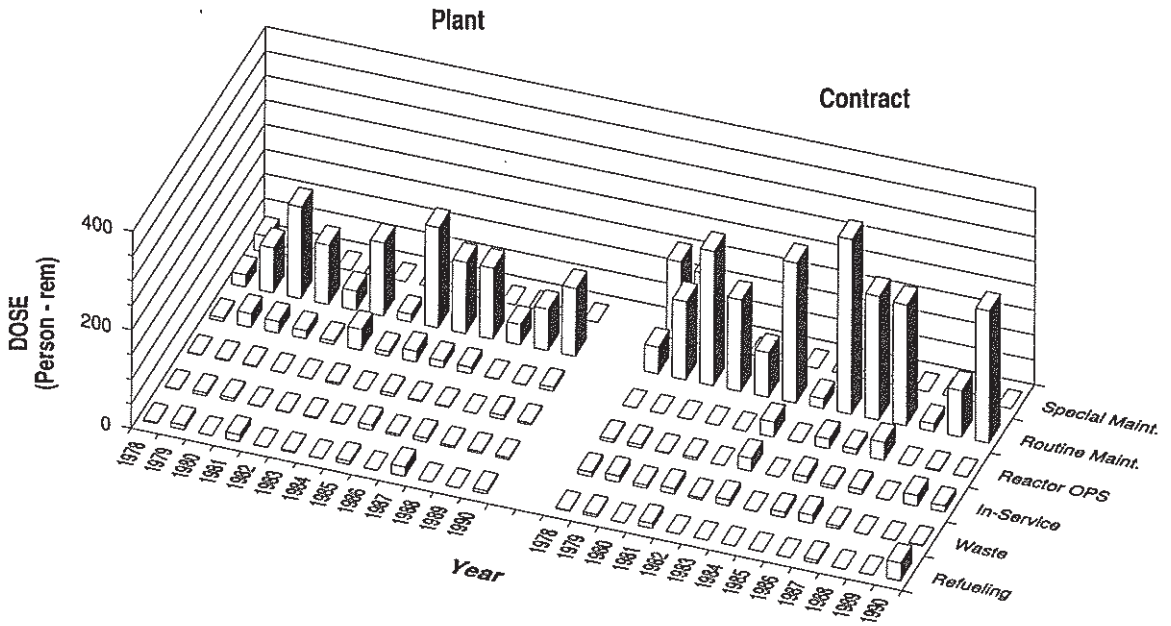
APPENDIX E (continued)

CRYSTAL RIVER 3

Dose-Performance Indicators **PWR**



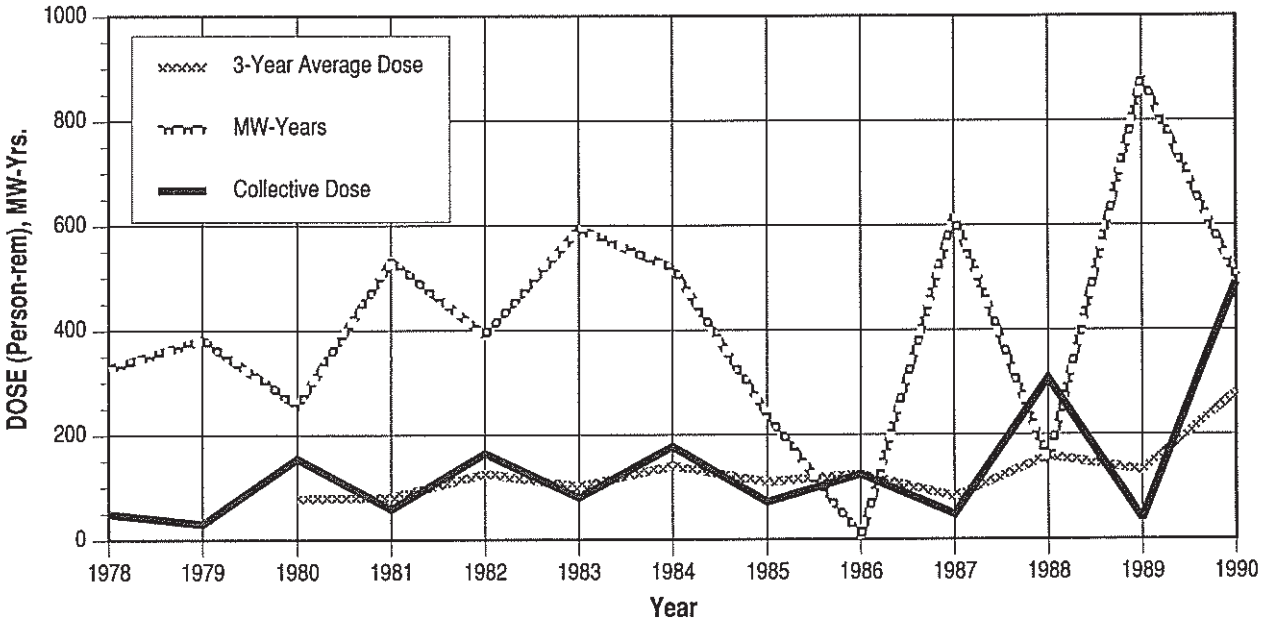
Breakdown by Job Function



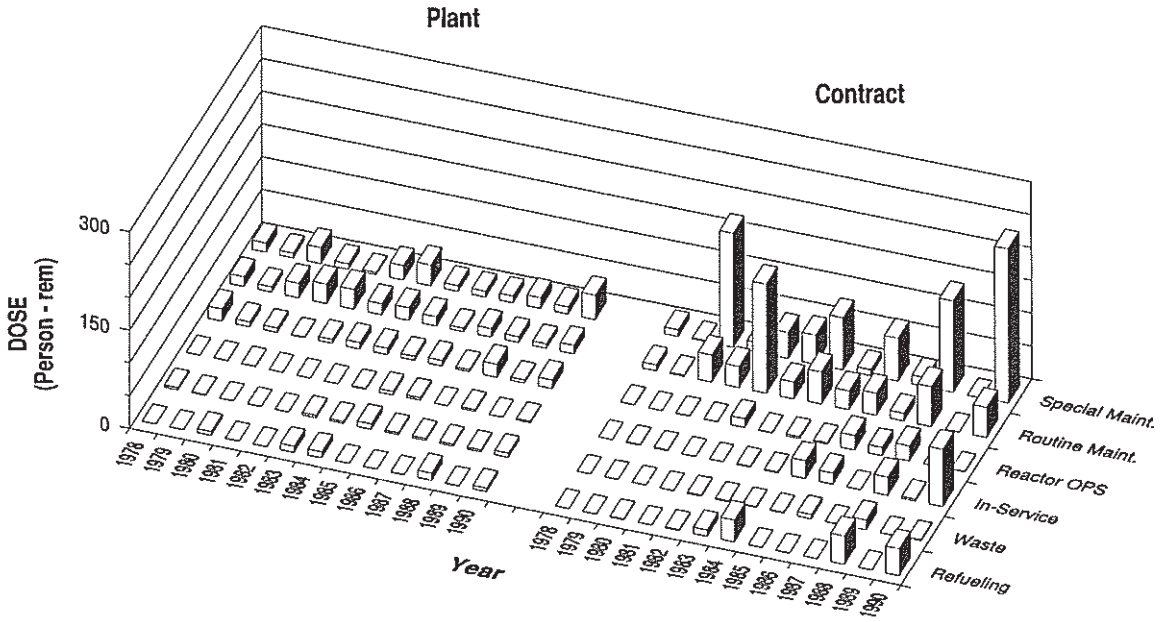
APPENDIX E (continued)

DAVIS-BESSE

Dose-Performance Indicators **PWR**



Breakdown by Job Function

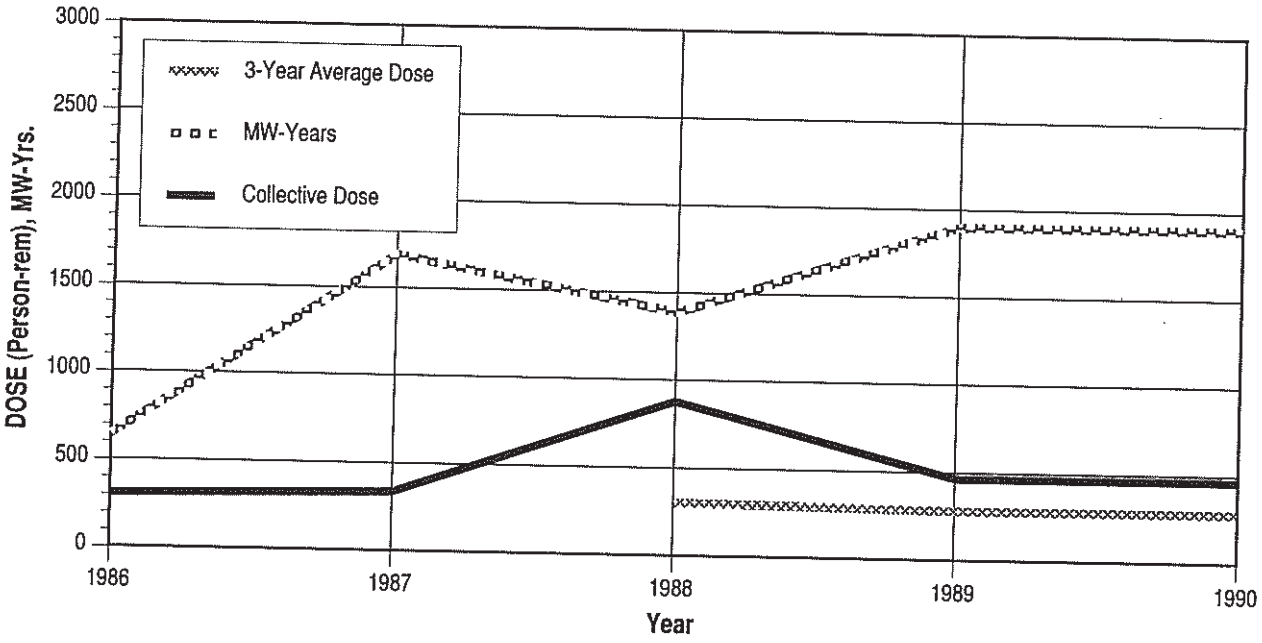


APPENDIX E (continued)

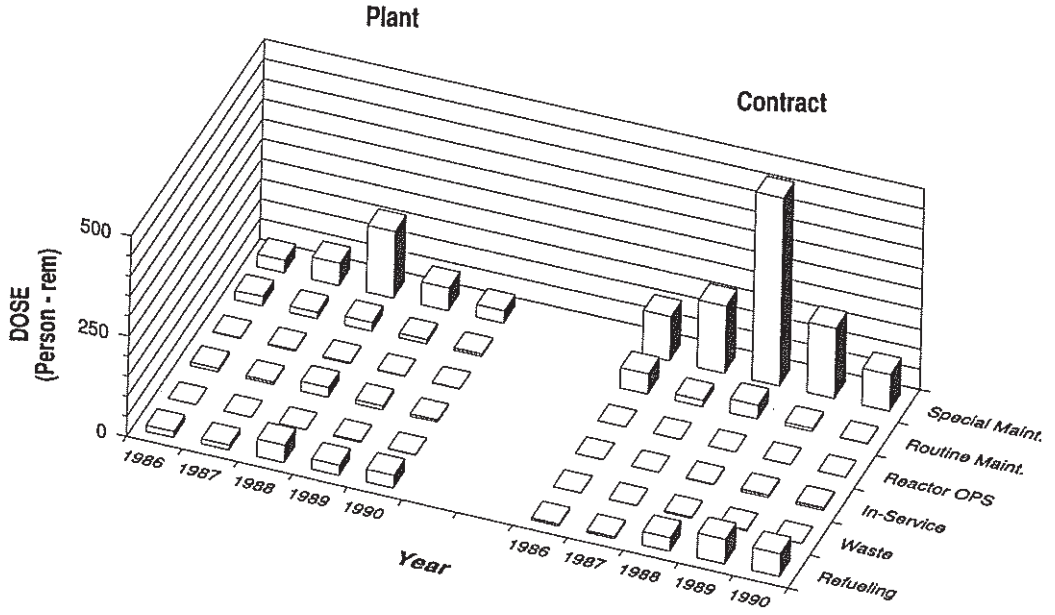
DIABLO CANYON 1, 2

Dose-Performance Indicators

PWR



Breakdown by Job Function

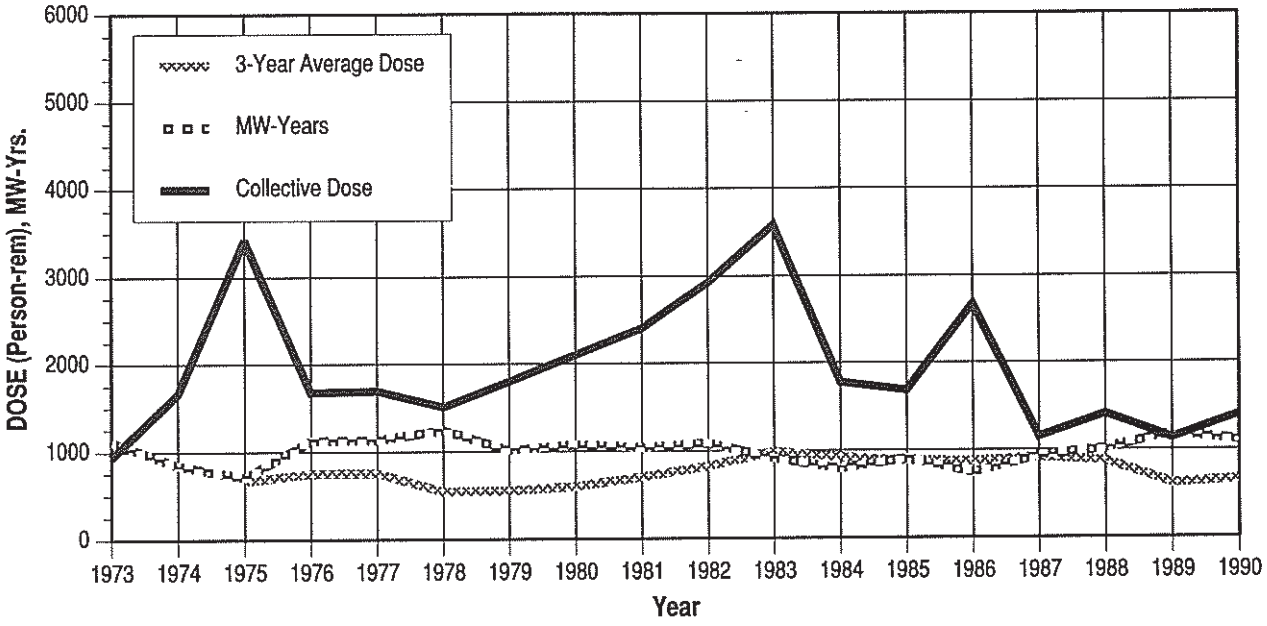


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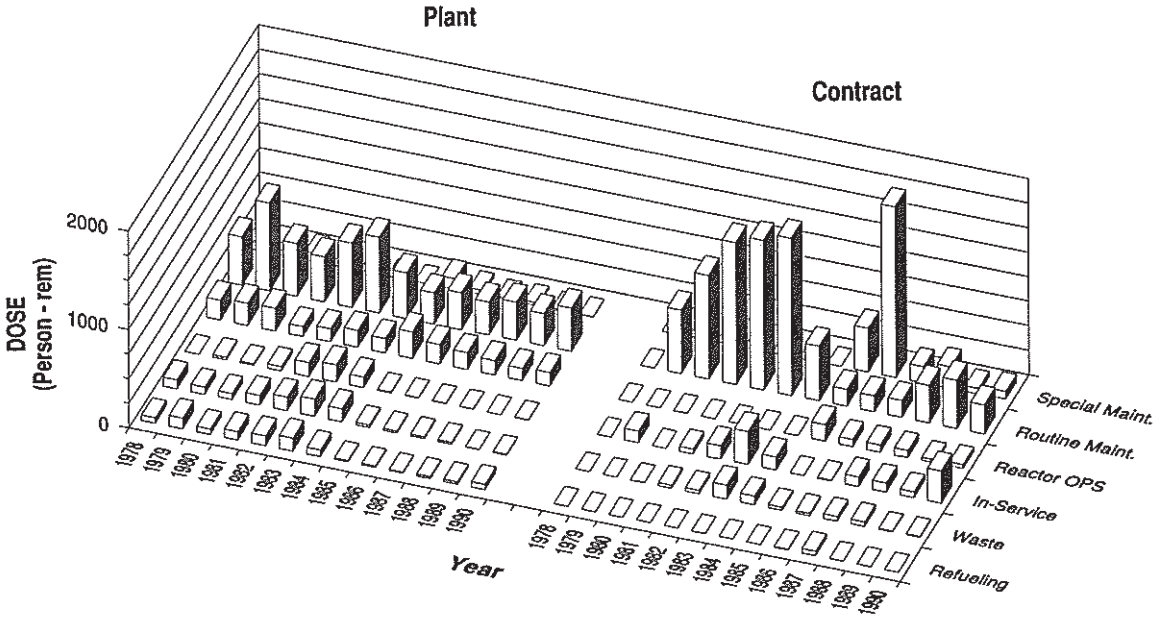
DRESDEN 2, 3

Dose-Performance Indicators

BWR



Breakdown by Job Function

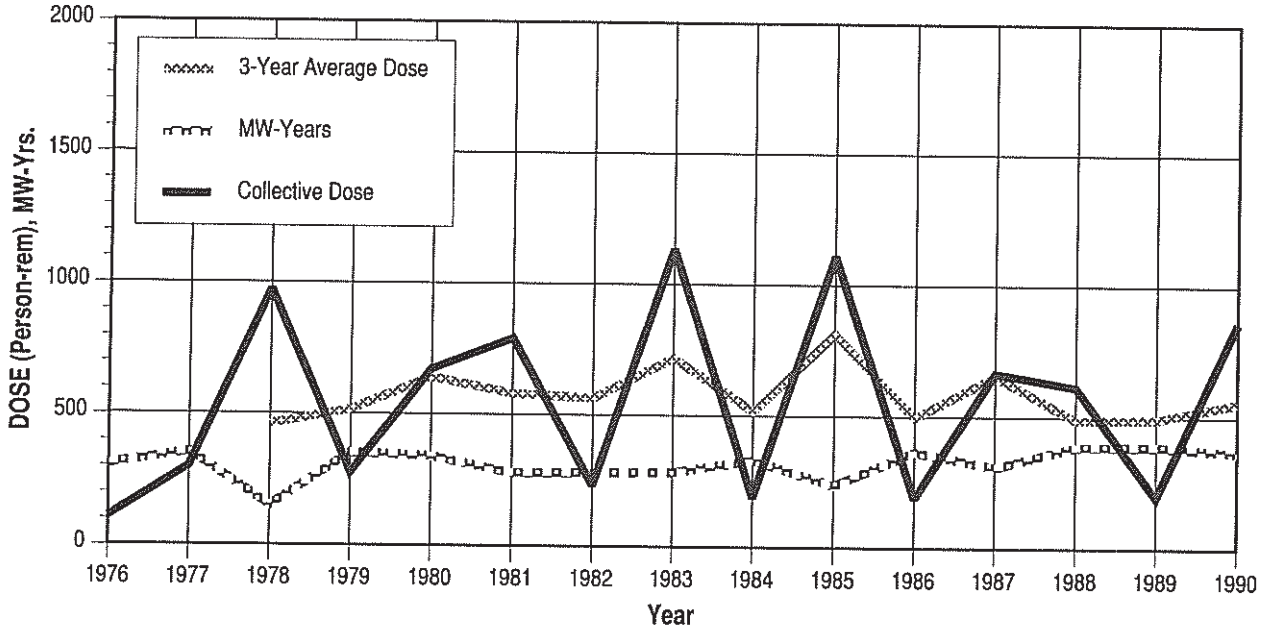


APPENDIX E (continued)

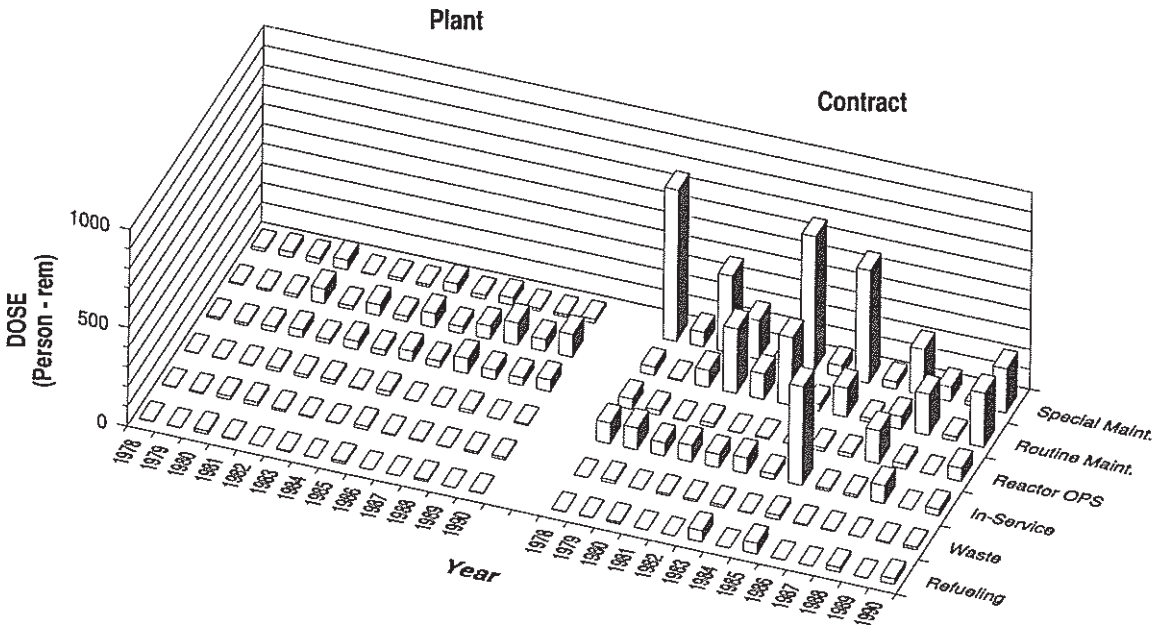
DUANE ARNOLD

Dose-Performance Indicators

BWR



Breakdown by Job Function

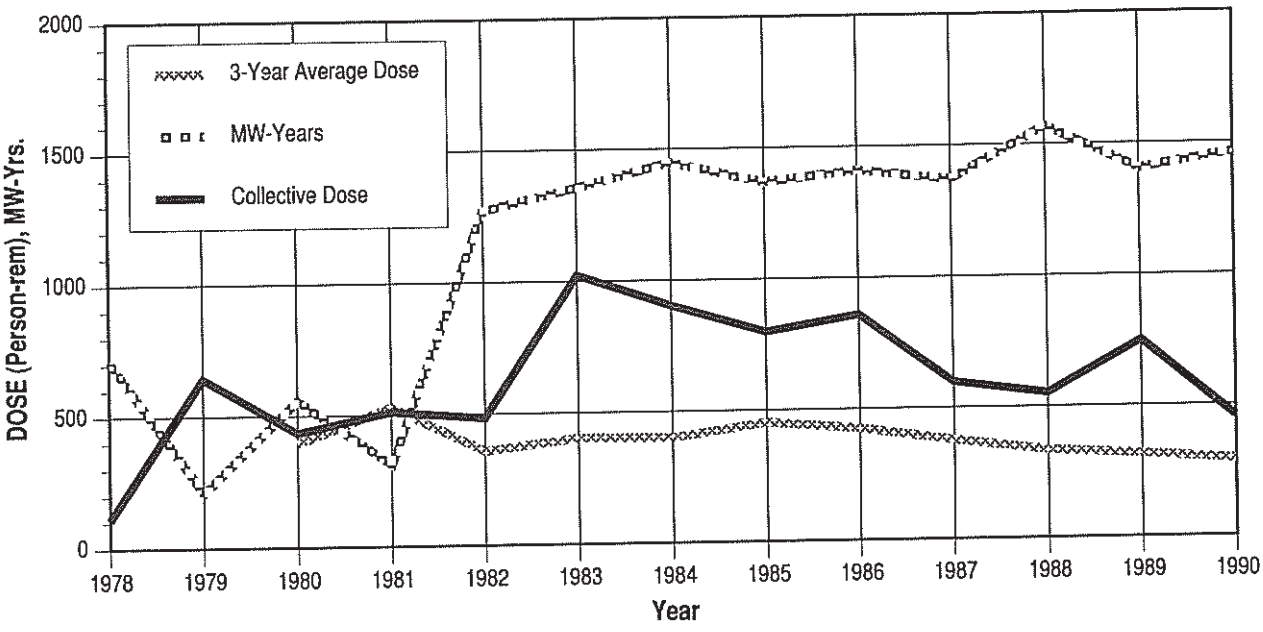


APPENDIX E (continued)

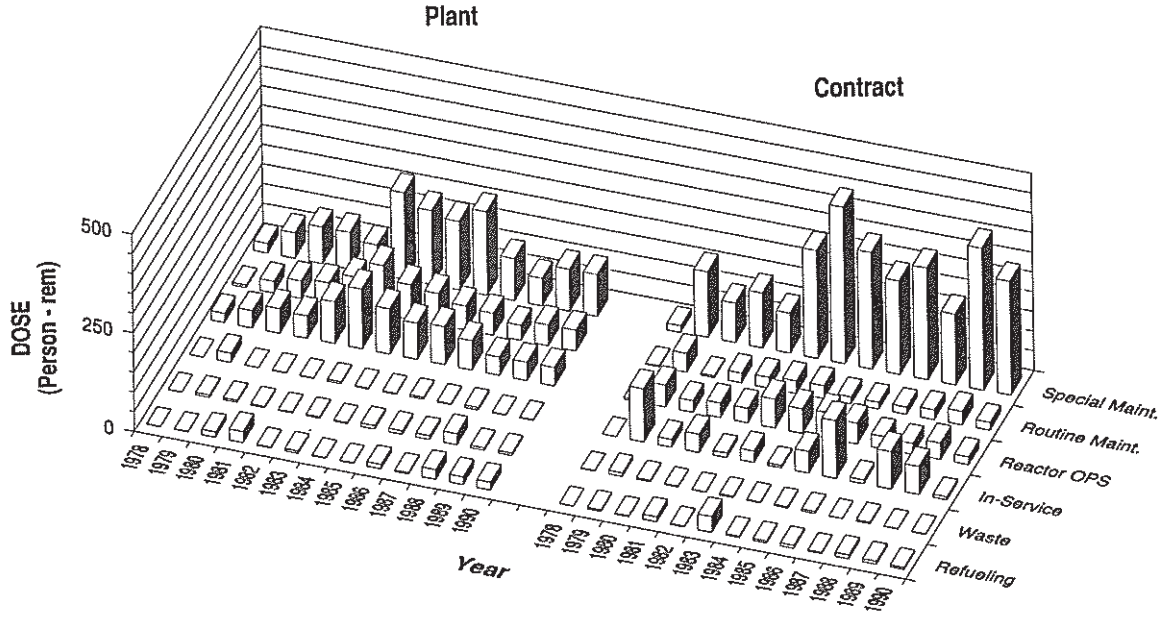
FARLEY 1, 2

Dose-Performance Indicators

PWR



Breakdown by Job Function

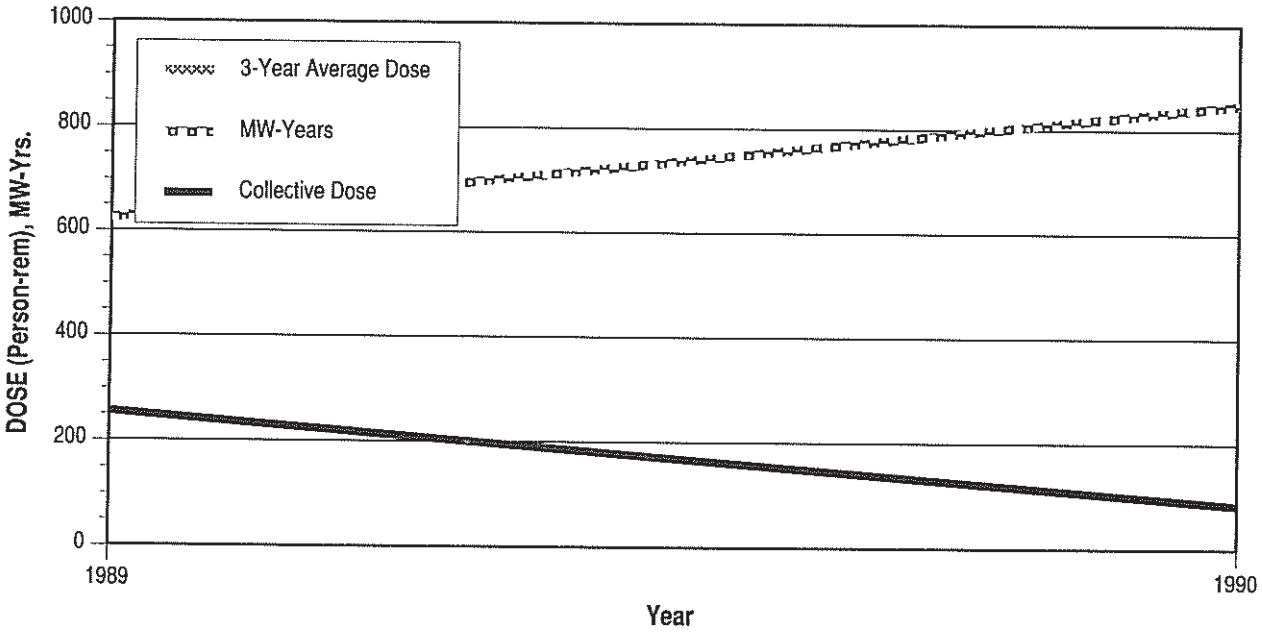


APPENDIX E (continued)

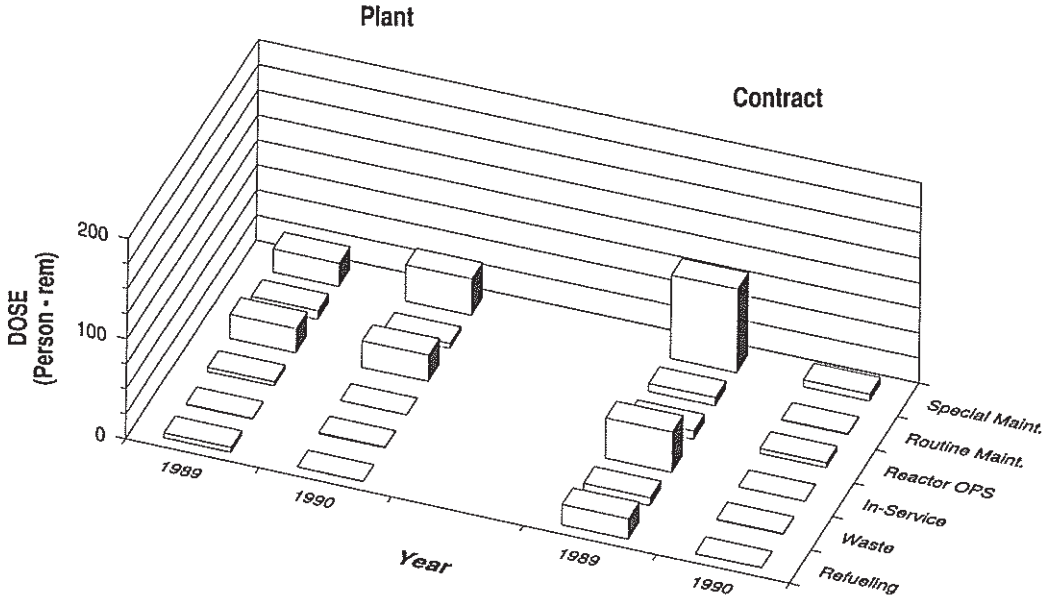
FERMI 2

Dose-Performance Indicators

BWR



Breakdown by Job Function

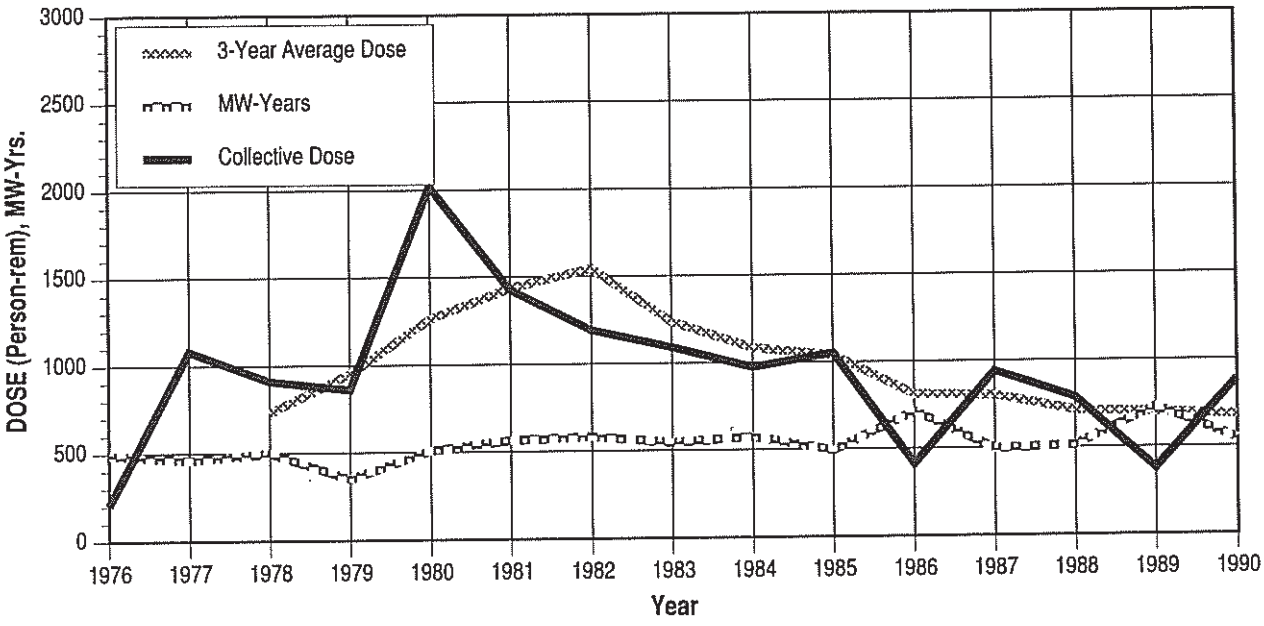


APPENDIX E (continued)

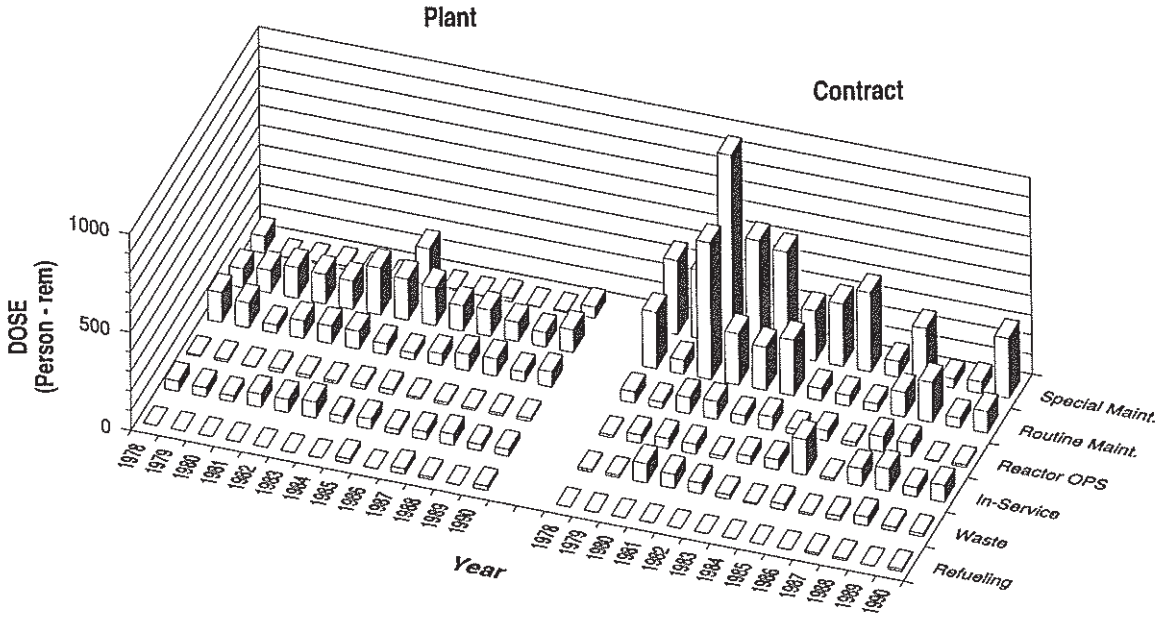
FITZPATRICK

Dose-Performance Indicators

BWR



Breakdown by Job Function

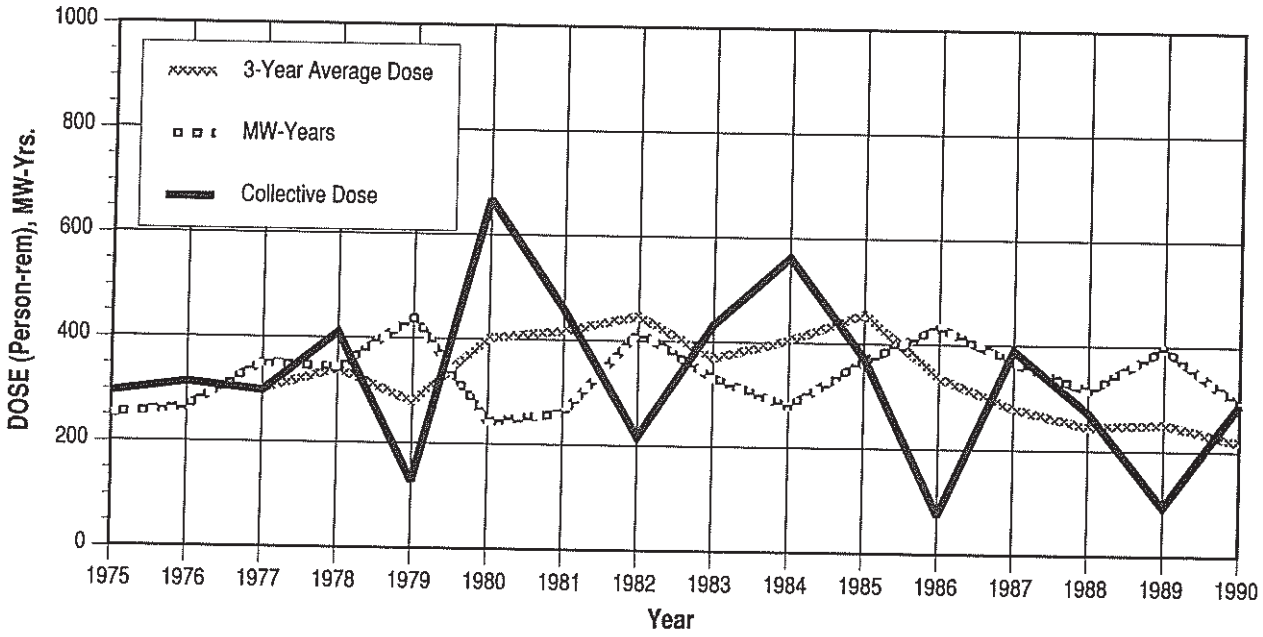


APPENDIX E (continued)

