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Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities 1993

Twenty-Sixth 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.
NUREG-0713	Occupational Radiation Exposure At Commercial Nuclear Power Reactors and Other Facilities 1990, Vol. 12, U.S. Nuclear Regulatory Commission, January 1993.
NUREG-0713	Occupational Radiation Exposure At Commercial Nuclear Power Reactors and Other Facilities 1991, Vol. 13, U.S. Nuclear Regulatory Commission, July 1993.
NUREG-0713	Occupational Radiation Exposure At Commercial Nuclear Power Reactors and Other Facilities 1992, Vol. 14, U.S. Nuclear Regulatory Commission, December 1993.

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 1993 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 licensees also submit exposure information for terminating employees pursuant to 10 CFR § 20.408. Analysis of this "termination" data is also presented in this report.

Annual reports for 1993 were received from a total of **360** NRC licensees, **114** LWRS reported of which were operators of nuclear power reactors. Compilations of the 360 reports indicated that **189,711** individuals were monitored, **94,186** of whom received a measurable dose (Table 3.1). The collective dose incurred by these individuals was calculated to be **29,045** person-cSv (person-rem)[2] which represents an **11% decrease** from the 1992 value. The number of workers receiving a measurable dose also decreased, resulting in the average measurable dose of **0.31** cSv (rem) for 1993. The average measurable dose is defined to be the total collective dose divided by the number of workers receiving a measurable dose. These figures have been adjusted to account for transient reactor workers.

In 1993, the annual collective dose per reactor for light water reactor licensees (LWRs) was **240** person-cSv (person-rem). This represents a **10%** decrease from the 1992 value of 266 person-cSv (person-rem). The annual collective dose per reactor for boiling water reactors (BWRs) was **330** person-cSv (person-rem) and, for pressurized water reactors (PWRs), it was **194** person-cSv (person-rem).

A total of **140,216** termination reports (Table 5.1) were submitted to the NRC which contained personal identification and exposure information for **99,749** individuals who had completed their work assignment or employment with a covered category of NRC licensees during 1993. Analyses of these termination data indicate that **12,685** individuals completed work assignments at two or more nuclear reactor facilities during calendar year. 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 1993, the average measurable dose calculated from reported data was **0.27** cSv (rem). The corrected dose distribution resulted in an average measurable dose of **0.31** cSv (rem).

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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 five-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.

Comments should be directed to:

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FOREWORD

Based on information received from 360 licensees required to submit annual reports, collective doses decreased by 10% in 1993 as compared to 1992 figures. The annual collective dose decreased by 10% at light-water reactors from the 1992 data. Collective doses reported by industrial radiographers, low-level disposal facilities, and fuel fabricators showed a decrease, whereas manufacturers and distributors showed an increase. There was also an increase in the number of workers in this area for 1993.

NUREG-0713, Volume 15, summarizes the occupational exposure data for 1993 that are maintained in the U.S. Nuclear Regulatory Commission's Radiation Exposures Information Reporting System (REIRS). 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.

As of November 1994 I have taken over as the new Project Officer for the REIRS database. Charleen Radddatz has moved on to other projects. She served well in her capacity as the former Project Officer. All future comments should be directed to Mary L. Thomas at 301-415-6230 or MLT1@NRC.GOV.

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PREFACE

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

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

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

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

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

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

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

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

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

Occupational Radiation Exposure
at Commercial Nuclear Power Reactors and Other Facilities
Twenty-sixth Annual Report, 1993

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.

In January 1975, with the separation of the AEC into the Energy Research and Development Administration (ERDA) and the U.S. Nuclear Regulatory Commission

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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.

(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 Office of Health, a division of Environment, Safety and Health, in 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.)

In May of 1991, the Revised 10 CFR Part 20 "Standards for Protection Against Radiation; Final Rule" was published in the Federal Register. The revision redefined the radiation monitoring and reporting requirements of NRC licensees. Instead of summary annual reports (§20.407) and termination reports (§20.408), licensees are now required to submit an annual report of the dose received by each monitored worker (Revised §20.2206). Licensees are required to implement the new requirements on or before January of 1994. This regulatory change will have a significant impact on the content and structure of future documents in the NUREG-0713 series, but since only a few licensees implemented the requirements during 1993, the 1993 report continues to present the data and analyses as appropriate under the "old" 10 CFR Part 20. The licensee reports submitted under the Revised Part 20 have been incorporated into the analyses presented in this document.

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 cSv (rem), so 0.312 cSv (rem) 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 calculated 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, 90% of the nuclear power reactors reported the actual collective dose in 1993 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 Revised 10 CFR § 20 was published in the Federal Register on May 21, 1991. With the revision of Part 20, licensees will be required to report the monitoring results for each individual likely to exceed 10% of the regulatory limits during the monitoring year. This will eliminate the need for the staff to calculate collective dose from the statistical distributions and will further improve the accuracy of the collective dose information presented in this report. Licensees are required to implement the new reporting requirements as of January 1, 1994. Certain licensees began reporting under these new requirements during 1993, and the data have been included in the analyses presented here. (See Sections 3.1.1 and 5.1)

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 for the year (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, fluoroscopy, and accelerators. Information shown for these categories does not reflect the total U.S. experience.

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4 States that have entered into an agreement with the NRC that allows each state to license organizations using radioactive materials for certain purposes. As of 01/1/94, there are 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 workers whom they monitored for exposure to radiation. Since the regulations do not require these licensees to report the collective dose incurred by the workers 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).

The Revised 10 CFR § 20 was published in the Federal Register on May 21, 1991. § 20.2206 of the revised rule requires licensees to report the radiation exposure monitoring results for each individual for the monitoring year. Licensees were required to implement the new reporting requirements on or before January 1, 1994.

For 1993, 79% of NRC licensees reported under the "old" 10 CFR § 20 and submitted annual dose distributions under § 20.407. The remaining 21% of the licensees submitted annual reports of individual exposure under the Revised 10 CFR § 20.2206. Some licensees reported under both regulations to ensure proper reporting, since they may have operated under both new and old regulations during the year.

For those licensees submitting under the new requirements, the individual's total effective dose equivalent (TEDE), as defined in the Revised § 20.1003, was summed per individual and tabulated into the appropriate dose range for comparative analysis in this report. For these reports, the total collective dose is considered more accurate, since the licensee reported the dose to each individual and the total collective dose was calculated from the sum of these doses and not statistically derived from the distribution (see Section 3.1.4). The TEDE includes the dose contribution from the committed effective dose equivalent (CEDE) for those workers who had intakes that required monitoring and reporting of internal dose. Reports submitted under the "old" 10 CFR § 20.407 did not include the whole body contribution from internal dose.

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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.

3.1.2 Number of Monitored Workers

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

For licensees submitting under the Revised 10 CFR § 20.2206, the total number of workers was determined from the number of unique identification numbers submitted per licensee.

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 workers having less than measurable doses from the total number of monitored workers. This figure is used to calculate the average measurable dose per worker because it deletes those workers who received exposures too small to be detected by personnel monitoring devices. Many of the deleted workers probably did not routinely work in radiation areas and were monitored for convenience or for identification purposes.

For licensees submitting under the Revised 10 CFR § 20.2206, the number of workers with measurable dose includes any individual with a TEDE greater than zero cSv (rem). This does not include workers with a TEDE reported as zero, not detectable - ND, or not required to be reported - NR. [Ref. 18]

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 workers and has the units person-cSv (person-rem).[6] Since 10 CFR § 20.407 does not require licensees to list their collective dose on the required annual dose distribution report, the staff must calculate this collective dose (when it is not provided) from the reports by summing the products obtained from

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6 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.

multiplying the number of workers reported in each of the dose ranges by the midpoint of the corresponding dose 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 workers reported in each dose range is less than the midpoint of the range, and therefore the resultant calculated collective doses shown in this report for these licensees may be about 10% higher than the sum of the actual individual doses. 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.

For 1993, approximately 90% of the power reactor licensees reported the actual collective dose with the § 20.407 annual reports. Also for 1993, several of the non-reactor licensees began reporting the collective dose voluntarily. In addition, some of these licensees implemented the reporting requirements of the Revised 10 CFR § 20, which requires the reporting of the TEDE to each individual (see Section 3.1.1). When provided, the actual collective dose was used in the analysis.

3.1.5 Average Individual Dose

The average individual dose is obtained by dividing the collective dose by the total number of workers reported as being monitored. This figure is usually less than the average measurable dose because it includes the number of those workers 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 workers receiving zero or minimal doses, many of whom were monitored for convenience or identification purposes.

3.1.7 Number of Licensees Reporting

The number of licensees refers to the 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 same categories of licensees are required to report under the Revised 10 CFR § 20.2206. The third column in Table 3.1 shows the number of licensees

that have filed such reports during the last ten years. Agreement 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 workers whose annual doses exceed 1.5[7] cSv 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 cSv (rem). The last column in Table 3.1 shows the values of CR for the different types of licensees. One can see that all categories have a CR that is less than 0.50 and that 1993 is the ninth year in a row the CR for commercial LWRs, and the grand total for all licensees, has been 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 each licensee category). In nearly every category a large number of workers receive doses that are less than measurable, and very few doses exceed 4 or 5 cSv (rem). About 90% of the reported workers 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 cSv (rem) are not necessarily classified as personnel overexposures. Although 1.25 cSv (rem) 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 to receive a whole body dose of 3 cSv (rem) per calendar quarter [up to 12 cSv (rem) 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) cSv (rem), where N equals the

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7 The collective dose of workers with doses exceeding 1.5 cSv (rem) was calculated by assuming that half of the collective dose incurred by workers with doses between 1 and 2 cSv (rem) was due to doses greater than 1.5 cSv (rem). 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
1984 - 1993

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	1993	176	4,720	3,006	1,627	0.34	0.54	0.44
	1992	246	6,703	4,265	1,864	0.28	0.44	0.37
	1991	248	6,820	4,649	2,160	0.31	0.46	0.40
	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	1,836	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
Manufacturing and Distribution	1993	58	4,913	2,254	680	0.14	0.30	0.47
	1992	67	5,210	2,250	784	0.15	0.35	0.54
	1991	59	4,930	1,952	722	0.15	0.37	0.59
	1990	58	4,203	2,279	693	0.16	0.30	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
Low-Level Waste Disposal	1993	2	432	76	21	0.05	0.27	0.22
	1992	2	467	82	37	0.08	0.45	0.34
	1991	2	905	147	39	0.04	0.27	0.24
	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
Independent Spent Fuel Storage	1993	2	135	52	14	0.10	0.26	0.11
	1992	2	290	85	11	0.04	0.13	0.00
	1991	2	41	24	4	0.10	0.17	0.00
	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
Fuel Fabrication and Processing	1993	8	9,649	2,611	339	0.04	0.13	0.08
	1992	11	8,439	5,061	545	0.06	0.11	0.03
	1991	11	11,702	3,929	378	0.03	0.10	0.01
	1990	11	14,505	3,871	422	0.03	0.11	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
Commercial Light Water Reactors***	1993	114	169,862	86,187	26,365	0.16	0.31	0.22
	1992	114	183,900	94,317	29,298	0.16	0.31	0.24
	1991	115	179,043	91,085	28,528	0.16	0.31	0.26
	1990	116	187,081	98,802	36,607	0.20	0.37	0.33
	1989	113	188,477	100,080	35,930	0.19	0.36	0.33
	1988	111	193,532	96,653	40,055	0.21	0.41	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
Grand Totals and Averages	1993	360	189,711	94,186	29,045	0.15	0.31	0.22
	1992	442	205,009	106,060	32,538	0.16	0.31	0.24
	1991	437	203,441	101,786	31,831	0.16	0.31	0.27
	1990	447	213,152	109,547	39,874	0.19	0.36	0.34
	1989	449	212,474	109,990	39,078	0.18	0.36	0.34
	1988	427	215,662	105,841	42,886	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	47,500	0.23	0.44	0.46
	1984	506	189,782	108,748	59,417	0.31	0.55	0.56

* These categories consist only of NRC licensees. Agreement State licensed organizations do not report occupational exposure data to the NRC.

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

*** Includes all LWRs in commercial operation, although some of them may not have been in operation for a full year. All reactor data are adjusted to account for the multiple counting of transient reactor workers. (see Section 5)

TABLE 3.2
DISTRIBUTION OF ANNUAL WHOLE BODY DOSE BY LICENSE CATEGORY
1993

LICENSE CATEGORY (No. reporting)	*Number of Individuals with Whole Body Doses in the Ranges (cSv or rem)														TOTAL NUMBER MONITORED	NUMBER WITH MEAS. DOSE	TOTAL COLLECTIVE DOSE (person-cSv)
	No Meas.	Meas. <0.1	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			
INDUSTRIAL RADIOGRAPHY																	
Single Location (39)	492	147	13	15	3	1	4								675	183	23
Multiple Location (137)	1,222	806	542	507	276	196	335	113	38	8	2				4,045	2,823	1,603
Total (176)	1,714	953	555	522	279	197	339	113	38	8	2				4,720	3,006	1,627
MANUFACTURING AND DISTRIBUTION																	
"A" - Broad (8)	1,530	452	101	86	43	32	133	63	12	3					2,455	925	512
Limited (50)	1,129	1,003	173	85	38	19	10	1							2,458	1,329	168
Total (58)	2,659	1,455	274	171	81	51	143	64	12	3					4,913	2,254	680
LOW-LEVEL WASTE DISPOSAL																	
Total (2)	356	38	16	7	7	2	6								432	76	21
INDEPENDENT SPENT FUEL STORAGE																	
Total (2)	83	26	10	8	3	3	2								135	52	14
FUEL FABRICATION																	
Total (8)	7,038	1,784	544	212	31	17	17	6							9,649	2,611	339
COMMERCIAL POWER REACTORS**																	
Boiling Water (38)	36,118	16,378	7,853	6,444	3,676	2,188	2,636	151	1	1					75,446	39,328	12,222
Pressurized Water (76)	57,483	25,599	12,348	9,665	4,636	2,224	2,052	83	1						114,091	56,608	14,143
Total (114)	93,601	41,977	20,201	16,109	8,312	4,412	4,688	234	2	1					189,537	95,936	26,365
GRAND TOTALS	105,451	46,233	21,600	17,029	8,713	4,682	5,195	417	52	12	2				209,386	103,935	29,045

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

** Includes all reactors in commercial operation during 1993, although some of them may not have been in operation for a full year. These values have not been adjusted for the multiple counting of transient reactor workers (see Section 5).

individual's age in years. Although there is currently no annual limit, annual exposures that exceed 12 cSv (rem) indicate that an exposure in excess of regulatory limits has occurred.

Under the regulatory limits of the Revised 10 CFR § 20.1201, annual TEDE in excess of 5 cSv (rem) for occupationally exposed adults are, by definition, overexposures.

Table 3.3 gives a summary of the annual whole body exposures reported to the Commission by certain categories of NRC licensees as required by 10 CFR § 20.407. Table 3.3 shows that about 95% of the exposures have consistently remained less than 2 cSv (rem) between 1968 and 1984. For the past 8 years the percentage of workers with less than 2 cSv (rem) has been greater than or equal to 98%. The number of workers receiving an annual exposure in excess of 5 cSv (rem) 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 1993. There are a few characteristics of these distributions that 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 cSv (rem) are included in the value plotted at 0.1 cSv (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.

Another feature of these types of graphs is that several comparisons of various dose distributions can be made quickly. For example, Figure 3.1 shows that in 1993 about 50% of the workers monitored by firms licensed for independent spent fuel storage received doses that were less than 0.1 cSv (rem), while all of the workers monitored at fuel fabrication facilities

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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.

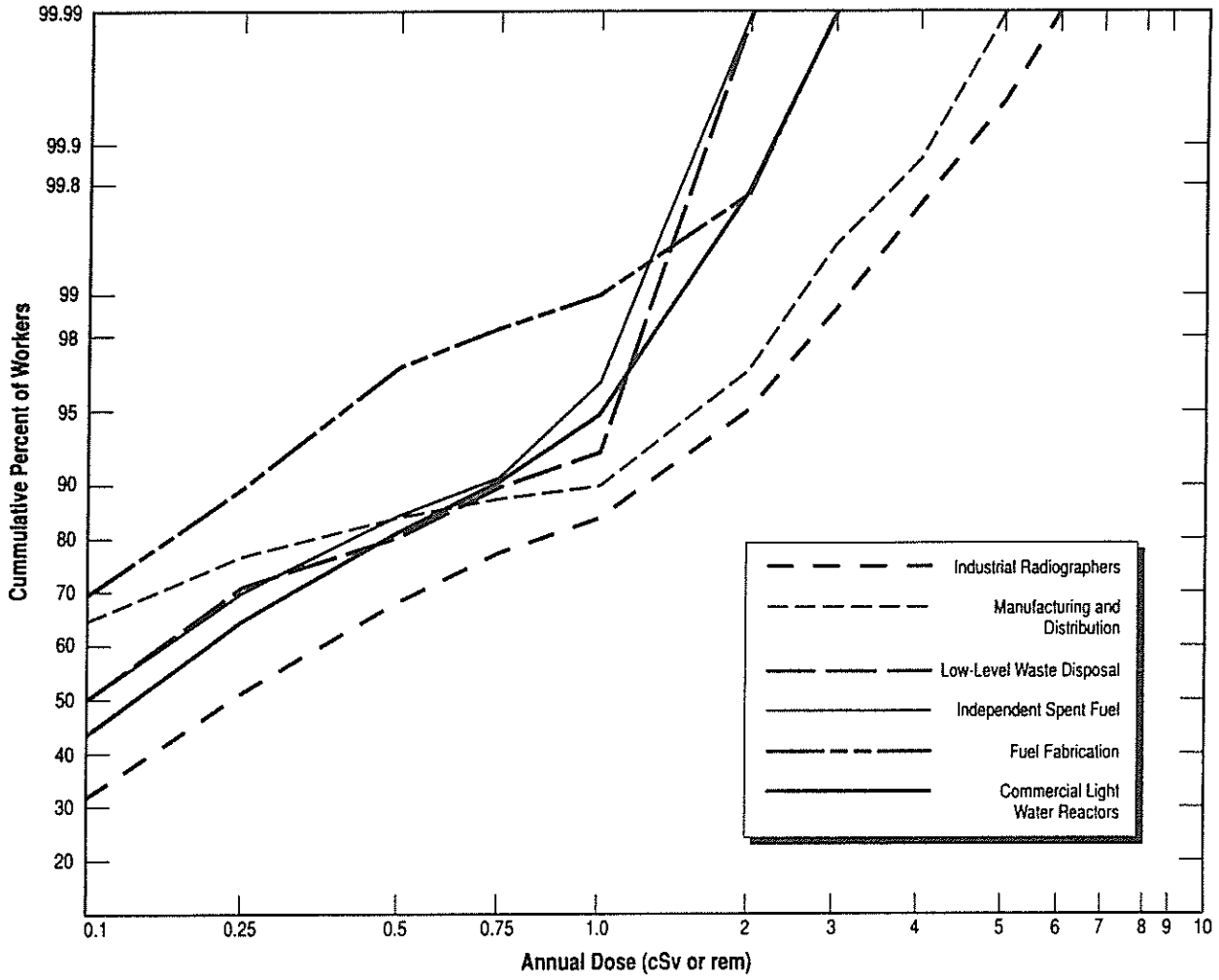
TABLE 3.3
SUMMARY OF ANNUAL DOSE DISTRIBUTIONS FOR CERTAIN NRC LICENSEES

1968-1993

Year	Total Number of Monitored Persons: Reported Number	Total Number of Monitored Persons: Corrected Number*	Percent of Individuals With Doses <2 cSv*	Percent of Individuals With Doses <5 cSv*	Number of Individuals With Doses >12 cSv*
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% (15)	2
1986	225,582	213,017	98.0%	>99.99% (8)	0
1987	243,562	227,997	98.7%	>99.99% (4)	1
1988	231,234	215,662	98.6%	>99.99% (8)	0
1989	229,353	212,474	98.9%	>99.99% (7)	1
1990	234,045	214,781	98.9%	>99.99% (3)	0
1991	219,229	206,732	99.4%	>99.99% (2)	0
1992	222,728	205,009	99.4%	>99.99% (1)	0
1993	209,386	189,711	99.5%	>99.99% (2)	0

* Data for 1977-1993 are based on the distribution of individual doses after adjusting for the multiple counting of transient reactor workers (see Section 5). The number of people exceeding 5 cSv is shown in parentheses from 1985-1993.

Figure 3.1
Annual Dose Distribution of Workers at Certain NRC Licensees 1993



License Category	Average Meas. Dose	CR*
Industrial Radiographers	0.54	0.44
Manufacturing and Distribution	0.30	0.47
Low-Level Waste Disposal	0.27	0.22
Independent Spent Fuel	0.26	0.11
Fuel Fabrication	0.13	0.08
Commercial Light Water Reactors	0.31	0.22

* CR is the ratio of the dose delivered at individual doses exceeding 1.5 cSv 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.

received doses less than 3.00 cSv (rem). 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.

The relative positions and curvature of the graphs are indicative of certain characteristics of the dose distributions. The position of the 1993 plot of the dose distribution of workers at fuel fabrication facilities above that of the other plots indicates smaller values of the average dose 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 cSv (rem) in 1993 as compared to other licensed activities.

The tendency of the plots to curve upward for doses greater than 1 cSv (rem) 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 log-normal. 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 that reduces exposures reported at higher doses can be seen in the plot for independent spent fuel storage facilities. The relatively low points on the curve between 0.10 and 0.25 cSv (rem) indicate a large percentage of workers receiving dose in this range, while the curve takes a steep upwards turn at 0.75 cSv (rem) indicating tighter controls limiting exposure above this level. This distribution characteristic is further demonstrated for the independent spent fuel facilities where the average measurable dose is 0.26 cSv (rem), and the CR value is 0.11.

3.3 Summary of Occupational Exposure Data by License Category

3.3.1 Industrial Radiography Licenses, Single and Multiple Locations

Industrial radiography 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 that was designed and shielded for

TABLE 3.4
ANNUAL EXPOSURE INFORMATION FOR INDUSTRIAL RADIOGRAPHERS

1991-1993

Year	Type of License	Number of Licenses	Number of Monitored Workers	Workers with Measurable Doses	Collective Dose (person-cSv or person-rem)	Average Measurable Dose (cSv or rem)
1993	Single location	39	673	183	23	0.13
	Multiple locations	137	4,046	2,824	1,603	0.57
	Total	176	4,721	3,007	1,627	0.54
1992	Single location	48	771	182	37	0.20
	Multiple locations	198	5,932	4,082	1,827	0.45
	Total	246	6,703	4,265	1,864	0.44
1991	Single location	56	822	338	44	0.13
	Multiple locations	192	5,998	4,311	2,116	0.49
	Total	248	6,820	4,649	2,160	0.46

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 176 radiography licensees in 1993, which is 70 less than those reporting in 1992. Table 3.4 summarizes the reported data for the two types of radiography licenses for 1993 and for the previous two years for comparison purposes.

For each of the years shown, the average measurable dose for workers performing radiography at a single location ranged from 20 to 40 percent of the average measurable dose of workers at multiple location facilities. This is 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 1993 is presented in Appendix A in descending order of average measurable dose.

In 1993, 22 multiple location radiography licensees reported average measurable doses greater that 1.0 cSv (rem). Two of these licensees exceeded an average measurable dose of 2.0 cSv (rems). This is the same number of licensees reporting an average measurable dose above 2.0 cSv (rems) as for 1992, with one of the licensees exceeding 2.0 cSv (rem) both years.

High exposures in radiography can be directly attributable to the type and location of the radiography field work. For example, locations such as oil drilling platforms and aerial tanks offer the radiographer little available shielding. In these situations there may not be an opportunity to use distance as a means of minimizing exposure and achieving ALARA. While these licensed activities usually result in average measurable doses that are higher than other licensees, they involve a relatively small number of exposed workers.

Figure 3.2 shows the number of workers with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose per worker for both types of industrial radiography facilities from 1973 through 1993.

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 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 1993 and the previous two years. Looking at the information shown separately for the Type "A" Broad and Limited licensees, it can be seen 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, it should be noted 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

Figure 3.2
Average Annual Values at Industrial Radiography Facilities 1973 – 1993

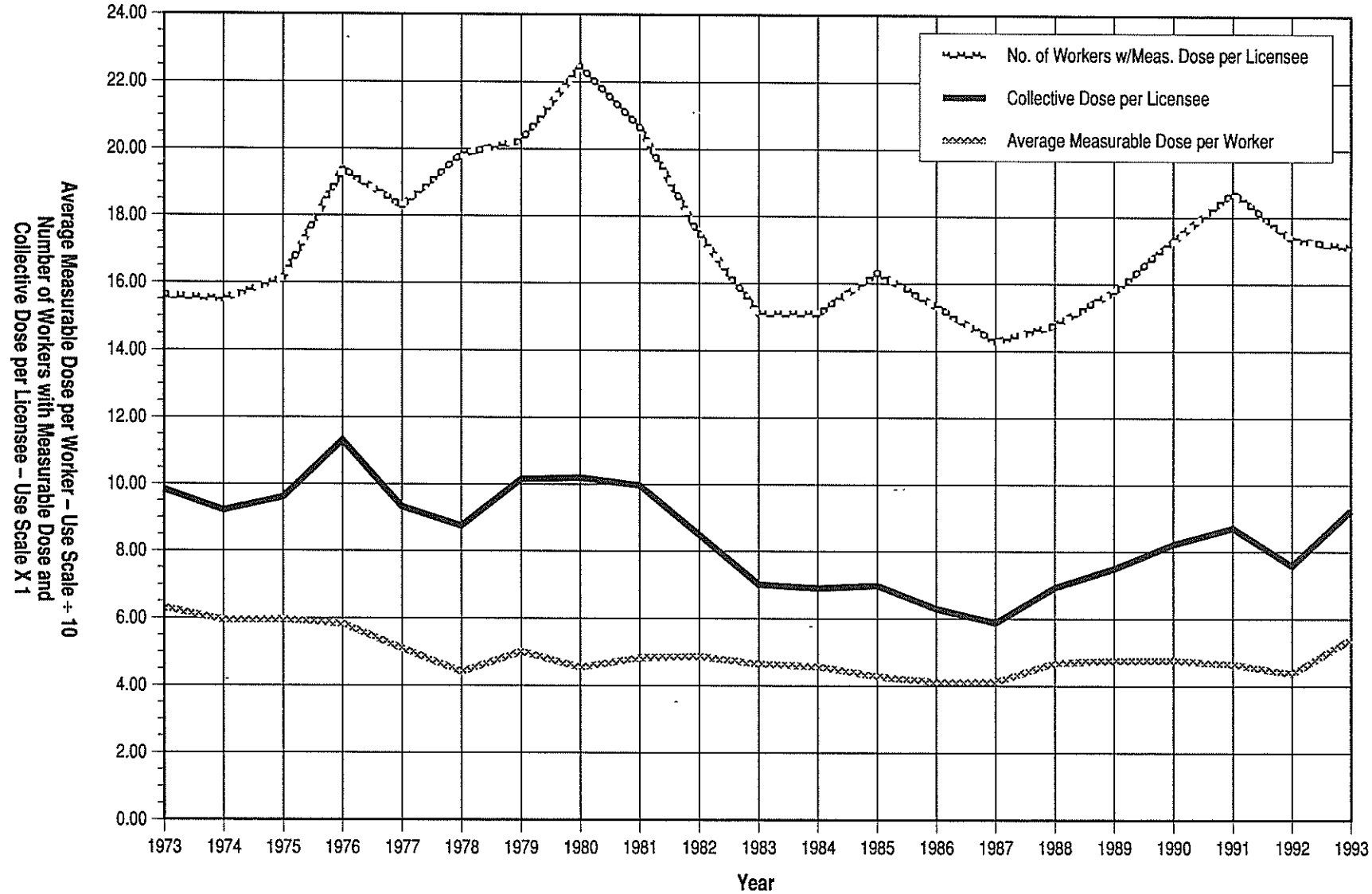


TABLE 3.5
ANNUAL EXPOSURE INFORMATION FOR MANUFACTURERS AND DISTRIBUTORS

1991-1993

Year	Type of License	Number of Licenses	Number of Monitored Workers	Workers with Measurable Doses	Collective Dose (person-cSv or person-rem)	Average Measurable Dose (cSv or rem)
1993	M & D-"A"-Broad	8	2,455	925	512	0.55
	M & D-Limited	50	2,458	1,329	168	0.13
	Total	58	4,913	2,254	680	0.30
1992	M & D-"A"-Broad	11	3,632	1,674	718	0.43
	M & D-Limited	56	1,578	576	72	0.13
	Total	67	5,210	2,250	784	0.35
1991	M & D-"A"-Broad	12	3,732	1,443	674	0.47
	M & D-Limited	46	1,198	513	47	0.09
	Total	58	4,930	1,956	721	0.37

next and may be included as a Broad licensee one year and a Limited licensee at other times. Since the number of reporting licensees is quite small, these fluctuations may have a significant impact on the values of the parameters.

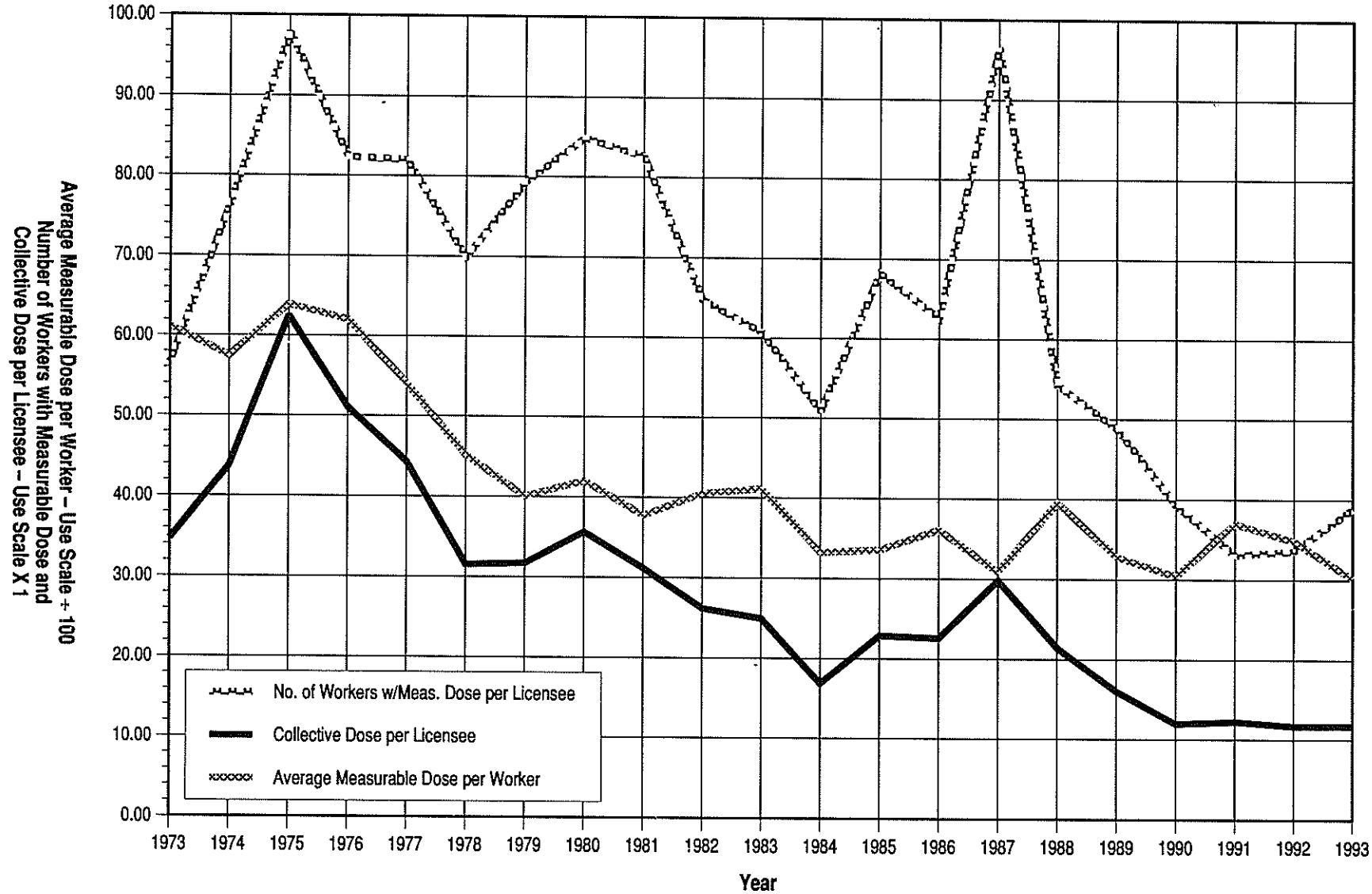
Figure 3.3 shows the number of workers with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose per worker for both Type "A" Broad and Limited manufacturing and distribution facilities.

In order to see the contribution that each of these licensees made toward the total values of the number of workers 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 1993.

3.3.3 Low-Level Waste Disposal Licenses

Low-level waste disposal 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

Figure 3.3
Average Annual Values at Manufacturing and Distribution Facilities 1973 – 1993



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 1984 through 1993. Appendix A summarizes the exposure information reported by these two licensees in 1993.

Figure 3.4 shows the number of workers with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose per worker for low-level waste disposal facilities from 1982 through 1993. Since only two licensees have been involved in this activity over the past ten years, the numbers have remained fairly stable from 1984 through 1993.

3.3.4 Independent Spent Fuel Storage Installation Licenses

Independent spent fuel storage installation 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.

Five licenses have been issued for these activities, four at nuclear power plants and one at an independent facility. Three of the reactor facilities reported the exposure information for the fuel storage activities along with other activities performed 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 1993. Appendix A summarizes the exposure information reported by these two installations. A contributing factor to the relatively high average dose reported for the years prior to 1987 was that the licensees reported the doses of only those workers <u>required</u> to be monitored for exposure to radiation, unlike most other licensees which report the doses of all workers for whom monitoring was <u>provided</u>. This had a tendency to result in the calculation of a higher average dose.

Figure 3.4
Average Annual Values at Low-Level Waste Disposal Facilities 1982 – 1993

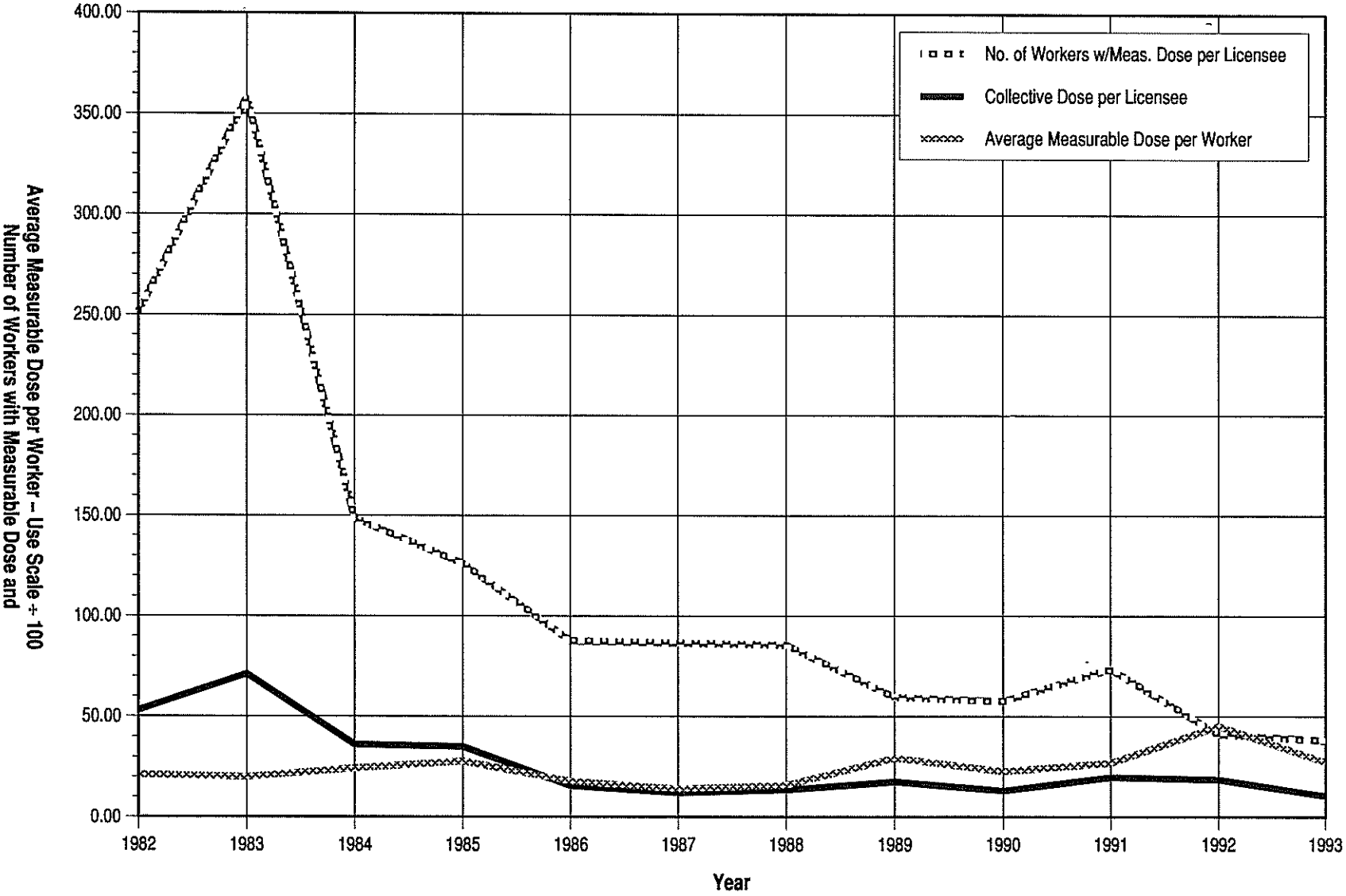


Figure 3.5 shows the number of workers with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose per worker for independent spent fuel storage facilities.

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.

Figure 3.6 shows the number of workers with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose per worker for fuel fabrication licensees. Appendix A lists each of the licensees reporting in 1993, with the number of workers monitored, the number of workers receiving measurable external doses, and the collective dose for each licensee in descending order of average measurable dose.

Table 3.6 shows that there were eight fuel fabrication facilities in 1993. 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.

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

Figure 3.5
Average Annual Values at Independent Spent Fuel Storage Facilities 1982 – 1993

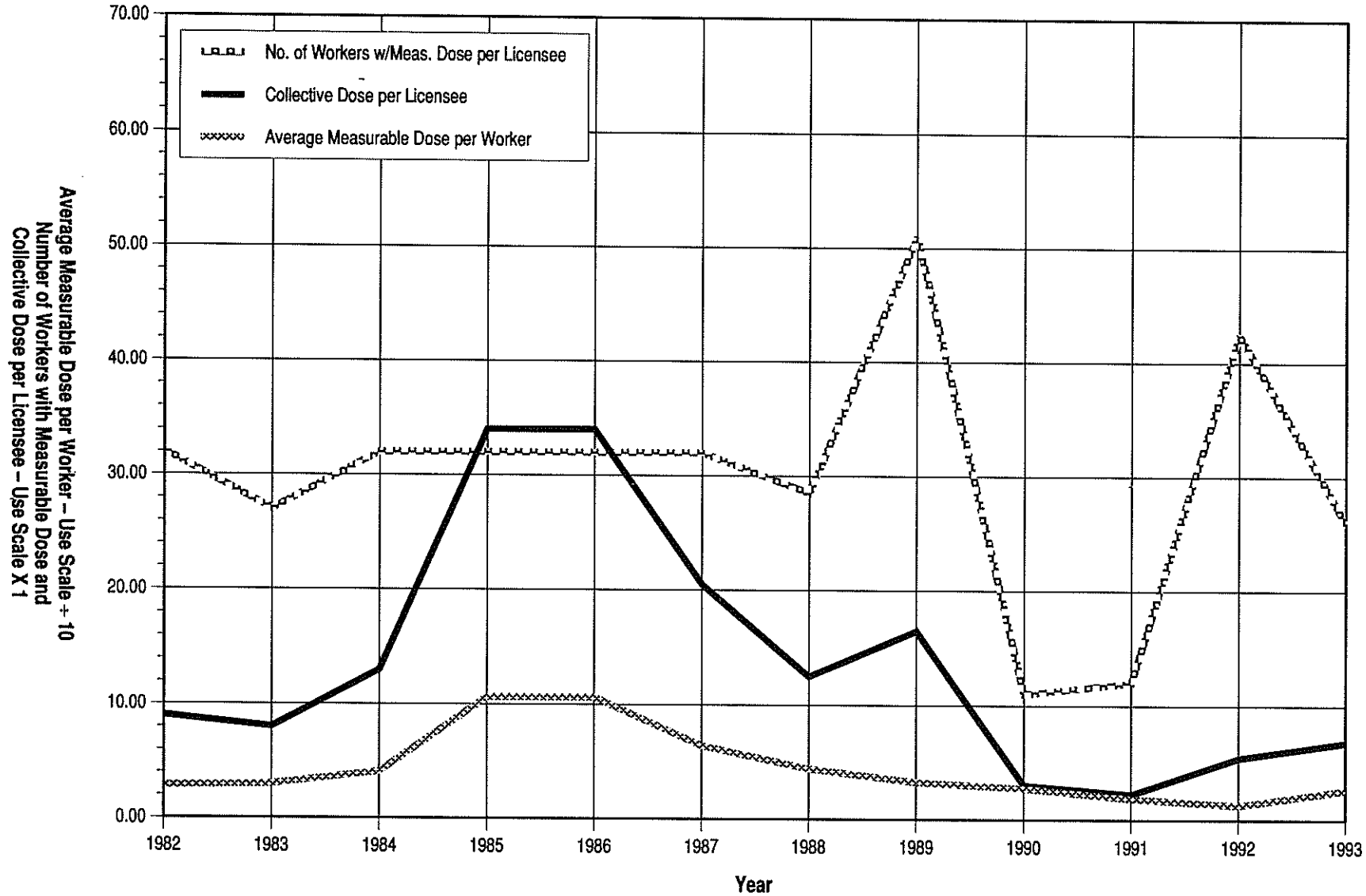


Figure 3.6
Average Annual Values at Fuel Fabrication and Processing Facilities 1973 – 1993

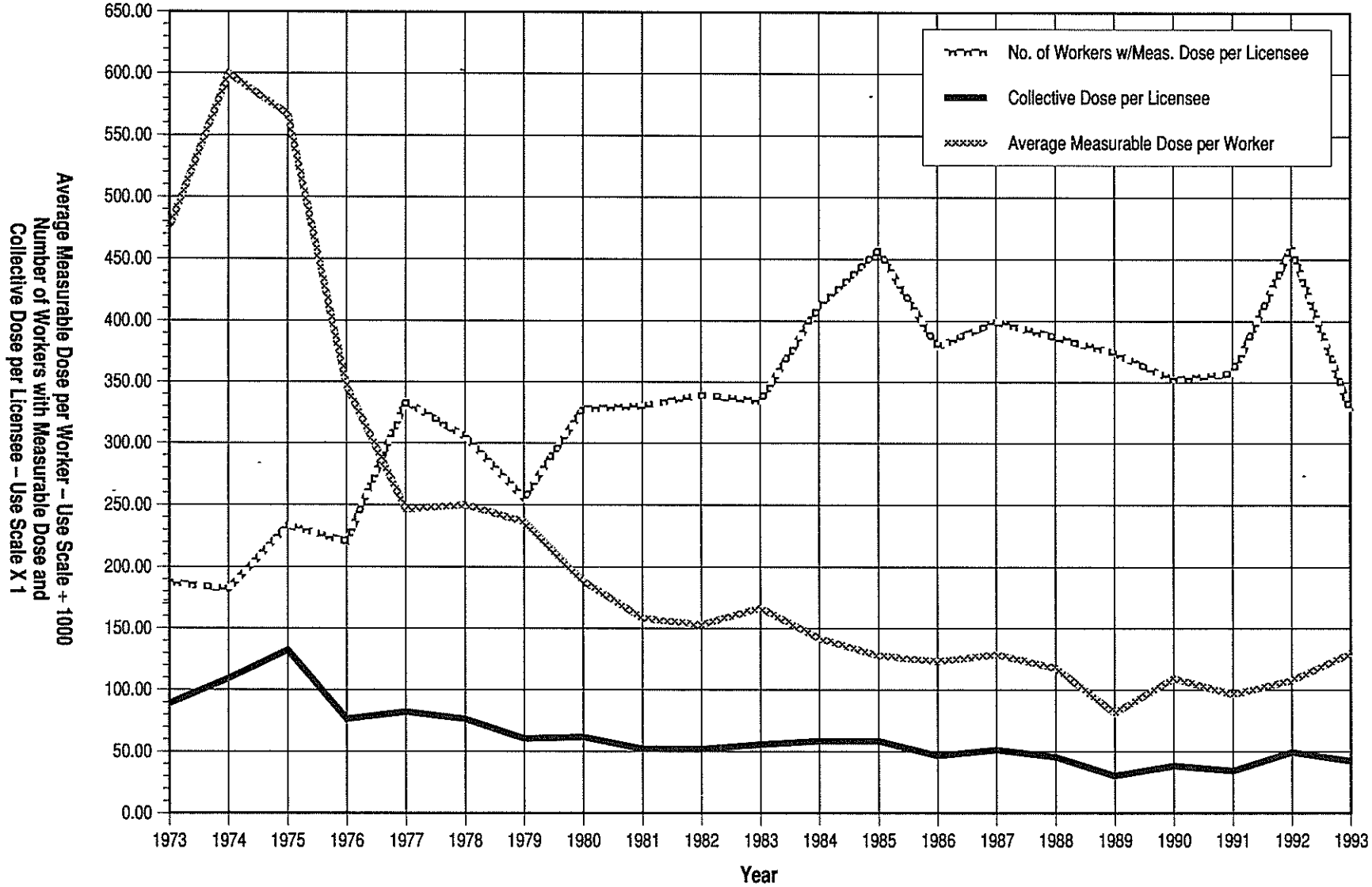


TABLE 3.6
ANNUAL EXPOSURE INFORMATION FOR FUEL FABRICATORS
1991-1993

Year	Type of License	Number of Licenses	Number of Monitored Workers	Workers with Measurable Doses	Collective Dose (person-rems or person-cSv)	Average Measurable Dose (rems or cSv)
1993	Uranium Fuel Fab	8	9,649	2,611	339	0.13
1992	Uranium Fuel Fab	11	8,439	5,061	545	0.11
1991	Uranium Fuel Fab	11	11,702	3,929	378	0.10

3.3.6 Light Water-Cooled Power Reactor (LWR) Licenses

LWR licenses are issued to utilities to allow them to use special nuclear material in a reactor that produces heat to generate 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.

Table 3.1 shows the number of licensees, total number of monitored workers, the number of workers with measurable dose, the total collective dose, and average dose per worker for all reports received from reactor facilities that were in commercial operation for the years 1984 through 1993. This includes reactors that may not have been in commercial operation for a full year. Data for 1984 through 1988 included all reactors that reported, even though some of them were shut down. Data for 1989 through 1993 do not include reactors that have been shut down. It is important to note that these figures have been adjusted for the multiple counting of transient reactors workers (see Section 5). The reported dose distribution of workers monitored at each plant site is presented in alphabetical order by site name in Appendix B.

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

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

A license to operate a power reactor is issued to utilities to allow them to use special nuclear material in a reactor to produce heat to generate electricity to be sold to consumers. In the HTGR, a gas, usually helium, is used as the primary coolant. Fort St. Vrain near Greeley, Colorado, was the

only such reactor in operation in the U.S. but has not been in commercial operation since 1989. Table 3.7 shows the annual whole body doses incurred by workers at the plant. In 1993, the doses have increased significantly due to decontamination and decommissioning operations.

TABLE 3.7
ANNUAL EXPOSURE INFORMATION FOR FORT ST. VRAIN
1974-1993

Year	No. of Individuals with Annual Doses in Ranges (cSv or rem)				Total No. of Workers Monitored	Annual Collective Dose (person-cSv or person-rem)	Gross Electricity Generated (MW-yr)	Average Measurable Dose per Worker (cSv or rem)
	No Meas'ble Dose	Meas'ble Dose <0.10	0.10-0.25	0.25-3.00				
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
1991	525	63	9	4	601	5.4	0.0	0.07
1992	520	144	36	34	734	25.4	0.0	0.12
1993	657	51	37	78	823	75.2	0.0	0.45

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 had been in commercial operation for less than twelve months during the first year and reactors that have been permanently defueled. 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 taken from Reference 14.

Three Mile Island 2 had been included in the compilation of data for commercially operating reactors through 1988 even though 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 has <u>not</u> been included in the data analysis since 1988. 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 electricity generated (in megawatt-years) that is presented in Tables 4.1, 4.2, and 4.3 is the summation of electricity generated by the number of reactors included in each year. These sums are divided by the number of

TABLE 4.1

SUMMARY OF ANNUAL INFORMATION REPORTED BY COMMERCIAL BOILING WATER REACTORS*

1973-1993

Year	Number of Reactors Included	Annual Collective Doses (person-cSv or person-rem)	No. of Workers With Measurable Doses	Gross Electricity Generated (MW-yr)	Average Dose Per Worker (cSv or rem)	Average Collective Dose Per Reactor (person-cSv or person-rem)	Average No. Personnel With Measurable Doses Per Reactor	Average Collective Dose per MW-yr (person-cSv /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	1.34	283	438
1974	14	7,095	8,769	4,060.2	0.81	507	626	1.75	290	485
1975	18	12,611	14,607	5,786.4	0.86	701	812	2.18	321	595
1976	22	12,300	16,604	8,137.9	0.74	559	755	1.51	370	630
1977	23	19,041	21,388	9,102.5	0.89	828	930	2.09	396	637
1978	25	15,273	20,278	11,856.0	0.75	611	811	1.29	474	660
1979	25	18,325	25,245	11,671.0	0.73	733	1,010	1.57	467	660
1980	26	29,530	34,094	10,868.2	0.87	1,136	1,311	2.72	418	663
1981	26	25,471	34,755	10,899.2	0.73	980	1,337	2.34	419	663
1982	26	24,437	32,235	10,614.6	0.76	940	1,240	2.30	408	663
1983	26	27,455	33,473	9,730.1	0.82	1,056	1,287	2.82	374	663
1984	27	27,097	41,105	10,019.2	0.66	1,004	1,522	2.70	371	754
1985	29	20,573	38,237	12,284.0	0.54	709	1,319	1.67	424	775
1986	30	19,349	37,928	12,102.1	0.51	645	1,264	1.60	403	786
1987	32	16,717	41,737	15,109.0	0.40	522	1,304	1.11	472	832
1988	34	17,983	40,305	16,665.4	0.45	529	1,185	1.08	490	845
1989	36	15,549	44,360	17,543.5	0.35	432	1,232	0.89	487	857
1990	37	15,780	41,577	21,336.1	0.38	426	1,124	0.74	577	862
1991	37	12,005	38,492	21,505.8	0.31	324	1,040	0.56	581	860
1992	37	13,309	42,095	20,592.2	0.32	360	1,138	0.65	557	859
1993	37	12,221	38,309	21,995.6	0.31	330	1,062	0.56	594	798

*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.

TABLE 4.2

SUMMARY OF ANNUAL INFORMATION REPORTED BY COMMERCIAL PRESSURIZED WATER REACTORS*

1973-1993

Year	Number of Reactors Included	Annual Collective Doses (person-cSv or person-rem)	No. of Workers With Measurable Doses	Gross Electricity Generated (MW-yr)	Average Dose Per Worker (cSv or rem)	Average Collective Dose Per Reactor (person-cSv or person-rem)	Average No. Personnel With Measurable Doses Per Reactor	Average Collective Dose per MW-yr (person-cSv /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	2.49	314	544
1974	19	6,555	9,370	6,530.7	0.70	345	493	1.00	344	591
1975	26	8,268	10,884	11,982.5	0.76	318	419	0.69	461	647
1976	30	13,807	17,588	13,325.0	0.79	460	586	1.04	444	701
1977	34	13,467	20,878	17,345.8	0.65	396	614	0.78	510	688
1978	39	16,528	25,700	19,840.5	0.64	424	659	0.83	509	706
1979	42	21,657	38,828	18,255.0	0.56	516	924	1.19	435	746
1980	42	24,265	46,237	18,289.3	0.52	578	1,101	1.33	435	746
1981	44	28,673	47,351	20,553.7	0.61	652	1,076	1.40	467	752
1982	48	27,753	52,146	22,140.6	0.53	578	1,086	1.25	461	777
1983	49	29,017	52,173	23,195.5	0.56	592	1,065	1.25	473	785
1984	51	28,138	56,994	26,478.4	0.49	552	1,118	1.06	519	809
1985	53	22,469	54,633	29,470.7	0.41	424	1,031	0.76	556	820
1986	60	23,032	62,995	33,593.0	0.37	384	1,050	0.69	560	878
1987	64	23,684	62,597	37,007.3	0.38	370	978	0.64	578	900
1988	68	22,786	62,921	42,929.7	0.36	335	925	0.53	631	885
1989	71	20,381	63,894	44,679.5	0.32	287	900	0.46	629	897
1990	73	20,812	67,081	46,955.6	0.31	285	919	0.44	643	907
1991	74	16,510	60,269	51,942.6	0.27	223	814	0.32	702	913
1992	73	15,985	61,048	53,419.8	0.26	219	836	0.30	732	923
1993	73	14,142	56,588	50,480.6	0.25	194	775	0.28	692	919

*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.

TABLE 4.3

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

1973-1993

Year	Number of Reactors Included	Annual Collective Doses (person-cSv or person-rem)	No. of Workers With Measurable Doses	Gross Electricity Generated (MW-yr)	Average Dose Per Worker (cSv or rem)	Average Collective Dose Per Reactor (person-cSv or person-rem)	Average No. Personnel With Measurable Doses Per Reactor	Average Collective Dose per MW-yr (person-cSv /MW-yr)	Average Electricity Generated Per Reactor (MW-yr)	Average Maximum Dependable Capacity Net (MWe)	Percent of Maximum Dependable Capacity Achieved
1973	24	13,962	14,780	7,164.1	0.94	582	616	1.95	299	491	61%
1974	33	13,650	18,139	10,590.9	0.75	414	550	1.29	321	546	59%
1975	44	20,879	25,491	17,768.9	0.82	475	579	1.18	404	626	65%
1976	52	26,107	34,192	21,462.9	0.76	502	658	1.22	413	671	62%
1977	57	32,508	42,266	26,448.3	0.77	570	742	1.23	464	667	70%
1978	64	31,801	45,978	31,696.5	0.69	497	718	1.00	495	688	72%
1979	67	39,982	64,073	29,926.0	0.62	597	956	1.34	447	714	63%
1980	68	53,795	80,331	29,157.5	0.67	791	1,181	1.84	429	714	60%
1981	70	54,144	82,106	31,452.9	0.66	773	1,173	1.72	449	719	63%
1982	74	52,190	84,381	32,755.2	0.62	705	1,140	1.59	443	737	60%
1983	75	56,472	85,646	32,925.6	0.66	753	1,142	1.72	439	743	59%
1984	78	55,235	98,099	36,497.6	0.56	708	1,258	1.51	468	790	59%
1985	82	43,042	92,870	41,754.7	0.46	525	1,133	1.03	509	804	63%
1986	90	42,381	100,923	45,695.1	0.42	471	1,121	0.93	508	847	60%
1987	96	40,401	104,334	52,116.3	0.39	421	1,087	0.78	543	877	62%
1988	102	40,769	103,226	59,595.1	0.39	400	1,012	0.68	584	871	67%
1989	107	35,930	108,254	62,223.0	0.33	336	1,012	0.58	582	883	66%
1990	110	36,592	108,658	68,291.7	0.34	333	988	0.54	621	892	70%
1991	111	28,515	98,761	73,448.4	0.29	257	890	0.39	662	895	74%
1992	110	29,294	103,143	74,012.0	0.28	266	938	0.40	673	901	75%
1993	110	26,363	95,896	72,476.2	0.27	240	872	0.36	659	878	75%

*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.

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-cSv (person-rem) 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.

4.2.5 Percent of Maximum Dependable Capacity Achieved

The *percent of maximum dependable capacity achieved* is shown for all LWRs in Table 4.3. This parameter gives an indication of the overall power generation performance of LWRs as compared to the maximum capacity that could be obtained in a given year. It is calculated by dividing the average electricity generated per reactor by the average maximum dependable capacity for each year.

From 1973 to 1978 this indicator exhibited an increasing trend as a number of new reactors began producing power at higher efficiencies. Following the accident at Three Mile Island, reactor operations personnel concentrated on improving safety systems and complying with the new regulations for these systems. During this time period, from 1979 to 1987, the percent of maximum dependable capacity remained around 61%. Following the completion of most of these mandated repairs, reactors have increased the percent of maximum

dependable capacity from 62% in 1987 to 75% in 1993, a gain of 13% in 6 years.

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 1993. 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 1993 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 total collective dose decreased by 10% to a value of 26,363 person-cSv (person-rem) in 1993. The value of CR (see Section 3.1.8) decreased to a value of 0.22 This is the ninth 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 1993, the average collective dose per reactor dropped by 68%. In 1993, the collective dose per reactor for PWRs decreased from 219 person-cSv (person-rem) in 1992 to 194 person-cSv (person-rem) in 1993. The collective dose per reactor for BWRs decreased by 8%, from 360 person-cSv (person-rem) in 1992, to 330 person-cSv (person-rem) in 1993. The overall collective dose per reactor for LWRs decreased from 266 person-cSv (person-rem) in 1992 to 240 person-cSv (person-rem) in 1993. The number of workers with measurable dose per reactor has decreased to 1,062 for BWRs and decreased to 775 for PWRs in 1993. The overall decreasing trend in average reactor collective doses since 1983 indicates that licensees are continuing to successfully implement ALARA dose reduction features at their facilities.

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 decreased by 10% from a value of 29,294 person-cSv (person-rem) in 1992 to 26,363 person-cSv (person-rem) in 1993. Together with the decrease in the number of workers with measurable dose, this resulted in the average measurable dose per worker decreasing to 0.27 cSv (rem) in 1993. Figure 4.2 shows that in 1993 the gross electricity generated decreased for the first time since 1980.

TABLE 4.4

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

1977 - 1993

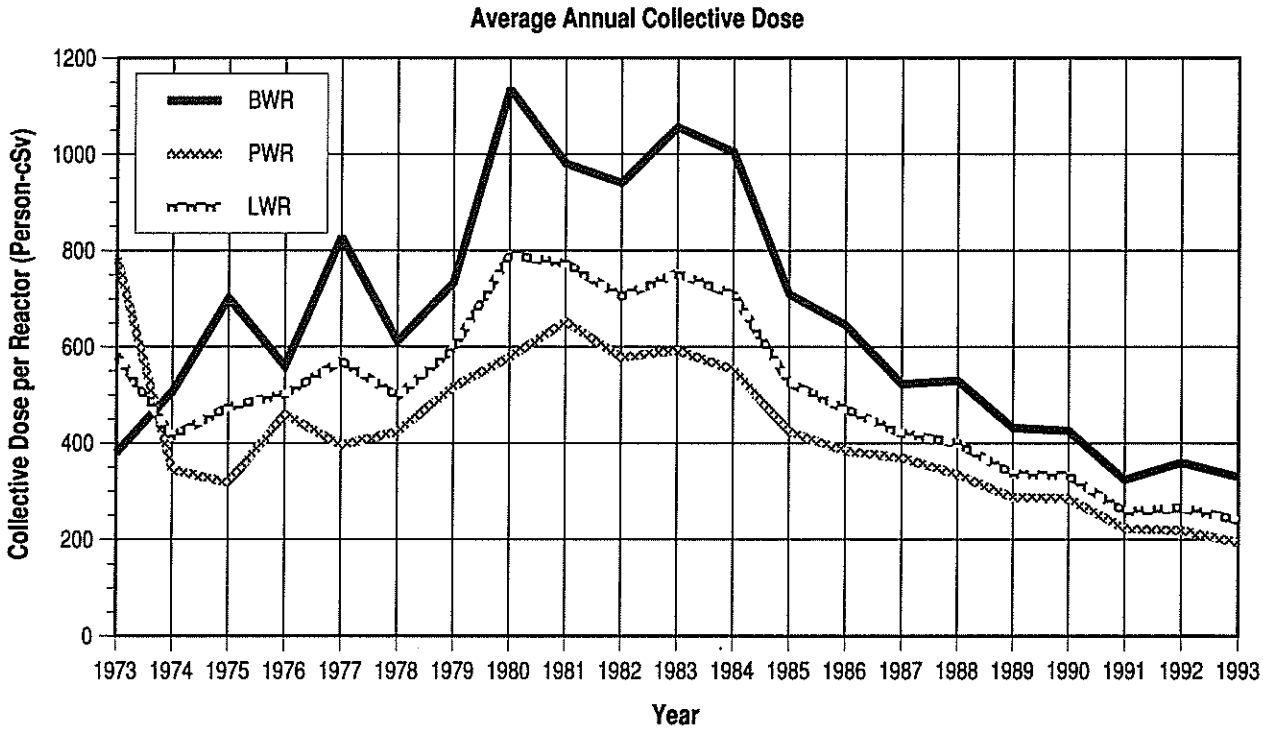
Year	Number of Individuals with Whole Body Doses in the Ranges (cSv or rem)																	Total Number Monitored	Number with Measurable Exposure	Collective Dose** (person-cSv or rem)	CR***
	No Meas'ble Exposure	Meas'ble <0.10	0.10-0.25	0.25-0.5	0.50-0.75	0.75-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0	5.0-6.0	6.0-7.0	7.0-8.0	8.0-9.0	9.0-10.0	10.0-12.0	>12				
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						144,990	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	40,769	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	35,930	0.33
1990	83,873	42,607	17,529	14,192	8,226	5,260	8,594	1,794	335	21								182,431	98,558	36,592	0.33
1991	87,250	42,587	16,764	13,184	7,187	4,194	5,975	938	219	17								178,315	91,065	28,527	0.27
1992	87,717	41,934	17,822	14,777	8,134	4,520	6,076	808	85	4								181,877	94,160	29,294	0.24
1993	82,842	37,349	17,243	13,777	7,510	4,253	5,296	638	76	5								168,989	86,147	26,363	0.22

*Summary of reports submitted in accordance with 10 CFR 20.407 by only those 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 multiple reporting of transient individuals (see Section 5).

** The collective dose, when not reported by the licensee, was calculated by the NRC staff using methods described in Section 3.1.4.

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

Figure 4.1
Average Collective Dose and Number of Workers per Reactor 1973 – 1993



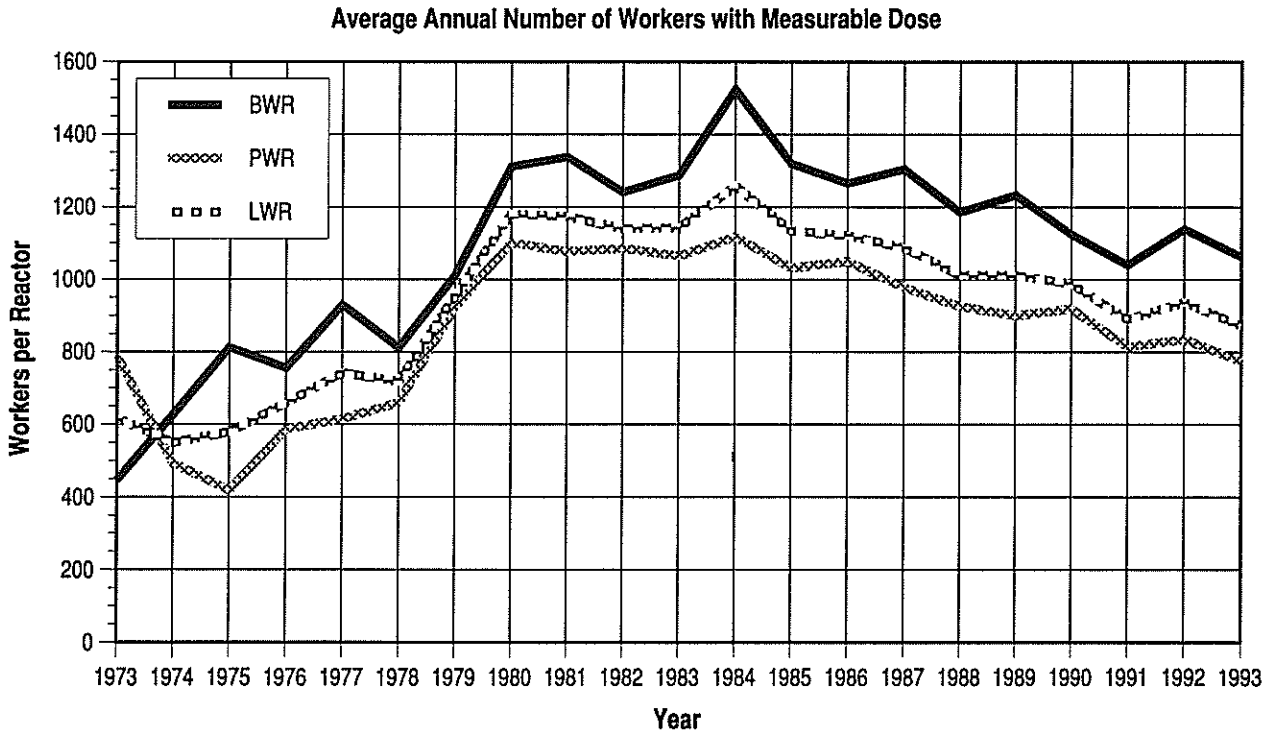
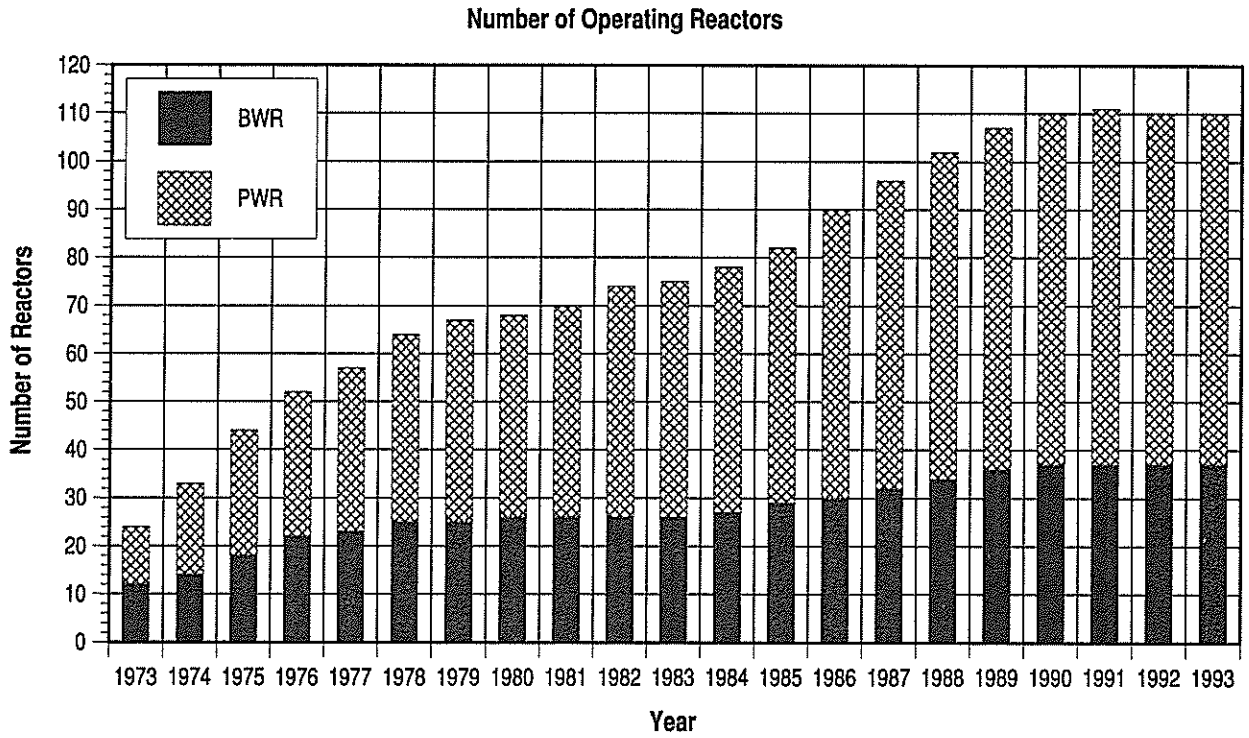


Figure 4.2
Number of Operating Reactors and Gross Electricity Generated 1973 – 1993



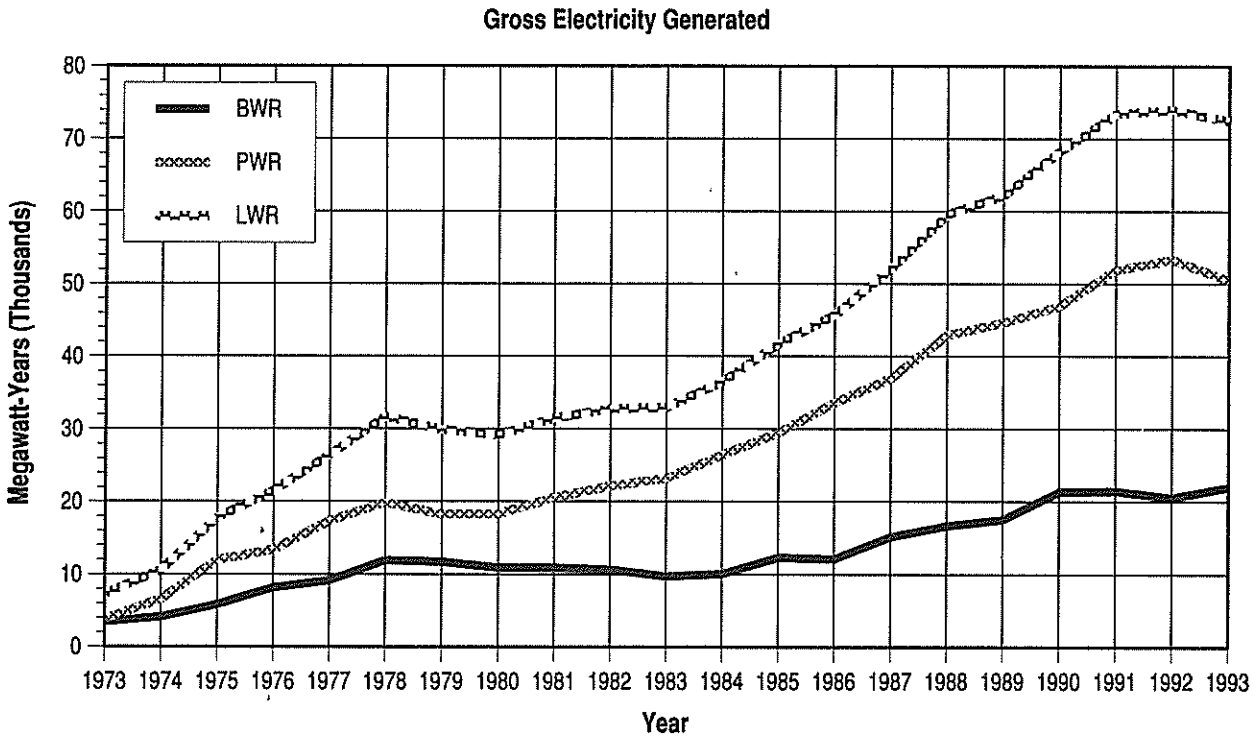
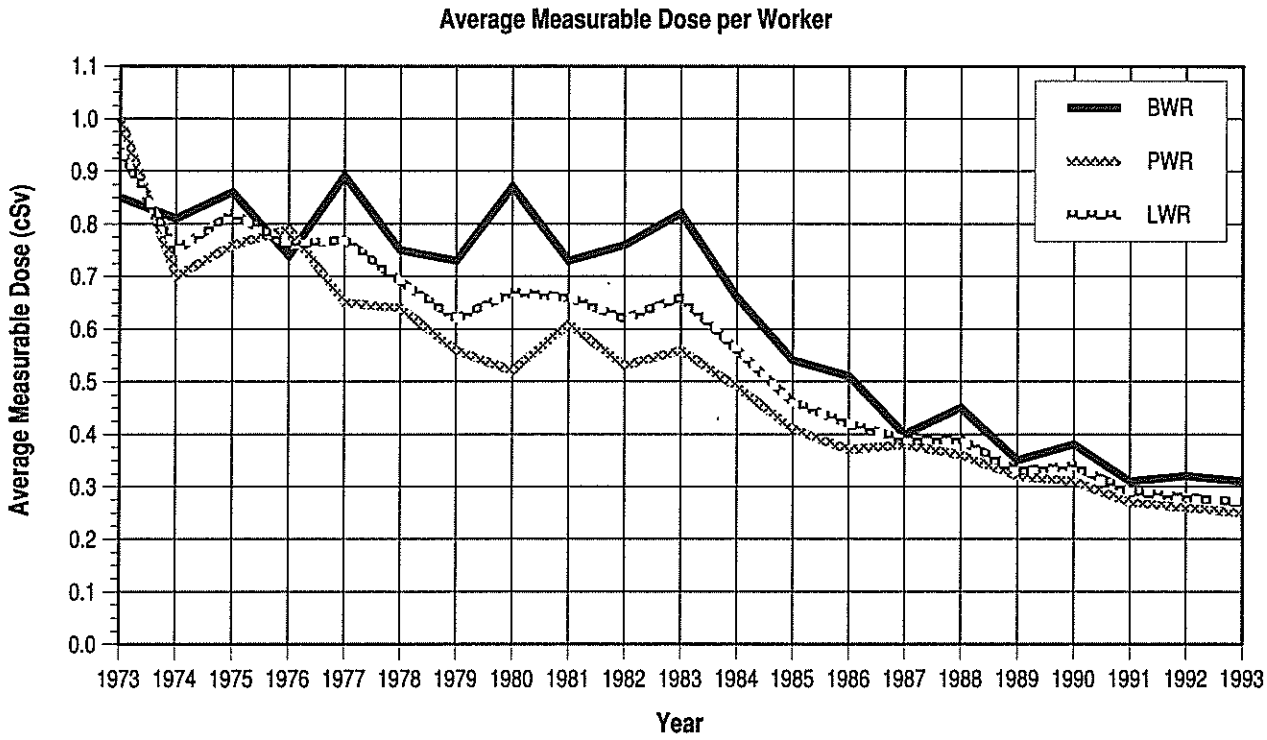
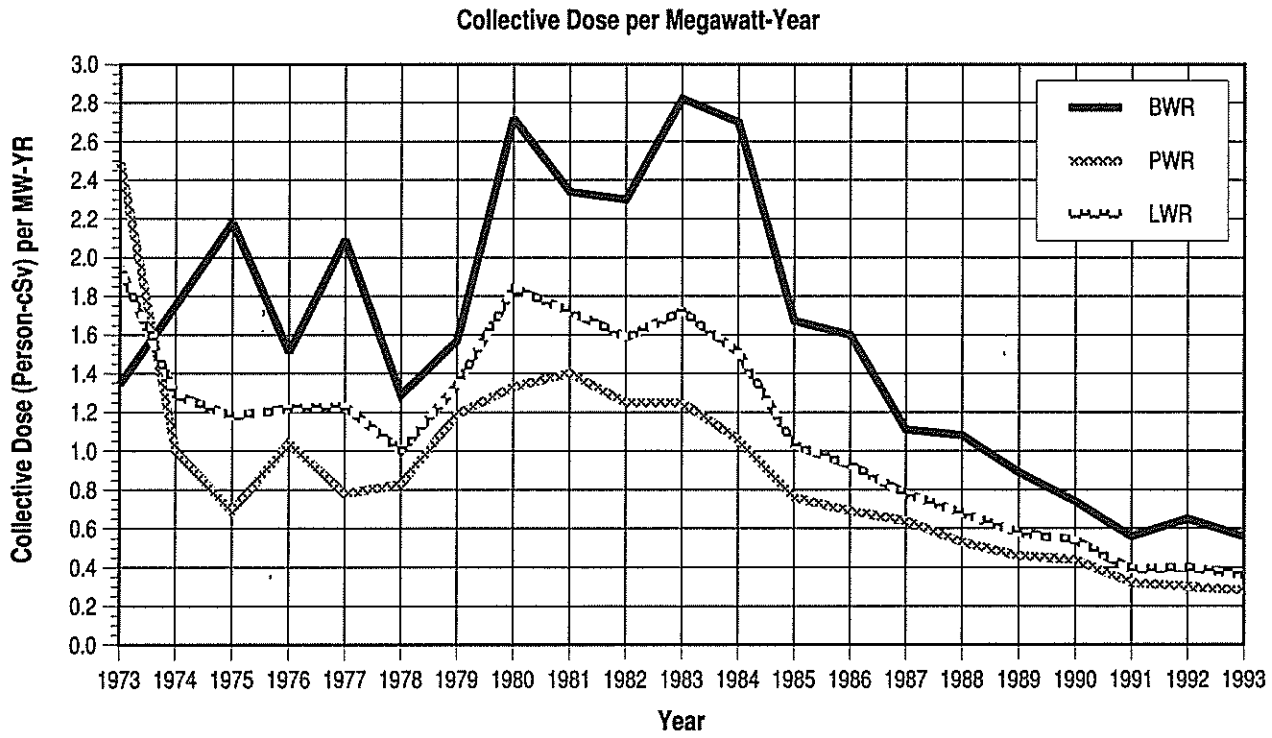


Figure 4.3
Average Measurable Dose per Worker and Collective Dose per Megawatt-Year 1973 – 1993





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

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 1993. 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 a decrease from 204 person-cSv (person-rem) in 1992 to 192 person-cSv (person-rem) in 1993. At BWRs, the median fluctuates more from year to year, and in 1993 the median collective dose increased to 317 person-cSv (person-rem). Figure 4.4 also shows that, in 1993, 50% of the PWRs reported collective doses between 126 and 246 person-cSv (person-rem) while 50% of the BWRs reported collective doses between 217 and 427 person-cSv (person-rem). 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).