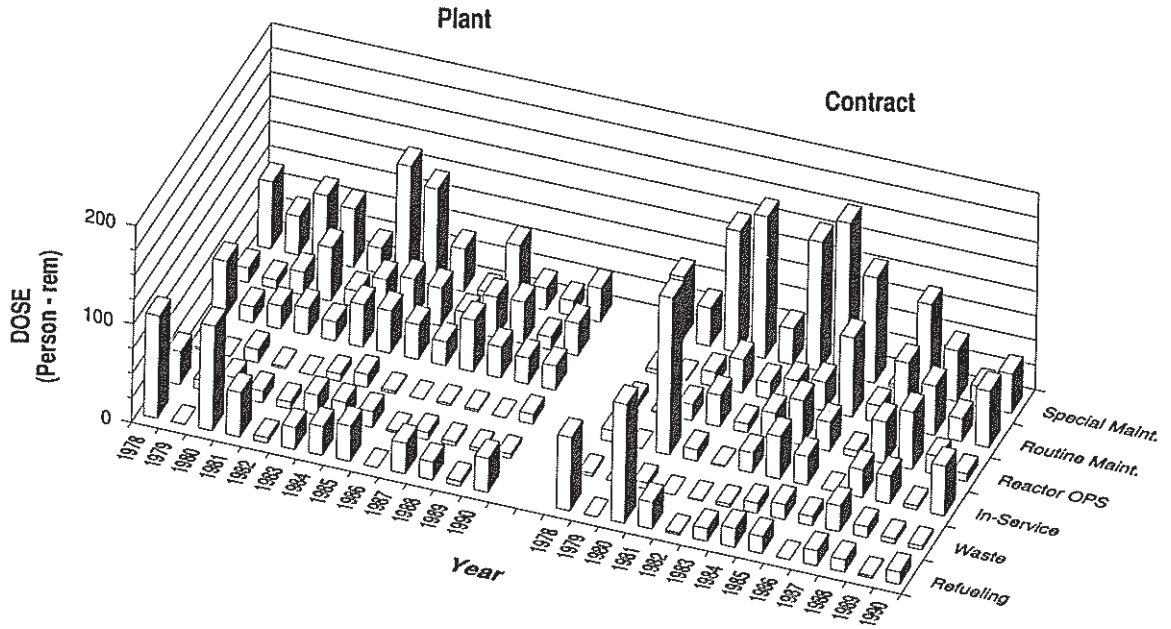
FORT CALHOUN

Dose-Performance Indicators

PWR



Breakdown by Job Function

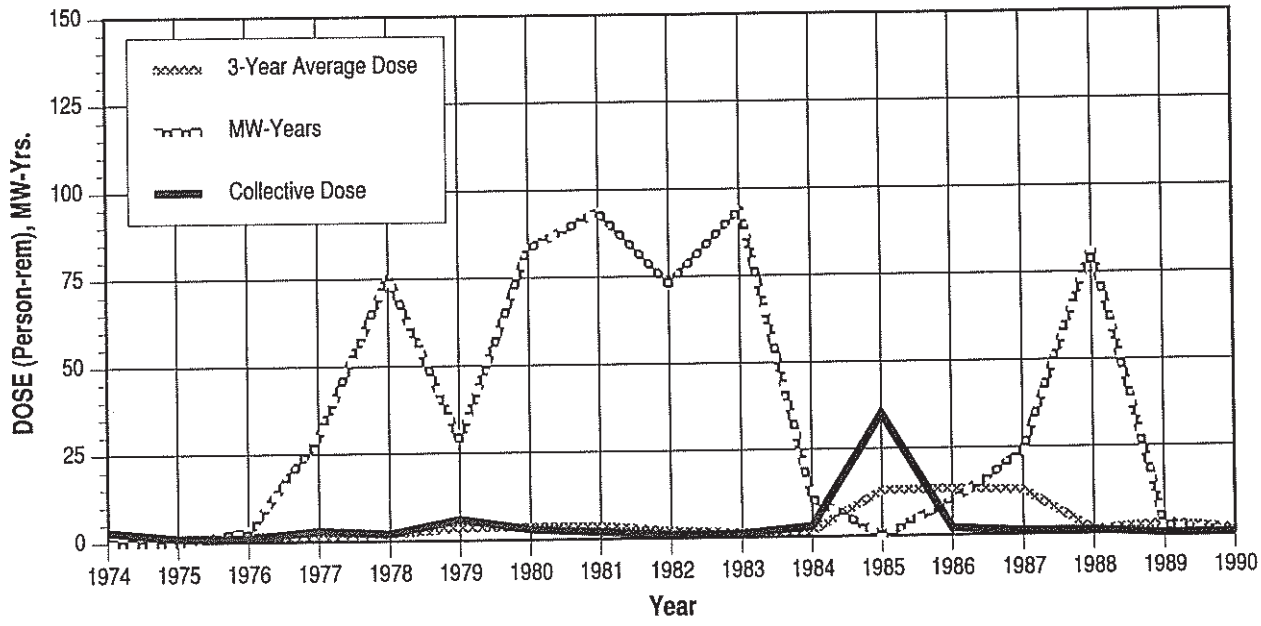


APPENDIX E (continued)

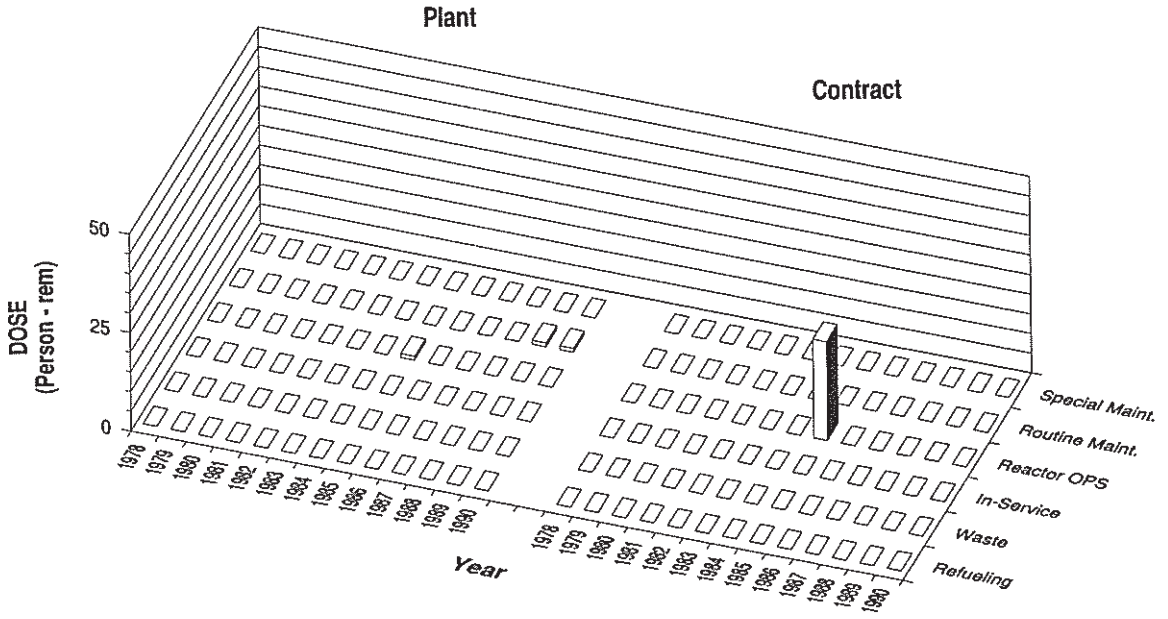
FORT ST. VRAIN

Dose-Performance Indicators

HTGR



Breakdown by Job Function

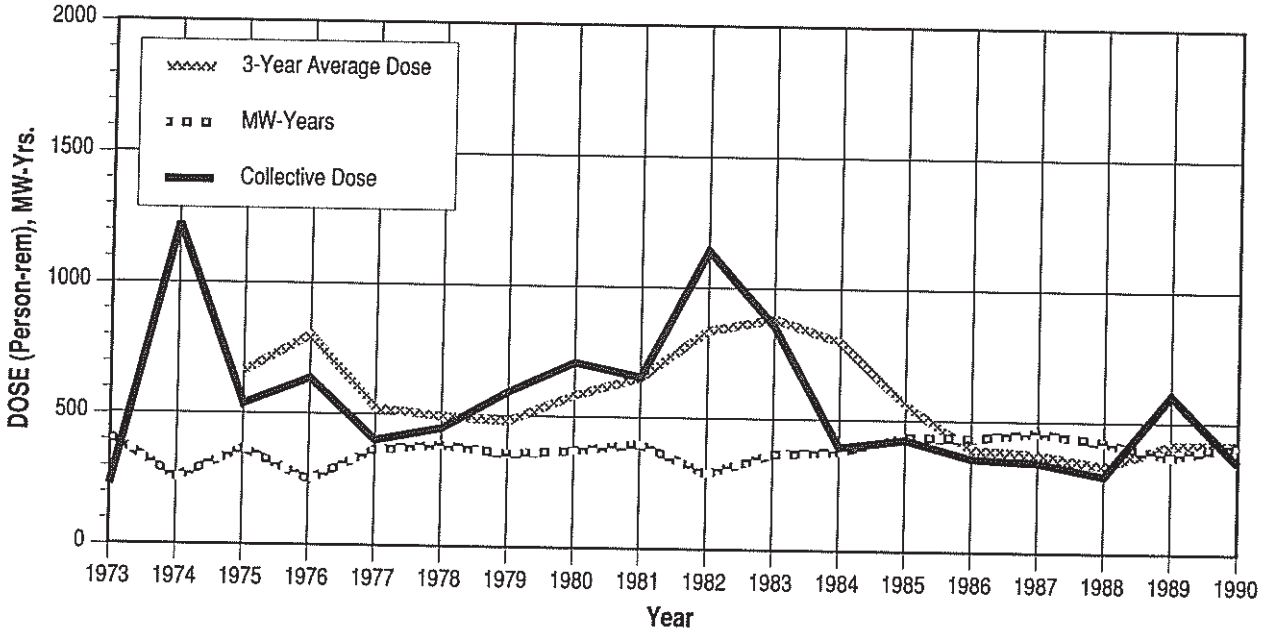


APPENDIX E (continued)

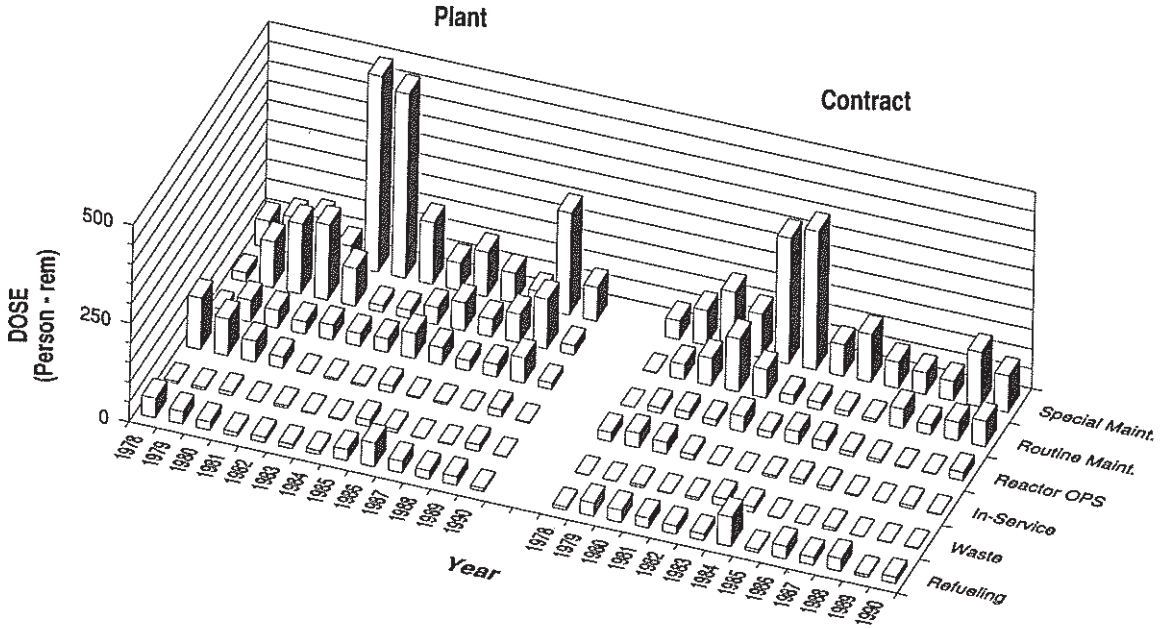
GINNA

Dose-Performance Indicators

PWR



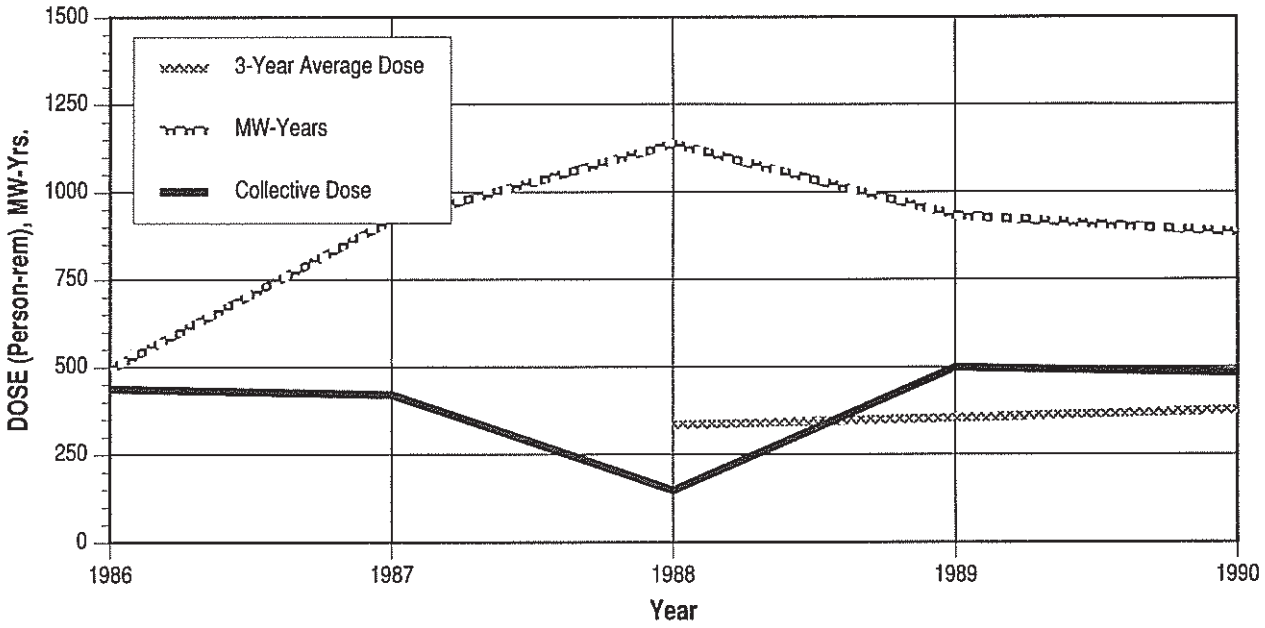
Breakdown by Job Function



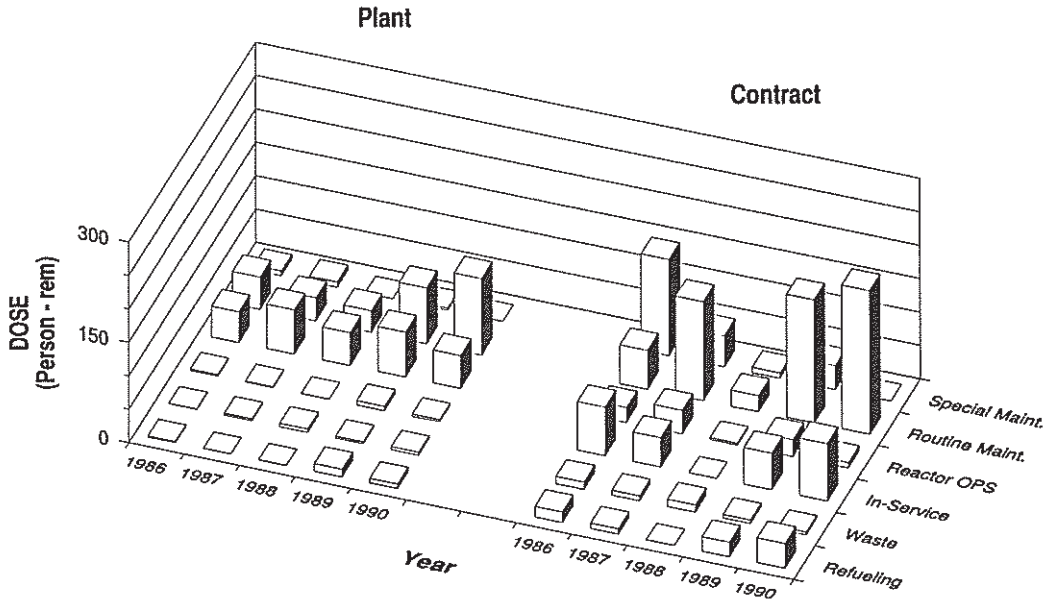
APPENDIX E (continued)

GRAND GULF

Dose-Performance Indicators **BWR**



Breakdown by Job Function

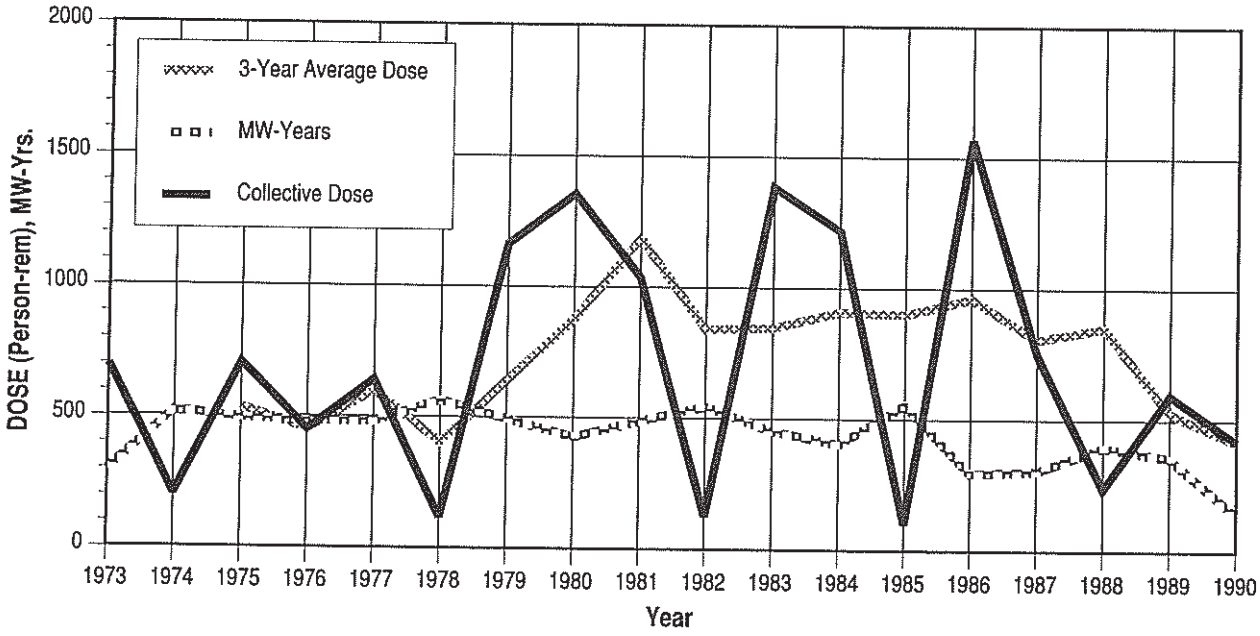


APPENDIX E (continued)

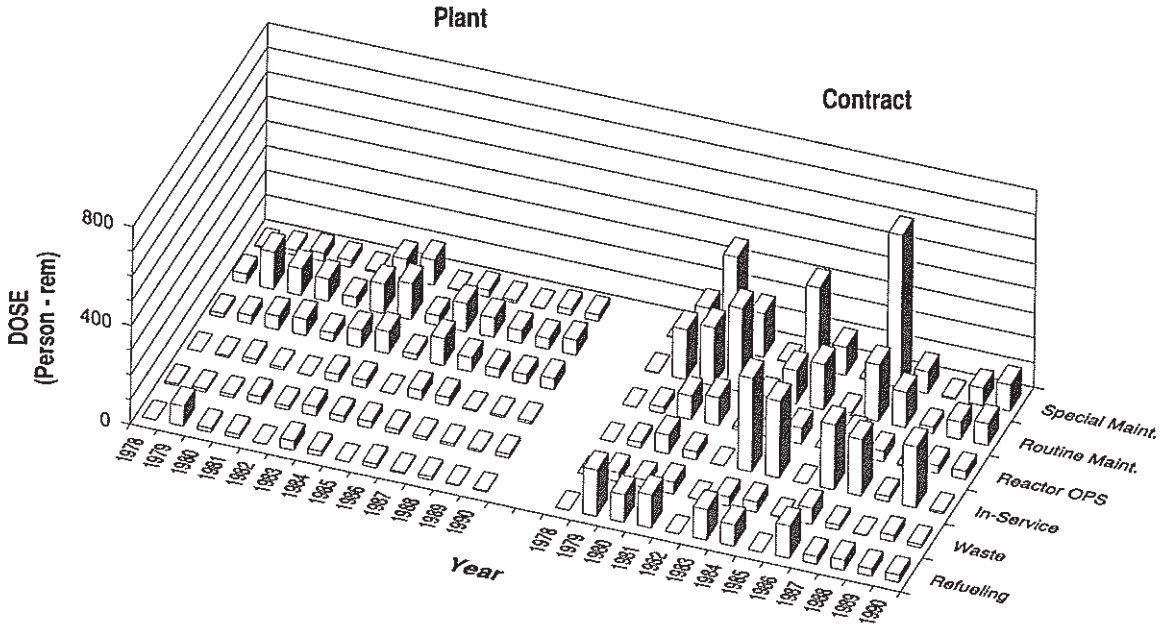
HADDAM NECK

Dose-Performance Indicators

PWR



Breakdown by Job Function

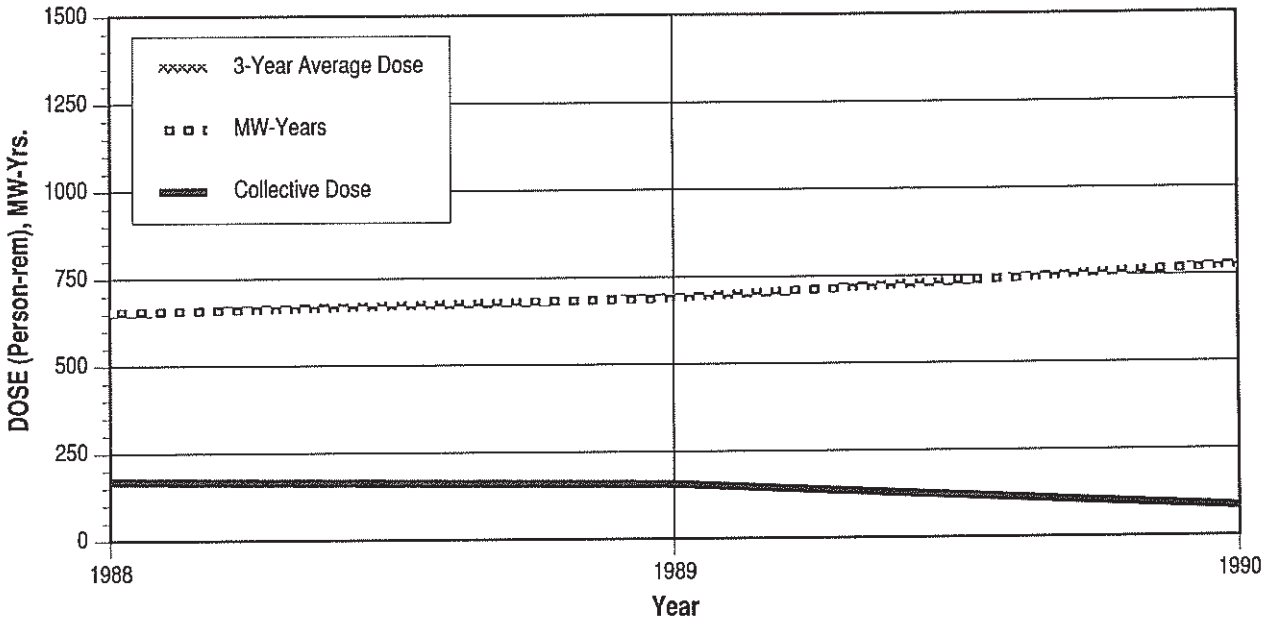


APPENDIX E (continued)

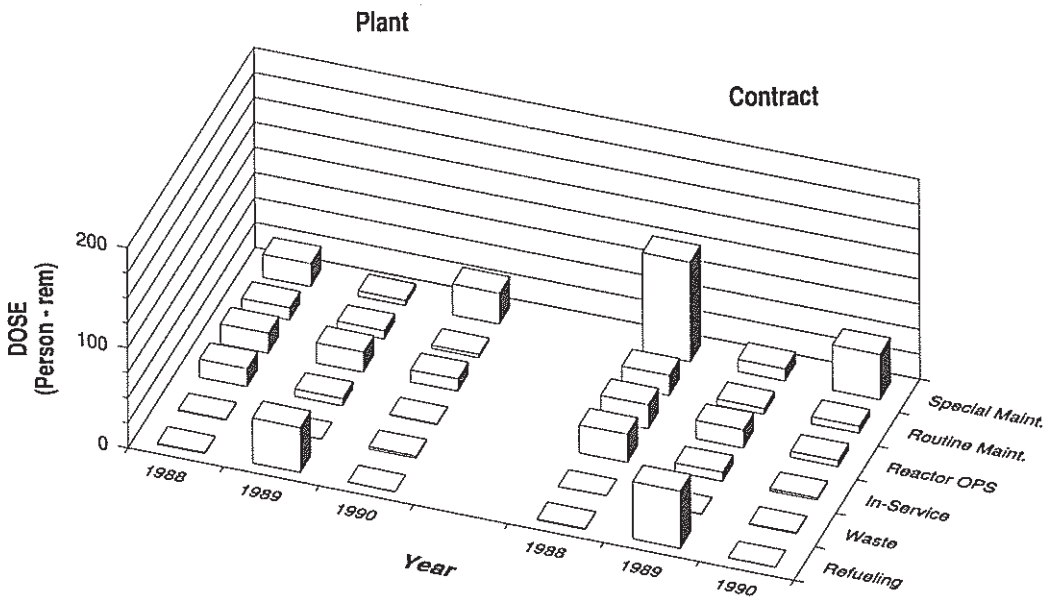
HARRIS

Dose-Performance Indicators

PWR



Breakdown by Job Function

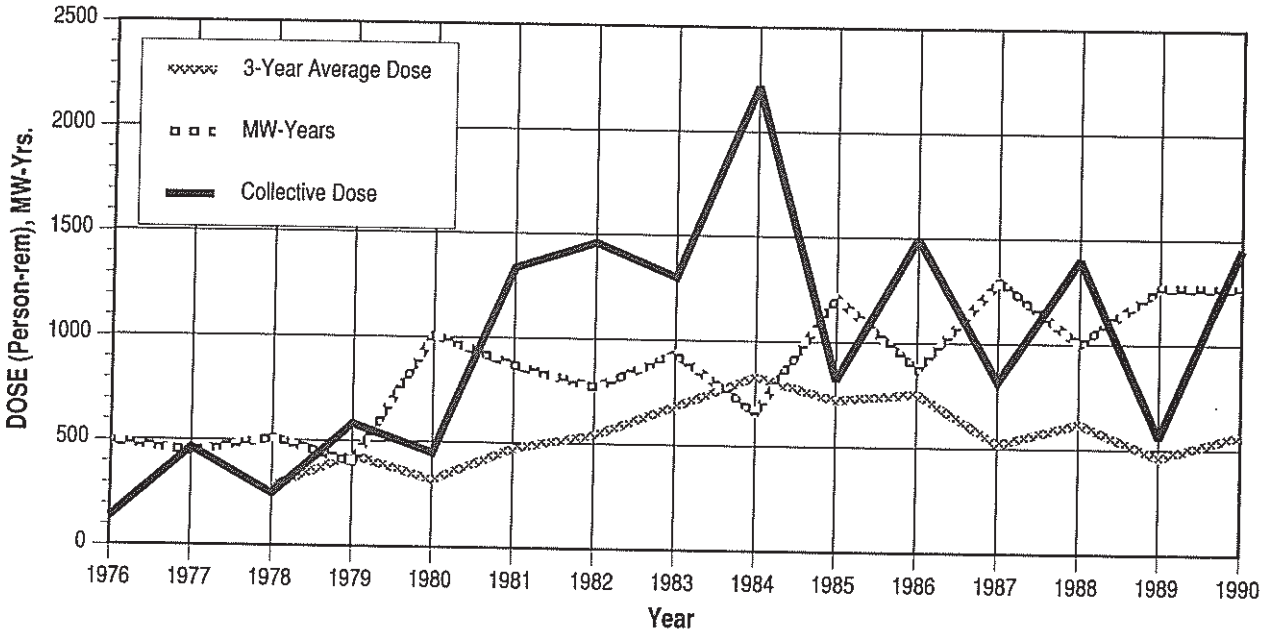


APPENDIX E (continued)

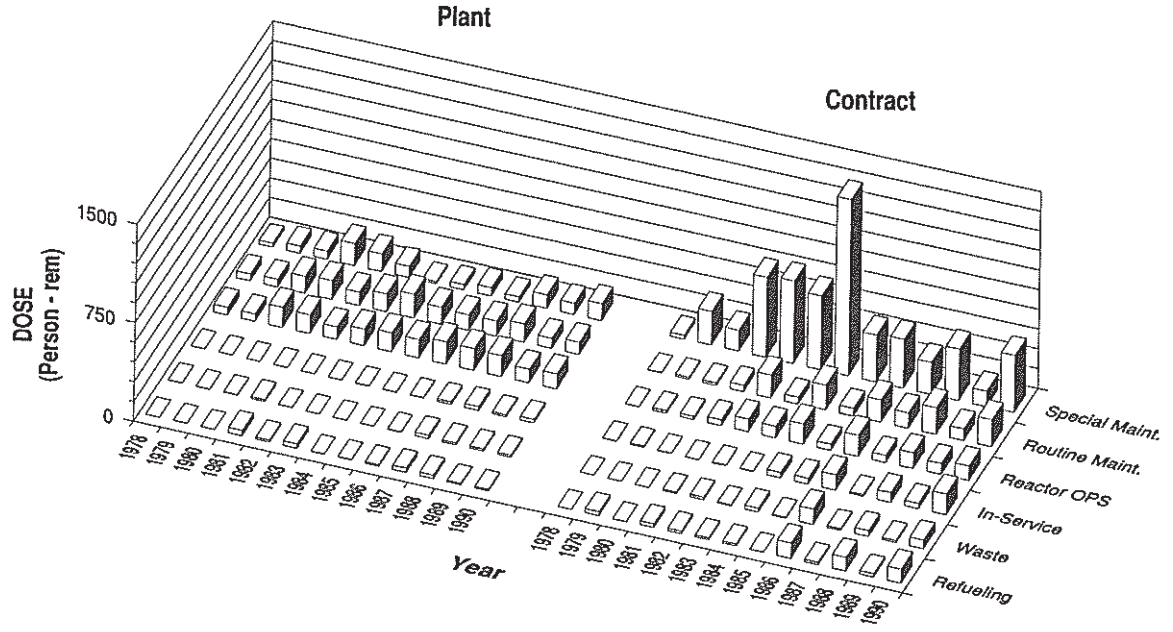
HATCH 1, 2

Dose-Performance Indicators

BWR



Breakdown by Job Function

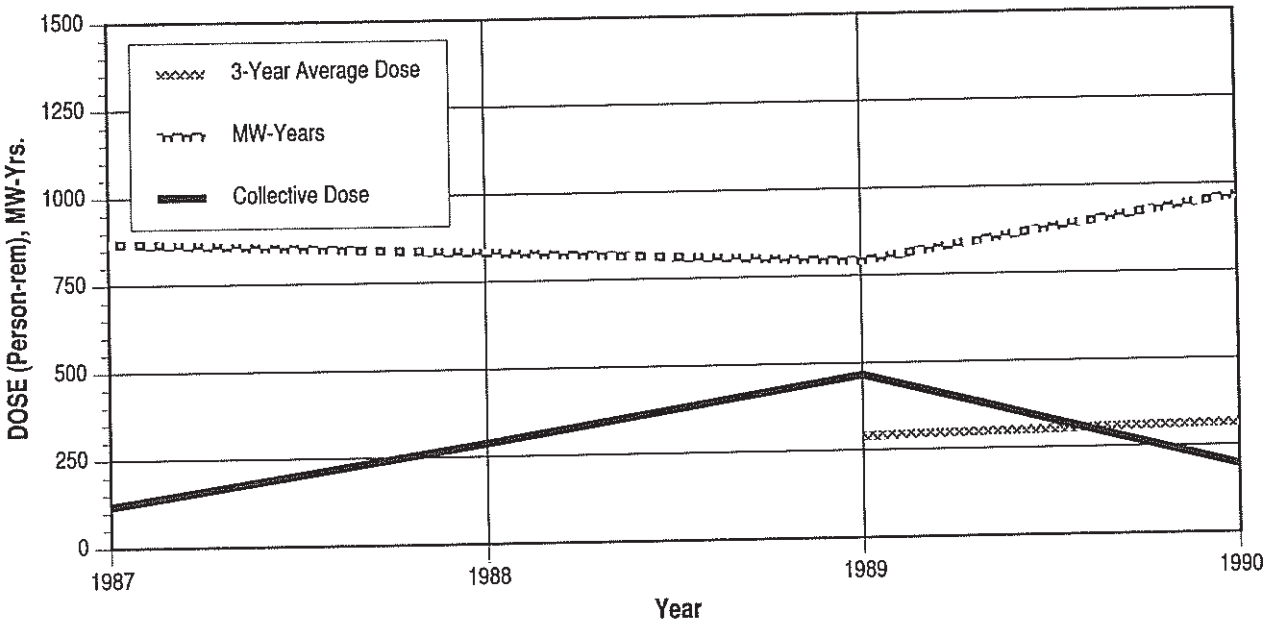


APPENDIX E (continued)