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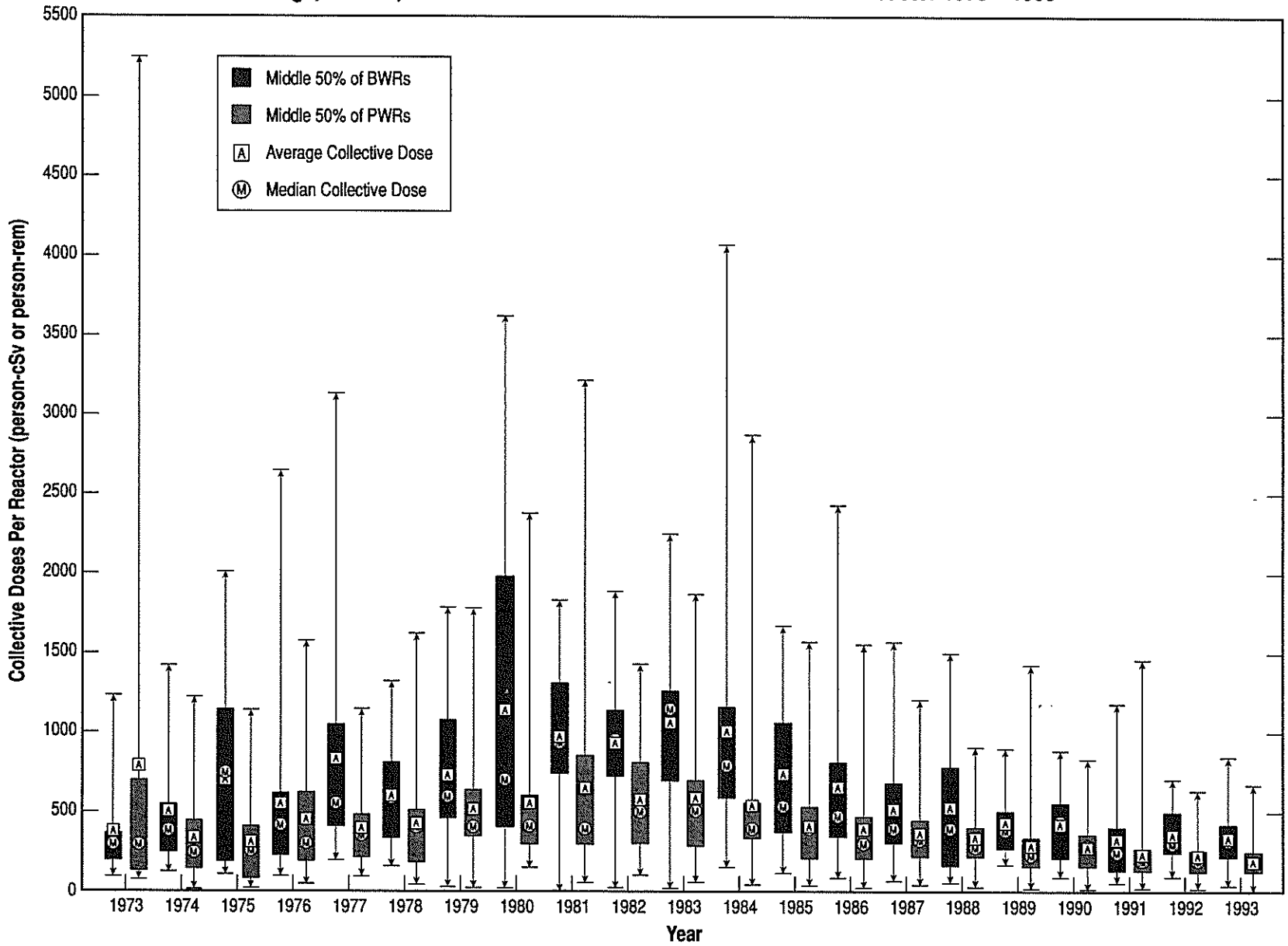
9 The value at which 50% of the reactors reported greater collective doses and the other 50% reported smaller collective doses.

Figure 4.4
Average, Median, and Extreme Values of the Collective Dose Per Reactor 1973 – 1993



4.5 Plant Rankings by Collective Dose per Reactor

Since the number of reactors from which data have been collected is still statistically rather small, 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 1989 through 1993. 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. Also shown is a parameter CR, which is defined as the ratio of the annual collective dose delivered at individual doses exceeding 1.5 cSv (rem) to the total annual collective dose. The value of CR has continued to decline for most plants, and in 1993, the CR for all the U.S. LWRs fell between 0.05 and 0.50, the range recommended by the UNSCEAR [Ref. 10].

In 1993, the five BWR sites with the highest collective doses all exceeded 469 person-cSv (person-rem) per reactor (Table 4.5). These reactors were Washington Nuclear 2, Monticello, Clinton, Hatch 1, and Dresden 2 and 3. (Note: Although Hatch 1,2 doses not appear as one of the bottom five BWR's for 1993 in Table 4.5, Hatch 1 received 637 person-cSv(person-rem) of the 669 person-rem for the site in 1993 making it the BWR with the second highest dose in 1993). Although the six reactors at these five sites represented only 16% of the 37 BWRs, they contributed 31% of the total collective dose incurred at BWRs in 1993.

Some of the activities which contributed to the collective dose accumulated at the BWR site with the highest collective dose per reactor [1655 person-cSv (person-rem)] for the two unit site were valve maintenance replacement and testing, refueling in-service inspection, radwaste work, health physics coverage, penetration repair, recirculation pump motor replacement, and control rod drive changeout and inspection.

At PWRs, the five sites with the highest collective doses all exceeded 348 person-cSv (person-rem) per reactor (Table 4.6). These reactors were David-Besse, Maine Yankee, Haddam Neck, North Anna 1 and 2, and Indian Point 2. Although representing 8% of the 73 PWRs included in 1993, they contributed 19% of the total collective dose at PWRs. Much of the collective dose accumulated at the plant with the highest dose per reactor [675 person-cSv (person-rem)] in 1993 was attributed to outage support (including scaffolding and insulation installation and removal, health physics support, and radwaste

TABLE 4.5

BOILING WATER REACTORS LISTED IN ASCENDING ORDER OF COLLECTIVE DOSE PER REACTOR

1989-1993

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	728	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	1,131	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

1991

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Limerick 1, 2	106	0.09	0.1	0.04
Grand Gulf	94	0.13	0.1	0.11
Browns Ferry 1, 2, 3	354	0.20	0.8	0.01
Vermont Yankee	118	0.38	0.2	0.13
River Bend 1	144	0.18	0.2	0.02
Perry	146	0.24	0.1	0.10
Nine Mile Point 1, 2	292	0.19	0.2	0.10
Duane Arnold	202	0.60	0.4	0.56
Big Rock Point	226	0.52	3.8	0.48
Fermi 2	228	0.19	0.3	0.00
Clinton	233	0.23	0.3	0.01
Susquehanna 1, 2	507	0.27	0.3	0.07
Quad Cities 1, 2	509	0.30	0.5	0.18
Fitzpatrick	333	0.26	0.8	0.23
Hope Creek 1	373	0.22	0.4	0.16
Washington Nuclear 2	387	0.36	0.8	0.21
Brunswick 1, 2	778	0.30	0.8	0.23
Lasalle 1, 2	806	0.41	0.4	0.25
Cooper Station	405	0.37	0.7	0.20
Millstone Point 1	409	0.35	1.9	0.18
Monticello	465	0.48	1.1	0.29
Peach Bottom 2, 3	934	0.35	0.8	0.20
Dresden 2, 3	1,005	0.49	1.5	0.40
Hatch 1, 2	1,161	0.46	1.0	0.30
Pilgrim	605	0.21	1.5	0.14
Oyster Creek	1,185	0.38	3.4	0.34

1992

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Cooper Station	84	0.18	0.1	0.07
Millstone Point 1	99	0.28	0.2	0.47
Monticello	114	0.25	0.2	0.19
Limerick 1,2	330	0.21	0.2	0.06
Browns Ferry 1,2,3	516	0.19	0.5	0.04
Fermi 2	245	0.20	0.3	0.01
Peach Bottom 2,3	502	0.26	0.3	0.16
Hatch 1,2	550	0.34	0.4	0.16
Big Rock Point	277	0.56	8.5	0.52
Pilgrim	281	0.21	0.5	0.02
Nine Mile Point 1,2	563	0.31	0.6	0.17
Dresden 2,3	619	0.34	0.7	0.22
Brunswick 1,2	623	0.23	1.7	0.16
Susquehanna 1,2	724	0.38	0.5	0.23
Vermont Yankee	381	0.41	0.9	0.19
Clinton	431	0.36	0.7	0.12
Hope Creek 1	436	0.26	0.5	0.18
Grand Gulf	484	0.24	0.5	0.14
Duane Arnold	502	0.48	1.2	0.28
Perry	571	0.38	0.7	0.15
Quad Cities 1,2	1,157	0.48	1.2	0.31
Lasalle 1,2	1,167	0.48	0.8	0.32
Washington Nuclear 2	612	0.41	0.9	0.24
Oyster Creek	657	0.24	1.2	0.16
Fitzpatrick	674	0.28	***	0.24
River Bend 1	710	0.35	2.1	0.21

1993

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Fermi 2	35	0.10	0.0	0.00
Millstone Point 1	81	0.27	0.1	0.15
Hope Creek 1	98	0.14	0.1	0.05
Limerick 1,2	217	0.17	0.1	0.02
Big Rock Point	152	0.36	3.0	0.26
Susquehanna 1,2	335	0.23	0.2	0.05
River Bend 1	180	0.21	0.3	0.14
Vermont Yankee	217	0.26	0.5	0.08
Fitzpatrick	232	0.16	0.4	0.14
Peach Bottom 2,3	552	0.31	0.3	0.17
Perry	278	0.23	0.6	0.03
Browns Ferry 1,2,3	870	0.24	1.3	0.08
Nine Mile Point 1,2	633	0.27	0.5	0.14
Grand Gulf	332	0.18	0.4	0.07
Hatch 1,2	669	0.39	0.6	0.18
Cooper Station	391	0.35	0.9	0.20
Duane Arnold	407	0.39	1.0	0.34
Oyster Creek	416	0.16	0.8	0.07
Quad Cities 1,2	849	0.39	0.9	0.24
Lasalle 1,2	854	0.50	0.6	0.33
Pilgrim	435	0.33	0.8	0.03
Brunswick 1,2	872	0.30	1.9	0.17
Washington Nuclear 2	469	0.34	0.6	0.19
Monticello	494	0.52	1.1	0.30
Clinton	498	0.40	0.7	0.09
Dresden 2,3	1,655	0.60	1.7	0.38

* 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

1989-1993

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	0.12	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	0.19
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
Zion 1,2	624	0.49	0.4	0.36
Palisades	314	0.31	0.7	0.15
Sequoyah 1,2	657	0.33	0.4	0.23
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	0.36	1.0	0.23
Indian Point 2	608	0.57	1.0	0.51
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

1991

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Callaway 1	21	0.07	0.0	0.00
Cook 1, 2	69	0.08	0.0	0.00
Indian Point 3	40	0.13	0.0	0.00
Yankee-Rowe	40	0.25	0.3	0.07
Prairie Island 1, 2	98	0.17	0.1	0.03
Fort Calhoun	57	0.20	0.1	0.07
Calvert Cliffs 1, 2	132	0.07	0.1	0.02
Zion 1, 2	173	0.19	0.2	0.03
Seabrook	92	0.13	0.1	0.00
Crystal River 3	104	0.13	0.2	0.01
Maine Yankee	105	0.25	0.1	0.09
South Texas 1, 2	257	0.22	0.1	0.06
Point Beach 1, 2	265	0.37	0.3	0.22
Byron 1, 2	268	0.25	0.1	0.07
San Onofre 1, 2, 3	412	0.23	0.2	0.07
Comanche Peak	148	0.15	0.2	0.02
Arkansas 1, 2	351	0.17	0.2	0.06
McGuire 1, 2	361	0.21	0.2	0.06
Vogtle 1, 2	362	0.27	0.2	0.07
Oconee 1, 2, 3	551	0.28	0.2	0.16
Millstone Point 2, 3	381	0.35	0.5	0.18
Robinson 2	193	0.22	0.3	0.10
Three Mile Island 1	198	0.13	0.3	0.02
Palo Verde 1, 2, 3	605	0.27	0.2	0.15
Palisades	211	0.16	0.4	0.01
Davis-Besse	216	0.22	0.3	0.11
Kewaunee	221	0.45	0.5	0.46
Harris	226	0.26	0.3	0.09
Salem 1, 2	458	0.11	0.3	0.23
Catawba 1, 2	462	0.25	0.3	0.10
St. Lucie 1, 2	479	0.37	0.3	0.18
Beaver Valley 1, 2	495	0.29	0.4	0.19
Surry 1, 2	510	0.33	0.4	0.18
Diablo Canyon 1, 2	546	0.27	0.3	0.10
Braidwood 1, 2	550	0.34	0.4	0.15
Summer 1	291	0.30	0.5	0.14
North Anna 1, 2	629	0.30	0.4	0.35
Farley 1, 2	648	0.39	0.4	0.35
Ginna	328	0.35	0.8	0.14
Wolf Creek 1	331	0.33	0.5	0.10
Sequoyah 1, 2	698	0.36	0.4	0.25
Waterford 3	364	0.28	0.4	0.11
Turkey Point 3, 4	939	0.45	3.6	0.30
Trojan	567	0.38	3.1	0.31
Haddam Neck	590	0.51	1.3	0.36
Indian Point 2	1,468	0.81	3.2	0.41

1992

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Davis-Besse	19	0.07	0.0	0.00
Summer 1	27	0.11	0.0	0.00
Three Mile Island 1	34	0.06	0.0	0.00
South Texas 1,2	147	0.16	0.1	0.01
Wolf Creek 1	78	0.17	0.1	0.12
Trojan	84	0.15	0.2	0.03
Indian Point 2	97	0.20	0.1	0.13
Byron 1,2	199	0.19	0.1	0.02
Prairie Island 1,2	211	0.25	0.3	0.10
San Onofre 1,2,3	324	0.20	0.1	0.02
Braidwood 1,2	228	0.22	0.1	0.05
Kewaunee	122	0.27	0.3	0.07
Point Beach 1,2	256	0.41	0.3	0.24
St. Lucie 1,2	264	0.21	0.2	0.04
Beaver Valley 1,2	289	0.20	0.2	0.06
Seabrook	147	0.18	0.2	0.01
Turkey Point 3,4	325	0.24	0.3	0.11
Calvert Cliffs 1,2	330	0.17	0.3	0.16
Palo Verde 1,2,3	541	0.27	0.2	0.19
ComanchePeak	188	0.17	0.2	0.02
McGuire 1,2	386	0.24	0.2	0.13
Catawba 1,2	394	0.26	0.2	0.05
Haddam Neck	202	0.25	0.4	0.08
Indian Point 3	212	0.21	0.4	0.04
Vogtle 1,2	426	0.34	0.2	0.10
Harris	213	0.23	0.3	0.07
Salem 1,2	431	0.10	0.4	0.06
Oconee 1,2,3	649	0.33	0.3	0.10
Waterford 3	226	0.19	0.2	0.05
Diablo Canyon 1,2	459	0.25	0.2	0.09
Sequoyah 1,2	465	0.27	0.3	0.09
Cook 1,2	492	0.25	0.6	0.12
Ginna	261	0.31	0.6	0.09
Surry 1,2	539	0.32	0.4	0.15
Fort Calhoun	272	0.34	0.9	0.10
North Anna 1,2	576	0.27	0.4	0.27
Palisades	295	0.23	0.5	0.18
Callaway 1	336	0.30	0.3	0.12
Robinson 2	352	0.28	0.7	0.09
Farley 1,2	805	0.40	0.6	0.28
Crystal River 3	424	0.30	0.7	0.16
Arkansas 1,2	876	0.28	0.6	0.18
Maine Yankee	461	0.39	0.7	0.17
Zion 1,2	1,043	0.60	0.9	0.44
Millstone Point 2,3	1,280	0.40	1.1	0.33

1993

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Col. Dose per MW-Yr	CR**
Seabrook	6	0.05	0.0	0.00
Waterford 3	15	0.08	0.0	0.00
Cook 1,2	44	0.07	0.0	0.00
Harris	31	0.09	0.0	0.00
Prairie Island 1,2	106	0.20	0.1	0.00
Comanche Peak 1,2	109	0.12	0.1	0.03
Indian Point 3	60	0.13	0.4	0.00
Crystal River 3	60	0.09	0.1	0.00
Oconee 1,2,3	237	0.16	0.1	0.00
Point Beach 1,2	186	0.33	0.2	0.16
Kewaunee	106	0.24	0.2	0.06
South Texas 1,2	251	0.22	1.5	0.04
Arkansas 1,2	268	0.14	0.2	0.01
Braidwood 1,2	273	0.26	0.1	0.03
Turkey Point 3,4	275	0.22	0.2	0.08
Diablo Canyon 1,2	281	0.19	0.1	0.03
Fort Calhoun	157	0.22	0.4	0.01
Farley 1,2	333	0.26	0.2	0.12
Wolf Creek 1	183	0.19	0.2	0.01
Vogtle 1,2	367	0.27	0.2	0.11
Sequoyah 1,2	372	0.23	0.9	0.08
Surry 1,2	383	0.27	0.3	0.09
Ginna	193	0.23	0.5	0.08
Palo Verde 1,2,3	592	0.28	0.2	0.16
Catawba 1,2	396	0.25	0.2	0.07
Calvert Cliffs 1,2	405	0.28	0.3	0.14
Salem 1,2	408	0.11	0.3	0.07
Three Mile Island 1	206	0.11	0.3	0.01
Byron 1,2	432	0.32	0.2	0.09
Callaway 1	225	0.20	0.2	0.02
McGuire 1,2	463	0.27	0.3	0.14
St. Lucie 1,2	492	0.34	0.4	0.16
San Onofre 1,2,3	767	0.35	0.4	0.14
Millstone Point 2,3	557	0.27	0.4	0.16
Palisades	289	0.32	0.7	0.13
Summer 1	297	0.26	0.4	0.08
Beaver Valley 1,2	621	0.30	0.5	0.12
Zion 1,2	643	0.36	0.4	0.22
Robinson 2	337	0.28	0.7	0.11
Davis-Besse	348	0.28	0.5	0.11
Maine Yankee	377	0.37	0.6	0.13
Haddam neck	408	0.41	0.9	0.25
North Anna 1,2	908	0.33	0.6	0.28
Indian Point 2	675	0.45	1.0	0.23

* 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.

work), steam generator related work, corrective and preventive maintenance, refueling, and motor operated valve and reactor coolant pump work.

Tables 4.7a and b list the sites that had been in commercial operation for at least five years as of December 31, 1993, and show the values of several parameters for each of the sites. They also give averages for the two types of reactors. Based on the 184 reactor-years of operation accumulated by the 37 BWRs listed, the average annual collective dose per reactor was found to be 374 person-cSv (person-rem), the average measurable dose per worker was 0.33 cSv (rem), and the average collective dose per megawatt-year was 0.7.

Based on the 348 reactor-years of operation at the 70 PWRs listed, the average annual collective dose per reactor, average measurable dose per worker, and average collective dose per megawatt-year were found to be 245 person-cSv (person-rem), 0.29 cSv (rem), and 0.4 person-cSv/megawatt-year, respectively. All of these values, at both types of facilities, are lower than those found for the five year period ending in 1992, with the exception of the collective dose per megawatt-year at PWRs, which remained the same.

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, 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.

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. Jobs that were large contributors to BWR doses in 1993 included valve maintenance and replacement, in-service inspection work, health physics coverage and support, refueling activities, system and component decontamination, and temporary shielding installation and removal. At PWR facilities, the major contributors to the collective dose were steam generator related work, refueling activities, in-service inspection, health physics coverage and support, valve related work, reactor coolant pump maintenance, and installation and teardown of scaffolding and shielding.

A complete breakdown of the activities contributing to the collective dose at the ten sites with the highest dose per reactor ranking in 1993 (from Tables 4.7a and b) is given in Tables 4.8a and 4.8b for BWRs and PWRs respectively. The outage dose and duration is shown as well as the collective dose for each activity.

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

1989 - 1993

Site Name*	Annual Collective Dose per Reactor	Total Coll. Dose per Site (cSv)	Workers with Meas. Doses	Avg. Meas. Dose (cSv)	Total Mega-watt-years	Average Collective Dose per MW-yr
LIMERICK 1,2	122	1,094	7,237	0.15	7,621.6	0.1
FERMI 2	169	846	4,528	0.19	4,069.8	0.2
BIG ROCK POINT	213	1,064	2,119	0.50	244.5	4.4
MILLSTONE POINT 1	236	1,182	3,024	0.39	2,435.7	0.5
BROWNS FERRY 1,2,3	247	3,706	13,467	0.28	2,100.0	1.8
VERMONT YANKEE	262	1,311	3,745	0.35	2,207.3	0.6
SUSQUEHANNA 1,2	271	2,710	8,971	0.30	8,403.7	0.3
NINE MILE POINT 1,2	275	2,751	10,837	0.25	4,780.6	0.6
PEACH BOTTOM 2,3	309	3,093	10,256	0.30	6,556.5	0.5
HOPE CREEK 1	314	1,568	7,349	0.21	4,531.1	0.3
COOPER STATION	320	1,602	5,068	0.32	2,899.7	0.6
MONTICELLO	335	1,674	3,810	0.44	2,270.0	0.7
PILGRIM	351	1,753	9,191	0.19	2,189.1	0.8
GRAND GULF	378	1,890	8,275	0.23	4,806.7	0.4
RIVER BEND 1	416	2,081	6,831	0.30	3,057.5	0.7
CLINTON	417	2,087	6,044	0.35	2,798.0	0.7
DUANE ARNOLD	433	2,166	4,307	0.50	2,069.5	1.0
HATCH 1,2	439	4,391	10,108	0.43	6,174.9	0.7
QUAD CITIES 1,2	444	4,443	10,192	0.44	5,325.4	0.8
PERRY	480	2,400	6,742	0.36	3,844.5	0.6
WASHINGTON NUCLEAR 2	499	2,496	6,609	0.38	3,452.3	0.7
FITZPATRICK	500	2,500	7,633	0.33	2,230.6	1.1
LASALLE 1,2	516	5,161	10,409	0.50	8,084.2	0.6
BRUNSWICK 1,2	561	5,607	15,223	0.37	3,781.2	1.5
DRESDEN 2,3	581	5,810	11,101	0.52	4,799.7	1.2
OYSTER CREEK	696	3,478	12,756	0.27	2,239.1	1.6
Grand Totals and Averages	9,784	68,864	205,832	0.33	102,973.2	0.7
Averages Per Reactor-Year		374	1,119		559.6	

* Sites where not all reactors had completed five full years of commercial operation as of 12/31/93 are not included.

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

1989 - 1993

Site Name*	Annual Collective Dose per Reactor	Total Coll. Dose per Site (cSv)	Workers with Meas. Doses	Avg. Meas. Dose (cSv)	Total Mega-watt-years	Average Collective Dose per MW-yr
PRAIRIE ISLAND 1,2	70	702	3,176	0.22	4,740.4	0.1
SOUTH TEXAS 1,2	114	1,022	5,330	0.19	6,274.0	0.2
HARRIS	142	711	3,511	0.20	3,766.6	0.2
BYRON 1,2	151	1,505	5,973	0.25	8,870.2	0.2
THREE MILE ISLAND 1	151	756	5,924	0.13	3,764.3	0.2
CALVERT CLIFFS 1,2	152	1,517	9,220	0.16	4,313.0	0.4
BRAIDWOOD 1,2	153	1,533	6,284	0.24	8,284.4	0.2
POINT BEACH 1,2	159	1,589	3,253	0.49	4,375.8	0.4
WOLF CREEK 1	161	805	3,415	0.24	4,707.5	0.2
KEWAUNEE	167	833	2,441	0.34	2,288.2	0.4
COOK 1,2	168	1,678	6,782	0.25	7,277.6	0.2
OCONEE 1,2,3	168	2,525	9,572	0.26	11,378.7	0.2
FORT CALHOUN	174	869	3,769	0.23	1,749.9	0.5
WATERFORD 3	183	917	4,447	0.21	4,806.2	0.2
VOGTLE 1,2	184	1,653	5,986	0.28	8,831.5	0.2
SALEM 1,2	191	1,907	18,716	0.10	7,331.6	0.3
PALO VERDE 1,2,3	197	2,957	11,198	0.26	12,289.5	0.2
SAN ONOFRE 1,2,3	197	2,955	10,119	0.29	9,808.8	0.3
DIABLO CANYON 1,2	207	2,074	8,485	0.24	9,665.5	0.2
SUMMER 1	209	1,043	3,818	0.27	3,645.8	0.3
DAVIS-BESSE	222	1,110	4,312	0.26	3,728.3	0.3
CATAWBA 1,2	240	2,395	8,784	0.27	8,900.3	0.3
ST. LUCIE 1,2	251	2,507	7,285	0.34	7,013.8	0.4
MCGUIRE 1,2	256	2,557	9,310	0.27	8,262.8	0.3
CRYSTAL RIVER 3	260	1,298	5,228	0.25	2,859.7	0.5
CALLAWAY 1	261	1,307	4,728	0.28	5,124.5	0.3
TURKEY POINT 3,4	270	2,702	8,456	0.32	4,094.9	0.7
SURRY 1,2	284	2,843	9,656	0.29	5,717.0	0.5
ARKANSAS 1,2	297	2,968	11,715	0.25	6,892.1	0.4
FARLEY 1,2	299	2,992	8,853	0.34	7,118.1	0.4
ROBINSON 2	303	1,514	6,097	0.25	2,301.9	0.7
INDIAN POINT 3	309	1,546	4,646	0.33	2,748.1	0.6
BEAVER VALLEY 1,2	313	3,131	9,214	0.34	6,155.7	0.5
ZION 1,2	318	3,179	7,073	0.45	6,087.2	0.5
MAINE YANKEE	345	1,724	4,365	0.39	3,436.8	0.5
GINNA	347	1,734	4,880	0.36	2,039.3	0.9
PALISADES	375	1,875	6,930	0.27	2,402.8	0.8
SEQUOYAH 1,2	387	3,870	10,212	0.38	7,734.4	0.5
MILLSTONE POINT 2,3	389	3,890	9,974	0.39	6,503.0	0.6
NORTH ANNA 1,2	417	4,174	12,034	0.35	7,246.3	0.6
HADDAM NECK	443	2,217	5,403	0.41	1,857.3	1.2
INDIAN POINT 2	857	4,284	6,967	0.61	3,244.7	1.3
Grand Totals and Averages	10,740	85,368	297,541	0.29	239,639	0.4
Averages Per Reactor-Year		245	855		688.6	

* Sites where not all reactors had completed five full years of commercial operation as of 12/31/93 are not included.

TABLE 4.8a
ACTIVITIES CONTRIBUTING TO HIGH COLLECTIVE DOSES AT SELECTED PLANTS IN 1993

BWR's with High Collective Doses

Dresden 2 and 3 (1655 rem)

Outage dose/duration (U 2): 1,138 rem/167 days
Outage dose/duration (U 3): 38 rem/75 days
Average daily outage dose (U 2): 6.81 rem/day
Average daily outage dose (U 3): 0.51 rem/day
Average daily operating dose: N/A

Units 2 and 3

-Valve work (including removal/replacement, repair, cleaning, repacking, testing, and inspection) (131.8 rem)
-Refueling (56.7 rem)
-ISI (in-service inspection) (49.9 rem)
-Radwaste work (Total of 47.4 rem)
  Radwaste systems upgrade - 35.3 rem
  Waste processing and shipping - 12.1 rem
-Health physics related work (Total of 45.3 rem)
  Surveys, walkdowns, and station support - 29.6 rem
  HP coverage in drywell - 15.7 rem
-Penetration work (44.9 rem)
-General access (operator rounds, walkdowns, cleaning) (41.0 rem)
-Replacement of recirculation pump motor (25.3 rem)
-Control rod drive changeout/inspection (24.9 rem)
-Instrumentation work (Total of 27.9 rem)
  IRM/SRM (intermediate/source range monitor) cable replacement - 16 rem
  RPIS (rod position indication system) probe and LPRMS (low power range monitor system) repair/replacement - 11.9 rem
-Shielding work in preparation for outage (22.7 rem)
-Housekeeping (22.2 rem)
-Snubber testing (includes scaffolding installation/removal) (17.2 rem)
-Hanger work (includes scaffolding installation/removal) (15.6 rem)
-Decontamination (includes scaffolding installation/removal) (13.9 rem)
-Remove/replace reactor vessel flange thermocouples (12.3 rem)

Hatch 1 and 2 (669 rem) (Unit 1 dose-637 rem)

Outage dose/duration (U 1): 414 rem/61 days
Average daily outage dose (U 1): 6.79 rem/day
Average daily operating dose (U 1): ~0.53 rem/day
Average daily operating dose (U 2): ~0.26 rem/day

Unit 1

-Valve work (Total of 45.9 rem)
  RHR (residual heat removal) system valve repair - 21.1 rem
  Recirculation valve repair/inspection - 14.2 rem
  Plant service water valve repair - 10.6 rem
-Insulation removal/replacement (for ISI of recirc. pipe) (24.3 rem)
-ISI (in-service inspection) of recirculation system piping (17.6 rem)
-Health physics coverage (16.9 rem)
-Electrical disconnects in preparation for control rod drive changeout (16.3 rem)
-Processing of irradiated material from spent fuel pool (15.3 rem)
-Torus desludging, inspection, and painting (12.4 rem)
-Mechanical Stress improvement of welds in drywell (11.9 rem)
-Minor mechanical/electrical work (10.1 rem)

Clinton (498 rem)

Outage dose/duration: 454 rem/75 days
Average daily outage dose: 6.05 rem/day
Average daily operating dose: 0.15 rem/day

-ISI (in-service inspection) (86.0 rem)
-Refueling (includes reactor head disassembly/assembly, shroud head bolt replacement, jet pump beam ISI) (53.0 rem)
-Valve maintenance/testing (Total of 43.7 rem)
  Reactor water cleanup valve work - 14.8 rem
  Safety relief valve testing - 9.1 rem
  Feedwater check valve work - 8.1 rem
  89-10 valve testing - 6.8 rem
  Main steam isolation valve work - 5.0 rem
-Preventive maintenance and surveillance (33.9 rem)
-Drywell shielding (24.0 rem)
-HP coverage (drywell and auxiliary bldg.) (23.4 rem)
-Chemical decontamination work (22.4 rem)
-Reactor recirculation system work (Total of 16.3 rem)
  Pump seal replacement - 4.5 rem
  Other reactor recirculation system work - 11.8 rem
-Operations and surveillance (10.8 rem)
-Scaffolding (auxiliary building steam tunnel) (8.1 rem)
-LLRT/ILRT (local/integrated leak rate testing) (7.5 rem)
-RPV (reactor pressure vessel) work (Total of 7.4 rem)
  Decontamination of RPV pool - 4.0 rem
  Flush RPV nozzles - 3.3 rem

Monticello (494 rem)

Outage dose/duration: 429 rem/58 days
Average daily outage dose: 7.4 rem/day
Average daily operating dose: 0.21 rem/day

-Valve work (75.2 rem)
-ISI (in-service inspection) (54.7 rem)
-Torus decontamination/painting (31.9 rem)
-Decontamination of recirculation system (22.7 rem)
-LLRT (local leak rate testing) (19.4 rem)
-Reactor head disassembly/reassembly (17.6 rem)

Washington Nuclear 2 (469 rem)

Outage dose/duration: 386 rem/48 days
Average daily outage dose: 8.04 rem/day
Average daily operating dose: 0.26 rem/day

-ISI (in-service inspection) and NDE (non-destructive exams) to detrmine the type of erosion/corrosion on piping (Total of 100.4 rem)
  Scaffolding and insulation removal/installation for ISI - 47.2 rem
  NDE - 53.2 rem
-Valve work (Total of 43.0 rem)
  MOVAT (motor-operated valve acceptance tests) and valve refurbishment-25.2 rem
  MSRV (main steam relief valve) work - 17.8 rem
-Health physics coverage during outage (38.2 rem)
-Refueling (reactor head disassembly/reassembly) (30.8 rem)
-Shielding (Total of 19.4 rem)
  Installation/removal of shielding in drywell - 10 rem
  Installation of shield clips (for permanent shadow shields) around recirculation piping - 9.4 rem

TABLE 4.8b
ACTIVITIES CONTRIBUTING TO HIGH COLLECTIVE DOSES AT SELECTED PLANTS IN 1993

PWR's with High Collective Doses

Haddam Neck (408 rem) Outage dose/duration: 392 rem/66 days
Average daily outage dose: 5.94 rem/day
Average daily operating dose: 0.05 rem/day

- -Steam generator (S/G) primary side work (Total of 124.7 rem)
  - Tube plug-in-plug - 33.7 rem
  - Eddy current testing - 23.4 rem
  - Equipment setup/teardown - 23.2 rem
  - Tube plugging - 20.7 rem
  - Remove/install manways - 9.1 rem
  - HP surveys - 7.9 rem
  - Tube sheet rerolls - 5.2 rem
- -ISI (in-service inspection) (54.5 rem)
- -Refueling (51.0 rem)
- -Health physics (HP) (Total of 47.7 rem)
  - Radiation work permits - 33.2 rem
  - HP in containment - 12.6 rem
- -Valve work (Total of 35.1 rem)
  - MOV (motor-operated valve) work - 19.1 rem
  - Valve repair - 10.8 rem
  - Loop drain isolation valve work - 5.1 rem
- -Operations, routine surveillance (19.5 rem)
- -Radwaste processing and decon (11.4 rem)
- -Appendix J (containment leak testing) mods (11.3 rem)
- -S/G secondary side work (7.6 rem)
- -Shielding (7.3 rem)
- -Instrumentation and control (6.8 rem)
- -Replace reactor coolant pump seal (5.9 rem)
- -Replace insulation (4.2 rem)

Maine Yankee (377 rem) Outage dose/duration: 362 rem/77 days
Average daily outage dose: 4.7 rem
Average daily operating dose: 0.05 rem

- -Steam generator related work (Total of 80.0 rem)
  - Eddy current testing - 63.0 rem
  - Sludge lancing and secondary side inspections - 17.0 rem
- -Valve work (Total of 67.7 rem)
  - MOV (motor-operated valve) inspection - 27.9 rem
  - Non-MOV inspection - 20.7 rem
  - Relocation of letdown valve - 19.1 rem
- -Repair thermal shield (35.8 rem)
- -Rebuild reactor coolant pump rotating assembly (28.7 rem)
- -Refueling (reactor head disassembly/assembly) (27.2 rem)
- -ISI (in-service inspection) non-destructive exams (19.5 rem)
- -Temporary lead shielding (9.6 rem)

Davis Besse (348 rem) Outage dose/duration: 336 rem/60 days
Average daily outage dose: 5.6 rem/day
Average daily operating dose: 0.04 rem/day

- -Steam generator work (eddy current testing/sleeving/tubing) (43.9 rem)
- -Main feedwater nozzle work (32.1 rem)
- -ISI (in-service inspection) (16.5 rem)
- -Replace reactor coolant pump motor (15.3 rem)
- -Tension/detension reactor head (11.6 rem)
- -Replace letdown cooler (10.8 rem)
- -CRDM (control rod drive mechanism) work (10.6 rem)
- -Repair reactor head vent line cladding (9.4 rem)

Indian Point 2 (675 rem) Outage dose/duration: 629 rem/83 days
Average daily outage dose: 7.58 rem/day
Average daily operating dose: 0.16 rem/day

- -Outage support (Total of 243.0 rem)
  - Scaffolding/insulation installation/removal - 69.4 rem
  - Health physics support - 41.5 rem
  - Radwaste - 39.5 rem
  - Operations - 24.8 rem
  - Supervisory tours, inspections - 23.9 rem
  - Temporary shielding - 16.9 rem
  - Temporary services (lighting, etc.) - 12.8 rem
- -S/G work (Total of 124.2 rem)
  - Primary side work - 77.4 rem
  - Secondary side work - 46.8 rem
- -Maintenance work (corrective and preventive) (98.9 rem)
- -Refueling (70.5 rem)
- -MOV (motor-operated valve) work (29.9 rem)
- -Reactor coolant pump work (18.9 rem)
- -Modifications (13.8 rem)
- -ISI (in-service inspection) (13.3 rem)
- -Retrieval of loose part in S/G (11.4 rem)
- -Chemical decon of residual heat removal system (4.5 rem)

North Anna 1,2 (908 rem)* Outage dose/duration (U 1)*: 583 rem/96 days
Outage dose/duration (U 2): 364 rem/50 days
Average daily outage dose (U 1): 6.07 rem/day
Average daily outage dose (U 2): 7.28 rem/day
Average daily operating dose: N/A
* North Anna 1 replaced its steam generators in 1993

Unit 1

- -SGRP (steam generator replacement project) (240 rem)
- -RTD (resistance temperature device) bypass project (Total of 84.9 rem)
  - Cut out existing RTD bypass system - 40.8 rem
  - Install new RTD system - 44.1 rem
- -NDE (non-destructive exams) (30.9 rem)
- -Reactor head disassembly/assembly (19.6 rem)
- -Decontamination work (exclusive of SGRP) (14.8 rem)
- -Scaffolding installation/removal (exclusive of SGRP) (13.5 rem)
- -Health physics walkdowns (exclusive of SGRP) (11.7 rem)

Unit 2

- -S/G primary side work (65.2 rem)
- -RTD bypass project (50.9 rem)
- -Insulation removal/installation (24.4 rem)
- -Reactor head disassembly/assembly (19.3 rem)
- -Valve cutout/replacement (16.6 rem)
- -Scaffolding installation/removal (15.3 rem)
- -Design change package for S/G support heater (13.3 rem)
- -HP walkdown/surveys (11.9 rem)
- -Decontamination work (11.0 rem)
- -ISI (in-service inspection) (10.1 rem)

Even with the use of better techniques and robotics, 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, even between plants of a given type, affect the nature of these parameters [Ref. 15]. Therefore, care should be exercised when attempting to draw conclusions from these data.

4.6 Collective Dose by Work Function and Employee Type

Each plant is required by its Technical Specifications to submit an annual statistical report which 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 4.9 through 4.14 summarize the 1993 data for BWRs, PWRs, and LWRs. Table 4.9 shows that, at both BWRs and PWRs, about 64% 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 1993, a higher percentage of the collective dose was attributed to routine maintenance performed by contractors than in previous years.

One should note that the collective doses obtained from these reports are not used in any other tables in this document. The reasons for this are that the Technical Specifications of each plant requires only 80% of the plant's collective dose be accounted for, and some utilities may use the results of self-reading pocket dosimeters instead of the results of the official dosimeter (usually thermoluminescent dosimeters) in compiling the data. Also, when examining the number of personnel shown on these reports, it should be kept in mind that individuals who perform tasks in more than one category may be counted more than once.

Table 4.10 shows that workers performing special maintenance prior to 1987 incurred the largest portion (35%-45%) of the collective dose and that workers performing routine maintenance activities usually incurred between 25% and 35% of the total. For the past seven 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 1991 through 1993, when it increased to over 9%) is due to

TABLE 4.9
ANNUAL COLLECTIVE DOSE
BY WORK FUNCTION AND PERSONNEL TYPE
1993

WORK AND JOB FUNCTION	STATION EMPLOYEES PERSON-cSv	STATION EMPLOYEES % OF TOTAL	UTILITY EMPLOYEES PERSON-cSv	UTILITY EMPLOYEES % OF TOTAL	CONTRACT WORKERS PERSON-cSv	CONTRACT WORKERS % OF TOTAL	TOTAL PER WORK FUNCTION PERSON-cSv	TOTAL PER WORK FUNCTION % OF TOTAL
BOILING WATER REACTORS								
REACTOR OPS & SURV	1,209	9.9%	81	0.7%	459	3.8%	1,749	14.3%
ROUTINE MAINTENANCE	2,140	17.5%	199	1.6%	3,788	31.1%	6,127	50.2%
IN-SERVICE INSPECTION	107	0.9%	35	0.3%	723	5.9%	865	7.1%
SPECIAL MAINTENANCE	659	5.4%	175	1.4%	1,453	11.9%	2,287	18.8%
WASTE PROCESSING	154	1.3%	9	0.1%	128	1.0%	291	2.4%
REFUELING	241	2.0%	97	0.8%	539	4.4%	877	7.2%
TOTAL	4,510	37.0%	596	4.9%	7,090	58.1%	12,196	100.0%
PRESSURIZED WATER REACTORS								
REACTOR OPS & SURV	747	5.2%	31	0.2%	470	3.3%	1,249	8.6%
ROUTINE MAINTENANCE	1,590	11.0%	608	4.2%	2,873	19.9%	5,072	35.1%
IN-SERVICE INSPECTION	167	1.2%	188	1.3%	1,652	11.4%	2,006	13.9%
SPECIAL MAINTENANCE	592	4.1%	192	1.3%	2,805	19.4%	3,589	24.8%
WASTE PROCESSING	161	1.1%	9	0.1%	207	1.4%	378	2.6%
REFUELING	604	4.2%	254	1.8%	1,305	9.0%	2,163	15.0%
TOTAL	3,862	26.7%	1,282	8.9%	9,312	64.4%	14,457	100.0%
ALL LIGHT WATER REACTORS								
REACTOR OPS & SURV	1,957	7.3%	112	0.4%	929	3.5%	2,997	11.2%
ROUTINE MAINTENANCE	3,730	14.0%	807	3.0%	6,661	25.0%	11,199	42.0%
IN-SERVICE INSPECTION	274	1.0%	222	0.8%	2,375	8.9%	2,871	10.8%
SPECIAL MAINTENANCE	1,251	4.7%	367	1.4%	4,258	16.0%	5,877	22.0%
WASTE PROCESSING	316	1.2%	18	0.1%	335	1.3%	669	2.5%
REFUELING	845	3.2%	351	1.3%	1,844	6.9%	3,040	11.4%
TOTAL	8,373	31.4%	1,878	7.0%	16,402	61.5%	26,653	100.0%

TABLE 4.10

PERCENTAGES OF ANNUAL COLLECTIVE
DOSE AT LWRs BY WORK FUNCTION
1983 - 1993

WORK FUNCTION	PERCENTAGE OF COLLECTIVE DOSE EACH YEAR										
	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993
REACTOR OPERATIONS AND SURVEILLANCE	10.1%	11.4%	12.8%	12.8%	11.9%	11.0%	12.2%	12.3%	14.0%	11.6%	11.2%
ROUTINE MAINTENANCE	29.7%	26.9%	34.6%	33.2%	35.0%	37.7%	36.2%	36.5%	36.1%	38.7%	42.0%
INSERVICE INSPECTION	7.6%	6.3%	8.6%	8.3%	8.0%	8.7%	9.5%	8.8%	8.9%	9.2%	10.8%
SPECIAL MAINTENANCE	43.9%	45.4%	32.5%	35.5%	33.2%	30.1%	31.3%	31.6%	28.2%	25.8%	22.0%
WASTE PROCESSING	4.6%	3.6%	5.1%	4.0%	3.9%	3.6%	3.4%	3.0%	3.1%	3.1%	2.5%
REFUELING	4.1%	6.4%	6.5%	6.2%	8.1%	8.8%	7.3%	7.7%	9.7%	11.5%	11.4%

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 1989 through 1993 for BWRs and PWRs separately. The general decrease in collective dose is also apparent among most of these activities.

Table 4.11 presents the distribution of the collective dose for 1993 at all LWRs among five occupational categories. As in past years, maintenance personnel incurred the majority (64%) of the collective dose with contractor maintenance personnel receiving about twice as much as the station and utility maintenance employees combined. None of the values listed changed significantly from those found for 1987 through 1992. The collective doses shown in Tables 4.9 and 4.11 do not equal those shown in other tables in the report because they are the sum of the doses taken from the type of annual reports shown in Appendix D rather than the collective dose that was obtained or calculated from the annual reports required to be submitted pursuant to 10 CFR Part 20.407.

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

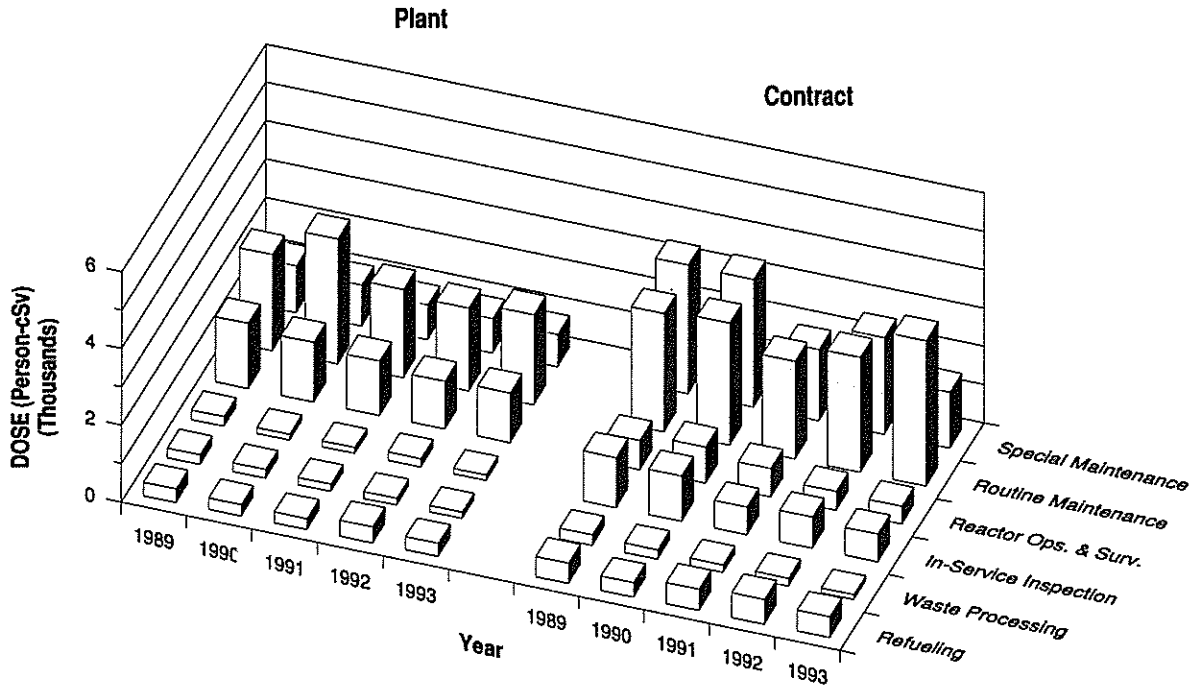
(1) The collective dose incurred by workers in the work function "Reactor Operations and Surveillance" on each plant's annual report submitted pursuant to their technical specifications (the first number in the last column in Appendix D) was determined.

(2) The ratio of this dose to the total collective dose (the last number in the last column in Appendix D) was calculated and multiplied by the total collective dose that had been calculated or obtained from the 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.

Figure 4.5
Collective Dose by Work Function and Personnel Type 1989 – 1993

Boiling Water Reactors



Pressurized Water Reactors

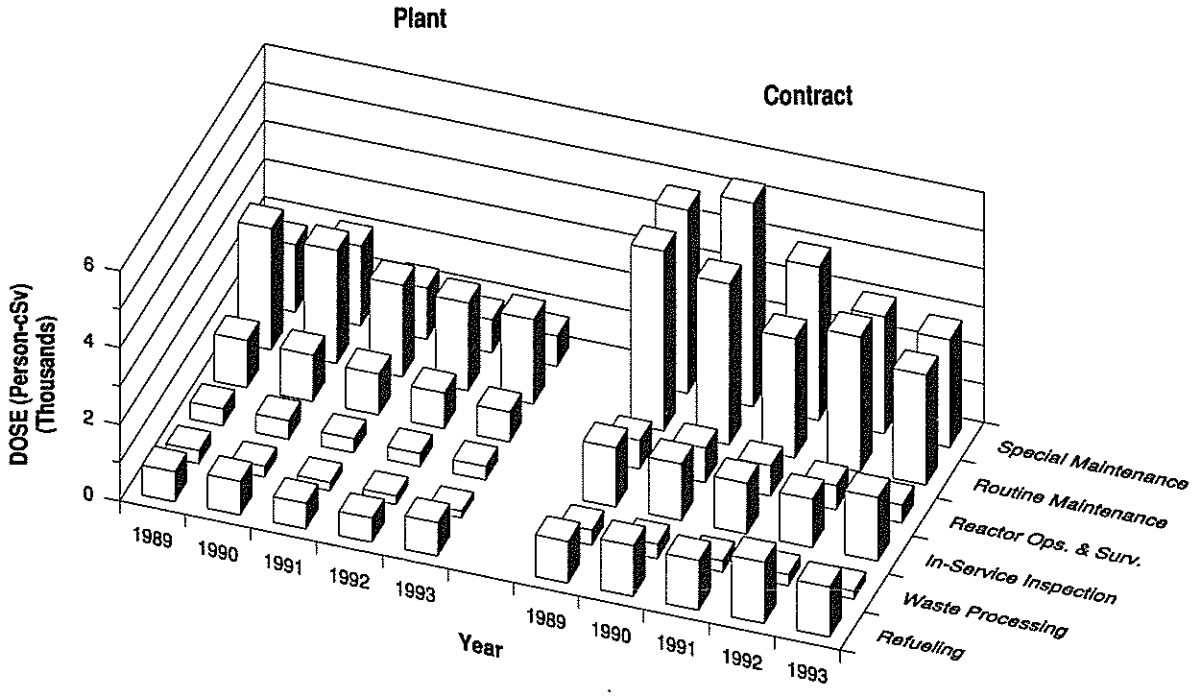


TABLE 4.11
ANNUAL COLLECTIVE DOSE
BY OCCUPATION AND PERSONNEL TYPE
1993

OCCUPATION	STATION EMPLOYEES PERSON-cSv	STATION EMPLOYEES % OF TOTAL	UTILITY EMPLOYEES PERSON-cSv	UTILITY EMPLOYEES % OF TOTAL	CONTRACT WORKERS PERSON-cSv	CONTRACT WORKERS % OF TOTAL	TOTAL PER WORK FUNCTION PERSON-cSv	TOTAL PER WORK FUNCTION % OF TOTAL
BOILING WATER REACTORS								
MAINTENANCE	2,265	18.6%	442	3.6%	5,608	46.0%	8,314	68.2%
OPERATIONS	1,006	8.2%	27	0.2%	207	1.7%	1,240	10.2%
HEALTH PHYSICS	708	5.8%	5	0.0%	598	4.9%	1,311	10.7%
SUPERVISORY	281	2.3%	26	0.2%	159	1.3%	466	3.8%
ENGINEERING	251	2.1%	96	0.8%	519	4.3%	866	7.1%
TOTAL	4,510	37.0%	596	4.9%	7,090	58.1%	12,196	100.0%
PRESSURIZED WATER REACTORS								
MAINTENANCE	1,988	13.7%	1,058	7.3%	6,437	44.5%	9,483	65.6%
OPERATIONS	716	5.0%	37	0.3%	261	1.8%	1,015	7.0%
HEALTH PHYSICS	773	5.3%	79	0.5%	1,416	9.8%	2,268	15.7%
SUPERVISORY	186	1.3%	22	0.1%	234	1.6%	442	3.1%
ENGINEERING	199	1.4%	86	0.6%	965	6.7%	1,250	8.6%
TOTAL	3,862	26.7%	1,282	8.9%	9,312	64.4%	14,457	100.0%
ALL LIGHT WATER REACTORS								
MAINTENANCE	4,252	16.0%	1,500	5.6%	12,045	45.2%	17,797	66.8%
OPERATIONS	1,723	6.5%	65	0.2%	467	1.8%	2,255	8.5%
HEALTH PHYSICS	1,481	5.6%	84	0.3%	2,014	7.6%	3,578	13.4%
SUPERVISORY	467	1.8%	47	0.2%	393	1.5%	907	3.4%
ENGINEERING	450	1.7%	182	0.7%	1,484	5.6%	2,116	7.9%
TOTAL	8,373	31.4%	1,878	7.0%	16,402	61.5%	26,653	100.0%

(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 4.12 and 4.13 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 4.12 is still useful in showing the percentage of personnel associated with each of the six work functions shown. About 55% of the personnel performed routine or special maintenance functions, about 21% were involved with reactor operations and surveillance, and the remaining 24% were divided among the other three work functions.

Table 4.13 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 health physics category with 9.2% at BWRs and 15.2% at PWRs. Overall, 58% of the personnel were contractors, 34% were station employees, and 8% were utility employees in 1993.

Table 4.14 presents the average annual dose incurred by workers in the five occupational categories in 1993. These averages were calculated by dividing the collective dose reported for these groups (see Table 4.11) by the number of individuals shown in Table 4.13. It shows that in most instances, the maintenance and health physics personnel incur the highest average doses. When examining the values of the averages that are given in Table 4.14, 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 4.14; (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 cSv (rem) 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.

TABLE 4.12
NUMBER OF PERSONNEL*
BY WORK FUNCTION AND PERSONNEL TYPE
1993

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	16,860	16.5%	1,355	1.3%	6,645	6.5%	24,860	24.3%
ROUTINE MAINTENANCE	14,199	13.9%	1,759	1.7%	27,474	26.8%	43,432	42.4%
IN-SERVICE INSPECTION	1,160	1.1%	548	0.5%	5,488	5.4%	7,196	7.0%
SPECIAL MAINTENANCE	3,001	2.9%	855	0.8%	10,385	10.1%	14,241	13.9%
WASTE PROCESSING	3,586	3.5%	155	0.2%	1,363	1.3%	5,104	5.0%
REFUELING	2,378	2.3%	583	0.6%	4,581	4.5%	7,542	7.4%
TOTAL	41,184	40.2%	5,255	5.1%	55,936	54.6%	102,375	100.0%
PRESSURIZED WATER REACTORS**								
REACTOR OPS & SURV	6,043	8.7%	1,587	2.3%	4,138	6.0%	11,768	16.9%
ROUTINE MAINTENANCE	7,635	11.0%	1,979	2.8%	12,686	18.3%	22,300	32.1%
IN-SERVICE INSPECTION	1,583	2.3%	922	1.3%	5,715	8.2%	8,220	11.8%
SPECIAL MAINTENANCE	3,757	5.4%	1,198	1.7%	10,088	14.5%	15,043	21.7%
WASTE PROCESSING	1,366	2.0%	90	0.1%	1,788	2.6%	3,244	4.7%
REFUELING	3,244	4.7%	859	1.2%	4,800	6.9%	8,903	12.8%
TOTAL	23,628	34.0%	6,635	9.5%	39,215	56.4%	69,478	100.0%
ALL LIGHT WATER REACTORS**								
REACTOR OPS & SURV	22,903	13.3%	2,942	1.7%	10,783	6.3%	36,628	21.3%
ROUTINE MAINTENANCE	21,834	12.7%	3,738	2.2%	40,160	23.4%	65,732	38.2%
IN-SERVICE INSPECTION	2,743	1.6%	1,470	0.9%	11,203	6.5%	15,416	9.0%
SPECIAL MAINTENANCE	6,758	3.9%	2,053	1.2%	20,473	11.9%	29,284	17.0%
WASTE PROCESSING	4,952	2.9%	245	0.1%	3,151	1.8%	8,348	4.9%
REFUELING	5,622	3.3%	1,442	0.8%	9,381	5.5%	16,445	9.6%
TOTAL	64,812	37.7%	11,890	6.9%	95,151	55.4%	171,853	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 (762 people), because the data were not submitted in the suggested format.

TABLE 4.13
NUMBER OF PERSONNEL*
BY OCCUPATION AND PERSONNEL TYPE
1993

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	6,984	13.0%	2,125	4.0%	20,577	38.4%	29,686	55.5%
OPERATIONS	4,780	8.9%	549	1.0%	2,556	4.8%	7,885	14.7%
HEALTH PHYSICS	2,352	4.4%	161	0.3%	2,412	4.5%	4,925	9.2%
SUPERVISORY	1,851	3.5%	644	1.2%	1,554	2.9%	4,049	7.6%
ENGINEERING	2,116	4.0%	1,851	3.5%	3,016	5.6%	6,983	13.0%
TOTAL	18,083	33.8%	5,330	10.0%	30,115	56.3%	53,528	100.0%
PRESSURIZED WATER REACTORS								
MAINTENANCE	6,863	12.5%	1,963	3.6%	22,155	40.2%	30,981	56.2%
OPERATIONS	4,230	7.7%	211	0.4%	1,535	2.8%	5,976	10.8%
HEALTH PHYSICS	2,928	5.3%	149	0.3%	5,321	9.7%	8,398	15.2%
SUPERVISORY	2,195	4.0%	341	0.6%	1,381	2.5%	3,917	7.1%
ENGINEERING	2,177	4.0%	922	1.7%	2,741	5.0%	5,840	10.6%
TOTAL	18,393	33.4%	3,586	6.5%	33,133	60.1%	55,112	100.0%
ALL LIGHT WATER REACTORS								
MAINTENANCE	13,847	12.7%	4,088	3.8%	42,732	39.3%	60,667	55.8%
OPERATIONS	9,010	8.3%	760	0.7%	4,091	3.8%	13,861	12.8%
HEALTH PHYSICS	5,280	4.9%	310	0.3%	7,733	7.1%	13,323	12.3%
SUPERVISORY	4,046	3.7%	985	0.9%	2,935	2.7%	7,966	7.3%
ENGINEERING	4,293	4.0%	2,773	2.6%	5,757	5.3%	12,823	11.8%
TOTAL	36,476	33.6%	8,916	8.2%	63,248	58.2%	108,640	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 4.14
AVERAGE DOSES BY OCCUPATION AND PERSONNEL TYPE*
1993

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	2,265	6,984	0.32	442	2,125	0.21	5,608	20,577	0.27	8,314	29,686	0.28
OPERATIONS	1,006	4,780	0.21	27	549	0.05	207	2,556	0.08	1,240	7,885	0.16
HEALTH PHYSICS	708	2,352	0.30	5	161	0.03	598	2,412	0.25	1,311	4,925	0.27
SUPERVISORY	281	1,851	0.15	26	644	0.04	159	1,554	0.10	466	4,049	0.11
ENGINEERING	251	2,116	0.12	96	1,851	0.05	519	3,016	0.17	866	6,983	0.12
TOTAL	4,510	18,083	0.25	596	5,330	0.11	7,090	30,115	0.24	12,196	53,528	0.23
PRESSURIZED WATER REACTORS												
MAINTENANCE	1,988	6,863	0.29	1,058	1,963	0.54	6,437	22,155	0.29	9,483	30,981	0.31
OPERATIONS	716	4,230	0.17	37	211	0.18	261	1,535	0.17	1,015	5,976	0.17
HEALTH PHYSICS	773	2,928	0.26	79	149	0.53	1,416	5,321	0.27	2,268	8,398	0.27
SUPERVISORY	186	2,195	0.08	22	341	0.06	234	1,381	0.17	442	3,917	0.11
ENGINEERING	199	2,177	0.09	86	922	0.09	965	2,741	0.35	1,250	5,840	0.21
TOTAL	3,862	18,393	0.21	1,282	3,586	0.36	9,312	33,133	0.28	14,457	55,112	0.26
ALL LIGHT WATER REACTORS												
MAINTENANCE	4,252	13,847	0.31	1,500	4,088	0.37	12,045	42,732	0.28	17,797	60,667	0.29
OPERATIONS	1,723	9,010	0.19	65	760	0.08	467	4,091	0.11	2,255	13,861	0.16
HEALTH PHYSICS	1,481	5,280	0.28	84	310	0.27	2,014	7,733	0.26	3,578	13,323	0.27
SUPERVISORY	467	4,046	0.12	47	985	0.05	393	2,935	0.13	907	7,966	0.11
ENGINEERING	450	4,293	0.10	182	2,773	0.07	1,484	5,757	0.26	2,116	12,823	0.17
TOTAL	8,373	36,476	0.23	1,878	8,916	0.21	16,402	63,248	0.26	26,653	108,640	0.25

* 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.

4.8 Graphical Representation of Dose Trends in Appendix E

Each page of Appendix E presents two types of graphs for one site. One graph plots selected dose-performance indicators from 1973 through 1993, and the other indicates the collective dose by job function for 1978 through 1993. 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 1993. 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 collective dose for the current year and the previous two years and then dividing this sum by the number of reactors reporting during those years. Data for years when the plant was not in commercial operation have been included when available. 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 1993. 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 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 Atomic 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 94,186 workers receiving the average dose of 0.31 cSv (rem) continuously during an entire working career (working from age 18 until age 65) or the maximum accidental dose of 6.0 cSv (rem) to the whole body during 1993 (see Section 6) might expect an increased cancer death risk of about 9 chances in a 1000 for the average dose and 5 chances per 1000 for the maximum dose.[10] Should a worker receive 0.31 cSv (rem) continuously during an entire working career (working from age 18 until age 65), his/her lifetime risk of dying from cancer is estimated to increase by approximately 4%. Since the American Cancer Society estimates that an individual's risk of dying of cancer is about

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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)

20% (one in five), the risk to an individual receiving 0.31 cSv (rem) would be approximately 21%.

The potential genetic effects from a worker population receiving 29,045 person-cSv (person-rem) (Table 3.1) are small compared to genetic damages that normally occur spontaneously in a population of this size. Approximately 100,000 serious genetic defects occur normally in one million live births, i.e., an average of about one serious defect in every ten live births. Theoretically, the total genetic damage in the first generation children of the 29,045 exposed workers would, according to NUREG/CR-4214 [Ref. 17], be an increase of about 1 case (approximately 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., 94,186 children born to this worker population. The estimates were calculated from Table 4.1 of reference 17.

5 TERMINATION DATA SUBMITTED PURSUANT TO 10 CFR § 20.408

5.1 Termination Reports, 1969-1993

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, over 1.9 million reports have been received for the 756,829 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 25 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 1993 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.**

In 1993, certain licensees implemented the requirements of the Revised 10 CFR Part 20. While all licensees are required to implement the Revised Part 20 by January of 1994, licensees had the option of implementing earlier than this deadline. Therefore licensees reporting under the Revised Part 20 for 1993 are considered "early implementors" of the requirements.

The data required to be reported has changed significantly. Under §20.2206, annual exposure reports (Form 5) are required to be submitted for each

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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.

TABLE 5.1 TERMINATION REPORTS SUBMITTED TO THE NRC 1969 - 1993				
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	115,967	79,003	111,977	75,814
1991	110,135	75,369	105,387	71,611
1992	118,654	82,270	113,032	77,700
1993+	140,216	99,749	127,738	91,073

* 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.