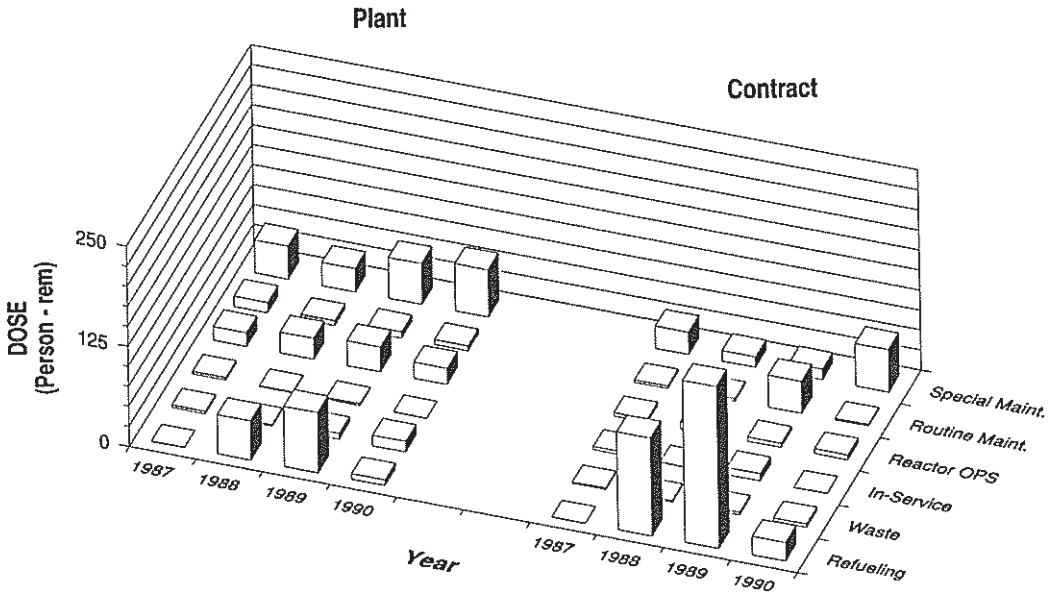
HOPE CREEK 1

Dose-Performance Indicators

BWR



Breakdown by Job Function

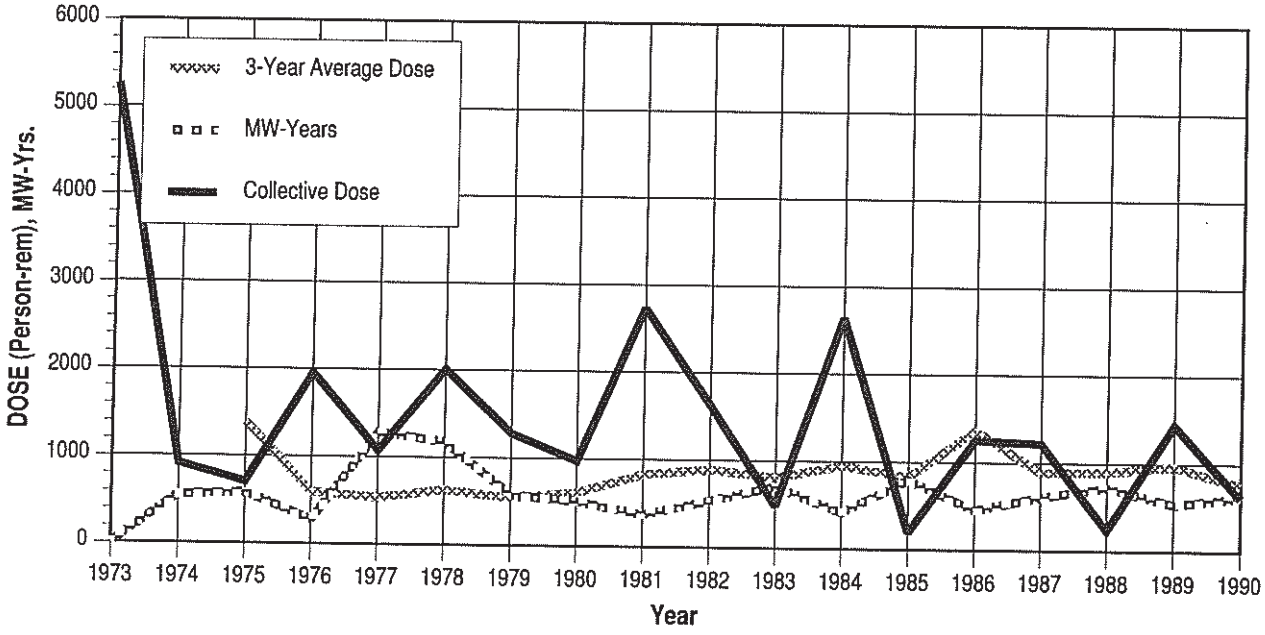


APPENDIX E (continued)

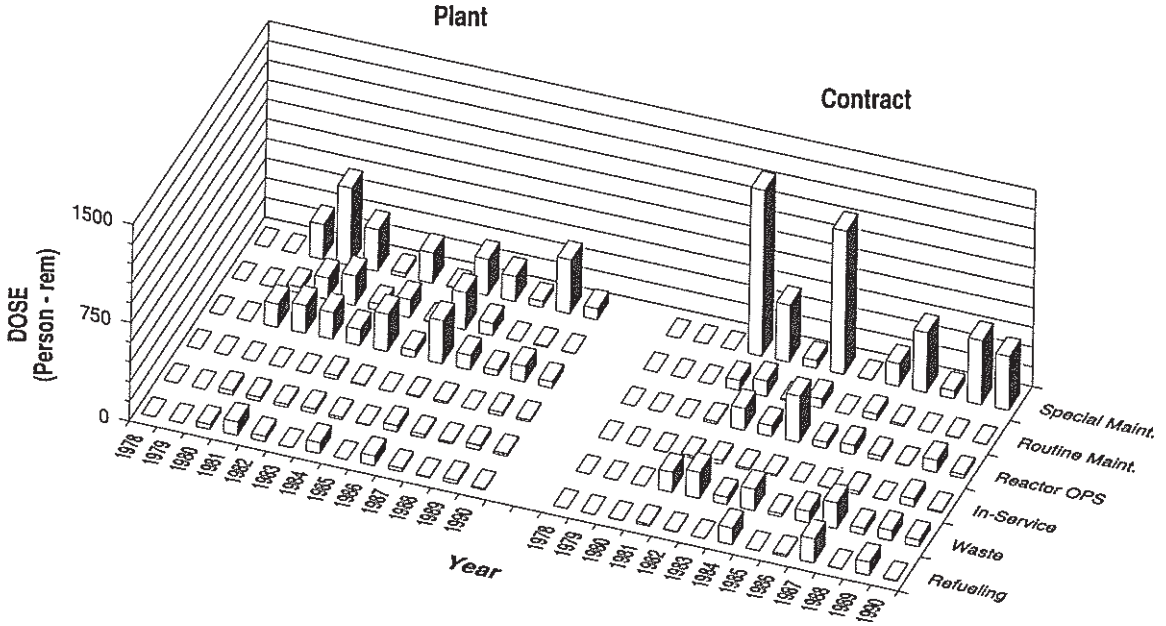
INDIAN POINT 2

Dose-Performance Indicators

PWR



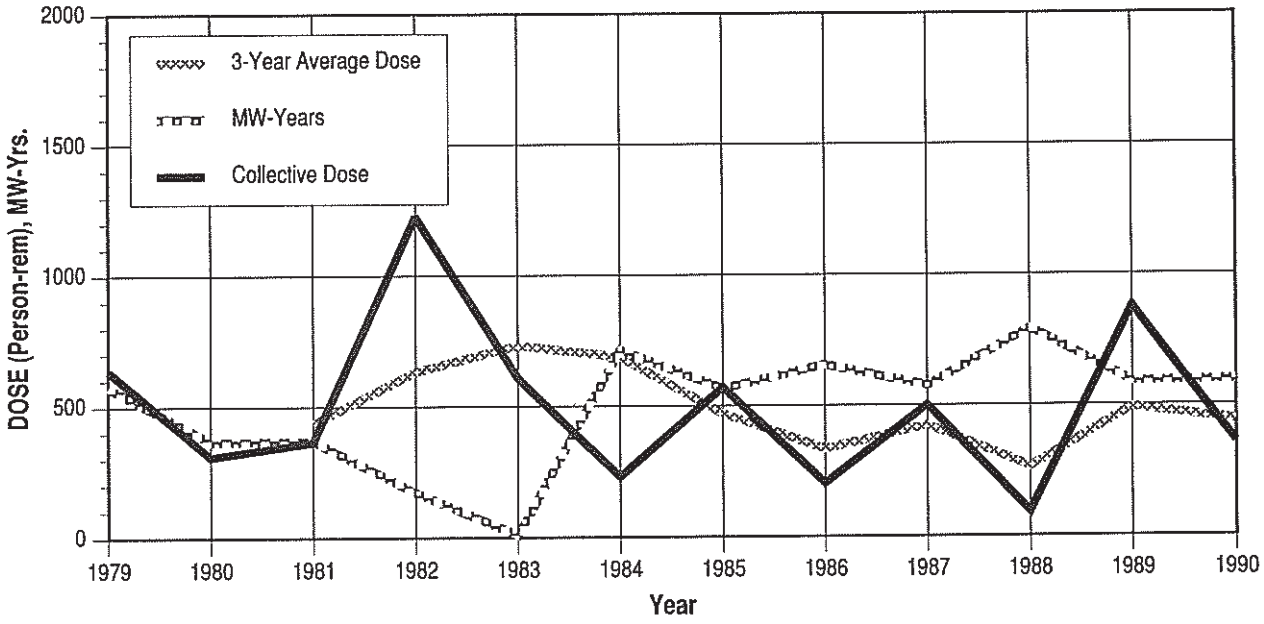
Breakdown by Job Function



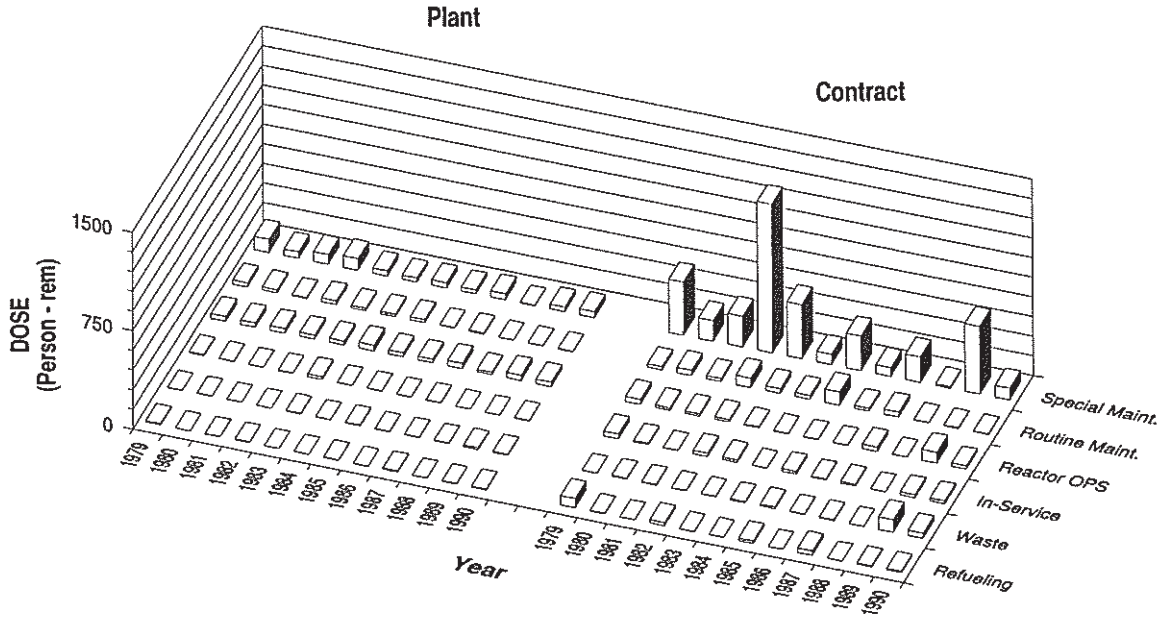
APPENDIX E (continued)

INDIAN POINT 3

Dose-Performance Indicators **PWR**



Breakdown by Job Function

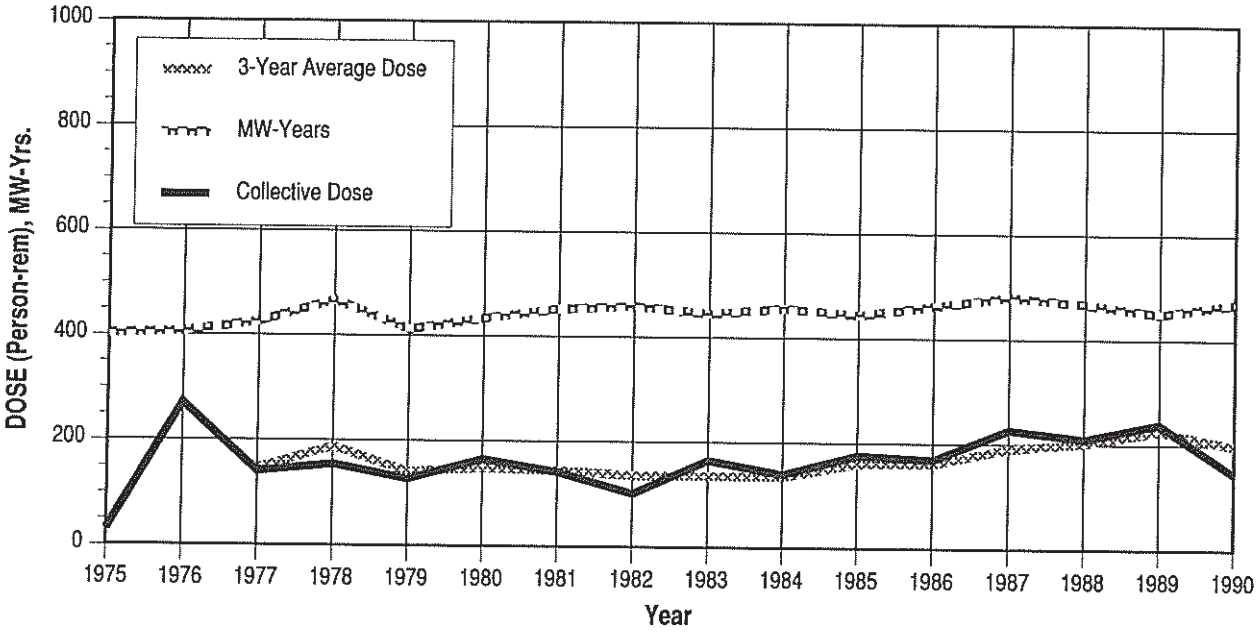


APPENDIX E (continued)

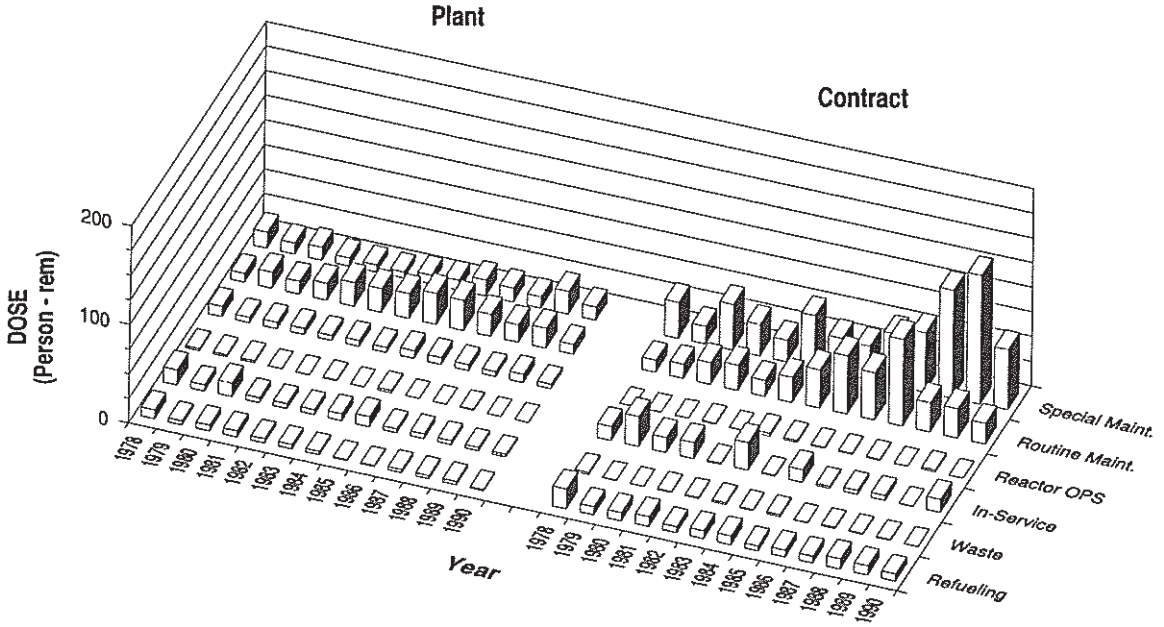
KEWAUNEE

Dose-Performance Indicators

PWR



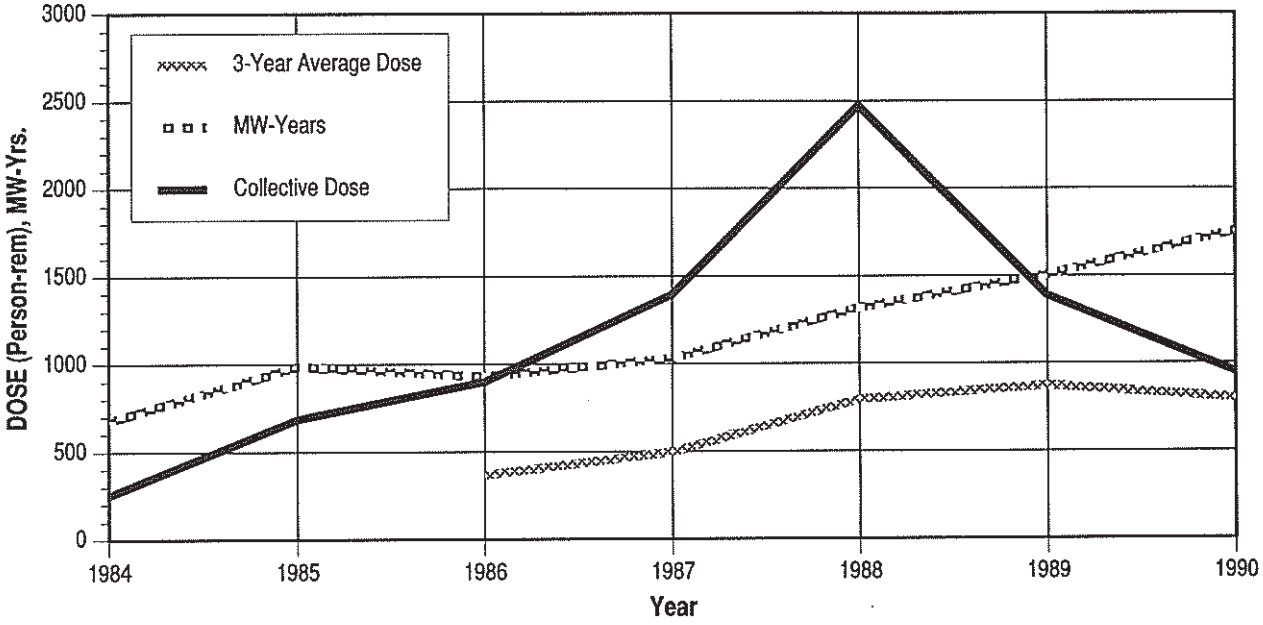
Breakdown by Job Function



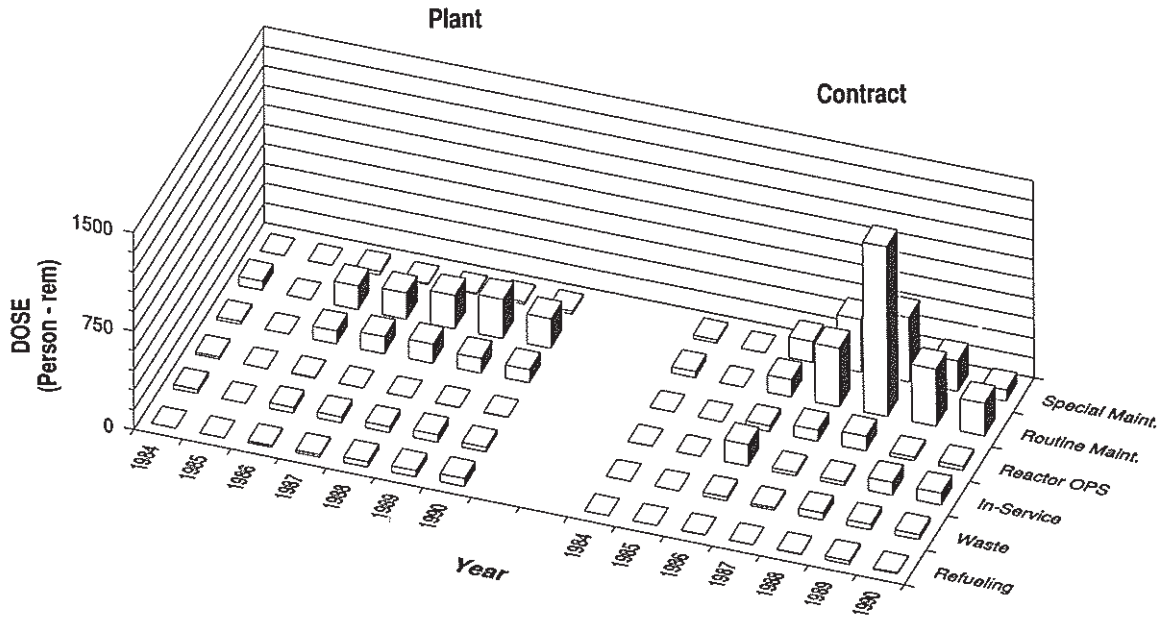
APPENDIX E (continued)

LASALLE 1, 2

Dose-Performance Indicators **BWR**



Breakdown by Job Function

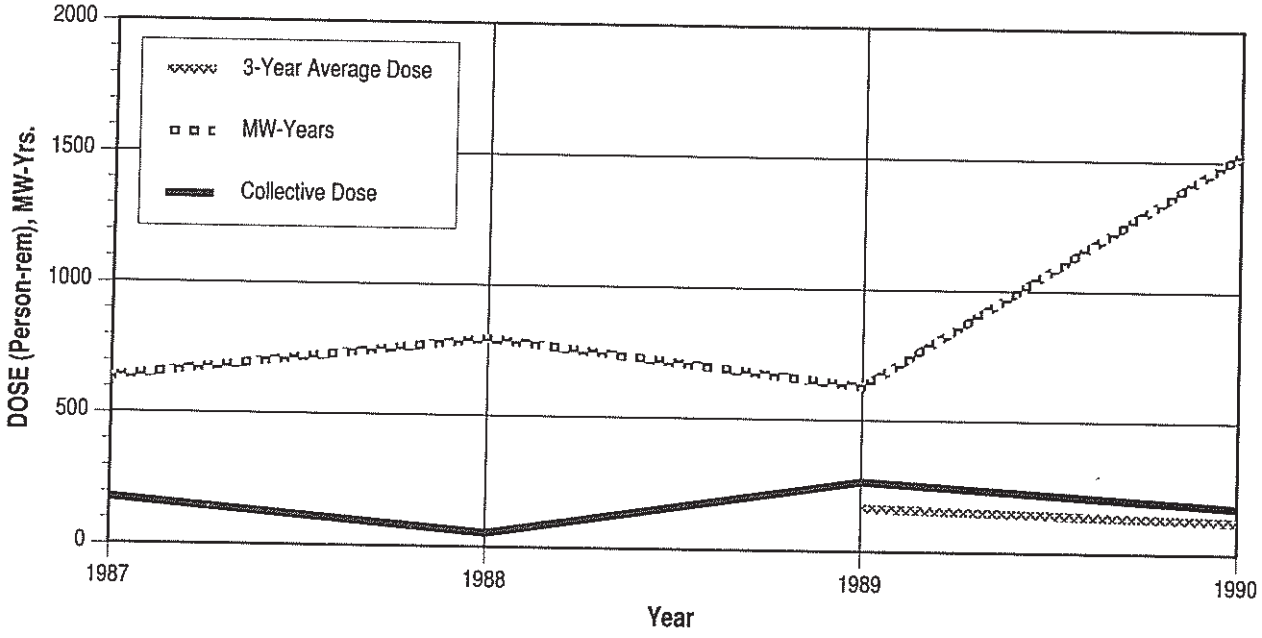


APPENDIX E (continued)

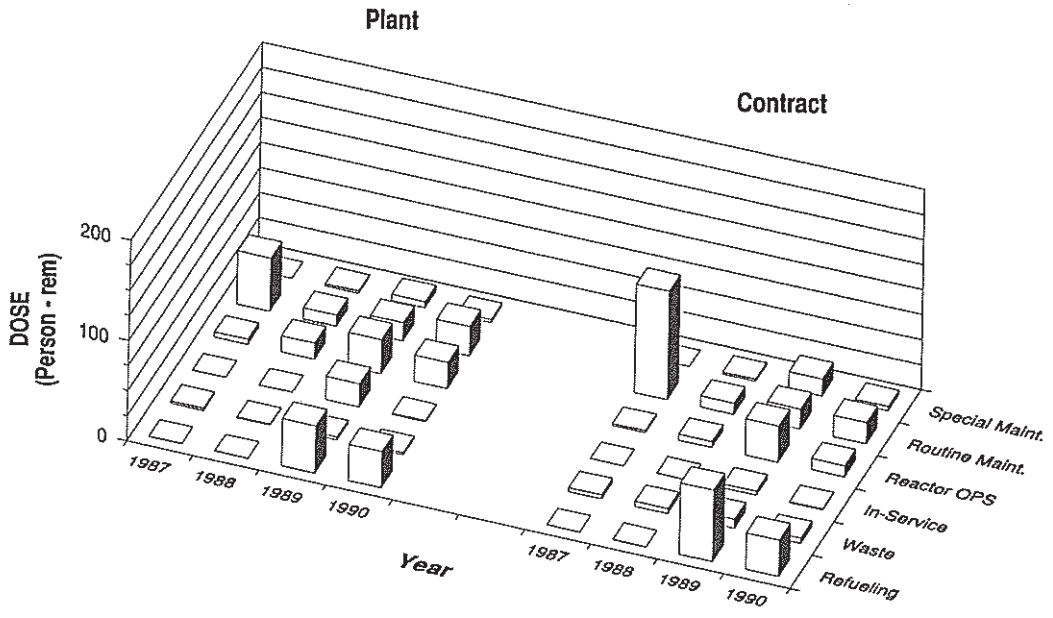
LIMERICK 1, 2

Dose-Performance Indicators

BWR



Breakdown by Job Function

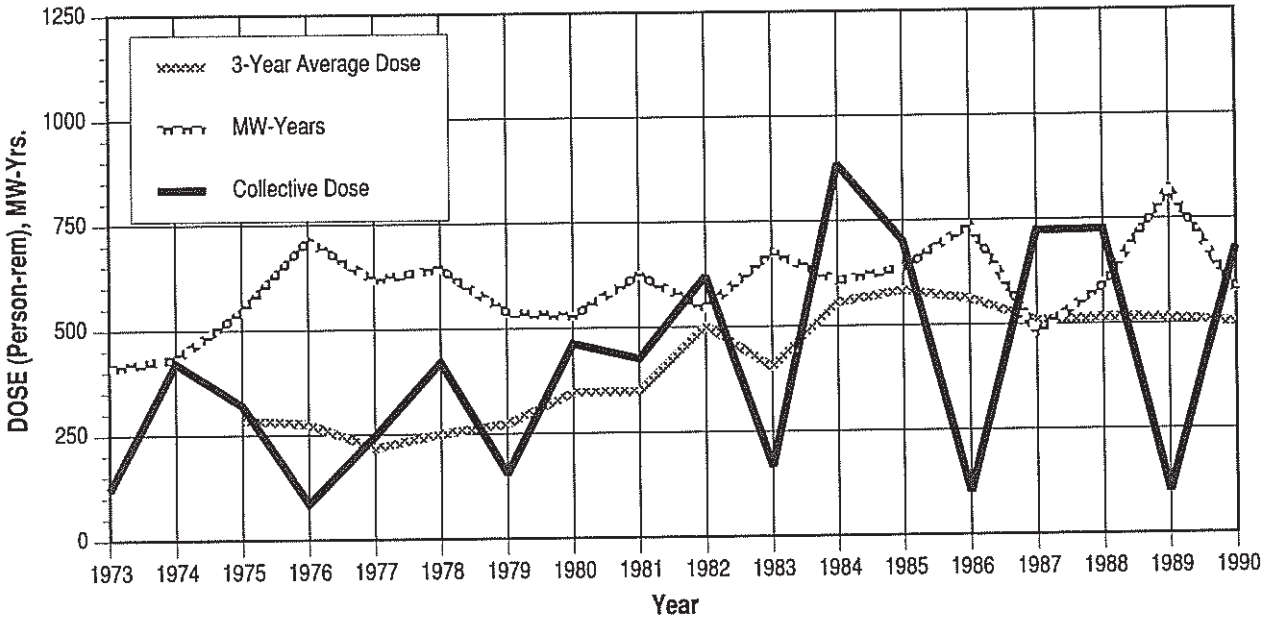


APPENDIX E (continued)

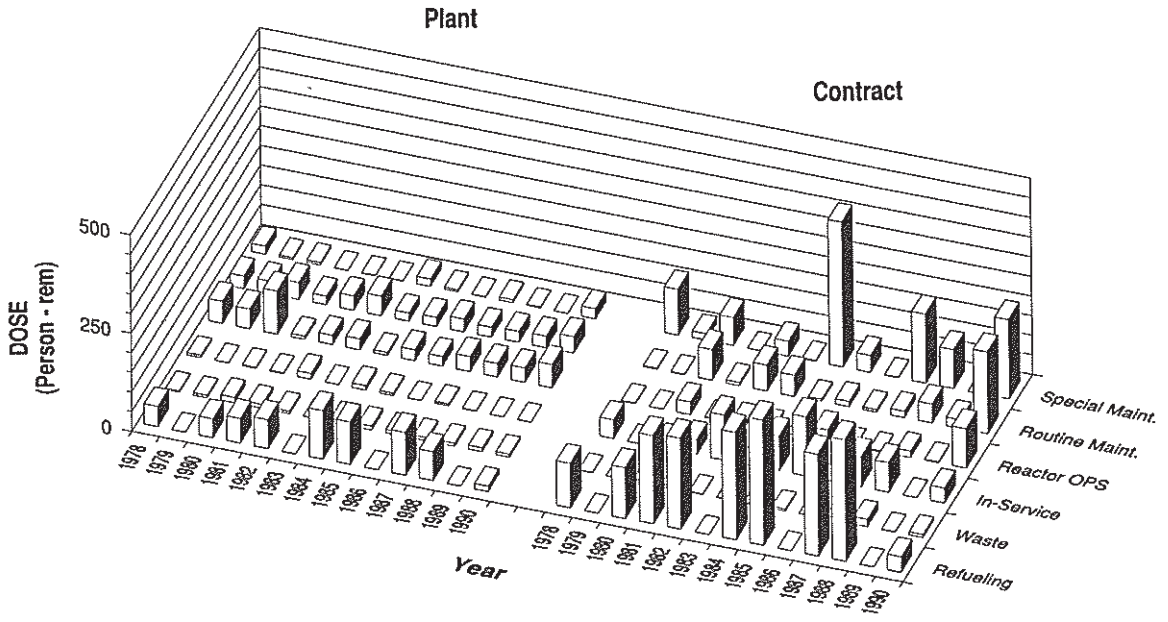
MAINE YANKEE

Dose-Performance Indicators

PWR



Breakdown by Job Function

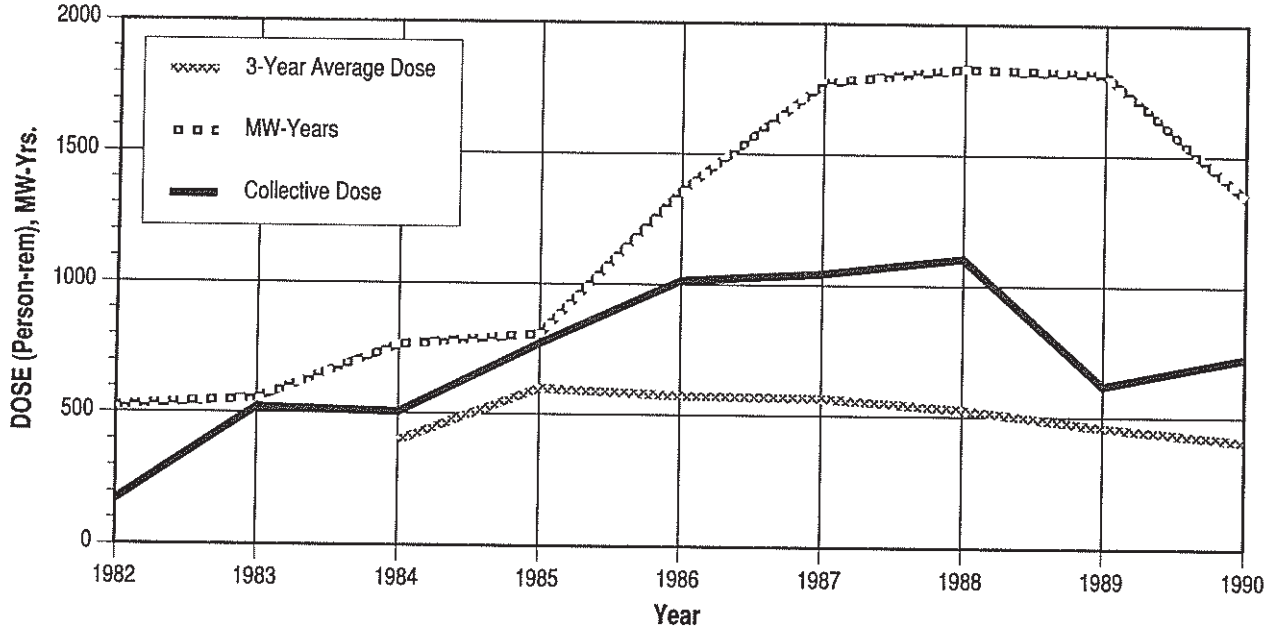


APPENDIX E (continued)