\+ Annual reports submitted under the Revised Part 20 were included with the termination submittals for 1993. See Section 5.1.

individual for whom monitoring was required. During 1993, several licensees implemented the Revised Part 20, and therefore submitted annual reports in addition to reports for terminating individuals. These reports were included in the database queries used in the transient worker analysis presented in this section. A significant increase (18%) was noted in the total number of reports submitted to REIRS in 1993 as shown in Table 5.1, reflecting the

addition of annual reports to the termination data. The total effective dose equivalent (TEDE) was treated as the equivalent of the total whole body dose under the "old" Part 20. Readers should be aware of this change when drawing conclusions from the 1993 data.

5.2 Limitations of Termination Data

When examining or using the statistics that are based on the termination data, one should keep in mind that these data have various limitations: (1) some licensees submit a termination report for each monitoring period rather than waiting until the individual actually completes a work assignment at the facility; (2) the reports contain no indication of the tasks the workers may have performed nor of the type of employees (contractor, plant part-time, etc.) they were while monitored by the licensee; (3) the period(s) of exposure that is reported for terminating individuals usually indicate the monitoring period during which they may have been exposed to radiation rather than the actual dates of exposure; (4) most licensees report cumulative periods of exposure and doses rather than the actual periods and dose incurred during each period; (5) licensees having more than one licensed facility sometimes include in the termination report, submitted when individuals leave the second facility, the dose that they incurred at the first facility, which may already have been reported; (6) certain licensees implemented the requirements of the Revised 10 CFR § 20 during 1993. The data required to be reported has changed significantly. The data for the licensees that implemented the Revised Part 20 during 1993 has been included in the termination analysis presented here (See Section 5.1). Although the REIR System corrects for most 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 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 0.32 cSv (rem) in 1984 to a value of 0.20 cSv (rem) in 1993. The average dose for each category of transient worker is considerably less than that 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 cSv (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 ten years in which a worker exceeded the quarterly limit of 3 cSv (rem) as a result of 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 cSv (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). The inspection of licensees by the NRC regional inspectors serve to enforce these regulations.

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 is useful 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 5.2
TRANSIENT WORKERS PER CALENDAR QUARTER
1984 - 1993

All Covered Licensees				Power Reactor Facilities			
Year	No. of Persons Terminated by Two or more Licensees Within One Quarter	Collective Dose (person-cSv person-rem)	Average Individual Dose (cSv or rem)	Year	No. of Persons Terminated by Two or more Licensees Within One Quarter	Collective Dose (person-cSv person-rem)	Average Individual Dose (cSv or rem)
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	3,983	833	0.21	1990	3,906	810	0.21
1991	3,570	797	0.22	1991	3,448	754	0.22
1992	3,592	630	0.18	1992	3,458	594	0.17
1993	3,089	617	0.20	1993	2,944	573	0.19

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
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	3,225	707	0.22	529	82	0.15	152	22	0.14
1991	2,838	668	0.24	471	75	0.16	139	11	0.08
1992	2,819	496	0.18	501	86	0.17	138	12	0.09
1993	2,469	491	0.20	391	71	0.18	84	11	0.13

Table 5.3 summarizes the number and doses of the transients found among the individuals terminating during the ten years from 1984 through 1993. 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 table shows the general decreasing trend in the average measurable dose for each category of transient reactor worker.

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 (as reported in Appendices B and F) 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 reports and compares it with the "reported 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. The corrected dose distribution is also shown in Table 4.4. During each of the years shown, each of the transient workers was counted an average of 2.6 times so that in 1993, the 12,685 transients would have been reported as 32,360 individuals. This was not surprising because some individuals were reported by as many as 9 different facilities in 1993.

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 1987 through 1993. 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 1993, Table 5.4b shows that the summation of annual reports indicated that 95,896 workers received a measurable dose (188,664 monitored minus 92,768 with no measurable exposure), 237 of whom received doses greater than 2 cSv (rem). After accounting for those individuals who were reported more than once, the corrected distribution indicated that there were really only 86,147 workers who received a measurable dose and that 719 of them received doses greater than 2 cSv (rem).

TABLE 5.3

TRANSIENT WORKERS PER CALENDAR YEAR AT NUCLEAR POWER FACILITIES

1984 - 1993

Year	No. of Commercial Reactors	No. of Persons Terminated by Two or More Licensees	Collective Dose (person-cSv person-rem)	Average Dose (cSv or rem)
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	110	11,376	7,641	0.67
1991	111	9,568	5,554	0.58
1992	110	10,836	5,645	0.52
1993	110	12,685	6,206	0.49

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
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	6,958	3,553	0.51	2,480	2,064	0.83	1,938	2,023	1.04
1991	6,132	2,804	0.46	1,980	1,484	0.75	1,456	1,266	0.87
1992	6,917	2,802	0.41	2,253	1,541	0.68	1,666	1,303	0.78
1993	8,333	3,159	0.38	2,742	1,660	0.61	1,610	1,386	0.86

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 (cSv or rem)																Total Individuals	**Collective Dose (Person-cSv or -rem)	Avg. Dose (cSv or rem)	Avg. Meas. Dose (cSv or rem)
	Less than Measurable	Meas'ble <0.10	0.10-0.25	0.25-0.50	0.50-0.75	0.75-1.00	1.00-2.00	2.00-3.00	3.00-4.00	4.00-5.00	5.0-6.0	6.0-7.0	7.0-8.0	8.0-9.0	9.0-10.0	>10				
Reported 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 - 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 - 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 - 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 - 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 - 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 - 1990	11,643	5,875	3,930	3,691	2,103	1,323	1,896	171	8								30,640	7,641	0.25	0.40
Correct Distribution of Transients - 1990	2,479	1,603	1,166	1,300	1,011	823	1,965	750	259	20							11,376	7,641	0.67	0.86
Reported Distribution of Transients - 1991	10,452	4,689	3,186	3,117	1,733	949	1,070	147	13								25,356	5,554	0.22	0.37
Correct Distribution of Transients - 1991	2,360	1,378	998	1,182	854	706	1,471	415	188	16							9,568	5,554	0.58	0.77
Reported Distribution of Transients - 1992	11,318	5,585	3,999	3,812	1,885	959	924	69	4								28,555	5,645	0.20	0.33
Correct Distribution of Transients - 1992	2,582	1,559	1,224	1,447	1,138	853	1,532	428	72	1							10,836	5,645	0.52	0.68
Reported Distribution of Transients - 1993	13,052	6,539	4,408	4,073	2,149	1,049	1,040	50									32,360	6,206	0.19	0.32
Correct Distribution of Transients - 1993	3,126	1,951	1,450	1,741	1,347	890	1,648	454	74	4							12,685	6,206	0.49	0.65

*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 (cSv or rem)																Total Individuals	**Collective Dose (Person-cSv or -rem)	Avg. Dose (cSv or rem)	Avg. Meas. Dose (cSv or rem)
	Less than Measurable	Meas'ble <0.10	0.10-0.25	0.25-0.50	0.50-0.75	0.75-1.00	1.00-2.00	2.00-3.00	3.00-4.00	4.00-5.00	5.0-6.0	6.0-7.0	7.0-8.0	8.0-9.0	9.0-10.0	>10				
Reported Statistical Distribution - 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	35,932	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	35,932	0.19	0.36
Reported Statistical Distribution - 1990	93,037	46,879	20,293	16,583	9,318	5,760	8,525	1,215	84	1							201,695	36,592	0.18	0.34
**Correct Statistical Distribution - 1990	83,873	42,607	17,529	14,192	8,226	5,260	8,594	1,794	335	21							182,431	36,592	0.20	0.37
Reported Statistical Distribution - 1991	95,342	45,898	18,952	15,119	8,066	4,437	5,574	670	44	1							194,103	28,527	0.15	0.29
**Correct Statistical Distribution - 1991	87,250	42,587	16,764	13,184	7,187	4,194	5,975	938	219	17							178,315	28,527	0.16	0.31
Reported Statistical Distribution - 1992	96,453	45,960	20,597	17,142	8,881	4,626	5,468	449	17	3							199,596	29,294	0.15	0.28
**Correct Statistical Distribution - 1992	87,717	41,934	17,822	14,777	8,134	4,520	6,076	808	85	4							181,877	29,294	0.16	0.31
Reported Statistical Distribution - 1993	92,768	41,937	20,201	16,109	8,312	4,412	4,688	234	2	1							188,664	26,363	0.14	0.27
**Correct Statistical Distribution - 1993	82,842	37,349	17,243	13,777	7,510	4,253	5,296	638	76	5							168,989	26,363	0.16	0.31

*Includes data from Fort St. Vrain for the years 1987 through 1989.
**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.

Since the number of transient workers receiving measurable doses and the collective dose they receive are only about 11% and 24% of the total number of workers and of the total collective dose, respectively, for 1993, their impact on most 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 3 cSv (rem) is usually considerably higher than the number found in the reported statistical distribution. But there is still a clear decreasing trend in the number of higher doses; in 1993, there were 81 annual doses that exceeded 3 cSv (rem), compared with 89 in 1992 and 236 in 1991. Table 5.5 shows that no doses greater than 5 cSv (rem) were reported in 1993 and that **since 1985, there have been no additional transient workers identified as having received a dose of greater than 5 cSv (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 cSv (rem) and shows that such reductions can be accomplished without increasing the collective dose since the collective dose has decreased during this same time period.

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.

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 1993, for example, one finds that the number of individuals not included in these analyses is approximately 19,000. However, there is no indication that the exclusion of these individuals significantly impacts the statistics presented here.

TABLE 5.5

ANNUAL WHOLE BODY DOSES EXCEEDING 5 cSv (rem)
AT NUCLEAR POWER FACILITIES

Year	Reported Number >5 cSv (rem)	Corrected Number >5 cSv (rem)	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
1991	0	0	0
1992	0	0	0
1993	0	0	0

5.6 Five-Year Dose Averages

In 1990, the International Commission on Radiological Protection (ICRP) recommended that occupational effective dose be limited to 2 cSv (rem) per year. The ICRP further recommended that this dose be averaged over defined periods of five years, i.e., no more than 10 cSv (rem) to any worker over a five-year period. The annual dose should be constrained by a limit of 5 cSv (rem) in any single year. These recommendations were based on a finding that detriment due to radiation exposure was more a function of long-term cumulative dose than it was of small variations in annual dose, provided the annual dose did not exceed a defined upper bound.

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-cSv person-rem)	Average Dose (cSv or rem)	Average Measurable Dose (cSv or rem)
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	46,742	23,062	8,296	0.18	0.36
1991	111	43,929	20,554	5,961	0.14	0.29
1992	110	50,491	23,450	6,943	0.14	0.30
1993	110	59,623	28,534	7,570	0.13	0.27

The extent to which licensees have been able to meet the 5 cSv (rem) per year recommendation has been analyzed extensively in previous sections of this report. To assess the extent to which NRC reactor licensees meet the five-year dose recommendation, the REIRS database was queried to sum the whole body dose for each individual whose termination records were within a five-year period. Only those individuals whose exposure period began and ended during a five year interval are included. Individuals need not have terminated in order to have been included in an interval, since reactor licensees often report yearly dose increments, and in 1993 the annual reports submitted under the Revised Part 20 were included in this analysis (see Section 5.1). Individuals may be counted in more than one interval.

The data are presented in Table 5.7. The compilation of roughly 200,000 records included in this query for each five-year period shows that, for all years 1978 to 1993, 99.8% of the individuals with measurable dose meet the recommendation of a five-year dose total of less than 10 cSv (rem). In addition, for each successive five-year period, the extent to which these recommendations are being met has been steadily increasing by a fraction of a percent each year. For the period 1978 to 1982, 709 workers did not meet the recommendation, while for the period 1989 to 1993, only 117 did not meet the recommended five-year dose totals.

5.7 Career Dose Statistics at Reactor Facilities 1977 - 1993

The reports containing the data for these analyses were submitted under 10 CFR § 20.408, which requires licensees to report the doses received by individuals terminating from NRC licensed facilities. As stated previously, one use of these reports is to monitor compliance with regulatory dose limits. Another is to correct the dose distributions reported under § 20.407 for the effects of the transient worker population. In addition to these, the termination data may be used to analyze career information from workers terminated from NRC licensed facilities. Since approximately 95% of the workers terminate from reactor facilities, these data were queried to produce reports containing information on career doses and career length broken down by the age and sex of the individual.

5.7.1 Compilation of the Data

The data was compiled from reports submitted by reactor licensees for each individual in the REIR System. The first recorded date of exposure monitoring was used as the "hire" date for that individual. Likewise, the last recorded date of exposure monitoring was used for the individual's "termination" date. In most cases, the actual hire and termination dates are not given, and in cases where they are given, these dates correspond to exposure dates in nearly all cases. All doses attributed to reactor licensees for an individual were summed during this "career" time period. Only those individuals who terminated between 1977 and 1993 (inclusive) are considered in this report. For most of the data presented, only those workers receiving measurable dose were included in the statistics. This eliminates the majority of the individuals who were visitors or were simply monitored for administrative purposes. In addition to the information on dose and length of employment, information on the individual's sex and birthdate was compiled from reports where such information was available.

TABLE 5.7

FIVE-YEAR REACTOR DOSE TOTALS*
1978-1993

Years	Number of Individuals with Whole Body Doses in the Ranges (cSv or rem)																					Percent of Workers w/ Meas. Dose Meeting ICRP
	0.00-0.01	0.01-1.00	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	10.0-11.0	11.0-12.0	12.0-13.0	13.0-14.0	14.0-15.0	15-20	20-25	25-30	30-50	>50	
'78-82	71,835	81,747	15,368	7,923	4,426	2,413	1,537	1,072	689	462	309	189	164	103	65	50	109	22	4	2	1	99.6%
'79-83	77,565	86,961	16,470	8,924	4,941	2,770	1,847	1,238	800	546	347	273	148	109	75	58	119	12	1	2	1	99.6%
'80-84	81,587	87,264	16,277	8,889	5,082	2,980	1,939	1,283	918	610	405	289	185	111	76	60	77	16	3	2	1	99.6%
'81-85	85,484	89,702	15,716	8,525	4,755	2,968	1,922	1,340	999	629	389	277	164	129	77	43	89	9	3	0	1	99.6%
'82-86	89,200	94,136	14,927	8,040	4,637	2,984	1,914	1,323	898	590	380	280	158	121	57	50	78	9	3	1	2	99.7%
'83-87	97,661	97,206	14,451	7,556	4,418	2,661	1,651	1,122	750	488	330	213	128	71	46	35	46	3	3	0	6	99.8%
'84-88	104,296	101,148	14,753	6,874	3,945	2,289	1,423	926	585	416	237	126	101	69	52	21	25	4	2	0	4	99.8%
'85-89	104,921	96,616	14,029	6,376	3,540	2,015	1,241	801	462	313	182	151	81	43	27	12	18	0	0	0	5	99.9%
'86-90	103,087	90,636	13,339	5,768	3,051	1,730	1,066	700	405	278	157	102	65	27	13	7	3	0	0	0	4	99.9%
'87-91	96,522	80,970	13,232	5,704	2,997	1,621	1,029	591	337	215	135	91	35	19	10	3	2	0	0	0	1	99.9%
'88-92	96,252	81,605	12,812	5,344	2,596	1,491	811	480	285	196	103	63	59	28	9	3	0	0	1	0	0	99.9%
'89-93	95,730	76,182	11,801	4,930	2,347	1,213	636	339	242	128	92	62	26	19	5	3	0	0	2	0	0	99.9%

* Data includes exposure records through 1993. Only those exposures that have been reported on termination reports submitted under 10 CFR 20.408 or the annual reports submitted under the Revised 20.2206 (see Section 5.1) are included. Overexposure records (see Section 6) that have not been reported on subsequent termination submittals are not included.

For the years 1977 to 1987, the "overexposure" events reported to the NRC under 10 CFR § 20.403 and § 20.405 (see Section 6) are included in the career dose analysis. For the years 1988 through 1993, only those doses reported under § 20.408 are included in the analysis, and no adjustments have been made to account for overexposures reported under § 20.403 and § 20.405

The total numbers and percentages of workers in each category reflect the level of completeness of data presented in these analyses. The total number of individuals included in the career dose analysis was 608,690. Out of the total, 357,585 (59%) of the individuals received measurable dose. For this analysis, measurable dose is considered to be any dose recorded greater than or equal to 1 millirem. The birthdate, and therefore the age at termination, was known for 77% of the individuals. The sex was recorded for 75% of the individuals of known age. The age and sex were known for 58% of the total number of workers with measurable dose.

5.7.2 Limitations of the Data

When analyzing and drawing conclusions from these data, it is important to note several limitations of the data. When possible, attempts have been made to minimize these limitations.

One limitation is that a large number of individuals listed in Tables 5.8 through 5.11 may not have completed their careers. A number of licensees submit "termination" reports for individuals on a yearly basis, regardless of their actual employment status. Typically an individual will have been reported as "terminating" on December 31st of the year in question, and will appear to have been "hired" again on January 1st. In addition, annual exposure reports submitted under the Revised Part 20 have been included in the 1993 data (see Section 5.1).

In the analysis presented here, the practice of reporting annual exposure would not significantly effect data for the years 1977 through 1992. However, a significant number of individuals were reported as "terminated" in December of 1993 which are included in these analyses. It is logical to assume that an even larger number of individuals were employed as temporary workers during 1993 that will most likely be reported to have worked at other facilities in 1994, and therefore have not yet ended their "careers". The probability that a worker recorded as terminated in 1992 or earlier would skip a year of work and begin working again in 1994 is much lower, and for this analysis, can be considered insignificant. For this reason, the career data prior to 1993 is thought to be more complete, and therefore care should be taken when drawing conclusions from the 1993 data for career length and career dose.

While a large number of licensee submittals identify the sex of the worker, in most cases the sex of the individual was assumed from the first name or title given in the submittal's letterhead or salutation. Where the first name is not indicative of the sex of the individual, or is unclear, a null value is recorded and the sex is treated as "unknown". Prior to 1989, these unknown records may have been assumed to be male and entered as such. A concerted effort to identify the sex of the individual has been undertaken since 1989, and the current set of names identified as male or female were used to retroactively update records that contained these names and were previously not identified by sex. The data from 1989 to 1993 for the sex of the worker is consequently more complete than it is for previous years. Due to the inherent uncertainties associated with these assumptions, care should be taken when drawing conclusions from the data broken down by sex.

Another problem has been the licensee's practice of reporting incremental periods of exposure and then reporting all or part of the individual's exposure history at that facility when the individual actually terminates employment. Licensees also report corrections to past data without clearly identifying the records as corrections to a previous submittal. In certain cases this may cause an overlap for periods of exposure and may double the dose recorded for that individual at that facility during the overlapping time period. Considerable effort has gone into eliminating this problem from the data. New data entering the system are run through extensive verification procedures to identify data that overlaps or is otherwise inconsistent with data already in the system. However, such procedures were not applied to data in the past and it has proven difficult to identify and correct for overlapping exposure records. While this only affects a small percentage of the records, it is an additional source of error for any conclusions drawn from the termination data.

5.8 Career Dose Distributions by Dose and Career Length

Table 5.8 presents the career dose distribution data broken down by dose and length of career for individuals terminating from reactor facilities from 1977 to 1993. The upper table on the page shows the number of individuals that accumulated a career dose for each of the dose ranges indicated. An individual whose career dose exactly equals one of the end-points of a range is included in the higher dose range. The left most column of the tables indicate the "career length" or period of time the individual was monitored at a reactor facility. The lower table shows the total collective dose received by individuals in each dose range.

Table 5.8 presents data for over half a million workers (608,690) monitored during the period 1977 - 1993. The number of these workers with measurable dose was 357,585. Eighty percent of the workers with measurable dose received career doses less than 2 cSv (rem), while 92% of these workers received a career dose less than 5 cSv (rem). It is important to note that this dose is received during the entire career of the worker, and can be compared favorably to the current 3 cSv (rem) per calendar quarter regulatory limit. As anticipated, Table 5.8 shows that the longer the career, the higher the career dose for most workers.

Table 5.9 shows the average career doses, average annual dose, and average career lengths for the total monitored work-force and those with measurable dose by career length. The highest career doses for all monitored individuals were accumulated by individuals who worked between 20 and 25 years. This category also had one of the highest values of average annual dose of 0.39 cSv (rem) for workers with measurable dose. The average annual dose was calculated from the total collective dose of individuals in each career length range divided by the total collective career length (in years) for these individuals. This resulted in an overall (1977 - 1993) average annual dose for workers with measurable dose of 0.37 cSv (rem). The average measurable dose calculated from reactor § 20.407 submittals for the years 1977 through 1993 corrected for transient reactor workers was found to be 0.50 cSv (rem) (see Table 4.4). The workers in Table 5.9 have been reported as having terminated their employment, while workers included in Table 4.4 include all active workers which may also contribute to the difference in these figures. The data presented in Table 5.9 is considered more accurate since it represents actual individual exposures as opposed to the calculated collective doses that are included in the Table 4.4 data.

5.9 Career Dose Distribution by Age and Sex

Table 5.10 presents the data for the 77% of workers with measurable dose for which the age of the worker is known. The data are broken down by age and year of termination for all workers with measurable dose from 1977 through 1993. The average values for age at termination, career length, and career dose are included to examine the trends over time for these workers. The data suggest a slightly aging population of workers with the average career length increasing from about one year in 1977 to over eight years in 1993. During this time period the average career doses have also increased, but at a slower rate, from 1.04 cSv (rem) in 1977 to just under 3.0 cSv (rem) in 1993. As previously discussed in Section 5.7.2, the 1993 termination data are considered incomplete and therefore it may be more prudent to note the increase from 1.05 cSv (rem) in 1977 to 1.85 cSv (rem) in 1992. Using the

TABLE 5.8
CAREER DOSE DISTRIBUTIONS BY DOSE AND CAREER LENGTH AT REACTOR FACILITIES
1977 - 1993

Number of Personnel in Dose Range (ranges in cSv or rem)

Career Length	No Meas.	Meas. <0.1	0.1 - 0.5	0.5 - 1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 50	>50	Total with Measureable Dose	Total Monitored
<=30 days	119,924	20,497	6,661	2,551	3,171	1,133	64	10	3	-	-	-	-	1	-	34,091	154,015
31 days to 6 mo	53,279	32,158	20,879	8,500	7,464	2,634	1,229	320	44	3	2	-	-	-	1	73,234	126,513
6 mo. to 1 yr	19,279	12,181	7,422	2,938	2,740	1,329	716	322	257	4	-	-	-	-	-	27,909	47,188
1 to 2 years	20,400	14,302	9,629	4,576	4,306	2,037	1,158	678	825	38	2	1	-	-	-	37,552	57,952
2 to 3 years	10,314	8,831	6,278	3,119	3,269	1,845	999	642	1,113	116	11	1	1	-	-	26,225	36,539
3 to 4 years	6,707	6,508	4,971	2,675	2,887	1,710	978	609	1,168	213	36	4	1	-	1	21,761	28,468
4 to 5 years	4,922	5,300	4,087	2,261	2,507	1,471	970	610	1,247	291	58	14	3	-	1	18,820	23,742
5 to 10 years	12,185	16,216	13,430	7,187	8,440	5,464	3,792	2,717	6,404	1,949	649	205	76	37	4	66,570	76,755
10 to 15 years	3,148	6,161	6,174	3,547	4,284	2,894	2,103	1,662	4,764	2,162	1,032	484	226	176	5	35,674	38,822
15 to 20 years	788	1,688	2,074	1,207	1,495	1,050	824	642	1,986	1,023	557	334	181	218	25	13,304	14,092
20 to 25 years	83	176	284	182	190	131	124	88	322	184	132	79	65	110	20	2,087	2,170
More than 25 yrs	76	60	54	31	26	23	13	12	39	20	18	15	6	30	11	358	434
Totals	251,105	124,078	81,943	38,774	40,779	21,721	12,970	8,312	18,172	6,003	2,497	1,137	559	572	68	357,585	608,690

Total Collective Dose of Personnel in Dose Range (person-cSv or -rem)

Career Length	No Meas.	Meas. <0.1	0.1 - 0.5	0.5 - 1	1 - 2	2 - 3	3 - 4	4 - 5	5 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 50	>50	Total Dose	Average Career Dose
<=30 days	-	535	1,586	1,822	4,790	2,528	223	42	18	-	-	-	-	43	-	11,589	0.34
31 days to 6 mo	-	1,131	5,165	6,060	10,722	6,288	4,227	1,392	260	36	34	-	-	-	61	35,376	0.48
6 mo. to 1 yr	-	408	1,808	2,104	3,902	3,232	2,473	1,412	1,531	44	-	-	-	-	-	16,914	0.61
1 to 2 years	-	486	2,413	3,292	6,142	4,950	3,999	3,024	5,273	427	32	25	-	-	-	30,064	0.80
2 to 3 years	-	306	1,598	2,248	4,701	4,515	3,445	2,864	7,513	1,334	179	23	27	-	-	28,753	1.10
3 to 4 years	-	232	1,271	1,950	4,202	4,174	3,381	2,717	7,911	2,463	588	91	25	-	321	29,328	1.35
4 to 5 years	-	189	1,040	1,644	3,636	3,643	3,357	2,713	8,594	3,508	972	309	82	-	176	29,862	1.59
5 to 10 years	-	597	3,439	5,211	12,294	13,442	13,190	12,140	44,730	23,542	11,026	4,510	2,052	1,248	1,265	148,685	2.23
10 to 15 years	-	250	1,591	2,590	6,279	7,157	7,335	7,433	33,984	26,422	17,722	10,744	6,168	6,195	282	134,150	3.76
15 to 20 years	-	71	536	879	2,183	2,588	2,878	2,868	14,178	12,501	9,598	7,459	4,930	7,991	1,438	70,097	5.27
20 to 25 years	-	7	75	132	270	329	433	399	2,385	2,250	2,271	1,772	1,787	4,191	1,224	17,525	8.40
More than 25 yrs	-	2	13	21	39	54	46	54	276	233	319	336	161	1,115	700	3,369	9.41
Totals		3,680	18,949	26,133	54,369	50,372	44,765	37,016	126,635	72,759	42,741	25,268	15,232	20,739	5,466	555,712	1.55

TABLE 5.9
AVERAGE CAREER LENGTHS AND DOSES BY CAREER LENGTH
1977 - 1993

Career Length	Average Career Dose		Average Annual Dose		Average Career Length	
	Total Monitored cSv (Rem)	Number w/ Measurable cSv (Rem)	Total Monitored cSv (Rem)	Number w/ Measurable cSv (Rem)	Total Monitored (Years)	Number w/ Measurable (Years)
<=30 Days	0.08	0.34	--	--	0.02	0.04
31 Days - 6 Mo.	0.28	0.48	--	--	0.24	0.24
6 Mo. - 1 Yr	0.36	0.61	0.49	0.82	0.74	0.74
1 - 2 Yrs	0.52	0.80	0.36	0.54	1.46	1.47
2 - 3 Yrs	0.79	1.10	0.32	0.44	2.47	2.47
3 - 4 Yrs	1.03	1.35	0.30	0.39	3.47	3.47
4 - 5 Yrs	1.26	1.59	0.28	0.35	4.49	4.49
5 - 10 Yrs	1.89	2.23	0.26	0.31	7.23	7.26
10 - 15 Yrs	3.46	3.76	0.28	0.31	12.16	12.18
15 - 20 Yrs	4.97	5.27	0.29	0.31	17.00	17.01
20 - 25 Yrs	8.08	8.40	0.37	0.39	21.62	21.62
> 25 Yrs	7.76	9.41	0.21	0.26	37.11	36.57
Totals	0.91	1.55	0.31	0.37	2.94	4.26

1977 and 1992 data, the average career length has increased by nearly 600% while the average career dose has increased by 78%. The average career dose has remained less than 3 cSv (rem) for each year. The average age at termination increased by only 11% from a value of 36.26 years in 1977 to 40.25 years in 1992.

Table 5.11 presents the average values of age at termination, career length, and career dose broken down by sex and year of termination for all workers of known age receiving measurable dose from 1977 through 1993. The sex of the workers was determined as discussed in Section 5.7.2, and the sex and age was known for 75% of these workers. The table shows that the termination age of female workers averaged 8 years younger than that for male workers in 1977, but only about 5 years younger in 1993. The career doses of females have averaged about one third of the male career doses, while the career lengths have averaged about two thirds of the male career lengths. The percentage of female workers (in the group of workers with known age and sex) has increased from 1% in 1977 to 8% in 1991 and back down to 6% in 1993. The average termination age of females increased 25% from 1977 to 1993 while the male average age increased by 11%.

TABLE 5.10
CAREER DOSE DISTRIBUTIONS BY AGE AND YEAR OF TERMINATION FOR PERSONNEL WITH MEASURABLE DOSE
1977 - 1993

Total Number of Personnel in Each Age Range

Year	18-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	>60	Total	Average Age at Term. (Yrs)	Average Career Length (Yrs)
1977	170	1304	1349	1068	748	554	527	520	445	365	7,050	36.26	1.00
1978	126	1088	1231	1041	697	552	417	427	437	340	6,356	36.54	1.50
1979	131	1495	1647	1448	937	637	569	558	435	342	8,199	35.68	1.34
1980	166	1747	1871	1768	1248	940	726	751	649	482	10,348	36.64	1.46
1981	181	2412	2590	2259	1579	1048	906	813	683	564	13,035	35.72	1.52
1982	135	1421	1984	1903	1564	1105	852	712	660	608	10,944	37.47	2.20
1983	161	1645	2297	2097	1763	1260	844	743	624	583	12,017	36.74	2.42
1984	181	1943	2711	2465	2111	1430	1099	799	796	649	14,184	36.77	2.78
1985	159	1617	2620	2477	2157	1590	1136	841	760	713	14,070	37.33	3.16
1986	163	1557	2670	2613	2472	1752	1133	922	793	774	14,849	37.59	3.80
1987	219	1827	3051	3285	3017	2317	1636	1065	946	840	18,203	37.66	4.18
1988	203	1556	2437	2721	2498	2088	1401	937	859	712	15,412	37.89	4.61
1989	217	1489	2412	3017	2781	2424	1664	1116	835	766	16,721	38.32	4.94
1990	166	1457	2463	3316	3240	2767	1883	1274	976	840	18,382	38.83	5.40
1991	147	1323	2026	3003	3077	2842	1954	1335	985	830	17,522	39.47	6.24
1992	163	1659	2552	3822	4211	3942	3196	2096	1516	1072	24,229	40.26	6.86
1993	181	2433	5031	8484	10406	9753	7893	5193	3240	1745	54,359	40.77	8.33

Total Collective Dose of Personnel in Each Age Range (cSv or rem)

Year	18-20	20-25	25-30	30-35	35-40	40-45	45-50	50-55	55-60	>60	Total Dose	Average Career Dose
1977	90	1,458	1,550	1,254	849	535	504	445	366	288	7,337	1.040
1978	41	1,050	1,528	1,142	733	639	476	501	434	317	6,861	1.081
1979	56	1,087	1,551	1,303	815	472	491	402	342	382	6,901	0.841
1980	81	1,646	1,957	1,861	1,331	1,070	683	726	708	563	10,625	1.026
1981	78	2,807	3,212	2,735	1,842	1,217	1,065	862	871	666	15,354	1.179
1982	32	1,156	2,039	2,353	2,066	1,441	1,114	869	914	909	12,892	1.177
1983	58	1,709	2,842	2,994	2,481	1,480	1,110	879	915	1,018	15,487	1.289
1984	64	1,991	3,900	3,808	2,923	2,530	1,527	972	1,181	1,212	20,107	1.417
1985	25	1,323	3,334	3,706	3,360	2,147	1,560	1,128	927	1,029	18,539	1.317
1986	25	1,067	3,065	3,872	3,964	2,736	1,652	1,366	1,359	1,295	20,400	1.373
1987	48	835	3,506	4,617	4,684	3,207	2,208	1,520	1,601	1,599	23,825	1.307
1988	32	759	2,671	4,204	3,992	3,251	1,925	1,410	1,429	1,429	21,102	1.366
1989	41	729	2,678	4,950	4,847	3,966	2,541	1,606	1,325	1,248	23,932	1.431
1990	34	726	2,691	5,081	5,690	5,269	3,334	2,023	1,963	1,645	28,456	1.547
1991	42	628	2,009	5,244	6,164	5,568	3,740	2,449	2,042	2,005	29,891	1.704
1992	38	785	2,393	6,680	8,748	8,574	6,889	4,360	3,489	2,836	44,791	1.849
1993	66	1,964	8,442	22,682	34,837	34,335	27,428	17,431	10,751	4,815	162,753	2.996

TABLE 5.11
AVERAGE CAREER VALUES BY SEX AND YEAR OF TERMINATION
FOR PERSONNEL OF KNOWN AGE WITH MEASURABLE DOSE
1977 - 1993

	Females of Known Age				Males of Known Age				Known Age, Sex Unknown				Total Personnel			
Year	Number with Meas'ble	Average Age at Term.	Average Career Length (Yrs)	Average Career Dose (cSv, rem)	Number with Meas'ble	Average Age at Term.	Average Career Length (Yrs)	Average Career Dose (cSv, rem)	Number with Meas'ble	Average Age at Term.	Average Career Length (Yrs)	Average Career Dose (cSv, rem)	Number with Meas'ble	Average Age at Term.	Average Career Length (Yrs)	Average Career Dose (cSv, rem)
1977	28	28.94	1.08	0.881	2,270	36.84	1.21	1.405	4,772	36.02	0.90	0.868	7,070	36.26	1.00	1.040
1978	39	34.09	1.92	0.708	2,289	37.07	1.80	1.401	4,046	36.27	1.32	0.904	6,374	36.54	1.50	1.081
1979	85	29.64	1.24	0.324	3,511	36.22	1.52	1.002	4,625	35.38	1.20	0.728	8,221	35.68	1.34	0.841
1980	328	30.59	0.97	0.194	8,302	37.09	1.49	1.093	1,731	35.64	1.41	0.865	10,361	36.64	1.46	1.026
1981	529	31.08	1.25	0.342	10,807	35.88	1.53	1.301	1,722	36.19	1.58	0.669	13,058	35.72	1.52	1.179
1982	475	31.50	1.43	0.254	8,666	38.10	2.30	1.341	1,816	36.03	1.93	0.639	10,957	37.47	2.20	1.177
1983	503	31.04	1.91	0.370	9,569	37.20	2.54	1.450	1,971	35.97	1.96	0.741	12,043	36.74	2.42	1.289
1984	795	30.85	1.86	0.475	11,991	37.13	2.91	1.563	1,423	37.05	2.25	0.715	14,209	36.77	2.78	1.417
1985	556	31.57	2.78	0.435	9,272	38.50	3.66	1.637	4,296	35.56	2.11	0.739	14,124	37.33	3.16	1.317
1986	702	32.25	2.83	0.392	9,936	38.65	4.34	1.681	4,273	36.00	2.73	0.820	14,911	37.59	3.80	1.373
1987	651	32.42	3.62	0.485	11,120	39.11	5.14	1.683	6,520	35.71	2.59	0.748	18,291	37.66	4.18	1.307
1988	526	33.75	4.12	0.432	8,963	39.33	5.67	1.817	5,991	36.09	3.07	0.774	15,480	37.89	4.61	1.366
1989	912	33.27	3.49	0.504	11,944	38.79	5.20	1.640	3,926	38.06	4.49	1.010	16,782	38.32	4.94	1.431
1990	980	33.49	3.60	0.535	13,593	39.24	5.53	1.727	3,869	38.75	5.43	1.172	18,442	38.83	5.40	1.547
1991	1,084	34.35	4.54	0.615	12,737	39.85	6.40	1.917	3,765	39.69	6.18	1.298	17,586	39.47	6.24	1.704
1992	1,342	34.61	4.41	0.645	18,441	40.47	6.86	2.037	4,503	41.04	7.58	1.439	24,286	40.25	6.86	1.849
1993	2,524	36.08	5.94	1.326	41,559	41.01	8.47	3.339	10,409	40.95	8.34	2.031	54,492	40.77	8.33	2.996

The data for workers of known age and unknown sex are included in Table 5.11 to give some indication of the values for workers not included in the analysis by age and sex. It is found that the values lie between that for the male and female workers, and are nearly the same as for the male worker population. There is no way of determining whether the analysis presented here would be significantly impacted if the sex and age were known for this group. The fact that the average career length for this group is considerably less each year than the value for males, and less than the total workers where age and sex are known, may reflect that this group contains a large number of short-term or "temporary" workers. It is known that a contributing factor in the number of workers in this category is the licensee's practice of reporting only the first initial of the first name of the individual (see Section 5.7.2). This is thought to be a more common practice among temporary workers where licensee personnel files may be less complete, and therefore supports the theory that this group may contain a disproportionate number of short-term employees. However, the figures presented here for workers of known age and sex are believed to be representative of the overall population of workers with measurable dose.

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[14], respectively, of workers to ionizing radiation from licensed material and other sources of radiation within the licensee's control. 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 cSv (rem) per calendar quarter[15]. Licensees are permitted to allow workers to be exposed to doses not exceeding 3 cSv (rem) per calendar quarter if they can show that the worker's cumulative dose will not exceed 5 cSv (rem) multiplied by the worker's age since his/her eighteenth birthday [cumulative dose < 5(N-18), where N is the worker's age][16]. 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 receive 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)[17] 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, <u>not</u> the amount retained.) The MPCs are listed in Appendix B, Table 1, Column 1, of 10 CFR Part 20. Because there are 520 hours in thirteen 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 or equal to 520. This rule applies regardless of the route of

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14 These are the section numbers before they were changed by the revision of 10 CFR Part 20 (see 56 CFR 23360, May 21, 1991). The "old" 10 CFR Part 20 remained in effect throughout 1993, although some licensees implemented the "new" 10 CFR Part 20 early (before January 1, 1994). For licensees operating under the Revised 10 CFR 20, the limits are given in §20.1201.

15 For licensees operating under the Revised 10 CFR 20, the 1.25 rem/quarter limit no longer applies. For occupationally exposed adult workers, the total effective dose equivalent (TEDE) limit is 5 rem/year.

16 For the Revised 10 CFR 20, the 5(N-18) lifetime limit has been replaced by the concept of planned special exposures (PSEs); see §20.1206.

17 Under the Revised 10 CFR 20, the equivalent concept is the derived air concentration (DAC); see §20.1003.

intake (inhalation, ingestion, absorption through the skin or an open wound, injection, etc.).

10 CFR 20.403 and 20.405[18] 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 cSv (rem) or more; exposure to the skin of the whole body of any individual to 150 cSv (rem) or more; or exposure of the extremities (feet, ankles, hands or forearms) of any individual to 375 cSv (rem) 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 cSv (rem) or more; exposure of the skin of the whole body of any individual to 30 cSv (rem) or more; or exposure of the extremities to 75 cSv (rem) 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 cSv (rem), or that exceed 3 cSv (rem), as discussed in § 3.2 of this document. Reports of skin exposures that exceed 7.5 cSv (rem) and extremity exposures that exceed 18.75 cSv (rem) 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.

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18 For the Revised 10 CFR 20, see §§20.2202-20.2203 for analogous reporting requirements.

Written reports of events required to be reported under Category A or B must also be submitted within 30 days.

6.2 Limitations of the Data

The analysis and summary of incidents presented here involving exposures in excess of regulatory limits represent the status of events as of the publication of this report. Exposure events of this type typically undergo a long review and evaluation process by the licensee, the NRC inspector for the Regional office, and NRC headquarters. Preliminary dose estimates submitted by licensees are often conservatively high, and do not represent the final dose assigned for the event. It is therefore not uncommon for an "overexposure" event to be re-assessed and the final assigned dose to be categorized as not having been in excess of the regulatory limits. In other cases, the exposure may not be identified until a later date, such as during the next scheduled audit or inspection of the licensee's exposure records.

For these reasons, an attempt is made to keep current the exposure events summary presented here. An event that has been re-assessed and determined not to be an exposure in excess of the limits is not included in this report. In addition, events which are identified that occurred in prior years are added to the summary.

It is important for the reader to note that the summary presented here represents a "snapshot" of the status of events as of the publication date of this report. Previous or future reports may not correlate in the exact number of events due to the review cycle and re-assessment of the events.

6.3 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 1985 through 1993. For the period 1990-1993, it shows the number of individuals who exceeded various limits while employed by one of several types of licensees. For the period 1985-1989, 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 1993, three individuals received external doses that exceeded applicable whole-body limits (one individual exceeded the quarterly whole-body dose limit twice during 1993). In each of the past five years from 1989 through 1993,

the highest external whole-body dose was 93, 24, 3, 1.9, and 6 cSv (rems), respectively.

In 1993 there were no incidents in which individuals received external exposures of the magnitude described as Category A.

Three events occurred in Category B. A radiography assistant received a dose of 6 rem to the whole body. The assistant failed to secure the source in a shielded position before moving the device to another location. The radiographer was not properly observing the assistant.

One individual received a whole-body dose of 5.4 cSv (rems) while conducting medical-related research and development. This same individual also exceeded the 1.25 cSv (rems)/quarter limit during 1993. The incident involved "tagging" of samples with Technetium 99m.

Another individual working for a multiple-location radiography firm received an extremity dose of 275 cSv (rems). The incident resulted from a failure of an Iridium 192 radiography source to seat properly in the shielded device. The radiographer did not follow the correct procedures for retracting a stuck source and failed to acknowledge the high radiation levels indicated by the survey meter and alarming ratemeter. The high extremity dose resulted from the individual's attempts to manipulate the guide tube and locking mechanism while in close proximity to the unshielded source.

In addition to the 1994 events noted above, one event that occurred in 1992 was reported in 1994. The incident involved a technician's exposure to a moisture density gauge device during field compaction tests for road construction work.

TABLE 6.1
OCCUPATIONAL EXPOSURES IN EXCESS OF REGULATORY LIMITS
1985 - 1993

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)
1993	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS		1							
		SUM OF DOSES		6							
	POWER REACTORS	NO. OF PERSONS									
		SUM OF DOSES									
	MEDICAL FACILITIES	NO. OF PERSONS	1						2		
		SUM OF DOSES	1.3						41.3		
	MARKETING & MANUFACT.	NO. OF PERSONS	5								
		SUM OF DOSES	10.6								
	OTHER	NO. OF PERSONS	2[a]	1[a]						1	
		SUM OF DOSES	4.0	5.4						275	
1992	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS									1
		SUM OF DOSES									300-1000
	POWER REACTORS	NO. OF PERSONS	1			4					
		SUM OF DOSES	1.9			57.7					
	MEDICAL FACILITIES	NO. OF PERSONS							4	1	
		SUM OF DOSES							143.6	272	
	MARKETING & MANUFACT.	NO. OF PERSONS									
		SUM OF DOSES									
	OTHER	NO. OF PERSONS	1[b]			1			1		
		SUM OF DOSES	1.9			24.1			40.5		
1991	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	2								
		SUM OF DOSES	5.6								
	POWER REACTORS	NO. OF PERSONS									
		SUM OF DOSES									
	MEDICAL FACILITIES	NO. OF PERSONS	2								
		SUM OF DOSES	3.8								
	MARKETING & MANUFACT.	NO. OF PERSONS							1		
		SUM OF DOSES							22.3		
	OTHER	NO. OF PERSONS	1								
		SUM OF DOSES	2.4								
1990	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	3	3[c,d]				1[c]		1	2[d]
		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[e]								
		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		
	ALL OTHER	NO. OF PERSONS	4			1			2	1	
		SUM OF DOSES	6.6			9.2			105	178	
1988	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	3	1						1	
		SUM OF DOSES	8.1	6.1						118	
	ALL OTHER	NO. OF PERSONS	7			4	1	1	1	1	
		SUM OF DOSES	19.34			66.8	61	278	58	127	
1987	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	1							1	
		SUM OF DOSES	3.1							180	
	ALL OTHER	NO. OF PERSONS	2	1		5			3		1
		SUM OF DOSES	2.8	7.5		128.4			72.0		650
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	

[a]Same individual exceeded 1.25 rem/qtr limit twice during 1993.
[b]This 1992 exposure was reported in 1994.
[c]This individual received a whole-body dose of 24 rem in addition to a 6000 rem skin dose.
[d]One of these individuals received a 9 rem whole-body dose in addition to a 1070 rem extremity dose.
[e]One of these persons exceeded the quarterly whole-body dose limits three times in one calendar year.

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APPENDIX A

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

1993

APPENDIX A

INDUSTRIAL RADIOGRAPHERS Single Location - 1993

Licensee Name	Program Code 03310	License Number	Total Number of Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-cSv)	Average Meas. Dose (cSv or rem)
INDUSTRIAL NDT CO., INC.		39-24888-01	20	15	7.675	0.51
WISCONSIN CENTRIFUGAL, INC.		48-11641-01	5	5	1.725	0.35
MINNESOTA VALLEY ENGINEERING		22-24393-01	3	3	0.925	0.31
LUCIUS PITKIN, INC.		29-27816-01	16	16	4.625	0.29
ARROW TANK & ENGINEERING CO.		22-13253-01	6	3	0.600	0.20
MANOIR - ELECTRO ALLOYS, INC.		34-24346-01	10	5	0.950	0.19
MAYNARD ELECTRIC STEEL CASTING CO.		48-07080-01	4	3	0.475	0.16
HIGH STEEL STRUCTURES, INC.		37-17534-01	10	3	0.275	0.09
DURALOY		37-02279-02	5	5	0.375	0.08
ARMY, DEPARTMENT OF THE		29-00047-06	248	73	3.650	0.05
CITY METAL COMPANY D/B/A/ MISSOURI		24-15152-01	5	1	0.050	0.05
EMPIRE STEEL CASTINGS, INC.		37-02448-01	5	2	0.100	0.05
INGERSOLL-RAND CO.		29-02015-02	2	2	0.100	0.05
IONICS, INC.		37-20757-02	10	2	0.100	0.05
IRONTON IRON, INC.		34-24800-02	3	3	0.150	0.05
NILES STEEL TANK CO.		21-04741-01	1	1	0.050	0.05
SHAFER VALVE COMPANY		34-21198-01	3	1	0.050	0.05
TAMPELLA POWER, INC.		37-28585-01	6	3	0.150	0.05
THE DURIRON COMPANY, INC.		34-06398-01	3	2	0.100	0.05
THIOKOL CORPORATION		17-16380-01	37	13	0.650	0.05
TRANS WORLD AIRLINES, INC.		24-05151-05	98	6	0.300	0.05
ATLANTIC RESEARCH CORPORATION		45-02808-04	14	6	0.200	0.03
CARONDELET FOUNDRY COMPANY		24-26136-01	8	4	0.110	0.03
LYNCHBURG FOUNDRY COMPANY		45-17464-01	7	1	0.020	0.02
BABCOCK & WILCOX CO.		34-02160-03	28	5	0.060	0.01
ARMY, DEPARTMENT OF THE		13-18235-01	30	0	0.000	0.00
BUCKEYE STEEL CASTINGS		34-06627-01	2	0	0.000	0.00
CONNEX PIPE SYSTEMS, INC.		34-00850-02	5	0	0.000	0.00
COPES-VULCAN		37-19530-01	1	0	0.000	0.00
GENERAL MOTORS CORPORATION		21-08678-03	2	0	0.000	0.00
GENERAL MOTORS CORPORATION		34-15315-02	16	0	0.000	0.00
GM POWERTRAIN		21-02392-01	3	0	0.000	0.00
GREDE-PRYOR, INC.		35-18099-01	2	0	0.000	0.00
HARRISON STEEL CASTINGS CO.		13-02141-01	6	0	0.000	0.00
NORTHWEST AIRLINES, INC.		22-12080-01	35	0	0.000	0.00
PELTON CASTEEL, INC.		48-02669-02	4	0	0.000	0.00
REFINERY PRODUCTS CORPORATION		48-03665-02	3	0	0.000	0.00
THE WILLIAM POWELL CO.		34-02963-01	2	0	0.000	0.00
WAUKESHA FOUNDRY DIVISION		48-13776-01	7	0	0.000	0.00
			675	183	23.465	0.13

APPENDIX A (cont.)

INDUSTRIAL RADIOGRAPHERS Multiple Location - 1993

Licensee Name	Program Code 03320	License Number	Total Number of Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-cSv)	Average Meas. Dose (cSv or rem)
ARROW NDE CO., INC.		35-23198-01	2	2	4.125	2.06
TRI STATE INSPECTION & CONSULTANTS		37-19640-01	3	2	4.125	2.06
MIDWEST INSPECTION SERVICES		35-27005-01	32	30	50.600	1.69
INSPECTION MANAGEMENT CORPORATION		35-26824-01	8	8	13.350	1.67
AKRON INDUSTRIAL SERV., INC.		34-24673-01	3	2	3.125	1.56
INTERMOUNTAIN TESTING CO.		05-07872-01	24	24	36.600	1.53
QUALITY ENERGY SERV. & TESTS CORP.		35-26815-01	14	14	20.880	1.49
CAPITAL X-RAY SERV., INC.		35-11114-01	29	29	41.950	1.45
TECHNICAL WELDING LABORATORY, INC.		42-25214-01	49	49	69.370	1.42
SOUTHWEST X-RAY CORPORATION		49-27434-01	16	13	18.030	1.39
SIERRA TESTING, INC.		35-26950-01	35	33	44.600	1.35
H & H X-RAY SERV., INC.		17-19236-01	8	8	10.670	1.33
GLOBE X-RAY SERV., INC.		35-15194-01	38	35	45.950	1.31
TULSA GAMMA RAY, INC.		35-17178-01	35	33	42.200	1.28
QSL INSPECTION, INC.		37-28085-01	41	37	44.300	1.20
BILL MILLER, INC.		35-19048-01	32	29	33.680	1.16
PENN INSPECTION CO.		35-21144-01	20	20	22.050	1.10
MATTINGLY TESTING SERVICES, INC.		25-21479-01	6	6	6.600	1.10
TESTMASTER INSPECTION CO.,INC.		34-24872-01	15	15	15.950	1.06
MIDWEST INDUSTRIAL X-RAY, INC.		33-27427-01	16	13	13.400	1.03
WESTERN X-RAY COMPANY		35-19993-01	13	13	13.270	1.02
H. R. INSPECTION SERV., INC.		15-06209-01	7	7	7.100	1.01
COLBY & THIELMEIER TESTING CO.		24-13737-01	8	8	6.800	0.85
NORTHWEST INSP. & TESTING SERV., INC.		11-27394-01	2	2	1.675	0.84
TRI STATE ASSOCIATES, INC.		45-24967-01	6	2	1.675	0.84
BARNETT INDUSTRIAL X-RAY		35-26953-01	19	19	15.700	0.83
NDT SPECIALISTS, INC.		48-25917-01	5	5	3.925	0.79
WESTERN IND. X-RAY INSPECTION CO.		49-27356-01	11	11	8.600	0.78
ACCU-TECH EVALUATION SERVICES, INC.		29-28358-01	22	17	13.230	0.78
MONTANA X-RAY, INC.		25-21134-01	4	4	3.100	0.78
CALUMET TESTING SERV., INC.		13-16347-01	38	30	22.980	0.77
NORTH AMERICAN INSPECTION, INC.		37-23370-01	76	56	42.400	0.76
ALLEGHENY LABORATORIES		37-20734-01	4	3	2.160	0.72
CONSOLIDATED NDE, INC.		29-21452-01	89	83	58.280	0.70
HUNTINGTON TESTING & TECHNOLOGY		47-23076-01	34	31	21.530	0.69
TEI ANALYTICAL SERVICES, INC.		37-28004-01	55	52	35.730	0.69
CENTURY INSPECTION, INC.		42-08456-02	114	102	69.100	0.68
JAN X-RAY SERVICES, INC.		21-16560-01	58	58	39.260	0.68
H&G INSP. CO., INC.		42-26838-01	39	38	25.630	0.67
PROFESSIONAL SERV. INDUSTRIES, INC.		37-00276-25	9	7	4.710	0.67
MET-CHEM TESTING LABS OF UTAH, INC.		43-27362-01	30	16	10.770	0.67
TWIN PORTS TESTING, INC.		48-23476-01	31	27	17.600	0.65
CTI, INC.		50-19202-01	103	80	49.180	0.61
CURTIS INSPECTION SERVICES, INC.		35-27438-01	34	34	20.700	0.61
MID AMERICAN INSPECTION SERIVES, INC.		21-26060-01	31	31	17.680	0.57
ST. LOUIS TESTING LABS, INC.		24-00188-02	12	11	6.250	0.57
ALASKA INDUSTRIAL X-RAY		50-16084-01	8	7	3.700	0.53

APPENDIX A (cont.)

INDUSTRIAL RADIOGRAPHERS Multiple Location - 1993

Licensee Name	Program Code 03320	License Number	Total Number of Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-cSv)	Average Meas. Dose (cSv or rem)
WESTERN STRESS, INC.		42-26900-01	70	39	20.600	0.53
INDUSTRIAL NDT SERVICES DIVISION		13-06147-04	15	11	5.800	0.53
N. V. ENTERPRISES		49-26888-01	2	2	1.050	0.53
DIAMOND H TESTING COMPANY		11-27316-01	12	12	6.275	0.52
ALLIED INSPECTION SERV., INC.		21-18428-01	7	6	3.025	0.50
EASTERN TESTING & INSPECTION, INC.		29-09814-01	16	11	5.500	0.50
MQS INSPECTION, INC.		12-00622-07	315	241	117.000	0.49
WISCONSIN INDUSTRIAL TESTING, INC.		48-17480-01	72	68	32.530	0.48
LAW ENGINEERING, INC.		10-00346-03	9	7	3.230	0.46
ADVEX CORPORATION		45-16452-01	10	8	3.600	0.45
SPACE SCIENCE SERVICES, INC.		09-07550-01	55	36	15.900	0.44
GLITSCH FIELD SERVICES/NDE, INC.		34-14071-01	39	29	12.760	0.44
BRANCH RADIOGRAPHIC LABS., INC.		29-03405-02	23	11	4.825	0.44
EDWARDS PIPELINE TESTING, INC.		35-23193-01	163	151	65.900	0.44
TESTING TECHNOLOGIES, INC.		45-25007-01	13	12	5.175	0.43
VALLEY INSPECTION SERVICE, INC.		37-28385-01	7	4	1.630	0.41
QUALITY INSPECTION & TESTING		50-29038-01	8	8	3.200	0.40
CONAM INSPECTION		12-16559-01	142	100	39.850	0.40
CONNELL LIMITED PARTNERSHIP		35-13735-01	4	3	1.190	0.40
SAM-SON INSPECTION & TECH. SERV., INC.		34-25898-01	21	15	5.870	0.39
BRAUN INTERTEC CORPORATION		22-16537-02	19	15	5.650	0.38
EBASCO SERVICES INCORPORATED		29-07056-03	14	2	0.750	0.38
PITT-DES MOINES, INC.		37-27878-01	19	17	6.060	0.36
NON DESTRUCTIVE INSPECTION SERV.		47-11883-01	5	5	1.775	0.36
NON-DESTRUCTIVE TESTING CORP.		29-19742-01	11	5	1.775	0.36
FROEHLING & ROBERTSON, INC.		45-08890-01	11	7	2.455	0.35
SPEC CONSULTANTS, INC.		37-27891-01	15	11	3.725	0.34
MATERIAL TESTING LABORATORIES, INC.		45-17151-01	20	12	4.060	0.34
GENERAL TESTING & INSPECTION CO.		34-09037-01	6	4	1.350	0.34
MASSACHUSETTS MATERIALS RESEARCH		07-01173-03	10	8	2.690	0.34
UNITED STATES TESTING CO., INC.		41-25235-01	139	97	31.380	0.32
TESTING INST. OF AK, INC.		50-17446-01	19	13	4.200	0.32
Q. C. LABS, INC.		09-11579-03	27	16	5.150	0.32
BAKER TESTING SERV., INC.		20-19067-01	11	7	2.200	0.31
GREAT LAKES TESTING, INC.		48-26484-01	7	6	1.850	0.31
S. K. MCBRYDE, INC.		32-25137-01	4	3	0.925	0.31
OLD DOMINION FABRICATORS		45-15581-01	5	4	1.175	0.29
TRUTOM LTD.		31-28562-01	21	11	3.100	0.28
ARCTIC SLOPE INSP. SERVICES, INC.		50-29015-01	12	9	2.400	0.27
GRINNELL CORPORATION		38-28750-01	18	15	3.780	0.25
X-RAY, INC.		46-03414-03	33	15	3.625	0.24
CRAMER & LINDELL ENGINEERS, INC.		06-20794-01	24	20	4.650	0.23
GENERAL DYNAMICS CORPORATION		06-01781-08	48	47	10.650	0.23
X-R-I TESTING		21-05472-01	139	35	7.900	0.23
LABARGE PIPE & STEEL CO.		35-26836-01	4	4	0.850	0.21
NOOTER CORP.		24-03783-01	18	6	1.250	0.21
MARYLAND Q.C. LABORATORIES		19-28683-01	20	16	3.250	0.20

APPENDIX A (cont.)

INDUSTRIAL RADIOGRAPHERS Multiple Location - 1993

Licensee Name	Program Code 03320	License Number	Total Number of Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-cSv)	Average Meas. Dose (cSv or rem)
NEWPORT NEWS SHIPBUILDING & DRYDOCK		45-09428-02	78	78	15.820	0.20
MAGNA CHEK, INC.		21-19111-02	34	4	0.775	0.19
SCIENTIFIC TECHNICAL, INC.		45-24882-01	4	4	0.775	0.19
WOS TESTING COMPANY, INC.		48-26385-01	7	5	0.960	0.19
ABC TESTING, INC.		20-19778-01	6	5	0.950	0.19
NOVA DATA TESTING LABS, INC.		45-24872-01	10	9	1.675	0.19
CTL ENGINEERING, INC.		34-08331-01	2	2	0.358	0.18
INDESERV, INC.		45-25074-01	2	2	0.350	0.18
COMO TECH INSPECTION		15-26978-01	18	9	1.550	0.17
PROGRESS SERV., INC.		34-19592-01	10	5	0.825	0.17
WALASHEK ENTERPRISES, INC.		53-23225-01	4	4	0.650	0.16
TENNESSEE VALLEY AUTHORITY		41-06832-06	43	19	3.082	0.16
CHICAGO BRIDGE AND IRON COMPANY		42-13553-02	180	122	19.630	0.16
VENEGAS INDUSTRIAL TESTING		28-14847-02	3	2	0.320	0.16
CERTIFIED TESTING LABS., INC.		29-14150-01	23	23	3.619	0.16
PROFESSIONAL WELDING ASSOC.,INC.		48-25806-01	8	6	0.940	0.16
ASTROTECH, INC.		37-09928-01	10	6	0.890	0.15
CONSUMERS POWER CO.		21-08606-03	17	12	1.737	0.14
PSI ENERGY, INC.		13-15544-06	5	3	0.400	0.13
TENNECO GAS PIPELINE COMPANY		42-09073-02	16	8	0.975	0.12
NDT SERVICES, INC.		52-19438-01	12	11	1.300	0.12
ANVIL CORPORATION		46-23236-03	14	14	1.075	0.08
CENTERIOR SERVICE COMPANY		34-23406-01	8	5	0.381	0.08
ANR PIPELINE CO.		21-24502-01	5	2	0.150	0.08
PRECISION COMPONENTS CORP.		37-16280-01	47	18	1.130	0.06
HUTCHINSON TECHNICAL COLLEGE		22-15554-01	323	60	3.325	0.06
ALONSO & CARUS IRON WORKS, INC.		52-21350-01	6	6	0.300	0.05
AMERICAN AIRLINES, INC.		35-13964-01	29	5	0.250	0.05
ANCHOR/DARLING VALVE COMPANY		37-15476-01	7	3	0.150	0.05
EG&G FLORIDA, INC.		09-21233-02	9	2	0.100	0.05
EG&G FLORIDA, INC.		09-21233-01	42	6	0.300	0.05
FACTORY MUTUAL RESEARCH CORPORATION		20-04007-02	4	1	0.050	0.05
PHOENIX LABORATORIES, INC.		20-15102-01	6	3	0.150	0.05
POWER PIPING CO.		37-09945-01	7	4	0.200	0.05
SENIOR ENGINEERING CO.		24-19500-01	4	2	0.100	0.05
VERMONT NONDESTRUCTIVE TESTING, INC.		44-28509-01	8	1	0.050	0.05
VOITH HYDRO, INC.		37-16280-03	18	2	0.100	0.05
NORFOLK SHIPBUILDING & DRYDOCK CO.		45-12042-01	14	10	0.350	0.04
PACIFIC RIM CONSULTING		53-29063-02	14	1	0.005	0.01
AMERICAN FOUNDRY GROUP, INC.		35-26893-01	3	0	0.000	0.00
ARMY, DEPARTMENT OF THE		30-02405-05	3	0	0.000	0.00
C & R LABS		53-19179-01	4	0	0.000	0.00
WESTINGHOUSE ELECTRIC CORP.		37-05809-02	9	0	0.000	0.00
			4,046	2,824	1603.572	0.57

APPENDIX A (cont.)

MANUFACTURERS AND DISTRIBUTORS - 1993

Licensee Name	Program Type	Program Code	License Number	Total Number of Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-cSv)	Average Meas. Dose (cSv or rem)
ADVANCED MEDICAL SYS., INC.	A-BROAD	03211	34-19089-01	6	6	10.650	1.78
MALLINCKRODT, INC.	A-BROAD	03211	24-04206-01	385	205	236.600	1.15
DU PONT MERCK PHARMACEUTICAL CO.	A-BROAD	03211	20-28598-01	719	462	240.000	0.52
AMERSHAM CORPORATION	A-BROAD	03211	20-12836-01	46	28	10.320	0.37
RTS TECHNOLOGY, INC.	A-BROAD	03211	20-27966-01	4	3	0.490	0.16
E. R. SQUIBB & SONS, INC.	A-BROAD	03211	29-00139-02	859	90	6.850	0.08
ABB INDUSTRIAL SYSTEMS INC.	A-BROAD	03211	34-00255-03	389	117	6.800	0.06
NUCLEAR RESEARCH CORP.	A-BROAD	03211	29-04236-01	47	14	0.700	0.05
				2,455	925	512.410	0.55
FRONTIER TECHNOLOGY CORP.	B-BROAD	03212	SNM-1957	42	6	0.750	0.13
OHMART CORP.	B-BROAD	03212	34-00639-01	47	37	3.550	0.10
BEST INDUSTRIES, INC.	B-BROAD	03212	45-19757-01	80	80	6.250	0.08
FISCHER TECHNOLOGY, INC.	B-BROAD	03212	06-19165-01	9	2	0.100	0.05
NORLAND CORP.	B-BROAD	03212	48-13403-01	17	2	0.100	0.05
				195	127	10.750	0.08
ELIAS USA, INC.	OTHER	03214	48-26355-01	1	1	0.547	0.55
SEAMAN NUCLEAR CORPORATION	OTHER	03214	48-12016-01	19	8	3.875	0.48
CP CLARE CORPORATION	OTHER	03214	24-26366-01	9	1	0.375	0.38
CIS-US, INC.	OTHER	03214	20-20973-01	18	11	3.680	0.33
HERLEY-MDI	OTHER	03214	20-13270-01	6	5	0.950	0.19
DU PONT MERCK PHARMACEUTICAL CO.	OTHER	03214	20-00320-19	8	6	1.060	0.18
NORDION INTERNATIONAL INC.	OTHER	03214	54-28275-01	25	16	2.575	0.16
QUAL-X, INC.	OTHER	03214	34-16907-02	5	1	0.150	0.15
HALLIBURTON CO.	OTHER	03214	35-00502-03	1,280	793	118.300	0.15
INTERGRATED INDUSTRIAL SYS., INC.	OTHER	03214	06-21253-01	30	5	0.375	0.08
THERATRONICS INTERNATIONAL LIMITED	OTHER	03214	54-28315-01	37	37	2.625	0.07
GENERAL NUCLEONICS, INC.	OTHER	03214	04-12071-02	10	5	0.300	0.06
PYROTRONICS	OTHER	03214	29-08864-03	26	26	1.550	0.06
NUCLEAR RESEARCH CORPORATION	OTHER	03214	37-02401-01	54	15	0.875	0.06
CANBERRA INDUSTRIES, INC.	OTHER	03214	06-15099-01	70	11	0.550	0.05
KIDDE-FENWAL, INC.	OTHER	03214	20-15285-01	16	1	0.050	0.05
LIFECODES CORPORATION	OTHER	03214	06-28766-01	22	1	0.050	0.05
PRINCETON GAMMA-TECH, INC.	OTHER	03214	29-12783-01	73	10	0.500	0.05
RADIATION MONITORING DEVICES, INC.	OTHER	03214	20-16325-01	30	4	0.200	0.05
SAINT-GOBAIN/NORTON	OTHER	03214	34-06558-05	78	14	0.700	0.05
SMH (US), INC.	OTHER	03214	37-03572-06	79	79	3.950	0.05
STOCKER & YALE, INC.	OTHER	03214	20-16532-01	24	24	1.200	0.05
VARIAN/ASSOCIATES, CF & RPP	OTHER	03214	20-02237-04	16	2	0.100	0.05
METOREX INC.	OTHER	03214	37-28461-01	14	3	0.120	0.04
ADVANCED DETECTION TECHNOLOGIES, INC.	OTHER	03214	06-23793-01	3	0	0.000	0.00
COLLABORATIVE BIOMEDICAL PROD., INC.	OTHER	03214	20-28701-01	25	0	0.000	0.00
DRG INTERNATIONAL, INC.	OTHER	03214	29-17621-01	3	0	0.000	0.00
MEAD JOHNSON & COMPANY	OTHER	03214	13-00772-02	13	0	0.000	0.00
OXFORD ANALYTICAL, INC.	OTHER	03214	20-19842-01	5	0	0.000	0.00
				1,999	1,079	144.657	0.13

APPENDIX A (cont.)

MANUFACTURERS AND DISTRIBUTORS - 1993

Licensee Name	Program Code 02500	License Number	Total Number of Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-cSv)	Average Meas. Dose (cSv or rem)
NUCLEAR PHARMACY OF IDAHO, INC.	PHARMACIES	11-27398-01MD	6	6	2.600	0.43
MPI PHARMACY SERVICES, INC.	PHARMACIES	29-28341-02MD	17	11	1.900	0.17
RADIOPHARMACY INCORPORATED	PHARMACIES	13-26246-01MD	9	8	1.225	0.15
NORTHERN VIRGINIA ISOTOPES, INC.	PHARMACIES	45-25221-01MD	12	4	0.525	0.13
SPECTRUM PHARMACY INCORPORATED	PHARMACIES	13-26367-01	21	19	2.070	0.11
DIAGNOSTIC PHOTON CORPORATION	PHARMACIES	52-16345-02MD	10	4	0.325	0.08
MALLINCKRODT, INC.	PHARMACIES	24-04206-07MD	13	9	0.590	0.07
MALLINCKRODT MEDICAL, INC.	PHARMACIES	24-04206-14MD	15	12	0.725	0.06
OKLAHOMA, UNIVERSITY OF	PHARMACIES	35-03176-04MD	39	16	0.943	0.06
MID-AMERICA ISOTOPES, INC.	PHARMACIES	24-26241-01	15	3	0.150	0.05
MID-AMERICA ISOTOPES, INC.	PHARMACIES	24-26241-02	3	2	0.100	0.05
SYNCOR CORP.	PHARMACIES	35-19583-01MD	11	2	0.100	0.05
SYNCOR CORPORATION	PHARMACIES	45-17769-01MD	14	6	0.300	0.05
SYNCOR INTERNATIONAL CORPORATION	PHARMACIES	20-21227-01MD	39	12	0.600	0.05
SYNCOR CORPORATION	PHARMACIES	34-16654-01MD	34	9	0.410	0.05
PYRAMID DIAGNOSTICS SERVICES, INC.	PHARMACIES	41-26525-01MD	6	0	0.000	0.00
			264	123	12.563	0.10

APPENDIX A (cont.)

FUEL FABRICATORS AND PROCESSORS -1993

Licensee Name	Program Code 21210	License Number	Total Number of Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-cSv)	Average Meas. Dose (cSv or rem)
NUCLEAR FUEL SERVICES, INC.		SNM-0124	3,373	323	78.650	0.24
WESTINGHOUSE ELECTRIC CORP.		SNM-1107	613	505	97.530	0.19
SIEMENS POWER CORP.		SNM-1227	639	495	62.600	0.13
COMBUSTION ENGINEERING, INC.		SNM-1067	186	56	6.950	0.12
B&W FUEL CO.		SNM-1168	204	89	10.180	0.11
GENERAL ELECTRIC CO.		SNM-1097	1,078	376	35.180	0.09
GENERAL ATOMICS		SNM-0696	927	86	6.500	0.08
BABCOCK & WILCOX CO.		SNM-0042	2,629	681	41.080	0.06
			9,649	2,611	338.670	0.13

INDEPENDENT SPENT FUEL STORAGE INSTALLATION - 1993

Licensee Name	Program Code 23200	License Number	Total Number of Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-cSv)	Average Meas. Dose (cSv or rem)
GENERAL ELECTRIC CO.		SNM-2500	122	52	13.550	0.26
CAROLINA POWER & LIGHT CO.		SNM-2502	13	0	0.000	0.00
PUBLIC SERV. CO. OF CO*		SNM-2504	0	0	0.000	0.00
VIRGINIA ELECTRIC POWER**		SNM-2501	0	0	0.000	0.00
BALTIMORE GAS & ELECTRIC CO.***		SNM-2505	0	0	0.000	0.00
			135	52	13.550	0.26

* Reported with Ft. St. Vrain

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

*** Reported with Calvert Cliffs 1,2 DPR-53, 69

LOW LEVEL WASTE DISPOSAL FACILITIES - 1993

Licensee Name	Program Code 03231	License Number	Total Number of Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-cSv)	Average Meas. Dose (cSv or rem)
CHEM-NUCLEAR SYSTEMS, INC.		12-13536-01	146	59	19.020	0.32
U. S. ECOLOGY, INC.		16-19204-01	286	17	1.850	0.11
			432	76	20.870	0.27

APPENDIX B

Annual Whole Body Doses at Licensed Nuclear Power Facilities

1993

APPENDIX B
ANNUAL WHOLE BODY DOSES AT LICENSED NUCLEAR POWER FACILITIES
CY 1993

PLANT NAME	TYPE	Number of Individuals with Whole Body Doses in the Ranges (cSv or rems)														TOTAL NUMBER MONI-TORED	NUMBER WITH MEAS. DOSE	TOTAL COLLECTIVE DOSE (person-rem, cSv
		Meas.	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	1,301	1,167	515	218	58	20	3								3,282	1,981	268 **
BEAVER VALLEY 1,2	PWR	1,225	746	461	462	211	112	94	1							3,312	2,087	621 **
BIG ROCK POINT	BWR	110	181	57	68	35	28	49	1							529	419	152 **
BRAIDWOOD 1,2	PWR	1,186	303	279	312	114	24	11								2,229	1,043	273 **
BROWNS FERRY 1,2,3	BWR	3,420	1,462	909	681	315	143	81	3							7,014	3,594	870 **
BRUNSWICK 1,2	BWR	2,090	1,232	604	465	245	174	201								5,011	2,921	872 **
BYRON 1,2	PWR	1,596	430	318	299	169	104	50								2,966	1,370	432 **
CALLAWAY 1	PWR	939	482	332	207	66	33	6								2,065	1,126	225 **
CALVERT CLIFFS 1,2	PWR	2,337	620	319	239	112	99	73								3,799	1,462	405 **
CATAWBA 1,2	PWR	1,898	573	396	372	128	59	36								3,462	1,564	396 **
CLINTON	BWR	782	391	230	331	154	84	63								2,035	1,253	498 **
COMANCHE PEAK 1,2*	PWR	2,649	619	211	92	17	2	4								3,594	945	109 **
COOK 1,2	PWR	1,309	448	117	21	1										1,896	587	44 **
COOPER STATION	BWR	1,817	451	187	198	124	66	104								2,947	1,130	391 **
CRYSTAL RIVER 3	PWR	1,110	473	166	42	2										1,793	683	60 **
DAVIS-BESSE	PWR	830	447	299	278	109	61	50								2,074	1,244	348 **
DIABLO CANYON 1,2	PWR	2,401	759	389	262	64	23	11								3,909	1,508	281
DRESDEN 2,3	BWR	1,837	753	369	366	299	310	577	77							4,588	2,751	1,655 **
DUANE ARNOLD	BWR	1,940	297	186	166	135	103	143	13							2,983	1,043	407 **
FARLEY 1,2	PWR	708	513	339	216	123	38	55								1,992	1,284	333 **
FERMI 2	BWR	1,379	236	94	28	2										1,739	360	35 **
FITZPATRICK	BWR	682	959	186	130	76	36	39	1							2,109	1,427	232 **
FORT CALHOUN	PWR	688	312	177	122	75	24	3								1,401	713	157 **
GINNA	PWR	759	370	224	153	58	31	20								1,615	856	193 **
GRAND GULF	BWR	1,405	963	388	269	122	40	23	2							3,212	1,807	332 **
HADDAM NECK	PWR	832	360	170	160	104	80	127	3							1,836	1,004	408 **
HARRIS	PWR	918	228	72	22	5										1,245	327	31 **
HATCH 1,2	BWR	1,096	572	323	304	211	176	141	4							2,829	1,733	669 **
HOPE CREEK 1	BWR	1,051	442	116	73	41	10	6								1,739	688	98 **
INDIAN POINT 2	PWR	688	430	275	285	186	133	203	2							2,202	1,514	675 **
INDIAN POINT 3	PWR	1,053	314	108	42	12	2									1,531	478	62
KEWAUNEE	PWR	374	183	93	92	44	16	8								810	436	106 **
LASALLE 1,2	BWR	948	516	283	260	166	128	335	13							2,649	1,701	854 **
LIMERICK 1,2	BWR	2,004	678	316	186	87	13	7								3,291	1,287	217 **
MAINE YANKEE	PWR	669	244	222	266	165	58	60	1							1,685	1,016	377 **
MCGUIRE 1,2	PWR	1,814	676	394	308	157	65	85								3,499	1,685	463 **
MILLSTONE POINT 1	BWR	279	159	56	38	24	14	13	1							584	305	81
MILLSTONE POINT 2,3	PWR	1,887	1,073	378	256	163	96	90	8							3,951	2,064	557
MONTICELLO	BWR	446	274	146	148	96	105	181	4							1,400	954	494 **
NINE MILE POINT 1,2	BWR	1,811	963	535	445	212	99	91	7							4,163	2,352	633 **

* Indicates plants counted for the first time in 1993 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 1993

PLANT NAME	TYPE	Number of Individuals with Whole Body Doses in the Ranges (cSv or rems)														TOTAL NUMBER MONI-TORED	NUMBER WITH MEAS. DOSE	TOTAL COLLECTIVE DOSE (person-rem, cSv
		Meas.	Meas. <0.10	0.10-0.25	0.25-0.5	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			
NORTH ANNA 1,2	PWR	867	1,269	398	439	291	140	187	43	1						3,635	2,768	908 **
OCONEE 1,2,3	PWR	2,306	760	413	244	57	24	1								3,805	1,499	237 **
OYSTER CREEK	BWR	184	1,541	443	331	170	42	30	3							2,744	2,560	416 **
PALISADES	PWR	456	288	202	212	128	38	36	4							1,364	908	289 **
PALO VERDE 1,2,3	PWR	2,231	950	434	320	187	110	122	1							4,355	2,124	592 **
PEACH BOTTOM 2,3	BWR	2,737	639	400	334	179	85	118	2							4,494	1,757	552 **
PERRY	BWR	1,041	504	314	252	125	30	10								2,276	1,235	278 **
PILGRIM	BWR	932	387	289	264	263	110	15								2,260	1,328	435 **
POINT BEACH 1,2	PWR	455	204	100	89	99	27	40								1,014	559	186 **
PRAIRIE ISLAND 1,2	PWR	687	215	154	117	40	6									1,219	532	106 **
QUAD CITIES 1,2	BWR	1,748	788	394	335	205	183	232	13							3,898	2,150	849 **
RIVER BEND 1	BWR	955	461	168	101	64	19	34								1,802	847	180 **
ROBINSON 2	PWR	1,135	454	301	244	119	54	49								2,356	1,221	337 **
SALEM 1,2	PWR	2,812	2,557	500	306	120	42	33	1							6,371	3,559	408 **
SAN ONOFRE 1,2,3	PWR	2,060	740	416	423	314	164	131	5							4,253	2,193	767 **
SEABROOK	PWR	1,105	98	7	5											1,215	110	6 **
SEQUOYAH 1,2	PWR	1,911	728	403	271	148	41	37	1							3,540	1,629	372 **
SOUTH TEXAS 1,2	PWR	2,428	543	250	187	87	56	15								3,566	1,138	251 **
ST. LUCIE 1,2	PWR	1,347	594	272	258	165	75	96	2							2,809	1,462	492
SUMMER 1	PWR	802	412	283	260	88	46	32								1,923	1,121	297 **
SURRY 1,2	PWR	1,287	498	323	343	138	57	41	2							2,689	1,402	363 **
SUSQUEHANNA 1,2	BWR	1,836	655	362	269	122	56	24								3,324	1,488	335 **
THREE MILE ISLAND 1	PWR	407	1,183	385	195	54	15	3								2,242	1,835	206 **
TURKEY POINT 3,4	PWR	1,325	543	313	274	86	26	29								2,596	1,271	275 **
VERMONT YANKEE	BWR	1,062	311	243	169	58	30	22								1,895	833	217
VOGTLE 1,2	PWR	958	478	349	282	120	61	46	2							2,296	1,338	367 **
WASHINGTON NUCLEAR 2	BWR	1,960	543	255	233	146	104	97	7							3,345	1,385	469 **
WATERFORD 3	PWR	1,036	160	29	6											1,231	195	15
WOLF CREEK 1	PWR	753	450	251	185	71	16	2								1,728	975	183 **
ZION 1,2	PWR	1,677	685	311	279	181	146	163	7	-						3,449	1,772	643 **
TOTALS: 73 PWRs		57,216	25,579	12,348	9,665	4,636	2,224	2,052	83	1						113,804	56,588	14,142
TOTALS: 37 BWRs		35,552	16,358	7,853	6,444	3,676	2,188	2,636	151	1	1					74,860	39,308	12,221
TOTALS: 110 LWRs		92,768	41,937	20,201	16,109	8,312	4,412	4,688	234	2	1					188,664	95,896	26,363

* Indicates plants counted for the first time in 1993 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 1993

PLANT NAME	TYPE	Number of Individuals with Whole Body Doses in the Ranges (cSv or rems)														TOTAL NUMBER MONI-TORED	NUMBER WITH MEAS. DOSE	TOTAL COLLECTIVE DOSE (person-rem, cSv
		No Mea-surable	Meas. <0.10	0.10-0.25	0.25-0.5	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	5														5	0	0
DRESDEN 1 *	BWR	Reported with Dresden 2,3																
FORT ST. VRAIN *	HTGR	657	51	37	25	12	15	25	1							823	166	75 **
HUMBOLDT BAY *	BWR	144	24													168	24	1
INDIAN POINT 1 *	PWR	Reported with Indian Point 2																
LACROSSE *	BWR	37	27	10	8	1	2									85	48	8
RANCHO SECO *	PWR	183	22	12	1											218	35	4
SHOREHAM	BWR	566	20													586	20	1
THREE MILE ISLAND 2*	PWR	35	101	22	18	16	7	3								202	167	33 **
TROJAN *	PWR	220	25	26	3											274	54	21 **
WATTS BAR 1,2	PWR	262	20													282	20	1 **
YANKEE-ROWE *	PWR	354	65	54	56	50	34	54								667	313	163 **
TOTAL REPORTING: 11		2,463	355	161	111	79	58	82	1							3,310	847	307

* 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

1969-1993

* 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	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Opera-tions	Per Work Function: Maint. & Others	Per Personnel Type: Con-tractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
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
	1991	1,515.8	88.4	2,064	351	35	316	242	109	0.17	0.2
	1992	1,352.1	77.4	3,114	876	21	855	719	157	0.28	0.6
	1993	1,606.0	91.3	1,981	268	9	259	194	74	0.14	0.2
BEAVER VALLEY 1,2	1977	355.6	57.0	331	878	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
	1991	1,267.5	78.6	1,689	495	62	433	325	170	0.29	0.4
	1992	1,441.9	89.1	1,414	289	29	260	203	86	0.20	0.2
	1993	1,157.9	73.1	2,087	621	59	562	490	131	0.30	0.5

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Opera-tions	Per Work Function: Maint. & Others	Per Personnel Type: Con-tractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
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	0.98	6.8
	1975	35.1	59.8	300	180	58	122	20	160	0.60	5.1
	1976	29.5	50.1	488	289	82	207	105	184	0.59	9.8
	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
	1991	59.1	85.2	435	226	31	195	42	184	0.52	3.8
	1992	32.7	54.5	496	277	36	241	51	226	0.56	8.5
	1993	51.2	79.4	419	152	30	122	41	111	0.36	3.0
BRAIDWOOD 1,2	1989	1,381.8	75.4	1,460	296	7	289	198	98	0.20	0.2
Docket 50-456, 50-457; NPF-72, NPF-77	1990	1,740.2	84.1	1,081	186	9	177	107	79	0.17	0.1
1st commercial operation 7/88, 10/88	1991	1,377.2	68.9	1,641	550	101	449	387	163	0.34	0.4
Type - PWRs	1992	1,885.9	89.0	1,059	228	29	199	140	88	0.22	0.1
Capacity - 1120, 1120 MWe	1993	1,899.3	86.9	1,043	273	23	250	170	103	0.26	0.1
BROWNS FERRY 1,2,3	1975	161.7	17.8	2,380	325			0.14	2.0		
Docket 50-259, 50-260, 50-296	1976	337.6	26.9	2,207	234			0.11	0.7		
DPR - 33, - 52, - 68	1977	1,327.5	73.7	1,858	863	60	803	249	614	0.46	0.7
1st commercial operation 8/74, 3/75,	1978	1,992.1	73.5	2,376	1,792	4	1,788	261	1,531	0.75	0.9
3/77	1979	2,393.0	79.1	2,689	1,667	0	1,667	289	1,378	0.62	0.7
Type - BWRs	1980	2,182.1	73.6	2,712	1,826	4	1,822	50	1,776	0.67	0.8
Capacity - 1065,1065,1065 MWe	1981	2,132.9	69.5	3,379	2,380	100	2,280	404	1,976	0.70	1.1
	1982	2,025.4	67.6	3,277	2,220	181	2,039	317	1,903	0.68	1.1
	1983	1,641.0	54.3	3,302	3,363	276	3,087	909	2,454	1.02	2.0

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Operations	Per Work Function: Maint. & Others	Per Personnel Type: Contractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person-cSv (-rems)/ MW-Yr
BROWNS FERRY 1,2,3 (Continued)	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	---
	1991	445.0	17.7	1,815	354	134	220	121	233	0.20	0.8
	1992	979.9	32.2	2,658	516	85	431	299	217	0.19	0.5
	1993	675.1	66.8	3,594	870	78	792	600	270	0.24	1.3
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
	1991	952.8	64.5	2,586	778	120	658	451	327	0.30	0.8
	1992	375.9	27.9	2,690	623	95	528	464	159	0.23	1.7
	1993	470.0	33.8	2,921	872	118	754	645	227	0.30	1.9
BYRON 1,2	1986	894.5	88.6	1,081	76	12	64	47	29	0.07	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
	1991	1,816.3	89.9	1,077	268	42	226	158	110	0.25	0.1
	1992	1,888.4	90.1	1,021	199	43	156	118	81	0.19	0.1
	1993	1,785.6	83.5	1,370	432	57	375	248	184	0.32	0.2

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With ... Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Opera-tions	Per Work Function: Maint. & Others	Per Personnel Type: Con-tractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
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
	1991	1,193.1	99.7	280	21	9	12	2	19	0.07	0.0
	1992	967.5	83.0	1,133	336	52	284	244	92	0.30	0.3
	1993	1,002.9	86.4	1,126	225	73	152	157	68	0.20	0.2
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
	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
	1991	1,085.0	64.7	1,974	132	25	107	70	62	0.07	0.1
	1992	1,271.2	73.9	1,979	330	35	295	228	102	0.17	0.3
	1993	1,462.1	83.9	1,462	405	13	392	299	106	0.28	0.3
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
	1991	1,691.5	74.6	1,871	462	50	412	141	321	0.25	0.3
	1992	1,962.8	83.9	1,515	414	52	362	92	322	0.27	0.2
	1993	1,896.1	81.5	1,564	396	29	367	59	337	0.25	0.2

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Operations	Per Work Function: Maint. & Others	Per Personnel Type: Contractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person-cSv (-rems)/ MW-Yr
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	1991	722.7	80.8	1,010	233	222	11	143	90	0.23	0.3
Capacity - 930 MWe	1992	589.7	68.6	1,195	431	63	368	287	144	0.36	0.7
	1993	701.5	79.6	1,253	498	48	450	367	131	0.40	0.7
COMANCHE PEAK 1,2	1991	644.4	82.2	985	148	13	135	111	37	0.15	0.2
Docket 50-445; NPF-87	1992	830.8	84.0	1,128	188	28	160	158	30	0.17	0.2
1st commercial operation 8/90, 8/93	1993	853.8	81.2	945	109	25	84	92	17	0.12	0.1
Type - PWR											
Capacity - 1150 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
	1991	1,837.4	90.2	815	69	28	41	48	21	0.08	0.0
	1992	760.9	50.8	1,954	492	60	432	416	76	0.25	0.6
	1993	1,927.7	98.5	587	44	10	34	29	15	0.07	0.0
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

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Opera-tions	Per Work Function: Maint. & Others	Per Personnel Type: Con-tractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
COOPER STATION (Continued)	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
	1991	566.3	78.8	1,099	405	50	355	255	150	0.37	0.7
	1992	731.0	96.4	463	84	16	68	16	68	0.18	0.1
	1993	436.1	58.8	1,130	391	33	358	245	146	0.35	0.9
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
	1991	654.6	82.0	821	116	8	108	59	57	0.14	0.2
	1992	632.1	76.1	1,403	424	7	417	333	91	0.30	0.7
	1993	722.4	85.0	683	60	4	56	31	29	0.09	0.1
DAVIS-BESSE 1	1978	326.4	48.7	421	48	13	35	14	34	0.11	0.1
Docket 50-346; NPF-3	1979	381.0	67.0	304	30	8	22	5	25	0.10	0.1
1st commercial operation 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
	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

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Operations	Per Work Function: Maint. & Others	Per Personnel Type: Contractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person-cSv (-rems)/ MW-Yr
DAVIS-BESSE 1 (Continued)	1990	500.0	56.7	1,377	489	14	475	414	75	0.36	1.0
	1991	703.6	81.8	1,000	216	38	178	159	57	0.22	0.3
	1992	915.2	100.0	287	19	10	9	0	19	0.07	0.0
	1993	729.5	83.4	1,244	348	12	336	269	79	0.28	0.5
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
	1991	1,809.6	83.8	2,040	546	1	545	377	169	0.27	0.3
	1992	1,995.7	90.9	1,850	459	0	459	303	156	0.25	0.2
	1993	2,008.6	91.4	1,508	281	0	281	182	99	0.19	0.1
DRESDEN 1[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

[1]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	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Operations	Per Work Function: Maint. & Others	Per Personnel Type: Contractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person-cSv (-rems)/ MW-Yr
DRESDEN 1[2];2,3 (Continued)	1989	1,184.2	83.1	2,259	1,131	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
	1991	675.2	60.7	2,044	1,005	166	839	433	572	0.49	1.5
	1992	872.4	75.4	1,812	619	128	491	272	347	0.34	0.7
	1993	960.1	68.5	2,751	1,655	125	1,530	1,116	539	0.60	1.7
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
	1991	503.7	94.5	336	202	34	168	43	159	0.60	0.4
	1992	416.5	81.9	1,043	502	123	379	276	226	0.48	1.2
	1993	393.4	79.5	1,043	407	86	321	299	108	0.39	1.0
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

[2]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	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Operations	Per Work Function: Maint. & Others	Per Personnel Type: Contractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person-cSv (-rems)/ MW-Yr
FARLEY 1,2 (Continued)	1990	1,464.0	86.7	1,700	457	47	410	342	115	0.27	0.3
	1991	1,464.0	88.1	1,645	648	106	542	498	150	0.39	0.4
	1992	1,331.7	81.8	2,018	805	121	684	570	235	0.40	0.6
	1993	1,455.5	88.3	1,284	333	22	311	224	109	0.26	0.2
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	1991	739.0	77.0	1,223	228	53	175	151	77	0.19	0.3
Type - BWR	1992	874.3	81.3	1,213	245	50	195	151	94	0.20	0.3
Capacity - 1047 MWe	1993	984.3	92.9	360	35	23	12	7	28	0.10	0.0
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
	1991	399.7	53.4	1,269	333	48	285	127	206	0.26	0.8
	1992	0.0	0.0	2,374	674	70	604	476	198	0.28	---
	1993	559.6	81.7	1,427	232	33	199	81	151	0.16	0.4
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

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Opera-tions	Per Work Function: Maint. & Others	Per Personnel Type: Con-tractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
FORT CALHOUN (Continued)	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
	1991	391.1	91.7	284	57	14	43	25	32	0.20	0.1
	1992	303.4	65.9	802	272	59	213	154	118	0.34	0.9
	1993	369.7	80.8	713	157	16	141	87	70	0.22	0.4
GINNA	1971	327.8		340	430	69	361	108	322	1.26	1.3
Docket 50-244; DPR-18	1972	293.6		677	1,032	71	961	278	754	1.52	3.5
1st commercial operation 7/70	1973	409.5		319	224	55	169	84	140	0.70	0.5
Type - PWR	1974	253.7	62.4	884	1,225					1.39	4.8
Capacity - 470 MWe	1975	365.2	76.7	685	538					0.79	1.5
	1976	248.8	58.2	758	636	29	607	210	426	0.84	2.6
	1977	365.6	85.5	530	401	15	386	120	281	0.76	1.1
	1978	386.5	80.6	657	450	20	430	98	352	0.68	1.2
	1979	355.0	72.8	878	592	68	524	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
	1991	418.6	86.7	947	328	36	292	201	127	0.35	0.8
	1992	417.6	86.9	832	261	27	234	144	117	0.31	0.6
	1993	419.6	86.3	856	193	18	175	101	92	0.23	0.5

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Opera-tions	Per Work Function: Maint. & Others	Per Personnel Type: Con-tractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
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
	1991	1,085.2	94.0	699	94	22	72	25	69	0.13	0.1
	1992	969.0	83.7	2,032	484	68	416	349	135	0.24	0.5
	1993	936.4	81.5	1,807	332	38	294	223	109	0.18	0.4
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
	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
	1991	444.4	76.4	1,168	590	80	510	463	127	0.51	1.3
	1992	465.2	80.1	797	202	28	174	129	73	0.25	0.4
	1993	448.6	81.6	1,004	408	42	366	312	96	0.41	0.9

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total - Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Opera-tions	Per Work Function: Maint. & Others	Per Personnel Type: Con-tractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
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	1991	724.8	81.5	872	226	27	199	150	76	0.26	0.3
Capacity - 860 MWe	1992	661.8	74.9	930	213	34	179	134	79	0.23	0.3
	1993	913.0	99.7	327	31	9	22	10	21	0.09	0.0
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
	1991	1,152.4	77.4	2,508	1,161	196	965	798	363	0.46	1.0
	1992	1,293.8	88.6	1,615	550	119	431	294	256	0.34	0.4
	1993	1,189.6	85.5	1,733	669	139	530	339	270	0.39	0.6
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	1991	882.5	84.2	1,700	373	11	362	249	124	0.22	0.4
	1992	841.9	80.8	1,694	436	9	427	304	132	0.26	0.5
	1993	1,049.2	97.8	688	98	22	76	8	90	0.14	0.1

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Operations	Per Work Function: Maint. & Others	Per Personnel Type: Contractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
HUMBOLDT BAY[3]	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	---
	1993	0.0	0.0	24	1	0	0	0	0	0.04	---
INDIAN POINT 1[4],2,3[5]	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

[3]Humboldt Bay has been shutdown since 1976, 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.

[4]Indian Point 1 was defuelled 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 commerical reactors.

[5]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	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Operations	Per Work Function: Maint. & Others	Per Personnel Type: Contractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person-cSv (-rems)/ MW-Yr
INDIAN POINT 1[6],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	1,061	608	66	542	450	158	0.57	1.0
	1991	461.2	55.7	1,810	1,468	179	1,289	927	541	0.81	3.2
	1992	930.9	99.1	489	97	27	70	39	58	0.20	0.1
	1993	702.1	75.7	1,514	675	77	598	480	195	0.45	1.0
INDIAN POINT 3[7]	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
	1991	862.8	87.5	299	40	23	17	5	35	0.13	0.0
	1992	561.7	61.4	1,003	212	53	159	132	80	0.21	0.4
	1993	140.5	14.9	478	60	23	37	19	41	0.13	0.4

[6]Indian Point 1 was defuelled 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.

[7]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	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Opera-tions	Per Work Function: Maint. & Others	Per Personnel Type: Con-tractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
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
	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
	1991	441.8	83.4	495	221	4	217	188	33	0.45	0.5
	1992	471.4	88.0	450	122	3	119	88	34	0.27	0.3
	1993	457.1	86.8	436	106	2	104	65	41	0.24	0.2
LACROSSE*	1970	15.3			111			40	71		7.2
Docket 50-409; DPR-45	1971	323.1		218	158					0.72	4.8
1t 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

*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	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Opera-tions	Per Work Function: Maint. & Others	Per Personnel Type: Con-tractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
LACROSSE (Continued)	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	---
	1993	0.0	0.0	48	8	0	0	0	0	0.17	---
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
	1991	1,837.0	86.7	1,985	806	161	645	427	379	0.41	0.4
	1992	1,447.4	72.0	2,418	1,167	195	972	648	519	0.48	0.8
	1993	1,542.0	76.0	1,701	854	204	650	387	467	0.50	0.6
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	1991	1,810.9	86.8	1,151	106	24	82	52	54	0.09	0.1
	1992	1,741.4	84.8	1,559	330	23	307	182	148	0.21	0.2
	1993	1,913.2	91.6	1,287	217	33	184	113	104	0.17	0.1
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

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Opera-tions	Per Work Function: Maint. & Others	Per Personnel Type: Con-tractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
MAINE YANKEE (Continued)	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
	1991	738.1	86.6	426	105	27	78	46	59	0.25	0.1
	1992	631.7	79.1	1,189	461	87	374	360	101	0.39	0.7
	1993	674.8	79.8	1,016	377	74	303	309	68	0.37	0.6
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
	1991	1,945.1	85.0	1,723	361	18	343	111	250	0.21	0.2
	1992	1,696.8	74.4	1,619	418	38	380	114	304	0.26	0.2
	1993	1,470.4	66.2	1,685	463	16	447	83	380	0.27	0.3
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

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Operations	Per Work Function: Maint. & Others	Per Personnel Type: Contractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person-cSv (-rems)/ MW-Yr
MILLSTONE POINT 1 (Continued)	1990	608.3	91.6	365	131	42	89	58	73	0.36	0.2
	1991	213.1	35.4	1,154	409	60	349	311	98	0.35	1.9
	1992	431.8	68.1	348	99	22	77	63	36	0.28	0.2
	1993	627.9	96.8	305	81	27	54	32	49	0.27	0.1
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
	1991	819.5	69.7	1,084	381	21	360	256	125	0.35	0.5
	1992	1,115.1	59.9	3,190	1,280	35	1,245	1,173	107	0.40	1.1
	1993	1,525.2	79.7	2,064	557	29	528	234	323	0.27	0.4
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

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Opera-tions	Per Work Function: Maint. & Others	Per Personnel Type: Con-tractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
MONTICELLO (Continued)	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
	1991	429.4	80.8	964	465	102	363	101	364	0.48	1.1
	1992	528.3	97.5	454	114	46	68	10	104	0.25	0.2
	1993	458.1	84.4	954	494	118	376	94	400	0.52	1.1
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
	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
	1991	1,250.8	79.7	1,543	292	72	220	94	198	0.19	0.2
	1992	965.9	61.8	1,800	563	102	461	184	379	0.31	0.6
	1993	1,380.2	84.6	2,352	633	90	543	427	206	0.27	0.5
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

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Operations	Per Work Function: Maint. & Others	Per Personnel Type: Contractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person-cSv (-rems)/ MW-Yr
NORTH ANNA 1,2 (Continued)	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
	1991	1,597.5	88.6	2,085	629	19	610	461	168	0.30	0.4
	1992	1,403.2	84.1	2,159	576	15	561	413	163	0.27	0.4
	1993	1,428.4	80.1	2,768	908	12	896	711	197	0.33	0.6
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
	1991	2,275.0	86.7	1,966	551	46	505	143	408	0.28	0.2
	1992	2,110.7	82.0	1,954	612	60	552	166	446	0.31	0.3
	1993	2,399.2	91.3	1,499	237	23	214	43	194	0.16	0.1
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

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Opera-tions	Per Work Function: Maint. & Others	Per Personnel Type: Con-tractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
OYSTER CREEK (Continued)	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
	1991	351.6	60.5	3,089	1,185	151	1,034	938	247	0.38	3.4
	1992	536.3	85.9	2,771	657	70	587	438	219	0.24	1.2
	1993	551.9	87.8	2,560	416	60	356	238	178	0.16	0.8
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
	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
	1991	587.0	78.1	1,315	211	42	169	133	78	0.16	0.4
	1992	581.9	76.1	1,267	295	37	258	211	84	0.23	0.5
	1993	424.4	53.7	908	289	45	244	188	101	0.32	0.7

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Opera-tions	Per Work Function: Maint. & Others	Per Personnel Type: Con-tractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
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	1991	3,043.9	78.9	2,242	605	79	526	422	183	0.27	0.2
Capacity - 1221, 1221, 1221 MWe	1992	3,102.3	82.0	1,981	541	53	488	373	168	0.27	0.2
	1993	2,677.1	74.3	2,124	592	51	541	435	157	0.28	0.2
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	2,327	114	2,213	2,025	302	0.55	---
	1989	491.0	35.0	2,301	728	243	485	357	371	0.32	1.5
	1990	1,684.0	85.7	1,585	377	99	278	179	198	0.24	0.2
	1991	1,210.9	62.3	2,702	934	137	797	610	324	0.35	0.8
	1992	1,516.6	78.7	1,911	502	121	381	256	246	0.26	0.3
	1993	1,654.0	81.9	1,757	552	135	417	292	260	0.31	0.3
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	1991	1,074.2	91.9	600	146	24	122	50	96	0.24	0.1
Capacity - 1141 MWe	1992	856.2	75.5	1,487	571	28	543	440	131	0.38	0.7
	1993	479.2	48.2	1,235	278	30	248	106	172	0.23	0.6

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Operations	Per Work Function: Maint. & Others	Per Personnel Type: Contractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person-cSv (-rems)/MW-Yr
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
	1991	406.3	65.8	2,836	605	113	492	410	195	0.21	1.5
	1992	561.0	85.4	1,332	281	50	231	122	159	0.21	0.5
	1993	513.7	80.9	1,328	435	54	381	283	152	0.33	0.8
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	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Operations	Per Work Function: Maint. & Others	Per Personnel Type: Contractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person-cSv (-rems)/ MW-Yr
POINT BEACH 1,2 (Continued)	1991	874.8	87.1	724	265	42	223	134	131	0.37	0.3
	1992	866.7	85.8	617	256	39	217	118	138	0.41	0.3
	1993	911.0	90.0	559	186	26	160	63	123	0.33	0.2
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
	1991	1,023.3	95.6	586	98	10	88	26	72	0.17	0.1
	1992	811.6	76.2	845	211	12	199	72	139	0.25	0.3
	1993	978.3	90.7	532	106	5	101	32	74	0.20	0.1
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

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Opera-tions	Per Work Function: Maint. & Others	Per Personnel Type: Con-tractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
QUAD CITIES 1,2 (Continued)	1990	1,148.9	77.8	2,186	1,028	183	845	713	315	0.47	0.9
	1991	1,044.5	73.2	1,722	509	107	402	292	217	0.30	0.5
	1992	960.8	68.0	2,413	1,157	168	989	754	403	0.48	1.2
	1993	974.9	67.0	2,150	849	131	718	491	358	0.39	0.9
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	---
	1991	0.0	0.0	101	9	5	4	1	8	0.09	---
	1992	0.0	0.0	70	7	4	3	0	7	0.10	---
	1993	0.0	0.0	35	4	3	1	0	4	0.11	---
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	1991	814.7	87.2	780	144	38	106	54	90	0.18	0.2
	1992	336.1	39.7	2,022	710	77	633	580	130	0.35	2.1
	1993	640.0	71.6	847	180	41	139	56	124	0.21	0.3

*Rancho Seco has been permanently shutdown.

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Opera-tions	Per Work Function: Maint. & Others	Per Personnel Type: Con-tractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
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
	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
	1991	575.1	81.4	885	193	31	162	139	54	0.22	0.3
	1992	487.2	66.8	1,267	352	51	301	260	92	0.28	0.7
	1993	502.7	70.7	1,221	337	13	324	246	91	0.28	0.7
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
	1991	1,726.4	79.3	4,201	458	15	443	366	92	0.11	0.3
	1992	1,200.9	61.1	4,376	431	16	415	340	91	0.10	0.4
	1993	1,366.3	65.4	3,559	408	11	397	318	90	0.11	0.3

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Operations	Per Work Function: Maint. & Others	Per Personnel Type: Contractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person-cSv (-rems)/ MW-Yr
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	68.3	7,514	986	105	881	831	155	0.27	1.5
	1985	1,381.8	132.9	5,742	722	16	173	151	38	0.24	15.5
	1986	1,698.2	61.1	3,594	824	86	738	574	250	0.24	1.1
	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
	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
	1991	1,987.6	75.3	1,814	412	43	369	289	123	0.23	0.2
	1992	2,228.6	87.1	1,651	324	5	319	229	95	0.20	0.1
	1993	1,771.3	79.9	2,193	767	89	678	598	169	0.35	0.4
SEABROOK	1991	810.4	75.9	699	92	2	90	43	49	0.13	0.1
Docket 50-443; NPF-86	1992	932.4	81.3	806	147	0	147	128	19	0.18	0.2
1st commercial operation 8/90	1993	1,071.5	93.6	110	6	0	6	0	6	0.05	0.0
Type - PWR											
Capacity - 1150 MWe											
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

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Opera-tions	Per Work Function: Maint. & Others	Per Personnel Type: Con-tractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
SEQUOYAH 1,2 (Continued)	1991	1,965.4	88.0	1,928	698	39	659	299	399	0.36	0.4
	1992	1,849.0	85.4	1,714	465	32	433	343	122	0.27	0.3
	1993	405.7	21.8	1,629	372	29	343	272	100	0.23	0.9
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	1991	1,741.5	72.4	1,144	257	38	219	172	85	0.22	0.1
Type - PWRs	1992	2,096.0	83.8	923	147	9	138	91	56	0.16	0.1
Capacity - 1251, 1251 MWe	1993	163.1	8.3	1,138	251	12	239	197	54	0.22	1.5
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
	1991	1,592.8	90.8	1,282	479	38	441	303	176	0.37	0.3
	1992	1,511.9	87.3	1,251	264	29	235	153	111	0.21	0.2
	1993	1,227.6	77.7	1,462	492	36	456	304	188	0.34	0.4
SUMMER 1	1984	504.6	61.1	1,120	295	29	266	202	93	0.26	0.6
Docket 50-395; NPF-12	1985	627.7	71.6	1,201	379	74	305	241	138	0.32	0.6
1st commercial operation 1/84	1986	853.7	95.3	392	23	5	18	12	11	0.06	0.03
Type - PWR	1987	618.7	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

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Operations	Per Work Function: Maint. & Others	Per Personnel Type: Contractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person-cSv (-rems)/ MW-Yr
SUMMER 1 (Continued)	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
	1991	642.5	82.9	984	291	21	270	253	38	0.30	0.5
	1992	892.6	97.4	249	27	6	21	12	15	0.11	0.0
	1993	728.3	84.0	1,121	297	11	286	253	44	0.26	0.4
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
	1991	1,271.9	84.5	1,547	510	45	465	311	199	0.33	0.4
	1992	1,396.3	88.9	1,660	539	108	431	383	156	0.32	0.4
	1993	1,283.1	84.6	1,402	383	72	311	241	142	0.27	0.3
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
	1991	1,878.0	89.8	1,844	507	44	463	251	256	0.27	0.3
	1992	1,604.2	79.7	1,885	724	29	695	356	368	0.38	0.5
	1993	1,602.1	77.3	1,488	335	19	316	172	163	0.23	0.2

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Opera-tions	Per Work Function: Maint. & Others	Per Personnel Type: Con-tractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
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[10]	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
	1991	688.7	86.4	1,542	198	47	151	99	99	0.13	0.3
	1992	836.8	100.0	558	34	15	19	5	29	0.06	0.0
	1993	722.0	88.5	1,835	206	53	153	110	96	0.11	0.3
THREE MILE ISLAND 2[11]	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	---
	1991	0.0	0.0	153	37	1	36	3	34	0.24	---
	1992	0.0	0.0	315	157	7	150	99	58	0.50	---
	1993	0.0	0.0	167	33	1	32	19	14	0.20	---

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

[11]Three Mile Island 2 has been shut down since the 1979 accident, but was still included in the count of reactors through 1988 since dose was still being accumulated to defuel and decontaminate the unit during this time period.

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Operations	Per Work Function: Maint. & Others	Per Personnel Type: Contractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person-cSv (-rems)/MW-Yr
TROJAN[12]	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
	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
	1991	181.6	16.1	1,496	567	17	550	475	92	0.38	3.1
	1992	553.9	68.4	567	84	8	76	52	32	0.15	0.2
	1993	0.0	68.4	54	21	3	18	12	9	0.39	---
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
	1991	258.2	21.0	2,087	939	105	834	685	254	0.45	3.6
	1992	968.9	75.5	1,374	325	32	293	173	152	0.24	0.3
	1993	1,244.8	91.0	1,271	275	6	269	164	111	0.22	0.2

[12]Trojan has been permanently shutdown.

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Opera-tions	Per Work Function: Maint. & Others	Per Personnel Type: Con-tractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
VERMONT YANKEE	1973	222.1		244	85					0.35	0.4
Docket 50-271; DPR-28	1974	303.5		357	216	24	192	103	113	0.61	0.7
1st commercial operation 11/72	1975	429.0	87.8	282	153	70	83	63	90	0.54	0.4
Type - BWR	1976	389.6	77.1	815	411	36	375	246	165	0.50	1.1
Capacity - 504 MWe	1977	423.5	85.1	641	258	83	175	90	168	0.40	0.6
	1978	387.5	75.9	934	339	78	261	158	181	0.36	0.9
	1979	414.0	82.1	1,220	1,170	546	624	642	528	0.96	2.8
	1980	357.8	71.5	1,443	1,338	141	1,197	926	412	0.93	3.7
	1981	429.1	84.6	1,264	731	121	610	408	323	0.58	1.7
	1982	501.0	96.0	481	205	60	145	80	125	0.43	0.4
	1983	346.1	69.3	1,316	1,527	215	1,312	787	740	1.16	4.4
	1984	398.1	79.0	954	626	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
	1991	492.3	94.3	310	118	19	99	66	52	0.38	0.2
	1992	446.8	88.1	921	381	58	323	319	62	0.41	0.9
	1993	402.3	80.1	833	217	41	176	166	51	0.26	0.5
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	1991	1,966.5	89.2	1,357	362	50	312	296	66	0.27	0.2
Capacity - 1079, 1110 MWe	1992	2,047.9	90.0	1,262	426	51	375	310	116	0.34	0.2
	1993	2,060.4	88.3	1,338	367	34	333	251	116	0.27	0.2
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
	1991	508.5	50.3	1,088	387	88	299	143	244	0.36	0.8
	1992	682.3	65.6	1,489	612	11	601	307	305	0.41	0.9
	1993	849.6	79.5	1,385	469	1	468	207	262	0.34	0.6

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Operations	Per Work Function: Maint. & Others	Per Personnel Type: Contractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person-cSv (-rems)/ MW-Yr
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
	1991	870.6	79.8	1,301	364	101	263	307	57	0.28	0.4
	1992	909.6	83.2	1,213	226	52	174	177	49	0.19	0.2
	1993	1,088.3	99.4	195	15	3	12	5	10	0.08	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
	1991	707.6	71.9	1,010	331	37	294	244	87	0.33	0.5
	1992	1,010.8	86.7	446	78	17	61	42	36	0.17	0.1
	1993	940.5	80.6	975	183	31	152	117	66	0.19	0.2
YANKEE ROWE[13]	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

[13]Yankee Rowe ended commercial operation as of 10/91, and will not be put in commercial operation again. It is no longer included in the count of commercial reactors.

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

Reporting Organization	Year	Megawatt Years (MW-Yr)	Unit Availability Factor	Total Personnel With Measurable Doses	Person-cSv (-rems) Collective Dose	Per Work Function: Opera-tions	Per Work Function: Maint. & Others	Per Personnel Type: Con-tractor	Per Personnel Type: Station & Utility	Average Measurable Dose (cSv or rems)	Person -cSv (-rems)/ MW-Yr
YANKEE ROWE (Continued)	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
	1991	121.2	72.3	162	40	11	29	16	24	0.25	0.3
	1992	0.0	0.0	324	94	10	84	59	35	0.29	---
	1993	0.0	0.0	313	163	8	155	153	10	0.52	---
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
	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
	1991	1,125.7	58.2	902	173	26	147	90	83	0.19	0.2
	1992	1,128.8	59.0	1,732	1,043	19	1,024	783	260	0.60	0.9
	1993	1,458.2	70.9	1,772	643	15	628	461	182	0.36	0.4

APPENDIX D

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

1993

NOTE: Appendix D contains data on operating plants as well as plants which are no longer in commercial operation.

APPENDIX D

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

1993

PLANT: *ARKANSAS 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	29	3	0	32	5.123	0.599	0.000	5.722
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	0.324	0.000	0.000	0.324
TOTAL	30	3	0	33	5.447	0.599	0.000	6.046
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	85	2	114	201	16.285	0.348	20.980	37.613
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	49	0	80	129	15.344	0.000	20.008	35.352
SUPERVISORY PERSONNEL	3	0	0	3	0.380	0.000	0.000	0.380
ENGINEERING PERSONNEL	3	1	13	17	0.475	0.128	4.070	4.673
TOTAL	140	3	207	350	32.484	0.476	45.058	78.018
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	11	0	123	134	1.526	0.000	40.267	41.793
OPERATIONS PERSONNEL	1	0	0	1	0.329	0.000	0.000	0.329
HEALTH PHYSICS PERSONNEL	17	0	8	25	3.646	0.000	1.935	5.581
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	0	9	10	0.145	0.000	2.536	2.681
TOTAL	30	0	140	170	5.646	0.000	44.738	50.384
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	10	0	97	107	1.487	0.000	19.863	21.350
OPERATIONS PERSONNEL	1	0	0	1	0.136	0.000	0.000	0.136
HEALTH PHYSICS PERSONNEL	2	0	2	4	0.281	0.000	0.220	0.501
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.302	0.302
ENGINEERING PERSONNEL	0	0	4	4	0.000	0.000	1.015	1.015
TOTAL	13	0	104	117	1.904	0.000	21.400	23.304
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	2	0	3	5	0.295	0.000	0.821	1.116
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	2	0	3	5	0.295	0.000	0.821	1.116
REFUELING								
MAINTENANCE PERSONNEL	8	0	40	48	1.115	0.000	14.061	15.176
OPERATIONS PERSONNEL	1	0	0	1	0.120	0.000	0.000	0.120
HEALTH PHYSICS PERSONNEL	4	0	7	11	0.785	0.000	1.067	1.852
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	6	6	0.000	0.000	1.684	1.684
TOTAL	13	0	53	66	2.020	0.000	16.812	18.832
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	114 (98)	2 (2)	374 (348)	490 (448)	20.413	0.348	95.171	115.932
OPERATIONS PERSONNEL	32 (32)	3 (3)	0 (0)	35 (35)	5.708	0.599	0.000	6.307
HEALTH PHYSICS PERSONNEL	74 (52)	0 (0)	100 (92)	174 (144)	20.351	0.000	24.051	44.402
SUPERVISORY PERSONNEL	3 (3)	0 (0)	1 (1)	4 (4)	0.380	0.000	0.302	0.682
ENGINEERING PERSONNEL	5 (5)	1 (1)	32 (30)	38 (36)	0.944	0.128	9.305	10.377
GRAND TOTALS	228(190)	6 (6)	507 (471)	741 (667)	47.796	1.075	128.829	177.700

*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

1993

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	11	0	25	36	3.105	0.000	11.350	14.455
OPERATIONS PERSONNEL	63	0	4	67	17.720	0.000	0.480	18.200
HEALTH PHYSICS PERSONNEL	18	0	27	45	3.530	0.000	9.820	13.350
SUPERVISORY PERSONNEL	20	0	26	46	4.935	0.000	6.660	11.595
ENGINEERING PERSONNEL	8	0	0	8	1.315	0.000	0.000	1.315
TOTAL	120	0	82	202	30.605	0.000	28.310	58.915
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	183	0	212	395	79.830	0.000	93.480	173.310
OPERATIONS PERSONNEL	2	0	0	2	0.570	0.000	0.010	0.580
HEALTH PHYSICS PERSONNEL	6	0	60	66	1.365	0.000	29.080	30.445
SUPERVISORY PERSONNEL	10	0	55	65	3.360	0.000	21.185	24.545
ENGINEERING PERSONNEL	3	0	0	3	0.415	0.000	0.000	0.415
TOTAL	204	0	327	531	85.540	0.000	143.755	229.295
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2	0	229	231	0.840	0.000	133.960	134.800
OPERATIONS PERSONNEL	0	0	0	0	0.020	0.000	0.000	0.020
HEALTH PHYSICS PERSONNEL	0	0	55	55	0.035	0.000	29.500	29.535
SUPERVISORY PERSONNEL	5	0	35	40	2.395	0.000	15.130	17.525
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	7	0	319	326	3.290	0.000	178.590	181.880
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	2	0	144	146	1.025	0.000	59.005	60.030
OPERATIONS PERSONNEL	1	0	0	1	0.190	0.000	0.000	0.190
HEALTH PHYSICS PERSONNEL	0	0	13	13	0.055	0.000	7.135	7.190
SUPERVISORY PERSONNEL	3	0	8	11	0.485	0.000	2.525	3.010
ENGINEERING PERSONNEL	0	0	0	0	0.020	0.000	0.000	0.020
TOTAL	6	0	165	171	1.775	0.000	68.665	70.440
WASTE PROCESSING								
MAINTENANCE PERSONNEL	3	0	14	17	0.800	0.000	5.820	6.620
OPERATIONS PERSONNEL	6	0	0	6	1.600	0.000	0.010	1.610
HEALTH PHYSICS PERSONNEL	1	0	20	21	0.245	0.000	6.735	6.980
SUPERVISORY PERSONNEL	2	0	0	2	1.020	0.000	0.100	1.120
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	12	0	34	46	3.665	0.000	12.665	16.330
REFUELING								
MAINTENANCE PERSONNEL	9	0	62	71	2.295	0.000	41.975	44.270
OPERATIONS PERSONNEL	2	0	0	2	0.825	0.000	0.000	0.825
HEALTH PHYSICS PERSONNEL	0	0	20	20	0.005	0.000	8.270	8.275
SUPERVISORY PERSONNEL	8	0	9	17	2.470	0.000	5.430	7.900
ENGINEERING PERSONNEL	1	0	0	1	0.145	0.000	0.000	0.145
TOTAL	20	0	91	111	5.740	0.000	55.675	61.415
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	210	0	686	896	87.895	0.000	345.590	433.485
OPERATIONS PERSONNEL	74	0	4	78	20.925	0.000	0.500	21.425
HEALTH PHYSICS PERSONNEL	25	0	195	220	5.235	0.000	90.540	95.775
SUPERVISORY PERSONNEL	48	0	133	181	14.665	0.000	51.030	65.695
ENGINEERING PERSONNEL	12	0	0	12	1.895	0.000	0.000	1.895
GRAND TOTALS	369	0	1018	1387	130.615	0.000	487.660	618.275

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	2	3	6	0.672	0.705	0.665	2.042
OPERATIONS PERSONNEL	38	0	0	38	19.793	0.001	0.001	19.795
HEALTH PHYSICS PERSONNEL	13	0	4	17	5.020	0.000	1.239	6.259
SUPERVISORY PERSONNEL	1	2	0	3	0.426	0.325	0.001	0.752
ENGINEERING PERSONNEL	2	0	0	2	0.607	0.020	0.002	0.629
TOTAL	55	4	7	66	26.518	1.051	1.908	29.477
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	18	0	0	18	3.242	0.258	0.131	3.631
OPERATIONS PERSONNEL	1	0	0	1	0.595	0.000	0.009	0.604
HEALTH PHYSICS PERSONNEL	3	0	0	3	1.242	0.000	0.073	1.315
SUPERVISORY PERSONNEL	0	0	0	0	0.001	0.000	0.001	0.002
ENGINEERING PERSONNEL	0	0	0	0	0.043	0.000	0.000	0.043
TOTAL	22	0	0	22	5.123	0.258	0.214	5.595
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	5	11	17	0.829	1.439	6.761	9.029
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.014	0.000	0.014
HEALTH PHYSICS PERSONNEL	1	0	3	4	0.260	0.000	0.841	1.101
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.001	0.001
ENGINEERING PERSONNEL	1	0	0	1	0.125	0.000	0.000	0.125
TOTAL	3	5	14	22	1.214	1.453	7.603	10.270
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	36	47	44	127	23.639	30.830	21.646	76.115
OPERATIONS PERSONNEL	8	0	2	10	2.447	0.026	0.476	2.949
HEALTH PHYSICS PERSONNEL	19	0	13	32	6.955	0.000	6.016	12.971
SUPERVISORY PERSONNEL	1	1	4	6	1.239	0.109	1.040	2.388
ENGINEERING PERSONNEL	3	0	0	3	1.504	0.018	0.000	1.522
TOTAL	67	48	63	178	35.784	30.983	29.178	95.945
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.223	0.081	0.020	0.324
OPERATIONS PERSONNEL	0	0	0	0	0.895	0.000	0.000	0.895
HEALTH PHYSICS PERSONNEL	4	0	1	5	1.663	0.000	0.267	1.930
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	1	5	2.781	0.081	0.287	3.149
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.135	0.081	0.077	0.293
OPERATIONS PERSONNEL	11	0	0	11	2.681	0.000	0.000	2.681
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.065	0.000	0.428	0.493
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	11	0	1	12	2.881	0.081	0.505	3.467
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	56	54	58	168	28.740	33.394	29.300	91.434
OPERATIONS PERSONNEL	58	0	2	60	26.411	0.041	0.486	26.938
HEALTH PHYSICS PERSONNEL	40	0	22	62	15.205	0.000	8.864	24.069
SUPERVISORY PERSONNEL	2	3	4	9	1.666	0.434	1.043	3.143
ENGINEERING PERSONNEL	6	0	0	6	2.279	0.038	0.002	2.319
GRAND TOTALS	162	57	86	305	74.301	33.907	39.695	147.903

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	5	0	13	18	1.157	0.000	2.309	3.466
OPERATIONS PERSONNEL	63	0	41	104	7.643	0.000	0.346	7.989
HEALTH PHYSICS PERSONNEL	18	0	6	24	5.912	0.000	1.508	7.420
SUPERVISORY PERSONNEL	61	72	0	133	2.080	0.066	0.067	2.213
ENGINEERING PERSONNEL	25	49	19	93	1.671	0.595	0.135	2.401
TOTAL	172	121	79	372	18.463	0.661	4.365	23.489
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	121	6	577	704	27.613	0.005	99.016	126.634
OPERATIONS PERSONNEL	126	0	1	127	15.418	0.000	0.006	15.424
HEALTH PHYSICS PERSONNEL	22	0	58	80	7.279	0.000	15.068	22.347
SUPERVISORY PERSONNEL	153	1	40	194	5.163	0.001	12.236	17.400
ENGINEERING PERSONNEL	44	94	10	148	3.005	1.149	0.074	4.228
TOTAL	466	101	686	1253	58.478	1.155	126.400	186.033
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2	5	11	18	0.430	0.006	1.861	2.297
OPERATIONS PERSONNEL	3	0	0	3	0.353	0.000	0.000	0.353
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.171	0.000	0.010	0.181
SUPERVISORY PERSONNEL	8	0	19	27	0.281	0.000	5.875	6.156
ENGINEERING PERSONNEL	12	0	0	12	0.826	0.001	0.002	0.829
TOTAL	26	5	30	61	2.061	0.007	7.748	9.816
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	18	0	141	159	4.026	0.000	24.119	28.145
OPERATIONS PERSONNEL	6	0	0	6	0.759	0.000	0.000	0.759
HEALTH PHYSICS PERSONNEL	3	0	1	4	0.809	0.000	0.134	0.943
SUPERVISORY PERSONNEL	32	0	13	45	1.088	0.000	4.124	5.212
ENGINEERING PERSONNEL	1	4	0	5	0.083	0.044	0.000	0.127
TOTAL	60	4	155	219	6.765	0.044	28.377	35.186
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	3	3	0.021	0.000	0.431	0.452
OPERATIONS PERSONNEL	4	0	184	188	0.481	0.000	1.561	2.042
HEALTH PHYSICS PERSONNEL	2	0	0	2	0.700	0.000	0.095	0.795
SUPERVISORY PERSONNEL	0	0	0	0	0.005	0.000	0.000	0.005
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	6	0	187	193	1.207	0.000	2.087	3.294
REFUELING								
MAINTENANCE PERSONNEL	43	0	4	47	9.922	0.000	0.705	10.627
OPERATIONS PERSONNEL	11	0	0	11	1.318	0.000	0.000	1.318
HEALTH PHYSICS PERSONNEL	3	0	0	3	0.990	0.000	0.076	1.066
SUPERVISORY PERSONNEL	67	0	0	67	2.247	0.000	0.021	2.268
ENGINEERING PERSONNEL	1	2	0	3	0.066	0.026	0.000	0.092
TOTAL	125	2	4	131	14.543	0.026	0.802	15.371
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	189	11	749	949	43.169	0.011	128.441	171.621
OPERATIONS PERSONNEL	213	0	226	439	25.972	0.000	1.913	27.885
HEALTH PHYSICS PERSONNEL	49	0	65	114	15.861	0.000	16.891	32.752
SUPERVISORY PERSONNEL	321	73	72	466	10.864	0.067	22.323	33.254
ENGINEERING PERSONNEL	83	149	29	261	5.651	1.815	0.211	7.677
GRAND TOTALS	855	233	1141	2229	101.517	1.893	169.779	273.189

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	229	11	654	894	3.725	0.139	14.239	18.103
OPERATIONS PERSONNEL	161	2	19	182	33.725	0.511	0.082	34.318
HEALTH PHYSICS PERSONNEL	78	0	68	146	7.503	0.000	7.074	14.577
SUPERVISORY PERSONNEL	54	3	78	135	2.677	0.053	2.509	5.239
ENGINEERING PERSONNEL	64	9	80	153	3.621	0.330	4.895	8.846
TOTAL	586	25	899	1510	51.251	1.033	28.799	81.083
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	427	26	1232	1685	125.721	4.666	295.634	426.021
OPERATIONS PERSONNEL	154	2	21	177	5.601	0.080	1.881	7.562
HEALTH PHYSICS PERSONNEL	89	2	68	159	12.643	0.660	11.156	24.459
SUPERVISORY PERSONNEL	59	3	119	181	4.214	1.211	9.324	14.749
ENGINEERING PERSONNEL	62	9	97	168	9.468	1.466	11.819	22.753
TOTAL	791	42	1537	2370	157.647	8.083	329.814	495.544
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	31	0	200	231	1.974	0.000	22.219	24.193
OPERATIONS PERSONNEL	2	0	1	3	0.001	0.000	0.001	0.002
HEALTH PHYSICS PERSONNEL	19	0	36	55	1.337	0.000	1.355	2.692
SUPERVISORY PERSONNEL	3	1	2	6	0.048	0.039	0.029	0.116
ENGINEERING PERSONNEL	7	3	23	33	1.200	1.275	6.880	9.355
TOTAL	62	4	262	328	4.560	1.314	30.484	36.358
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	296	4	1129	1429	39.258	0.146	182.039	221.443
OPERATIONS PERSONNEL	67	0	19	86	2.616	0.000	0.342	2.958
HEALTH PHYSICS PERSONNEL	70	0	63	133	4.723	0.000	6.780	11.503
SUPERVISORY PERSONNEL	17	2	107	126	0.524	0.093	6.169	6.786
ENGINEERING PERSONNEL	30	6	97	133	1.232	0.402	14.464	16.098
TOTAL	480	12	1415	1907	48.353	0.641	209.794	258.788
WASTE PROCESSING								
MAINTENANCE PERSONNEL	32	4	79	115	1.024	0.042	3.051	4.117
OPERATIONS PERSONNEL	10	0	2	12	0.642	0.000	0.752	1.394
HEALTH PHYSICS PERSONNEL	28	0	7	35	0.770	0.000	0.659	1.429
SUPERVISORY PERSONNEL	2	0	1	3	0.011	0.000	0.001	0.012
ENGINEERING PERSONNEL	1	0	1	2	0.006	0.000	0.335	0.341
TOTAL	73	4	90	167	2.453	0.042	4.798	7.293
REFUELING								
MAINTENANCE PERSONNEL	57	1	131	189	2.987	0.012	17.717	20.716
OPERATIONS PERSONNEL	29	0	1	30	1.736	0.000	0.010	1.746
HEALTH PHYSICS PERSONNEL	13	0	14	27	1.847	0.000	1.248	3.095
SUPERVISORY PERSONNEL	2	1	1	4	0.082	0.000	0.316	0.398
ENGINEERING PERSONNEL	2	3	33	38	0.015	0.074	2.724	2.813
TOTAL	103	5	180	288	6.667	0.086	22.015	28.768
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	1072	46	3425	4543	174.689	5.005	534.899	714.593
OPERATIONS PERSONNEL	423	4	63	490	44.321	0.591	3.068	47.980
HEALTH PHYSICS PERSONNEL	297	2	256	555	28.823	0.660	28.272	57.755
SUPERVISORY PERSONNEL	137	10	308	455	7.556	1.396	18.348	27.300
ENGINEERING PERSONNEL	166	30	331	527	15.542	3.547	41.117	60.206
GRAND TOTALS	2095	92	4383	6570	270.931	11.199	625.704	907.834

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	13	18	25	56	4.180	3.855	6.022	14.057
OPERATIONS PERSONNEL	85	0	14	99	32.535	0.000	2.909	35.444
HEALTH PHYSICS PERSONNEL	53	1	79	133	14.722	0.152	45.220	60.094
SUPERVISORY PERSONNEL	18	0	1	19	3.858	0.127	0.115	4.100
ENGINEERING PERSONNEL	6	1	3	10	1.890	0.753	1.609	4.252
TOTAL	175	20	122	317	57.185	4.887	55.875	117.947
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	187	71	539	797	78.901	26.928	224.909	330.738
OPERATIONS PERSONNEL	1	0	34	35	0.442	0.000	8.608	9.050
HEALTH PHYSICS PERSONNEL	4	0	16	20	2.110	0.000	4.885	6.995
SUPERVISORY PERSONNEL	25	2	14	41	6.867	0.532	5.210	12.609
ENGINEERING PERSONNEL	49	2	181	232	14.844	0.889	68.157	83.890
TOTAL	266	75	784	1125	103.164	28.349	311.769	443.282
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	16	4	31	51	4.531	1.645	11.000	17.176
OPERATIONS PERSONNEL	0	0	1	1	0.102	0.000	0.266	0.368
HEALTH PHYSICS PERSONNEL	2	0	3	5	0.455	0.000	0.692	1.147
SUPERVISORY PERSONNEL	1	0	0	1	0.447	0.004	0.175	0.626
ENGINEERING PERSONNEL	11	2	62	75	2.507	0.270	16.587	19.364
TOTAL	30	6	97	133	8.042	1.919	28.720	38.681
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	17	6	345	368	4.763	1.841	143.350	149.954
OPERATIONS PERSONNEL	0	0	14	14	0.027	0.000	5.869	5.896
HEALTH PHYSICS PERSONNEL	3	0	3	6	1.145	0.000	0.967	2.112
SUPERVISORY PERSONNEL	2	0	15	17	0.957	0.053	4.254	5.264
ENGINEERING PERSONNEL	10	0	81	91	2.407	0.094	27.238	29.739
TOTAL	32	6	458	496	9.299	1.988	181.678	192.965
WASTE PROCESSING								
MAINTENANCE PERSONNEL	13	2	16	31	3.365	1.155	7.141	11.661
OPERATIONS PERSONNEL	0	0	0	0	0.016	0.000	0.217	0.233
HEALTH PHYSICS PERSONNEL	3	0	7	10	2.394	0.000	1.790	4.184
SUPERVISORY PERSONNEL	0	0	1	1	0.033	0.004	0.146	0.183
ENGINEERING PERSONNEL	1	0	4	5	0.389	0.004	2.552	2.945
TOTAL	17	2	28	47	6.197	1.163	11.846	19.206
REFUELING								
MAINTENANCE PERSONNEL	5	2	26	33	1.159	0.561	8.405	10.125
OPERATIONS PERSONNEL	0	0	0	0	0.287	0.000	0.074	0.361
HEALTH PHYSICS PERSONNEL	2	0	7	9	0.393	0.000	1.610	2.003
SUPERVISORY PERSONNEL	0	0	0	0	0.561	0.000	0.037	0.598
ENGINEERING PERSONNEL	5	0	104	109	1.184	0.193	45.163	46.540
TOTAL	12	2	137	151	3.584	0.754	55.289	59.627
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	251	103	982	1336	96.899	35.985	400.827	533.711
OPERATIONS PERSONNEL	86	0	63	149	33.409	0.000	17.943	51.352
HEALTH PHYSICS PERSONNEL	67	1	115	183	21.219	0.152	55.164	76.535
SUPERVISORY PERSONNEL	46	2	31	79	12.723	0.720	9.937	23.380
ENGINEERING PERSONNEL	82	5	435	522	23.221	2.203	161.306	186.730
GRAND TOTALS	532	111	1626	2269	187.471	39.060	645.177	871.708

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	0	3	5	0.824	0.000	0.480	1.304
OPERATIONS PERSONNEL	77	0	27	104	15.537	0.000	0.258	15.795
HEALTH PHYSICS PERSONNEL	47	0	51	98	21.422	0.000	11.584	33.006
SUPERVISORY PERSONNEL	50	2	2	54	2.868	0.000	0.100	2.968
ENGINEERING PERSONNEL	23	39	8	70	2.527	1.058	0.622	4.207
TOTAL	199	41	91	331	43.178	1.058	13.044	57.280
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	174	2	646	822	84.457	0.006	104.202	188.665
OPERATIONS PERSONNEL	54	0	39	93	10.907	0.000	0.372	11.279
HEALTH PHYSICS PERSONNEL	2	0	49	51	0.649	0.000	11.122	11.771
SUPERVISORY PERSONNEL	233	0	147	380	13.242	0.000	7.904	21.146
ENGINEERING PERSONNEL	21	64	27	112	2.403	1.715	2.148	6.266
TOTAL	484	66	908	1458	111.658	1.721	125.748	239.127
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	6	0	343	349	3.007	0.000	55.344	58.351
OPERATIONS PERSONNEL	1	0	0	1	0.176	0.000	0.000	0.176
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.042	0.000	0.036	0.078
SUPERVISORY PERSONNEL	16	0	8	24	0.889	0.000	0.431	1.320
ENGINEERING PERSONNEL	23	140	4	167	2.480	3.783	0.318	6.581
TOTAL	46	140	355	541	6.594	3.783	56.129	66.506
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	7	22	307	336	3.246	0.077	49.435	52.758
OPERATIONS PERSONNEL	13	0	0	13	2.624	0.000	0.001	2.625
HEALTH PHYSICS PERSONNEL	2	0	1	3	0.969	0.000	0.021	0.990
SUPERVISORY PERSONNEL	28	0	15	43	1.597	0.000	0.827	2.424
ENGINEERING PERSONNEL	4	7	4	15	0.422	0.179	0.274	0.875
TOTAL	54	29	327	410	8.858	0.256	50.558	59.672
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	1	1	0.028	0.000	0.223	0.251
OPERATIONS PERSONNEL	3	0	135	138	0.585	0.000	1.295	1.880
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.076	0.000	0.000	0.076
SUPERVISORY PERSONNEL	1	0	0	1	0.071	0.000	0.000	0.071
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	4	0	136	140	0.760	0.000	1.518	2.278
REFUELING								
MAINTENANCE PERSONNEL	4	0	4	8	2.074	0.000	0.649	2.723
OPERATIONS PERSONNEL	10	0	42	52	1.953	0.000	0.404	2.357
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.023	0.000	0.000	0.023
SUPERVISORY PERSONNEL	21	0	2	23	1.210	0.000	0.107	1.317
ENGINEERING PERSONNEL	2	1	0	3	0.206	0.026	0.004	0.236
TOTAL	37	1	48	86	5.466	0.026	1.164	6.656
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	193	24	1304	1521	93.636	0.083	210.333	304.052
OPERATIONS PERSONNEL	158	0	243	401	31.782	0.000	2.330	34.112
HEALTH PHYSICS PERSONNEL	51	0	101	152	23.181	0.000	22.763	45.944
SUPERVISORY PERSONNEL	349	2	174	525	19.877	0.000	9.369	29.246
ENGINEERING PERSONNEL	73	251	43	367	8.038	6.761	3.366	18.165
GRAND TOTALS	824	277	1865	2966	176.514	6.844	248.161	431.519

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

PLANT: *CALLAWAY 1 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	107	107	0.371	0.000	35.982	36.353
OPERATIONS PERSONNEL	67	0	2	69	17.458	0.135	0.665	18.258
HEALTH PHYSICS PERSONNEL	22	0	33	55	5.113	0.000	9.551	14.664
SUPERVISORY PERSONNEL	4	0	0	4	1.915	0.034	0.164	2.113
ENGINEERING PERSONNEL	3	0	0	3	0.947	0.018	0.018	0.983
TOTAL	96	0	142	238	25.804	0.187	46.380	72.371
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	84	0	58	142	20.552	0.000	18.924	39.476
OPERATIONS PERSONNEL	4	0	0	4	1.794	0.001	0.022	1.817
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.368	0.000	0.225	0.593
SUPERVISORY PERSONNEL	2	1	0	3	0.643	0.312	0.037	0.992
ENGINEERING PERSONNEL	3	0	1	4	0.682	0.000	0.349	1.031
TOTAL	93	1	59	153	24.039	0.313	19.557	43.909
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	81	81	0.523	0.000	38.503	39.026
OPERATIONS PERSONNEL	6	0	1	7	1.307	0.000	0.337	1.644
HEALTH PHYSICS PERSONNEL	1	0	14	15	0.508	0.000	2.993	3.501
SUPERVISORY PERSONNEL	1	0	0	1	0.205	0.000	0.000	0.205
ENGINEERING PERSONNEL	8	0	5	13	2.544	0.020	2.896	5.460
TOTAL	16	0	101	117	5.087	0.020	44.729	49.836
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	4	0	60	64	0.831	0.000	22.113	22.944
OPERATIONS PERSONNEL	0	0	1	1	0.014	0.000	0.117	0.131
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.007	0.000	0.043	0.050
SUPERVISORY PERSONNEL	1	1	0	2	0.203	0.203	0.000	0.406
ENGINEERING PERSONNEL	1	0	10	11	0.344	0.000	6.426	6.770
TOTAL	6	1	71	78	1.399	0.203	28.699	30.301
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.006	0.000	0.094	0.100
OPERATIONS PERSONNEL	14	1	0	15	5.630	0.000	0.113	5.743
HEALTH PHYSICS PERSONNEL	3	0	0	3	0.946	0.000	0.322	1.268
SUPERVISORY PERSONNEL	1	0	0	1	0.407	0.000	0.000	0.407
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	18	1	0	19	6.989	0.000	0.529	7.518
REFUELING								
MAINTENANCE PERSONNEL	3	0	25	28	1.378	0.000	11.863	13.241
OPERATIONS PERSONNEL	4	0	0	4	1.088	0.154	0.000	1.242
HEALTH PHYSICS PERSONNEL	0	0	18	18	0.064	0.000	4.973	5.037
SUPERVISORY PERSONNEL	0	0	0	0	0.059	0.035	0.000	0.094
ENGINEERING PERSONNEL	1	0	1	2	0.483	0.000	0.303	0.786
TOTAL	8	0	44	52	3.072	0.189	17.139	20.400
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	91	0	331	422	23.661	0.000	127.479	151.140
OPERATIONS PERSONNEL	95	1	4	100	27.291	0.290	1.254	28.835
HEALTH PHYSICS PERSONNEL	26	0	65	91	7.006	0.000	18.107	25.113
SUPERVISORY PERSONNEL	9	2	0	11	3.432	0.584	0.201	4.217
ENGINEERING PERSONNEL	16	0	17	33	5.000	0.038	9.992	15.030
GRAND TOTALS	237	3	417	657	66.390	0.912	157.033	224.335

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

PLANT: *CALVERT CLIFFS 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	3	0	0	3	0.370	0.000	0.000	0.370
OPERATIONS PERSONNEL	53	0	0	53	9.927	0.000	0.000	9.927
HEALTH PHYSICS PERSONNEL	3	0	0	3	0.440	0.000	0.000	0.440
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	59	0	0	59	10.737	0.000	0.000	10.737
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	40	7	110	157	7.704	0.915	31.556	40.175
OPERATIONS PERSONNEL	5	0	1	6	0.864	0.000	0.152	1.016
HEALTH PHYSICS PERSONNEL	10	0	6	16	1.654	0.000	1.309	2.963
SUPERVISORY PERSONNEL	1	0	1	2	0.110	0.000	0.153	0.263
ENGINEERING PERSONNEL	8	1	0	9	1.574	0.218	0.000	1.792
TOTAL	64	8	118	190	11.906	1.133	33.170	46.209
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2	2	45	49	0.334	0.261	8.333	8.928
OPERATIONS PERSONNEL	1	0	0	1	0.344	0.000	0.000	0.344
HEALTH PHYSICS PERSONNEL	23	0	85	108	7.609	0.000	25.555	33.164
SUPERVISORY PERSONNEL	0	0	3	3	0.000	0.000	0.370	0.370
ENGINEERING PERSONNEL	4	0	0	4	1.045	0.000	0.000	1.045
TOTAL	30	2	133	165	9.332	0.261	34.258	43.851
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	63	15	221	299	16.227	4.195	78.403	98.825
OPERATIONS PERSONNEL	9	0	3	12	5.918	0.000	0.923	6.841
HEALTH PHYSICS PERSONNEL	14	0	45	59	4.097	0.000	12.911	17.008
SUPERVISORY PERSONNEL	1	0	1	2	0.595	0.000	0.110	0.705
ENGINEERING PERSONNEL	3	0	2	5	1.261	0.000	0.877	2.138
TOTAL	90	15	272	377	28.098	4.195	93.224	125.517
WASTE PROCESSING								
MAINTENANCE PERSONNEL	3	1	17	21	0.538	0.151	3.330	4.019
OPERATIONS PERSONNEL	1	1	4	6	0.102	0.138	0.939	1.179
HEALTH PHYSICS PERSONNEL	18	1	43	62	6.791	0.338	15.701	22.830
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	22	3	64	89	7.431	0.627	19.970	28.028
REFUELING								
MAINTENANCE PERSONNEL	27	8	75	110	7.000	1.149	39.924	48.073
OPERATIONS PERSONNEL	1	0	3	4	0.131	0.000	2.161	2.292
HEALTH PHYSICS PERSONNEL	9	0	42	51	2.664	0.000	14.076	16.740
SUPERVISORY PERSONNEL	1	0	4	5	0.121	0.000	2.064	2.185
ENGINEERING PERSONNEL	1	0	2	3	0.143	0.000	0.806	0.949
TOTAL	39	8	126	173	10.059	1.149	59.031	70.239
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	138(128)	33 (16)	468 (390)	639 (534)	32.173	6.671	161.546	200.390
OPERATIONS PERSONNEL	70 (69)	1 (1)	11 (13)	82 (83)	17.286	0.138	4.175	21.599
HEALTH PHYSICS PERSONNEL	77 (52)	1 (1)	221 (120)	299 (173)	23.255	0.338	69.552	93.145
SUPERVISORY PERSONNEL	3 (5)	0 (0)	9 (11)	12 (16)	0.826	0.000	2.697	3.523
ENGINEERING PERSONNEL	16 (27)	1 (1)	4 (4)	21 (32)	4.023	0.218	1.683	5.924
GRAND TOTALS	304(281)	36 (19)	713 (538)	1053 (838)	77.563	7.365	239.653	324.581