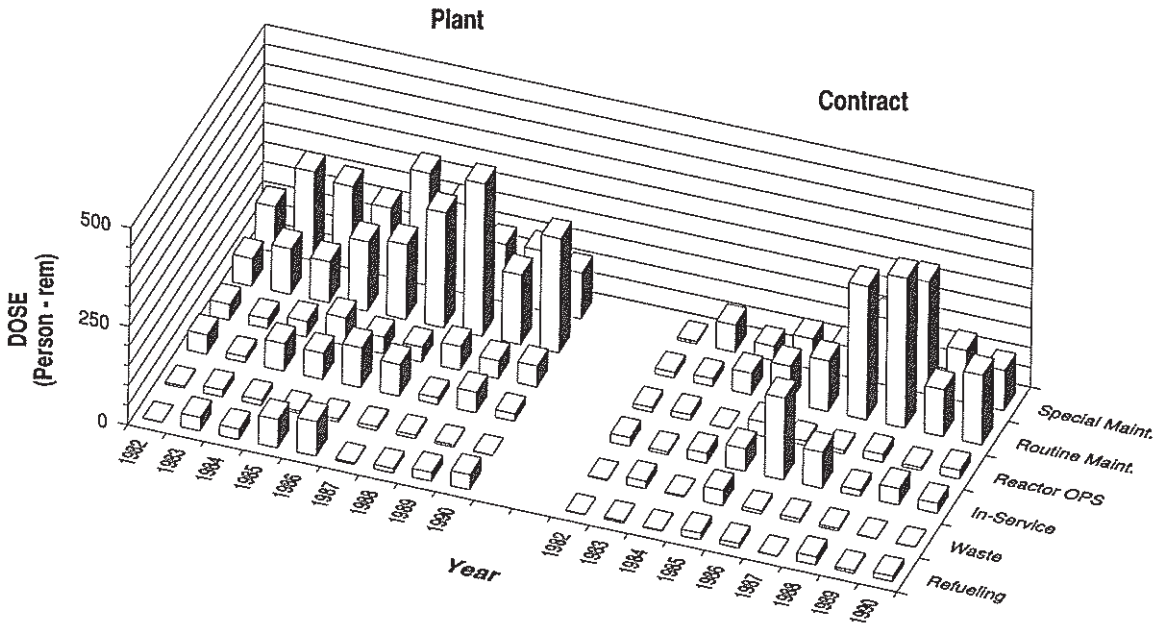
MCGUIRE 1, 2

Dose-Performance Indicators

PWR



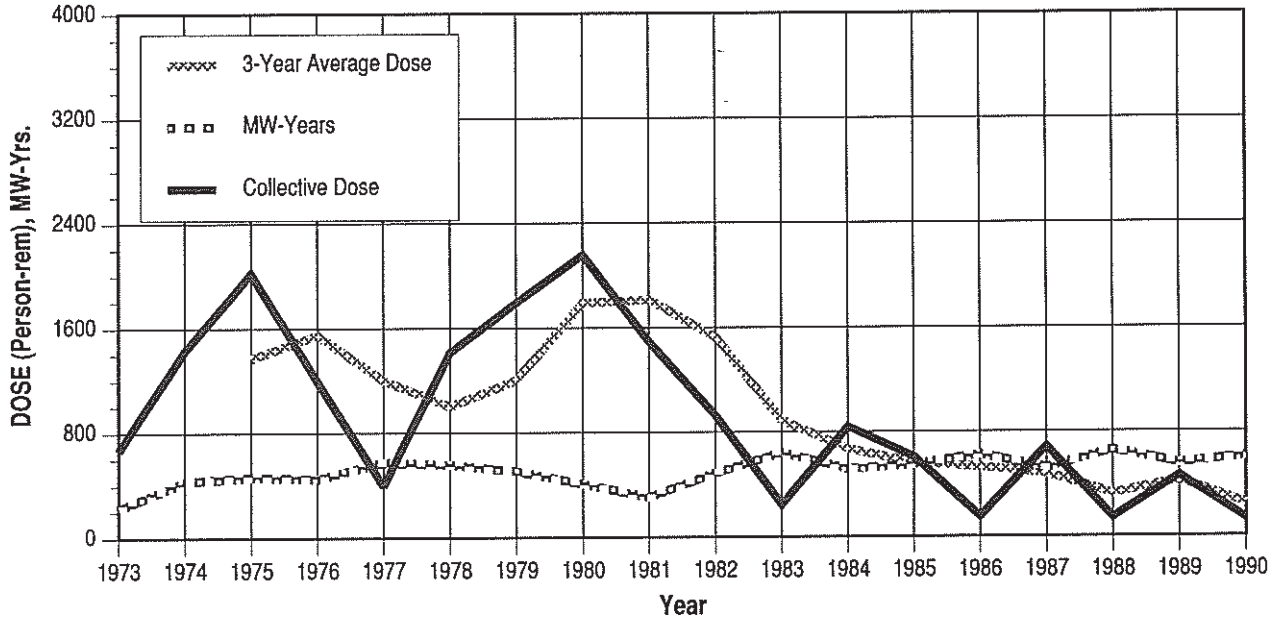
Breakdown by Job Function



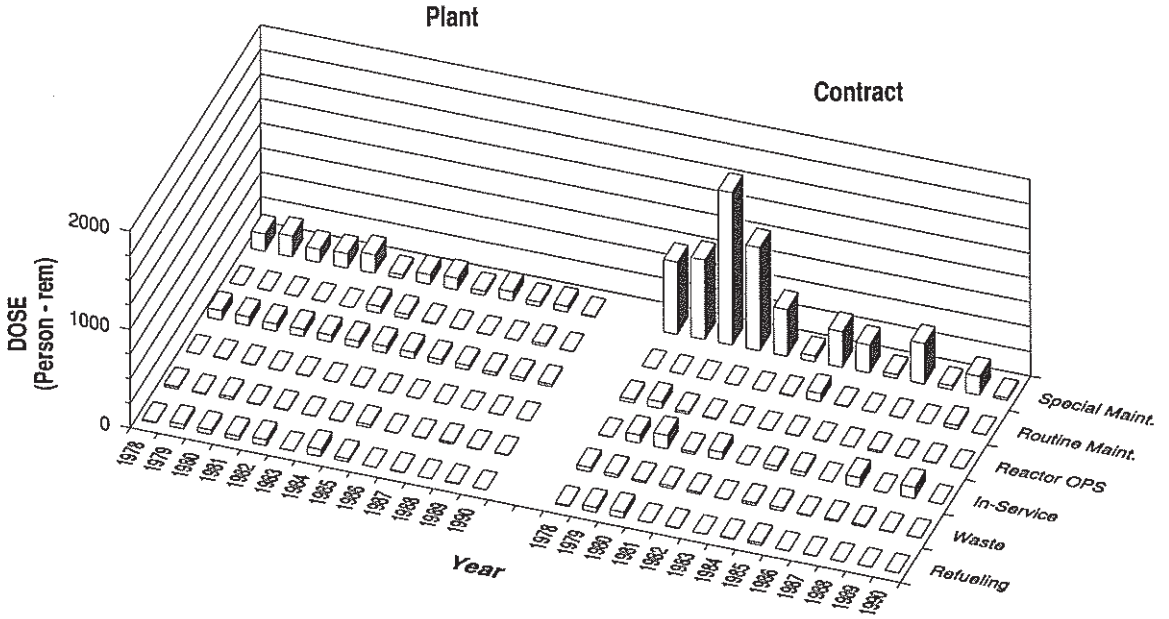
APPENDIX E (continued)

MILLSTONE POINT 1

Dose-Performance Indicators **BWR**



Breakdown by Job Function

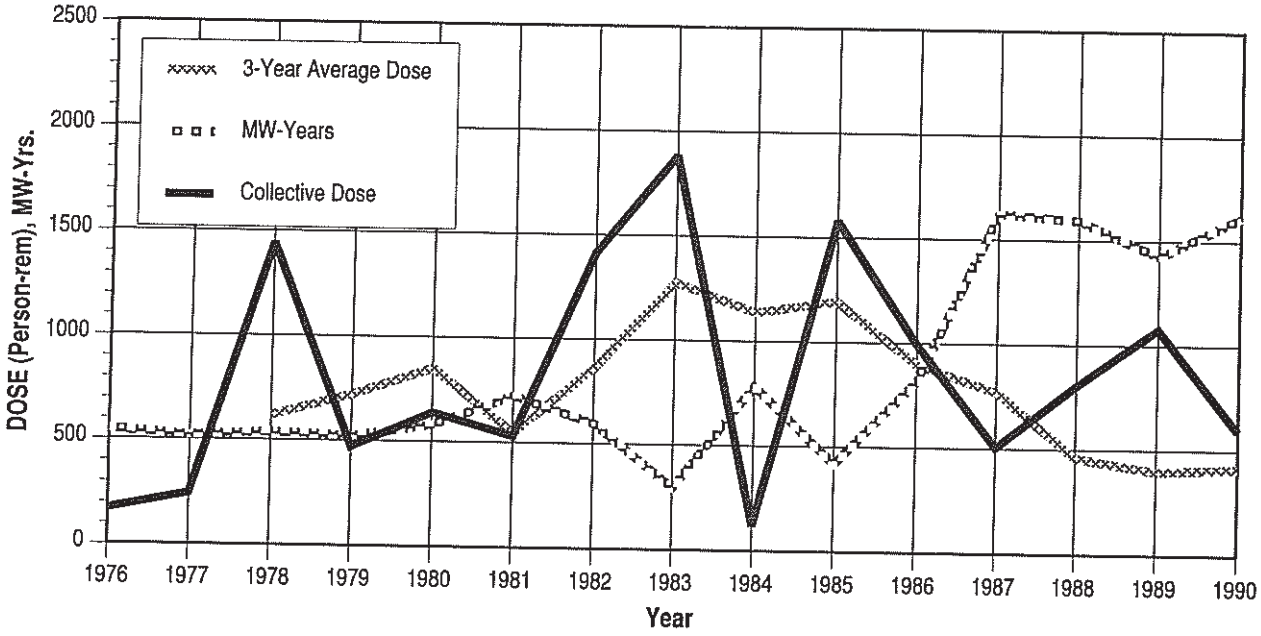


APPENDIX E (continued)

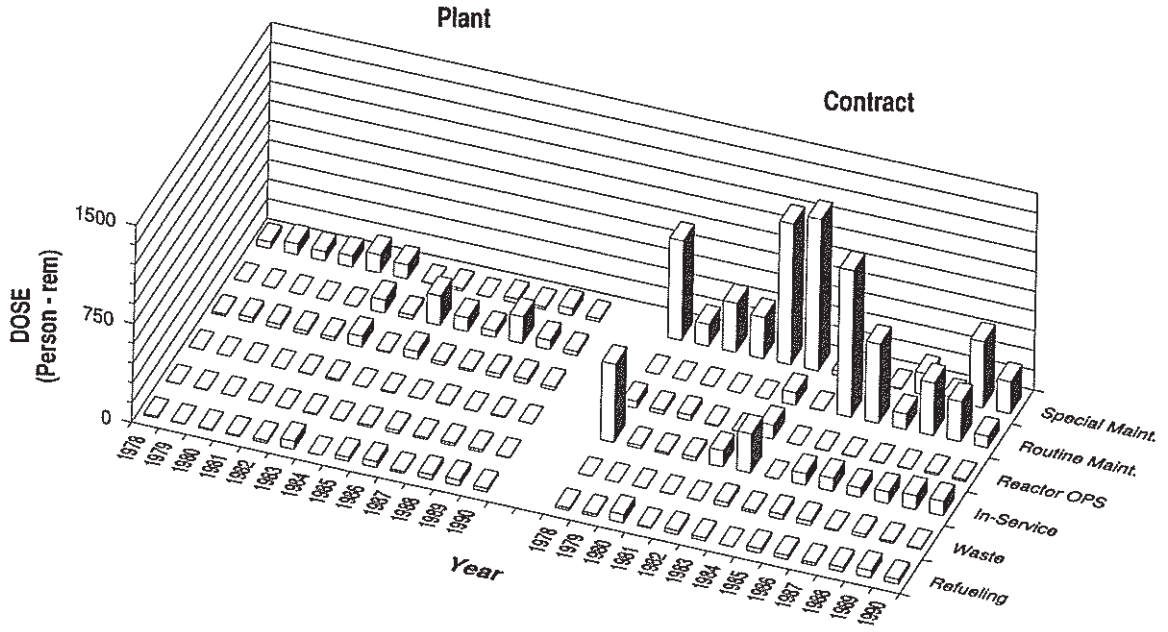
MILLSTONE POINT 2, 3

Dose-Performance Indicators

PWR



Breakdown by Job Function

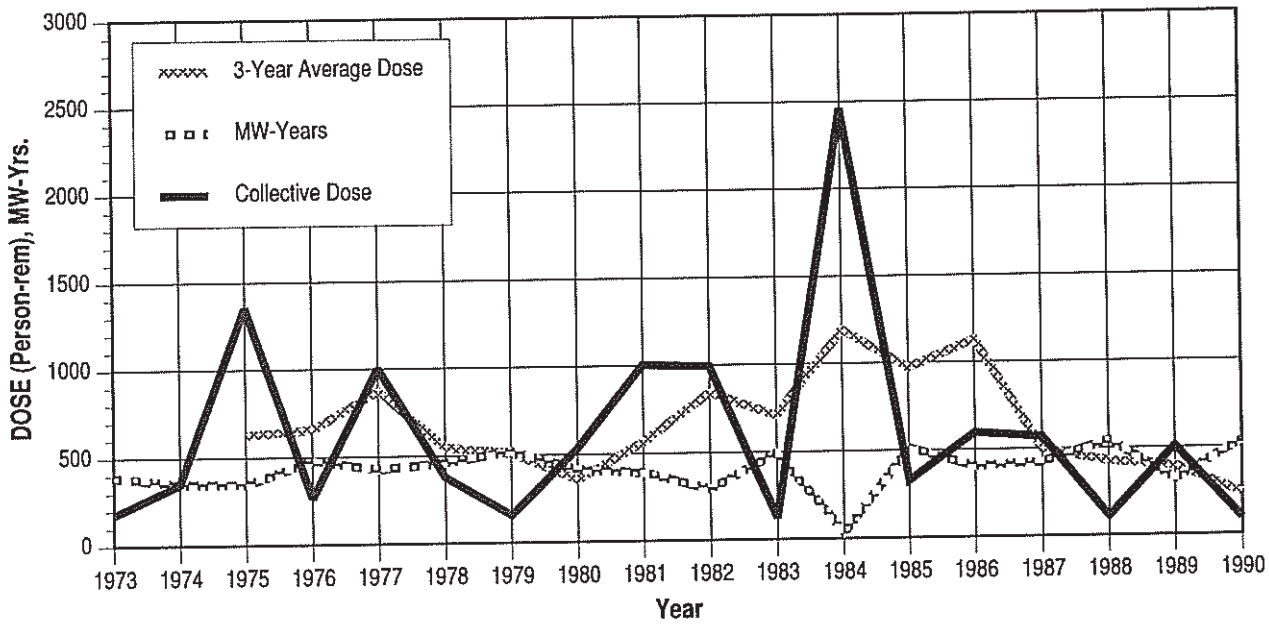


APPENDIX E (continued)

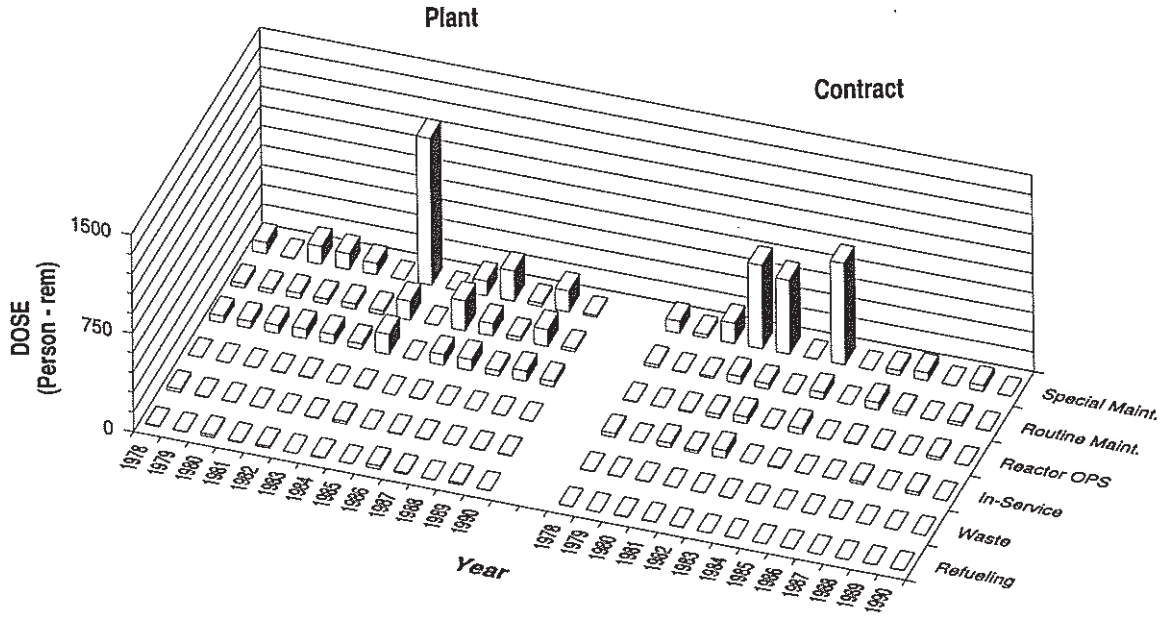
MONTICELLO

Dose-Performance Indicators

BWR



Breakdown by Job Function

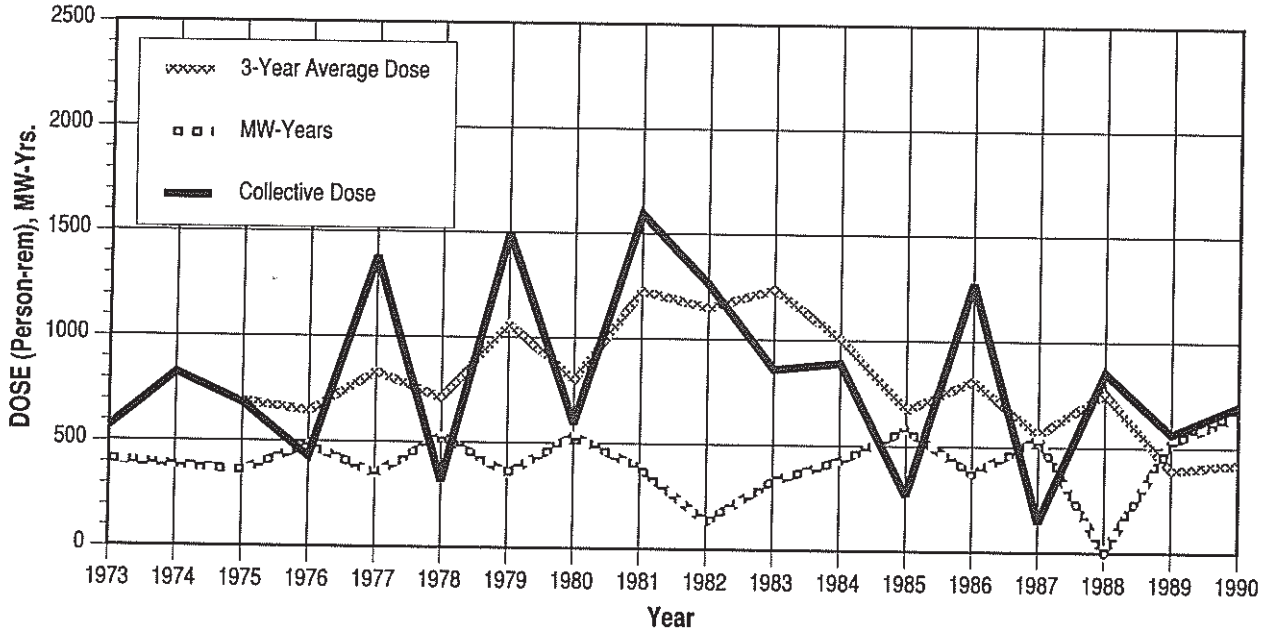


APPENDIX E (continued)

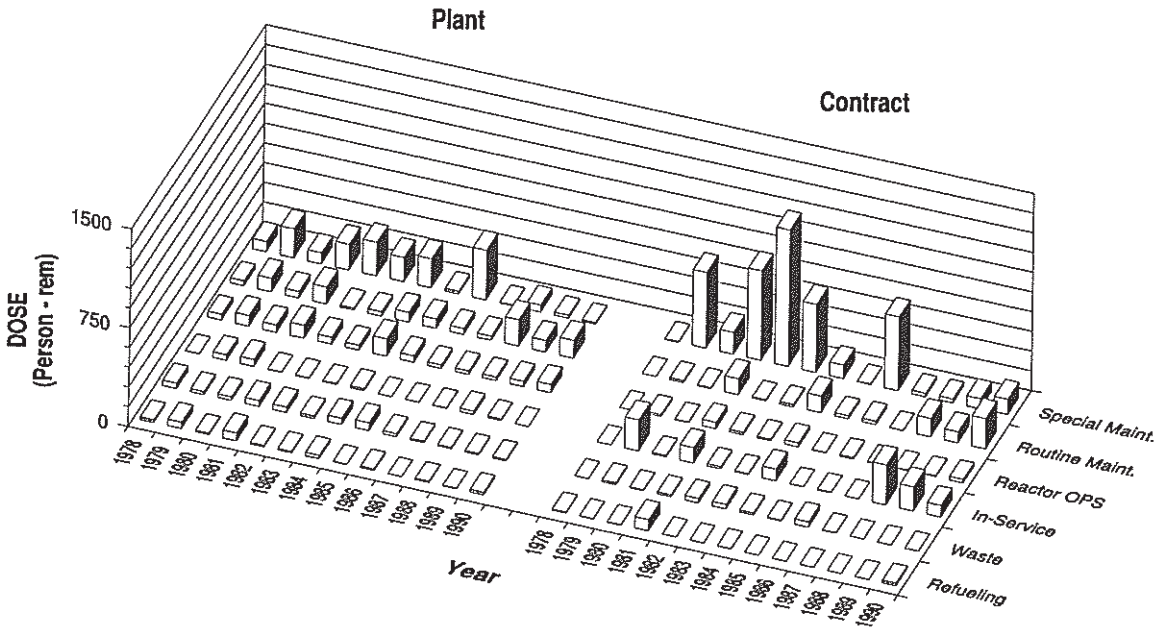
NINE MILE POINT 1, 2

Dose-Performance Indicators

BWR



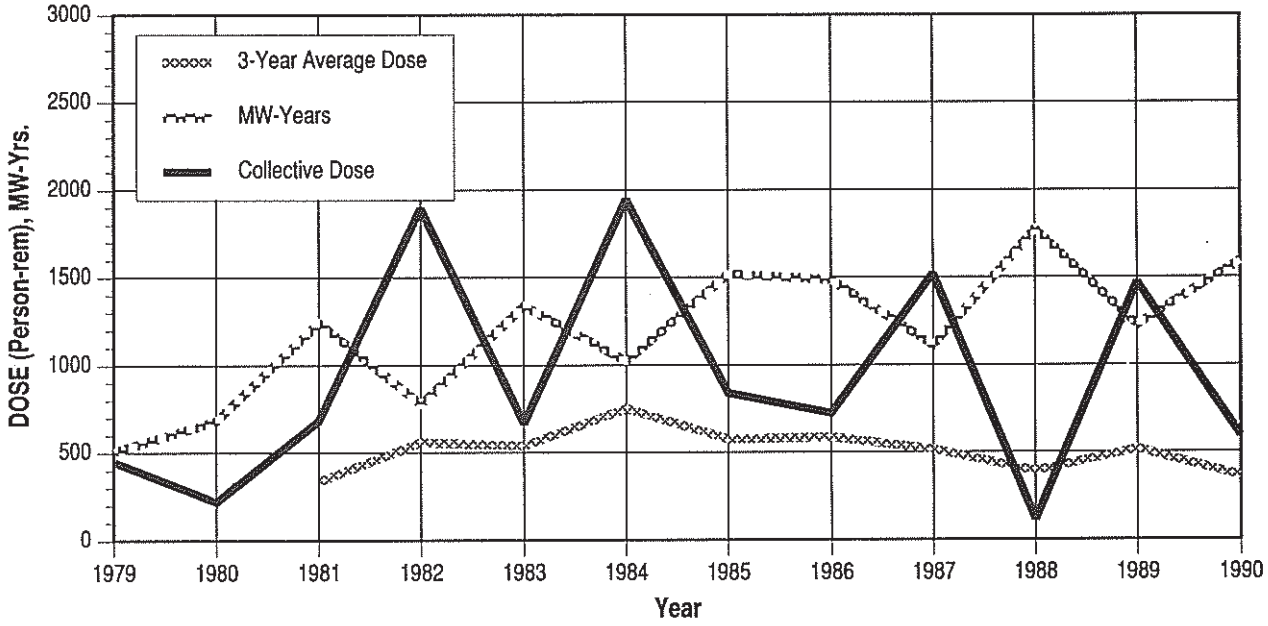
Breakdown by Job Function



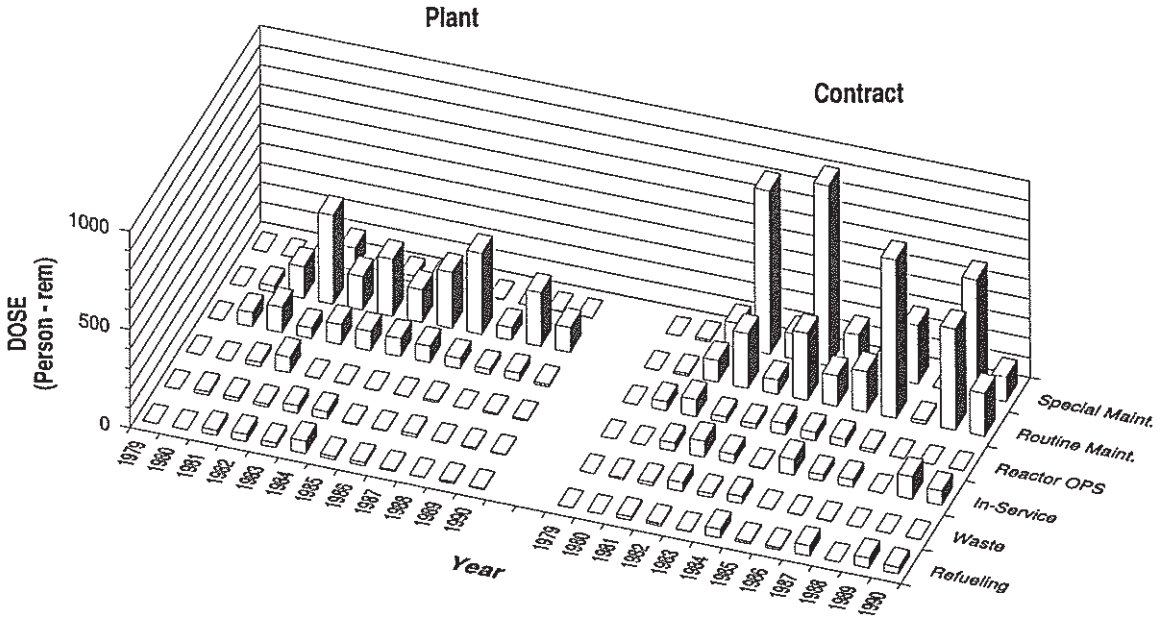
APPENDIX E (continued)

NORTH ANNA 1, 2

Dose-Performance Indicators **PWR**



Breakdown by Job Function

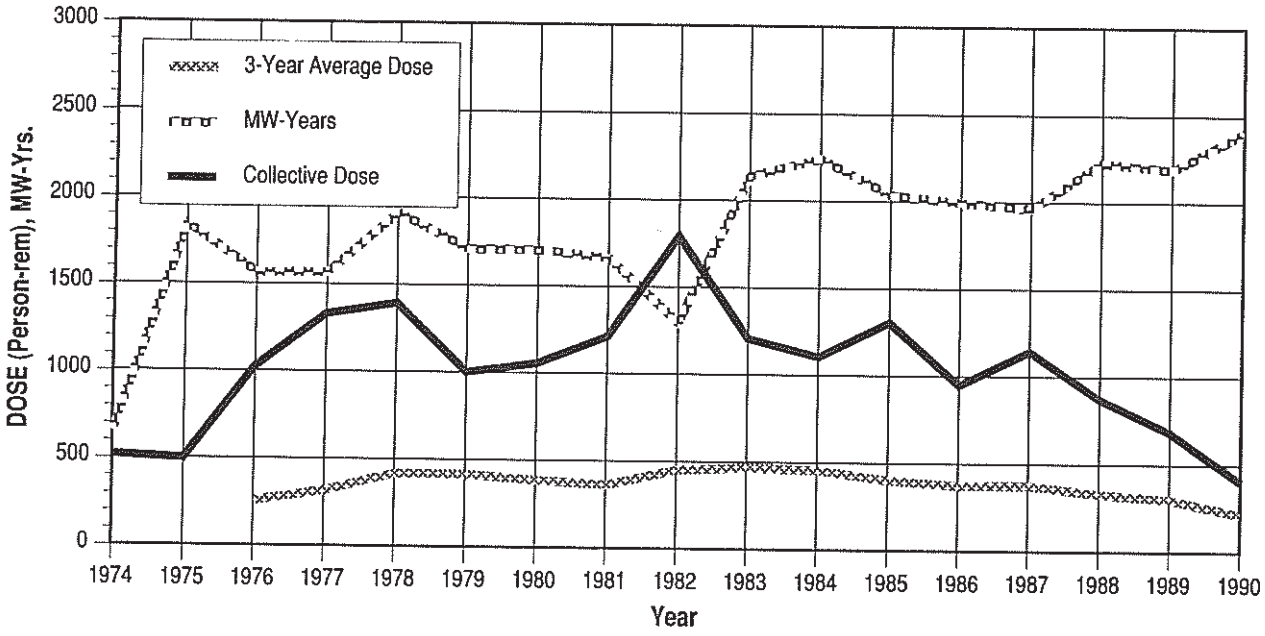


APPENDIX E (continued)

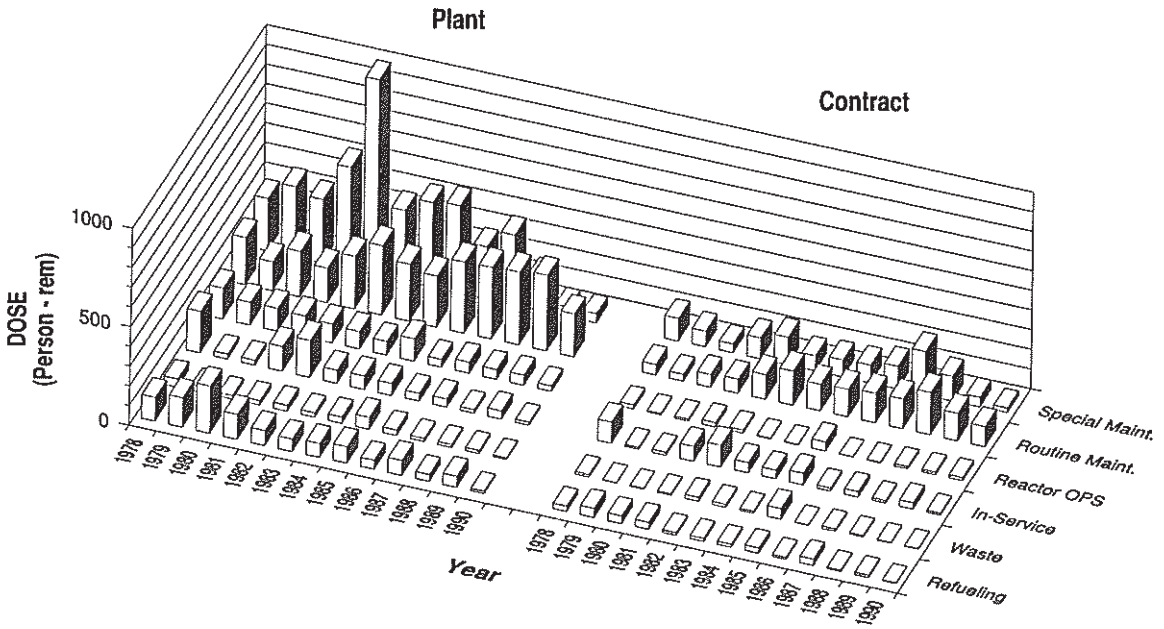
OCONEE 1, 2, 3

Dose-Performance Indicators

PWR



Breakdown by Job Function

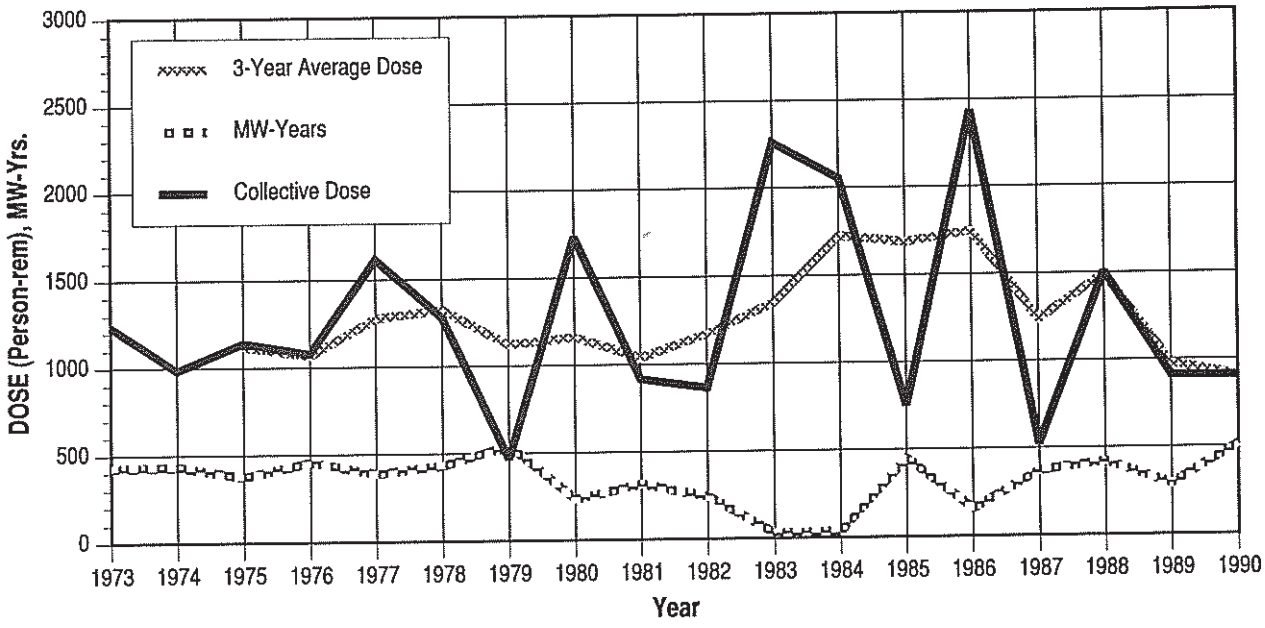


APPENDIX E (continued)

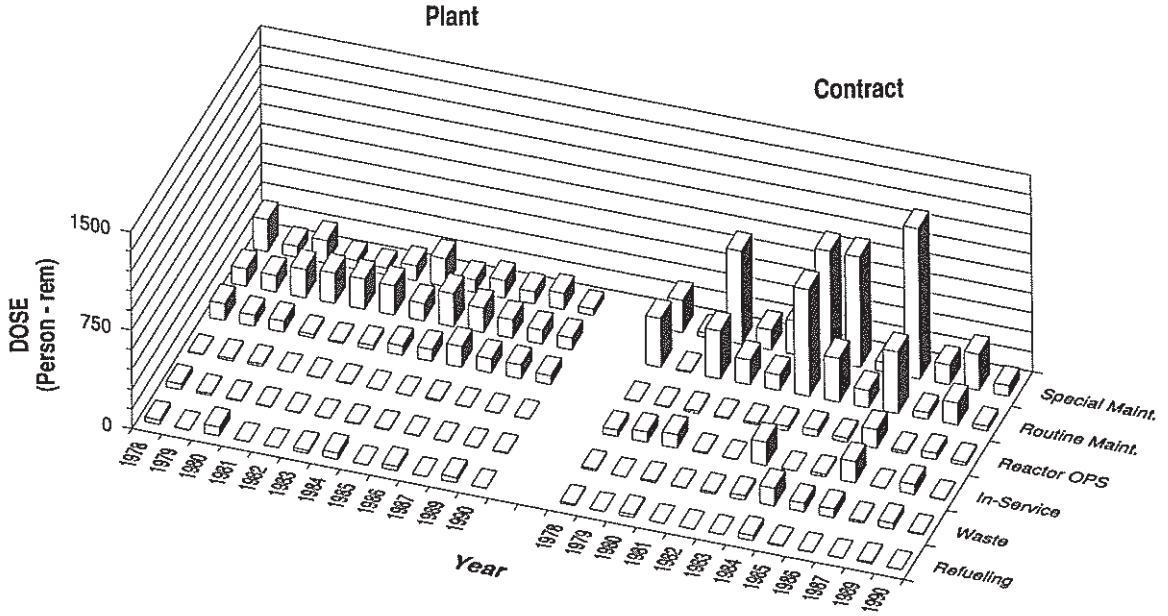
OYSTER CREEK

Dose-Performance Indicators

BWR



Breakdown by Job Function

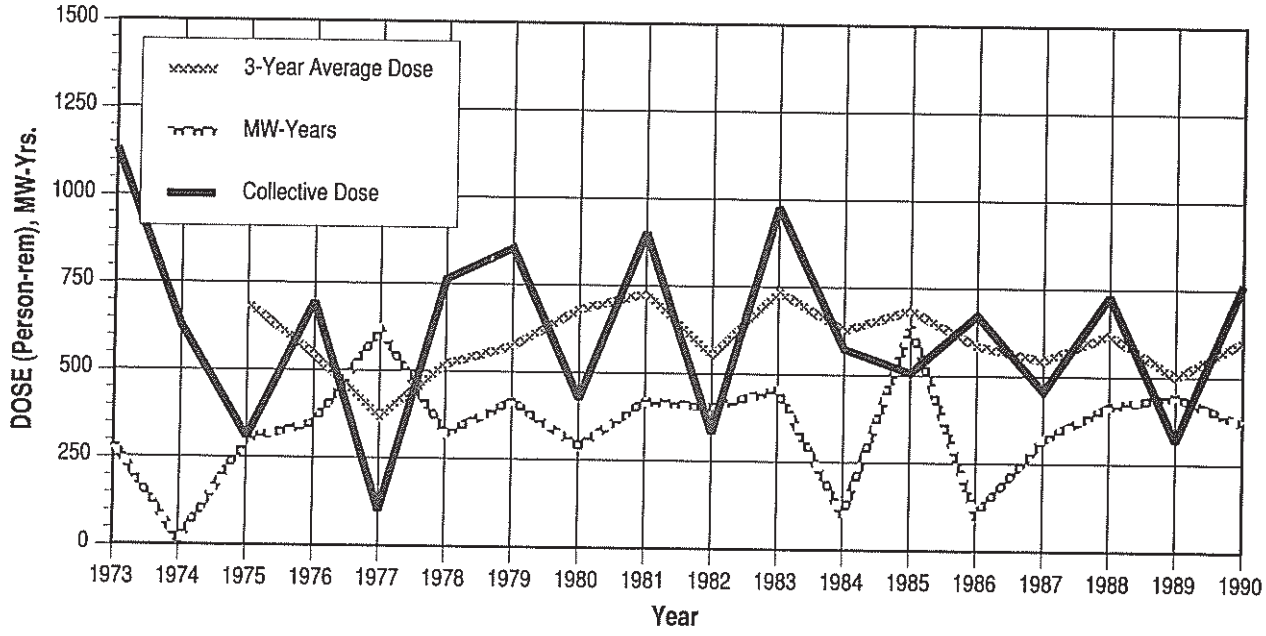


APPENDIX E (continued)