*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

1993

PLANT: *CATAWBA 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	251	418	29	698	6.111	2.453	0.149	8.713
OPERATIONS PERSONNEL	87	6	35	128	11.820	0.555	3.557	15.932
HEALTH PHYSICS PERSONNEL	38	3	70	111	5.017	0.024	1.315	6.356
SUPERVISORY PERSONNEL	7	3	3	13	0.207	0.000	0.010	0.217
ENGINEERING PERSONNEL	8	3	42	53	0.109	0.050	0.033	0.192
TOTAL	391	433	179	1003	23.264	3.082	5.064	31.410
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	236	355	22	613	17.641	19.709	0.344	37.694
OPERATIONS PERSONNEL	48	4	35	87	0.736	0.171	1.650	2.557
HEALTH PHYSICS PERSONNEL	34	1	44	79	3.035	0.016	2.379	5.430
SUPERVISORY PERSONNEL	4	1	3	8	0.159	0.043	0.000	0.202
ENGINEERING PERSONNEL	5	3	3	11	0.142	0.028	0.042	0.212
TOTAL	327	364	107	798	21.713	19.967	4.415	46.095
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	180	297	24	501	19.642	75.996	2.271	97.909
OPERATIONS PERSONNEL	6	0	1	7	0.111	0.000	0.002	0.113
HEALTH PHYSICS PERSONNEL	22	1	51	74	1.729	0.127	7.735	9.591
SUPERVISORY PERSONNEL	2	2	3	7	0.036	0.861	0.000	0.897
ENGINEERING PERSONNEL	5	2	37	44	0.017	0.030	10.932	10.979
TOTAL	215	302	116	633	21.535	77.014	20.940	119.489
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	151	324	15	490	3.057	12.547	0.253	15.857
OPERATIONS PERSONNEL	56	3	28	87	0.563	0.056	0.746	1.365
HEALTH PHYSICS PERSONNEL	30	2	46	78	0.864	0.264	0.386	1.514
SUPERVISORY PERSONNEL	4	1	3	8	0.018	0.000	0.034	0.052
ENGINEERING PERSONNEL	7	2	9	18	0.321	0.111	0.789	1.221
TOTAL	248	332	101	681	4.823	12.978	2.208	20.009
WASTE PROCESSING								
MAINTENANCE PERSONNEL	18	15	0	33	0.078	0.037	0.000	0.115
OPERATIONS PERSONNEL	9	1	35	45	0.642	0.091	0.550	1.283
HEALTH PHYSICS PERSONNEL	20	1	13	34	2.119	0.000	0.556	2.675
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	2	2	0.000	0.000	0.000	0.000
TOTAL	47	17	50	114	2.839	0.128	1.106	4.073
REFUELING								
MAINTENANCE PERSONNEL	246	377	24	647	49.710	106.118	2.921	158.749
OPERATIONS PERSONNEL	79	6	34	119	13.503	1.227	14.701	29.431
HEALTH PHYSICS PERSONNEL	27	2	55	84	4.573	0.043	11.769	16.385
SUPERVISORY PERSONNEL	6	1	3	10	0.793	0.300	0.141	1.234
ENGINEERING PERSONNEL	8	3	10	21	0.645	0.202	0.223	1.070
TOTAL	366	389	126	881	69.224	107.890	29.755	206.869
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	1082(258)	1786(453)	114 (30)	2982 (741)	96.239	216.860	5.938	319.037
OPERATIONS PERSONNEL	285 (87)	20 (6)	168 (35)	473 (128)	27.375	2.100	21.206	50.681
HEALTH PHYSICS PERSONNEL	171 (38)	10 (3)	279 (70)	460 (111)	17.337	0.474	24.140	41.951
SUPERVISORY PERSONNEL	23 (7)	8 (3)	15 (3)	46 (13)	1.213	1.204	0.185	2.602
ENGINEERING PERSONNEL	33 (8)	13 (4)	103 (44)	149 (56)	1.234	0.421	12.019	13.674
GRAND TOTALS	1594(398)	1837(469)	679 (182)	4110 (1049)	143.398	221.059	63.488	427.945

*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

1993

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	131	1	259	391	3.819	0.022	4.843	8.684
OPERATIONS PERSONNEL	53	2	10	65	4.788	0.382	0.354	5.474
HEALTH PHYSICS PERSONNEL	49	0	53	102	11.250	0.000	17.079	28.329
SUPERVISORY PERSONNEL	29	1	9	39	2.842	0.005	0.301	3.148
ENGINEERING PERSONNEL	25	0	19	44	0.698	0.000	0.255	0.953
TOTAL	287	4	350	641	23.397	0.359	22.832	46.588
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	93	1	53	147	2.402	0.013	1.086	3.501
OPERATIONS PERSONNEL	30	1	1	32	0.988	0.020	0.006	1.014
HEALTH PHYSICS PERSONNEL	26	0	8	34	0.994	0.000	0.201	1.195
SUPERVISORY PERSONNEL	5	0	2	7	0.074	0.000	0.093	0.167
ENGINEERING PERSONNEL	4	0	0	4	0.134	0.000	0.000	0.134
TOTAL	158	2	64	224	4.592	0.033	1.386	6.011
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	40	0	266	306	3.329	0.000	91.309	94.638
OPERATIONS PERSONNEL	5	0	2	7	0.139	0.000	2.399	2.538
HEALTH PHYSICS PERSONNEL	14	0	23	37	0.853	0.000	1.291	2.144
SUPERVISORY PERSONNEL	5	1	3	9	0.929	0.097	0.870	1.896
ENGINEERING PERSONNEL	16	0	35	51	2.801	0.000	31.791	34.592
TOTAL	80	1	329	410	8.051	0.097	127.660	135.808
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	151	3	451	605	40.559	0.473	116.649	157.681
OPERATIONS PERSONNEL	53	2	7	62	13.894	0.349	0.608	14.851
HEALTH PHYSICS PERSONNEL	48	0	51	99	7.754	0.000	6.426	14.180
SUPERVISORY PERSONNEL	24	1	7	32	3.390	0.028	0.848	4.266
ENGINEERING PERSONNEL	27	0	15	42	3.896	0.000	0.752	4.648
TOTAL	303	6	531	840	69.493	0.850	125.283	195.626
WASTE PROCESSING								
MAINTENANCE PERSONNEL	10	0	7	17	0.204	0.000	0.495	0.699
OPERATIONS PERSONNEL	1	0	3	4	0.005	0.000	0.963	0.968
HEALTH PHYSICS PERSONNEL	22	0	5	27	0.806	0.000	0.106	0.912
SUPERVISORY PERSONNEL	2	0	0	2	0.006	0.000	0.000	0.006
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	35	0	15	50	1.021	0.000	1.564	2.585
REFUELING								
MAINTENANCE PERSONNEL	123	2	404	529	10.945	0.150	62.959	74.054
OPERATIONS PERSONNEL	38	0	6	44	1.797	0.000	0.965	2.762
HEALTH PHYSICS PERSONNEL	24	0	44	68	2.407	0.000	7.544	9.951
SUPERVISORY PERSONNEL	24	0	11	35	2.470	0.000	3.929	6.399
ENGINEERING PERSONNEL	17	0	10	27	1.562	0.000	1.033	2.595
TOTAL	226	2	475	703	19.181	0.150	76.430	95.761
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	548	7	1440	1995	61.258	0.658	277.341	339.257
OPERATIONS PERSONNEL	180	5	29	214	21.611	0.701	5.295	27.607
HEALTH PHYSICS PERSONNEL	183	0	184	367	24.064	0.000	32.647	56.711
SUPERVISORY PERSONNEL	89	3	32	124	9.711	0.130	6.041	15.882
ENGINEERING PERSONNEL	89	0	79	168	9.091	0.000	33.831	42.922
GRAND TOTALS	1089	15	1764	2868	125.735	1.489	355.155	482.379

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

PLANT: *COMANCHE PEAK 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	32	32	0.238	0.000	9.347	9.585
OPERATIONS PERSONNEL	2	0	2	4	4.711	0.037	1.420	6.168
HEALTH PHYSICS PERSONNEL	7	0	24	31	1.578	0.033	6.811	8.422
SUPERVISORY PERSONNEL	0	0	0	0	0.154	0.033	0.028	0.215
ENGINEERING PERSONNEL	0	0	1	1	0.303	0.000	0.537	0.840
TOTAL	9	0	59	68	6.984	0.103	18.143	25.230
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	17	0	74	91	5.745	0.000	16.757	22.502
OPERATIONS PERSONNEL	0	0	1	1	0.129	0.000	0.515	0.644
HEALTH PHYSICS PERSONNEL	0	0	2	2	0.088	0.000	1.808	1.896
SUPERVISORY PERSONNEL	0	0	0	0	0.028	0.061	0.013	0.102
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.101	0.101
TOTAL	17	0	77	94	5.990	0.061	19.194	25.245
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	24	25	0.329	0.000	7.532	7.861
OPERATIONS PERSONNEL	0	0	2	2	0.190	0.000	0.896	1.086
HEALTH PHYSICS PERSONNEL	0	0	2	2	0.106	0.000	1.780	1.886
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.021	0.021
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.453	0.453
TOTAL	1	0	28	29	0.625	0.000	10.682	11.307
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	39	39	0.480	0.000	11.719	12.199
OPERATIONS PERSONNEL	0	0	1	1	0.032	0.000	0.823	0.855
HEALTH PHYSICS PERSONNEL	0	0	3	3	0.051	0.000	1.766	1.817
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.011	0.011
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.478	0.478
TOTAL	0	0	43	43	0.563	0.000	14.797	15.360
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	48	48	0.045	0.000	14.719	14.764
OPERATIONS PERSONNEL	0	0	3	3	0.265	0.000	0.823	1.088
HEALTH PHYSICS PERSONNEL	1	0	2	3	0.552	0.000	1.766	2.318
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.011	0.011
ENGINEERING PERSONNEL	0	0	0	0	0.017	0.000	0.478	0.495
TOTAL	1	0	53	54	0.879	0.000	17.797	18.676
REFUELING								
MAINTENANCE PERSONNEL	2	0	21	23	0.602	0.000	8.582	9.184
OPERATIONS PERSONNEL	1	0	1	2	0.467	0.000	0.851	1.318
HEALTH PHYSICS PERSONNEL	0	0	6	6	0.001	0.000	2.054	2.055
SUPERVISORY PERSONNEL	1	0	0	1	0.220	0.000	0.029	0.249
ENGINEERING PERSONNEL	1	0	0	1	0.233	0.000	0.519	0.752
TOTAL	5	0	28	33	1.523	0.000	12.035	13.558
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	20 (21)	0 (0)	238 (210)	258 (231)	7.439	0.000	68.656	76.095
OPERATIONS PERSONNEL	3 (5)	0 (0)	10 (17)	13 (22)	5.794	0.037	5.328	11.159
HEALTH PHYSICS PERSONNEL	8 (14)	0 (0)	39 (49)	47 (63)	2.376	0.033	15.985	18.394
SUPERVISORY PERSONNEL	1 (1)	0 (0)	0 (0)	1 (1)	0.402	0.094	0.113	0.609
ENGINEERING PERSONNEL	1 (1)	0 (0)	1 (7)	2 (8)	0.553	0.000	2.566	3.119
GRAND TOTALS	33 (42)	0 (0)	288 (283)	321 (325)	16.564	0.164	92.648	109.376

*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

1993

PLANT: *COOK 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	2	2	0.000	0.000	0.407	0.407
OPERATIONS PERSONNEL	7	0	0	7	0.696	0.000	0.000	0.696
HEALTH PHYSICS PERSONNEL	20	0	4	24	2.618	0.000	0.411	3.029
SUPERVISORY PERSONNEL	1	0	0	1	0.107	0.000	0.000	0.107
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	28	0	6	34	3.421	0.000	0.818	4.239
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	11	0	7	18	1.687	0.000	0.977	2.664
OPERATIONS PERSONNEL	0	0	1	1	0.000	0.000	0.153	0.153
HEALTH PHYSICS PERSONNEL	2	0	0	2	0.211	0.000	0.000	0.211
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	2	0	0	2	0.280	0.000	0.000	0.280
TOTAL	15	0	8	23	2.178	0.000	1.130	3.308
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	1	0	42	43	0.128	0.000	6.537	6.665
OPERATIONS PERSONNEL	0	0	4	4	0.000	0.000	0.586	0.586
HEALTH PHYSICS PERSONNEL	0	0	3	3	0.000	0.000	0.351	0.351
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	1	0	49	50	0.128	0.000	7.474	7.602
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	2	2	0.000	0.000	0.692	0.692
OPERATIONS PERSONNEL	0	0	2	2	0.000	0.000	0.678	0.678
HEALTH PHYSICS PERSONNEL	2	0	7	9	0.320	0.000	0.877	1.197
SUPERVISORY PERSONNEL	1	0	0	1	0.089	0.000	0.000	0.089
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	3	0	11	14	0.409	0.000	2.247	2.656
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	12	0	53	65	1.815	0.000	8.613	10.428
OPERATIONS PERSONNEL	7	0	7	14	0.696	0.000	1.417	2.113
HEALTH PHYSICS PERSONNEL	24	0	14	38	3.149	0.000	1.639	4.788
SUPERVISORY PERSONNEL	2	0	0	2	0.196	0.000	0.000	0.196
ENGINEERING PERSONNEL	2	0	0	2	0.280	0.000	0.000	0.280
GRAND TOTALS	47	0	74	121	6.136	0.000	11.669	17.805

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	8	0	6	14	0.278	0.000	0.553	0.831
OPERATIONS PERSONNEL	43	0	0	43	14.285	0.000	0.000	14.285
HEALTH PHYSICS PERSONNEL	21	0	18	39	3.403	0.000	4.146	7.549
SUPERVISORY PERSONNEL	4	0	2	6	0.598	0.000	0.148	0.746
ENGINEERING PERSONNEL	23	0	4	27	7.696	0.000	0.637	8.333
TOTAL	99	0	30	129	26.260	0.000	5.484	31.744
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	76	0	337	413	62.120	0.000	170.812	232.932
OPERATIONS PERSONNEL	5	0	0	5	0.032	0.000	0.000	0.032
HEALTH PHYSICS PERSONNEL	30	0	62	92	27.803	0.000	32.941	60.744
SUPERVISORY PERSONNEL	4	9	18	31	1.398	5.833	5.332	12.563
ENGINEERING PERSONNEL	7	21	11	39	0.190	10.490	4.360	15.040
TOTAL	122	30	428	580	91.543	16.323	213.445	321.311
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	26	26	0.000	0.000	11.100	11.100
OPERATIONS PERSONNEL	1	0	0	1	0.013	0.000	0.000	0.013
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	4	0	0	4	0.694	0.000	0.000	0.694
TOTAL	5	0	26	31	0.707	0.000	11.100	11.807
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	19	19	0.000	0.000	5.040	5.040
OPERATIONS PERSONNEL	1	0	0	1	0.002	0.000	0.000	0.002
HEALTH PHYSICS PERSONNEL	6	0	0	6	1.602	0.000	0.000	1.602
SUPERVISORY PERSONNEL	1	0	0	1	0.029	0.000	0.000	0.029
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	8	0	19	27	1.633	0.000	5.040	6.673
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	1	3	0.017	0.000	0.003	0.020
OPERATIONS PERSONNEL	4	0	0	4	2.258	0.000	0.000	2.258
HEALTH PHYSICS PERSONNEL	4	0	2	6	1.512	0.000	0.056	1.568
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	10	0	3	13	3.787	0.000	0.059	3.846
REFUELING								
MAINTENANCE PERSONNEL	0	0	5	5	0.000	0.000	0.367	0.367
OPERATIONS PERSONNEL	15	0	0	15	0.381	0.000	0.000	0.381
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	2	0	0	2	0.081	0.000	0.000	0.081
TOTAL	17	0	5	22	0.462	0.000	0.367	0.829
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	86 (76)	0 (0)	394 (371)	480 (447)	62.415	0.000	187.875	250.290
OPERATIONS PERSONNEL	69 (47)	0 (0)	0 (0)	69 (47)	16.971	0.000	0.000	16.971
HEALTH PHYSICS PERSONNEL	61 (31)	0 (0)	82 (62)	143 (93)	34.320	0.000	37.143	71.463
SUPERVISORY PERSONNEL	9 (7)	9 (9)	20 (18)	38 (34)	2.025	5.833	5.480	13.338
ENGINEERING PERSONNEL	36 (23)	21 (21)	15 (14)	72 (58)	8.661	10.490	4.997	24.148
GRAND TOTALS	261(184)	30 (30)	511 (465)	802 (679)	124.392	16.323	235.495	376.210

*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

1993

PLANT: *CRYSTAL RIVER 3 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	15	0	0	15	4.292	0.000	0.000	4.292
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.013	0.000	0.000	0.013
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.001	0.000	0.001
TOTAL	15	0	0	15	4.305	0.001	0.000	4.306
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	37	7	39	83	9.826	2.111	11.417	23.354
OPERATIONS PERSONNEL	2	0	7	9	1.437	0.164	1.744	3.345
HEALTH PHYSICS PERSONNEL	19	0	10	29	5.084	0.000	3.362	8.446
SUPERVISORY PERSONNEL	1	0	37	38	0.356	0.188	11.744	12.288
ENGINEERING PERSONNEL	0	3	9	12	0.120	1.016	2.817	3.953
TOTAL	59	10	102	171	16.823	3.479	31.084	51.386
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.038	0.038
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.017	0.000	0.000	0.017
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.052	0.052
ENGINEERING PERSONNEL	0	0	0	0	0.003	0.000	0.000	0.003
TOTAL	0	0	0	0	0.020	0.000	0.090	0.110
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	4	4	0.490	0.021	0.895	1.406
OPERATIONS PERSONNEL	13	0	0	13	3.392	0.000	0.108	3.500
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.626	0.000	0.057	0.683
SUPERVISORY PERSONNEL	1	0	0	1	0.250	0.003	0.029	0.282
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	15	0	4	19	4.758	0.024	1.089	5.871
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	37	7	43	87	10.316	2.132	12.350	24.798
OPERATIONS PERSONNEL	30	0	7	37	9.121	0.164	1.852	11.137
HEALTH PHYSICS PERSONNEL	20	0	10	30	5.740	0.000	3.419	9.159
SUPERVISORY PERSONNEL	2	0	37	39	0.606	0.191	11.825	12.622
ENGINEERING PERSONNEL	0	3	9	12	0.123	1.017	2.817	3.957
GRAND TOTALS	89	10	106	205	25.906	3.504	32.263	61.673

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	38	0	64	102	0.153	0.000	1.053	1.206
OPERATIONS PERSONNEL	223	1	61	285	6.026	0.002	0.458	6.486
HEALTH PHYSICS PERSONNEL	53	0	87	140	2.703	0.000	1.489	4.192
SUPERVISORY PERSONNEL	26	0	2	28	0.119	0.000	0.001	0.120
ENGINEERING PERSONNEL	281	1	23	305	0.968	0.000	0.083	1.051
TOTAL	621	2	237	860	9.969	0.002	3.084	13.055
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	217	2	715	934	7.912	0.000	14.155	22.067
OPERATIONS PERSONNEL	9	0	8	17	0.141	0.000	0.432	0.573
HEALTH PHYSICS PERSONNEL	14	0	52	66	0.278	0.000	0.452	0.730
SUPERVISORY PERSONNEL	9	0	0	9	0.086	0.000	0.000	0.086
ENGINEERING PERSONNEL	69	0	7	76	0.409	0.000	0.036	0.445
TOTAL	318	2	782	1102	8.826	0.000	15.075	23.901
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	87	2	467	556	6.216	0.000	121.994	128.210
OPERATIONS PERSONNEL	14	0	1	15	0.052	0.000	0.000	0.052
HEALTH PHYSICS PERSONNEL	24	0	29	53	0.638	0.000	0.932	1.570
SUPERVISORY PERSONNEL	15	0	1	16	0.225	0.000	0.160	0.385
ENGINEERING PERSONNEL	214	1	8	223	1.402	0.000	0.275	1.677
TOTAL	354	3	506	863	8.533	0.000	123.361	131.894
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	156	2	463	621	11.353	0.004	53.151	64.508
OPERATIONS PERSONNEL	25	0	0	25	0.892	0.000	0.000	0.892
HEALTH PHYSICS PERSONNEL	27	0	36	63	0.963	0.000	1.903	2.866
SUPERVISORY PERSONNEL	4	0	1	5	0.286	0.000	0.002	0.288
ENGINEERING PERSONNEL	87	0	9	96	1.629	0.000	0.460	2.089
TOTAL	299	2	509	810	15.123	0.004	55.516	70.643
WASTE PROCESSING								
MAINTENANCE PERSONNEL	52	0	49	101	0.259	0.000	0.380	0.639
OPERATIONS PERSONNEL	31	0	2	33	0.068	0.000	0.000	0.068
HEALTH PHYSICS PERSONNEL	36	0	66	102	3.853	0.000	2.454	6.307
SUPERVISORY PERSONNEL	5	0	0	5	0.010	0.000	0.000	0.010
ENGINEERING PERSONNEL	12	0	0	12	0.145	0.000	0.000	0.145
TOTAL	136	0	117	253	4.335	0.000	2.834	7.169
REFUELING								
MAINTENANCE PERSONNEL	149	0	447	596	6.620	0.000	59.584	66.204
OPERATIONS PERSONNEL	112	0	5	117	10.325	0.000	0.028	10.353
HEALTH PHYSICS PERSONNEL	45	0	92	137	13.532	0.000	25.354	38.886
SUPERVISORY PERSONNEL	20	0	1	21	1.177	0.000	0.005	1.182
ENGINEERING PERSONNEL	158	3	6	167	5.830	0.045	0.185	6.060
TOTAL	484	3	551	1038	37.484	0.045	85.156	122.685
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	699	6	2205	2910	32.513	0.004	250.317	282.834
OPERATIONS PERSONNEL	414	1	77	492	17.504	0.002	0.918	18.424
HEALTH PHYSICS PERSONNEL	199	0	362	561	21.967	0.000	32.584	54.551
SUPERVISORY PERSONNEL	79	0	5	84	1.903	0.000	0.168	2.071
ENGINEERING PERSONNEL	821	5	53	879	10.383	0.045	1.039	11.467
GRAND TOTALS	2212	12	2702	4926	84.270	0.051	285.026	369.347

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	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	5	2	5	12	0.880	0.242	1.345	2.467
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	9	1	2	12	1.230	0.140	0.219	1.589
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	14	3	7	24	2.110	0.382	1.564	4.056
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	4	3	13	20	0.805	0.705	3.075	4.585
OPERATIONS PERSONNEL	2	1	2	5	0.350	0.110	0.305	0.765
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.000	0.000	0.175	0.175
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	0	0	1	0.120	0.000	0.000	0.120
TOTAL	7	4	16	27	1.275	0.815	3.555	5.645
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	9	16	158	183	1.793	3.545	64.257	69.595
OPERATIONS PERSONNEL	1	1	2	4	0.104	0.235	0.770	1.109
HEALTH PHYSICS PERSONNEL	10	41	20	71	2.730	10.532	5.496	18.758
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.965	0.965
ENGINEERING PERSONNEL	0	0	1	1	0.000	0.000	0.195	0.195
TOTAL	20	58	182	260	4.627	14.312	71.683	90.622
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	1	1	2	0.000	0.275	0.145	0.420
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	13	4	1	18	8.403	1.035	1.090	10.528
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	5	2	20	8.403	1.310	1.235	10.948
REFUELING								
MAINTENANCE PERSONNEL	30	47	188	265	8.710	10.905	41.323	60.938
OPERATIONS PERSONNEL	5	1	3	9	0.865	0.315	0.445	1.625
HEALTH PHYSICS PERSONNEL	14	50	32	96	3.230	11.239	6.816	21.285
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.140	0.140
ENGINEERING PERSONNEL	6	1	6	13	1.260	0.130	1.150	2.540
TOTAL	55	99	230	384	14.065	22.589	49.874	86.528
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	48	69	365	482	12.188	15.672	110.145	138.005
OPERATIONS PERSONNEL	8	3	7	18	1.319	0.660	1.520	3.499
HEALTH PHYSICS PERSONNEL	46	96	56	198	15.593	22.946	13.796	52.335
SUPERVISORY PERSONNEL	0	0	2	2	0.000	0.000	1.105	1.105
ENGINEERING PERSONNEL	7	1	7	15	1.380	0.130	1.345	2.855
GRAND TOTALS	109	169	437	715	30.480	39.408	127.911	197.799

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	8	4	40	52	6.656	0.272	18.841	25.769
OPERATIONS PERSONNEL	116	0	30	146	49.188	0.000	2.768	51.956
HEALTH PHYSICS PERSONNEL	20	0	6	26	15.066	0.000	3.301	18.367
SUPERVISORY PERSONNEL	60	70	0	130	14.898	0.342	0.000	15.240
ENGINEERING PERSONNEL	15	68	40	123	4.020	4.729	5.020	13.769
TOTAL	219	142	116	477	89.828	5.343	29.930	125.101
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	252	47	1801	2100	216.069	3.573	843.175	1062.817
OPERATIONS PERSONNEL	110	0	40	150	46.510	0.000	3.643	50.153
HEALTH PHYSICS PERSONNEL	37	0	73	110	28.287	0.000	39.643	67.930
SUPERVISORY PERSONNEL	196	168	0	364	48.346	0.814	0.000	49.160
ENGINEERING PERSONNEL	59	261	402	722	15.321	18.062	50.987	84.370
TOTAL	654	476	2316	3446	354.533	22.449	937.448	1314.430
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	3	0	138	141	2.290	0.009	64.609	66.908
OPERATIONS PERSONNEL	2	0	1	3	0.716	0.000	0.068	0.784
HEALTH PHYSICS PERSONNEL	1	0	7	8	0.462	0.000	3.756	4.218
SUPERVISORY PERSONNEL	4	17	0	21	1.079	0.085	0.000	1.164
ENGINEERING PERSONNEL	3	38	52	93	0.690	2.615	6.625	9.930
TOTAL	13	55	198	266	5.237	2.709	75.058	83.004
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	9	98	107	0.026	0.652	46.073	46.751
OPERATIONS PERSONNEL	0	0	2	2	0.177	0.000	0.174	0.351
HEALTH PHYSICS PERSONNEL	2	0	0	2	1.858	0.000	0.036	1.894
SUPERVISORY PERSONNEL	0	1	0	1	0.044	0.007	0.000	0.051
ENGINEERING PERSONNEL	0	4	1	5	0.045	0.256	0.111	0.412
TOTAL	2	14	101	117	2.150	0.915	46.394	49.459
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	12	12	0.105	0.000	5.787	5.892
OPERATIONS PERSONNEL	9	0	130	139	3.684	0.000	11.938	15.622
HEALTH PHYSICS PERSONNEL	3	0	1	4	2.289	0.000	0.587	2.876
SUPERVISORY PERSONNEL	5	0	0	5	1.238	0.000	0.000	1.238
ENGINEERING PERSONNEL	3	6	2	11	0.689	0.446	0.234	1.369
TOTAL	20	6	145	171	8.005	0.446	18.546	26.997
REFUELING								
MAINTENANCE PERSONNEL	39	0	19	58	33.830	0.000	9.110	42.940
OPERATIONS PERSONNEL	16	0	0	16	6.722	0.000	0.000	6.722
HEALTH PHYSICS PERSONNEL	3	0	0	3	2.576	0.000	0.004	2.580
SUPERVISORY PERSONNEL	15	6	0	21	3.619	0.028	0.000	3.647
ENGINEERING PERSONNEL	0	11	0	11	0.009	0.747	0.032	0.788
TOTAL	73	17	19	109	46.756	0.775	9.146	56.677
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	302	60	2108	2470	258.976	4.506	987.595	1251.077
OPERATIONS PERSONNEL	253	0	203	456	106.997	0.000	18.591	125.588
HEALTH PHYSICS PERSONNEL	66	0	87	153	50.538	0.000	47.327	97.865
SUPERVISORY PERSONNEL	280	262	0	542	69.224	1.276	0.000	70.500
ENGINEERING PERSONNEL	80	388	497	965	20.774	26.855	63.009	110.638
GRAND TOTALS	981	710	2895	4586	506.509	32.637	1116.522	1655.668

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	14	0	3	17	7.772	0.004	1.097	8.873
OPERATIONS PERSONNEL	34	0	0	34	23.972	0.000	0.063	24.035
HEALTH PHYSICS PERSONNEL	10	0	24	34	5.483	0.000	17.472	22.955
SUPERVISORY PERSONNEL	7	2	2	11	2.134	3.603	0.476	6.213
ENGINEERING PERSONNEL	10	0	1	11	2.923	0.065	0.404	3.392
TOTAL	75	2	30	107	42.284	3.672	19.512	65.468
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	102	1	140	243	4.107	0.300	113.261	117.668
OPERATIONS PERSONNEL	6	0	0	6	1.108	0.000	0.113	1.221
HEALTH PHYSICS PERSONNEL	8	0	21	29	10.197	0.000	8.709	18.906
SUPERVISORY PERSONNEL	6	1	5	12	0.000	0.106	1.231	1.337
ENGINEERING PERSONNEL	25	1	12	38	0.000	0.170	8.898	9.068
TOTAL	147	3	178	328	15.412	0.576	132.212	148.200
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	2	59	61	0.096	1.100	33.757	34.953
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	2	2	0.962	0.000	1.269	2.231
SUPERVISORY PERSONNEL	0	0	3	3	0.000	0.000	0.722	0.722
ENGINEERING PERSONNEL	3	2	10	15	0.000	0.717	7.281	7.998
TOTAL	3	4	74	81	1.058	1.817	43.029	45.904
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	6	0	9	15	4.399	0.000	3.881	8.280
OPERATIONS PERSONNEL	1	0	1	2	0.257	0.000	0.326	0.583
HEALTH PHYSICS PERSONNEL	1	0	1	2	0.646	0.000	0.557	1.203
SUPERVISORY PERSONNEL	0	0	0	0	0.010	0.000	0.004	0.014
ENGINEERING PERSONNEL	1	0	0	1	0.241	0.000	0.017	0.258
TOTAL	9	0	11	20	5.553	0.000	4.785	10.338
WASTE PROCESSING								
MAINTENANCE PERSONNEL	6	0	0	6	3.593	0.000	0.200	3.793
OPERATIONS PERSONNEL	4	0	4	8	1.799	0.000	3.683	5.482
HEALTH PHYSICS PERSONNEL	1	0	0	1	1.002	0.000	0.200	1.202
SUPERVISORY PERSONNEL	0	0	0	0	0.033	0.000	0.004	0.037
ENGINEERING PERSONNEL	0	0	0	0	0.072	0.000	0.000	0.072
TOTAL	11	0	4	15	6.499	0.000	4.087	10.586
REFUELING								
MAINTENANCE PERSONNEL	4	0	31	35	2.859	0.000	16.081	18.940
OPERATIONS PERSONNEL	2	0	0	2	0.508	0.000	0.000	0.508
HEALTH PHYSICS PERSONNEL	1	0	11	12	0.917	0.000	3.749	4.666
SUPERVISORY PERSONNEL	0	0	0	0	0.014	0.000	0.183	0.197
ENGINEERING PERSONNEL	5	1	11	17	1.151	0.209	4.508	5.868
TOTAL	12	1	53	66	5.449	0.209	24.521	30.179
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	132	3	242	377	22.826	1.404	168.277	192.507
OPERATIONS PERSONNEL	47	0	5	52	27.644	0.000	4.185	31.829
HEALTH PHYSICS PERSONNEL	21	0	59	80	19.207	0.000	31.956	51.163
SUPERVISORY PERSONNEL	13	3	10	26	2.191	3.709	2.620	8.520
ENGINEERING PERSONNEL	44	4	34	82	4.387	1.161	21.108	26.656
GRAND TOTALS	257	10	350	617	76.255	6.274	228.146	310.675

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	20	1	12	33	0.175	0.001	0.029	0.205
OPERATIONS PERSONNEL	124	0	2	126	12.505	0.000	0.005	12.510
HEALTH PHYSICS PERSONNEL	64	0	85	149	4.911	0.000	3.508	8.419
SUPERVISORY PERSONNEL	6	2	7	15	0.111	0.030	0.107	0.248
ENGINEERING PERSONNEL	17	2	19	38	0.264	0.008	0.667	0.939
TOTAL	231	5	125	361	17.966	0.039	4.316	22.321
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	182	0	80	262	6.437	0.000	1.946	8.383
OPERATIONS PERSONNEL	46	0	1	47	0.670	0.000	0.004	0.674
HEALTH PHYSICS PERSONNEL	78	0	77	155	5.819	0.000	2.352	8.171
SUPERVISORY PERSONNEL	5	1	2	8	0.094	0.027	0.005	0.126
ENGINEERING PERSONNEL	5	2	1	8	0.098	0.012	0.001	0.111
TOTAL	316	3	161	480	13.118	0.039	4.308	17.465
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	4	0	123	127	0.025	0.000	32.818	32.843
OPERATIONS PERSONNEL	5	0	0	5	0.052	0.000	0.000	0.052
HEALTH PHYSICS PERSONNEL	13	0	28	41	0.194	0.000	1.237	1.431
SUPERVISORY PERSONNEL	2	1	6	9	0.220	0.020	0.296	0.536
ENGINEERING PERSONNEL	17	4	69	90	1.010	0.044	28.451	29.505
TOTAL	41	5	226	272	1.501	0.064	62.802	64.367
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	185	0	444	629	43.153	0.000	92.086	135.239
OPERATIONS PERSONNEL	81	0	8	89	5.199	0.000	0.854	6.053
HEALTH PHYSICS PERSONNEL	79	0	99	178	15.956	0.000	16.660	32.616
SUPERVISORY PERSONNEL	9	2	13	24	0.207	0.043	2.374	2.624
ENGINEERING PERSONNEL	27	2	124	153	1.474	0.047	36.270	37.791
TOTAL	381	4	688	1073	65.989	0.090	148.244	214.323
WASTE PROCESSING								
MAINTENANCE PERSONNEL	16	0	18	34	0.103	0.000	0.347	0.450
OPERATIONS PERSONNEL	24	0	1	25	0.380	0.000	0.125	0.505
HEALTH PHYSICS PERSONNEL	69	0	26	95	6.992	0.000	0.532	7.524
SUPERVISORY PERSONNEL	1	0	1	2	0.003	0.000	0.037	0.040
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	110	0	46	156	7.478	0.000	1.041	8.519
REFUELING								
MAINTENANCE PERSONNEL	37	0	4	41	1.583	0.000	0.115	1.698
OPERATIONS PERSONNEL	39	0	32	71	0.574	0.000	2.872	3.446
HEALTH PHYSICS PERSONNEL	12	0	19	31	0.358	0.000	0.610	0.968
SUPERVISORY PERSONNEL	4	0	0	4	0.139	0.000	0.000	0.139
ENGINEERING PERSONNEL	2	1	4	7	0.008	0.010	0.090	0.108
TOTAL	94	1	59	154	2.662	0.010	3.687	6.359
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	444	1	681	1126	51.476	0.001	127.341	178.818
OPERATIONS PERSONNEL	319	0	44	363	19.380	0.000	3.860	23.240
HEALTH PHYSICS PERSONNEL	315	0	334	649	34.230	0.000	24.899	59.129
SUPERVISORY PERSONNEL	27	6	29	62	0.774	0.120	2.819	3.713
ENGINEERING PERSONNEL	68	11	217	296	2.854	0.121	65.479	68.454
GRAND TOTALS	1173	18	1305	2496	108.714	0.242	224.398	333.354

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	123	2	56	181	5.523	0.008	0.945	6.476
OPERATIONS PERSONNEL	80	1	42	123	6.067	0.000	3.580	9.647
HEALTH PHYSICS PERSONNEL	29	0	0	29	3.190	0.000	0.000	3.190
SUPERVISORY PERSONNEL	121	11	65	197	0.705	0.049	0.501	1.255
ENGINEERING PERSONNEL	126	3	4	133	2.270	0.012	0.017	2.299
TOTAL	479	17	167	663	17.755	0.069	5.043	22.867
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	36	0	0	36	1.737	0.000	0.000	1.737
OPERATIONS PERSONNEL	4	0	0	4	0.057	0.000	0.000	0.057
HEALTH PHYSICS PERSONNEL	2	0	0	2	0.332	0.000	0.000	0.332
SUPERVISORY PERSONNEL	3	0	3	6	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	0	0	1	0.223	0.000	0.000	0.223
TOTAL	46	0	3	49	2.349	0.000	0.000	2.349
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	3	0	0	3	0.038	0.000	0.000	0.038
OPERATIONS PERSONNEL	25	0	0	25	0.447	0.000	0.000	0.447
HEALTH PHYSICS PERSONNEL	3	0	0	3	0.166	0.000	0.000	0.166
SUPERVISORY PERSONNEL	18	0	0	18	0.030	0.000	0.000	0.030
ENGINEERING PERSONNEL	11	0	1	12	0.020	0.000	0.004	0.024
TOTAL	60	0	1	61	0.701	0.000	0.004	0.705
WASTE PROCESSING								
MAINTENANCE PERSONNEL	26	0	68	94	2.903	0.000	1.135	4.038
OPERATIONS PERSONNEL	28	0	3	31	2.306	0.000	0.293	2.599
HEALTH PHYSICS PERSONNEL	7	0	0	7	0.991	0.000	0.000	0.991
SUPERVISORY PERSONNEL	4	0	18	22	0.000	0.000	0.039	0.039
ENGINEERING PERSONNEL	10	3	3	16	0.166	0.011	0.029	0.206
TOTAL	75	3	92	170	6.366	0.011	1.496	7.873
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	2	0	2	4	0.050	0.000	0.486	0.536
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.183	0.000	0.000	0.183
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	3	0	3	6	0.233	0.000	0.486	0.719
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	188	2	124	314	10.201	0.008	2.080	12.289
OPERATIONS PERSONNEL	139	1	47	187	8.927	0.000	4.359	13.286
HEALTH PHYSICS PERSONNEL	42	0	0	42	4.862	0.000	0.000	4.862
SUPERVISORY PERSONNEL	146	11	87	244	0.735	0.049	0.540	1.324
ENGINEERING PERSONNEL	148	6	8	162	2.679	0.023	0.050	2.752
GRAND TOTALS	663	20	266	949	27.404	0.080	7.029	34.513

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	46	27	136	209	0.836	0.000	1.704	2.540
OPERATIONS PERSONNEL	116	99	5	220	13.321	0.000	0.071	13.392
HEALTH PHYSICS PERSONNEL	62	17	44	123	11.206	0.001	4.194	15.401
SUPERVISORY PERSONNEL	27	4	32	63	0.194	0.015	0.188	0.397
ENGINEERING PERSONNEL	13	5	16	34	0.127	0.020	0.105	0.252
TOTAL	264	152	233	649	25.684	0.036	6.262	31.982
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	133	30	292	455	53.644	0.060	39.073	92.777
OPERATIONS PERSONNEL	87	12	6	105	8.091	0.000	0.183	8.274
HEALTH PHYSICS PERSONNEL	49	20	45	114	8.509	0.000	1.377	9.886
SUPERVISORY PERSONNEL	31	2	41	74	2.150	0.000	1.893	4.043
ENGINEERING PERSONNEL	41	6	27	74	0.992	0.010	0.415	1.417
TOTAL	341	70	411	822	73.386	0.070	42.941	116.397
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	150	30	264	444	5.564	0.050	5.226	10.840
OPERATIONS PERSONNEL	148	59	38	245	18.854	0.030	0.323	19.207
HEALTH PHYSICS PERSONNEL	67	23	59	149	2.764	0.009	0.925	3.698
SUPERVISORY PERSONNEL	89	36	166	291	1.471	0.235	1.744	3.450
ENGINEERING PERSONNEL	79	42	101	222	2.936	0.350	2.242	5.528
TOTAL	533	190	628	1351	31.589	0.674	10.460	42.723
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	31	0	105	136	0.371	0.000	7.164	7.535
OPERATIONS PERSONNEL	5	0	0	5	0.009	0.000	0.000	0.009
HEALTH PHYSICS PERSONNEL	17	16	6	39	0.714	0.000	0.034	0.748
SUPERVISORY PERSONNEL	4	1	8	13	0.022	0.000	0.109	0.131
ENGINEERING PERSONNEL	5	0	9	14	0.029	0.000	0.287	0.316
TOTAL	62	17	128	207	1.145	0.000	7.594	8.739
WASTE PROCESSING								
MAINTENANCE PERSONNEL	39	24	47	110	3.598	0.000	0.591	4.189
OPERATIONS PERSONNEL	17	5	2	24	3.088	0.000	0.893	3.981
HEALTH PHYSICS PERSONNEL	26	20	36	82	2.835	0.000	2.182	5.017
SUPERVISORY PERSONNEL	2	0	2	4	0.004	0.000	0.000	0.004
ENGINEERING PERSONNEL	2	1	1	4	0.000	0.002	0.000	0.002
TOTAL	86	50	88	224	9.525	0.002	3.666	13.193
REFUELING								
MAINTENANCE PERSONNEL	44	0	1	45	0.510	0.000	0.000	0.510
OPERATIONS PERSONNEL	5	4	0	9	0.101	0.000	0.000	0.101
HEALTH PHYSICS PERSONNEL	15	10	13	38	2.692	0.000	7.285	9.977
SUPERVISORY PERSONNEL	6	1	0	7	0.112	0.050	0.000	0.162
ENGINEERING PERSONNEL	1	2	2	5	0.001	0.028	0.011	0.040
TOTAL	71	17	16	104	3.416	0.078	7.296	10.790
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	443	111	845	1399	64.523	0.110	53.758	118.391
OPERATIONS PERSONNEL	378	179	51	608	43.464	0.030	1.470	44.964
HEALTH PHYSICS PERSONNEL	236	106	203	545	28.720	0.010	15.997	44.727
SUPERVISORY PERSONNEL	159	44	249	452	3.953	0.300	3.934	8.187
ENGINEERING PERSONNEL	141	56	156	353	4.085	0.410	3.060	7.555
GRAND TOTALS	1357	496	1504	3357	144.745	0.860	78.219	223.824

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	0	0	0	0	0.195	0.011	0.037	0.243
OPERATIONS PERSONNEL	22	0	0	22	6.816	0.000	0.005	6.821
HEALTH PHYSICS PERSONNEL	13	0	20	33	5.540	0.000	4.813	10.353
SUPERVISORY PERSONNEL	2	0	0	2	0.853	0.000	0.009	0.862
ENGINEERING PERSONNEL	3	0	0	3	1.144	0.001	0.002	1.147
TOTAL	40	0	20	60	14.548	0.012	4.866	19.426
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	52	26	51	129	15.945	8.115	15.787	39.847
OPERATIONS PERSONNEL	0	0	0	0	0.554	0.000	0.000	0.554
HEALTH PHYSICS PERSONNEL	19	0	54	73	4.241	0.000	17.842	22.083
SUPERVISORY PERSONNEL	2	0	1	3	1.239	0.002	1.171	2.412
ENGINEERING PERSONNEL	9	0	3	12	3.101	0.406	2.061	5.568
TOTAL	82	26	109	217	25.080	8.523	36.861	70.464
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	22	10	37	69	5.228	3.394	15.115	23.737
OPERATIONS PERSONNEL	0	0	0	0	0.073	0.000	0.000	0.073
HEALTH PHYSICS PERSONNEL	3	0	26	29	0.543	0.000	7.202	7.745
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.337	0.337
ENGINEERING PERSONNEL	5	0	39	44	1.916	0.062	19.412	21.390
TOTAL	30	10	103	143	7.760	3.456	42.066	53.282
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	1	0	24	25	1.079	0.087	8.540	9.706
OPERATIONS PERSONNEL	0	0	0	0	0.055	0.000	0.000	0.055
HEALTH PHYSICS PERSONNEL	1	0	3	4	0.846	0.000	1.654	2.500
SUPERVISORY PERSONNEL	0	0	0	0	0.063	0.000	0.048	0.111
ENGINEERING PERSONNEL	0	0	0	0	0.512	0.175	0.635	1.322
TOTAL	2	0	27	29	2.555	0.262	10.877	13.694
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.019	0.000	0.004	0.023
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	5	0	1	6	1.079	0.000	0.882	1.961
SUPERVISORY PERSONNEL	0	0	0	0	0.011	0.000	0.000	0.011
ENGINEERING PERSONNEL	0	0	0	0	0.001	0.000	0.000	0.001
TOTAL	5	0	1	6	1.110	0.000	0.886	1.996
REFUELING								
MAINTENANCE PERSONNEL	23	19	12	54	8.967	8.447	6.038	23.452
OPERATIONS PERSONNEL	0	0	0	0	1.784	0.000	0.000	1.784
HEALTH PHYSICS PERSONNEL	3	0	23	26	0.893	0.000	5.448	6.341
SUPERVISORY PERSONNEL	5	0	0	5	1.296	0.000	0.137	1.433
ENGINEERING PERSONNEL	5	2	3	10	1.759	0.405	1.072	3.236
TOTAL	36	21	38	95	14.699	8.852	12.695	36.246
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	98	55	124	277	31.433	20.054	45.521	97.008
OPERATIONS PERSONNEL	22	0	0	22	9.282	0.000	0.005	9.287
HEALTH PHYSICS PERSONNEL	44	0	127	171	13.142	0.000	37.841	50.983
SUPERVISORY PERSONNEL	9	0	2	11	3.462	0.002	1.702	5.166
ENGINEERING PERSONNEL	22	2	45	69	8.433	1.049	23.182	32.664
GRAND TOTALS	195	57	298	550	65.752	21.105	108.251	195.108

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	5	0	71	76	0.810	0.000	59.294	60.104
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	21	21	0.000	0.000	9.550	9.550
SUPERVISORY PERSONNEL	0	0	6	6	0.000	0.000	1.800	1.800
ENGINEERING PERSONNEL	0	0	6	6	0.000	0.000	1.330	1.330
TOTAL	5	0	104	109	0.810	0.000	71.974	72.784
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	5	0	71	76	0.810	0.000	59.294	60.104
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	21	21	0.000	0.000	9.550	9.550
SUPERVISORY PERSONNEL	0	0	6	6	0.000	0.000	1.800	1.800
ENGINEERING PERSONNEL	0	0	6	6	0.000	0.000	1.330	1.330
GRAND TOTALS	5	0	104	109	0.810	0.000	71.974	72.784

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

PLANT: *GINNA 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	43	50	110	203	1.052	0.182	1.040	2.274
OPERATIONS PERSONNEL	27	0	0	27	4.728	0.000	0.000	4.728
HEALTH PHYSICS PERSONNEL	13	0	48	61	1.136	0.000	2.233	3.369
SUPERVISORY PERSONNEL	14	16	12	42	1.179	0.637	0.284	2.100
ENGINEERING PERSONNEL	1	2	4	7	0.041	0.143	0.202	0.386
TOTAL	98	68	174	340	8.136	0.962	3.759	12.857
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	43	75	141	259	5.994	3.630	7.305	16.929
OPERATIONS PERSONNEL	20	0	0	20	0.249	0.000	0.000	0.249
HEALTH PHYSICS PERSONNEL	13	3	51	67	4.378	0.330	14.109	18.817
SUPERVISORY PERSONNEL	14	15	13	42	1.480	0.677	0.345	2.502
ENGINEERING PERSONNEL	1	2	3	6	0.162	0.054	0.562	0.778
TOTAL	91	95	208	394	12.263	4.691	22.321	39.275
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	27	44	54	125	1.511	2.617	4.464	8.592
OPERATIONS PERSONNEL	6	0	0	6	0.228	0.000	0.000	0.228
HEALTH PHYSICS PERSONNEL	8	0	28	36	0.173	0.000	1.377	1.550
SUPERVISORY PERSONNEL	11	14	10	35	0.870	3.346	1.224	5.440
ENGINEERING PERSONNEL	0	2	1	3	0.000	0.056	0.020	0.076
TOTAL	52	60	93	205	2.782	6.019	7.085	15.886
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	56	89	219	364	9.119	9.073	20.709	38.901
OPERATIONS PERSONNEL	22	0	0	22	1.419	0.000	0.000	1.419
HEALTH PHYSICS PERSONNEL	14	3	55	72	1.346	0.015	4.420	5.781
SUPERVISORY PERSONNEL	9	18	14	41	0.596	0.644	0.998	2.238
ENGINEERING PERSONNEL	1	2	3	6	0.035	0.015	0.149	0.199
TOTAL	102	112	291	505	12.515	9.747	26.276	48.538
WASTE PROCESSING								
MAINTENANCE PERSONNEL	14	5	24	43	0.291	0.106	0.452	0.849
OPERATIONS PERSONNEL	1	0	0	1	0.093	0.000	0.000	0.093
HEALTH PHYSICS PERSONNEL	5	3	18	26	0.261	0.131	0.634	1.026
SUPERVISORY PERSONNEL	1	3	1	5	0.021	0.111	0.018	0.150
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	21	11	43	75	0.666	0.348	1.104	2.118
REFUELING								
MAINTENANCE PERSONNEL	18	27	33	78	0.609	2.160	9.426	12.195
OPERATIONS PERSONNEL	8	0	0	8	2.143	0.000	0.000	2.143
HEALTH PHYSICS PERSONNEL	2	0	13	15	0.339	0.000	0.754	1.093
SUPERVISORY PERSONNEL	2	5	3	10	0.285	0.120	0.100	0.505
ENGINEERING PERSONNEL	1	0	1	2	0.448	0.000	0.128	0.576
TOTAL	31	32	50	113	3.824	2.280	10.408	16.512
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	201 (43)	290 (77)	581 (172)	1072 (292)	18.576	17.768	43.396	79.740
OPERATIONS PERSONNEL	84 (27)	0 (0)	0 (0)	84 (27)	8.860	0.000	0.000	8.860
HEALTH PHYSICS PERSONNEL	55 (13)	9 (3)	213 (53)	277 (69)	7.633	0.476	23.527	31.636
SUPERVISORY PERSONNEL	51 (14)	71 (16)	53 (14)	175 (44)	4.431	5.535	2.969	12.935
ENGINEERING PERSONNEL	4 (1)	8 (2)	12 (4)	24 (7)	0.686	0.268	1.061	2.015
GRAND TOTALS	395 (98)	378 (98)	859 (243)	1632 (439)	40.186	24.047	70.953	135.186

*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

1993

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	3	0	14	17	0.033	0.000	0.201	0.234
OPERATIONS PERSONNEL	63	0	5	68	21.880	0.000	1.490	23.370
HEALTH PHYSICS PERSONNEL	29	1	43	73	6.387	0.005	4.048	10.440
SUPERVISORY PERSONNEL	12	0	45	57	0.291	0.000	0.945	1.236
ENGINEERING PERSONNEL	19	0	4	23	0.962	0.000	0.115	1.077
TOTAL	126	1	111	238	29.553	0.005	6.799	36.357
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	128	0	500	628	51.337	0.000	150.646	201.983
OPERATIONS PERSONNEL	31	0	4	35	3.955	0.000	0.315	4.270
HEALTH PHYSICS PERSONNEL	28	1	44	73	8.303	0.115	12.015	20.433
SUPERVISORY PERSONNEL	10	0	38	48	2.358	0.000	4.533	6.891
ENGINEERING PERSONNEL	18	0	11	29	2.309	0.000	1.642	3.951
TOTAL	215	1	597	813	68.262	0.115	169.151	237.528
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	47	47	0.000	0.000	2.559	2.559
OPERATIONS PERSONNEL	7	0	0	7	0.443	0.000	0.000	0.443
HEALTH PHYSICS PERSONNEL	7	0	4	11	0.029	0.000	0.006	0.035
SUPERVISORY PERSONNEL	9	0	28	37	0.419	0.000	6.367	6.786
ENGINEERING PERSONNEL	1	0	0	1	0.006	0.000	0.000	0.006
TOTAL	24	0	79	103	0.897	0.000	8.932	9.829
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	51	0	22	73	0.745	0.000	1.009	1.754
OPERATIONS PERSONNEL	0	0	1	1	0.000	0.000	1.095	1.095
HEALTH PHYSICS PERSONNEL	4	0	1	5	1.151	0.000	0.017	1.168
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	55	0	24	79	1.896	0.000	2.121	4.017
REFUELING								
MAINTENANCE PERSONNEL	56	0	128	184	0.763	0.000	21.250	22.013
OPERATIONS PERSONNEL	7	0	1	8	0.535	0.000	0.702	1.237
HEALTH PHYSICS PERSONNEL	14	1	20	35	1.122	0.002	2.197	3.321
SUPERVISORY PERSONNEL	7	0	6	13	0.121	0.000	0.869	0.990
ENGINEERING PERSONNEL	7	0	1	8	0.550	0.000	0.057	0.607
TOTAL	91	1	156	248	3.091	0.002	25.075	28.168
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	238	0	711	949	52.878	0.000	175.665	228.543
OPERATIONS PERSONNEL	108	0	11	119	26.813	0.000	3.602	30.415
HEALTH PHYSICS PERSONNEL	82	3	112	197	16.992	0.122	18.283	35.397
SUPERVISORY PERSONNEL	38	0	117	155	3.189	0.000	12.714	15.903
ENGINEERING PERSONNEL	45	0	16	61	3.827	0.000	1.814	5.641
GRAND TOTALS	511	3	967	1481	103.699	0.122	212.078	315.899

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	3	1	0	4	3.350	0.280	0.240	3.870
OPERATIONS PERSONNEL	36	0	1	37	17.970	0.010	0.230	18.210
HEALTH PHYSICS PERSONNEL	14	0	34	48	5.580	0.030	15.030	20.640
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	0	0	1	0.420	0.120	0.240	0.780
TOTAL	54	1	35	90	27.320	0.440	15.740	43.500
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	42	27	100	169	18.140	6.330	43.350	67.820
OPERATIONS PERSONNEL	0	0	1	1	0.340	0.020	0.220	0.580
HEALTH PHYSICS PERSONNEL	7	0	3	10	1.800	0.080	1.730	3.610
SUPERVISORY PERSONNEL	0	0	0	0	0.030	0.000	0.080	0.110
ENGINEERING PERSONNEL	2	1	5	8	0.930	1.020	2.060	4.010
TOTAL	51	28	109	188	21.240	7.450	47.440	76.130
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	10	6	88	104	7.450	2.430	47.030	56.910
OPERATIONS PERSONNEL	0	0	2	2	0.240	0.000	0.490	0.730
HEALTH PHYSICS PERSONNEL	1	0	17	18	0.290	0.000	4.300	4.590
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	3	3	115	121	1.870	1.410	111.980	115.260
TOTAL	14	9	222	245	9.850	3.840	163.800	177.490
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	7	12	96	115	2.310	3.130	30.240	35.680
OPERATIONS PERSONNEL	0	0	1	1	0.070	0.000	0.200	0.270
HEALTH PHYSICS PERSONNEL	3	0	1	4	0.650	0.000	0.810	1.460
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.290	0.290
ENGINEERING PERSONNEL	1	1	8	10	0.620	0.640	1.640	2.900
TOTAL	11	13	107	131	3.650	3.770	33.180	40.600
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	1	1	0.010	0.000	0.100	0.110
OPERATIONS PERSONNEL	0	0	0	0	0.040	0.000	0.000	0.040
HEALTH PHYSICS PERSONNEL	12	0	20	32	7.110	0.000	8.130	15.240
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.040	0.000	0.040
TOTAL	12	0	21	33	7.160	0.040	8.230	15.430
REFUELING								
MAINTENANCE PERSONNEL	17	5	61	83	6.830	1.130	34.170	42.130
OPERATIONS PERSONNEL	19	0	0	19	4.310	0.000	0.090	4.400
HEALTH PHYSICS PERSONNEL	8	0	39	47	2.060	0.020	14.610	16.690
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	2	11	13	0.080	0.480	5.570	6.130
TOTAL	44	7	111	162	13.280	1.630	54.440	69.350
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	79	51	346	476	38.090	13.300	155.130	206.520
OPERATIONS PERSONNEL	55	0	5	60	22.970	0.030	1.230	24.230
HEALTH PHYSICS PERSONNEL	45	0	114	159	17.490	0.130	44.610	62.230
SUPERVISORY PERSONNEL	0	0	1	1	0.030	0.000	0.370	0.400
ENGINEERING PERSONNEL	7	7	139	153	3.920	3.710	121.490	129.120
GRAND TOTALS	186	58	605	849	82.500	17.170	322.830	422.500

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	2	0	0	2	0.840	0.000	0.070	0.910
OPERATIONS PERSONNEL	9	0	0	9	3.360	0.000	0.294	3.654
HEALTH PHYSICS PERSONNEL	10	0	0	10	3.240	0.000	0.010	3.250
SUPERVISORY PERSONNEL	0	0	0	0	0.060	0.010	0.020	0.090
ENGINEERING PERSONNEL	0	0	0	0	0.545	0.105	0.235	0.885
TOTAL	21	0	0	21	8.045	0.115	0.629	8.789
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	6	0	0	6	2.851	0.030	1.380	4.261
OPERATIONS PERSONNEL	0	0	0	0	0.020	0.000	0.060	0.080
HEALTH PHYSICS PERSONNEL	5	0	0	5	1.493	0.000	0.000	1.493
SUPERVISORY PERSONNEL	0	0	0	0	0.100	0.000	0.000	0.100
ENGINEERING PERSONNEL	0	0	0	0	0.020	0.000	0.020	0.040
TOTAL	11	0	0	11	4.484	0.030	1.460	5.974
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.030	0.000	0.000	0.030
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	0.030	0.000	0.000	0.030
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	13	0	20	33	4.547	0.000	7.440	11.987
OPERATIONS PERSONNEL	2	0	0	2	0.700	0.000	0.160	0.860
HEALTH PHYSICS PERSONNEL	6	0	1	7	1.990	0.000	0.185	2.175
SUPERVISORY PERSONNEL	0	0	0	0	0.030	0.000	0.000	0.030
ENGINEERING PERSONNEL	0	0	0	0	0.160	0.040	0.020	0.220
TOTAL	21	0	21	42	7.427	0.040	7.805	15.272
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.275	0.275
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	3	0	0	3	1.030	0.000	0.000	1.030
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	1	1	0.000	0.000	0.650	0.650
TOTAL	3	0	1	4	1.030	0.000	0.925	1.955
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	21	0	20	41	8.238	0.030	9.165	17.433
OPERATIONS PERSONNEL	11	0	0	11	4.110	0.000	0.514	4.624
HEALTH PHYSICS PERSONNEL	24	0	1	25	7.753	0.000	0.195	7.948
SUPERVISORY PERSONNEL	0	0	0	0	0.190	0.010	0.020	0.220
ENGINEERING PERSONNEL	0	0	1	1	0.725	0.145	0.925	1.795
GRAND TOTALS	56	0	22	78	21.016	0.185	10.819	32.020

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	72	2	106	180	30.672	1.217	38.015	69.904
OPERATIONS PERSONNEL	53	1	1	55	24.471	0.799	1.247	26.517
HEALTH PHYSICS PERSONNEL	36	1	18	55	17.521	0.174	6.405	24.100
SUPERVISORY PERSONNEL	16	1	5	22	7.091	0.224	2.477	9.792
ENGINEERING PERSONNEL	12	0	13	25	4.697	0.246	4.017	8.960
TOTAL	189	5	143	337	84.452	2.660	52.161	139.273
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	107	0	133	240	38.050	0.087	48.456	86.593
OPERATIONS PERSONNEL	30	0	0	30	15.210	0.000	0.076	15.286
HEALTH PHYSICS PERSONNEL	31	0	25	56	14.417	0.000	6.851	21.268
SUPERVISORY PERSONNEL	6	0	3	9	3.600	0.031	1.379	5.010
ENGINEERING PERSONNEL	10	1	9	20	3.657	0.348	4.021	8.026
TOTAL	184	1	170	355	74.934	0.466	60.783	136.183
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	10	0	147	157	5.444	0.000	61.165	66.609
OPERATIONS PERSONNEL	8	0	0	8	2.063	0.000	0.059	2.122
HEALTH PHYSICS PERSONNEL	4	0	5	9	1.073	0.000	1.489	2.562
SUPERVISORY PERSONNEL	1	0	2	3	0.338	0.000	1.063	1.401
ENGINEERING PERSONNEL	3	1	10	14	0.934	0.139	4.804	5.877
TOTAL	26	1	164	191	9.852	0.139	68.580	78.571
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	110	3	255	368	52.835	2.204	110.460	165.499
OPERATIONS PERSONNEL	10	0	0	10	3.335	0.000	0.059	3.394
HEALTH PHYSICS PERSONNEL	17	1	25	43	7.168	0.461	12.241	19.870
SUPERVISORY PERSONNEL	5	0	2	7	1.577	0.000	1.435	3.012
ENGINEERING PERSONNEL	5	0	20	25	2.733	0.087	8.143	10.963
TOTAL	147	4	302	453	67.648	2.752	132.338	202.738
WASTE PROCESSING								
MAINTENANCE PERSONNEL	30	0	62	92	12.383	0.000	19.475	31.858
OPERATIONS PERSONNEL	8	0	0	8	1.624	0.000	0.059	1.683
HEALTH PHYSICS PERSONNEL	6	0	19	25	2.571	0.000	7.838	10.409
SUPERVISORY PERSONNEL	1	0	0	1	0.216	0.000	0.484	0.700
ENGINEERING PERSONNEL	0	0	2	2	0.170	0.034	0.679	0.883
TOTAL	45	0	83	128	16.964	0.034	28.535	45.533
REFUELING								
MAINTENANCE PERSONNEL	9	0	126	135	3.174	0.000	47.517	50.691
OPERATIONS PERSONNEL	16	0	0	16	4.655	0.000	0.059	4.714
HEALTH PHYSICS PERSONNEL	7	0	14	21	2.284	0.000	5.239	7.523
SUPERVISORY PERSONNEL	1	0	2	3	0.434	0.000	1.006	1.440
ENGINEERING PERSONNEL	0	0	8	8	0.147	0.034	2.802	2.983
TOTAL	33	0	150	183	10.694	0.034	56.623	67.351
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	338	5	829	1172	142.558	3.508	325.088	471.154
OPERATIONS PERSONNEL	125	1	1	127	51.358	0.799	1.559	53.716
HEALTH PHYSICS PERSONNEL	101	2	106	209	45.034	0.635	40.063	85.732
SUPERVISORY PERSONNEL	30	1	14	45	13.256	0.255	7.844	21.355
ENGINEERING PERSONNEL	30	2	62	94	12.338	0.888	24.466	37.692
GRAND TOTALS	624	11	1012	1647	264.544	6.085	399.020	669.649

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	13	0	2	15	3.067	0.301	1.007	4.375
OPERATIONS PERSONNEL	53	0	0	53	15.388	0.093	0.103	15.584
HEALTH PHYSICS PERSONNEL	1	0	0	1	1.226	0.020	0.039	1.285
SUPERVISORY PERSONNEL	0	0	0	0	0.063	0.002	0.001	0.066
ENGINEERING PERSONNEL	0	2	0	2	0.082	0.653	0.016	0.751
TOTAL	67	2	2	71	19.826	1.069	1.166	22.061
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	5	0	0	5	4.082	0.261	0.115	4.458
OPERATIONS PERSONNEL	2	0	0	2	0.796	0.176	0.007	0.979
HEALTH PHYSICS PERSONNEL	5	0	0	5	2.160	0.041	0.008	2.209
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.004	0.001	0.005
ENGINEERING PERSONNEL	0	0	0	0	0.035	0.010	0.002	0.047
TOTAL	12	0	0	12	7.073	0.492	0.133	7.698
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.143	0.105	0.344	0.592
OPERATIONS PERSONNEL	0	0	0	0	0.018	0.071	0.001	0.090
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.099	0.006	0.000	0.105
SUPERVISORY PERSONNEL	0	0	0	0	0.004	0.000	0.000	0.004
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.060	0.000	0.060
TOTAL	0	0	0	0	0.264	0.242	0.345	0.851
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	81	3	15	99	30.029	1.760	5.479	37.268
OPERATIONS PERSONNEL	31	0	3	34	10.015	0.065	0.585	10.665
HEALTH PHYSICS PERSONNEL	23	1	0	24	6.159	0.134	0.192	6.485
SUPERVISORY PERSONNEL	0	0	0	0	0.218	0.000	0.001	0.219
ENGINEERING PERSONNEL	1	2	1	4	0.246	0.714	0.305	1.265
TOTAL	136	6	19	161	46.667	2.673	6.562	55.902
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.211	0.199	0.003	0.413
OPERATIONS PERSONNEL	4	0	0	4	1.043	0.089	0.000	1.132
HEALTH PHYSICS PERSONNEL	10	0	0	10	4.623	0.009	0.000	4.632
SUPERVISORY PERSONNEL	0	0	0	0	0.132	0.000	0.000	0.132
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.402	0.005	0.407
TOTAL	14	0	0	14	6.009	0.699	0.008	6.716
REFUELING								
MAINTENANCE PERSONNEL	8	0	0	8	2.678	0.051	0.183	2.912
OPERATIONS PERSONNEL	0	0	0	0	0.615	0.004	0.019	0.638
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.177	0.000	0.000	0.177
SUPERVISORY PERSONNEL	0	0	0	0	0.014	0.000	0.000	0.014
ENGINEERING PERSONNEL	0	0	0	0	0.008	0.173	0.000	0.181
TOTAL	8	0	0	8	3.492	0.228	0.202	3.922
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	107	3	17	127	40.210	2.677	7.131	50.018
OPERATIONS PERSONNEL	90	0	3	93	27.875	0.498	0.715	29.088
HEALTH PHYSICS PERSONNEL	39	1	0	40	14.444	0.210	0.239	14.893
SUPERVISORY PERSONNEL	0	0	0	0	0.431	0.006	0.003	0.440
ENGINEERING PERSONNEL	1	4	1	6	0.371	2.012	0.328	2.711
GRAND TOTALS	237	8	21	266	83.331	5.403	8.416	97.150

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

PLANT: *INDIAN POINT 2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	57	12	128	197	14.352	0.588	32.878	47.818
OPERATIONS PERSONNEL	47	0	0	47	20.920	0.000	0.000	20.920
HEALTH PHYSICS PERSONNEL	15	0	11	26	5.574	0.000	4.638	10.212
SUPERVISORY PERSONNEL	9	1	0	10	1.199	0.045	0.000	1.244
ENGINEERING PERSONNEL	9	0	1	10	0.817	0.000	0.695	1.512
TOTAL	137	13	140	290	42.862	0.633	38.211	81.706
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	60	49	127	236	2.033	1.852	6.899	10.784
OPERATIONS PERSONNEL	3	0	0	3	0.131	0.000	0.000	0.131
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.055	0.000	0.000	0.055
SUPERVISORY PERSONNEL	1	0	1	2	0.070	0.000	0.026	0.096
ENGINEERING PERSONNEL	1	5	1	7	0.070	0.885	0.105	1.060
TOTAL	66	54	129	249	2.359	2.737	7.030	12.126
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	42	40	153	235	1.792	0.870	12.625	15.287
OPERATIONS PERSONNEL	2	0	0	2	0.024	0.000	0.000	0.024
HEALTH PHYSICS PERSONNEL	1	0	1	2	0.005	0.000	0.080	0.085
SUPERVISORY PERSONNEL	1	1	1	3	0.185	0.152	0.118	0.455
ENGINEERING PERSONNEL	4	0	0	4	0.317	0.000	0.000	0.317
TOTAL	50	41	155	246	2.323	1.022	12.823	16.168
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	161	151	615	927	66.128	56.822	398.559	521.509
OPERATIONS PERSONNEL	48	0	0	48	5.840	0.000	0.000	5.840
HEALTH PHYSICS PERSONNEL	14	0	8	22	2.704	0.000	1.427	4.131
SUPERVISORY PERSONNEL	6	3	5	14	1.029	0.743	2.017	3.789
ENGINEERING PERSONNEL	12	0	2	14	3.551	0.000	1.218	4.769
TOTAL	241	154	630	1025	79.252	57.565	403.221	540.038
WASTE PROCESSING								
MAINTENANCE PERSONNEL	59	19	175	253	3.916	0.596	23.056	27.568
OPERATIONS PERSONNEL	3	0	0	3	0.124	0.000	0.000	0.124
HEALTH PHYSICS PERSONNEL	9	0	11	20	0.411	0.000	1.226	1.637
SUPERVISORY PERSONNEL	4	1	0	5	0.185	0.086	0.000	0.271
ENGINEERING PERSONNEL	6	0	0	6	0.731	0.000	0.000	0.731
TOTAL	81	20	186	287	5.367	0.682	24.282	30.331
REFUELING								
MAINTENANCE PERSONNEL	27	32	146	205	3.731	5.152	23.940	32.823
OPERATIONS PERSONNEL	11	0	0	11	0.778	0.000	0.000	0.778
HEALTH PHYSICS PERSONNEL	8	0	8	16	0.268	0.000	0.978	1.246
SUPERVISORY PERSONNEL	6	1	1	8	0.369	0.122	0.325	0.816
ENGINEERING PERSONNEL	4	0	1	5	2.045	0.000	0.005	2.050
TOTAL	56	33	156	245	7.191	5.274	25.248	37.713
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	406(181)	303(156)	1344 (659)	2053 (996)	91.952	65.880	497.957	655.789
OPERATIONS PERSONNEL	114 (56)	0 (0)	0 (0)	114 (56)	27.817	0.000	0.000	27.817
HEALTH PHYSICS PERSONNEL	48 (15)	0 (0)	39 (12)	87 (27)	9.017	0.000	8.349	17.366
SUPERVISORY PERSONNEL	27 (13)	7 (3)	8 (5)	42 (21)	3.037	1.148	2.486	6.671
ENGINEERING PERSONNEL	36 (15)	5 (5)	5 (4)	46 (24)	7.531	0.885	2.023	10.439
GRAND TOTALS	631(280)	315(164)	1396 (680)	2342 (1124)	139.354	67.913	510.815	718.082

*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

1993

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	1	0	0	1	0.120	0.000	0.000	0.120
OPERATIONS PERSONNEL	42	0	0	42	6.940	0.000	0.000	6.940
HEALTH PHYSICS PERSONNEL	25	0	5	30	6.460	0.000	0.790	7.250
SUPERVISORY PERSONNEL	1	0	0	1	0.100	0.000	0.000	0.100
ENGINEERING PERSONNEL	2	1	0	3	0.200	0.110	0.000	0.310
TOTAL	71	1	5	77	13.820	0.110	0.790	14.720
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	10	0	10	20	1.000	0.000	1.180	2.180
OPERATIONS PERSONNEL	8	0	0	8	1.260	0.000	0.000	1.260
HEALTH PHYSICS PERSONNEL	1	0	1	2	1.000	0.000	0.100	1.100
SUPERVISORY PERSONNEL	1	0	0	1	1.000	0.000	0.000	1.000
ENGINEERING PERSONNEL	0	4	1	5	0.000	0.480	0.110	0.590
TOTAL	20	4	12	36	4.260	0.480	1.390	6.130
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	2	2	0.000	0.000	0.200	0.200
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	2	2	0.000	0.000	0.200	0.200
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	35	0	55	90	5.810	0.000	8.850	14.660
OPERATIONS PERSONNEL	2	0	0	2	0.370	0.000	0.000	0.370
HEALTH PHYSICS PERSONNEL	3	0	0	3	0.500	0.000	0.000	0.500
SUPERVISORY PERSONNEL	4	0	1	5	0.610	0.000	0.100	0.710
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	44	0	56	100	7.290	0.000	8.950	16.240
WASTE PROCESSING								
MAINTENANCE PERSONNEL	4	0	4	8	0.620	0.000	0.830	1.450
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	4	0	4	8	0.620	0.000	0.830	1.450
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	50	0	69	119	7.550	0.000	10.860	18.410
OPERATIONS PERSONNEL	52	0	2	54	8.570	0.000	0.200	8.770
HEALTH PHYSICS PERSONNEL	29	0	6	35	7.960	0.000	0.890	8.850
SUPERVISORY PERSONNEL	6	0	1	7	1.710	0.000	0.100	1.810
ENGINEERING PERSONNEL	2	5	1	8	0.200	0.590	0.110	0.900
GRAND TOTALS	139	5	79	223	25.990	0.590	12.160	38.740

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	0	0	0	0	0.013	0.000	0.022	0.035
OPERATIONS PERSONNEL	3	0	0	3	1.868	0.000	0.000	1.868
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.029	0.000	0.000	0.029
ENGINEERING PERSONNEL	0	0	0	0	0.016	0.000	0.000	0.016
TOTAL	3	0	0	3	1.926	0.000	0.022	1.948
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	7	4	25	36	4.083	1.673	9.704	15.460
OPERATIONS PERSONNEL	2	1	3	6	0.930	0.141	0.911	1.982
HEALTH PHYSICS PERSONNEL	10	0	19	29	5.186	0.000	5.513	10.699
SUPERVISORY PERSONNEL	1	0	0	1	0.199	0.000	0.000	0.199
ENGINEERING PERSONNEL	0	0	1	1	0.010	0.000	0.278	0.288
TOTAL	20	5	48	73	10.408	1.814	16.406	28.628
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	12	12	0.002	0.005	3.330	3.337
OPERATIONS PERSONNEL	0	0	5	5	0.000	0.000	2.034	2.034
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	0.232	0.000	0.000	0.232
TOTAL	1	0	17	18	0.234	0.005	5.364	5.603
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	25	4	76	105	10.130	1.477	38.845	50.452
OPERATIONS PERSONNEL	1	0	0	1	0.246	0.000	0.016	0.262
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.259	0.000	0.064	0.323
SUPERVISORY PERSONNEL	3	0	0	3	0.713	0.000	0.000	0.713
ENGINEERING PERSONNEL	6	0	1	7	2.043	0.000	0.118	2.161
TOTAL	35	4	77	116	13.391	1.477	39.043	53.911
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.145	0.000	0.012	0.157
OPERATIONS PERSONNEL	1	0	0	1	0.671	0.000	0.000	0.671
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.091	0.000	0.000	0.091
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	1	0	0	1	0.907	0.000	0.012	0.919
REFUELING								
MAINTENANCE PERSONNEL	7	7	0	14	4.072	2.619	0.000	6.691
OPERATIONS PERSONNEL	1	0	0	1	0.517	0.000	0.000	0.517
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.177	0.000	0.000	0.177
ENGINEERING PERSONNEL	1	0	0	1	0.329	0.000	0.000	0.329
TOTAL	9	7	0	16	5.095	2.619	0.000	7.714
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	39	15	113	167	18.445	5.774	51.913	76.132
OPERATIONS PERSONNEL	8	1	8	17	4.232	0.141	2.961	7.334
HEALTH PHYSICS PERSONNEL	10	0	19	29	5.536	0.000	5.577	11.113
SUPERVISORY PERSONNEL	4	0	0	4	1.118	0.000	0.000	1.118
ENGINEERING PERSONNEL	8	0	2	10	2.630	0.000	0.396	3.026
GRAND TOTALS	69	16	142	227	31.961	5.915	60.847	98.723

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	27	9	85	121	29.944	0.340	27.558	57.842
OPERATIONS PERSONNEL	98	0	92	190	59.203	0.000	8.842	68.045
HEALTH PHYSICS PERSONNEL	37	0	3	40	28.011	0.000	0.746	28.757
SUPERVISORY PERSONNEL	100	82	21	203	17.264	0.770	3.328	21.362
ENGINEERING PERSONNEL	80	103	67	250	23.360	1.231	3.195	27.786
TOTAL	342	194	268	804	157.782	2.341	43.669	203.792
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	151	8	783	942	168.216	0.318	252.928	421.462
OPERATIONS PERSONNEL	48	0	0	48	28.644	0.000	0.000	28.644
HEALTH PHYSICS PERSONNEL	45	0	48	93	33.951	0.000	10.324	44.275
SUPERVISORY PERSONNEL	135	6	15	156	23.473	0.059	2.422	25.954
ENGINEERING PERSONNEL	41	49	14	104	12.079	0.583	0.659	13.321
TOTAL	420	63	860	1343	266.363	0.960	266.333	533.656
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	84	32	116	0.210	3.314	10.237	13.761
OPERATIONS PERSONNEL	0	0	0	0	0.249	0.000	0.000	0.249
HEALTH PHYSICS PERSONNEL	0	0	3	3	0.101	0.000	0.727	0.828
SUPERVISORY PERSONNEL	1	0	0	1	0.112	0.001	0.037	0.150
ENGINEERING PERSONNEL	2	23	0	25	0.658	0.273	0.000	0.931
TOTAL	3	107	35	145	1.330	3.588	11.001	15.919
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	6	7	159	172	6.800	0.265	51.524	58.589
OPERATIONS PERSONNEL	2	0	0	2	1.299	0.000	0.000	1.299
HEALTH PHYSICS PERSONNEL	2	0	3	5	1.464	0.000	0.497	1.961
SUPERVISORY PERSONNEL	12	2	13	27	2.035	0.017	2.054	4.106
ENGINEERING PERSONNEL	11	10	4	25	3.163	0.118	0.197	3.478
TOTAL	33	19	179	231	14.761	0.400	54.272	69.433
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	11	11	0.117	0.000	3.405	3.522
OPERATIONS PERSONNEL	17	0	66	83	9.970	0.000	6.403	16.373
HEALTH PHYSICS PERSONNEL	3	0	0	3	2.387	0.000	0.000	2.387
SUPERVISORY PERSONNEL	8	0	0	8	1.375	0.000	0.000	1.375
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	28	0	77	105	13.849	0.000	9.808	23.657
REFUELING								
MAINTENANCE PERSONNEL	0	0	7	7	0.063	0.000	2.282	2.345
OPERATIONS PERSONNEL	6	0	0	6	3.609	0.000	0.000	3.609
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.454	0.000	0.000	0.454
SUPERVISORY PERSONNEL	5	1	0	6	0.886	0.007	0.011	0.904
ENGINEERING PERSONNEL	0	1	0	1	0.070	0.010	0.000	0.080
TOTAL	12	2	7	21	5.082	0.017	2.293	7.392
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	184	108	1077	1369	205.350	4.237	347.934	557.521
OPERATIONS PERSONNEL	171	0	158	329	102.974	0.000	15.245	118.219
HEALTH PHYSICS PERSONNEL	88	0	57	145	66.368	0.000	12.294	78.662
SUPERVISORY PERSONNEL	261	91	49	401	45.145	0.854	7.852	53.851
ENGINEERING PERSONNEL	134	186	85	405	39.330	2.215	4.051	45.596
GRAND TOTALS	838	385	1426	2649	459.167	7.306	387.376	853.849

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	1867	91	147	2105	5.942	2.217	4.203	12.362
OPERATIONS PERSONNEL	135	17	52	204	8.291	0.302	1.386	9.979
HEALTH PHYSICS PERSONNEL	33	1	53	87	5.247	0.008	2.363	7.618
SUPERVISORY PERSONNEL	3	5	3	11	0.049	0.103	0.023	0.175
ENGINEERING PERSONNEL	35	28	22	85	1.427	0.638	0.595	2.660
TOTAL	2073	142	277	2492	20.956	3.268	8.570	32.794
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	57	61	125	243	3.442	1.078	1.774	6.294
OPERATIONS PERSONNEL	26	6	20	52	0.627	0.076	0.463	1.166
HEALTH PHYSICS PERSONNEL	18	0	29	47	0.454	0.000	1.033	1.487
SUPERVISORY PERSONNEL	0	1	1	2	0.000	0.002	0.005	0.007
ENGINEERING PERSONNEL	11	6	16	33	0.223	0.047	0.138	0.408
TOTAL	112	74	191	377	4.746	1.203	3.413	9.362
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	2	2	0.000	0.000	0.010	0.010
OPERATIONS PERSONNEL	1	0	2	3	0.006	0.000	0.025	0.031
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.006	0.000	0.000	0.006
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	1	1	0.000	0.000	0.055	0.055
TOTAL	2	0	5	7	0.012	0.000	0.090	0.102
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	80	64	142	286	7.278	1.966	9.329	18.573
OPERATIONS PERSONNEL	38	14	12	64	1.880	0.300	0.496	2.676
HEALTH PHYSICS PERSONNEL	28	0	42	70	1.544	0.000	1.421	2.965
SUPERVISORY PERSONNEL	0	0	2	2	0.000	0.000	0.045	0.045
ENGINEERING PERSONNEL	15	6	28	49	0.866	0.349	1.756	2.971
TOTAL	161	84	226	471	11.568	2.615	13.047	27.230
WASTE PROCESSING								
MAINTENANCE PERSONNEL	36	8	56	100	2.037	0.380	1.535	3.952
OPERATIONS PERSONNEL	48	4	14	66	1.279	0.025	0.295	1.599
HEALTH PHYSICS PERSONNEL	26	0	25	51	1.755	0.000	1.865	3.620
SUPERVISORY PERSONNEL	1	0	0	1	0.134	0.000	0.000	0.134
ENGINEERING PERSONNEL	10	2	12	24	0.084	1.165	0.000	1.249
TOTAL	121	14	107	242	5.289	1.570	3.695	10.554
REFUELING								
MAINTENANCE PERSONNEL	139	131	363	633	15.212	20.359	57.285	92.856
OPERATIONS PERSONNEL	136	26	71	233	6.624	3.218	5.807	15.649
HEALTH PHYSICS PERSONNEL	33	3	85	121	1.714	0.331	10.905	12.950
SUPERVISORY PERSONNEL	4	5	11	20	0.041	1.003	1.548	2.592
ENGINEERING PERSONNEL	48	34	72	154	2.097	1.999	9.031	13.127
TOTAL	360	199	602	1161	25.688	26.910	84.576	137.174
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	2179(279)	355(348)	835 (757)	3369 (1384)	33.911	26.000	74.136	134.047
OPERATIONS PERSONNEL	384(404)	67(124)	171 (301)	622 (829)	18.707	3.921	8.472	31.100
HEALTH PHYSICS PERSONNEL	139 (79)	4 (18)	234 (138)	377 (235)	10.720	0.339	17.587	28.646
SUPERVISORY PERSONNEL	8 (29)	11 (36)	17 (106)	36 (171)	0.224	1.108	1.621	2.953
ENGINEERING PERSONNEL	119(172)	76(263)	151 (237)	346 (672)	4.697	4.198	11.575	20.470
GRAND TOTALS	2829(963)	513(789)	1408 (1539)	4750 (3291)	68.259	35.566	113.391	217.216

*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

1993

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	3	0	4	7	1.456	0.000	5.140	6.596
OPERATIONS PERSONNEL	48	0	48	96	17.004	0.000	19.288	36.292
HEALTH PHYSICS PERSONNEL	23	0	48	71	10.524	0.000	22.450	32.974
SUPERVISORY PERSONNEL	1	0	1	2	0.721	0.000	0.755	1.476
ENGINEERING PERSONNEL	15	0	4	19	5.765	0.000	3.165	8.930
TOTAL	90	0	105	195	35.470	0.000	50.798	86.268
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	32	0	184	216	11.605	0.000	78.308	89.913
OPERATIONS PERSONNEL	16	0	19	35	6.280	0.000	7.067	13.347
HEALTH PHYSICS PERSONNEL	4	0	5	9	1.630	0.000	1.800	3.430
SUPERVISORY PERSONNEL	3	0	9	12	1.075	0.000	6.196	7.271
ENGINEERING PERSONNEL	8	0	87	95	3.263	0.000	73.988	77.251
TOTAL	63	0	304	367	23.853	0.000	167.359	191.212
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	11	12	0.115	0.000	8.305	8.420
OPERATIONS PERSONNEL	0	0	3	3	0.095	0.000	1.950	2.045
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.005	0.000	0.560	0.565
SUPERVISORY PERSONNEL	0	0	3	3	0.000	0.000	1.825	1.825
ENGINEERING PERSONNEL	1	0	19	20	0.289	0.000	9.255	9.544
TOTAL	2	0	37	39	0.504	0.000	21.895	22.399
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	11	0	48	59	3.743	0.000	16.670	20.413
OPERATIONS PERSONNEL	3	0	8	11	1.245	0.000	3.155	4.400
HEALTH PHYSICS PERSONNEL	1	0	6	7	0.505	0.000	2.380	2.885
SUPERVISORY PERSONNEL	0	0	14	14	0.080	0.000	6.250	6.330
ENGINEERING PERSONNEL	8	0	125	133	2.285	0.000	58.530	60.815
TOTAL	23	0	201	224	7.858	0.000	86.985	94.843
WASTE PROCESSING								
MAINTENANCE PERSONNEL	5	0	2	7	1.197	0.000	0.625	1.822
OPERATIONS PERSONNEL	1	0	1	2	0.560	0.000	0.250	0.810
HEALTH PHYSICS PERSONNEL	3	0	2	5	1.628	0.000	0.375	2.003
SUPERVISORY PERSONNEL	0	0	0	0	0.075	0.000	0.110	0.185
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.115	0.115
TOTAL	9	0	5	14	3.460	0.000	1.475	4.935
REFUELING								
MAINTENANCE PERSONNEL	12	0	77	89	4.085	0.000	26.031	30.116
OPERATIONS PERSONNEL	9	0	3	12	2.814	0.000	0.958	3.772
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.005	0.000	0.015	0.020
SUPERVISORY PERSONNEL	1	0	1	2	0.390	0.000	0.705	1.095
ENGINEERING PERSONNEL	4	0	16	20	0.830	0.000	4.836	5.666
TOTAL	26	0	97	123	8.124	0.000	32.545	40.669
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	64	0	326	390	22.201	0.000	135.079	157.280
OPERATIONS PERSONNEL	77	0	82	159	27.998	0.000	32.668	60.666
HEALTH PHYSICS PERSONNEL	31	0	62	93	14.297	0.000	27.580	41.877
SUPERVISORY PERSONNEL	5	0	28	33	2.341	0.000	15.841	18.182
ENGINEERING PERSONNEL	36	0	251	287	12.432	0.000	149.889	162.321
GRAND TOTALS	213	0	749	962	79.269	0.000	361.057	440.326

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

PLANT: *MCGUIRE 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	234	391	17	642	6.000	1.333	0.029	7.362
OPERATIONS PERSONNEL	58	5	30	93	2.493	0.081	1.618	4.192
HEALTH PHYSICS PERSONNEL	32	0	76	108	2.161	0.000	1.705	3.866
SUPERVISORY PERSONNEL	11	9	0	20	0.017	0.002	0.000	0.019
ENGINEERING PERSONNEL	15	9	79	103	0.093	0.023	0.124	0.240
TOTAL	350	414	202	966	10.764	1.439	3.476	15.679
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	239	399	19	657	91.503	225.408	5.165	322.076
OPERATIONS PERSONNEL	58	6	33	97	9.329	1.161	14.122	24.612
HEALTH PHYSICS PERSONNEL	32	0	77	109	9.568	0.000	23.919	33.487
SUPERVISORY PERSONNEL	12	9	1	22	3.909	1.083	0.101	5.093
ENGINEERING PERSONNEL	15	9	86	110	3.017	2.384	33.139	38.540
TOTAL	356	423	216	995	117.326	230.036	76.446	423.808
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	60	91	1	152	1.794	2.724	0.048	4.566
OPERATIONS PERSONNEL	2	0	6	8	0.001	0.000	0.038	0.039
HEALTH PHYSICS PERSONNEL	15	0	23	38	0.398	0.000	0.145	0.543
SUPERVISORY PERSONNEL	1	1	0	2	0.000	0.002	0.000	0.002
ENGINEERING PERSONNEL	1	4	9	14	0.000	0.013	0.289	0.302
TOTAL	79	96	39	214	2.193	2.739	0.520	5.452
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	120	119	2	241	1.565	4.278	0.002	5.845
OPERATIONS PERSONNEL	0	1	11	12	0.000	0.000	0.049	0.049
HEALTH PHYSICS PERSONNEL	12	0	15	27	0.333	0.000	0.096	0.429
SUPERVISORY PERSONNEL	0	1	0	1	0.000	0.002	0.000	0.002
ENGINEERING PERSONNEL	4	3	2	9	0.000	0.032	0.188	0.220
TOTAL	136	124	30	290	1.898	4.312	0.335	6.545
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	3	0	4	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	1	0	29	30	0.000	0.000	0.116	0.116
HEALTH PHYSICS PERSONNEL	4	0	0	4	0.013	0.000	0.000	0.013
SUPERVISORY PERSONNEL	1	0	0	1	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	7	3	29	39	0.013	0.000	0.116	0.129
REFUELING								
MAINTENANCE PERSONNEL	23	40	0	63	0.115	0.108	0.000	0.223
OPERATIONS PERSONNEL	0	0	2	2	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	10	0	14	24	0.000	0.000	0.010	0.010
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	0	8	9	0.000	0.000	0.038	0.038
TOTAL	34	40	24	98	0.115	0.108	0.048	0.271
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	677(239)	1043(408)	39 (19)	1759 (666)	100.977	233.851	5.244	340.072
OPERATIONS PERSONNEL	119 (58)	12 (6)	111 (33)	242 (97)	11.823	1.242	15.943	29.008
HEALTH PHYSICS PERSONNEL	105 (32)	0 (0)	205 (77)	310 (109)	12.473	0.000	25.875	38.348
SUPERVISORY PERSONNEL	25 (12)	20 (10)	1 (1)	46 (23)	3.926	1.089	0.101	5.116
ENGINEERING PERSONNEL	36 (15)	25 (9)	184 (87)	245 (111)	3.110	2.452	33.778	39.340
GRAND TOTALS	962(356)	1100(433)	540 (217)	2602 (1006)	132.309	238.634	80.941	451.884

*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

1993

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	10	0	2	12	3.410	0.350	1.700	5.460
OPERATIONS PERSONNEL	24	1	1	26	6.450	0.200	1.530	8.180
HEALTH PHYSICS PERSONNEL	17	0	5	22	5.210	0.000	1.660	6.870
SUPERVISORY PERSONNEL	0	0	0	0	0.010	0.000	0.010	0.020
ENGINEERING PERSONNEL	0	0	1	1	0.060	0.110	0.300	0.470
TOTAL	51	1	9	61	15.140	0.660	5.200	21.000
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	0.270	0.040	0.050	0.360
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.250	0.000	0.110	0.360
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.050	0.000	0.000	0.050
TOTAL	0	0	0	0	0.570	0.040	0.160	0.770
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.070	0.000	0.160	0.230
OPERATIONS PERSONNEL	0	0	0	0	0.060	0.000	0.000	0.060
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.100	0.000	0.010	0.110
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	1	0	2	0.200	0.280	0.240	0.720
TOTAL	1	1	0	2	0.430	0.280	0.410	1.120
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	34	0	27	61	11.970	0.180	11.990	24.140
OPERATIONS PERSONNEL	1	0	3	4	1.300	0.000	0.640	1.940
HEALTH PHYSICS PERSONNEL	14	0	4	18	4.110	0.000	1.810	5.920
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.010	0.010
ENGINEERING PERSONNEL	2	5	6	13	0.500	1.590	2.130	4.220
TOTAL	51	5	40	96	17.880	1.770	16.580	36.230
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.040	0.000	0.220	0.260
OPERATIONS PERSONNEL	1	0	1	2	0.350	0.010	0.180	0.540
HEALTH PHYSICS PERSONNEL	3	0	8	11	1.460	0.000	2.350	3.810
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.050	0.000	0.050
TOTAL	4	0	9	13	1.850	0.060	2.750	4.660
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	44	0	29	73	15.760	0.570	14.120	30.450
OPERATIONS PERSONNEL	26	1	5	32	8.160	0.210	2.350	10.720
HEALTH PHYSICS PERSONNEL	34	0	17	51	11.130	0.000	5.940	17.070
SUPERVISORY PERSONNEL	0	0	0	0	0.010	0.000	0.020	0.030
ENGINEERING PERSONNEL	3	6	7	16	0.810	2.030	2.670	5.510
GRAND TOTALS	107	7	58	172	35.870	2.810	25.100	63.780

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	10	0	3	13	3.670	0.580	2.000	6.250
OPERATIONS PERSONNEL	49	2	0	51	13.870	0.300	0.230	14.400
HEALTH PHYSICS PERSONNEL	36	1	15	52	9.860	3.990	5.960	19.810
SUPERVISORY PERSONNEL	0	0	0	0	0.080	0.010	0.020	0.110
ENGINEERING PERSONNEL	3	1	0	4	1.160	0.270	0.200	1.630
TOTAL	98	4	18	120	28.640	5.150	8.410	42.200
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	72	8	352	432	31.730	181.540	183.820	397.090
OPERATIONS PERSONNEL	24	1	4	29	6.450	1.500	1.620	9.570
HEALTH PHYSICS PERSONNEL	36	3	69	108	22.070	26.660	27.030	75.760
SUPERVISORY PERSONNEL	0	0	2	2	0.010	0.520	0.520	1.050
ENGINEERING PERSONNEL	8	9	55	72	3.830	25.480	25.340	54.650
TOTAL	140	21	482	643	64.090	235.700	238.330	538.120
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	48	48	0.000	20.400	20.400	40.800
OPERATIONS PERSONNEL	0	0	0	0	0.030	0.000	0.000	0.030
HEALTH PHYSICS PERSONNEL	1	1	3	5	0.440	1.160	1.170	2.770
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	1	10	11	0.110	4.090	4.100	8.300
TOTAL	1	2	61	64	0.580	25.650	25.670	51.900
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	26	0	18	44	8.540	4.790	8.250	21.580
OPERATIONS PERSONNEL	30	0	2	32	10.010	0.620	0.560	11.190
HEALTH PHYSICS PERSONNEL	7	2	19	28	3.020	11.670	11.696	26.386
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.010	0.010	0.020
ENGINEERING PERSONNEL	2	1	8	11	1.000	0.880	2.250	4.130
TOTAL	65	3	47	115	22.570	17.970	22.766	63.306
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	3	3	0.290	0.680	0.980	1.950
OPERATIONS PERSONNEL	1	0	0	1	0.360	0.000	0.020	0.380
HEALTH PHYSICS PERSONNEL	9	0	18	27	3.410	2.750	4.030	10.190
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.020	0.050	0.010	0.080
TOTAL	10	0	21	31	4.080	3.480	5.040	12.600
REFUELING								
MAINTENANCE PERSONNEL	43	0	77	120	17.810	27.900	31.460	77.170
OPERATIONS PERSONNEL	3	0	2	5	1.410	0.400	0.450	2.260
HEALTH PHYSICS PERSONNEL	23	0	20	43	7.140	4.590	4.700	16.430
SUPERVISORY PERSONNEL	0	0	0	0	0.010	0.010	0.040	0.060
ENGINEERING PERSONNEL	6	0	17	23	1.610	5.760	6.000	13.370
TOTAL	75	0	116	191	27.980	38.660	42.650	109.290
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	151	8	501	660	62.040	235.890	246.910	544.840
OPERATIONS PERSONNEL	107	3	8	118	32.130	2.820	2.880	37.830
HEALTH PHYSICS PERSONNEL	112	7	144	263	45.940	50.820	54.586	151.346
SUPERVISORY PERSONNEL	0	0	2	2	0.100	0.550	0.590	1.240
ENGINEERING PERSONNEL	19	12	90	121	7.730	36.530	37.900	82.160
GRAND TOTALS	389	30	745	1164	147.940	326.610	342.866	817.416

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	40	93	3	136	9.378	28.287	2.421	40.086
OPERATIONS PERSONNEL	45	0	0	45	30.052	0.000	1.320	31.372
HEALTH PHYSICS PERSONNEL	23	0	18	41	10.573	0.000	4.416	14.989
SUPERVISORY PERSONNEL	40	3	10	53	21.642	1.165	3.887	26.694
ENGINEERING PERSONNEL	8	0	0	8	4.868	0.000	0.000	4.868
TOTAL	156	96	31	283	76.513	29.452	12.044	118.009
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	45	240	29	314	25.831	81.861	8.049	115.741
OPERATIONS PERSONNEL	10	0	0	10	3.208	0.000	0.000	3.208
HEALTH PHYSICS PERSONNEL	10	0	16	26	2.906	0.000	4.434	7.340
SUPERVISORY PERSONNEL	6	0	11	17	2.158	0.339	3.669	6.166
ENGINEERING PERSONNEL	0	0	0	0	0.245	0.000	0.000	0.245
TOTAL	71	240	56	367	34.348	82.200	16.152	132.700
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	45	20	66	0.254	15.791	13.233	29.278
OPERATIONS PERSONNEL	0	0	0	0	0.341	0.000	0.000	0.341
HEALTH PHYSICS PERSONNEL	2	0	3	5	0.444	0.000	1.017	1.461
SUPERVISORY PERSONNEL	1	0	32	33	0.320	0.122	23.045	23.487
ENGINEERING PERSONNEL	0	0	0	0	0.026	0.000	0.000	0.026
TOTAL	4	45	55	104	1.385	15.913	37.295	54.593
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	26	144	29	199	12.633	88.667	9.018	110.318
OPERATIONS PERSONNEL	34	0	0	34	11.260	0.000	0.000	11.260
HEALTH PHYSICS PERSONNEL	10	0	21	31	5.876	0.000	10.078	15.954
SUPERVISORY PERSONNEL	19	2	15	36	6.405	1.057	4.226	11.688
ENGINEERING PERSONNEL	8	0	0	8	4.885	0.000	0.000	4.885
TOTAL	97	146	65	308	41.059	89.724	23.322	154.105
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	8	0	8	0.218	2.785	0.059	3.062
OPERATIONS PERSONNEL	0	0	0	0	0.188	0.000	0.000	0.188
HEALTH PHYSICS PERSONNEL	0	0	2	2	0.073	0.000	0.605	0.678
SUPERVISORY PERSONNEL	1	0	8	9	0.241	0.010	2.529	2.780
ENGINEERING PERSONNEL	0	0	0	0	0.005	0.000	0.000	0.005
TOTAL	1	8	10	19	0.725	2.795	3.193	6.713
REFUELING								
MAINTENANCE PERSONNEL	9	30	0	39	2.238	7.293	0.000	9.531
OPERATIONS PERSONNEL	48	0	0	48	14.503	0.000	0.014	14.517
HEALTH PHYSICS PERSONNEL	3	0	3	6	1.257	0.000	1.256	2.513
SUPERVISORY PERSONNEL	2	0	5	7	0.594	0.143	1.159	1.896
ENGINEERING PERSONNEL	0	0	0	0	0.071	0.000	0.000	0.071
TOTAL	62	30	8	100	18.663	7.436	2.429	28.528
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	121	560	81	762	50.552	224.684	32.780	308.016
OPERATIONS PERSONNEL	137	0	0	137	59.552	0.000	1.334	60.886
HEALTH PHYSICS PERSONNEL	48	0	63	111	21.129	0.000	21.806	42.935
SUPERVISORY PERSONNEL	69	5	81	155	31.360	2.836	38.515	72.711
ENGINEERING PERSONNEL	16	0	0	16	10.100	0.000	0.000	10.100
GRAND TOTALS	391	565	225	1181	172.693	227.520	94.435	494.648

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	1734	0	1091	2825	22.129	0.000	13.384	35.513
OPERATIONS PERSONNEL	5127	0	548	5675	38.656	0.000	2.965	41.621
HEALTH PHYSICS PERSONNEL	1936	0	622	2558	13.034	0.000	4.730	17.764
SUPERVISORY PERSONNEL	331	2	38	371	2.308	0.010	0.548	2.866
ENGINEERING PERSONNEL	741	6	261	1008	5.960	0.054	3.819	9.833
TOTAL	9869	8	2560	12437	82.087	0.064	25.446	107.597
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	3785	15	11679	15479	76.033	0.570	230.386	306.989
OPERATIONS PERSONNEL	841	0	123	964	15.360	0.000	1.095	16.455
HEALTH PHYSICS PERSONNEL	1594	0	1537	3131	19.608	0.000	25.549	45.157
SUPERVISORY PERSONNEL	195	4	285	484	3.037	0.024	4.050	7.111
ENGINEERING PERSONNEL	1326	14	1819	3159	13.083	0.165	41.376	54.624
TOTAL	7741	33	15443	23217	127.121	0.759	302.456	430.336
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	73	0	1949	2022	3.384	0.000	65.561	68.945
OPERATIONS PERSONNEL	8	0	1	9	0.046	0.000	0.028	0.074
HEALTH PHYSICS PERSONNEL	15	0	47	62	0.125	0.000	0.586	0.711
SUPERVISORY PERSONNEL	1	0	54	55	0.015	0.000	1.133	1.148
ENGINEERING PERSONNEL	50	0	521	571	0.987	0.000	13.773	14.760
TOTAL	147	0	2572	2719	4.557	0.000	81.081	85.638
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	42	2	3518	3562	0.860	0.055	47.637	48.552
OPERATIONS PERSONNEL	8	0	45	53	0.030	0.000	0.348	0.378
HEALTH PHYSICS PERSONNEL	19	0	21	40	0.162	0.000	0.245	0.407
SUPERVISORY PERSONNEL	3	0	111	114	0.051	0.000	1.140	1.191
ENGINEERING PERSONNEL	59	1	335	395	0.997	0.001	6.733	7.731
TOTAL	131	3	4030	4164	2.100	0.056	56.103	58.259
WASTE PROCESSING								
MAINTENANCE PERSONNEL	371	0	188	559	6.758	0.000	2.268	9.026
OPERATIONS PERSONNEL	1807	0	129	1936	10.415	0.000	1.288	11.703
HEALTH PHYSICS PERSONNEL	250	0	35	285	2.065	0.000	0.367	2.432
SUPERVISORY PERSONNEL	48	0	0	48	0.178	0.000	0.000	0.178
ENGINEERING PERSONNEL	46	0	17	63	0.629	0.000	0.213	0.842
TOTAL	2522	0	369	2891	20.045	0.000	4.136	24.181
REFUELING								
MAINTENANCE PERSONNEL	118	0	1295	1413	4.556	0.000	35.400	39.956
OPERATIONS PERSONNEL	129	0	222	351	0.997	0.000	2.977	3.974
HEALTH PHYSICS PERSONNEL	208	0	158	366	2.246	0.000	1.725	3.971
SUPERVISORY PERSONNEL	9	0	18	27	0.060	0.002	0.314	0.376
ENGINEERING PERSONNEL	198	0	63	261	2.454	0.000	1.238	3.692
TOTAL	662	0	1756	2418	10.313	0.002	41.654	51.969
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	6123 (328)	17 (4)	19720 (1620)	25860 (1952)	113.720	0.625	394.636	508.981
OPERATIONS PERSONNEL	7920 (212)	0 (0)	1068 (59)	8988 (271)	65.504	0.000	8.701	74.205
HEALTH PHYSICS PERSONNEL	4022 (168)	0 (0)	2420 (120)	6442 (288)	37.240	0.000	33.202	70.442
SUPERVISORY PERSONNEL	587 (70)	6 (4)	506 (67)	1099 (141)	5.649	0.036	7.185	12.870
ENGINEERING PERSONNEL	2420 (398)	21 (9)	3016 (409)	5457 (816)	24.110	0.220	67.152	91.482
GRAND TOTALS	21072 (1176)	44 (17)	26730 (2275)	47846 (3468)	246.223	0.881	510.876	757.980

*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

1993

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	96	0	24	120	1.807	0.000	0.276	2.083
OPERATIONS PERSONNEL	101	8	4	113	9.365	0.060	0.001	9.426
HEALTH PHYSICS PERSONNEL	30	0	13	43	0.401	0.000	0.279	0.680
SUPERVISORY PERSONNEL	32	1	1	34	0.328	0.000	0.000	0.328
ENGINEERING PERSONNEL	13	0	0	13	0.282	0.000	0.000	0.282
TOTAL	272	9	42	323	12.183	0.060	0.556	12.799
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	265	9	872	1146	85.201	0.026	153.154	238.381
OPERATIONS PERSONNEL	224	21	32	277	19.543	0.083	0.356	19.982
HEALTH PHYSICS PERSONNEL	103	19	293	415	26.318	0.018	70.103	96.439
SUPERVISORY PERSONNEL	113	15	25	153	6.695	0.024	0.112	6.831
ENGINEERING PERSONNEL	124	70	55	249	8.662	0.881	3.136	12.679
TOTAL	829	134	1277	2240	146.419	1.032	226.861	374.312
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	48	1	152	201	1.142	0.000	42.797	43.939
OPERATIONS PERSONNEL	14	2	3	19	2.520	0.338	0.351	3.209
HEALTH PHYSICS PERSONNEL	13	1	69	83	0.196	0.001	4.374	4.571
SUPERVISORY PERSONNEL	4	0	2	6	0.197	0.000	0.141	0.338
ENGINEERING PERSONNEL	20	5	9	34	2.870	0.025	2.438	5.333
TOTAL	99	9	235	343	6.925	0.364	50.101	57.390
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	99	1	1164	1264	9.456	0.017	385.176	394.649
OPERATIONS PERSONNEL	24	1	4	29	1.806	0.000	0.258	2.064
HEALTH PHYSICS PERSONNEL	31	0	220	251	4.637	0.000	44.420	49.057
SUPERVISORY PERSONNEL	16	3	14	33	2.594	0.000	1.522	4.116
ENGINEERING PERSONNEL	21	21	116	158	2.069	0.377	28.907	31.353
TOTAL	191	26	1518	1735	20.562	0.394	460.283	481.239
WASTE PROCESSING								
MAINTENANCE PERSONNEL	60	0	58	118	0.200	0.000	0.029	0.229
OPERATIONS PERSONNEL	17	1	1	19	0.185	0.082	0.000	0.267
HEALTH PHYSICS PERSONNEL	41	0	22	63	1.710	0.000	0.107	1.817
SUPERVISORY PERSONNEL	17	0	0	17	0.529	0.000	0.000	0.529
ENGINEERING PERSONNEL	7	0	1	8	0.024	0.000	0.000	0.024
TOTAL	142	1	82	225	2.648	0.082	0.136	2.866
REFUELING								
MAINTENANCE PERSONNEL	149	0	361	510	14.869	0.000	24.864	39.733
OPERATIONS PERSONNEL	49	6	1	56	2.772	0.023	0.000	2.795
HEALTH PHYSICS PERSONNEL	32	0	103	135	1.533	0.000	3.501	5.034
SUPERVISORY PERSONNEL	30	1	4	35	2.021	0.035	0.046	2.102
ENGINEERING PERSONNEL	9	6	13	28	0.191	0.364	0.287	0.842
TOTAL	269	13	482	764	21.386	0.422	28.698	50.506
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	717	11	2631	3359	112.675	0.043	606.296	719.014
OPERATIONS PERSONNEL	429	39	45	513	36.191	0.586	0.966	37.743
HEALTH PHYSICS PERSONNEL	250	20	720	990	34.795	0.019	122.784	157.598
SUPERVISORY PERSONNEL	212	20	46	278	12.364	0.059	1.821	14.244
ENGINEERING PERSONNEL	194	102	194	490	14.098	1.647	34.768	50.513
GRAND TOTALS	1802	192	3636	5630	210.123	2.354	766.635	979.112

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	266	197	26	489	1.983	0.551	0.030	2.564
OPERATIONS PERSONNEL	78	1	31	110	13.977	0.000	0.172	14.149
HEALTH PHYSICS PERSONNEL	45	0	58	103	0.832	0.000	1.771	2.603
SUPERVISORY PERSONNEL	5	0	2	7	0.189	0.000	0.000	0.189
ENGINEERING PERSONNEL	3	0	6	9	0.052	0.000	0.017	0.069
TOTAL	397	198	123	718	17.033	0.551	1.990	19.574
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	265	188	25	478	50.262	29.278	3.281	82.821
OPERATIONS PERSONNEL	53	1	39	93	1.987	0.007	15.288	17.282
HEALTH PHYSICS PERSONNEL	45	0	58	103	6.961	0.000	9.343	16.304
SUPERVISORY PERSONNEL	5	0	4	9	0.867	0.000	0.540	1.407
ENGINEERING PERSONNEL	3	0	6	9	0.321	0.000	0.266	0.587
TOTAL	371	189	132	692	60.398	29.285	28.718	118.401
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	76	69	6	151	2.055	3.643	0.191	5.889
OPERATIONS PERSONNEL	5	0	8	13	0.150	0.000	0.376	0.526
HEALTH PHYSICS PERSONNEL	13	0	31	44	0.318	0.000	1.045	1.363
SUPERVISORY PERSONNEL	1	0	0	1	0.004	0.000	0.000	0.004
ENGINEERING PERSONNEL	0	0	2	2	0.000	0.000	0.070	0.070
TOTAL	95	69	47	211	2.527	3.643	1.682	7.852
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	171	133	16	320	13.728	24.889	0.898	39.515
OPERATIONS PERSONNEL	9	2	25	36	0.061	0.407	0.789	1.257
HEALTH PHYSICS PERSONNEL	23	0	39	62	0.820	0.000	1.829	2.649
SUPERVISORY PERSONNEL	1	0	0	1	0.157	0.000	0.000	0.157
ENGINEERING PERSONNEL	2	0	4	6	0.145	0.000	0.133	0.278
TOTAL	206	135	84	425	14.911	25.296	3.649	43.856
WASTE PROCESSING								
MAINTENANCE PERSONNEL	89	8	0	97	3.089	0.004	0.000	3.093
OPERATIONS PERSONNEL	34	0	39	73	2.082	0.000	0.678	2.760
HEALTH PHYSICS PERSONNEL	38	0	9	47	1.782	0.000	0.121	1.903
SUPERVISORY PERSONNEL	1	0	1	2	0.176	0.000	0.000	0.176
ENGINEERING PERSONNEL	1	0	0	1	0.091	0.000	0.000	0.091
TOTAL	163	8	49	220	7.220	0.004	0.799	8.023
REFUELING								
MAINTENANCE PERSONNEL	36	40	2	78	0.593	5.583	0.053	6.229
OPERATIONS PERSONNEL	49	0	10	59	0.878	0.000	0.060	0.938
HEALTH PHYSICS PERSONNEL	15	0	17	32	0.111	0.000	0.471	0.582
SUPERVISORY PERSONNEL	1	0	0	1	0.006	0.000	0.000	0.006
ENGINEERING PERSONNEL	1	0	3	4	0.186	0.000	0.194	0.380
TOTAL	102	40	32	174	1.774	5.583	0.778	8.135
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	903(266)	635(198)	75 (26)	1613 (490)	71.710	63.948	4.453	140.111
OPERATIONS PERSONNEL	228 (78)	4 (2)	152 (40)	384 (120)	19.135	0.414	17.363	36.912
HEALTH PHYSICS PERSONNEL	179 (45)	0 (0)	212 (60)	391 (105)	10.824	0.000	14.580	25.404
SUPERVISORY PERSONNEL	14 (5)	0 (0)	7 (4)	21 (9)	1.399	0.000	0.540	1.939
ENGINEERING PERSONNEL	10 (3)	0 (0)	21 (6)	31 (9)	0.795	0.000	0.680	1.475
GRAND TOTALS	1334(397)	639(200)	467 (136)	2440 (733)	103.863	64.362	37.616	205.841

*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

1993

PLANT: *OYSTER CREEK TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	126	16	110	252	11.398	0.450	8.670	20.518
OPERATIONS PERSONNEL	134	0	5	139	26.263	0.000	0.026	26.289
HEALTH PHYSICS PERSONNEL	94	0	83	177	12.950	0.000	4.574	17.524
SUPERVISORY PERSONNEL	17	0	4	21	0.338	0.000	0.024	0.362
ENGINEERING PERSONNEL	20	0	1	21	0.431	0.000	0.067	0.498
TOTAL	391	16	203	610	51.380	0.450	13.361	65.191
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	428	48	749	1225	48.199	1.867	49.455	99.521
OPERATIONS PERSONNEL	257	1	47	305	10.405	0.000	0.348	10.753
HEALTH PHYSICS PERSONNEL	73	0	20	93	4.459	0.000	0.322	4.781
SUPERVISORY PERSONNEL	96	5	52	153	2.533	0.000	0.681	3.214
ENGINEERING PERSONNEL	168	2	56	226	3.393	0.049	0.868	4.310
TOTAL	1022	56	924	2002	68.989	1.916	51.674	122.579
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	27	3	143	173	0.306	0.070	2.725	3.101
OPERATIONS PERSONNEL	15	0	6	21	0.067	0.000	0.088	0.155
HEALTH PHYSICS PERSONNEL	16	0	4	20	0.203	0.000	0.240	0.443
SUPERVISORY PERSONNEL	1	0	2	3	0.010	0.000	0.008	0.018
ENGINEERING PERSONNEL	12	1	5	18	0.071	0.000	0.133	0.204
TOTAL	71	4	160	235	0.657	0.070	3.194	3.921
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	246	36	775	1057	43.299	3.196	158.767	205.262
OPERATIONS PERSONNEL	87	0	10	97	5.758	0.000	2.102	7.860
HEALTH PHYSICS PERSONNEL	57	0	46	103	6.076	0.000	4.311	10.387
SUPERVISORY PERSONNEL	25	0	25	50	1.472	0.000	1.930	3.402
ENGINEERING PERSONNEL	59	0	26	85	3.438	0.000	4.142	7.580
TOTAL	474	36	882	1392	60.043	3.196	171.252	234.491
WASTE PROCESSING								
MAINTENANCE PERSONNEL	79	6	65	150	1.275	0.022	4.235	5.532
OPERATIONS PERSONNEL	60	0	7	67	1.288	0.000	3.640	4.928
HEALTH PHYSICS PERSONNEL	40	0	17	57	1.292	0.000	0.429	1.721
SUPERVISORY PERSONNEL	4	0	0	4	0.080	0.000	0.000	0.080
ENGINEERING PERSONNEL	6	0	3	9	0.362	0.000	0.063	0.425
TOTAL	189	6	92	287	4.297	0.022	8.367	12.686
REFUELING								
MAINTENANCE PERSONNEL	44	5	79	128	0.380	0.020	8.953	9.353
OPERATIONS PERSONNEL	39	0	1	40	1.017	0.000	0.100	1.117
HEALTH PHYSICS PERSONNEL	15	0	10	25	0.221	0.000	0.331	0.552
SUPERVISORY PERSONNEL	2	0	2	4	0.025	0.000	0.060	0.085
ENGINEERING PERSONNEL	7	0	7	14	0.107	0.000	0.532	0.639
TOTAL	107	5	99	211	1.750	0.020	9.976	11.746
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	950(485)	114 (48)	1921 (984)	2985 (1517)	104.857	5.625	232.805	343.287
OPERATIONS PERSONNEL	592(311)	1 (1)	76 (52)	669 (364)	44.798	0.000	6.304	51.102
HEALTH PHYSICS PERSONNEL	295(114)	0 (0)	180 (92)	475 (206)	25.201	0.000	10.207	35.408
SUPERVISORY PERSONNEL	145(103)	5 (5)	85 (58)	235 (166)	4.458	0.000	2.703	7.161
ENGINEERING PERSONNEL	272(177)	3 (2)	98 (62)	373 (241)	7.802	0.049	5.805	13.656
GRAND TOTALS	2254(1190)	123 (56)	2360 (1248)	4737 (2494)	187.116	5.674	257.824	450.614

*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

1993

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	6	7	0	13	1.616	1.764	0.238	3.618
OPERATIONS PERSONNEL	38	0	0	38	11.126	0.062	0.556	11.744
HEALTH PHYSICS PERSONNEL	38	0	48	86	8.949	0.000	15.524	24.473
SUPERVISORY PERSONNEL	8	1	0	9	2.778	0.458	0.077	3.313
ENGINEERING PERSONNEL	1	0	1	2	0.802	0.083	0.592	1.477
TOTAL	91	8	49	148	25.271	2.367	16.987	44.625
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	77	4	117	198	27.737	1.355	42.573	71.665
OPERATIONS PERSONNEL	0	0	7	7	0.359	0.013	1.825	2.197
HEALTH PHYSICS PERSONNEL	45	0	35	80	10.366	0.000	7.563	17.929
SUPERVISORY PERSONNEL	4	0	2	6	1.522	0.005	0.877	2.404
ENGINEERING PERSONNEL	8	6	65	79	2.330	1.546	16.017	19.893
TOTAL	134	10	226	370	42.314	2.919	68.855	114.088
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	3	44	48	0.505	0.750	15.354	16.609
OPERATIONS PERSONNEL	1	0	4	5	0.873	0.000	0.846	1.719
HEALTH PHYSICS PERSONNEL	1	0	12	13	0.390	0.000	3.847	4.237
SUPERVISORY PERSONNEL	0	0	3	3	0.073	0.000	0.508	0.581
ENGINEERING PERSONNEL	0	7	37	44	0.249	5.871	19.930	26.050
TOTAL	3	10	100	113	2.090	6.621	40.485	49.196
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	1	0	29	30	0.509	0.003	9.159	9.671
OPERATIONS PERSONNEL	0	0	3	3	0.000	0.000	0.574	0.574
HEALTH PHYSICS PERSONNEL	1	0	3	4	0.323	0.000	1.290	1.613
SUPERVISORY PERSONNEL	0	0	1	1	0.002	0.000	0.161	0.163
ENGINEERING PERSONNEL	1	0	8	9	0.289	0.063	2.906	3.258
TOTAL	3	0	44	47	1.123	0.066	14.090	15.279
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	2	0	2	0.079	0.495	0.464	1.038
OPERATIONS PERSONNEL	0	0	0	0	0.493	0.000	0.125	0.618
HEALTH PHYSICS PERSONNEL	5	0	1	6	2.123	0.000	0.341	2.464
SUPERVISORY PERSONNEL	1	0	0	1	0.396	0.000	0.030	0.426
ENGINEERING PERSONNEL	0	0	0	0	0.095	0.086	0.117	0.298
TOTAL	6	2	1	9	3.186	0.581	1.077	4.844
REFUELING								
MAINTENANCE PERSONNEL	13	5	3	21	3.706	1.037	1.616	6.359
OPERATIONS PERSONNEL	24	0	5	29	5.490	0.004	1.281	6.775
HEALTH PHYSICS PERSONNEL	1	0	21	22	0.748	0.000	9.061	9.809
SUPERVISORY PERSONNEL	6	0	3	9	1.735	0.001	2.109	3.845
ENGINEERING PERSONNEL	5	0	41	46	2.071	0.044	31.745	33.860
TOTAL	49	5	73	127	13.750	1.086	45.812	60.648
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	98	21	193	312	34.152	5.404	69.404	108.960
OPERATIONS PERSONNEL	63	0	19	82	18.341	0.079	5.207	23.627
HEALTH PHYSICS PERSONNEL	91	0	120	211	22.899	0.000	37.626	60.525
SUPERVISORY PERSONNEL	19	1	9	29	6.506	0.464	3.762	10.732
ENGINEERING PERSONNEL	15	13	152	180	5.836	7.693	71.307	84.836
GRAND TOTALS	286	35	493	814	87.734	13.640	187.306	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

1993

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	2	0	2	4	1.237	0.000	0.650	1.887
OPERATIONS PERSONNEL	64	0	1	65	15.686	0.000	0.435	16.121
HEALTH PHYSICS PERSONNEL	53	0	63	116	14.671	0.000	16.205	30.876
SUPERVISORY PERSONNEL	2	0	0	2	1.170	0.000	0.145	1.315
ENGINEERING PERSONNEL	1	0	3	4	1.531	0.000	0.700	2.231
TOTAL	122	0	69	191	34.295	0.000	18.135	52.430
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	157	0	487	644	59.864	0.000	261.487	321.351
OPERATIONS PERSONNEL	18	0	6	24	7.386	0.000	2.204	9.590
HEALTH PHYSICS PERSONNEL	50	0	82	132	21.582	0.000	29.262	50.844
SUPERVISORY PERSONNEL	10	0	4	14	3.083	0.000	2.463	5.546
ENGINEERING PERSONNEL	13	0	50	63	5.536	0.000	29.014	34.550
TOTAL	248	0	629	877	97.451	0.000	324.430	421.881
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	7	0	112	119	2.022	0.000	58.048	60.070
OPERATIONS PERSONNEL	2	0	2	4	1.135	0.000	1.740	2.875
HEALTH PHYSICS PERSONNEL	10	0	38	48	3.145	0.000	9.680	12.825
SUPERVISORY PERSONNEL	1	0	2	3	0.340	0.000	0.504	0.844
ENGINEERING PERSONNEL	2	0	21	23	2.110	0.000	9.700	11.810
TOTAL	22	0	175	197	8.752	0.000	79.672	88.424
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	3	3	0.090	0.000	1.789	1.879
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.040	0.040
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.050	0.000	0.160	0.210
SUPERVISORY PERSONNEL	0	0	0	0	0.010	0.000	0.000	0.010
ENGINEERING PERSONNEL	0	0	1	1	0.000	0.000	0.220	0.220
TOTAL	0	0	4	4	0.150	0.000	2.209	2.359
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	1	2	0.240	0.000	0.810	1.050
OPERATIONS PERSONNEL	0	0	2	2	0.040	0.000	0.425	0.465
HEALTH PHYSICS PERSONNEL	14	0	12	26	4.935	0.000	4.047	8.982
SUPERVISORY PERSONNEL	0	0	1	1	0.185	0.000	0.300	0.485
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.010	0.010
TOTAL	15	0	16	31	5.400	0.000	5.592	10.992
REFUELING								
MAINTENANCE PERSONNEL	17	0	38	55	7.121	0.000	13.454	20.575
OPERATIONS PERSONNEL	7	0	1	8	2.510	0.000	0.665	3.175
HEALTH PHYSICS PERSONNEL	10	0	10	20	2.505	0.000	3.030	5.535
SUPERVISORY PERSONNEL	4	0	0	4	2.053	0.000	0.020	2.073
ENGINEERING PERSONNEL	6	0	9	15	2.009	0.000	2.214	4.223
TOTAL	44	0	58	102	16.198	0.000	19.383	35.581
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	184	0	643	827	70.574	0.000	336.238	406.812
OPERATIONS PERSONNEL	91	0	12	103	26.757	0.000	5.509	32.266
HEALTH PHYSICS PERSONNEL	137	0	205	342	46.888	0.000	62.384	109.272
SUPERVISORY PERSONNEL	17	0	7	24	6.841	0.000	3.432	10.273
ENGINEERING PERSONNEL	22	0	84	106	11.186	0.000	41.858	53.044
GRAND TOTALS	451	0	951	1402	162.246	0.000	449.421	611.667

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

PLANT: *PEACH BOTTOM 2,3 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	144	106	225	475	13.407	8.541	20.846	42.794
OPERATIONS PERSONNEL	157	55	187	399	16.370	5.827	12.644	34.841
HEALTH PHYSICS PERSONNEL	114	7	78	199	31.497	1.191	11.885	44.573
SUPERVISORY PERSONNEL	7	10	37	54	0.467	0.262	1.253	1.982
ENGINEERING PERSONNEL	66	96	75	237	5.808	2.565	2.689	11.062
TOTAL	488	274	602	1364	67.549	18.386	49.317	135.252
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	119	173	389	681	12.979	6.589	36.450	56.018
OPERATIONS PERSONNEL	76	29	135	240	2.462	1.820	6.340	10.622
HEALTH PHYSICS PERSONNEL	68	3	42	113	4.551	0.091	2.630	7.272
SUPERVISORY PERSONNEL	4	9	9	22	0.529	0.302	0.488	1.319
ENGINEERING PERSONNEL	40	38	33	111	1.091	0.888	0.753	2.732
TOTAL	307	252	608	1167	21.612	9.690	46.661	77.963
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	3	2	130	135	0.335	0.223	16.224	16.782
OPERATIONS PERSONNEL	0	1	31	32	0.000	0.054	4.211	4.265
HEALTH PHYSICS PERSONNEL	7	0	10	17	0.282	0.000	1.052	1.334
SUPERVISORY PERSONNEL	0	0	2	2	0.000	0.000	0.184	0.184
ENGINEERING PERSONNEL	0	1	8	9	0.000	0.024	2.807	2.831
TOTAL	10	4	181	195	0.617	0.301	24.478	25.396
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	116	158	332	606	15.657	18.410	44.585	78.652
OPERATIONS PERSONNEL	42	27	116	185	2.335	2.767	17.860	22.962
HEALTH PHYSICS PERSONNEL	60	3	48	111	8.263	0.318	4.045	12.626
SUPERVISORY PERSONNEL	3	5	13	21	1.084	0.810	0.294	2.188
ENGINEERING PERSONNEL	23	22	35	80	1.261	1.006	1.201	3.468
TOTAL	244	215	544	1003	28.600	23.311	67.985	119.896
WASTE PROCESSING								
MAINTENANCE PERSONNEL	25	28	42	95	0.928	0.616	2.346	3.890
OPERATIONS PERSONNEL	4	7	13	24	0.137	0.065	1.161	1.363
HEALTH PHYSICS PERSONNEL	29	2	10	41	2.775	0.169	1.080	4.024
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	3	0	4	0.003	0.125	0.000	0.128
TOTAL	59	40	65	164	3.843	0.975	4.587	9.405
REFUELING								
MAINTENANCE PERSONNEL	125	198	438	761	16.484	46.179	56.822	119.485
OPERATIONS PERSONNEL	39	30	157	226	2.598	7.121	22.630	32.349
HEALTH PHYSICS PERSONNEL	51	3	67	121	5.377	0.645	14.196	20.218
SUPERVISORY PERSONNEL	4	6	20	30	0.718	1.495	1.429	3.642
ENGINEERING PERSONNEL	31	29	47	107	2.214	2.150	4.025	8.389
TOTAL	250	266	729	1245	27.391	57.590	99.102	184.083
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	532	(291) 665 (401)	1556 (755)	2753 (1447)	59.790	80.558	177.273	317.621
OPERATIONS PERSONNEL	318	(555) 149 (209)	639 (1249)	1106 (2013)	23.902	17.654	64.846	106.402
HEALTH PHYSICS PERSONNEL	329	(155) 18 (19)	255 (121)	602 (295)	52.745	2.414	34.888	90.047
SUPERVISORY PERSONNEL	18	(23) 30 (41)	81 (100)	129 (164)	2.798	2.869	3.648	9.315
ENGINEERING PERSONNEL	161	(136) 189 (274)	198 (165)	548 (575)	10.377	6.758	11.475	28.610
GRAND TOTALS	1358	(1160) 1051 (944)	2729 (2390)	5138 (4494)	149.612	110.253	292.130	551.995

*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

1993

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	100	14	107	221	0.703	0.344	1.244	2.291
OPERATIONS PERSONNEL	111	4	4	119	13.918	0.158	0.261	14.337
HEALTH PHYSICS PERSONNEL	44	1	48	93	4.607	0.097	3.993	8.697
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.061	0.061
ENGINEERING PERSONNEL	5	41	5	51	0.197	0.974	0.022	1.193
TOTAL	260	60	165	485	19.425	1.573	5.581	26.579
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	124	20	215	359	9.012	0.348	9.296	18.656
OPERATIONS PERSONNEL	109	4	5	118	5.129	0.070	0.091	5.290
HEALTH PHYSICS PERSONNEL	44	2	57	103	3.395	0.012	1.028	4.435
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.022	0.022
ENGINEERING PERSONNEL	6	47	12	65	0.231	2.470	0.544	3.245
TOTAL	283	73	290	646	17.767	2.900	10.981	31.648
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	32	0	57	89	0.659	0.000	0.655	1.314
OPERATIONS PERSONNEL	16	1	1	18	0.093	0.009	0.002	0.104
HEALTH PHYSICS PERSONNEL	15	0	22	37	0.371	0.000	0.438	0.809
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	29	10	40	0.011	1.701	0.560	2.272
TOTAL	64	30	90	184	1.134	1.710	1.655	4.499
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	139	20	228	387	45.150	1.886	53.286	100.322
OPERATIONS PERSONNEL	112	4	5	121	18.940	0.206	0.731	19.877
HEALTH PHYSICS PERSONNEL	45	2	62	109	13.755	0.010	4.687	18.452
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.072	0.072
ENGINEERING PERSONNEL	6	48	15	69	0.815	5.988	1.382	8.185
TOTAL	302	74	311	687	78.660	8.090	60.158	146.908
WASTE PROCESSING								
MAINTENANCE PERSONNEL	55	12	3	70	0.355	0.401	0.053	0.809
OPERATIONS PERSONNEL	30	0	3	33	1.038	0.000	0.889	1.927
HEALTH PHYSICS PERSONNEL	33	0	19	52	1.023	0.000	0.470	1.493
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	5	2	8	0.000	0.035	0.043	0.078
TOTAL	119	17	27	163	2.416	0.436	1.455	4.307
REFUELING								
MAINTENANCE PERSONNEL	87	6	122	215	11.173	0.443	9.729	21.345
OPERATIONS PERSONNEL	87	2	2	91	3.500	0.243	0.025	3.768
HEALTH PHYSICS PERSONNEL	23	2	27	52	1.872	0.200	3.388	5.460
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	2	22	8	32	0.259	1.235	0.724	2.218
TOTAL	199	32	159	390	16.804	2.121	13.866	32.791
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	537	72	732	1341	67.052	3.422	74.263	144.737
OPERATIONS PERSONNEL	465	15	20	500	42.618	0.686	1.999	45.303
HEALTH PHYSICS PERSONNEL	204	7	235	446	25.023	0.319	14.004	39.346
SUPERVISORY PERSONNEL	0	0	3	3	0.000	0.000	0.155	0.155
ENGINEERING PERSONNEL	21	192	52	265	1.513	12.403	3.275	17.191
GRAND TOTALS	1227	286	1042	2555	136.206	16.830	93.696	246.732

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	5	1	6	12	1.870	0.113	3.810	5.793
OPERATIONS PERSONNEL	65	1	0	66	34.552	0.335	1.775	36.662
HEALTH PHYSICS PERSONNEL	14	0	0	14	5.594	0.000	0.112	5.706
SUPERVISORY PERSONNEL	4	1	2	7	2.212	0.576	1.147	3.935
ENGINEERING PERSONNEL	12	1	2	15	4.014	0.339	0.536	4.889
TOTAL	100	4	10	114	48.242	1.363	7.380	56.985
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	96	5	479	580	46.607	2.194	195.086	243.887
OPERATIONS PERSONNEL	14	1	17	32	4.621	0.239	7.224	12.084
HEALTH PHYSICS PERSONNEL	34	0	47	81	20.328	0.000	16.407	36.735
SUPERVISORY PERSONNEL	33	2	34	69	11.389	0.569	13.798	25.756
ENGINEERING PERSONNEL	36	3	19	58	11.056	0.717	9.653	21.426
TOTAL	213	11	596	820	94.001	3.719	242.168	339.888
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	118	119	0.481	0.042	42.031	42.554
OPERATIONS PERSONNEL	0	0	0	0	0.209	0.000	0.031	0.240
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.154	0.000	0.124	0.278
SUPERVISORY PERSONNEL	1	0	3	4	0.327	0.009	1.277	1.613
ENGINEERING PERSONNEL	2	0	5	7	0.438	0.047	2.203	2.688
TOTAL	4	0	126	130	1.609	0.098	45.666	47.373
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.036	0.036
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	0.036	0.036
WASTE PROCESSING								
MAINTENANCE PERSONNEL	6	1	0	7	2.448	0.191	0.277	2.916
OPERATIONS PERSONNEL	11	1	0	12	3.295	0.293	0.000	3.588
HEALTH PHYSICS PERSONNEL	5	0	0	5	1.786	0.000	0.000	1.786
SUPERVISORY PERSONNEL	2	0	0	2	0.825	0.000	0.000	0.825
ENGINEERING PERSONNEL	0	0	0	0	0.119	0.000	0.002	0.121
TOTAL	24	2	0	26	8.473	0.484	0.279	9.236
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.449	0.036	0.531	1.016
OPERATIONS PERSONNEL	0	0	0	0	0.203	0.000	0.003	0.206
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.106	0.000	0.016	0.122
SUPERVISORY PERSONNEL	0	0	0	0	0.083	0.001	0.002	0.086
ENGINEERING PERSONNEL	0	0	0	0	0.090	0.001	0.060	0.151
TOTAL	0	0	0	0	0.931	0.038	0.612	1.581
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	108	7	603	718	51.855	2.576	241.771	296.202
OPERATIONS PERSONNEL	90	3	17	110	42.880	0.867	9.033	52.780
HEALTH PHYSICS PERSONNEL	53	0	47	100	27.968	0.000	16.659	44.627
SUPERVISORY PERSONNEL	40	3	39	82	14.836	1.155	16.224	32.215
ENGINEERING PERSONNEL	50	4	26	80	15.717	1.104	12.454	29.275
GRAND TOTALS	341	17	732	1090	153.256	5.702	296.141	455.099

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	2.770	0.240	3.010
OPERATIONS PERSONNEL	0	0	0	0	13.250	0.000	0.000	13.250
HEALTH PHYSICS PERSONNEL	0	0	0	0	13.440	0.000	0.000	13.440
SUPERVISORY PERSONNEL	0	0	0	0	0.220	0.000	0.000	0.220
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	26.910	2.770	0.240	29.920
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	26.050	19.530	0.000	45.580
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	1.080	0.000	0.000	1.080
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	27.130	19.530	0.000	46.660
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	1.010	31.273	31.273	63.556
OPERATIONS PERSONNEL	0	0	0	0	4.700	0.000	0.000	4.700
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	2.420	0.000	0.000	2.420
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	8.130	31.273	31.273	70.676
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	39.070	39.070
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	39.070	39.070
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	2.980	2.980
OPERATIONS PERSONNEL	0	0	0	0	0.400	0.000	0.000	0.400
HEALTH PHYSICS PERSONNEL	0	0	0	0	2.480	0.000	0.000	2.480
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	2.880	0.000	2.980	5.860
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	18.220	0.000	0.000	18.220
OPERATIONS PERSONNEL	0	0	0	0	4.700	0.000	0.000	4.700
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	0	0	0	0	0.930	0.000	0.000	0.930
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	0	0	0	0	23.850	0.000	0.000	23.850
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	0 (43)	0 (31)	0 (170)	0 (244)	45.280	53.573	73.563	172.416
OPERATIONS PERSONNEL	0 (69)	0 (0)	0 (0)	0 (69)	23.050	0.000	0.000	23.050
HEALTH PHYSICS PERSONNEL	0 (27)	0 (0)	0 (0)	0 (27)	15.920	0.000	0.000	15.920
SUPERVISORY PERSONNEL	0 (15)	0 (0)	0 (0)	0 (15)	4.650	0.000	0.000	4.650
ENGINEERING PERSONNEL	0 (0)	0 (0)	0 (0)	0 (0)	0.000	0.000	0.000	0.000
GRAND TOTALS	0(154)	0 (31)	0 (170)	0 (355)	88.900	53.573	73.563	216.036

*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

1993

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	1	0	0	1	0.760	0.430	0.026	1.216
OPERATIONS PERSONNEL	0	0	0	0	1.003	0.000	0.000	1.003
HEALTH PHYSICS PERSONNEL	4	0	0	4	1.664	0.006	0.141	1.811
SUPERVISORY PERSONNEL	0	1	0	1	0.358	0.421	0.220	0.999
ENGINEERING PERSONNEL	0	0	0	0	0.256	0.000	0.000	0.256
TOTAL	5	1	0	6	4.041	0.857	0.387	5.285
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	7	16	1	24	2.287	4.721	0.136	7.144
OPERATIONS PERSONNEL	0	0	0	0	0.073	0.000	0.000	0.073
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.188	0.000	0.020	0.208
SUPERVISORY PERSONNEL	2	1	0	3	0.835	0.154	0.018	1.007
ENGINEERING PERSONNEL	2	0	0	2	0.808	0.000	0.008	0.816
TOTAL	11	17	1	29	4.191	4.875	0.182	9.248
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	38	20	58	0.638	9.049	10.615	20.302
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	2	0	4	6	0.527	0.001	1.073	1.601
SUPERVISORY PERSONNEL	0	0	12	12	0.167	0.095	4.684	4.946
ENGINEERING PERSONNEL	0	0	19	19	0.000	0.000	4.910	4.910
TOTAL	2	38	55	95	1.332	9.145	21.282	31.759
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	18	68	9	95	4.234	21.523	2.438	28.195
OPERATIONS PERSONNEL	2	0	0	2	2.844	0.000	0.000	2.844
HEALTH PHYSICS PERSONNEL	5	2	11	18	1.884	0.424	2.706	5.014
SUPERVISORY PERSONNEL	6	3	13	22	1.899	1.198	4.869	7.966
ENGINEERING PERSONNEL	4	0	0	4	1.161	0.000	0.008	1.169
TOTAL	35	73	33	141	12.022	23.145	10.021	45.188
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	0	2	1.066	0.196	0.029	1.291
OPERATIONS PERSONNEL	0	0	0	0	0.050	0.000	0.000	0.050
HEALTH PHYSICS PERSONNEL	3	0	0	3	1.161	0.000	0.048	1.209
SUPERVISORY PERSONNEL	0	0	0	0	0.015	0.037	0.000	0.052
ENGINEERING PERSONNEL	0	0	0	0	0.002	0.000	0.000	0.002
TOTAL	5	0	0	5	2.294	0.233	0.077	2.604
REFUELING								
MAINTENANCE PERSONNEL	21	14	0	35	5.410	4.890	0.024	10.324
OPERATIONS PERSONNEL	0	0	0	0	0.550	0.000	0.000	0.550
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.492	0.019	0.154	0.665
SUPERVISORY PERSONNEL	0	0	0	0	0.394	0.081	0.000	0.475
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.103	0.103
TOTAL	22	14	0	36	6.846	4.990	0.281	12.117
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	49	136	30	215	14.395	40.809	13.268	68.472
OPERATIONS PERSONNEL	2	0	0	2	4.520	0.000	0.000	4.520
HEALTH PHYSICS PERSONNEL	15	2	15	32	5.916	0.450	4.142	10.508
SUPERVISORY PERSONNEL	8	5	25	38	3.668	1.986	9.791	15.445
ENGINEERING PERSONNEL	6	0	19	25	2.227	0.000	5.029	7.256
GRAND TOTALS	80	143	89	312	30.726	43.245	32.230	106.201

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	9	11	20	40	9.842	0.109	4.958	14.909
OPERATIONS PERSONNEL	143	0	183	326	38.535	0.000	16.160	54.695
HEALTH PHYSICS PERSONNEL	41	0	19	60	36.485	0.000	2.953	39.438
SUPERVISORY PERSONNEL	88	88	6	182	13.298	1.244	0.397	14.939
ENGINEERING PERSONNEL	34	86	17	137	5.370	1.023	0.703	7.096
TOTAL	315	185	245	745	103.530	2.376	25.171	131.077
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	124	92	901	1117	143.632	0.955	226.993	371.580
OPERATIONS PERSONNEL	33	0	1	34	9.167	0.000	0.033	9.200
HEALTH PHYSICS PERSONNEL	14	0	17	31	13.069	0.000	2.547	15.616
SUPERVISORY PERSONNEL	136	17	87	240	20.541	0.249	5.553	26.343
ENGINEERING PERSONNEL	26	94	55	175	3.913	1.121	2.236	7.270
TOTAL	333	203	1061	1597	190.322	2.325	237.362	430.009
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	25	252	278	0.190	0.257	63.490	63.937
OPERATIONS PERSONNEL	2	0	0	2	0.614	0.000	0.000	0.614
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.792	0.000	0.000	0.792
SUPERVISORY PERSONNEL	4	1	5	10	0.543	0.021	0.334	0.898
ENGINEERING PERSONNEL	15	62	34	111	2.366	0.735	1.390	4.491
TOTAL	23	88	291	402	4.505	1.013	65.214	70.732
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	6	39	591	636	6.337	0.404	148.640	155.381
OPERATIONS PERSONNEL	3	0	1	4	0.907	0.000	0.018	0.925
HEALTH PHYSICS PERSONNEL	2	0	14	16	2.188	0.000	2.069	4.257
SUPERVISORY PERSONNEL	11	0	80	91	1.703	0.000	4.930	6.633
ENGINEERING PERSONNEL	25	111	143	279	3.819	1.325	5.771	10.915
TOTAL	47	150	829	1026	14.954	1.729	161.428	178.111
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	3	3	7	0.178	0.036	0.704	0.918
OPERATIONS PERSONNEL	36	0	12	48	10.350	0.000	1.171	11.521
HEALTH PHYSICS PERSONNEL	1	0	0	1	1.183	0.000	0.000	1.183
SUPERVISORY PERSONNEL	20	0	0	20	2.985	0.000	0.000	2.985
ENGINEERING PERSONNEL	1	0	0	1	0.021	0.000	0.000	0.021
TOTAL	59	3	15	77	14.717	0.036	1.875	16.628
REFUELING								
MAINTENANCE PERSONNEL	12	0	1	13	13.421	0.000	0.115	13.536
OPERATIONS PERSONNEL	19	0	0	19	5.190	0.000	0.000	5.190
HEALTH PHYSICS PERSONNEL	2	0	0	2	1.357	0.000	0.000	1.357
SUPERVISORY PERSONNEL	16	0	0	16	2.445	0.000	0.000	2.445
ENGINEERING PERSONNEL	1	2	0	3	0.101	0.023	0.000	0.124
TOTAL	50	2	1	53	22.514	0.023	0.115	22.652
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	153	170	1768	2091	173.600	1.761	444.900	620.261
OPERATIONS PERSONNEL	236	0	197	433	64.763	0.000	17.382	82.145
HEALTH PHYSICS PERSONNEL	61	0	50	111	55.074	0.000	7.569	62.643
SUPERVISORY PERSONNEL	275	106	178	559	41.515	1.514	11.214	54.243
ENGINEERING PERSONNEL	102	355	249	706	15.590	4.227	10.100	29.917
GRAND TOTALS	827	631	2442	3900	350.542	7.502	491.165	849.209