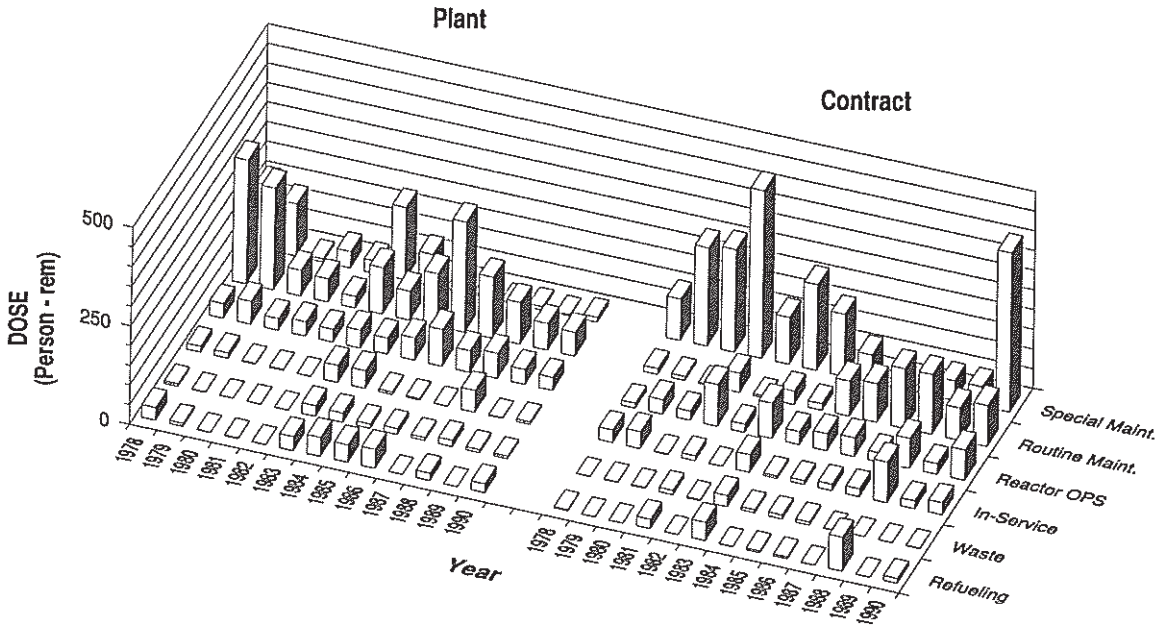
PALISADES

Dose-Performance Indicators

PWR



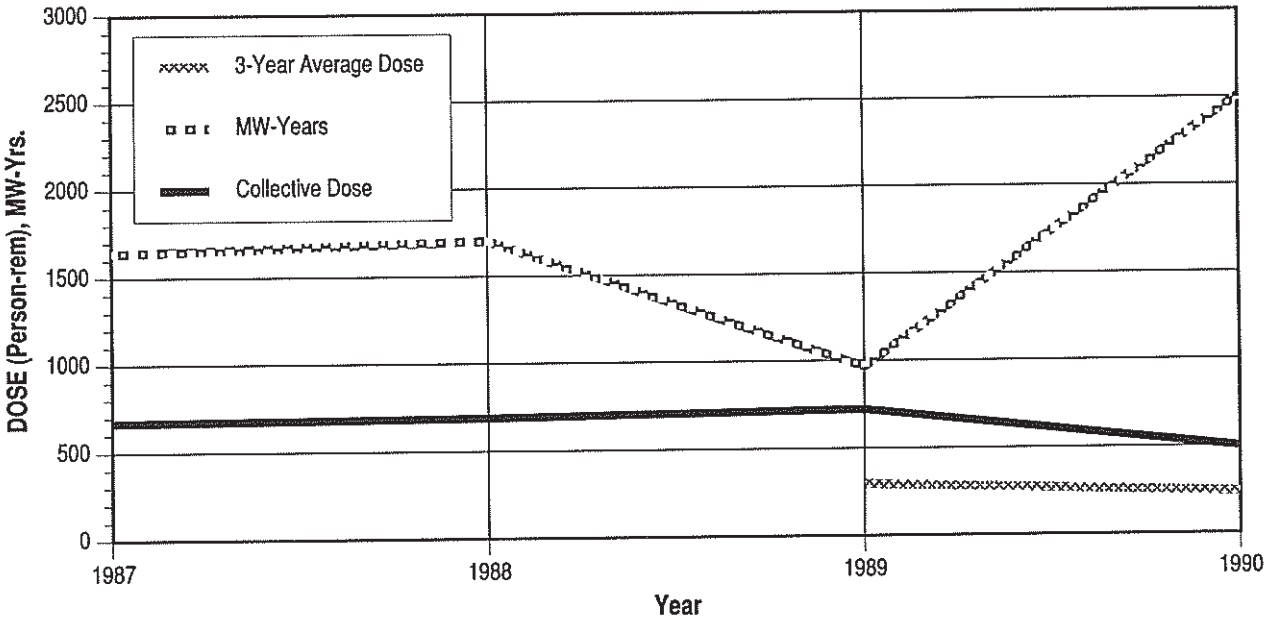
Breakdown by Job Function



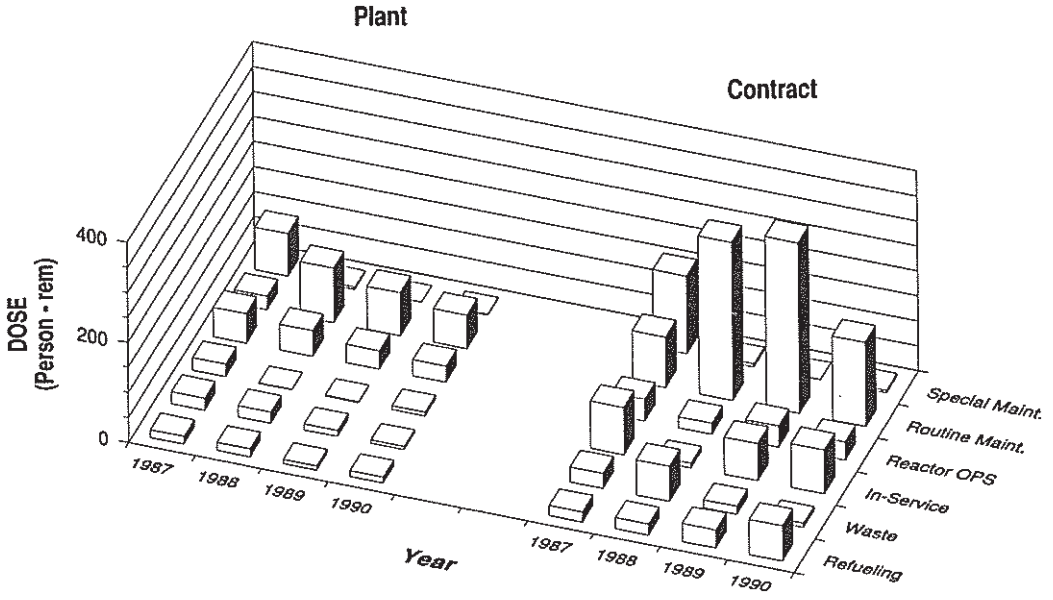
APPENDIX E (continued)

PALO VERDE 1, 2, 3

Dose-Performance Indicators **PWR**



Breakdown by Job Function

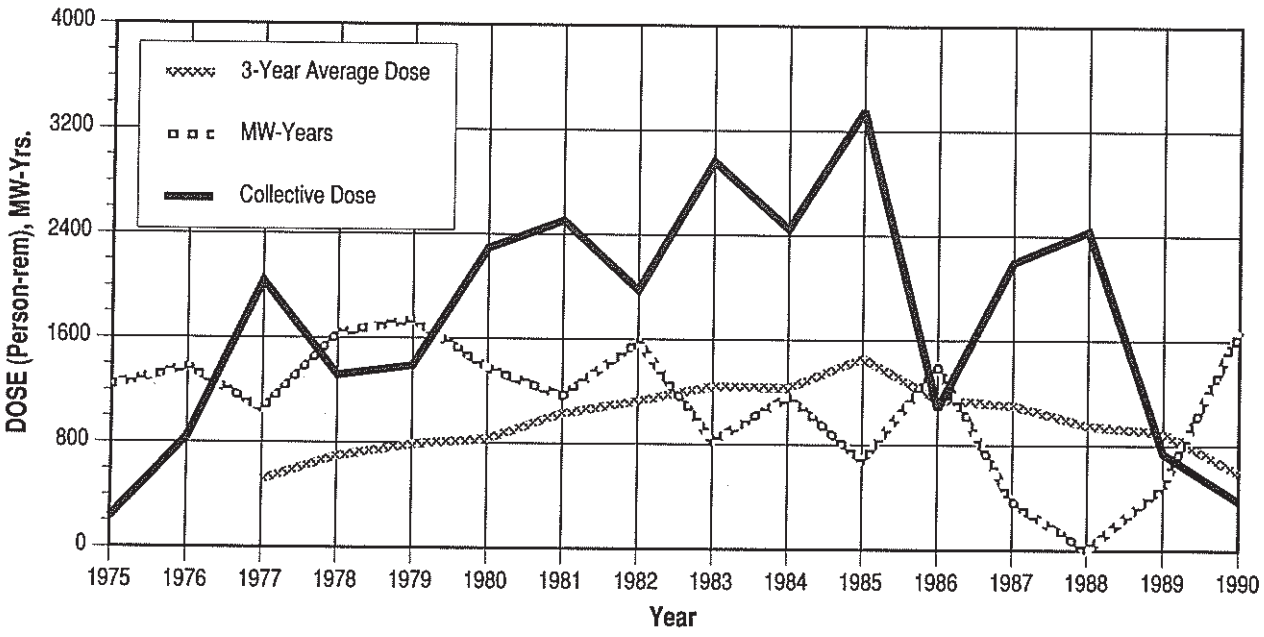


APPENDIX E (continued)

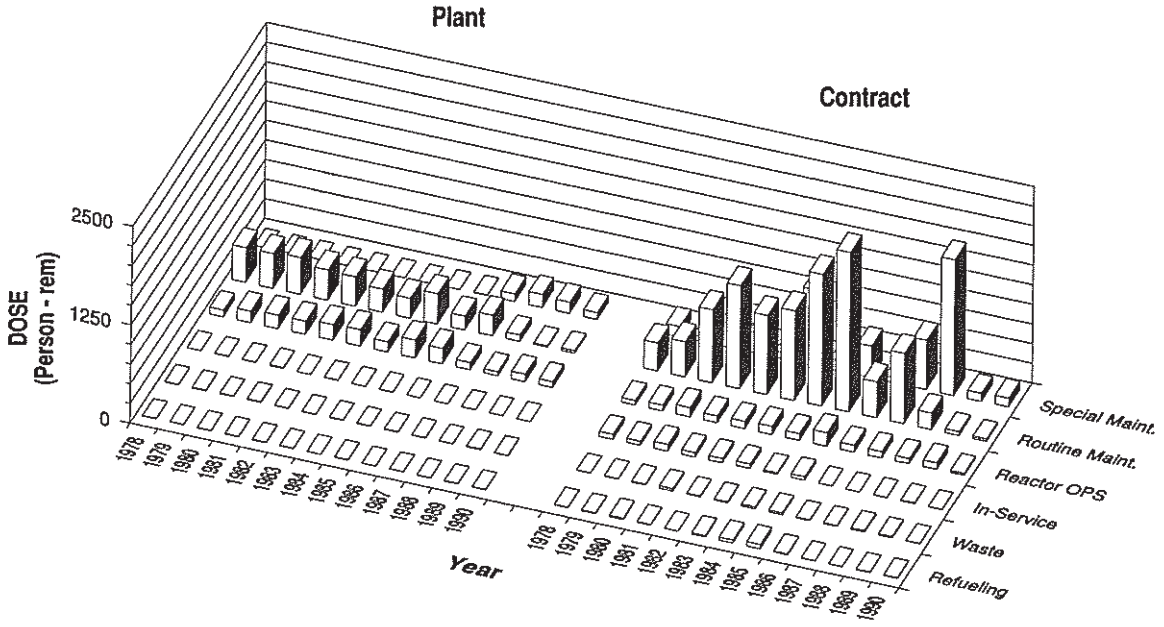
PEACH BOTTOM 2, 3

Dose-Performance Indicators

BWR



Breakdown by Job Function

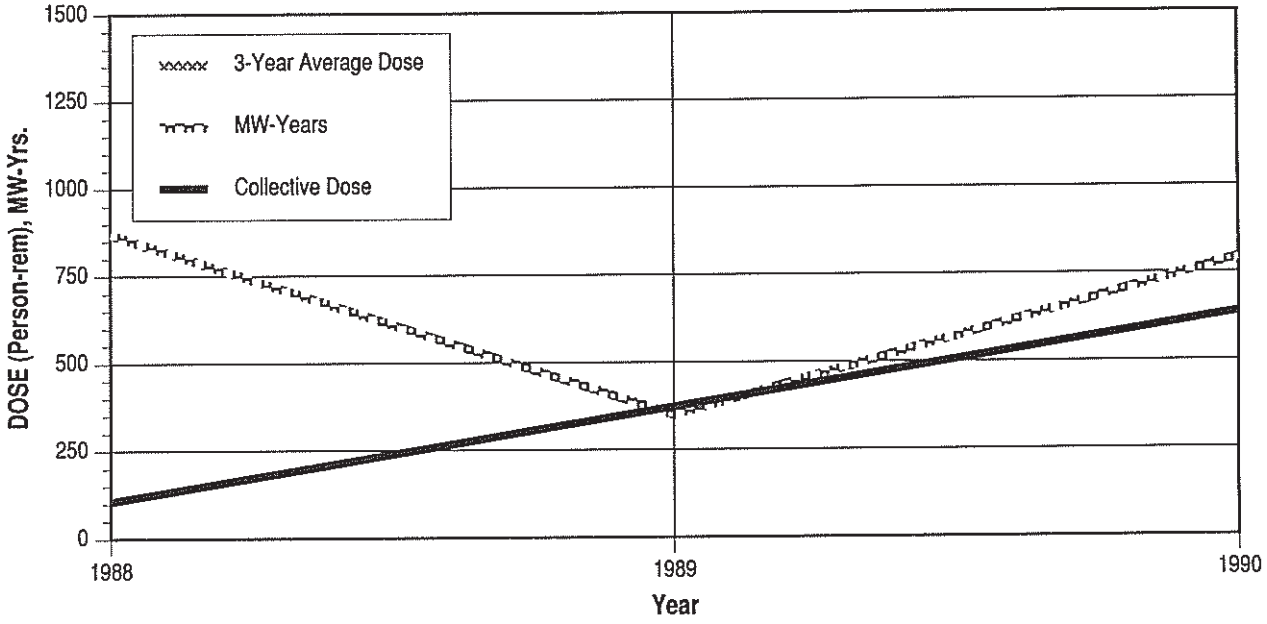


APPENDIX E (continued)

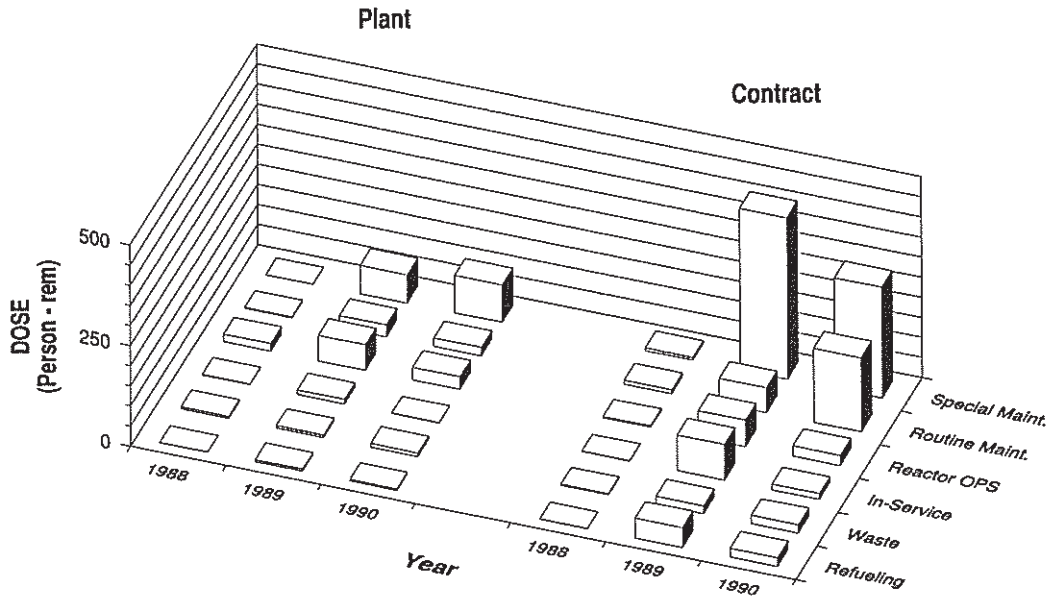
PERRY

Dose-Performance Indicators

BWR



Breakdown by Job Function

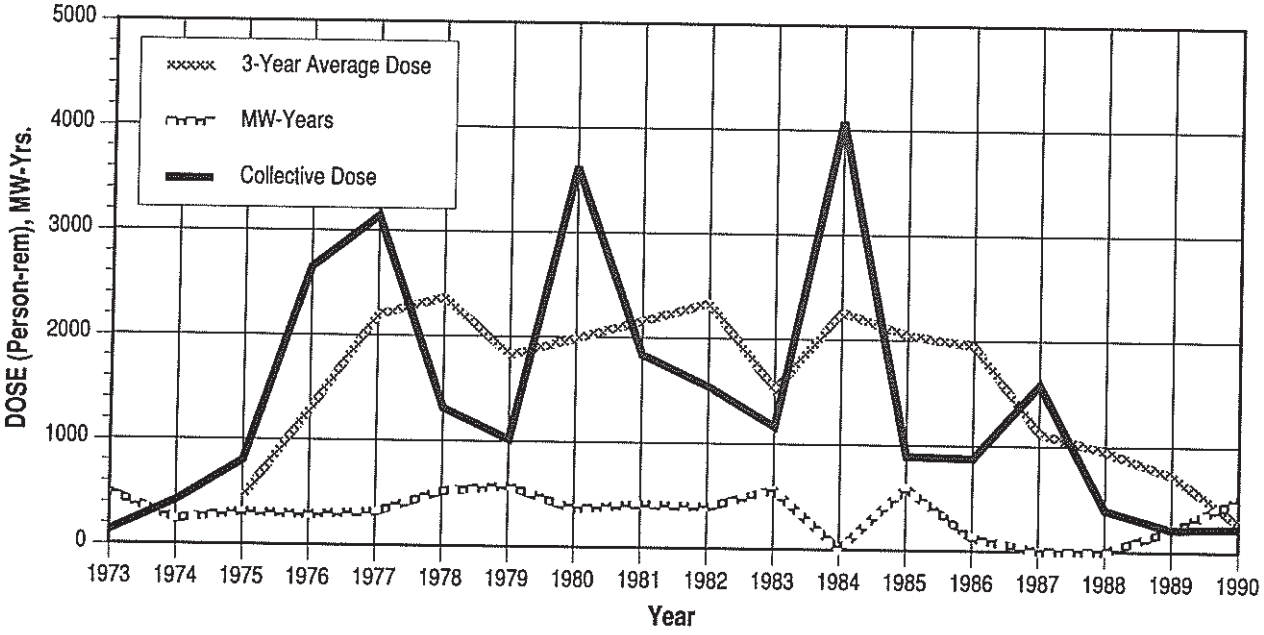


APPENDIX E (continued)

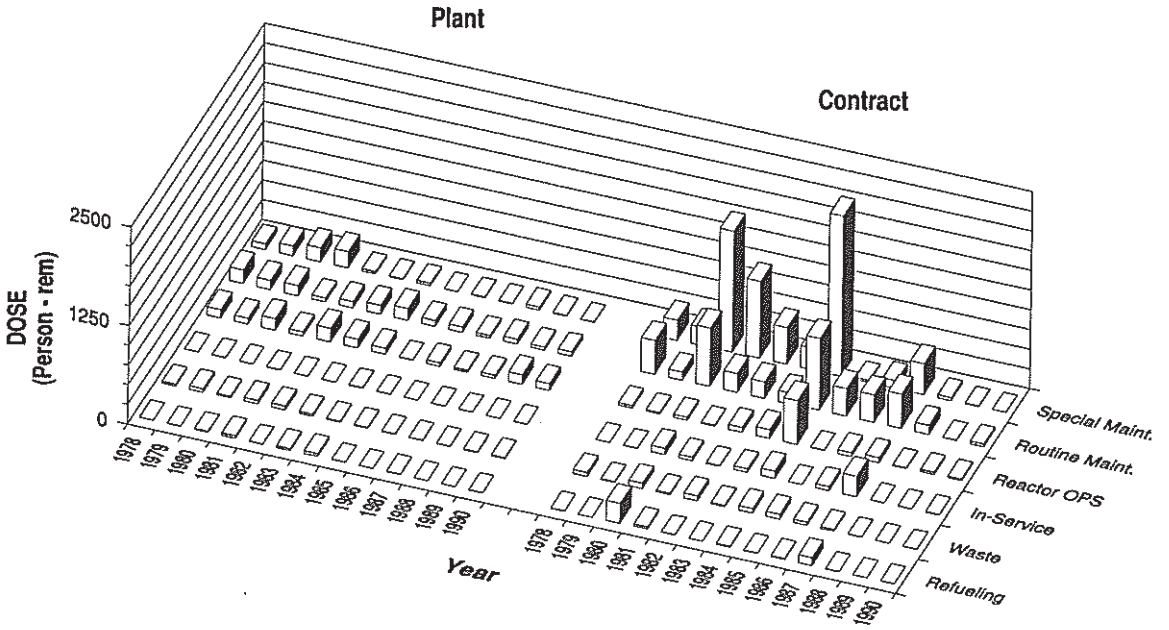
PILGRIM

Dose-Performance Indicators

BWR



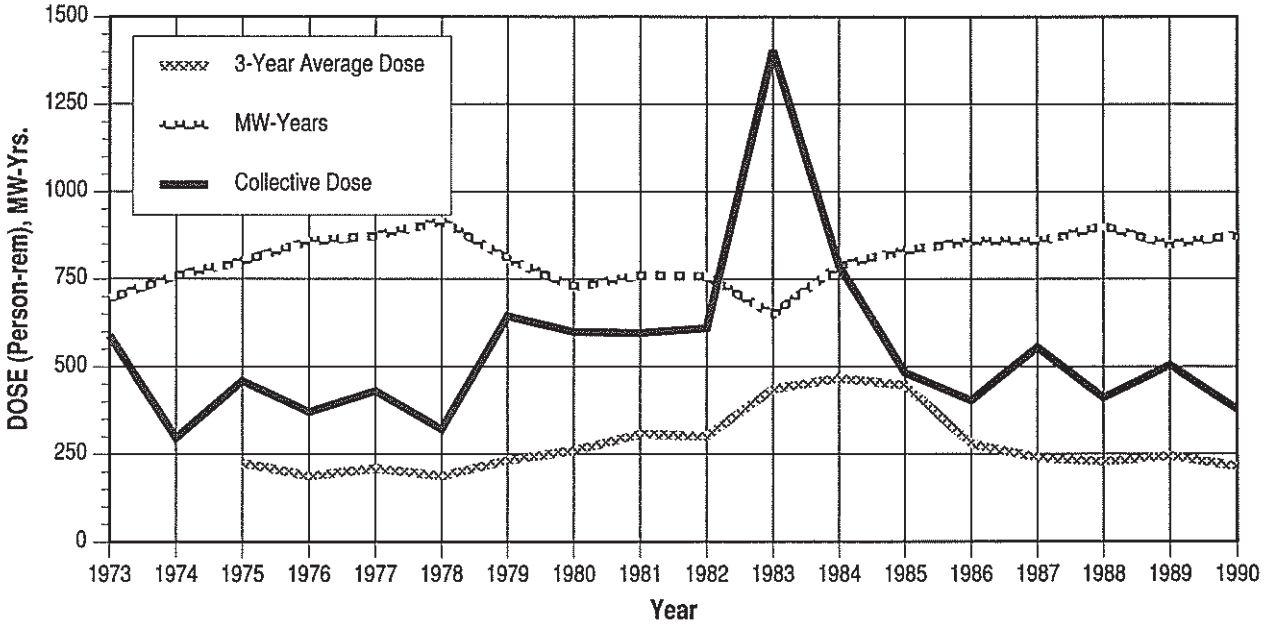
Breakdown by Job Function



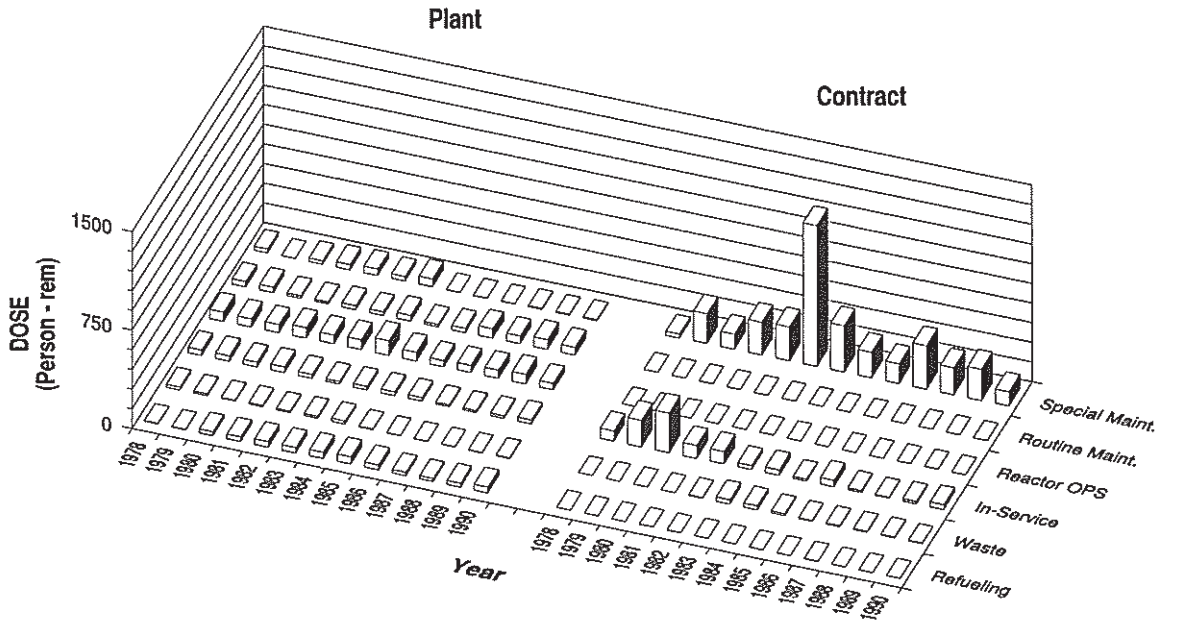
APPENDIX E (continued)

POINT BEACH 1, 2

Dose-Performance Indicators **PWR**



Breakdown by Job Function

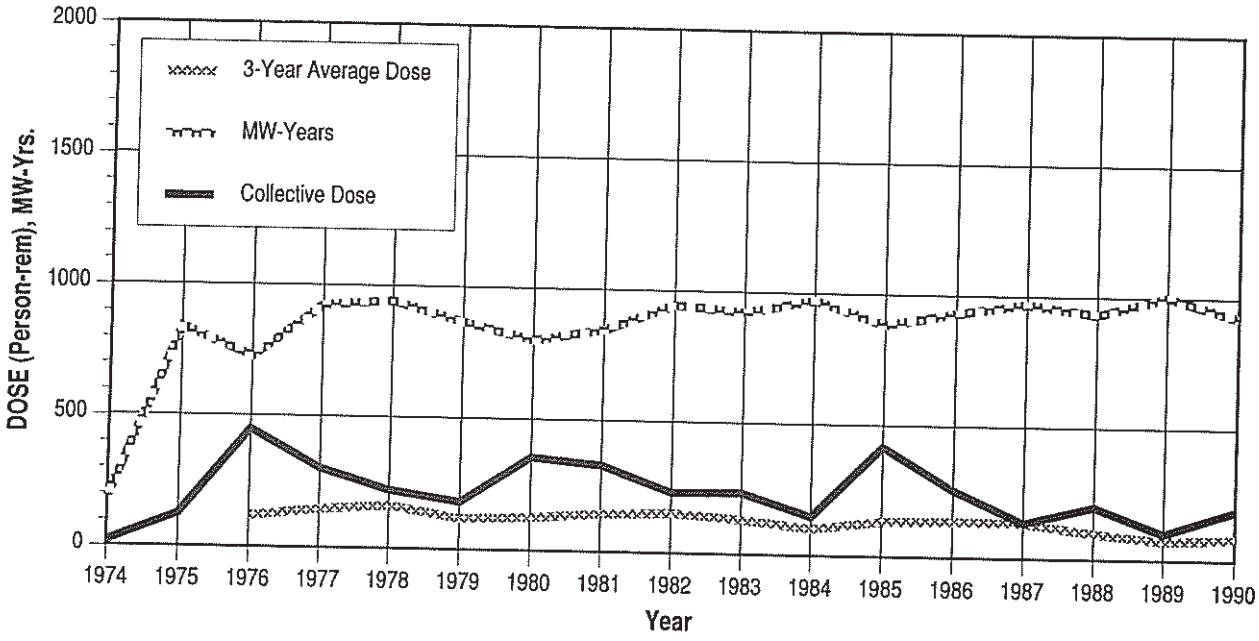


APPENDIX E (continued)

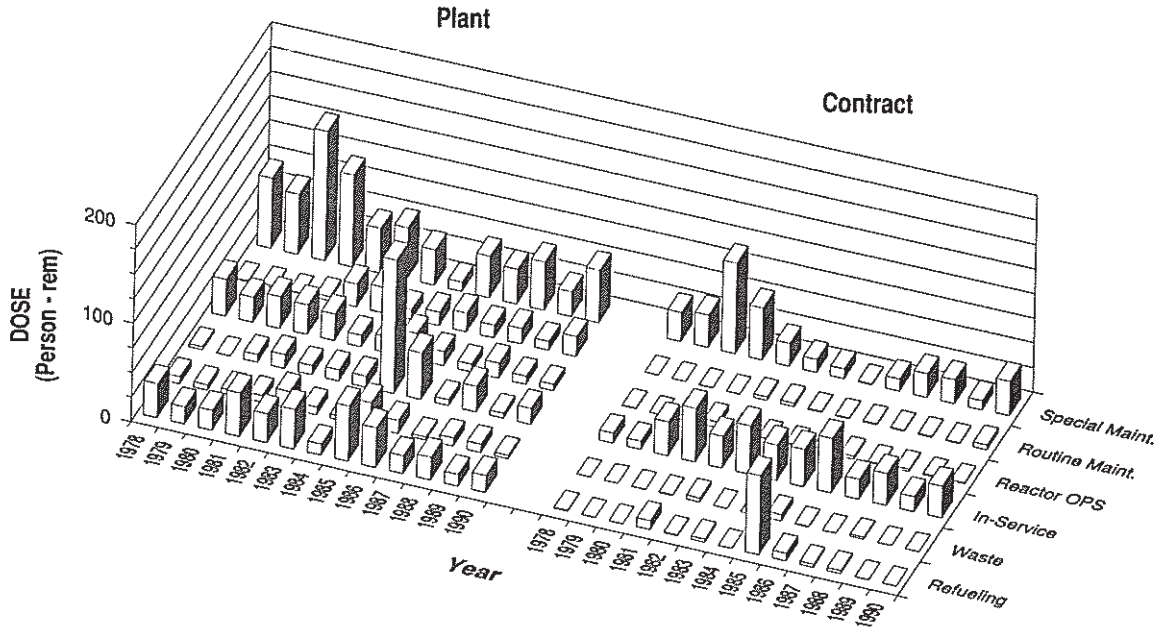
PRAIRIE ISLAND 1, 2

Dose-Performance Indicators

PWR



Breakdown by Job Function

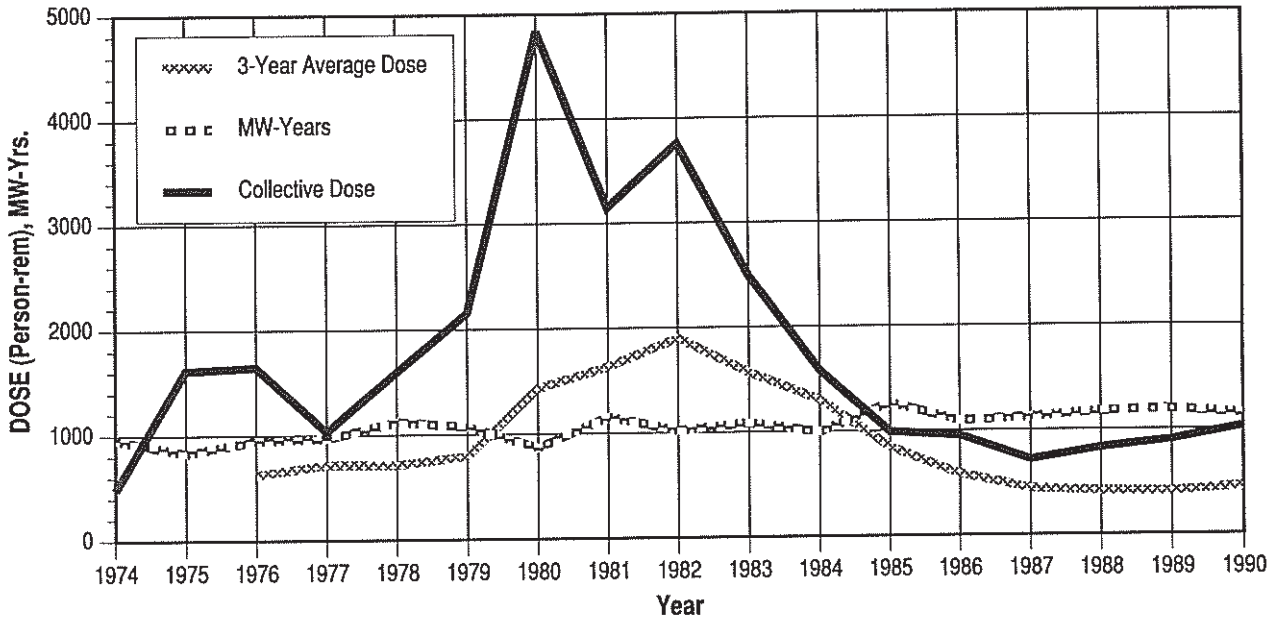


APPENDIX E (continued)

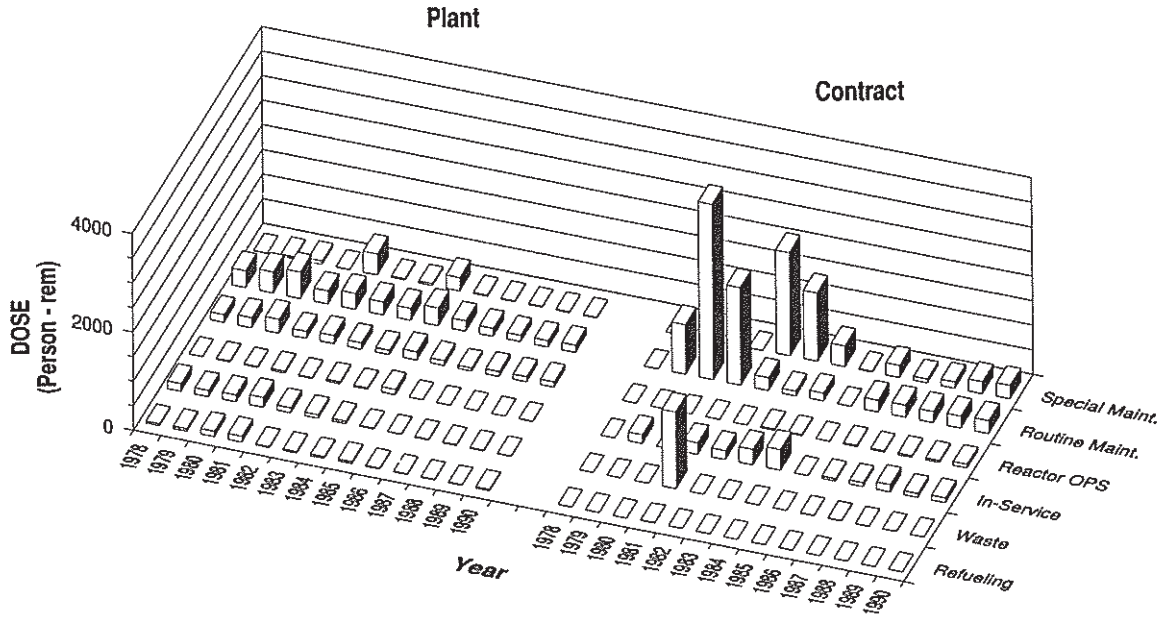
QUAD CITIES 1, 2

Dose-Performance Indicators

BWR



Breakdown by Job Function

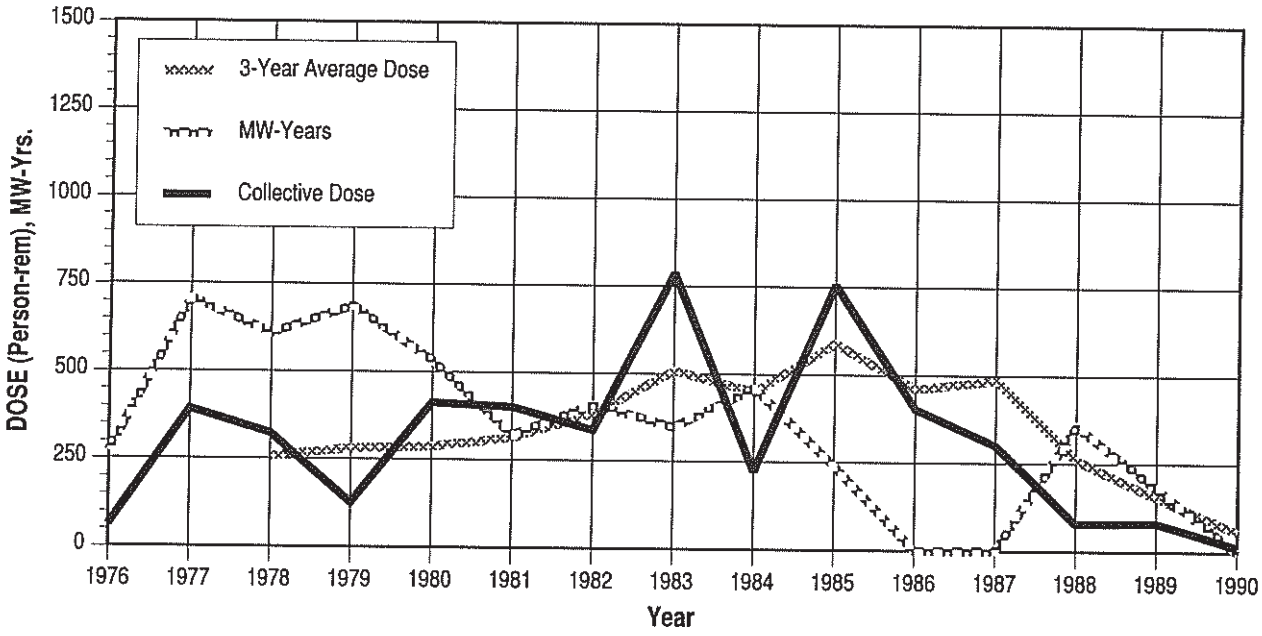


APPENDIX E (continued)

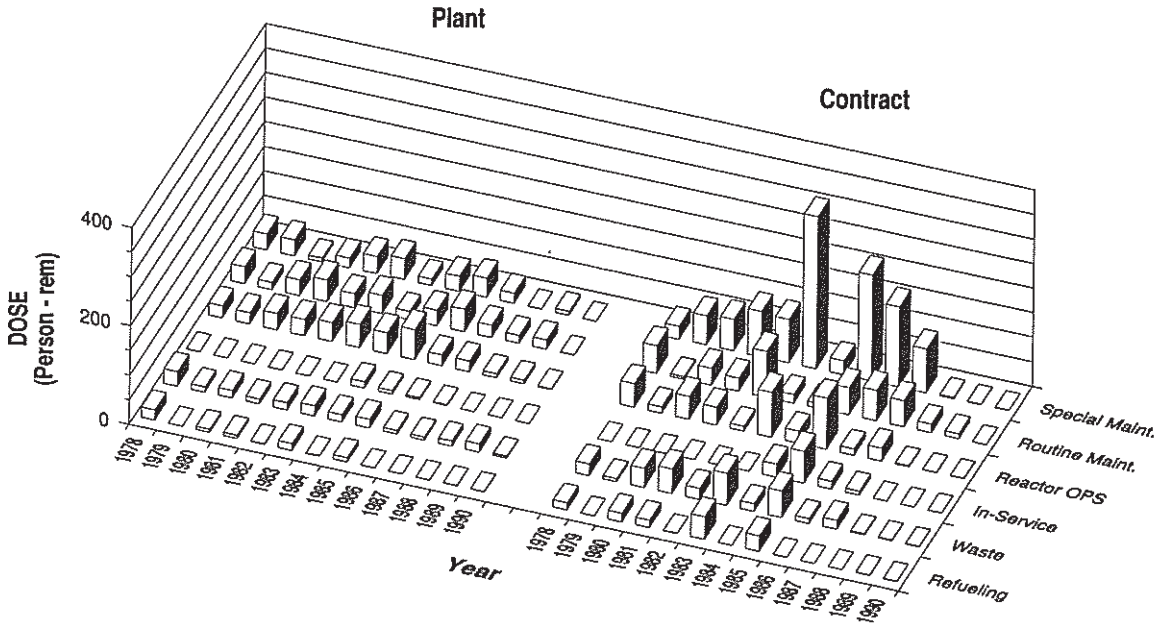
RANCHO SECO

Dose-Performance Indicators

PWR



Breakdown by Job Function

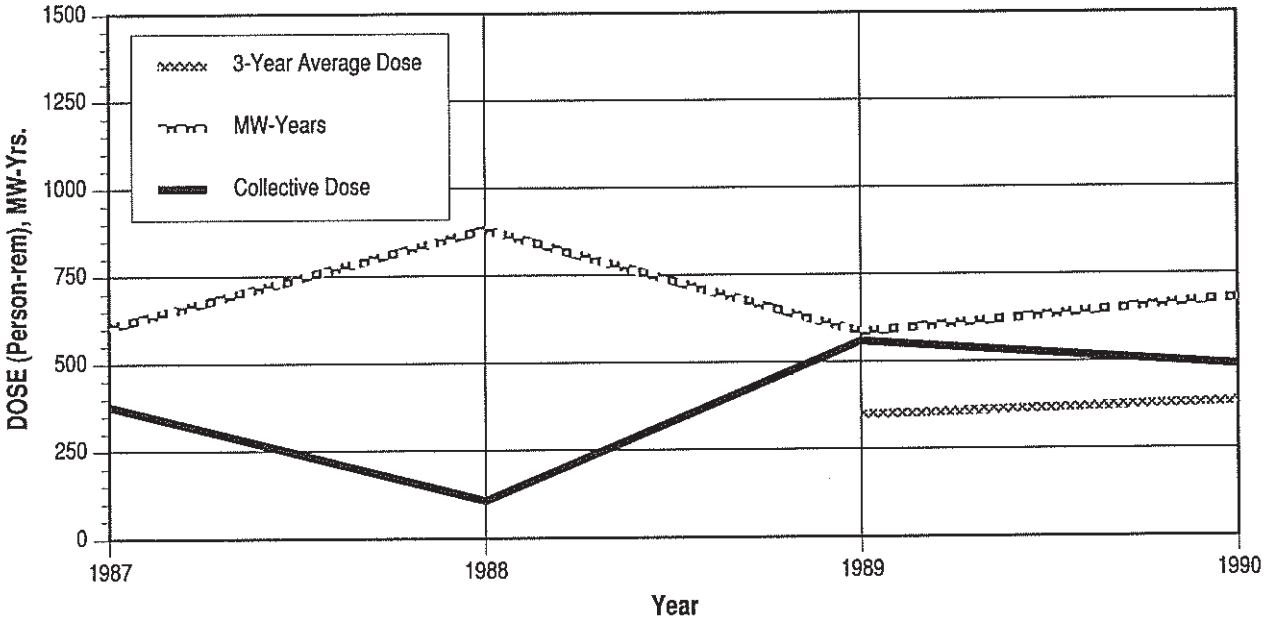


APPENDIX E (continued)

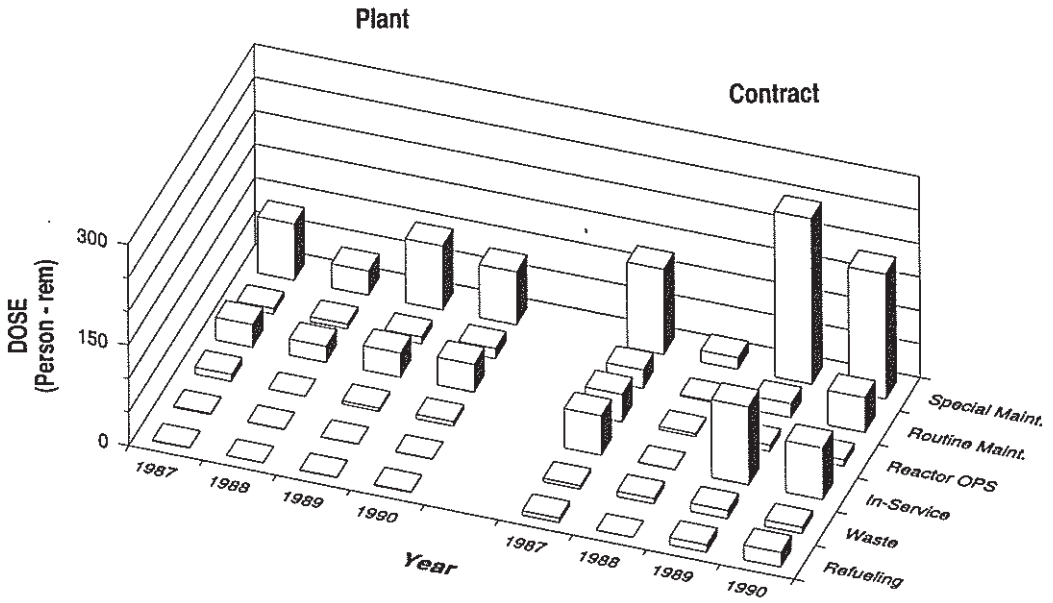
RIVER BEND 1

Dose-Performance Indicators

BWR



Breakdown by Job Function

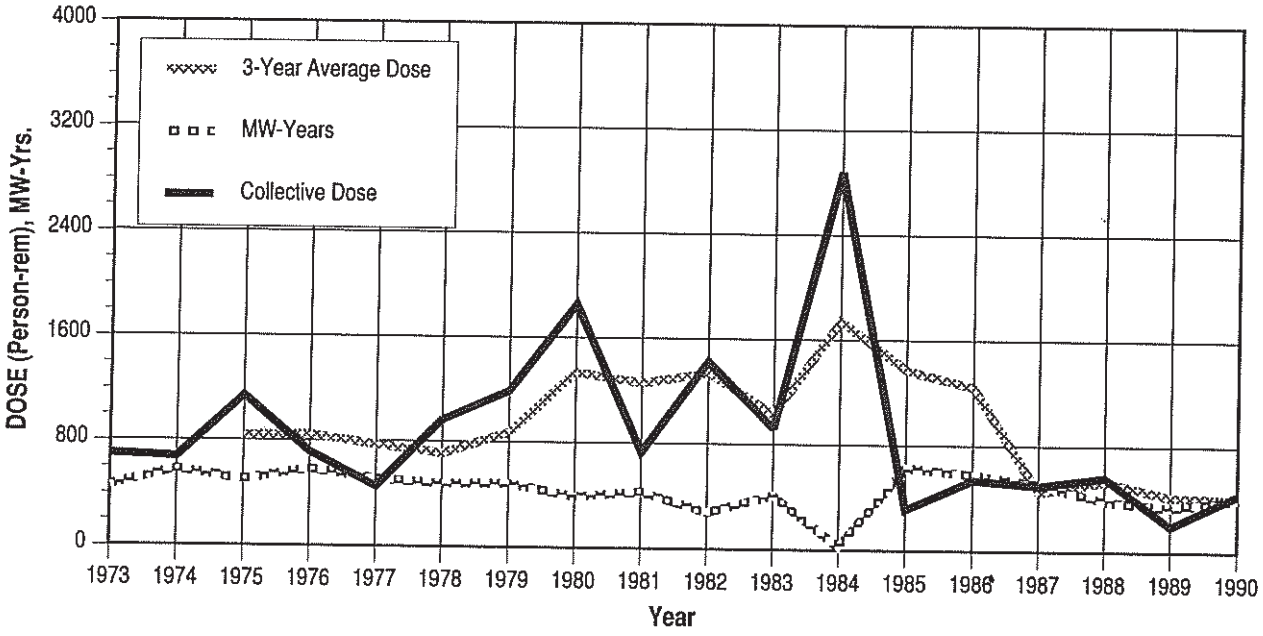


APPENDIX E (continued)

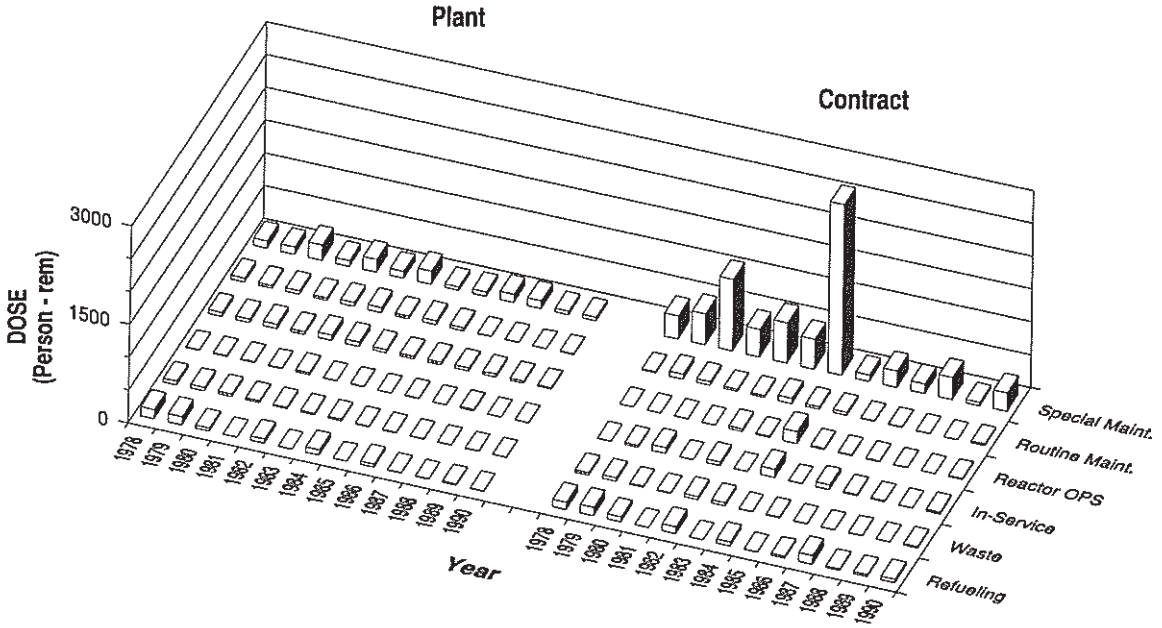
ROBINSON 2

Dose-Performance Indicators

PWR



Breakdown by Job Function

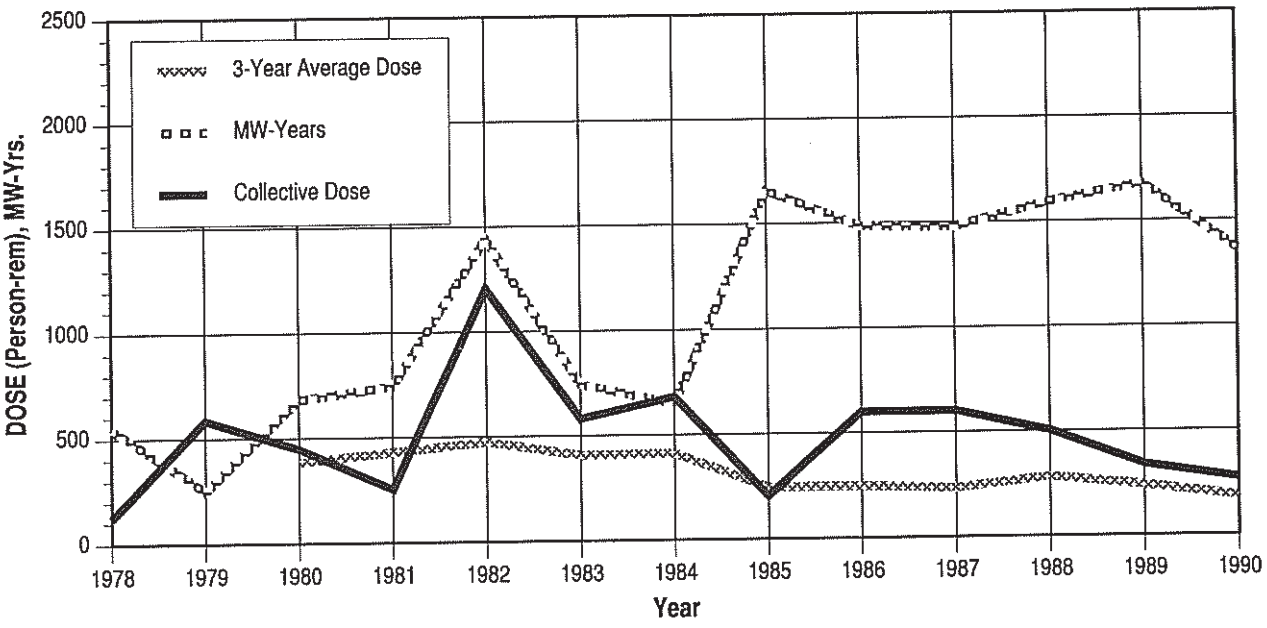


APPENDIX E (continued)

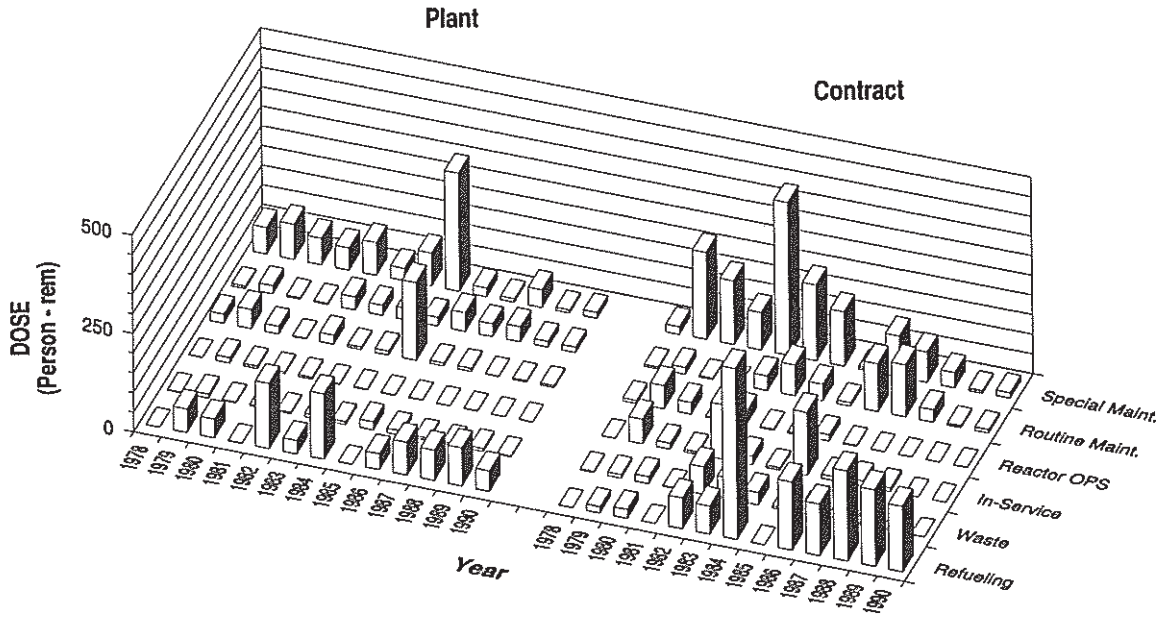
SALEM 1, 2

Dose-Performance Indicators

PWR



Breakdown by Job Function

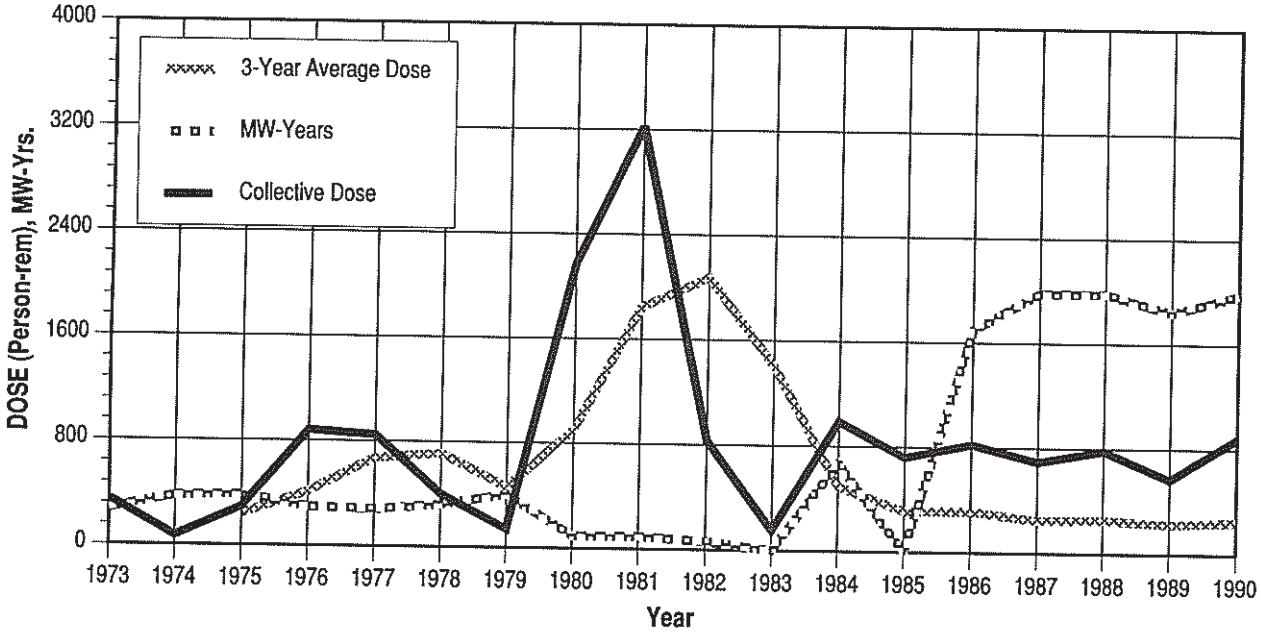


APPENDIX E (continued)

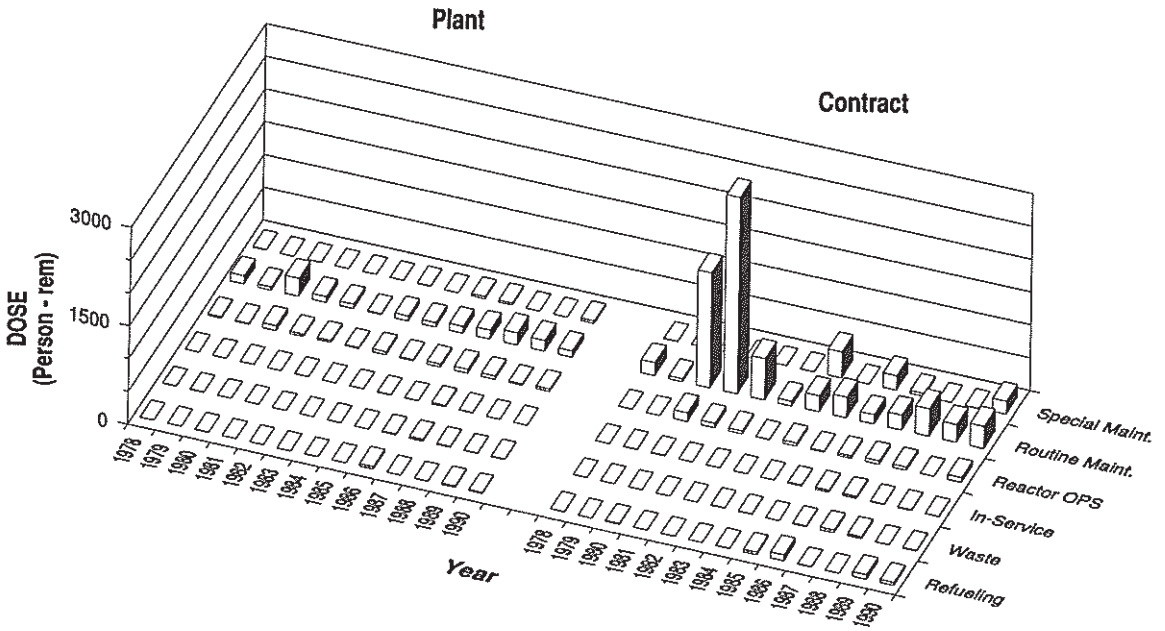
SAN ONOFRE 1, 2, 3

Dose-Performance Indicators

PWR



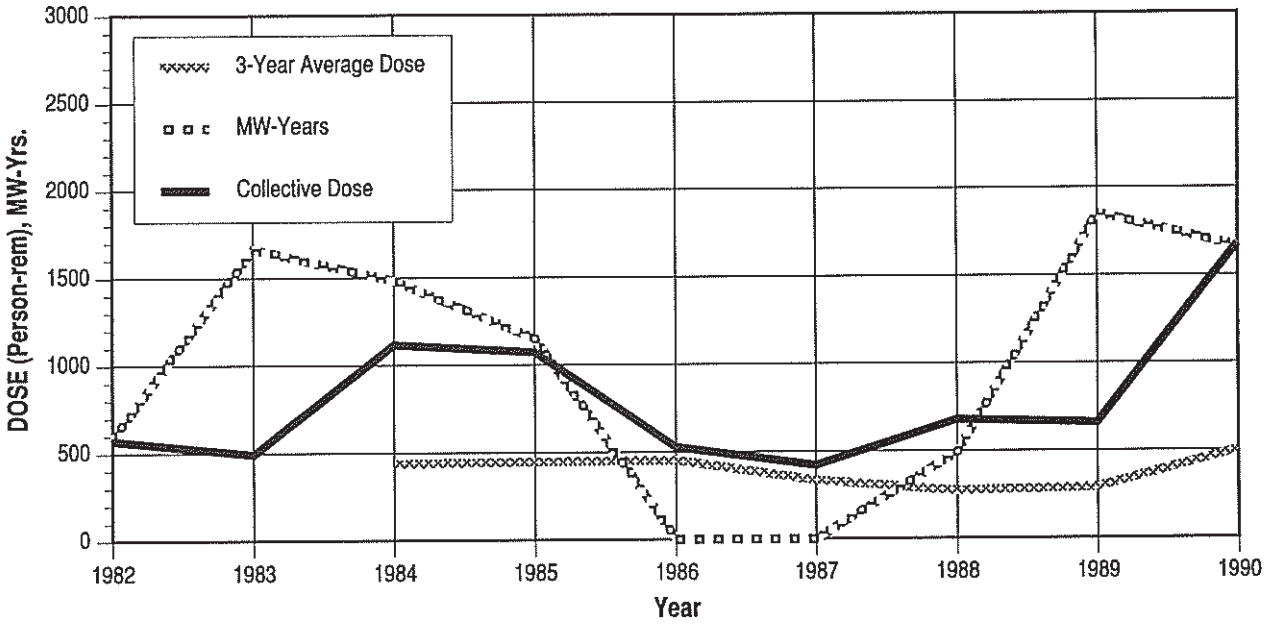
Breakdown by Job Function



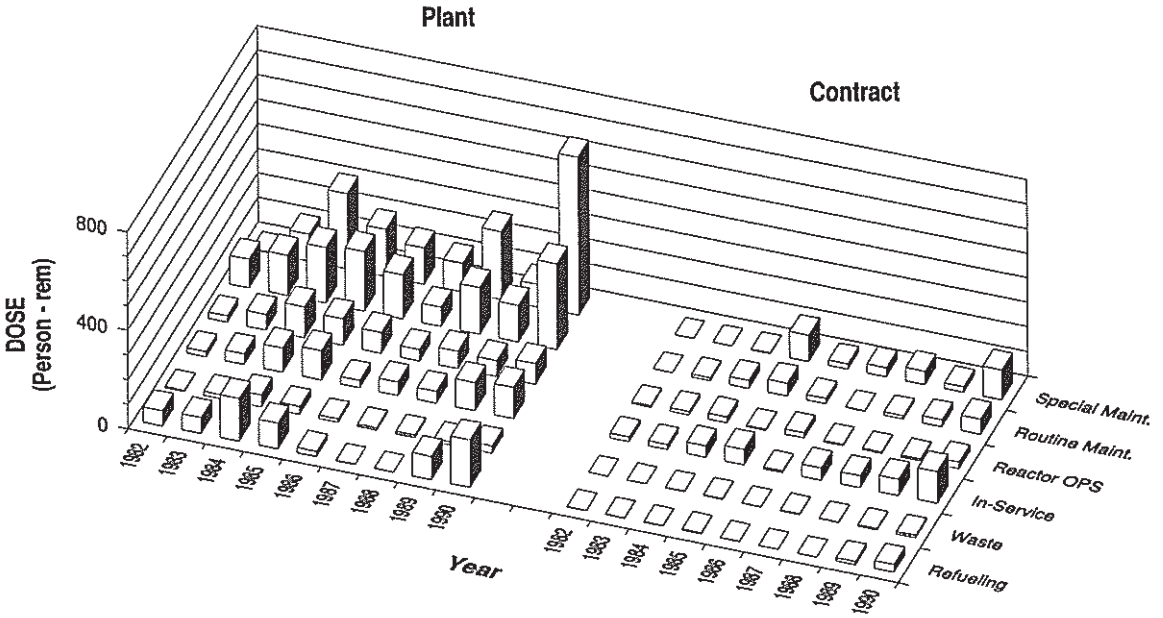
APPENDIX E (continued)

SEQUOYAH 1, 2

Dose-Performance Indicators **PWR**



Breakdown by Job Function

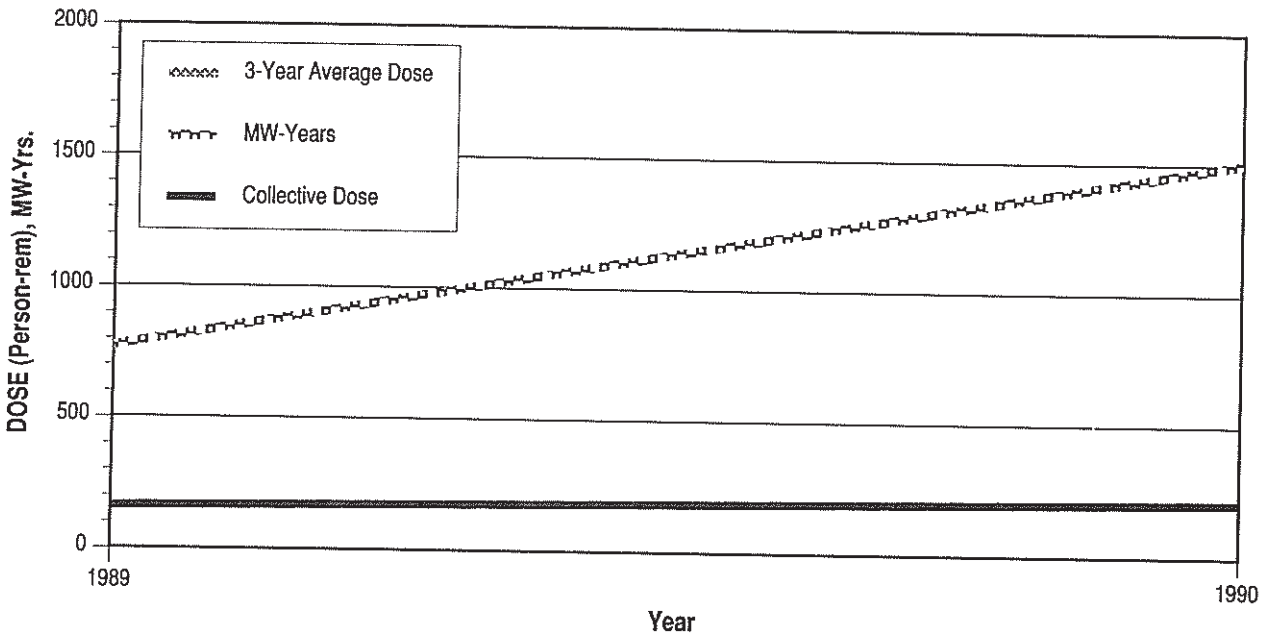


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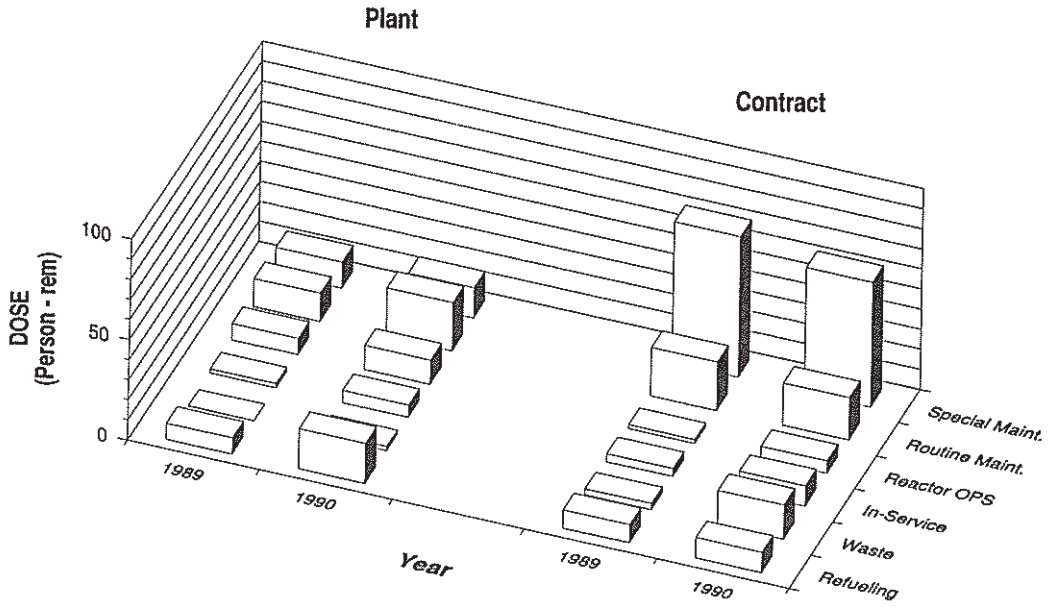
SOUTH TEXAS 1, 2

Dose-Performance Indicators

PWR



Breakdown by Job Function

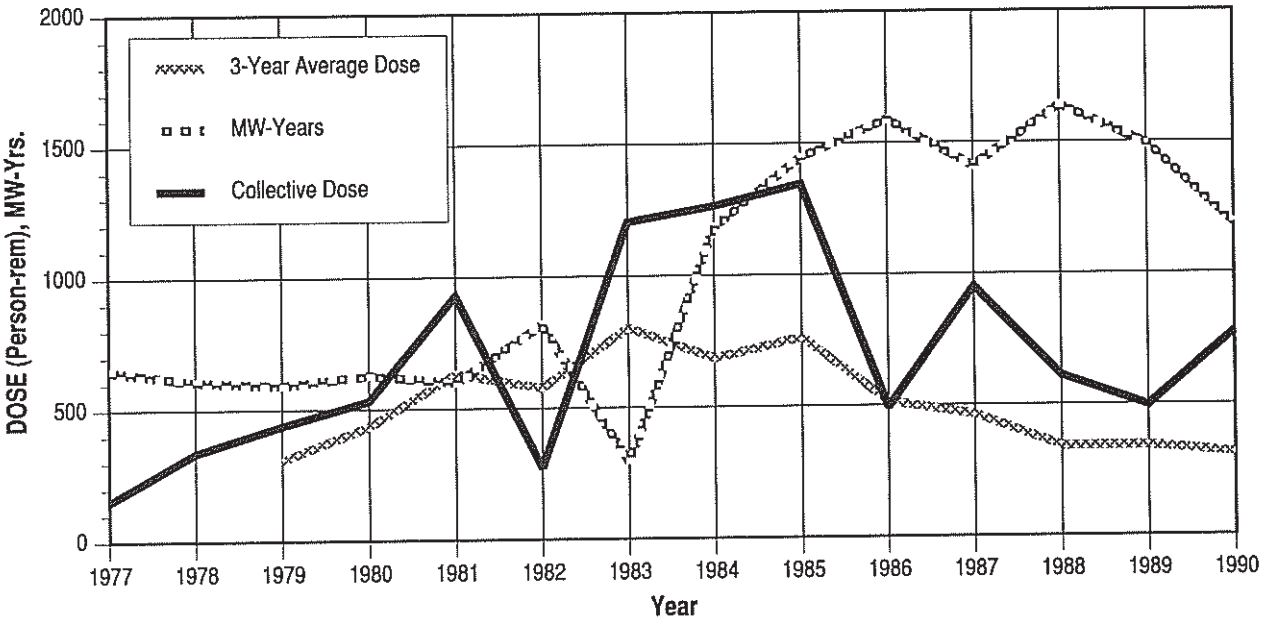


APPENDIX E (continued)