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	3	0	0	3	0.349	0.000	0.000	0.349
OPERATIONS PERSONNEL	3	0	0	3	0.278	0.000	0.000	0.278
HEALTH PHYSICS PERSONNEL	5	0	1	6	1.037	0.000	0.067	1.104
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	11	0	1	12	1.664	0.000	0.067	1.731
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	2	0	0	2	0.114	0.000	0.000	0.114
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	2	0	1	3	0.018	0.000	0.068	0.086
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	1	5	0.132	0.000	0.068	0.200
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	1	0	0	1	0.024	0.000	0.000	0.024
OPERATIONS PERSONNEL	2	0	0	2	0.090	0.000	0.000	0.090
HEALTH PHYSICS PERSONNEL	3	0	0	3	0.125	0.000	0.000	0.125
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	6	0	0	6	0.239	0.000	0.000	0.239
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	6	0	0	6	0.487	0.000	0.000	0.487
OPERATIONS PERSONNEL	5	0	0	5	0.368	0.000	0.000	0.368
HEALTH PHYSICS PERSONNEL	10	0	2	12	1.180	0.000	0.135	1.315
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	21	0	2	23	2.035	0.000	0.135	2.170

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

PLANT: *RIVER BEND 1 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	8	0	11	19	4.809	0.000	2.727	7.536
OPERATIONS PERSONNEL	38	0	0	38	19.119	0.000	0.015	19.134
HEALTH PHYSICS PERSONNEL	17	0	6	23	10.716	0.000	3.411	14.127
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.005	0.060	0.065
ENGINEERING PERSONNEL	4	1	1	6	1.020	0.410	0.330	1.760
TOTAL	67	1	18	86	35.664	0.415	6.543	42.622
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	9	0	16	25	4.894	0.000	4.058	8.952
OPERATIONS PERSONNEL	0	0	0	0	0.223	0.000	0.075	0.298
HEALTH PHYSICS PERSONNEL	1	0	11	12	0.330	0.000	4.989	5.319
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.008	0.040	0.048
ENGINEERING PERSONNEL	2	1	1	4	0.479	0.380	0.212	1.071
TOTAL	12	1	28	41	5.926	0.388	9.374	15.688
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	3	0	5	8	1.327	0.000	1.578	2.905
OPERATIONS PERSONNEL	5	0	0	5	1.801	0.000	0.000	1.801
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.350	0.000	0.260	0.610
SUPERVISORY PERSONNEL	0	0	1	1	0.000	0.000	0.070	0.070
ENGINEERING PERSONNEL	1	1	0	2	0.525	0.491	0.130	1.146
TOTAL	10	1	6	17	4.003	0.491	2.038	6.532
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	75	0	56	131	65.822	0.000	27.091	92.913
OPERATIONS PERSONNEL	9	0	0	9	3.615	0.000	0.070	3.685
HEALTH PHYSICS PERSONNEL	11	0	8	19	6.905	0.000	4.245	11.150
SUPERVISORY PERSONNEL	0	2	0	2	0.000	0.570	0.015	0.585
ENGINEERING PERSONNEL	8	7	9	24	2.378	2.880	3.948	9.206
TOTAL	103	9	73	185	78.720	3.450	35.369	117.539
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	2	2	0.025	0.000	0.823	0.848
OPERATIONS PERSONNEL	0	0	7	7	0.005	0.000	3.084	3.089
HEALTH PHYSICS PERSONNEL	1	0	3	4	0.860	0.000	1.889	2.749
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	1	0	12	13	0.890	0.000	5.796	6.686
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.005	0.005
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	0.005	0.005
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	95	0	90	185	76.877	0.000	36.282	113.159
OPERATIONS PERSONNEL	52	0	7	59	24.763	0.000	3.244	28.007
HEALTH PHYSICS PERSONNEL	31	0	28	59	19.161	0.000	14.794	33.955
SUPERVISORY PERSONNEL	0	2	1	3	0.000	0.583	0.185	0.768
ENGINEERING PERSONNEL	15	10	11	36	4.402	4.161	4.620	13.183
GRAND TOTALS	193	12	137	342	125.203	4.744	59.125	189.072

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

PLANT: *ROBINSON 2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	2	0	2	4	1.085	0.070	0.600	1.755
OPERATIONS PERSONNEL	8	0	0	8	3.437	0.000	1.135	4.572
HEALTH PHYSICS PERSONNEL	23	0	4	27	5.167	0.010	0.830	6.007
SUPERVISORY PERSONNEL	0	0	0	0	0.030	0.000	0.035	0.065
ENGINEERING PERSONNEL	0	0	3	3	0.790	0.095	0.790	1.675
TOTAL	33	0	9	42	10.509	0.175	3.390	14.074
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	2	0	4	6	1.405	0.115	2.456	3.976
OPERATIONS PERSONNEL	0	0	0	0	0.005	0.000	0.025	0.030
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.080	0.000	0.000	0.080
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.120	0.030	0.175	0.325
TOTAL	2	0	4	6	1.610	0.145	2.656	4.411
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.050	0.000	0.580	0.630
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.020	0.000	0.000	0.020
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	1	1	0.140	0.095	0.750	0.985
TOTAL	0	0	1	1	0.210	0.095	1.330	1.635
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	24	3	103	130	8.525	1.065	43.788	53.378
OPERATIONS PERSONNEL	3	0	1	4	1.505	0.000	0.655	2.160
HEALTH PHYSICS PERSONNEL	5	0	14	19	1.805	0.000	3.600	5.405
SUPERVISORY PERSONNEL	0	0	2	2	0.040	0.000	0.475	0.515
ENGINEERING PERSONNEL	4	1	27	32	1.640	0.230	7.715	9.585
TOTAL	36	4	147	187	13.515	1.295	56.233	71.043
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	0	1	0.205	0.115	0.295	0.615
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	3	0	0	3	0.620	0.000	0.015	0.635
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	1	1	0.000	0.000	0.200	0.200
TOTAL	4	0	1	5	0.825	0.115	0.510	1.450
REFUELING								
MAINTENANCE PERSONNEL	68	38	277	383	30.922	11.842	109.880	152.644
OPERATIONS PERSONNEL	36	0	1	37	11.010	0.000	2.275	13.285
HEALTH PHYSICS PERSONNEL	31	0	46	77	9.471	0.015	19.495	28.981
SUPERVISORY PERSONNEL	3	0	6	9	0.895	0.155	2.410	3.460
ENGINEERING PERSONNEL	23	2	160	185	6.740	1.140	73.227	81.107
TOTAL	161	40	490	691	59.038	13.152	207.287	279.477
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	97	41	386	524	42.192	13.207	157.599	212.998
OPERATIONS PERSONNEL	47	0	2	49	15.957	0.000	4.090	20.047
HEALTH PHYSICS PERSONNEL	62	0	64	126	17.163	0.025	23.940	41.128
SUPERVISORY PERSONNEL	3	0	8	11	0.965	0.155	2.920	4.040
ENGINEERING PERSONNEL	27	3	192	222	9.430	1.590	82.857	93.877
GRAND TOTALS	236	44	652	932	85.707	14.977	271.406	372.090

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	3	0	5	8	2.285	0.416	6.358	9.059
OPERATIONS PERSONNEL	0	0	0	0	0.199	0.084	0.183	0.466
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.538	0.034	0.141	0.713
SUPERVISORY PERSONNEL	0	0	0	0	0.098	0.000	0.031	0.129
ENGINEERING PERSONNEL	0	0	0	0	0.235	0.100	0.022	0.357
TOTAL	3	0	5	8	3.355	0.634	6.735	10.724
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	5	0	54	59	6.406	1.573	20.404	28.383
OPERATIONS PERSONNEL	0	0	0	0	3.280	0.278	0.287	3.845
HEALTH PHYSICS PERSONNEL	17	0	0	17	2.951	0.356	0.000	3.307
SUPERVISORY PERSONNEL	0	0	0	0	0.060	0.007	0.067	0.134
ENGINEERING PERSONNEL	2	0	0	2	0.721	0.646	0.062	1.429
TOTAL	24	0	54	78	13.418	2.860	20.820	37.098
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	3	10	79	92	1.135	2.506	51.246	54.887
OPERATIONS PERSONNEL	0	2	0	2	0.046	0.672	0.000	0.718
HEALTH PHYSICS PERSONNEL	6	0	21	27	1.621	0.004	9.625	11.250
SUPERVISORY PERSONNEL	0	0	6	6	0.087	0.000	4.341	4.428
ENGINEERING PERSONNEL	0	2	2	4	0.000	0.697	0.933	1.630
TOTAL	9	14	108	131	2.889	3.879	66.145	72.913
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	4	0	6	10	0.915	0.096	1.223	2.234
OPERATIONS PERSONNEL	0	0	0	0	0.128	0.009	0.121	0.258
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.053	0.000	0.104	0.157
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.007	0.000	0.007
TOTAL	4	0	6	10	1.096	0.112	1.448	2.656
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.032	0.020	0.004	0.056
OPERATIONS PERSONNEL	0	0	0	0	0.010	0.008	0.000	0.018
HEALTH PHYSICS PERSONNEL	0	0	10	10	2.580	0.000	4.201	6.781
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.003	0.000	0.000	0.003
TOTAL	0	0	10	10	2.625	0.028	4.205	6.858
REFUELING								
MAINTENANCE PERSONNEL	63	14	464	541	23.087	7.945	184.665	215.697
OPERATIONS PERSONNEL	17	2	6	25	7.281	1.466	1.836	10.583
HEALTH PHYSICS PERSONNEL	48	0	71	119	14.377	0.146	22.164	36.687
SUPERVISORY PERSONNEL	2	0	8	10	1.056	0.009	3.572	4.637
ENGINEERING PERSONNEL	1	3	5	9	0.730	2.004	2.231	4.965
TOTAL	131	19	554	704	46.531	11.570	214.468	272.569
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	78	24	608	710	33.860	12.556	263.900	310.316
OPERATIONS PERSONNEL	17	4	6	27	10.944	2.517	2.427	15.888
HEALTH PHYSICS PERSONNEL	71	0	102	173	22.120	0.540	36.235	58.895
SUPERVISORY PERSONNEL	2	0	14	16	1.301	0.016	8.011	9.328
ENGINEERING PERSONNEL	3	5	7	15	1.689	3.454	3.248	8.391
GRAND TOTALS	171	33	737	941	69.914	19.083	313.821	402.818

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	59	9	136	204	1.496	0.049	9.649	11.194
OPERATIONS PERSONNEL	17	26	12	55	1.509	3.069	2.642	7.220
HEALTH PHYSICS PERSONNEL	56	2	113	171	17.794	0.185	45.391	63.370
SUPERVISORY PERSONNEL	2	1	3	6	0.570	0.679	0.036	1.285
ENGINEERING PERSONNEL	34	4	36	74	1.625	0.124	1.143	2.892
TOTAL	168	42	300	510	22.994	4.106	58.861	85.961
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	140	20	633	793	24.520	4.364	119.631	148.515
OPERATIONS PERSONNEL	25	33	15	73	4.611	5.611	2.560	12.782
HEALTH PHYSICS PERSONNEL	55	2	211	268	5.802	0.251	29.878	35.931
SUPERVISORY PERSONNEL	1	1	5	7	0.148	0.003	1.756	1.907
ENGINEERING PERSONNEL	39	7	75	121	1.929	0.311	5.152	7.392
TOTAL	260	63	939	1262	37.010	10.540	158.977	206.527
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	22	3	195	220	0.310	0.004	41.823	42.137
OPERATIONS PERSONNEL	4	3	0	7	0.155	0.030	0.000	0.185
HEALTH PHYSICS PERSONNEL	2	0	9	11	0.086	0.000	0.038	0.124
SUPERVISORY PERSONNEL	1	0	1	2	0.000	0.000	0.002	0.002
ENGINEERING PERSONNEL	32	6	54	92	3.143	0.565	12.986	16.694
TOTAL	61	12	259	332	3.694	0.599	54.849	59.142
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	122	19	582	723	27.697	8.628	137.237	173.562
OPERATIONS PERSONNEL	6	8	2	16	0.092	0.055	0.011	0.158
HEALTH PHYSICS PERSONNEL	30	1	145	176	2.856	0.039	29.215	32.110
SUPERVISORY PERSONNEL	1	1	13	15	0.076	0.012	3.151	3.239
ENGINEERING PERSONNEL	36	4	99	139	6.099	0.238	32.926	39.263
TOTAL	195	33	841	1069	36.820	8.972	202.540	248.332
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	18	20	0.033	0.000	0.302	0.335
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	19	2	99	120	1.321	0.086	10.797	12.204
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	5	1	1	7	0.010	0.001	0.118	0.129
TOTAL	26	3	118	147	1.364	0.087	11.217	12.668
REFUELING								
MAINTENANCE PERSONNEL	66	4	163	233	28.537	0.096	74.354	102.987
OPERATIONS PERSONNEL	7	3	3	13	0.564	0.252	0.194	1.010
HEALTH PHYSICS PERSONNEL	31	2	131	164	1.669	0.214	10.840	12.723
SUPERVISORY PERSONNEL	1	1	1	3	0.060	0.146	0.022	0.228
ENGINEERING PERSONNEL	25	7	23	55	3.329	1.207	4.125	8.661
TOTAL	130	17	321	468	34.159	1.915	89.535	125.609
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	411(149)	55 (20)	1727 (722)	2193 (891)	82.593	13.141	382.996	478.730
OPERATIONS PERSONNEL	59 (26)	73 (33)	32 (15)	164 (74)	6.931	9.017	5.407	21.355
HEALTH PHYSICS PERSONNEL	193 (64)	9 (2)	708 (219)	910 (285)	29.528	0.775	126.159	156.462
SUPERVISORY PERSONNEL	6 (2)	4 (2)	23 (14)	33 (18)	0.854	0.840	4.967	6.661
ENGINEERING PERSONNEL	171 (45)	29 (8)	288 (132)	488 (185)	16.135	2.446	56.450	75.031
GRAND TOTALS	840(286)	170 (65)	2778 (1102)	3788 (1453)	136.041	26.219	575.979	738.239

*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

1993

PLANT: *SEABROOK 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	0.000	0.000	0.000
OPERATIONS PERSONNEL	1	0	0	1	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	10	0	0	10	0.030	0.000	0.000	0.030
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	11	0	0	11	0.030	0.000	0.000	0.030
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	1	0	0	1	0.070	0.000	0.000	0.070
HEALTH PHYSICS PERSONNEL	10	0	0	10	1.945	0.000	0.000	1.945
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	11	0	0	11	2.015	0.000	0.000	2.015
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	1	0	0	1	0.020	0.000	0.000	0.020
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	1	0	0	1	0.020	0.000	0.000	0.020
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	0.000	0.000	0.070	0.070
OPERATIONS PERSONNEL	1	0	0	1	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	6	0	0	6	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	7	0	1	8	0.010	0.000	0.070	0.080
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	2	0	0	2	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	2	0	0	2	0.000	0.000	0.000	0.000
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	0 (0)	0 (0)	1 (1)	1 (1)	0.000	0.000	0.070	0.070
OPERATIONS PERSONNEL	3 (1)	0 (0)	0 (0)	3 (1)	0.070	0.000	0.000	0.070
HEALTH PHYSICS PERSONNEL	29 (10)	0 (0)	0 (0)	29 (10)	2.005	0.000	0.000	2.005
SUPERVISORY PERSONNEL	0 (0)	0 (0)	0 (0)	0 (0)	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0 (0)	0 (0)	0 (0)	0 (0)	0.000	0.000	0.000	0.000
GRAND TOTALS	32 (11)	0 (0)	1 (1)	33 (12)	2.075	0.000	0.070	2.145

*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

1993

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	94	17	256	367	1.735	0.491	4.022	6.248
OPERATIONS PERSONNEL	43	2	5	50	7.046	0.357	0.126	7.529
HEALTH PHYSICS PERSONNEL	42	0	78	120	4.239	0.000	6.439	10.678
SUPERVISORY PERSONNEL	31	2	4	37	1.703	0.020	0.008	1.731
ENGINEERING PERSONNEL	34	19	50	103	2.029	0.760	1.066	3.855
TOTAL	244	40	393	677	16.752	1.628	11.661	30.041
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	102	19	366	487	22.968	4.245	67.230	94.443
OPERATIONS PERSONNEL	29	1	5	35	1.040	0.033	0.318	1.391
HEALTH PHYSICS PERSONNEL	49	0	82	131	4.926	0.000	18.136	23.062
SUPERVISORY PERSONNEL	28	3	6	37	2.696	0.110	0.280	3.086
ENGINEERING PERSONNEL	37	17	48	102	3.234	0.499	2.654	6.387
TOTAL	245	40	507	792	34.864	4.887	88.618	128.369
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	16	1	128	145	0.315	0.016	12.936	13.267
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	29	0	65	94	1.536	0.000	9.503	11.039
SUPERVISORY PERSONNEL	10	3	8	21	3.050	0.692	0.895	4.637
ENGINEERING PERSONNEL	20	14	87	121	2.356	2.181	29.458	33.995
TOTAL	75	18	288	381	7.257	2.889	52.792	62.938
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	72	8	304	384	8.167	0.150	48.441	56.758
OPERATIONS PERSONNEL	17	1	2	20	0.171	0.034	0.005	0.210
HEALTH PHYSICS PERSONNEL	46	0	73	119	2.912	0.000	6.174	9.086
SUPERVISORY PERSONNEL	29	2	4	35	1.930	0.101	0.816	2.847
ENGINEERING PERSONNEL	21	16	90	127	0.606	1.101	21.445	23.152
TOTAL	185	27	473	685	13.786	1.386	76.881	92.053
WASTE PROCESSING								
MAINTENANCE PERSONNEL	19	1	29	49	1.454	0.000	2.900	4.354
OPERATIONS PERSONNEL	2	0	2	4	0.563	0.000	0.866	1.429
HEALTH PHYSICS PERSONNEL	25	0	16	41	4.054	0.000	2.432	6.486
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	6	1	5	12	1.395	0.008	0.388	1.791
TOTAL	52	2	52	106	7.466	0.008	6.586	14.060
REFUELING								
MAINTENANCE PERSONNEL	50	3	138	191	4.404	0.325	29.085	33.814
OPERATIONS PERSONNEL	20	0	0	20	0.451	0.000	0.000	0.451
HEALTH PHYSICS PERSONNEL	33	0	54	87	3.116	0.000	4.331	7.447
SUPERVISORY PERSONNEL	17	0	4	21	1.870	0.000	0.317	2.187
ENGINEERING PERSONNEL	18	9	45	72	1.015	2.001	13.642	16.658
TOTAL	138	12	241	391	10.856	2.326	47.375	60.557
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	353	49	1221	1623	39.043	5.227	164.614	208.884
OPERATIONS PERSONNEL	111	4	14	129	9.271	0.424	1.315	11.010
HEALTH PHYSICS PERSONNEL	224	0	368	592	20.783	0.000	47.015	67.798
SUPERVISORY PERSONNEL	115	10	26	151	11.249	0.923	2.316	14.488
ENGINEERING PERSONNEL	136	76	325	537	10.635	6.550	68.653	85.838
GRAND TOTALS	939	139	1954	3032	90.981	13.124	283.913	388.018

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	0	1	1	0.360	0.695	2.609	3.664
OPERATIONS PERSONNEL	15	0	0	15	4.083	0.000	0.032	4.115
HEALTH PHYSICS PERSONNEL	7	0	3	10	2.335	0.000	1.967	4.302
SUPERVISORY PERSONNEL	0	0	0	0	0.792	0.161	0.010	0.963
ENGINEERING PERSONNEL	1	0	0	1	0.410	0.000	0.049	0.459
TOTAL	23	0	4	27	7.980	0.856	4.667	13.503
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	41	0	72	113	11.745	0.100	24.234	36.079
OPERATIONS PERSONNEL	0	0	0	0	0.071	0.000	0.000	0.071
HEALTH PHYSICS PERSONNEL	0	0	2	2	0.443	0.000	0.676	1.119
SUPERVISORY PERSONNEL	4	0	1	5	1.911	0.006	0.340	2.257
ENGINEERING PERSONNEL	0	0	1	1	0.320	0.000	0.613	0.933
TOTAL	45	0	76	121	14.490	0.106	25.863	40.459
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	74	74	0.621	0.086	25.979	26.686
OPERATIONS PERSONNEL	0	0	0	0	0.019	0.000	0.000	0.019
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.213	0.000	0.187	0.400
SUPERVISORY PERSONNEL	2	0	2	4	0.990	0.077	0.589	1.656
ENGINEERING PERSONNEL	2	0	10	12	0.669	0.000	3.547	4.216
TOTAL	4	0	86	90	2.512	0.163	30.302	32.977
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	20	0	173	193	7.848	0.040	86.227	94.115
OPERATIONS PERSONNEL	0	0	0	0	0.007	0.000	0.000	0.007
HEALTH PHYSICS PERSONNEL	11	0	33	44	2.610	0.000	7.628	10.238
SUPERVISORY PERSONNEL	13	0	3	16	4.158	0.115	1.576	5.849
ENGINEERING PERSONNEL	6	0	21	27	1.330	0.000	11.636	12.966
TOTAL	50	0	230	280	15.953	0.155	107.067	123.175
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	7	8	0.362	0.161	2.902	3.425
OPERATIONS PERSONNEL	0	0	0	0	0.012	0.000	0.000	0.012
HEALTH PHYSICS PERSONNEL	5	0	37	42	1.607	0.000	10.945	12.552
SUPERVISORY PERSONNEL	4	0	0	4	0.731	0.002	0.000	0.733
ENGINEERING PERSONNEL	0	0	0	0	0.001	0.000	0.000	0.001
TOTAL	10	0	44	54	2.713	0.163	13.847	16.723
REFUELING								
MAINTENANCE PERSONNEL	5	1	60	66	1.977	0.422	17.960	20.359
OPERATIONS PERSONNEL	0	0	0	0	0.933	0.000	0.093	1.026
HEALTH PHYSICS PERSONNEL	25	0	29	54	7.703	0.000	9.786	17.489
SUPERVISORY PERSONNEL	8	0	0	8	2.790	0.009	0.062	2.861
ENGINEERING PERSONNEL	0	0	6	6	0.142	0.000	4.314	4.456
TOTAL	38	1	95	134	13.545	0.431	32.215	46.191
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	67	1	387	455	22.913	1.504	159.911	184.328
OPERATIONS PERSONNEL	15	0	0	15	5.125	0.000	0.125	5.250
HEALTH PHYSICS PERSONNEL	48	0	104	152	14.911	0.000	31.189	46.100
SUPERVISORY PERSONNEL	31	0	6	37	11.372	0.370	2.577	14.319
ENGINEERING PERSONNEL	9	0	38	47	2.872	0.000	20.159	23.031
GRAND TOTALS	170	1	535	706	57.193	1.874	213.961	273.028

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

PLANT: *ST. LUCIE 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	3	3	0.625	0.025	1.795	2.445
OPERATIONS PERSONNEL	38	0	6	44	17.940	0.406	2.578	20.924
HEALTH PHYSICS PERSONNEL	25	0	30	55	6.420	0.000	9.467	15.887
SUPERVISORY PERSONNEL	1	0	0	1	0.130	0.000	0.000	0.130
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.110	0.050	0.160
TOTAL	64	0	39	103	25.115	0.541	13.890	39.546
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	158	6	289	453	97.161	2.490	127.918	227.569
OPERATIONS PERSONNEL	9	6	57	72	3.502	1.760	33.610	38.872
HEALTH PHYSICS PERSONNEL	41	0	75	116	24.248	0.000	47.995	72.243
SUPERVISORY PERSONNEL	0	0	0	0	0.140	0.000	0.000	0.140
ENGINEERING PERSONNEL	0	4	6	10	0.000	2.060	1.460	3.520
TOTAL	208	16	427	651	125.051	6.310	210.983	342.344
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	1	38	39	0.165	0.295	15.000	15.460
OPERATIONS PERSONNEL	1	0	10	11	0.770	0.020	2.475	3.265
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.025	0.000	0.120	0.145
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	1	10	11	0.000	0.495	3.400	3.895
TOTAL	1	2	58	61	0.960	0.810	20.995	22.765
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	109	4	87	200	39.115	1.310	36.780	77.205
OPERATIONS PERSONNEL	1	2	58	61	0.900	0.915	48.455	50.270
HEALTH PHYSICS PERSONNEL	6	0	4	10	2.075	0.000	1.150	3.225
SUPERVISORY PERSONNEL	0	0	0	0	0.020	0.000	0.000	0.020
ENGINEERING PERSONNEL	0	1	0	1	0.000	0.490	0.065	0.555
TOTAL	116	7	149	272	42.110	2.715	86.450	131.275
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	5	6	0.620	0.000	1.940	2.560
OPERATIONS PERSONNEL	0	0	3	3	0.090	0.000	1.620	1.710
HEALTH PHYSICS PERSONNEL	5	0	1	6	1.590	0.000	0.745	2.335
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	6	0	9	15	2.300	0.000	4.305	6.605
REFUELING								
MAINTENANCE PERSONNEL	4	0	1	5	1.095	0.000	0.240	1.335
OPERATIONS PERSONNEL	2	3	2	7	1.350	0.695	0.660	2.705
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.020	0.000	0.000	0.020
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	6	3	3	12	2.465	0.695	0.900	4.060
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	272(180)	11 (9)	423 (357)	706 (546)	138.781	4.120	183.673	326.574
OPERATIONS PERSONNEL	51 (61)	11 (7)	136 (118)	198 (186)	24.552	3.796	89.398	117.746
HEALTH PHYSICS PERSONNEL	77 (56)	0 (0)	110 (87)	187 (143)	34.378	0.000	59.477	93.855
SUPERVISORY PERSONNEL	1 (1)	0 (0)	0 (0)	1 (1)	0.290	0.000	0.000	0.290
ENGINEERING PERSONNEL	0 (0)	6 (6)	16 (14)	22 (20)	0.000	3.155	4.975	8.130
GRAND TOTALS	401(298)	28 (22)	685 (576)	1114 (896)	198.001	11.071	337.523	546.595

*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

1993

PLANT: *SUMMER 1 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM)				TOTAL PERSON-REM			
	STATION	UTILITY	CONTRACT	TOTAL	STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	1	0	0	1	0.540	0.000	0.394	0.934
OPERATIONS PERSONNEL	5	0	1	6	3.294	0.000	0.313	3.607
HEALTH PHYSICS PERSONNEL	4	0	10	14	1.470	0.000	3.569	5.039
SUPERVISORY PERSONNEL	0	0	0	0	0.109	0.000	0.006	0.115
ENGINEERING PERSONNEL	0	0	0	0	0.132	0.000	0.062	0.194
TOTAL	10	0	11	21	5.545	0.000	4.344	9.889
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	37	0	143	180	11.674	0.000	50.066	61.740
OPERATIONS PERSONNEL	6	2	12	20	3.675	0.528	3.428	7.631
HEALTH PHYSICS PERSONNEL	8	0	46	54	2.599	0.000	13.256	15.855
SUPERVISORY PERSONNEL	1	0	0	1	0.319	0.000	0.026	0.345
ENGINEERING PERSONNEL	0	0	23	23	0.295	0.000	11.803	12.098
TOTAL	52	2	224	278	18.562	0.528	78.579	97.669
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	7	7	0.061	0.000	2.863	2.924
OPERATIONS PERSONNEL	0	0	0	0	0.246	0.000	0.021	0.267
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.017	0.000	0.218	0.235
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	13	13	0.000	0.000	4.223	4.223
TOTAL	0	0	20	20	0.324	0.000	7.325	7.649
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	17	0	250	267	6.247	0.000	109.785	116.032
OPERATIONS PERSONNEL	8	0	7	15	2.787	0.000	1.339	4.126
HEALTH PHYSICS PERSONNEL	13	0	75	88	3.849	0.000	18.656	22.505
SUPERVISORY PERSONNEL	0	0	0	0	0.146	0.000	0.000	0.146
ENGINEERING PERSONNEL	2	0	33	35	0.872	0.000	13.014	13.886
TOTAL	40	0	365	405	13.901	0.000	142.794	156.695
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0	0	0.082	0.000	0.185	0.267
OPERATIONS PERSONNEL	0	0	0	0	0.006	0.000	0.263	0.269
HEALTH PHYSICS PERSONNEL	6	0	1	7	1.239	0.000	0.801	2.040
SUPERVISORY PERSONNEL	1	0	0	1	0.110	0.000	0.000	0.110
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.005	0.005
TOTAL	7	0	1	8	1.437	0.000	1.254	2.691
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.030	0.000	0.124	0.154
OPERATIONS PERSONNEL	0	0	0	0	0.031	0.000	0.066	0.097
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.045	0.000	0.095	0.140
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.007	0.000	0.088	0.095
TOTAL	0	0	0	0	0.113	0.000	0.373	0.486
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	55	0	400	455	18.634	0.000	163.417	182.051
OPERATIONS PERSONNEL	19	2	20	41	10.039	0.528	5.430	15.997
HEALTH PHYSICS PERSONNEL	31	0	132	163	9.219	0.000	36.595	45.814
SUPERVISORY PERSONNEL	2	0	0	2	0.684	0.000	0.032	0.716
ENGINEERING PERSONNEL	2	0	69	71	1.306	0.000	29.195	30.501
GRAND TOTALS	109	2	621	732	39.882	0.528	234.669	275.079

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	193	0	382	575	4.234	0.000	1.506	5.740
OPERATIONS PERSONNEL	328	51	104	483	20.053	0.069	1.428	21.550
HEALTH PHYSICS PERSONNEL	83	4	186	273	15.141	0.017	23.189	38.347
SUPERVISORY PERSONNEL	144	4	43	191	3.913	0.015	1.395	5.323
ENGINEERING PERSONNEL	99	46	15	160	1.845	0.161	0.215	2.221
TOTAL	847	105	730	1682	45.186	0.262	27.733	73.181
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	180	0	566	746	60.951	0.000	75.224	136.175
OPERATIONS PERSONNEL	229	12	57	298	5.770	0.010	4.401	10.181
HEALTH PHYSICS PERSONNEL	63	1	133	197	16.377	0.000	16.988	33.365
SUPERVISORY PERSONNEL	80	0	42	122	4.864	0.000	4.842	9.706
ENGINEERING PERSONNEL	46	11	32	89	1.880	0.089	3.238	5.207
TOTAL	598	24	830	1452	89.842	0.099	104.693	194.634
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	13	0	140	153	0.033	0.000	18.877	18.910
OPERATIONS PERSONNEL	2	0	12	14	0.014	0.000	1.816	1.830
HEALTH PHYSICS PERSONNEL	9	0	23	32	0.146	0.000	1.084	1.230
SUPERVISORY PERSONNEL	4	0	11	15	0.013	0.000	2.985	2.998
ENGINEERING PERSONNEL	6	0	22	28	0.775	0.000	3.617	4.392
TOTAL	34	0	208	242	0.981	0.000	28.379	29.360
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	51	0	409	460	0.946	0.000	55.251	56.197
OPERATIONS PERSONNEL	122	1	13	136	1.449	0.001	1.493	2.943
HEALTH PHYSICS PERSONNEL	27	0	77	104	2.105	0.000	7.249	9.354
SUPERVISORY PERSONNEL	13	0	29	42	0.600	0.000	5.343	5.943
ENGINEERING PERSONNEL	17	15	49	81	0.600	0.578	13.312	14.490
TOTAL	230	16	577	823	5.700	0.579	82.648	88.927
WASTE PROCESSING								
MAINTENANCE PERSONNEL	14	0	10	24	0.043	0.000	0.028	0.071
OPERATIONS PERSONNEL	18	2	3	23	0.488	0.001	0.008	0.497
HEALTH PHYSICS PERSONNEL	38	0	9	47	0.945	0.000	0.049	0.994
SUPERVISORY PERSONNEL	9	0	2	11	0.237	0.000	0.003	0.240
ENGINEERING PERSONNEL	3	0	0	3	0.001	0.000	0.000	0.001
TOTAL	82	2	24	108	1.714	0.001	0.088	1.803
REFUELING								
MAINTENANCE PERSONNEL	1	0	36	37	0.002	0.000	2.080	2.082
OPERATIONS PERSONNEL	12	6	5	23	0.323	0.057	0.092	0.472
HEALTH PHYSICS PERSONNEL	24	0	30	54	0.232	0.000	0.253	0.485
SUPERVISORY PERSONNEL	6	0	1	7	0.233	0.000	0.001	0.234
ENGINEERING PERSONNEL	0	1	1	2	0.000	0.047	0.330	0.377
TOTAL	43	7	73	123	0.790	0.104	2.756	3.650
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	452	0	1543	1995	66.209	0.000	152.966	219.175
OPERATIONS PERSONNEL	711	72	194	977	28.097	0.138	9.238	37.473
HEALTH PHYSICS PERSONNEL	244	5	458	707	34.946	0.017	48.812	83.775
SUPERVISORY PERSONNEL	256	4	128	388	9.860	0.015	14.569	24.444
ENGINEERING PERSONNEL	171	73	119	363	5.101	0.875	20.712	26.688
GRAND TOTALS	1834	154	2442	4430	144.213	1.045	246.297	391.555

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	59	0	0	59	16.587	0.000	0.000	16.587
HEALTH PHYSICS PERSONNEL	4	0	2	6	0.924	0.000	0.255	1.179
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	63	0	2	65	17.511	0.000	0.255	17.766
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	220	6	198	424	85.734	1.406	87.416	174.556
OPERATIONS PERSONNEL	3	0	8	11	0.820	0.000	3.124	3.944
HEALTH PHYSICS PERSONNEL	29	0	132	161	12.181	0.000	40.451	52.632
SUPERVISORY PERSONNEL	7	1	0	8	1.262	0.175	0.000	1.437
ENGINEERING PERSONNEL	13	3	15	31	2.226	0.331	6.484	9.041
TOTAL	272	10	353	635	102.223	1.912	137.475	241.610
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	34	0	36	70	13.131	0.000	17.068	30.199
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	0.125	0.000	0.000	0.125
ENGINEERING PERSONNEL	2	0	2	4	0.464	0.000	0.895	1.359
TOTAL	37	0	38	75	13.720	0.000	17.963	31.683
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	28	0	9	37	12.220	0.000	1.162	13.382
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	2	0	0	2	0.629	0.000	0.000	0.629
ENGINEERING PERSONNEL	0	0	1	1	0.000	0.000	0.195	0.195
TOTAL	30	0	10	40	12.849	0.000	1.357	14.206
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	0	2	0.305	0.000	0.000	0.305
OPERATIONS PERSONNEL	0	0	3	3	0.000	0.000	2.015	2.015
HEALTH PHYSICS PERSONNEL	3	0	1	4	1.295	0.000	0.275	1.570
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	1	1	0.000	0.000	0.440	0.440
TOTAL	5	0	5	10	1.600	0.000	2.730	4.330
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	7	0	0	7	1.156	0.000	0.000	1.156
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
SUPERVISORY PERSONNEL	1	0	0	1	0.145	0.000	0.000	0.145
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	8	0	0	8	1.301	0.000	0.000	1.301
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	284	6	243	533	111.390	1.406	105.646	218.442
OPERATIONS PERSONNEL	69	0	11	80	18.563	0.000	5.139	23.702
HEALTH PHYSICS PERSONNEL	36	0	135	171	14.400	0.000	40.981	55.381
SUPERVISORY PERSONNEL	11	1	0	12	2.161	0.175	0.000	2.336
ENGINEERING PERSONNEL	15	3	19	37	2.690	0.331	8.014	11.035
GRAND TOTALS	415	10	408	833	149.204	1.912	159.780	310.896

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	135	11	456	602	4.749	0.266	7.476	12.491
OPERATIONS PERSONNEL	101	3	1	105	17.309	0.087	0.010	17.406
HEALTH PHYSICS PERSONNEL	70	4	44	118	14.626	0.011	5.481	20.118
SUPERVISORY PERSONNEL	194	48	52	294	6.473	0.390	2.035	8.898
ENGINEERING PERSONNEL	72	9	25	106	2.848	0.311	0.552	3.711
TOTAL	572	75	578	1225	46.005	1.065	15.554	62.624
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	150	7	652	809	17.609	0.157	10.931	28.697
OPERATIONS PERSONNEL	66	6	4	76	1.431	0.009	0.017	1.457
HEALTH PHYSICS PERSONNEL	39	5	33	77	1.615	0.009	2.356	3.980
SUPERVISORY PERSONNEL	233	56	55	344	4.252	0.041	0.529	4.822
ENGINEERING PERSONNEL	87	21	23	131	1.035	0.064	0.280	1.379
TOTAL	575	95	767	1437	25.942	0.280	14.113	40.335
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	40	3	305	348	1.027	0.000	14.847	15.874
OPERATIONS PERSONNEL	12	0	0	12	0.062	0.000	0.000	0.062
HEALTH PHYSICS PERSONNEL	15	1	22	38	0.294	0.000	0.216	0.510
SUPERVISORY PERSONNEL	20	5	10	35	0.471	0.025	0.536	1.032
ENGINEERING PERSONNEL	3	5	11	19	0.002	0.222	1.369	1.593
TOTAL	90	14	348	452	1.856	0.247	16.968	19.071
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	126	4	561	691	8.755	0.075	59.795	68.625
OPERATIONS PERSONNEL	52	0	3	55	2.330	0.000	0.056	2.386
HEALTH PHYSICS PERSONNEL	26	0	14	40	0.862	0.000	0.463	1.325
SUPERVISORY PERSONNEL	60	3	27	90	1.996	0.016	0.513	2.525
ENGINEERING PERSONNEL	20	3	20	43	0.612	0.056	1.395	2.063
TOTAL	284	10	625	919	14.555	0.147	62.222	76.924
WASTE PROCESSING								
MAINTENANCE PERSONNEL	67	2	222	291	0.981	0.020	3.955	4.956
OPERATIONS PERSONNEL	53	0	0	53	11.108	0.000	0.000	11.108
HEALTH PHYSICS PERSONNEL	38	1	12	51	1.076	0.000	0.390	1.466
SUPERVISORY PERSONNEL	48	4	11	63	1.194	0.005	0.008	1.207
ENGINEERING PERSONNEL	4	1	5	10	0.003	0.000	0.000	0.003
TOTAL	210	8	250	468	14.362	0.025	4.353	18.740
REFUELING								
MAINTENANCE PERSONNEL	78	2	150	230	2.164	0.010	13.678	15.852
OPERATIONS PERSONNEL	73	0	0	73	2.556	0.000	0.000	2.556
HEALTH PHYSICS PERSONNEL	9	0	11	20	1.510	0.000	0.757	2.267
SUPERVISORY PERSONNEL	52	3	8	63	1.743	0.008	0.253	2.004
ENGINEERING PERSONNEL	11	6	7	24	0.287	0.026	1.143	1.456
TOTAL	223	11	176	410	8.260	0.044	15.831	24.135
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	596(151)	29 (19)	2346 (889)	2971 (1059)	35.285	0.528	110.682	146.495
OPERATIONS PERSONNEL	357(117)	9 (7)	8 (4)	374 (128)	34.796	0.096	0.083	34.975
HEALTH PHYSICS PERSONNEL	197 (70)	11 (8)	136 (44)	344 (122)	19.983	0.020	9.663	29.666
SUPERVISORY PERSONNEL	607(275)	119(100)	163 (73)	889 (448)	16.129	0.485	3.874	20.488
ENGINEERING PERSONNEL	197(105)	45 (31)	91 (52)	333 (188)	4.787	0.679	4.739	10.205
GRAND TOTALS	1954(718)	213(165)	2744 (1062)	4911 (1945)	110.980	1.808	129.041	241.829

*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

1993

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	4	0	24	28	0.228	0.000	0.226	0.454
OPERATIONS PERSONNEL	15	0	0	15	0.281	0.000	0.000	0.281
HEALTH PHYSICS PERSONNEL	7	0	8	15	0.382	0.000	0.223	0.605
SUPERVISORY PERSONNEL	5	1	1	7	0.170	0.040	0.080	0.290
ENGINEERING PERSONNEL	0	0	3	3	0.000	0.000	0.053	0.053
TOTAL	31	1	36	68	1.061	0.040	0.582	1.683
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	50	2	117	169	0.938	0.000	0.454	1.392
OPERATIONS PERSONNEL	30	0	0	30	0.041	0.000	0.000	0.041
HEALTH PHYSICS PERSONNEL	18	1	4	23	0.237	0.000	0.005	0.242
SUPERVISORY PERSONNEL	21	3	22	46	0.172	0.000	0.146	0.318
ENGINEERING PERSONNEL	8	0	7	15	0.002	0.000	0.001	0.003
TOTAL	127	6	150	283	1.390	0.000	0.606	1.996
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	27	6	72	105	0.033	0.000	0.360	0.393
OPERATIONS PERSONNEL	98	0	1	99	0.656	0.000	0.000	0.656
HEALTH PHYSICS PERSONNEL	43	5	14	62	1.810	0.000	2.382	4.192
SUPERVISORY PERSONNEL	172	28	18	218	0.497	0.042	0.080	0.619
ENGINEERING PERSONNEL	38	3	6	47	0.043	0.009	0.047	0.099
TOTAL	378	42	111	531	3.039	0.051	2.869	5.959
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	21	4	163	188	0.558	0.013	2.701	3.272
OPERATIONS PERSONNEL	35	0	2	37	0.596	0.000	0.007	0.603
HEALTH PHYSICS PERSONNEL	23	2	8	33	0.715	0.058	0.318	1.091
SUPERVISORY PERSONNEL	16	9	8	33	0.137	0.185	0.462	0.784
ENGINEERING PERSONNEL	9	0	3	12	0.101	0.000	0.010	0.111
TOTAL	104	15	184	303	2.107	0.256	3.498	5.861
WASTE PROCESSING								
MAINTENANCE PERSONNEL	45	5	109	159	0.910	0.015	11.711	12.636
OPERATIONS PERSONNEL	55	2	2	59	4.739	0.000	0.015	4.754
HEALTH PHYSICS PERSONNEL	31	0	10	41	2.748	0.000	1.635	4.383
SUPERVISORY PERSONNEL	33	6	14	53	0.599	0.007	1.311	1.917
ENGINEERING PERSONNEL	11	1	2	14	0.040	0.000	0.002	0.042
TOTAL	175	14	137	326	9.036	0.022	14.674	23.732
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	147 (74)	17 (16)	485 (235)	649 (325)	2.667	0.028	15.452	18.147
OPERATIONS PERSONNEL	233(113)	2 (2)	5 (3)	240 (118)	6.313	0.000	0.022	6.335
HEALTH PHYSICS PERSONNEL	122 (53)	8 (7)	44 (14)	174 (74)	5.892	0.058	4.563	10.513
SUPERVISORY PERSONNEL	247(187)	47 (41)	63 (33)	357 (261)	1.575	0.274	2.079	3.928
ENGINEERING PERSONNEL	66 (42)	4 (4)	21 (10)	91 (56)	0.186	0.009	0.113	0.308
GRAND TOTALS	815(469)	78 (70)	618 (295)	1511 (834)	16.633	0.369	22.229	39.231

*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

1993

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	0	0	0	0	0.130	0.000	0.010	0.140
OPERATIONS PERSONNEL	2	0	0	2	1.300	0.000	0.000	1.300
HEALTH PHYSICS PERSONNEL	4	0	0	4	1.730	0.000	0.130	1.860
SUPERVISORY PERSONNEL	0	0	0	0	0.240	0.000	0.480	0.720
ENGINEERING PERSONNEL	0	0	0	0	0.170	0.000	0.010	0.180
TOTAL	6	0	0	6	3.570	0.000	0.630	4.200
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	2	0	0	2	1.690	0.010	0.280	1.980
OPERATIONS PERSONNEL	0	0	0	0	0.030	0.000	0.000	0.030
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.330	0.000	0.040	0.370
SUPERVISORY PERSONNEL	0	0	0	0	0.030	0.000	0.070	0.100
ENGINEERING PERSONNEL	0	0	0	0	0.040	0.000	0.010	0.050
TOTAL	2	0	0	2	2.120	0.010	0.400	2.530
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	0.040	0.000	0.160	0.200
OPERATIONS PERSONNEL	0	0	0	0	0.010	0.000	0.000	0.010
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.190	0.000	0.030	0.220
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	0.240	0.000	0.190	0.430
WASTE PROCESSING								
MAINTENANCE PERSONNEL	4	0	0	4	0.760	0.000	0.010	0.770
OPERATIONS PERSONNEL	0	0	0	0	0.340	0.000	0.000	0.340
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.670	0.000	0.350	1.020
SUPERVISORY PERSONNEL	0	0	0	0	0.030	0.000	0.000	0.030
ENGINEERING PERSONNEL	0	0	0	0	0.010	0.000	0.000	0.010
TOTAL	4	0	1	5	1.810	0.000	0.360	2.170
REFUELING								
MAINTENANCE PERSONNEL	7	0	0	7	1.680	0.000	0.120	1.800
OPERATIONS PERSONNEL	1	0	0	1	0.180	0.000	0.000	0.180
HEALTH PHYSICS PERSONNEL	3	0	7	10	0.760	0.000	1.860	2.620
SUPERVISORY PERSONNEL	0	0	0	0	0.170	0.000	0.010	0.180
ENGINEERING PERSONNEL	0	0	26	26	0.180	0.000	12.150	12.330
TOTAL	11	0	33	44	2.970	0.000	14.140	17.110
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	13 (6)	0 (0)	0 (0)	13 (6)	4.300	0.010	0.580	4.890
OPERATIONS PERSONNEL	3 (1)	0 (0)	0 (0)	3 (1)	1.860	0.000	0.000	1.860
HEALTH PHYSICS PERSONNEL	7 (9)	0 (0)	8 (6)	15 (15)	3.680	0.000	2.410	6.090
SUPERVISORY PERSONNEL	0 (0)	0 (0)	0 (0)	0 (0)	0.470	0.000	0.560	1.030
ENGINEERING PERSONNEL	0 (0)	0 (0)	26 (26)	26 (26)	0.400	0.000	12.170	12.570
GRAND TOTALS	23 (16)	0 (0)	34 (32)	57 (48)	10.710	0.010	15.720	26.440

*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

1993

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	4	0	0	4	1.014	0.000	0.003	1.017
OPERATIONS PERSONNEL	17	0	0	17	4.316	0.000	0.000	4.316
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.088	0.000	0.006	0.094
SUPERVISORY PERSONNEL	1	0	0	1	0.225	0.004	0.000	0.229
ENGINEERING PERSONNEL	3	0	0	3	0.489	0.000	0.000	0.489
TOTAL	25	0	0	25	6.132	0.004	0.009	6.145
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	76	3	149	228	29.813	1.172	47.305	78.290
OPERATIONS PERSONNEL	12	0	5	17	3.406	0.012	1.410	4.828
HEALTH PHYSICS PERSONNEL	39	0	61	100	15.823	0.000	18.362	34.185
SUPERVISORY PERSONNEL	3	1	2	6	1.219	0.764	1.513	3.496
ENGINEERING PERSONNEL	12	1	6	19	4.501	0.190	1.356	6.047
TOTAL	142	5	223	370	54.762	2.138	69.946	126.846
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	3	0	29	32	1.078	0.300	44.900	46.278
OPERATIONS PERSONNEL	0	0	0	0	2.887	0.000	7.612	10.499
HEALTH PHYSICS PERSONNEL	2	0	1	3	0.139	0.000	6.438	6.577
SUPERVISORY PERSONNEL	0	0	1	1	0.005	0.003	4.090	4.098
ENGINEERING PERSONNEL	0	1	1	2	1.778	0.042	2.144	3.964
TOTAL	5	1	32	38	5.887	0.345	65.184	71.416
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	3	1	94	98	1.420	0.154	15.806	17.380
OPERATIONS PERSONNEL	8	0	24	32	0.366	0.000	0.000	0.366
HEALTH PHYSICS PERSONNEL	1	0	24	25	0.748	0.000	0.281	1.029
SUPERVISORY PERSONNEL	0	0	14	14	0.028	0.007	0.179	0.214
ENGINEERING PERSONNEL	6	0	10	16	0.293	0.112	0.280	0.685
TOTAL	18	1	166	185	2.855	0.273	16.546	19.674
WASTE PROCESSING								
MAINTENANCE PERSONNEL	9	0	1	10	3.964	0.000	0.308	4.272
OPERATIONS PERSONNEL	1	0	0	1	0.334	0.000	0.032	0.366
HEALTH PHYSICS PERSONNEL	14	0	4	18	4.226	0.000	2.880	7.106
SUPERVISORY PERSONNEL	0	0	0	0	0.002	0.000	0.000	0.002
ENGINEERING PERSONNEL	1	0	0	1	0.353	0.000	0.000	0.353
TOTAL	25	0	5	30	8.879	0.000	3.220	12.099
REFUELING								
MAINTENANCE PERSONNEL	27	9	46	82	13.486	6.054	15.590	35.130
OPERATIONS PERSONNEL	8	8	2	18	2.786	9.031	0.919	12.736
HEALTH PHYSICS PERSONNEL	2	0	15	17	0.805	0.000	3.794	4.599
SUPERVISORY PERSONNEL	0	4	3	7	0.080	4.440	0.652	5.172
ENGINEERING PERSONNEL	3	0	1	4	1.142	0.071	0.279	1.492
TOTAL	40	21	67	128	18.299	19.596	21.234	59.129
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	122(108)	13 (14)	319 (264)	454 (386)	50.775	7.680	123.912	182.367
OPERATIONS PERSONNEL	46 (39)	8 (8)	31 (29)	85 (76)	14.095	9.043	9.973	33.111
HEALTH PHYSICS PERSONNEL	58 (41)	0 (0)	105 (75)	163 (116)	21.829	0.000	31.761	53.590
SUPERVISORY PERSONNEL	4 (5)	5 (5)	20 (21)	29 (31)	1.559	5.218	6.434	13.211
ENGINEERING PERSONNEL	25 (26)	2 (2)	18 (18)	45 (46)	8.556	0.415	4.059	13.030
GRAND TOTALS	255(219)	28 (29)	493 (407)	776 (655)	96.814	22.356	176.139	295.309

*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

1993

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	15	0	31	46	4.080	0.000	14.402	18.482
OPERATIONS PERSONNEL	31	0	1	32	9.167	0.000	0.779	9.946
HEALTH PHYSICS PERSONNEL	15	0	13	28	4.714	0.000	5.076	9.790
SUPERVISORY PERSONNEL	1	0	0	1	0.179	0.000	0.110	0.289
ENGINEERING PERSONNEL	0	0	0	0	0.300	0.015	0.066	0.381
TOTAL	62	0	45	107	18.440	0.015	20.433	38.888
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	36	0	190	226	13.495	0.000	66.964	80.459
OPERATIONS PERSONNEL	21	0	1	22	5.467	0.000	0.442	5.909
HEALTH PHYSICS PERSONNEL	8	0	26	34	3.141	0.000	12.144	15.285
SUPERVISORY PERSONNEL	1	0	0	1	0.403	0.000	0.123	0.526
ENGINEERING PERSONNEL	2	0	1	3	0.425	0.002	0.196	0.623
TOTAL	68	0	218	286	22.931	0.002	79.869	102.802
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	40	40	0.018	0.000	12.887	12.905
OPERATIONS PERSONNEL	4	0	0	4	1.222	0.000	0.000	1.222
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.027	0.027
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.032	0.032
ENGINEERING PERSONNEL	0	0	0	0	0.041	0.000	0.000	0.041
TOTAL	4	0	40	44	1.281	0.000	12.946	14.227
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	9	0	138	147	3.317	0.000	40.424	43.741
OPERATIONS PERSONNEL	0	0	0	0	0.277	0.000	0.000	0.277
HEALTH PHYSICS PERSONNEL	3	0	7	10	0.594	0.000	1.692	2.286
SUPERVISORY PERSONNEL	0	0	0	0	0.004	0.000	0.004	0.008
ENGINEERING PERSONNEL	0	0	0	0	0.026	0.034	0.002	0.062
TOTAL	12	0	145	157	4.218	0.034	42.122	46.374
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	1	0	1	2	0.130	0.000	0.121	0.251
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	1	0	1	2	0.130	0.000	0.121	0.251
REFUELING								
MAINTENANCE PERSONNEL	0	0	0	0	0.144	0.000	0.971	1.115
OPERATIONS PERSONNEL	0	0	0	0	0.612	0.000	0.031	0.643
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.018	0.000	0.040	0.058
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.105	0.000	0.000	0.105
TOTAL	0	0	0	0	0.879	0.000	1.042	1.921
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	60	0	399	459	21.054	0.000	135.648	156.702
OPERATIONS PERSONNEL	56	0	2	58	16.745	0.000	1.252	17.997
HEALTH PHYSICS PERSONNEL	27	0	47	74	8.597	0.000	19.100	27.697
SUPERVISORY PERSONNEL	2	0	0	2	0.586	0.000	0.269	0.855
ENGINEERING PERSONNEL	2	0	1	3	0.897	0.051	0.264	1.212
GRAND TOTALS	147	0	449	596	47.879	0.051	156.533	204.463

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	13	0	27	40	6.482	0.000	12.608	19.090
OPERATIONS PERSONNEL	5	1	0	6	1.502	0.107	0.067	1.676
HEALTH PHYSICS PERSONNEL	14	0	9	23	4.981	0.031	4.045	9.057
SUPERVISORY PERSONNEL	1	0	6	7	0.273	0.000	2.659	2.932
ENGINEERING PERSONNEL	0	0	1	1	0.238	0.000	0.601	0.839
TOTAL	33	1	43	77	13.476	0.138	19.980	33.594
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	10	0	31	41	4.148	0.000	12.724	16.872
OPERATIONS PERSONNEL	27	0	0	27	6.730	0.000	0.017	6.747
HEALTH PHYSICS PERSONNEL	8	0	10	18	2.696	0.031	4.687	7.414
SUPERVISORY PERSONNEL	1	0	4	5	0.274	0.021	1.262	1.557
ENGINEERING PERSONNEL	1	0	4	5	0.375	0.000	2.432	2.807
TOTAL	47	0	49	96	14.223	0.052	21.122	35.397
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	21	0	44	65	6.778	0.000	16.132	22.910
OPERATIONS PERSONNEL	2	1	0	3	0.727	0.107	0.017	0.851
HEALTH PHYSICS PERSONNEL	3	0	6	9	1.044	0.031	2.868	3.943
SUPERVISORY PERSONNEL	0	0	14	14	0.080	0.000	5.407	5.487
ENGINEERING PERSONNEL	0	0	0	0	0.138	0.000	0.320	0.458
TOTAL	26	1	64	91	8.767	0.138	24.744	33.649
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	62	0	169	231	24.253	0.000	72.285	96.538
OPERATIONS PERSONNEL	22	0	0	22	6.002	0.000	0.017	6.019
HEALTH PHYSICS PERSONNEL	24	0	82	106	8.768	0.031	30.657	39.456
SUPERVISORY PERSONNEL	2	0	20	22	1.974	0.000	7.232	9.206
ENGINEERING PERSONNEL	0	0	9	9	0.411	0.000	2.632	3.043
TOTAL	110	0	280	390	41.408	0.031	112.823	154.262
WASTE PROCESSING								
MAINTENANCE PERSONNEL	3	0	11	14	1.452	0.000	4.741	6.193
OPERATIONS PERSONNEL	5	0	0	5	1.875	0.000	0.017	1.892
HEALTH PHYSICS PERSONNEL	11	0	23	34	4.331	0.031	13.061	17.423
SUPERVISORY PERSONNEL	0	0	1	1	0.080	0.000	0.510	0.590
ENGINEERING PERSONNEL	0	0	0	0	0.068	0.000	0.133	0.201
TOTAL	19	0	35	54	7.806	0.031	18.462	26.299
REFUELING								
MAINTENANCE PERSONNEL	49	1	65	115	19.863	0.781	36.023	56.667
OPERATIONS PERSONNEL	9	0	0	9	2.682	0.053	0.017	2.752
HEALTH PHYSICS PERSONNEL	19	0	42	61	5.316	0.031	12.896	18.243
SUPERVISORY PERSONNEL	1	0	5	6	0.488	0.000	2.203	2.691
ENGINEERING PERSONNEL	2	0	6	8	0.508	0.000	2.558	3.066
TOTAL	80	1	118	199	28.857	0.865	53.697	83.419
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	158	1	347	506	62.976	0.781	154.513	218.270
OPERATIONS PERSONNEL	70	2	0	72	19.518	0.267	0.152	19.937
HEALTH PHYSICS PERSONNEL	79	0	172	251	27.136	0.186	68.214	95.536
SUPERVISORY PERSONNEL	5	0	50	55	3.169	0.021	19.273	22.463
ENGINEERING PERSONNEL	3	0	20	23	1.738	0.000	8.676	10.414
GRAND TOTALS	315	3	589	907	114.537	1.255	250.828	366.620

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	0	0	0	0	0.178	0.000	0.021	0.199
OPERATIONS PERSONNEL	0	0	0	0	0.252	0.000	0.000	0.252
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.346	0.000	0.178	0.524
SUPERVISORY PERSONNEL	1	0	0	1	0.144	0.000	0.000	0.144
ENGINEERING PERSONNEL	0	0	0	0	0.004	0.081	0.000	0.085
TOTAL	2	0	0	2	0.924	0.081	0.199	1.204
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	249	7	261	517	153.751	3.060	136.977	293.788
OPERATIONS PERSONNEL	59	6	0	65	33.959	1.156	0.004	35.119
HEALTH PHYSICS PERSONNEL	45	2	51	98	27.107	0.344	29.419	56.870
SUPERVISORY PERSONNEL	18	2	1	21	5.138	0.582	0.395	6.115
ENGINEERING PERSONNEL	16	26	45	87	4.746	8.644	18.057	31.447
TOTAL	387	43	358	788	224.701	13.786	184.852	423.339
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	13	13	0.008	0.000	5.170	5.178
OPERATIONS PERSONNEL	0	0	0	0	0.008	0.000	0.000	0.008
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.127	0.000	0.144	0.271
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	1	2	5	8	0.246	0.697	3.081	4.024
TOTAL	1	2	18	21	0.389	0.697	8.395	9.481
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	6	0	1	7	3.862	0.098	0.595	4.555
OPERATIONS PERSONNEL	0	0	0	0	0.042	0.000	0.000	0.042
HEALTH PHYSICS PERSONNEL	1	0	1	2	0.627	0.000	0.314	0.941
SUPERVISORY PERSONNEL	1	0	0	1	0.285	0.000	0.000	0.285
ENGINEERING PERSONNEL	2	1	1	4	0.612	0.166	0.136	0.914
TOTAL	10	1	3	14	5.428	0.264	1.045	6.737
WASTE PROCESSING								
MAINTENANCE PERSONNEL	6	0	0	6	3.426	0.013	0.000	3.439
OPERATIONS PERSONNEL	0	0	0	0	0.013	0.000	0.000	0.013
HEALTH PHYSICS PERSONNEL	2	0	1	3	1.045	0.000	2.182	3.227
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.021	0.013	0.008	0.042
TOTAL	8	0	1	9	4.505	0.026	2.190	6.721
REFUELING								
MAINTENANCE PERSONNEL	3	0	12	15	1.416	0.017	2.715	4.148
OPERATIONS PERSONNEL	3	0	0	3	2.157	0.004	0.000	2.161
HEALTH PHYSICS PERSONNEL	0	0	3	3	0.090	0.000	0.909	0.999
SUPERVISORY PERSONNEL	1	0	1	2	0.217	0.000	0.072	0.289
ENGINEERING PERSONNEL	1	2	9	12	0.123	0.574	1.455	2.152
TOTAL	8	2	25	35	4.003	0.595	5.151	9.749
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	264	7	287	558	162.641	3.188	145.478	311.307
OPERATIONS PERSONNEL	62	6	0	68	36.431	1.160	0.004	37.595
HEALTH PHYSICS PERSONNEL	49	2	56	107	29.342	0.344	33.146	62.832
SUPERVISORY PERSONNEL	21	2	2	25	5.784	0.582	0.467	6.833
ENGINEERING PERSONNEL	20	31	60	111	5.752	10.175	22.737	38.664
GRAND TOTALS	416	48	405	869	239.950	15.449	201.832	457.231

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	0.582	0.000	0.256	0.838
OPERATIONS PERSONNEL	3	0	0	3	1.543	0.000	0.117	1.660
HEALTH PHYSICS PERSONNEL	0	0	1	1	0.051	0.000	0.182	0.233
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	3	0	1	4	2.176	0.000	0.555	2.731
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	6	6	0.527	0.000	2.148	2.675
OPERATIONS PERSONNEL	0	0	0	0	0.043	0.000	0.021	0.064
HEALTH PHYSICS PERSONNEL	1	2	1	4	0.424	1.520	0.511	2.455
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	1	2	7	10	0.994	1.520	2.680	5.194
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	1	0	1	0.035	0.347	0.000	0.382
OPERATIONS PERSONNEL	0	6	0	6	0.079	1.970	0.000	2.049
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.000	0.000	0.006	0.006
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	7	0	7	0.114	2.317	0.006	2.437
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0	0	0.136	0.000	0.132	0.268
OPERATIONS PERSONNEL	0	0	0	0	0.127	0.000	0.002	0.129
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.086	0.000	0.131	0.217
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	0.349	0.000	0.265	0.614
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	4	1	7	0.864	0.789	0.247	1.900
OPERATIONS PERSONNEL	0	0	1	1	0.034	0.000	0.268	0.302
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.187	0.000	0.058	0.245
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	4	2	9	1.085	0.789	0.573	2.447
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	0.002	0.000	0.002	0.004
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	0.002	0.000	0.002	0.004
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	2	5	7	14	2.144	1.136	2.783	6.063
OPERATIONS PERSONNEL	3	6	1	10	1.826	1.970	0.408	4.204
HEALTH PHYSICS PERSONNEL	2	2	2	6	0.750	1.520	0.890	3.160
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	7	13	10	30	4.720	4.626	4.081	13.427

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	0	0	4	4	0.565	0.000	1.871	2.436
OPERATIONS PERSONNEL	11	0	0	11	4.286	0.308	0.272	4.866
HEALTH PHYSICS PERSONNEL	22	0	33	55	6.992	0.051	9.742	16.785
SUPERVISORY PERSONNEL	5	0	2	7	1.706	0.021	1.171	2.898
ENGINEERING PERSONNEL	7	0	4	11	2.697	0.190	0.909	3.796
TOTAL	45	0	43	88	16.246	0.570	13.965	30.781
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	14	0	28	42	6.323	0.000	14.593	20.916
OPERATIONS PERSONNEL	2	0	0	2	0.501	0.010	0.026	0.537
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.338	0.010	0.354	0.702
SUPERVISORY PERSONNEL	2	0	0	2	1.123	0.005	1.013	2.141
ENGINEERING PERSONNEL	0	0	0	0	0.406	0.000	0.201	0.607
TOTAL	18	0	28	46	8.691	0.025	16.187	24.903
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	16	0	17	33	3.974	0.000	4.116	8.090
OPERATIONS PERSONNEL	0	0	0	0	0.054	0.000	0.010	0.064
HEALTH PHYSICS PERSONNEL	1	0	12	13	0.544	0.000	3.288	3.832
SUPERVISORY PERSONNEL	3	0	2	5	1.166	0.000	1.207	2.373
ENGINEERING PERSONNEL	3	1	27	31	0.958	0.123	8.607	9.688
TOTAL	23	1	58	82	6.696	0.123	17.228	24.047
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	34	0	123	157	10.463	0.013	40.804	51.280
OPERATIONS PERSONNEL	1	0	0	1	0.171	0.000	0.001	0.172
HEALTH PHYSICS PERSONNEL	5	0	4	9	2.087	0.000	1.911	3.998
SUPERVISORY PERSONNEL	4	0	2	6	1.090	0.000	1.858	2.948
ENGINEERING PERSONNEL	4	0	22	26	1.987	0.134	5.480	7.601
TOTAL	48	0	151	199	15.798	0.147	50.054	65.999
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	0	1	0.561	0.010	0.292	0.863
OPERATIONS PERSONNEL	0	0	1	1	0.092	0.000	0.457	0.549
HEALTH PHYSICS PERSONNEL	20	0	23	43	6.870	0.010	6.562	13.442
SUPERVISORY PERSONNEL	1	0	0	1	0.180	0.000	0.010	0.190
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
TOTAL	22	0	24	46	7.703	0.020	7.321	15.044
REFUELING								
MAINTENANCE PERSONNEL	35	0	36	71	7.429	0.000	7.962	15.391
OPERATIONS PERSONNEL	1	0	0	1	0.462	0.000	0.134	0.596
HEALTH PHYSICS PERSONNEL	3	0	2	5	0.847	0.000	2.244	3.091
SUPERVISORY PERSONNEL	2	0	2	4	0.647	0.021	0.452	1.120
ENGINEERING PERSONNEL	0	0	1	1	0.349	0.031	1.756	2.136
TOTAL	41	0	41	82	9.734	0.052	12.548	22.334
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	100	0	208	308	29.315	0.023	69.638	98.976
OPERATIONS PERSONNEL	15	0	1	16	5.566	0.318	0.900	6.784
HEALTH PHYSICS PERSONNEL	51	0	74	125	17.678	0.071	24.101	41.850
SUPERVISORY PERSONNEL	17	0	8	25	5.912	0.047	5.711	11.670
ENGINEERING PERSONNEL	14	1	54	69	6.397	0.478	16.953	23.828
GRAND TOTALS	197	1	345	543	64.868	0.937	117.303	183.108

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	0	0	3	3	0.172	0.059	3.145	3.376
OPERATIONS PERSONNEL	2	0	1	3	0.948	0.000	0.528	1.476
HEALTH PHYSICS PERSONNEL	1	0	1	2	0.278	0.060	0.801	1.139
SUPERVISORY PERSONNEL	0	0	0	0	0.014	0.000	0.045	0.059
ENGINEERING PERSONNEL	0	5	1	6	0.104	1.159	0.289	1.552
TOTAL	3	5	6	14	1.516	1.278	4.808	7.602
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	3	0	38	41	0.764	0.040	18.731	19.535
OPERATIONS PERSONNEL	0	0	1	1	0.194	0.000	0.859	1.053
HEALTH PHYSICS PERSONNEL	1	2	27	30	0.239	0.552	9.328	10.119
SUPERVISORY PERSONNEL	0	0	0	0	0.022	0.000	0.016	0.038
ENGINEERING PERSONNEL	0	1	0	1	0.092	0.303	0.060	0.455
TOTAL	4	3	66	73	1.311	0.895	28.994	31.200
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.006	0.000	0.143	0.149
OPERATIONS PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.005	0.000	0.008	0.013
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.000	0.000
ENGINEERING PERSONNEL	0	0	0	0	0.000	0.004	0.000	0.004
TOTAL	0	0	0	0	0.011	0.004	0.151	0.166
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	1	0	71	72	0.305	0.088	55.922	56.315
OPERATIONS PERSONNEL	0	0	0	0	0.172	0.000	0.000	0.172
HEALTH PHYSICS PERSONNEL	0	2	5	7	0.071	0.618	1.616	2.305
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.034	0.034
ENGINEERING PERSONNEL	0	1	0	1	0.037	0.466	0.037	0.540
TOTAL	1	3	76	80	0.585	1.172	57.609	59.366
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	53	54	0.744	0.007	21.616	22.367
OPERATIONS PERSONNEL	0	0	0	0	0.140	0.000	0.056	0.196
HEALTH PHYSICS PERSONNEL	1	1	30	32	0.366	0.212	9.764	10.342
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.025	0.025
ENGINEERING PERSONNEL	0	2	3	5	0.012	0.710	1.181	1.903
TOTAL	2	3	86	91	1.262	0.929	32.642	34.833
REFUELING								
MAINTENANCE PERSONNEL	2	0	55	57	0.420	0.025	27.222	27.667
OPERATIONS PERSONNEL	0	0	0	0	0.054	0.000	0.049	0.103
HEALTH PHYSICS PERSONNEL	0	0	2	2	0.058	0.064	0.725	0.847
SUPERVISORY PERSONNEL	0	0	0	0	0.000	0.000	0.038	0.038
ENGINEERING PERSONNEL	1	1	1	3	0.345	0.390	0.212	0.947
TOTAL	3	1	58	62	0.877	0.479	28.246	29.602
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	7	0	220	227	2.411	0.219	126.779	129.409
OPERATIONS PERSONNEL	2	0	2	4	1.508	0.000	1.492	3.000
HEALTH PHYSICS PERSONNEL	3	5	65	73	1.017	1.506	22.242	24.765
SUPERVISORY PERSONNEL	0	0	0	0	0.036	0.000	0.158	0.194
ENGINEERING PERSONNEL	1	10	5	16	0.590	3.032	1.779	5.401
GRAND TOTALS	13	15	292	320	5.562	4.757	152.450	162.769

*Workers may be counted in more than one category.