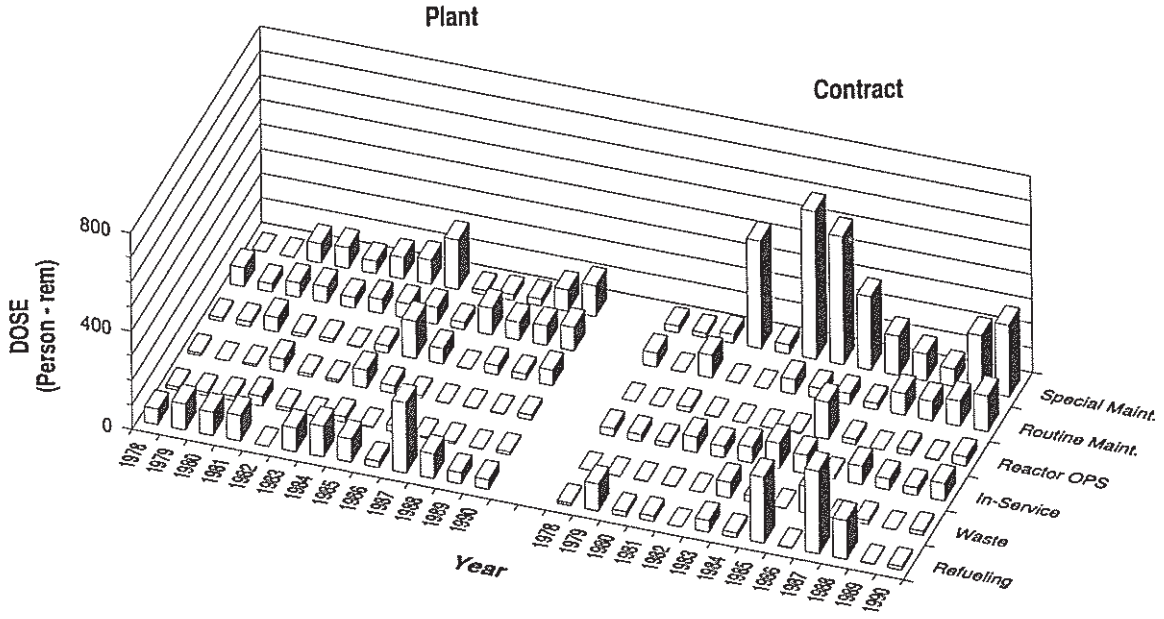
ST. LUCIE 1, 2

Dose-Performance Indicators

PWR



Breakdown by Job Function

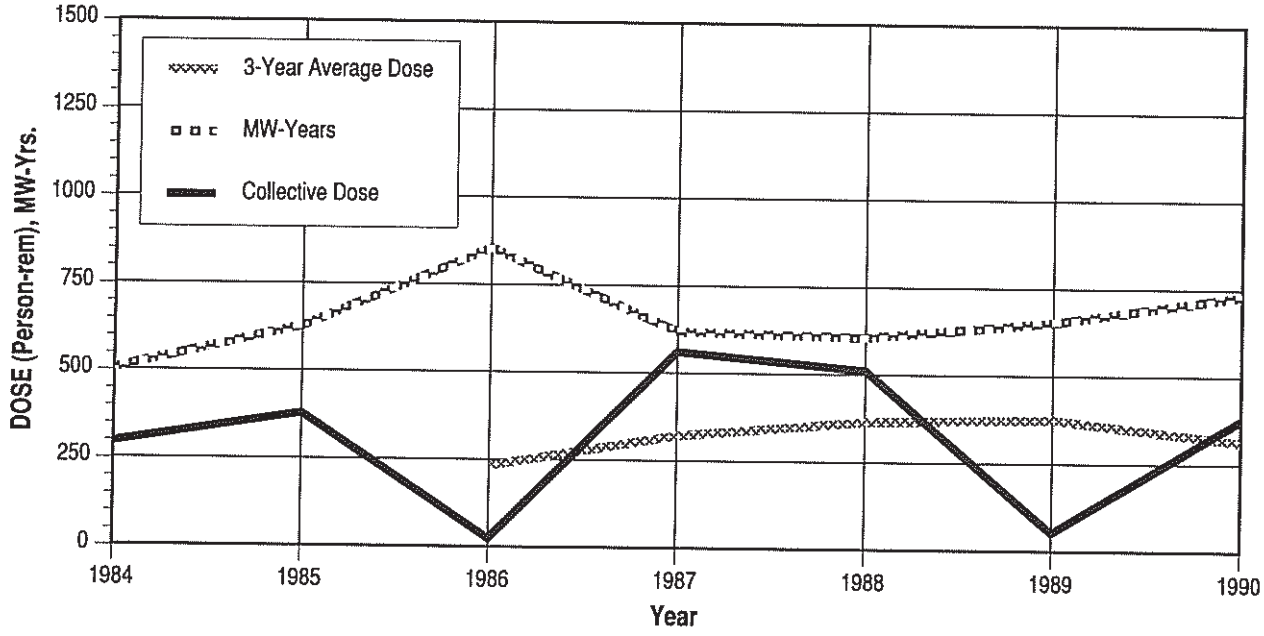


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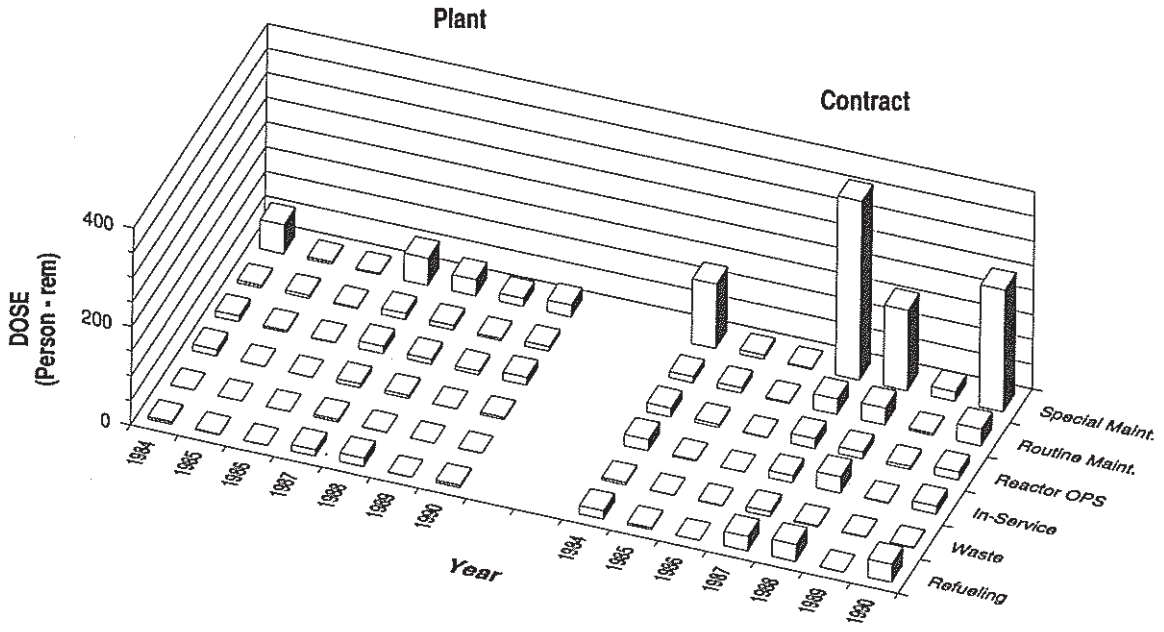
SUMMER 1

Dose-Performance Indicators

PWR



Breakdown by Job Function

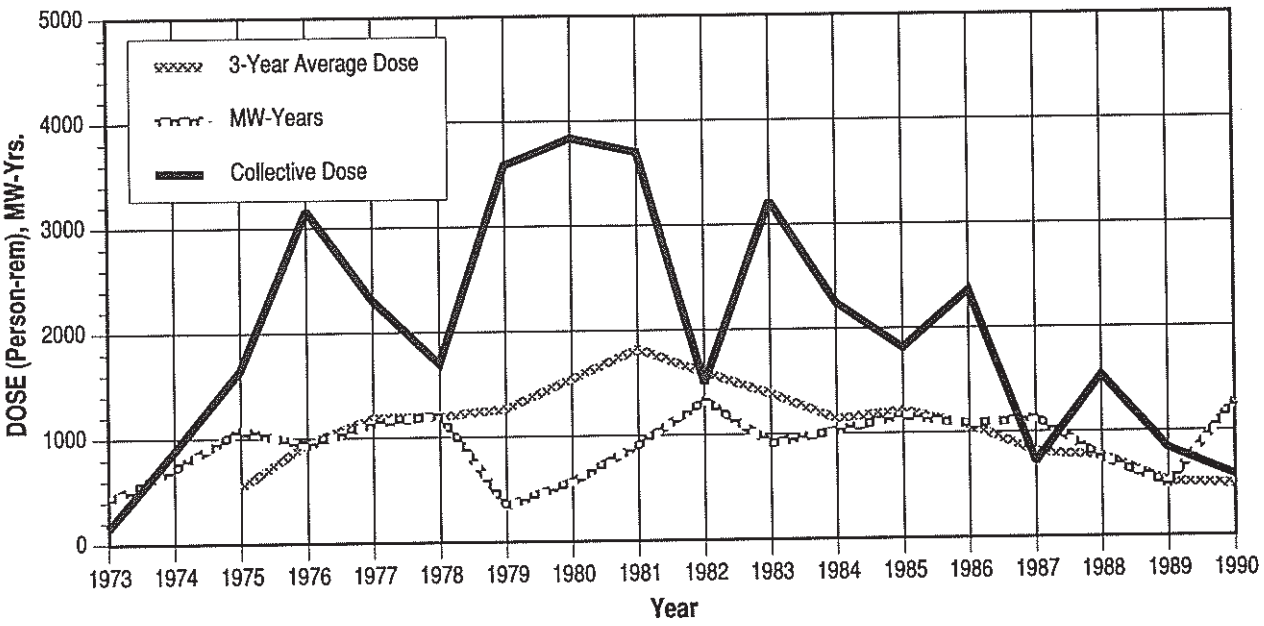


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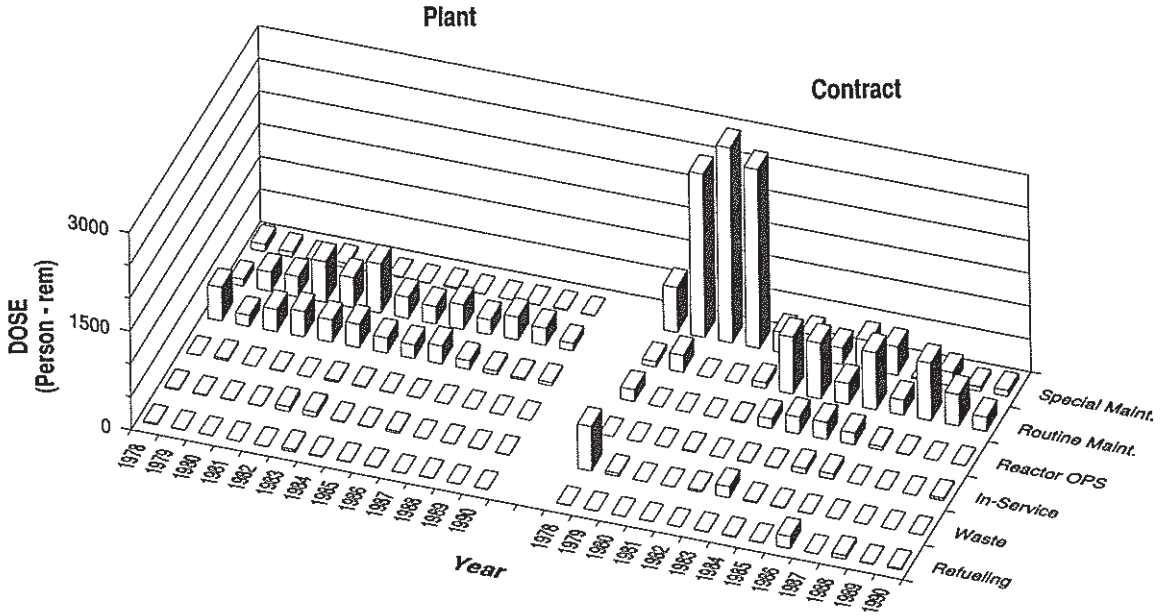
SURRY 1, 2

Dose-Performance Indicators

PWR



Breakdown by Job Function

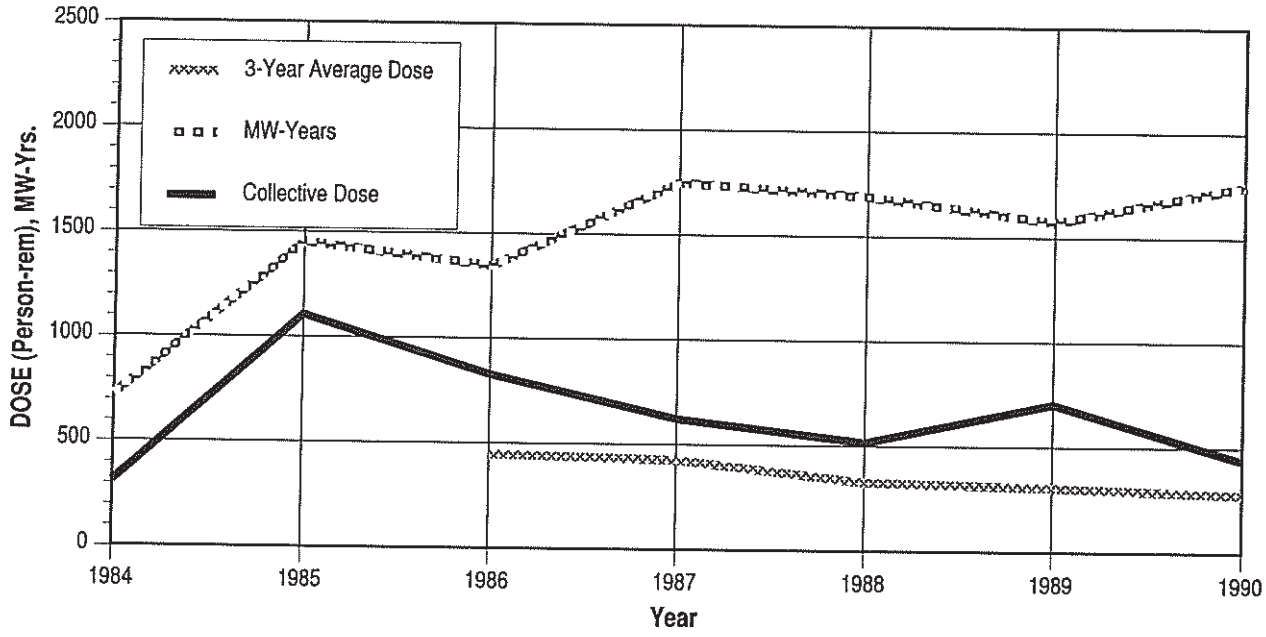


APPENDIX E (continued)

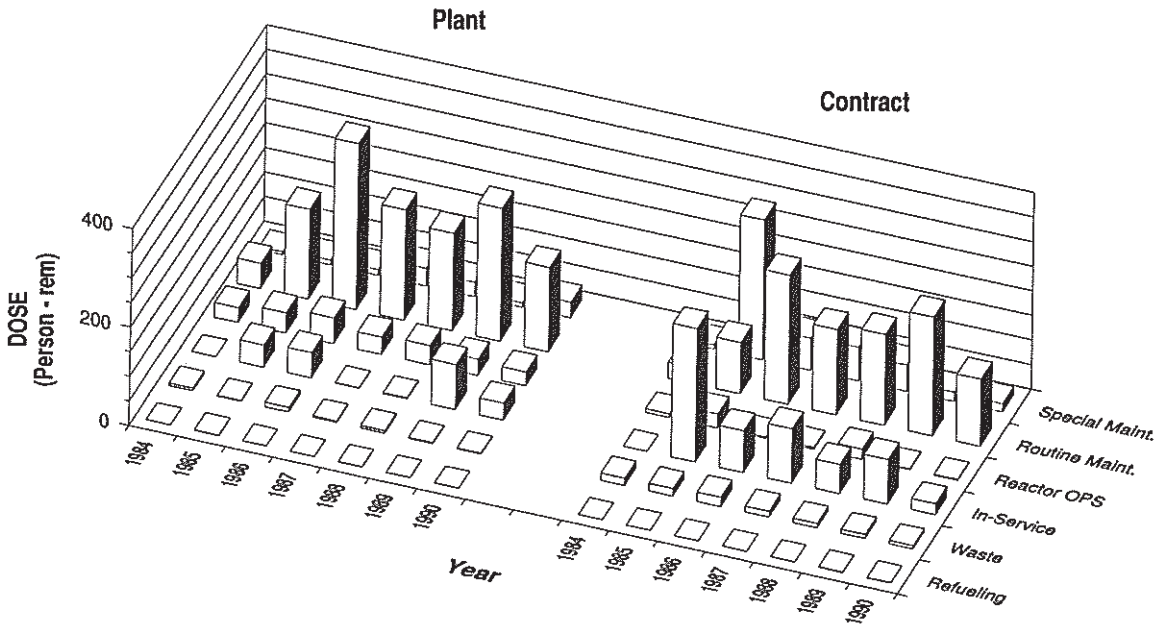
SUSQUEHANNA 1, 2

Dose-Performance Indicators

BWR



Breakdown by Job Function

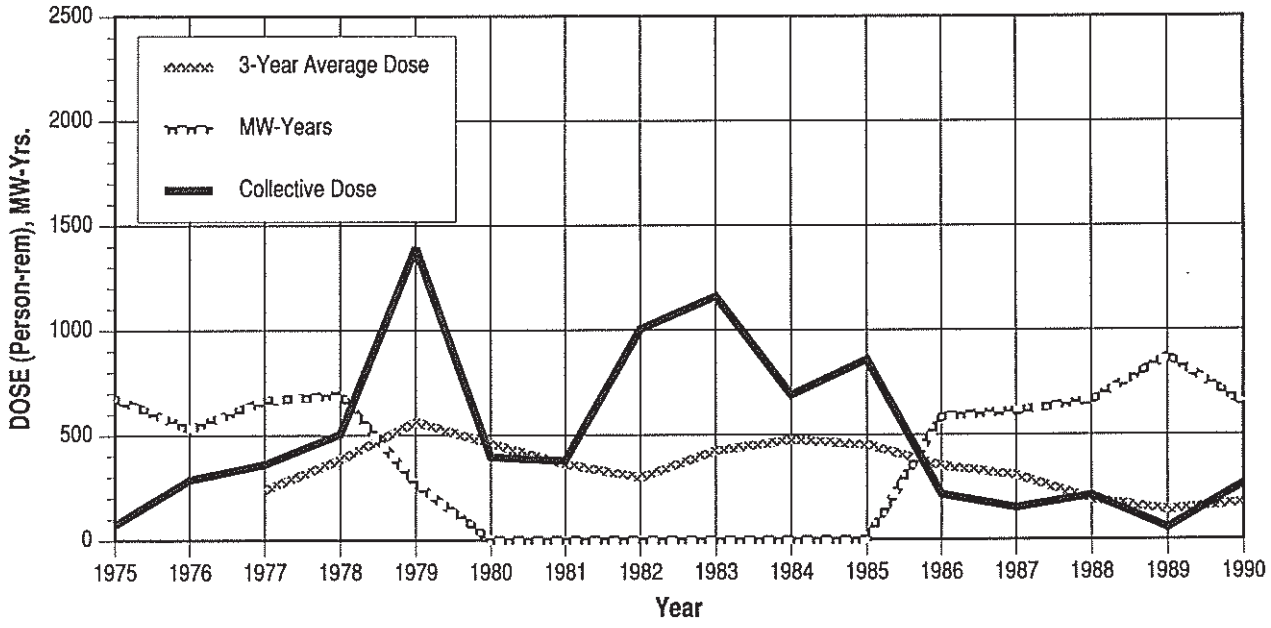


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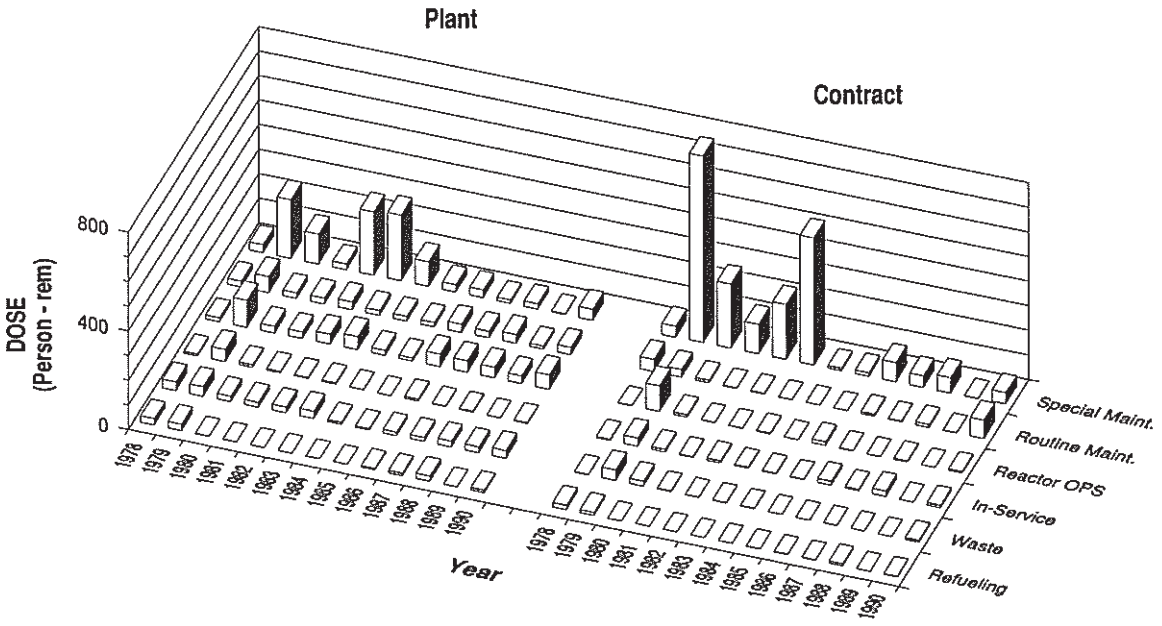
THREE MILE ISLAND 1

Dose-Performance Indicators

PWR



Breakdown by Job Function

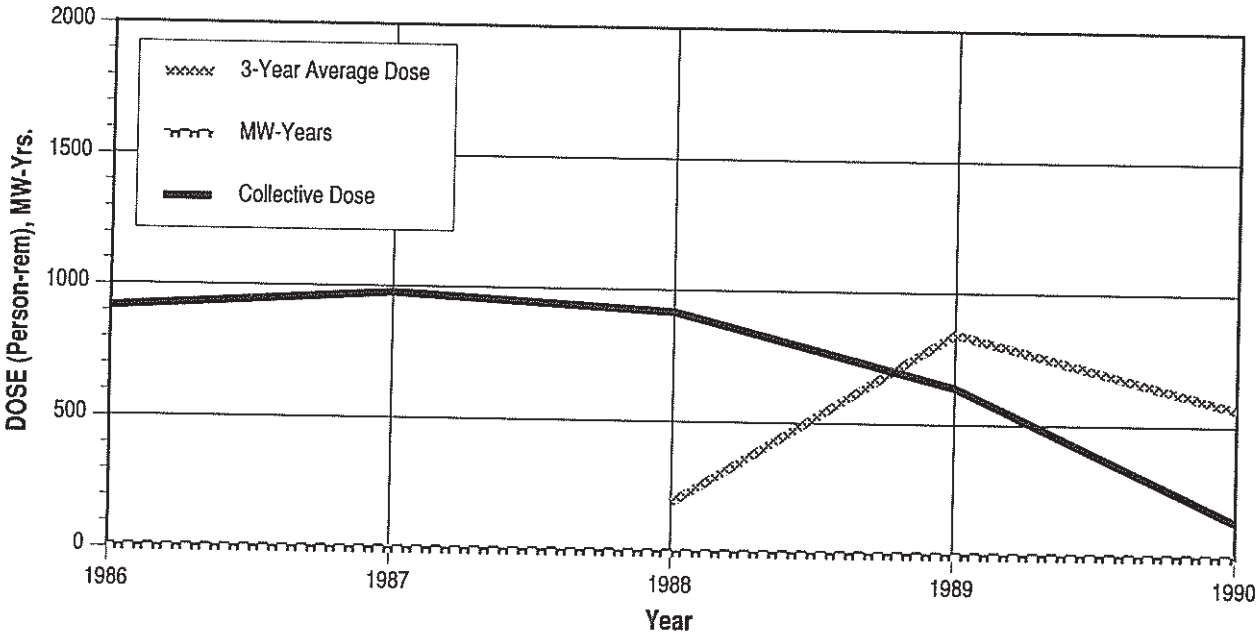


APPENDIX E (continued)

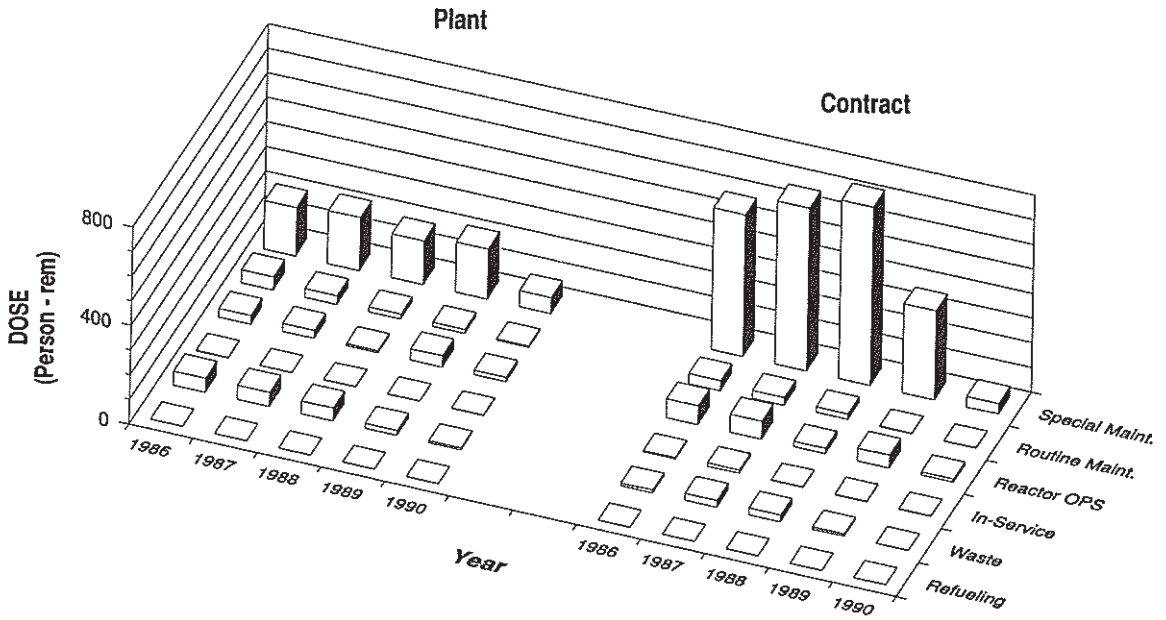
THREE MILE ISLAND 2

Dose-Performance Indicators

PWR



Breakdown by Job Function

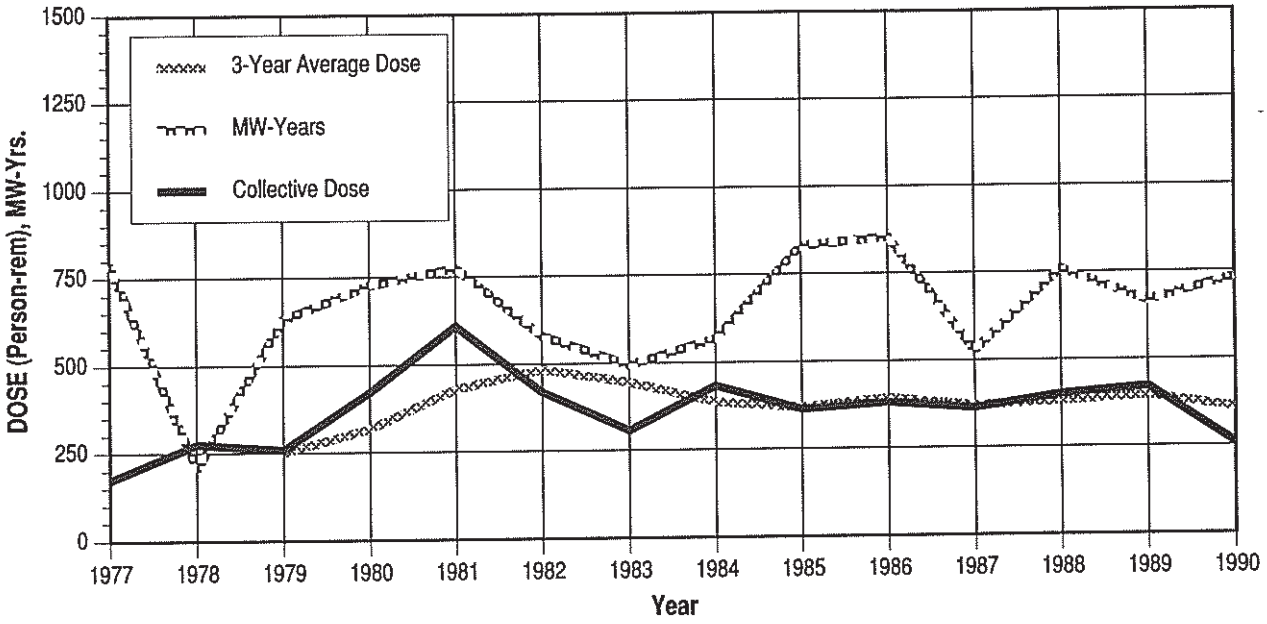


APPENDIX E (continued)

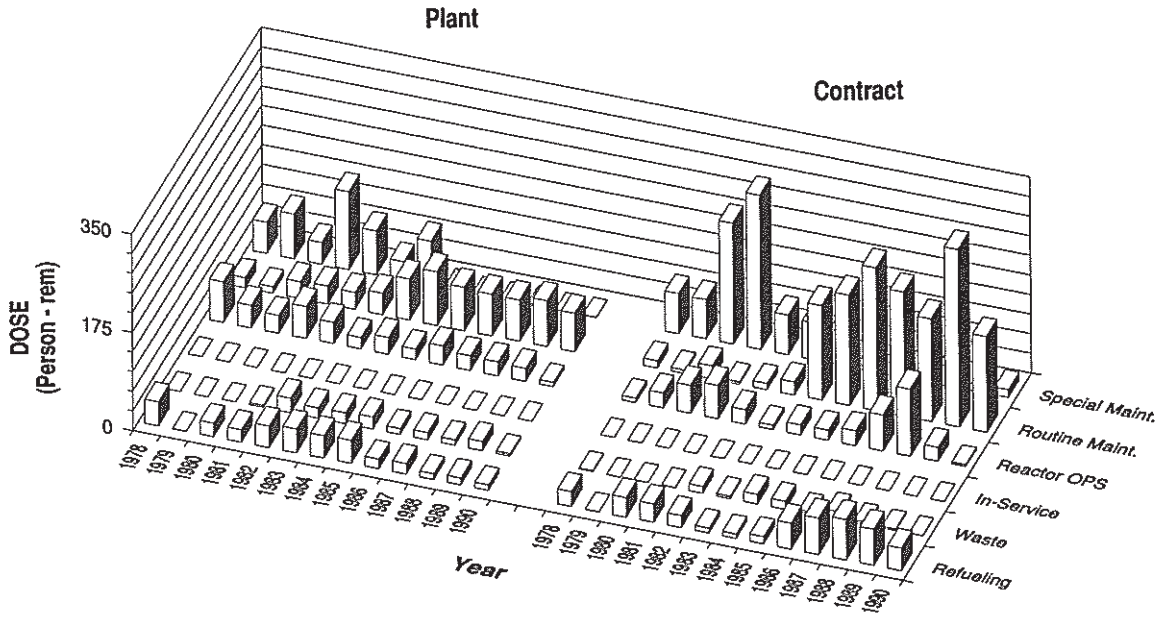
TROJAN

Dose-Performance Indicators

PWR



Breakdown by Job Function

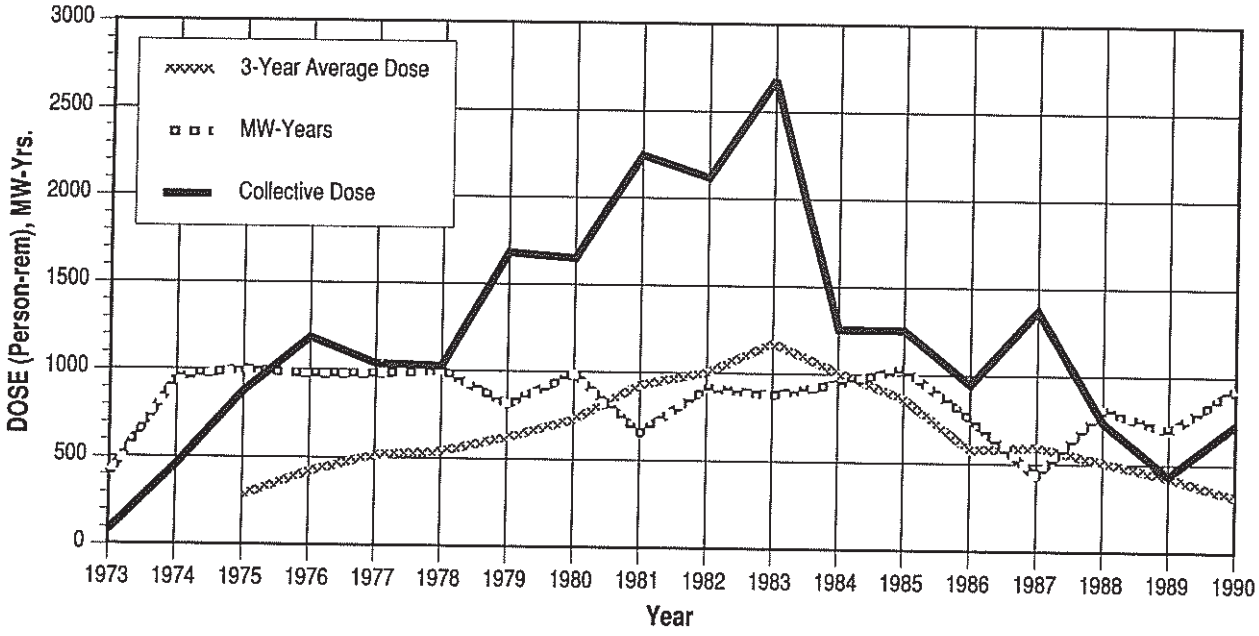


APPENDIX E (continued)

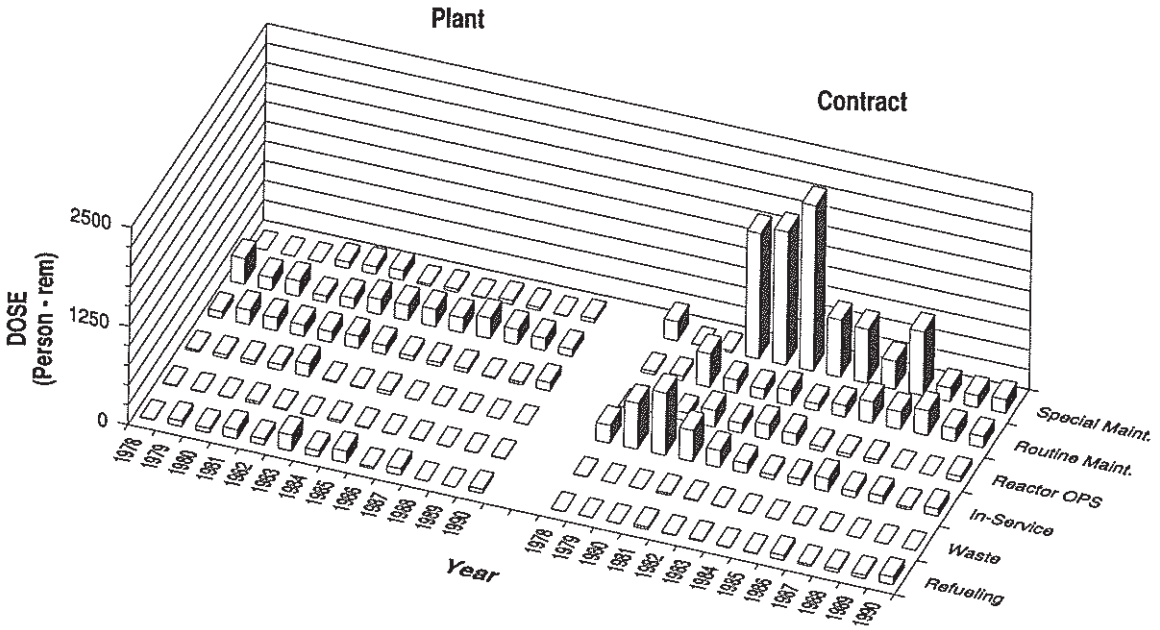
TURKEY POINT 3, 4

Dose-Performance Indicators

PWR



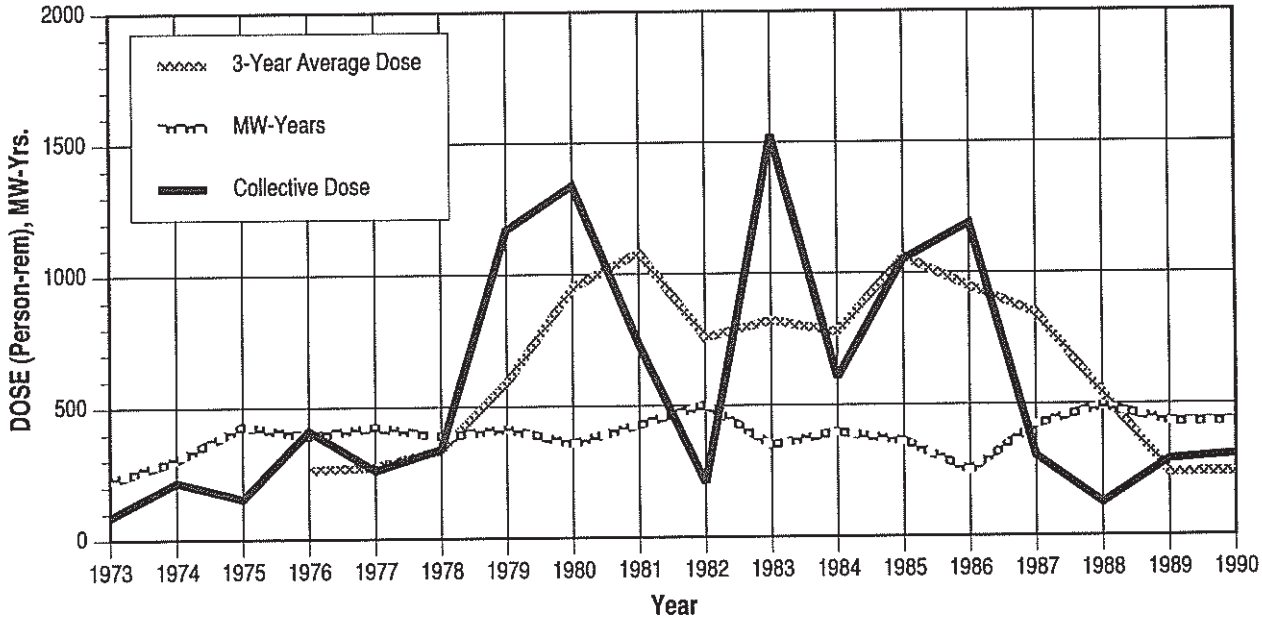
Breakdown by Job Function



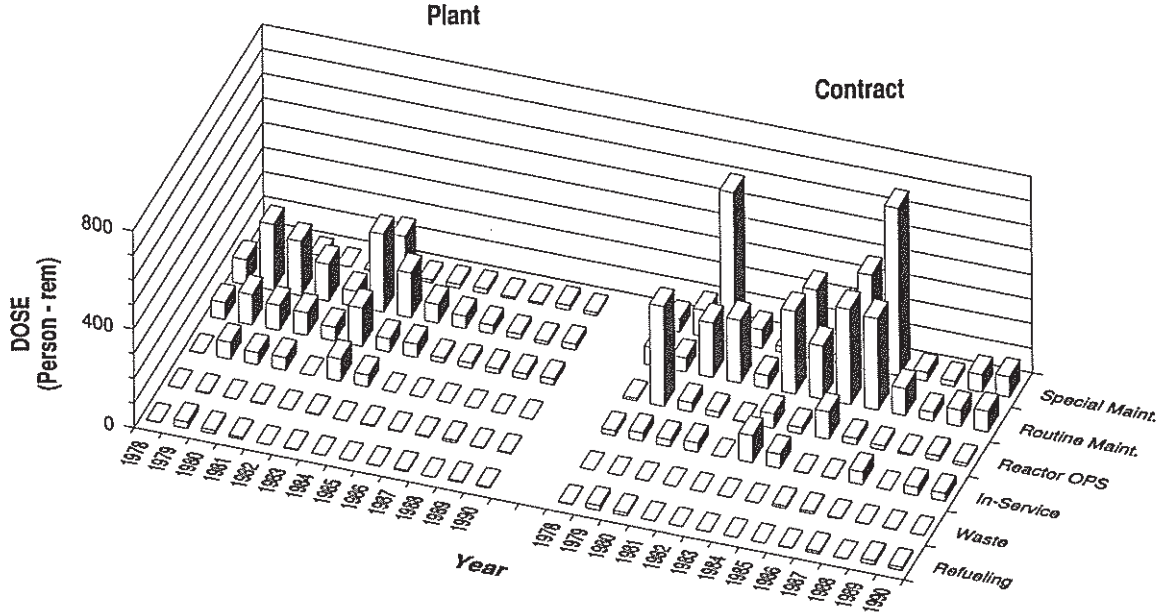
APPENDIX E (continued)

VERMONT YANKEE

Dose-Performance Indicators **BWR**



Breakdown by Job Function

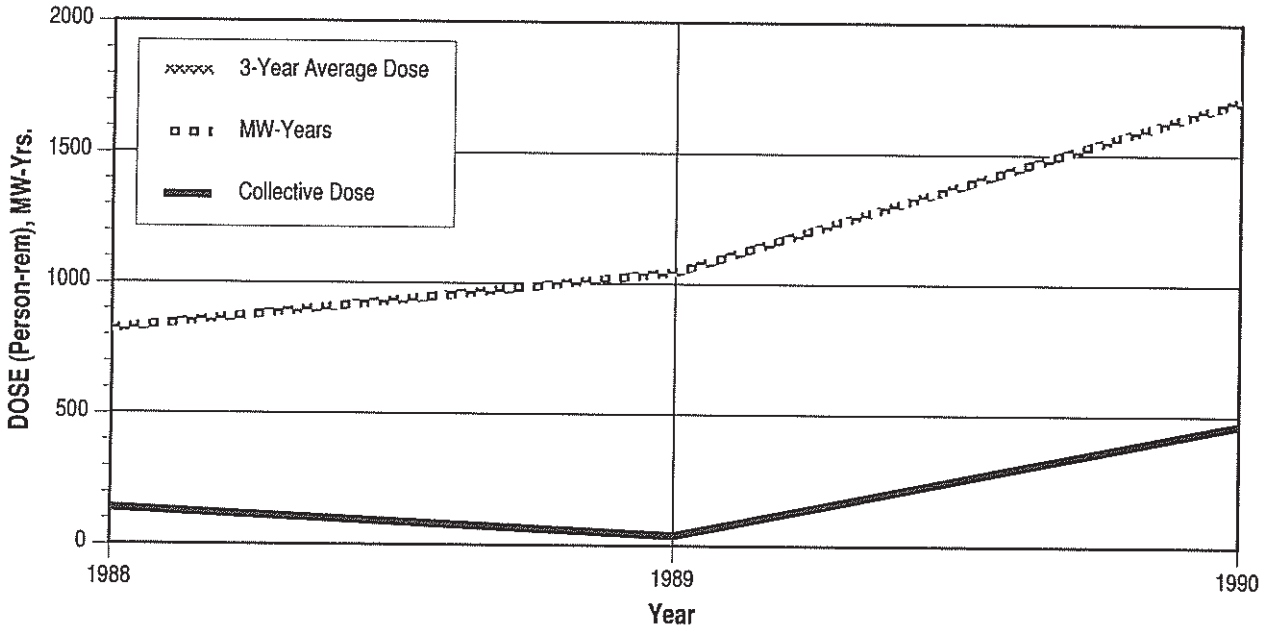


APPENDIX E (continued)

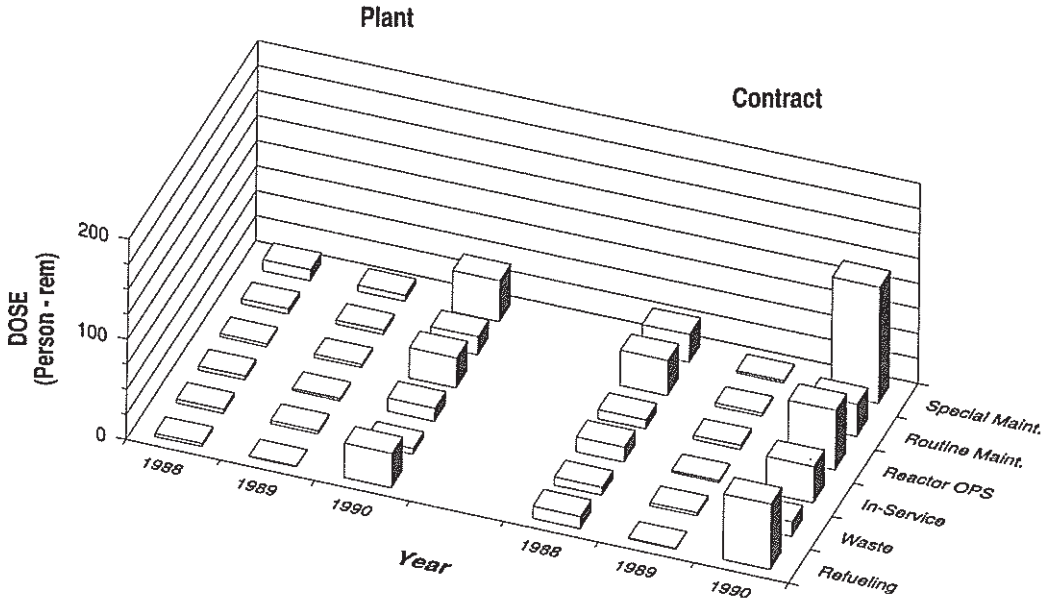
VOGTLE 1, 2

Dose-Performance Indicators

PWR



Breakdown by Job Function

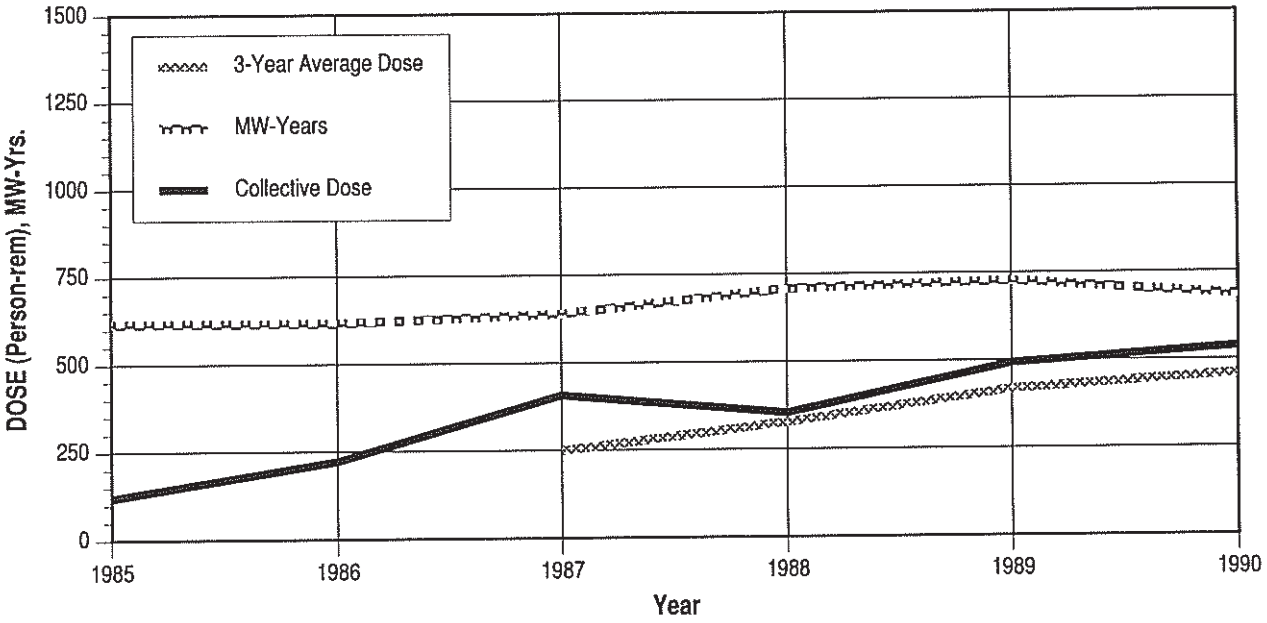


APPENDIX E (continued)

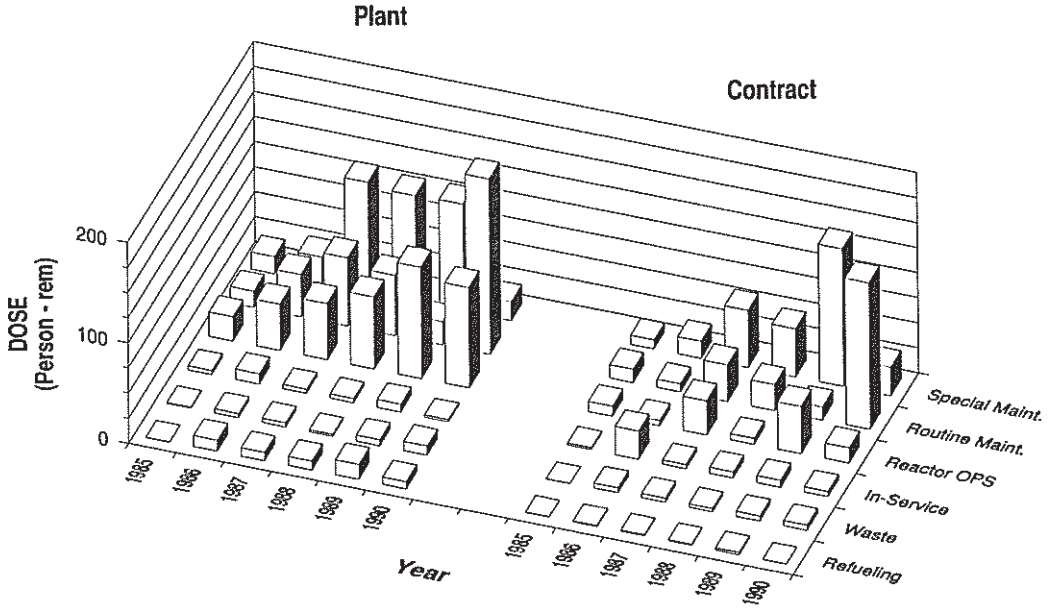
WASHINGTON NUCLEAR 2

Dose-Performance Indicators

BWR



Breakdown by Job Function

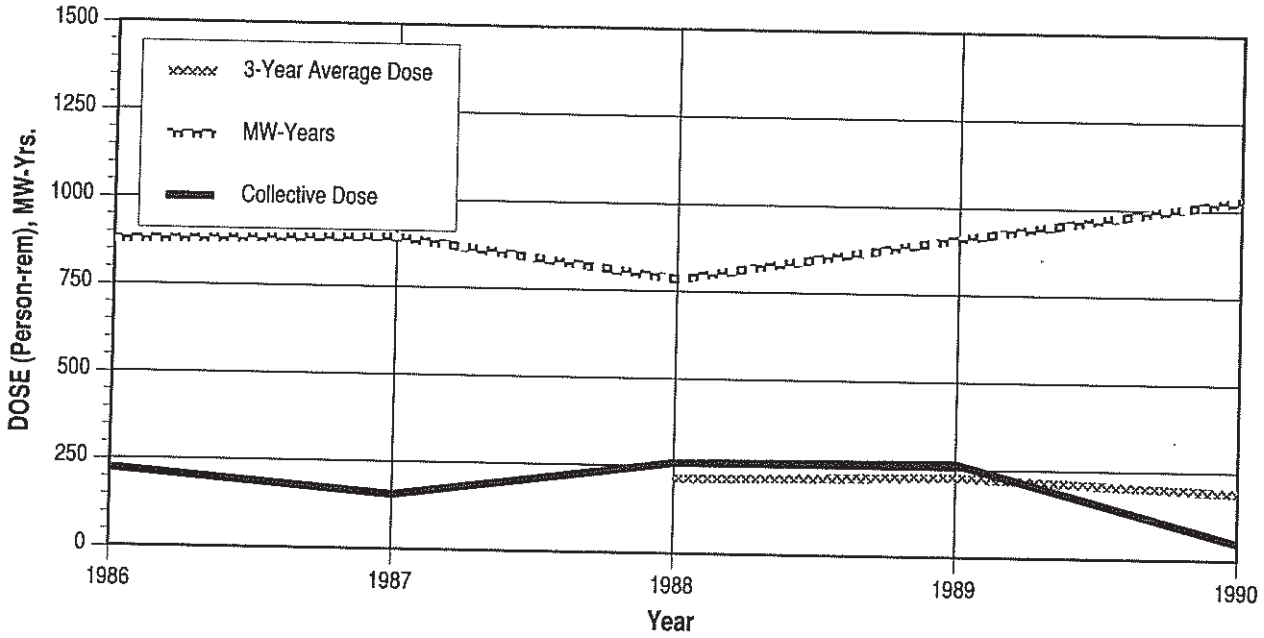


APPENDIX E (continued)

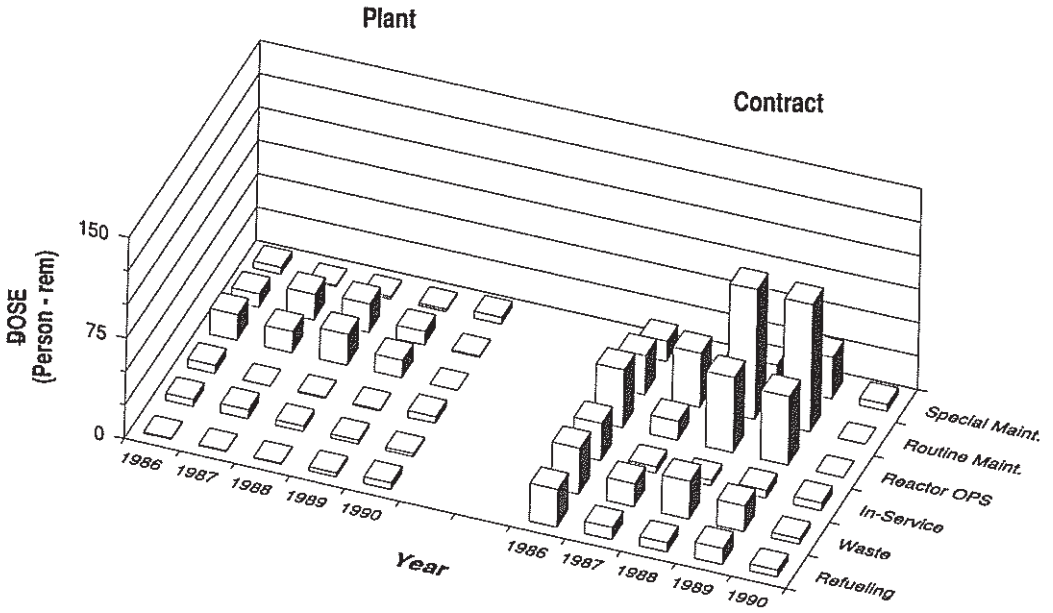
WATERFORD 3

Dose-Performance Indicators

PWR



Breakdown by Job Function

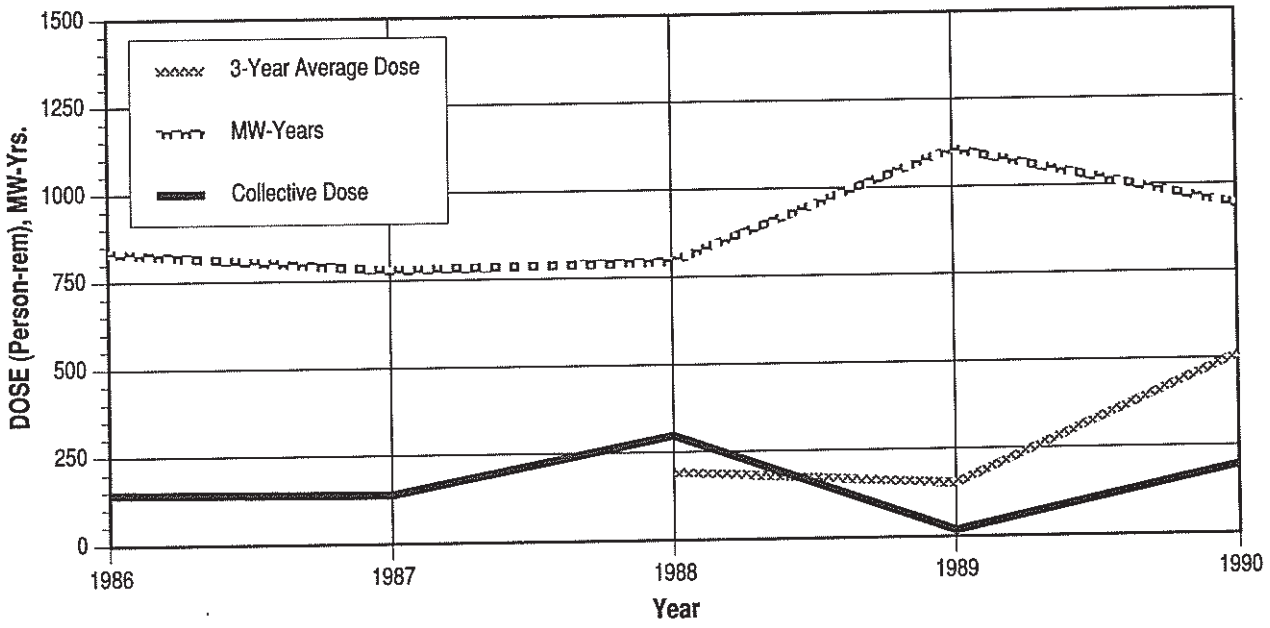


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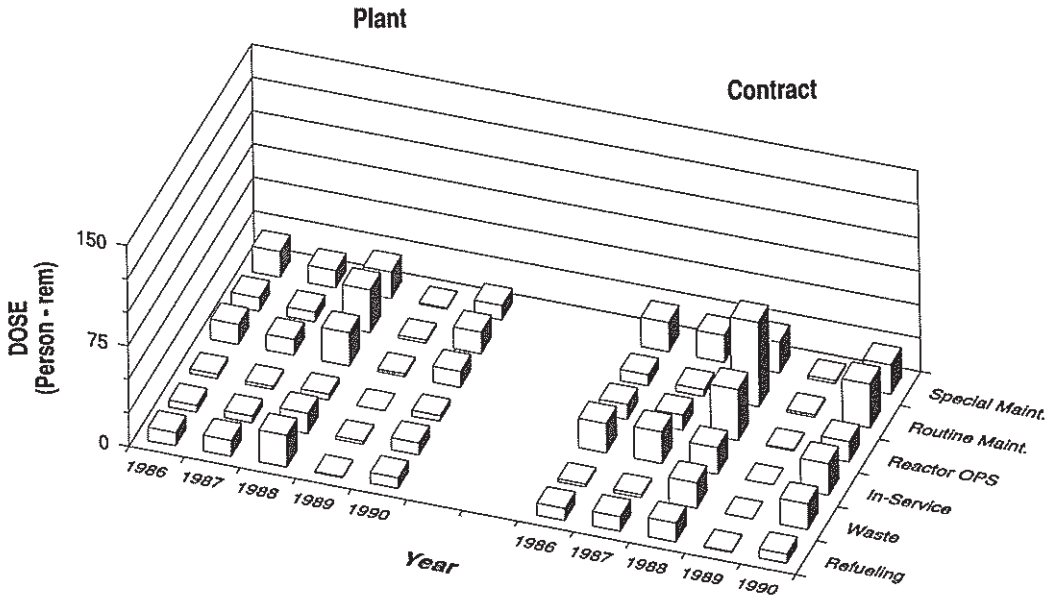
WOLF CREEK 1

Dose-Performance Indicators

PWR



Breakdown by Job Function

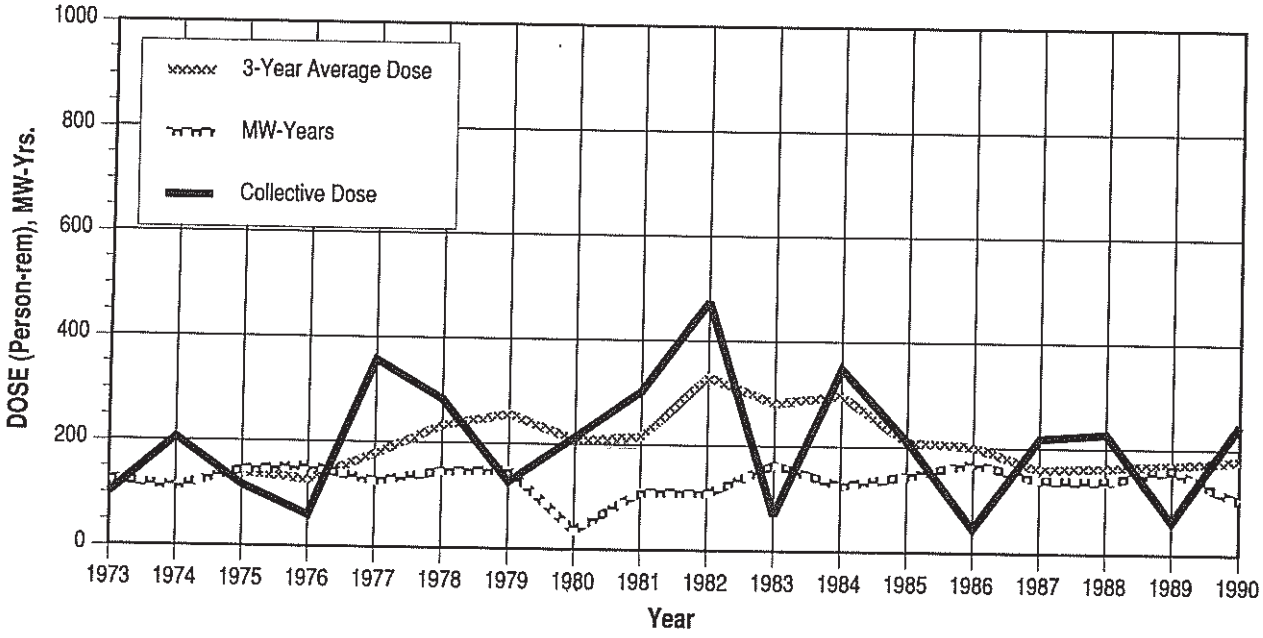


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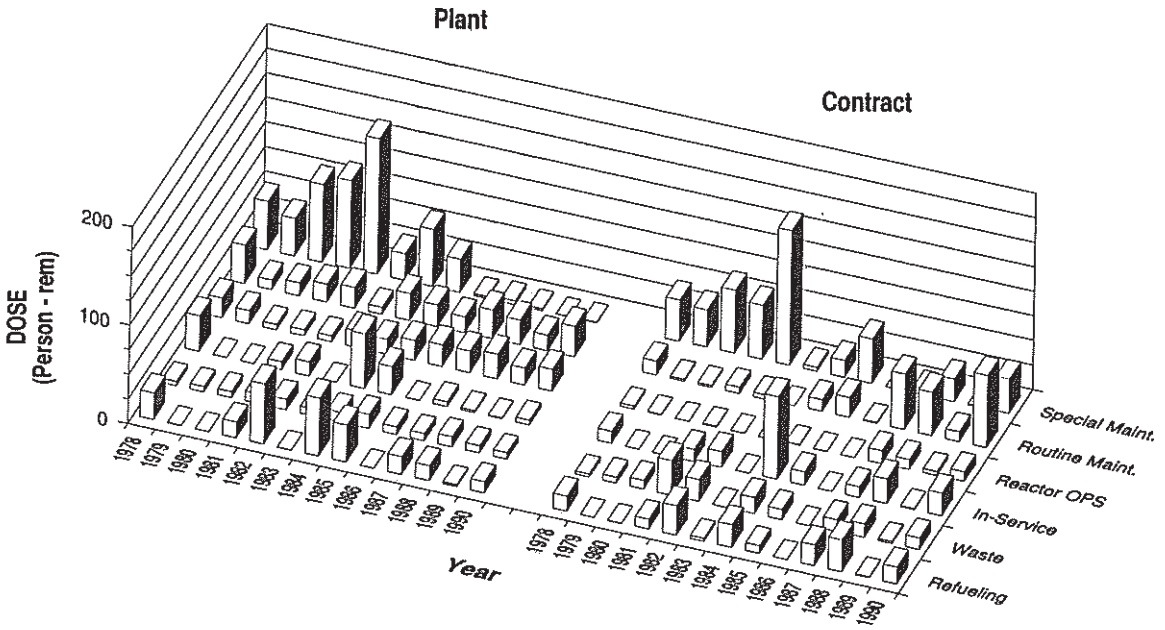
YANKEE-ROWE

Dose-Performance Indicators

PWR



Breakdown by Job Function

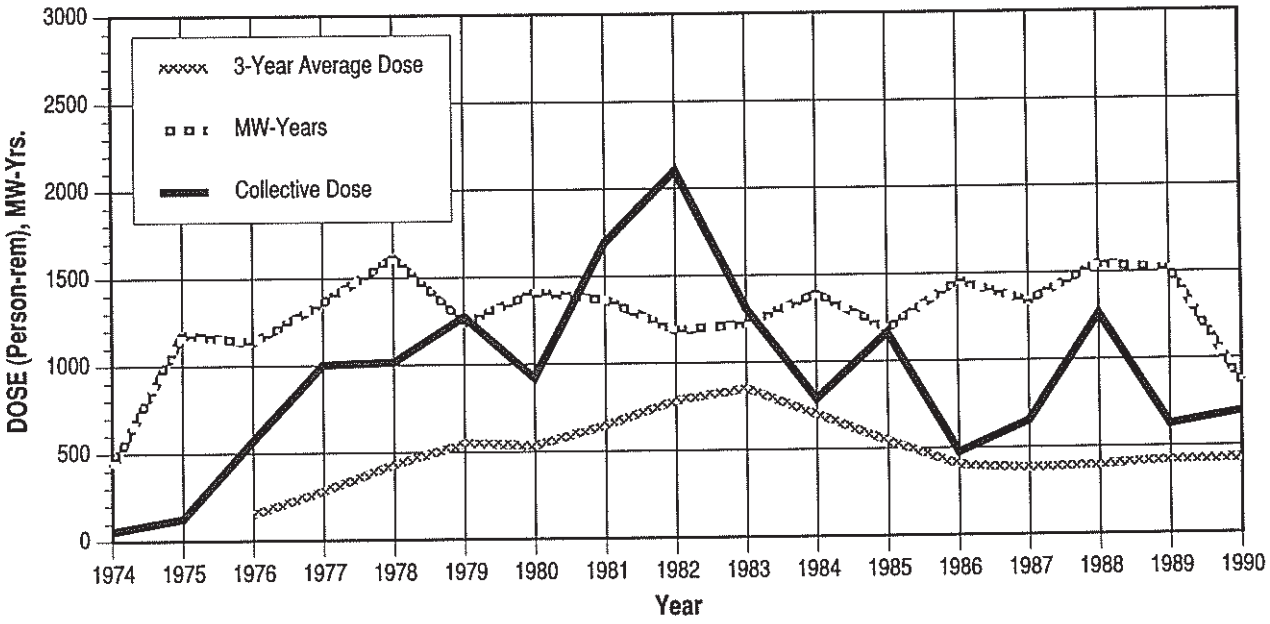


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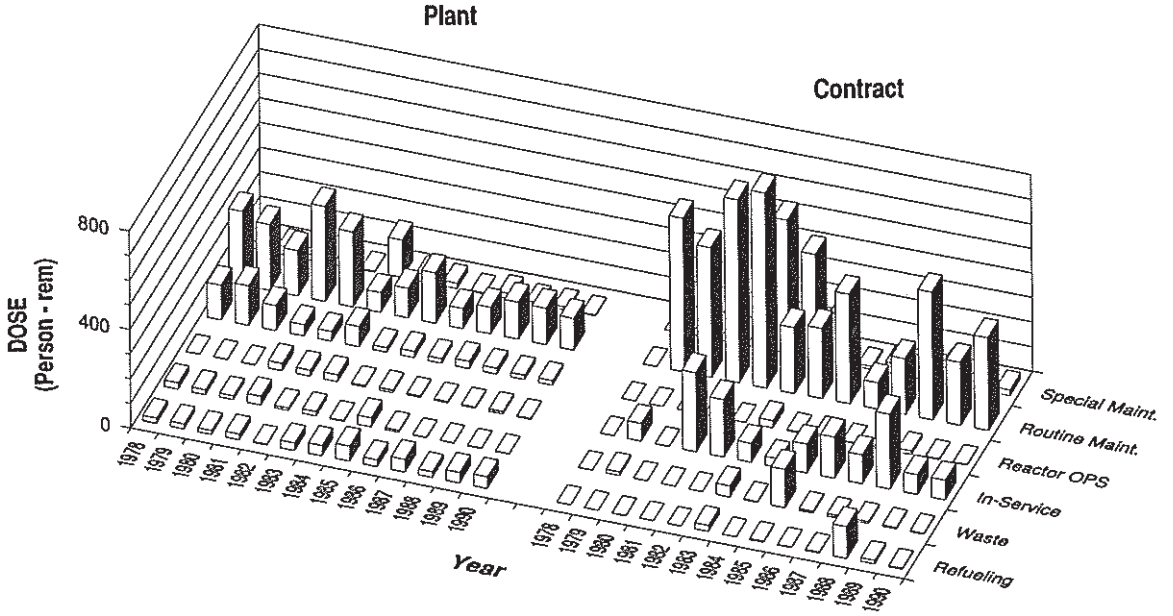
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Dose-Performance Indicators

PWR



Breakdown by Job Function



APPENDIX F

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

1984-1990

APPENDIX F*
SUMMARY OF ANNUAL WHOLE BODY DOSE DISTRIBUTIONS BY YEAR AND REACTOR TYPE
1984-1990

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 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	4.0-5.0	5-6.0	6-7.0	7-8.0	8-9.0	9-10	10-12	>12			
1990 - PWRs	54,572	29,791	13,030	10,747	5,759	3,384	4,712	607	43									122,645	68,073	20,812
1990 - BWRs	39,102	17,210	7,336	5,992	3,717	2,493	4,162	625	41	1								80,679	41,577	15,780
1990 - LWRs	93,674	47,001	20,366	16,739	9,476	5,877	8,874	1,232	84	1								203,324	109,650	36,592
1989 - PWRs	51,701	29,419	11,591	9,336	5,061	2,997	4,739	674	66	11								115,595	63,894	20,381
1989 - BWRs	40,951	19,343	7,887	6,323	3,753	2,544	3,962	515	33									85,311	44,360	15,558
1989 - LWRs	92,652	48,762	19,478	15,659	8,814	5,541	8,701	1,189	99	11								200,906	108,254	35,939
1988 - PWRs	47,866	27,177	11,014	9,260	5,563	3,541	5,405	829	127	4		1						110,787	62,921	22,786
1988 - BWRs	47,679	16,044	6,736	5,609	3,311	2,397	4,859	1,129	215	5								87,984	40,305	18,092
1988 - LWRs	95,545	43,221	17,750	14,869	8,874	5,938	10,264	1,958	342	9		1						198,771	103,226	40,878
1987 - PWRs	48,870	27,070	10,796	8,828	5,152	3,442	6,187	988	124	10								111,467	62,597	23,684
1987 - BWRs	43,688	17,711	7,027	5,739	3,447	2,383	4,578	723	117	12								85,425	41,737	16,717
1987 - LWRs	92,558	44,781	17,823	14,567	8,599	5,825	10,765	1,711	241	22								196,892	104,334	40,401
1986 - PWRs	44,016	29,758	10,128	8,159	4,784	3,059	5,594	1,244	239	30								107,011	62,995	23,032
1986 - BWRs	29,232	15,075	5,865	4,962	2,996	2,121	5,084	1,426	354	45								67,160	37,928	19,349
1986 - LWRs	73,248	44,833	15,993	13,121	7,780	5,180	10,678	2,670	593	75								174,171	100,923	42,381
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 - 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 - 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 - PWRs	37,875	24,887	8,599	6,585	4,133	2,998	6,781	2,253	681	77								94,869	56,994	28,138
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 - LWRs	59,616	39,884	14,764	11,492	7,166	5,396	12,460	4,967	1,675	295								157,715	98,099	55,235

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10. SUPPLEMENTARY NOTES

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 1990. 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 1990 annual reports submitted by about 443 licensees indicated that approximately 214,568 individuals were monitored, 110,204 of whom were monitored by nuclear power facilities. They incurred an average individual dose of 0.19 rem (cSv) and an average measurable dose of about 0.36 (cSv). Termination radiation exposure reports were analyzed to reveal that about 113,361 individuals completed their employment with one or more of the 443 covered licensees during 1990. Some 77,633 of these individuals terminated from power reactor facilities, and about 11,083 of them were considered to be transient workers who received an average dose of 0.67 rem (cSv).

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

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

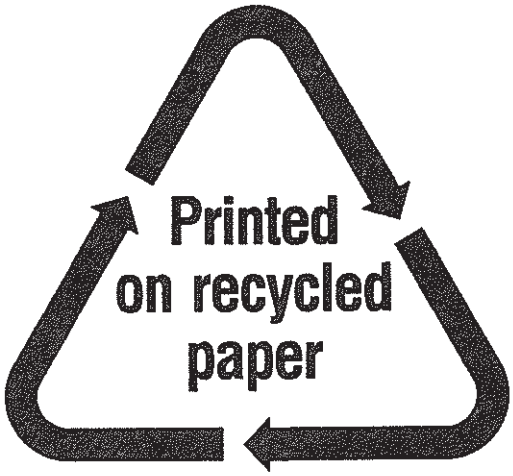
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