APPENDIX D (Continued)

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

1993

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	0	0	0	0	0.000	0.000	0.000	0.000
OPERATIONS PERSONNEL	100	0	0	100	12.825	0.000	0.000	12.825
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.092	0.000	0.000	0.092
SUPERVISORY PERSONNEL	42	0	0	42	1.653	0.000	0.000	1.653
ENGINEERING PERSONNEL	0	2	0	2	0.016	0.009	0.000	0.025
TOTAL	142	2	0	144	14.586	0.009	0.000	14.595
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	85	20	661	766	53.317	0.266	187.036	240.619
OPERATIONS PERSONNEL	45	0	193	238	5.778	0.000	0.106	5.884
HEALTH PHYSICS PERSONNEL	35	0	101	136	21.872	0.000	28.558	50.430
SUPERVISORY PERSONNEL	132	47	132	311	5.188	0.255	5.630	11.073
ENGINEERING PERSONNEL	100	98	33	231	4.577	0.579	1.966	7.122
TOTAL	397	165	1120	1682	90.732	1.100	223.296	315.128
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2	1	522	525	1.540	0.013	147.732	149.285
OPERATIONS PERSONNEL	1	0	0	1	0.114	0.000	0.000	0.114
HEALTH PHYSICS PERSONNEL	0	0	39	39	0.273	0.000	10.878	11.151
SUPERVISORY PERSONNEL	7	31	198	236	0.253	0.169	8.474	8.896
ENGINEERING PERSONNEL	21	15	115	151	0.985	0.086	6.833	7.904
TOTAL	31	47	874	952	3.165	0.268	173.917	177.350
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	22	3	152	177	13.567	0.034	43.164	56.765
OPERATIONS PERSONNEL	63	0	0	63	8.155	0.000	0.000	8.155
HEALTH PHYSICS PERSONNEL	5	0	2	7	2.986	0.000	0.537	3.523
SUPERVISORY PERSONNEL	40	1	74	115	1.578	0.007	3.163	4.748
ENGINEERING PERSONNEL	18	7	14	39	0.805	0.040	0.832	1.677
TOTAL	148	11	242	401	27.091	0.081	47.696	74.868
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	36	37	0.324	0.000	10.110	10.434
OPERATIONS PERSONNEL	12	0	0	12	1.609	0.000	0.000	1.609
HEALTH PHYSICS PERSONNEL	3	0	10	13	1.564	0.000	2.706	4.270
SUPERVISORY PERSONNEL	4	0	0	4	0.153	0.001	0.007	0.161
ENGINEERING PERSONNEL	0	0	0	0	0.008	0.000	0.000	0.008
TOTAL	20	0	46	66	3.658	0.001	12.823	16.482
REFUELING								
MAINTENANCE PERSONNEL	52	0	7	59	32.987	0.000	2.077	35.064
OPERATIONS PERSONNEL	41	0	0	41	5.217	0.000	0.000	5.217
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.025	0.000	0.015	0.040
SUPERVISORY PERSONNEL	66	0	17	83	2.607	0.000	0.710	3.317
ENGINEERING PERSONNEL	9	12	0	21	0.408	0.073	0.004	0.485
TOTAL	168	12	24	204	41.244	0.073	2.806	44.123
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	162	24	1378	1564	101.735	0.313	390.119	492.167
OPERATIONS PERSONNEL	262	0	193	455	33.698	0.000	0.106	33.804
HEALTH PHYSICS PERSONNEL	43	0	152	195	26.812	0.000	42.694	69.506
SUPERVISORY PERSONNEL	291	79	421	791	11.432	0.432	17.984	29.848
ENGINEERING PERSONNEL	148	134	162	444	6.799	0.787	9.635	17.221
GRAND TOTALS	906	237	2306	3449	180.476	1.532	460.538	642.546

*Workers may be counted in more than one category.

APPENDIX E

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

1973-1993

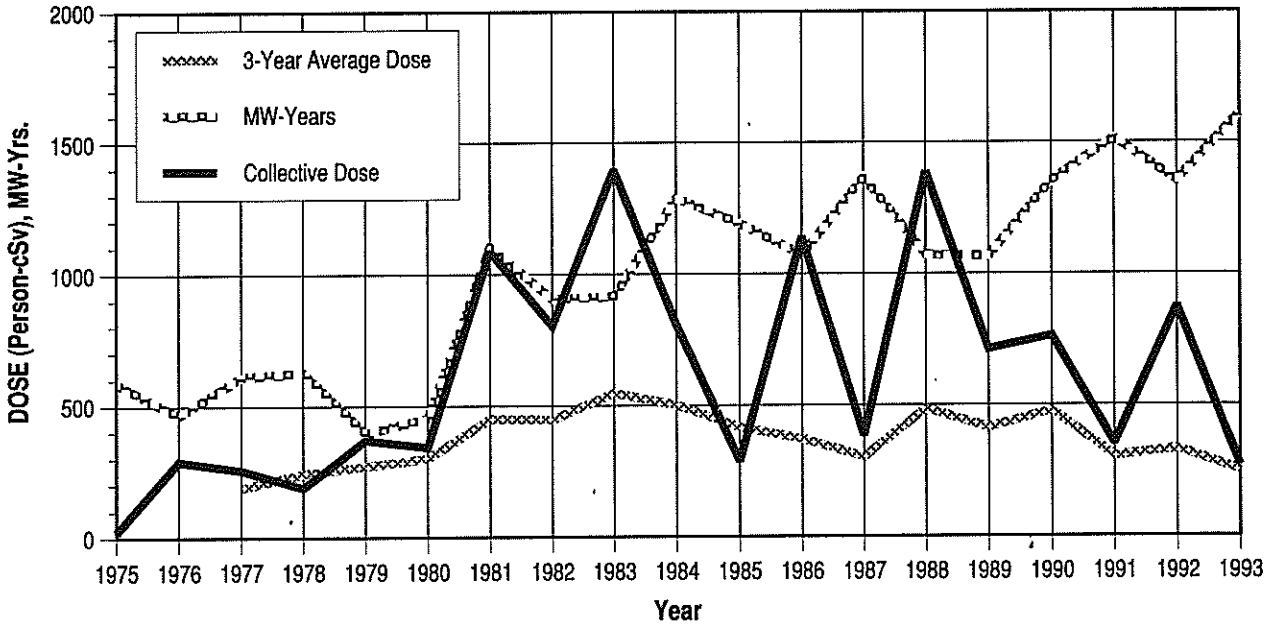
NOTE: Appendix E contains data on operating plants as well as plants which are no longer in commercial operation.

APPENDIX E

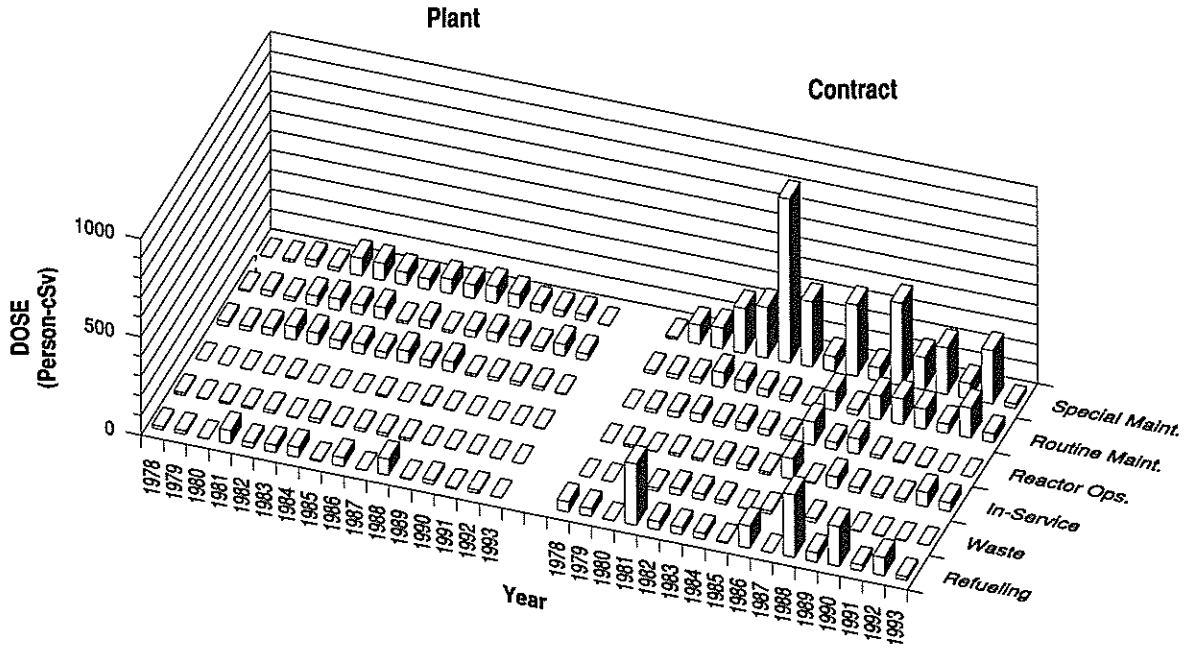
ARKANSAS 1, 2

Dose-Performance Indicators

PWR



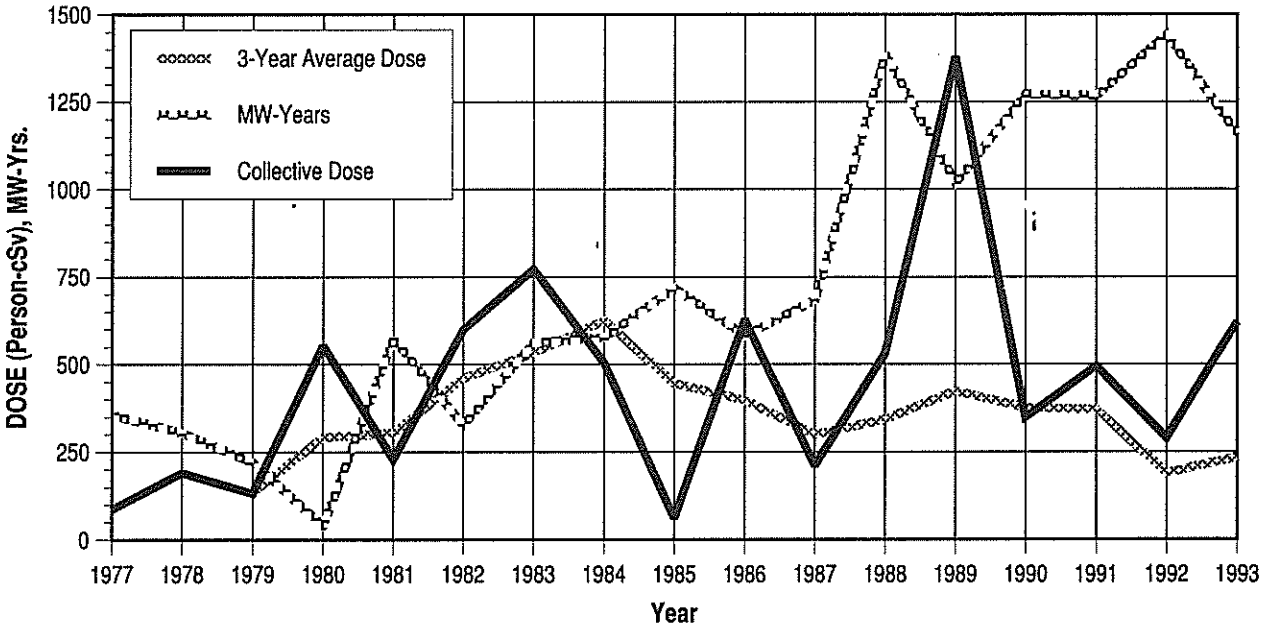
Breakdown by Job Function



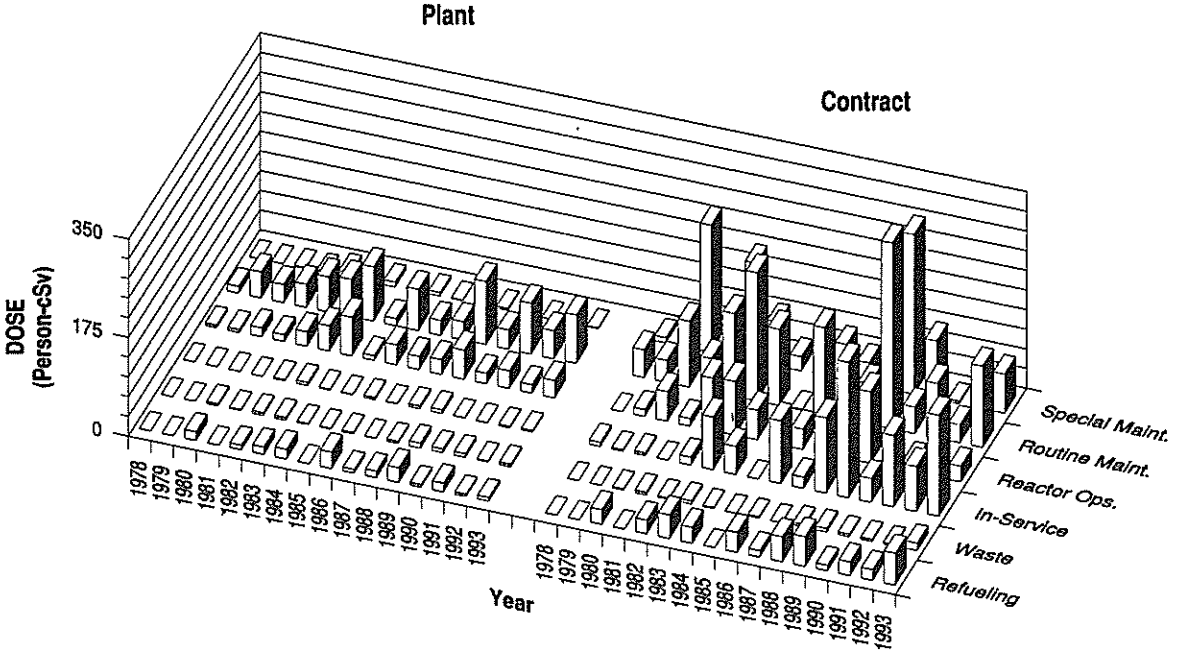
APPENDIX E (continued)

BEAVER VALLEY 1, 2

Dose-Performance Indicators **PWR**



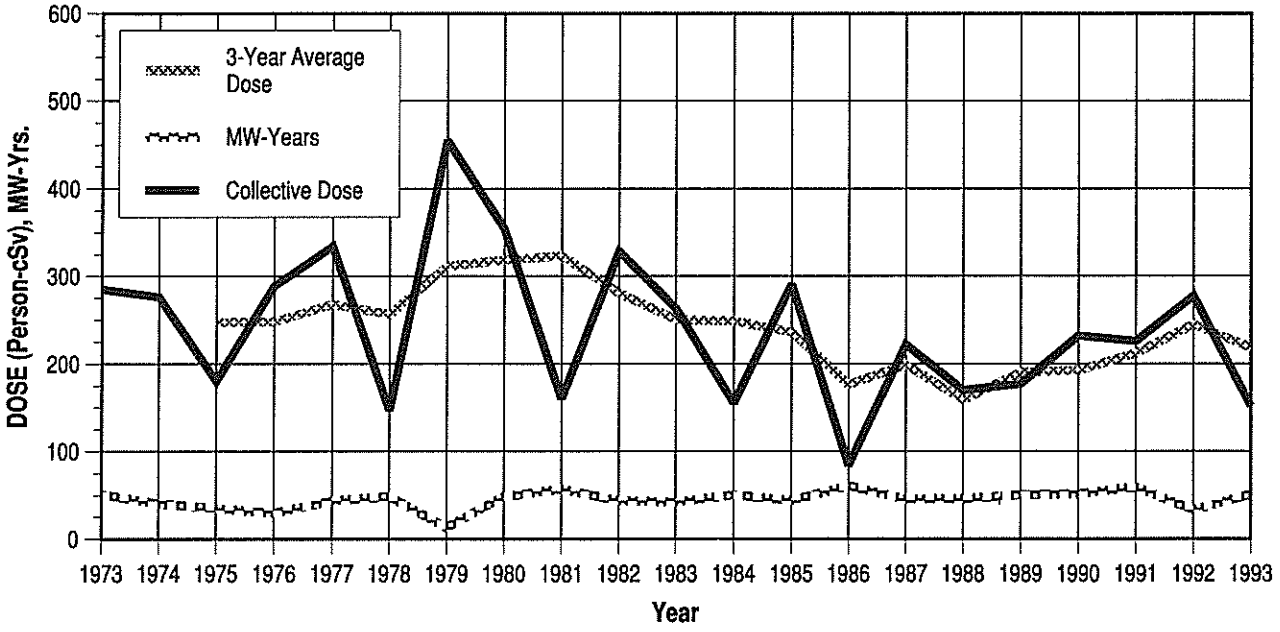
Breakdown by Job Function



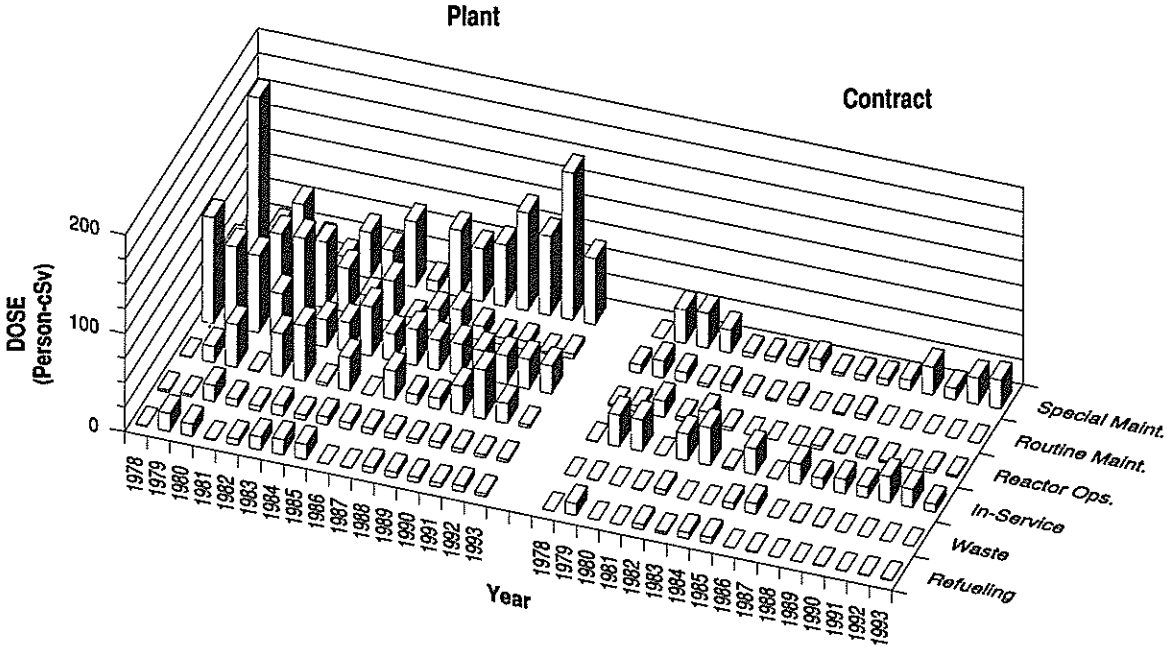
APPENDIX E (continued)

BIG ROCK POINT

Dose-Performance Indicators **BWR**



Breakdown by Job Function

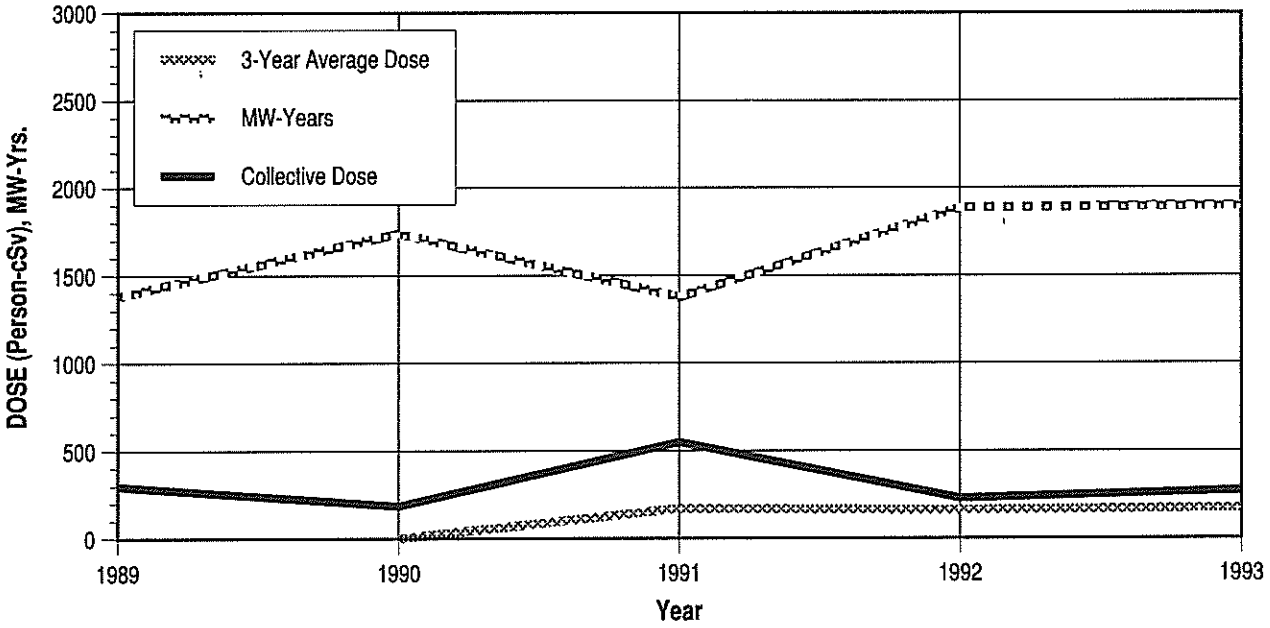


APPENDIX E (continued)

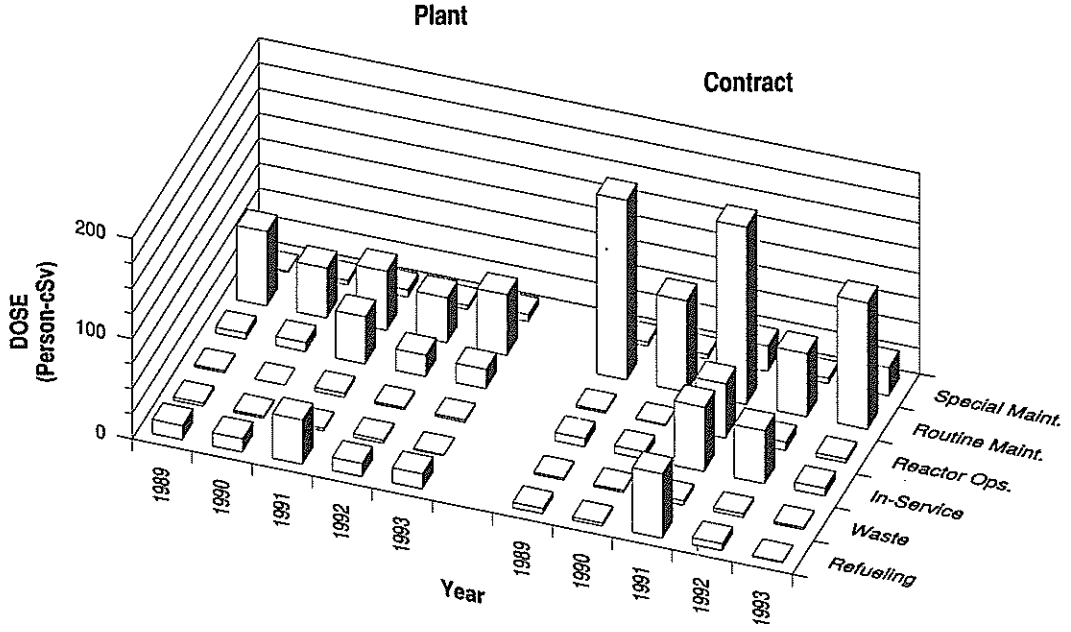
BRAIDWOOD 1, 2

Dose-Performance Indicators

PWR



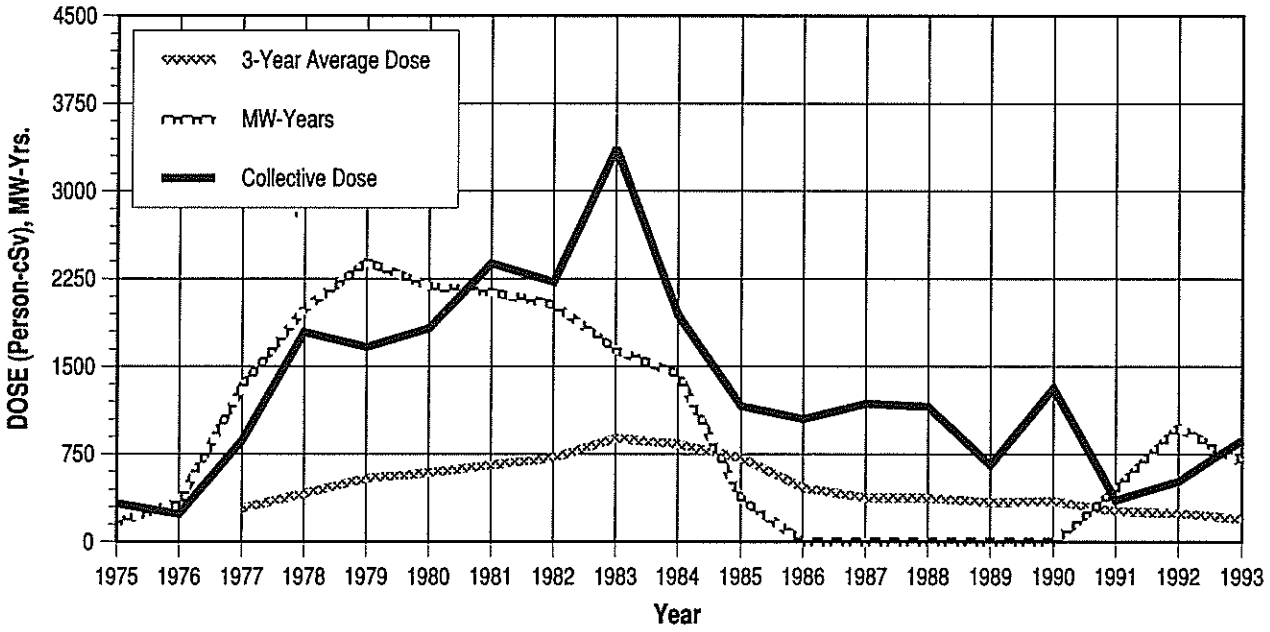
Breakdown by Job Function



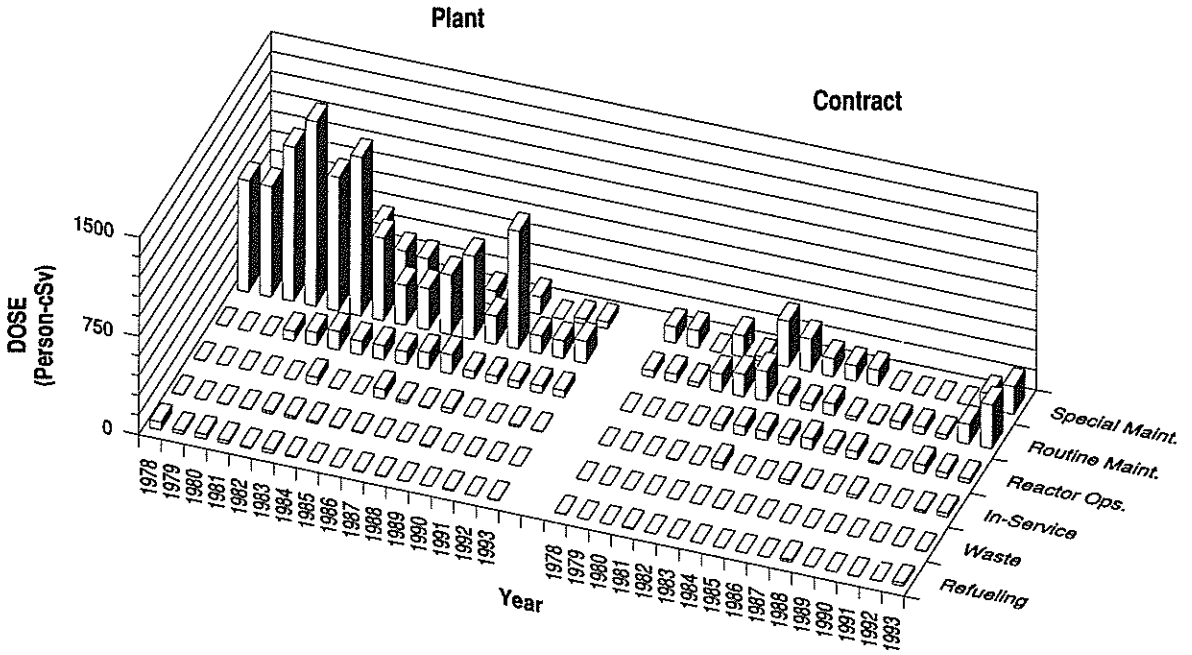
APPENDIX E (continued)

BROWNS FERRY 1, 2, 3

Dose-Performance Indicators **BWR**



Breakdown by Job Function

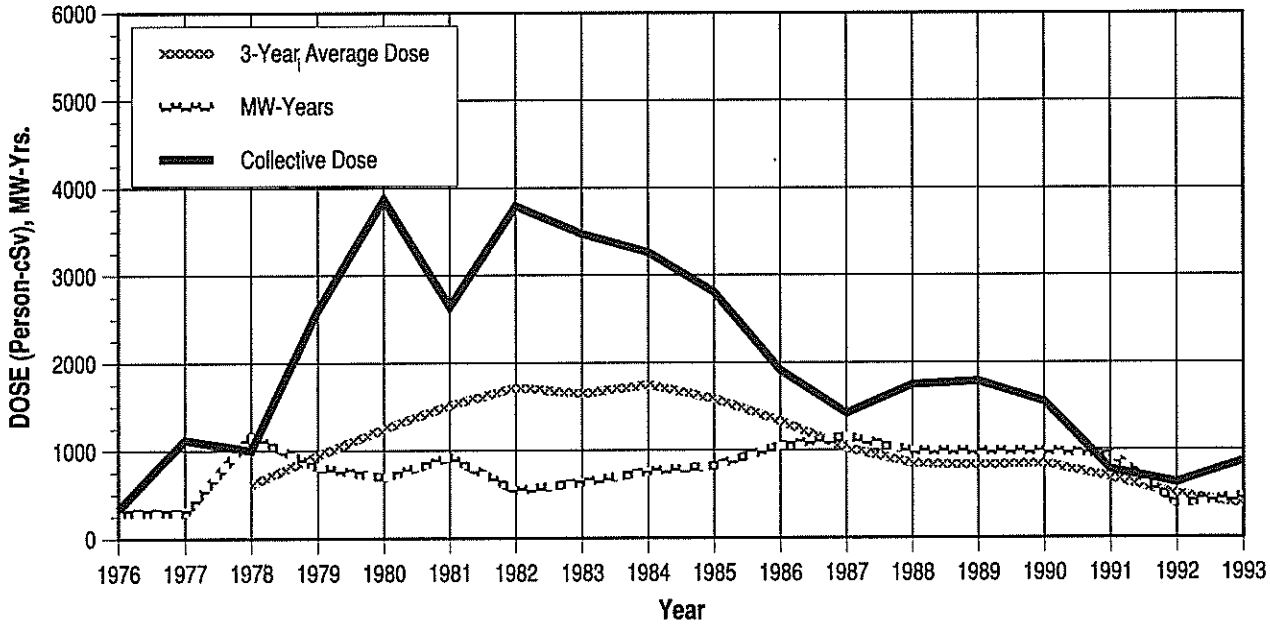


APPENDIX E (continued)

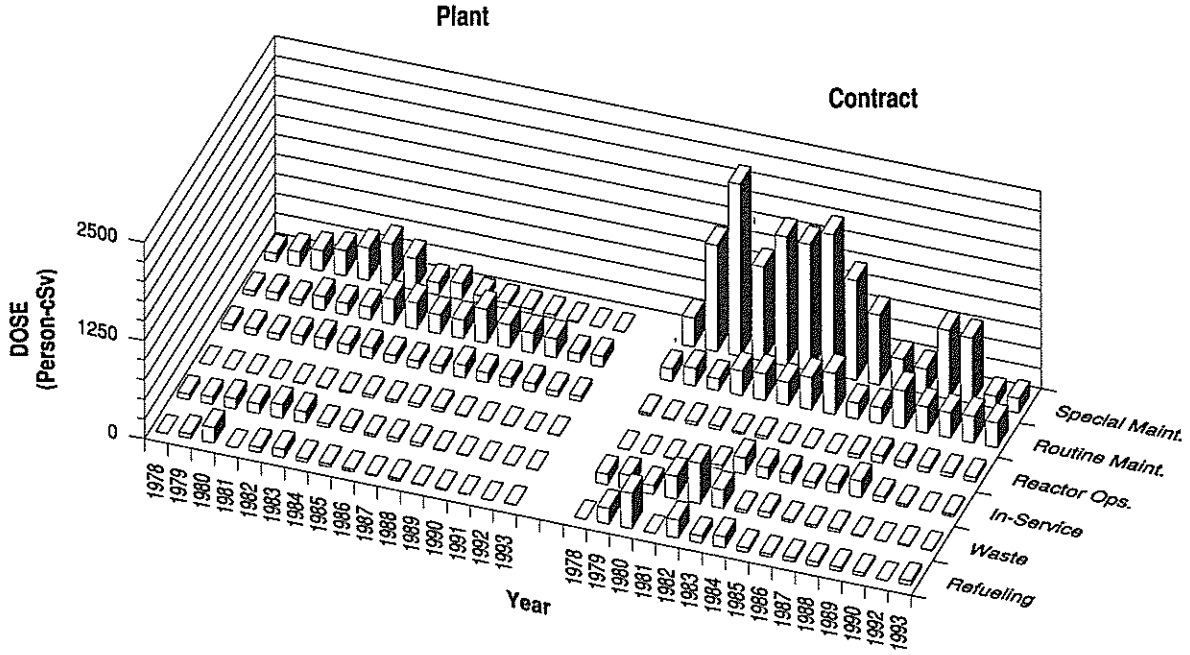
BRUNSWICK 1, 2

Dose-Performance Indicators

BWR



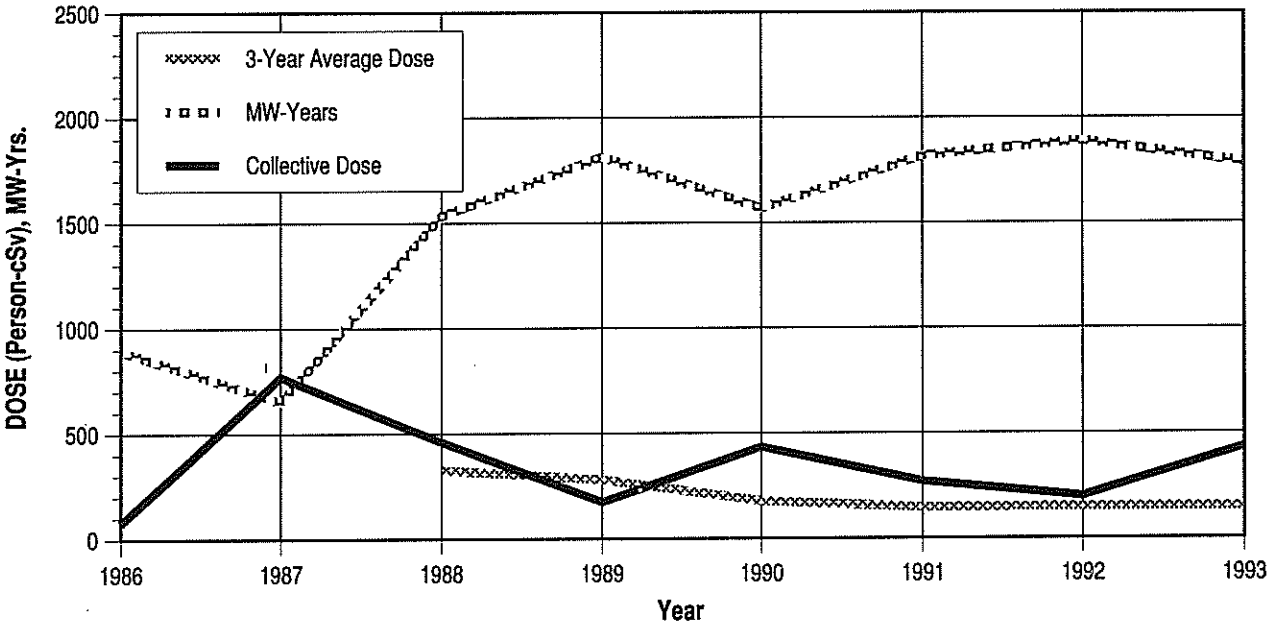
Breakdown by Job Function



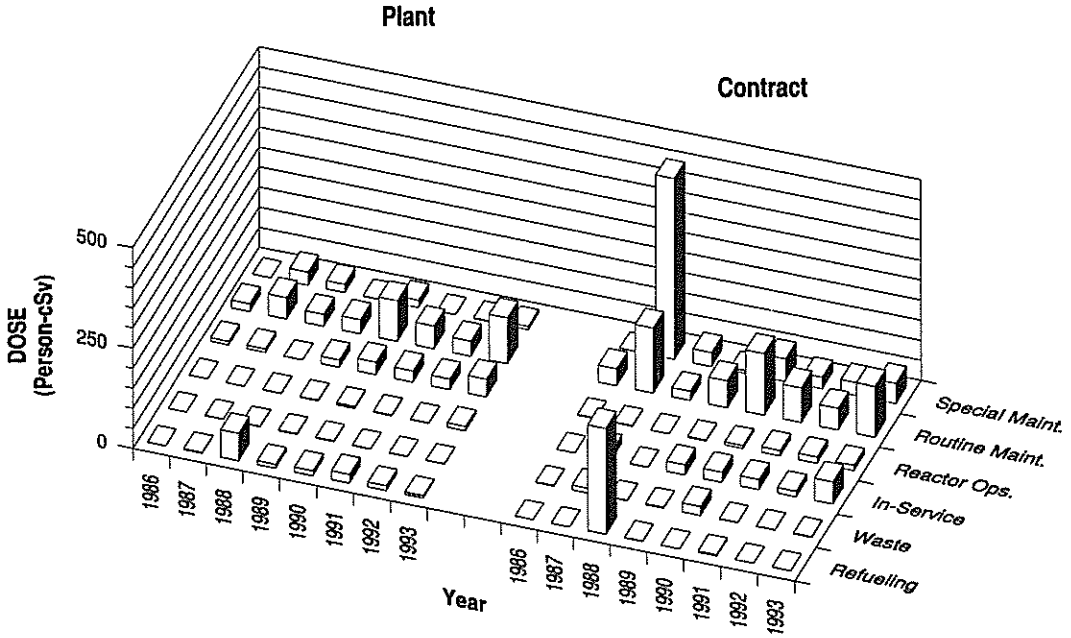
APPENDIX E (continued)

BYRON 1, 2

Dose-Performance Indicators **PWR**



Breakdown by Job Function

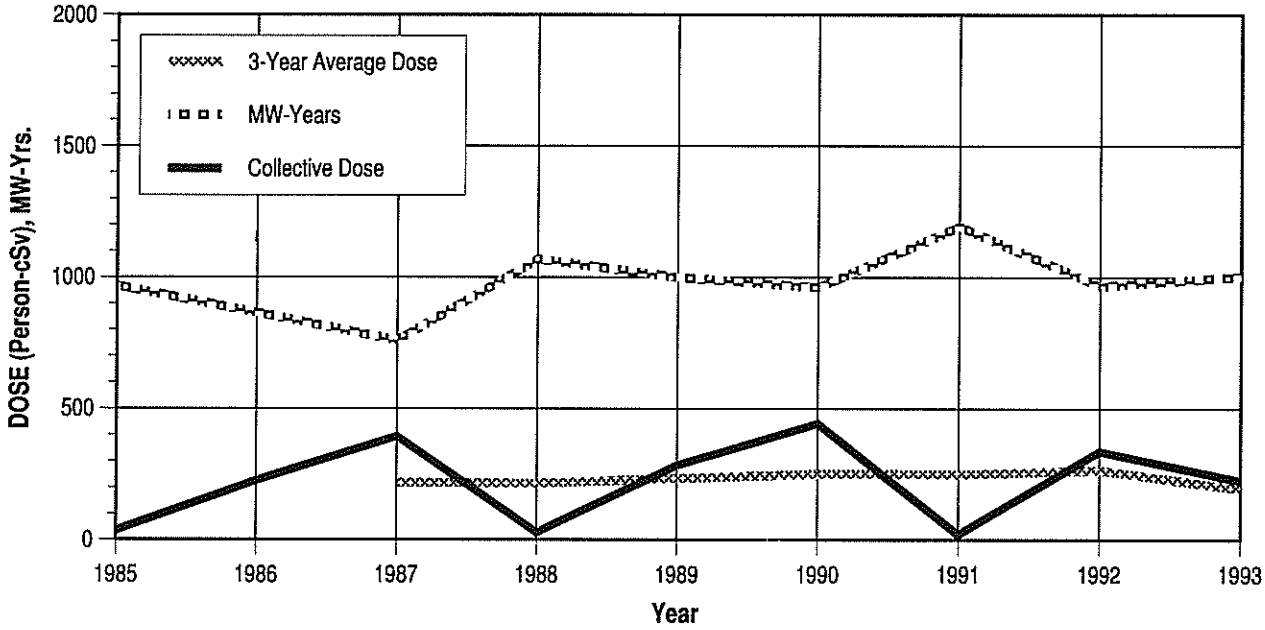


APPENDIX E (continued)

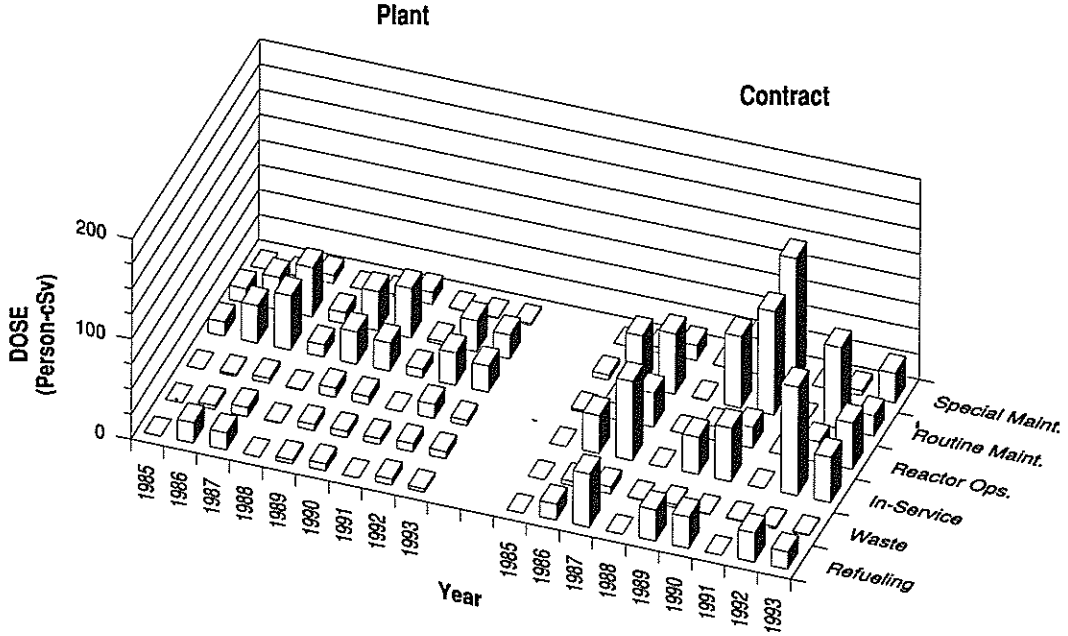
CALLAWAY 1

Dose-Performance Indicators

PWR



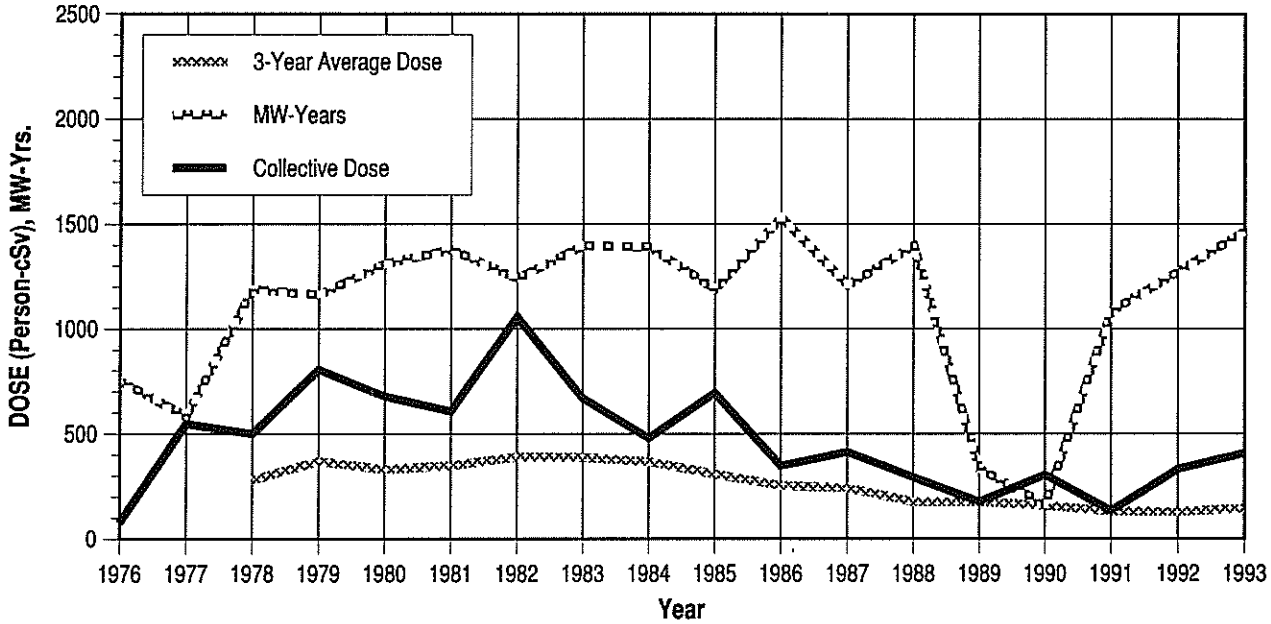
Breakdown by Job Function



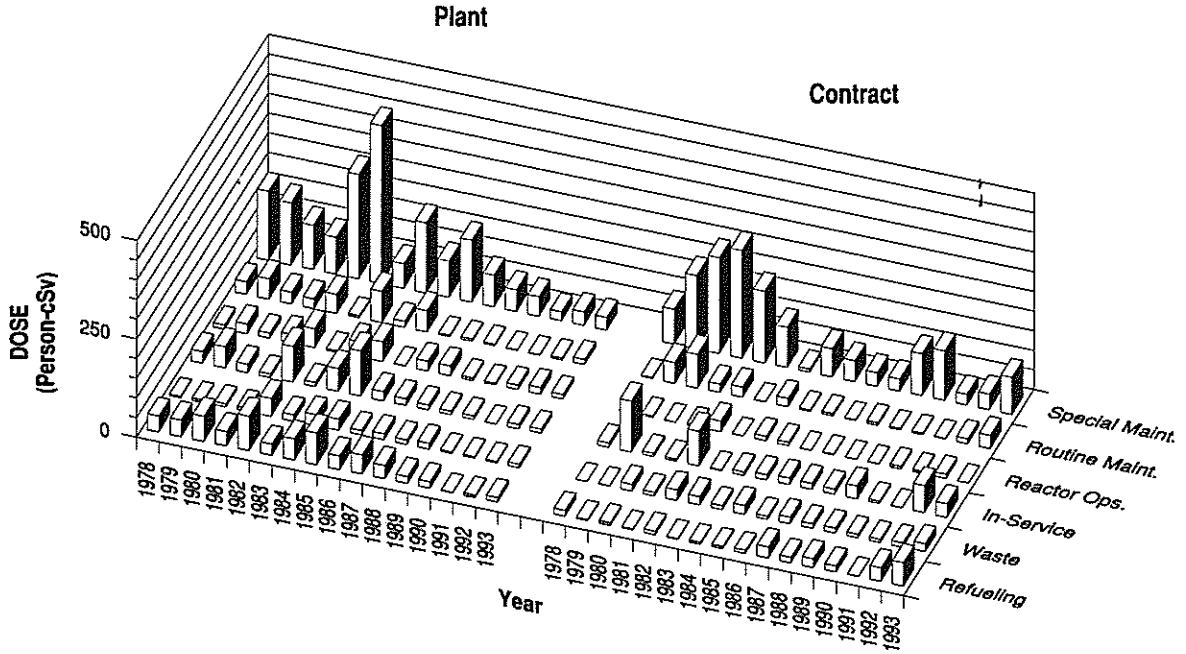
APPENDIX E (continued)

CALVERT CLIFFS 1, 2

Dose-Performance Indicators **PWR**



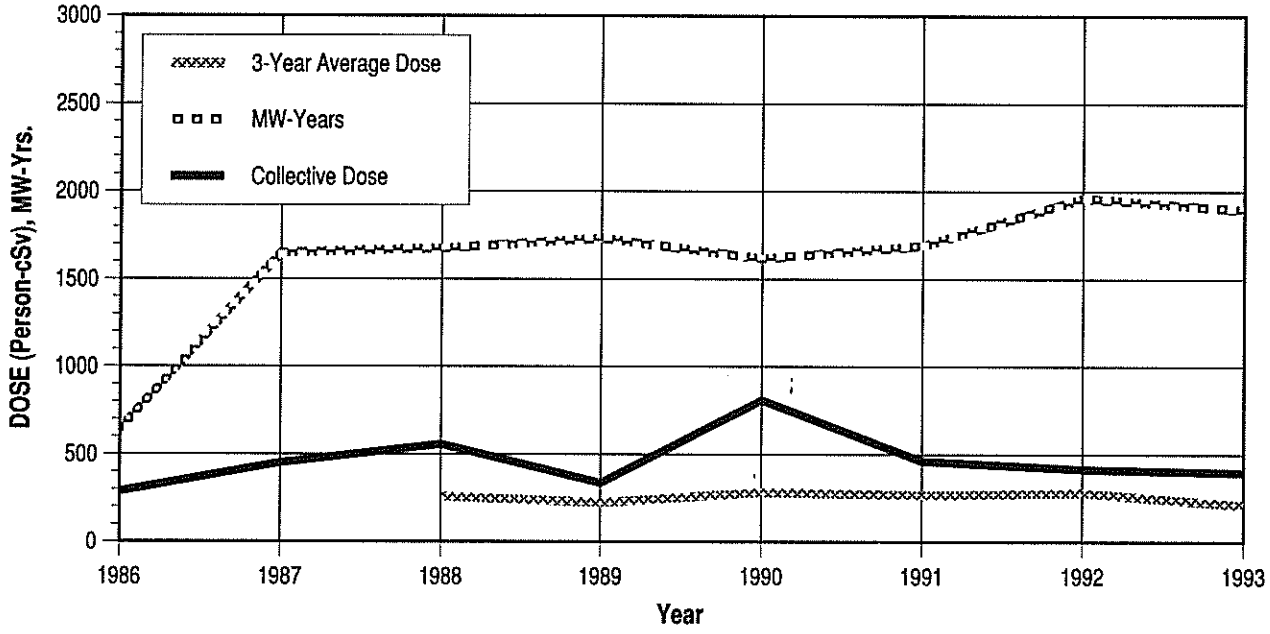
Breakdown by Job Function



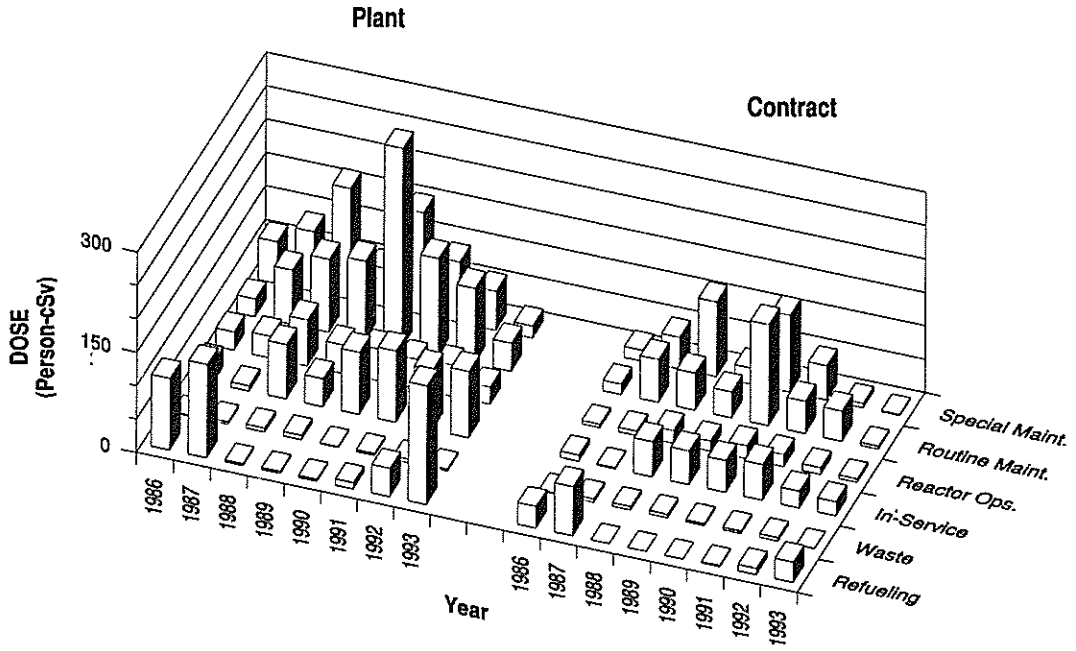
APPENDIX E (continued)

CATAWBA 1, 2

Dose-Performance Indicators **PWR**



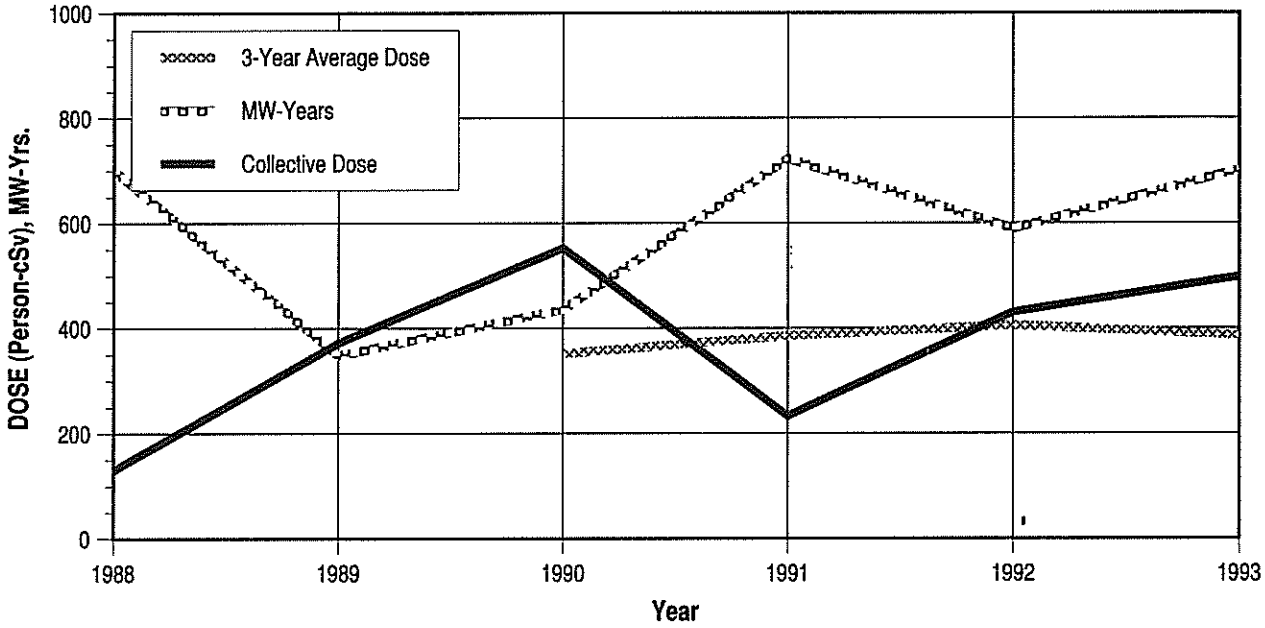
Breakdown by Job Function



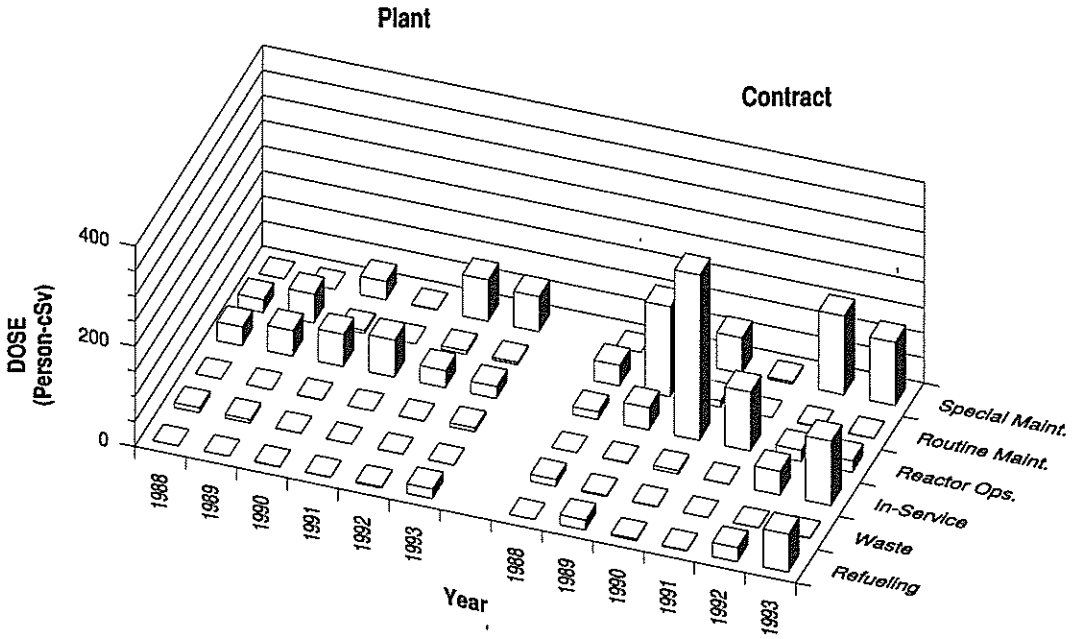
APPENDIX E (continued)

CLINTON

Dose-Performance Indicators **BWR**



Breakdown by Job Function

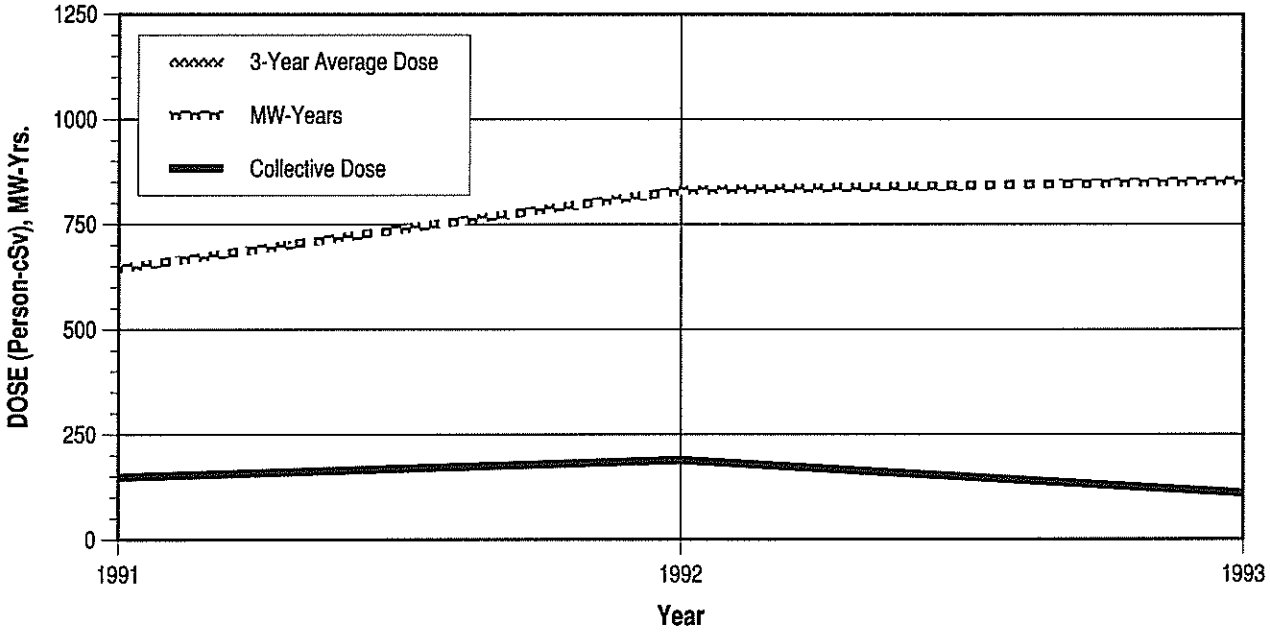


APPENDIX E (continued)

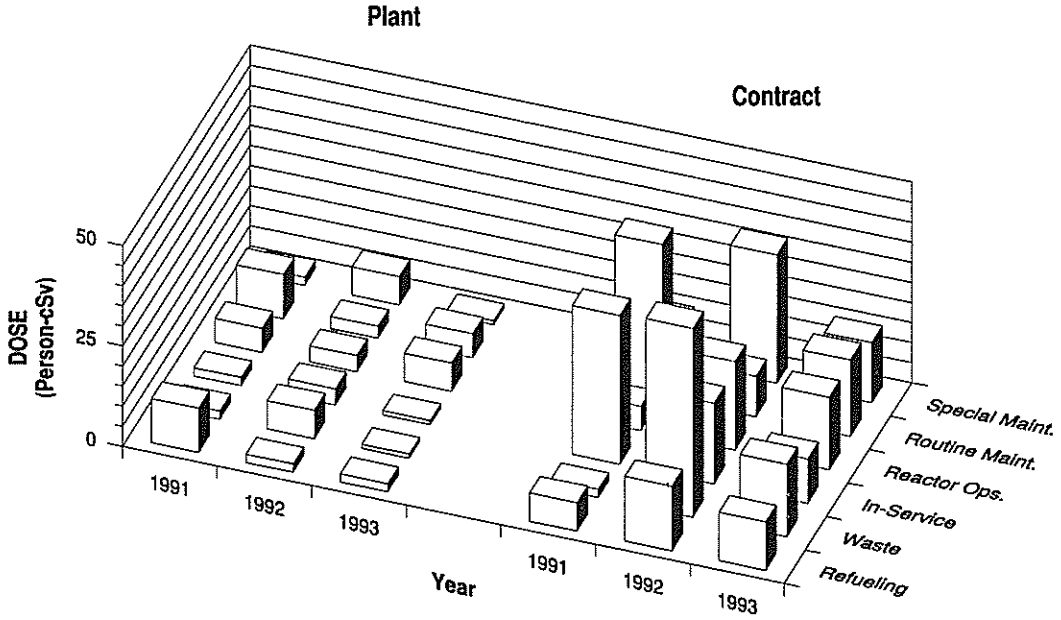
COMANCHE PEAK 1, 2

Dose-Performance Indicators

PWR



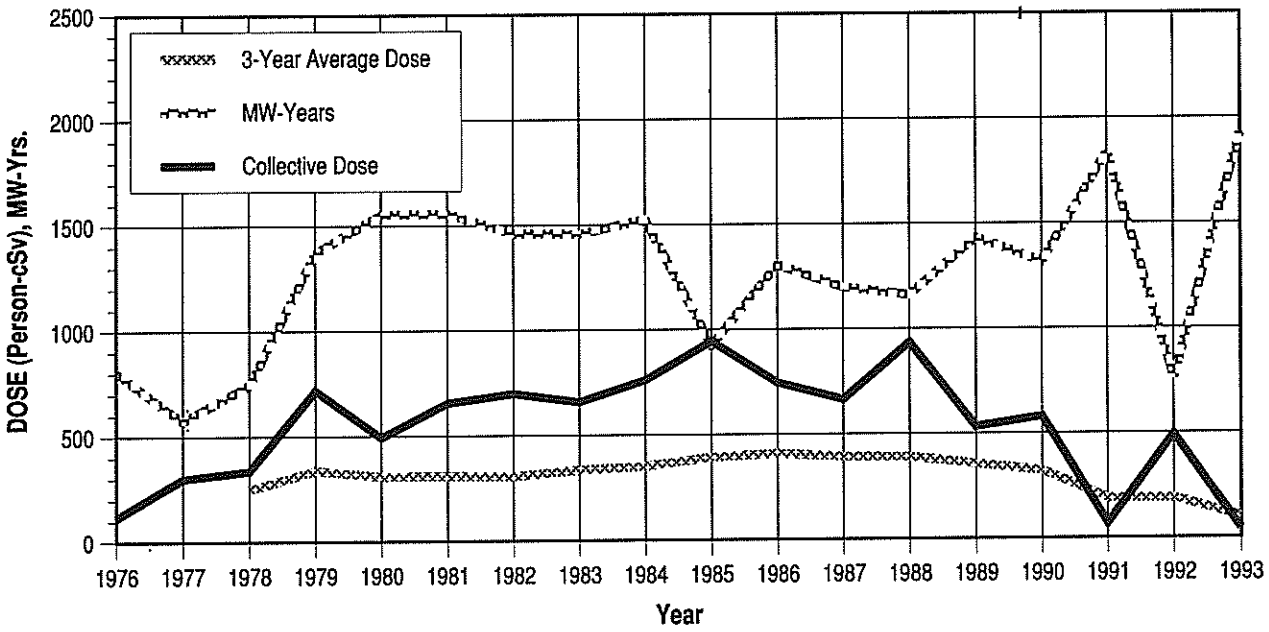
Breakdown by Job Function



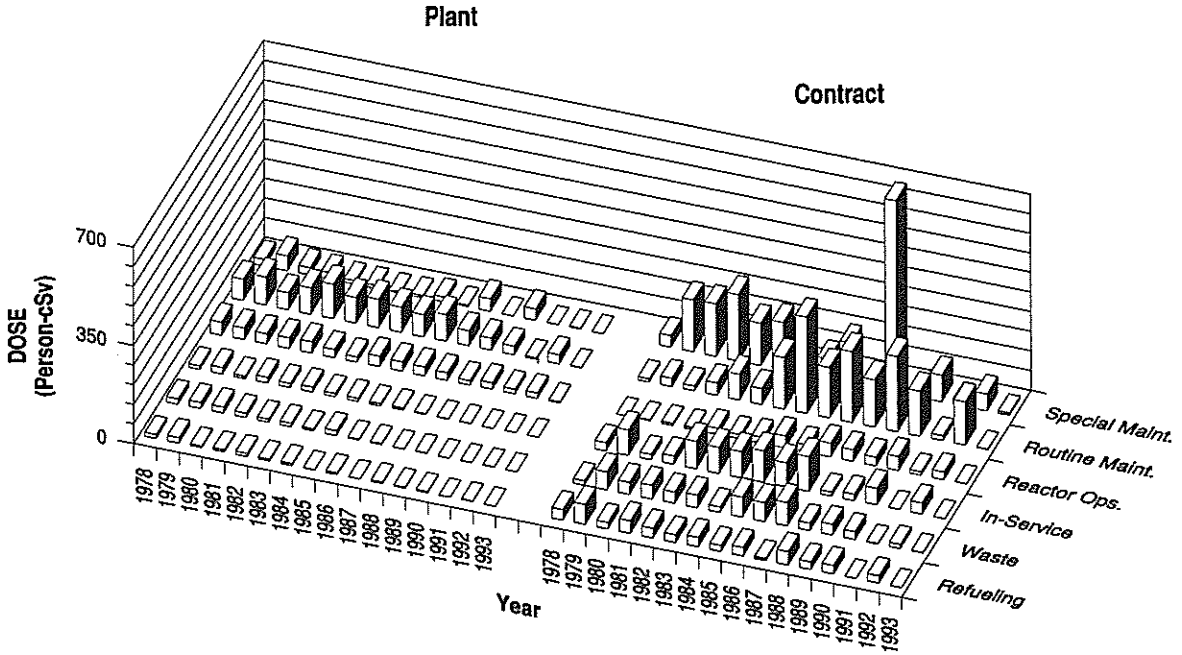
APPENDIX E (continued)

COOK 1, 2

Dose-Performance Indicators **PWR**



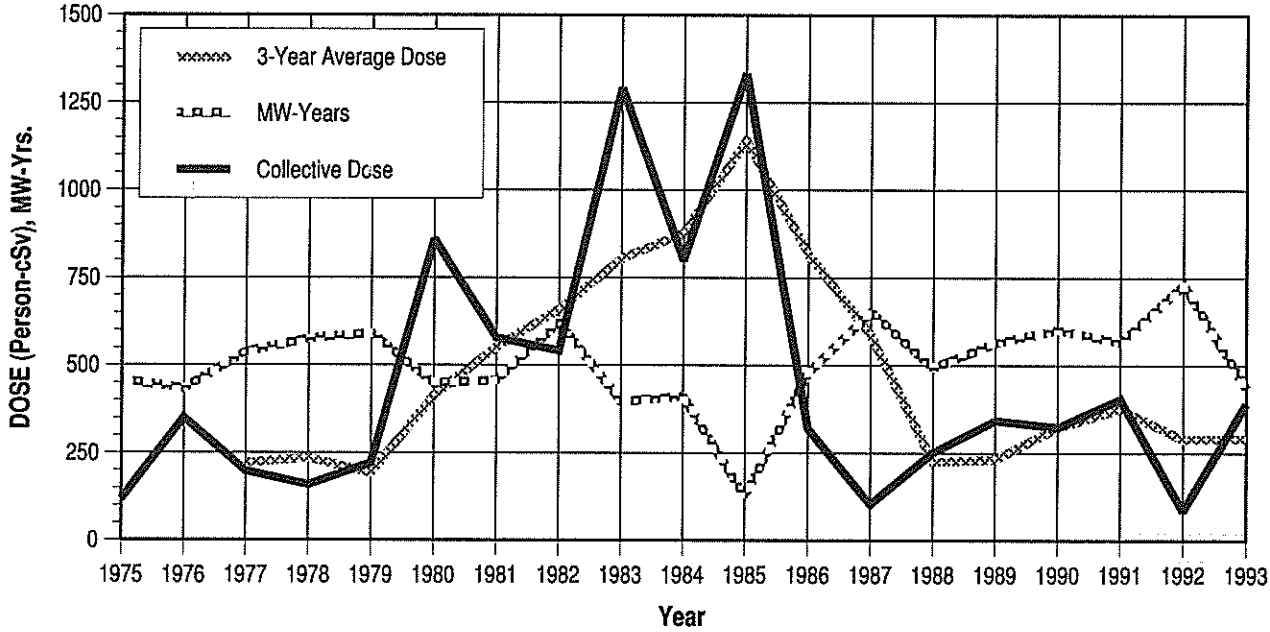
Breakdown by Job Function



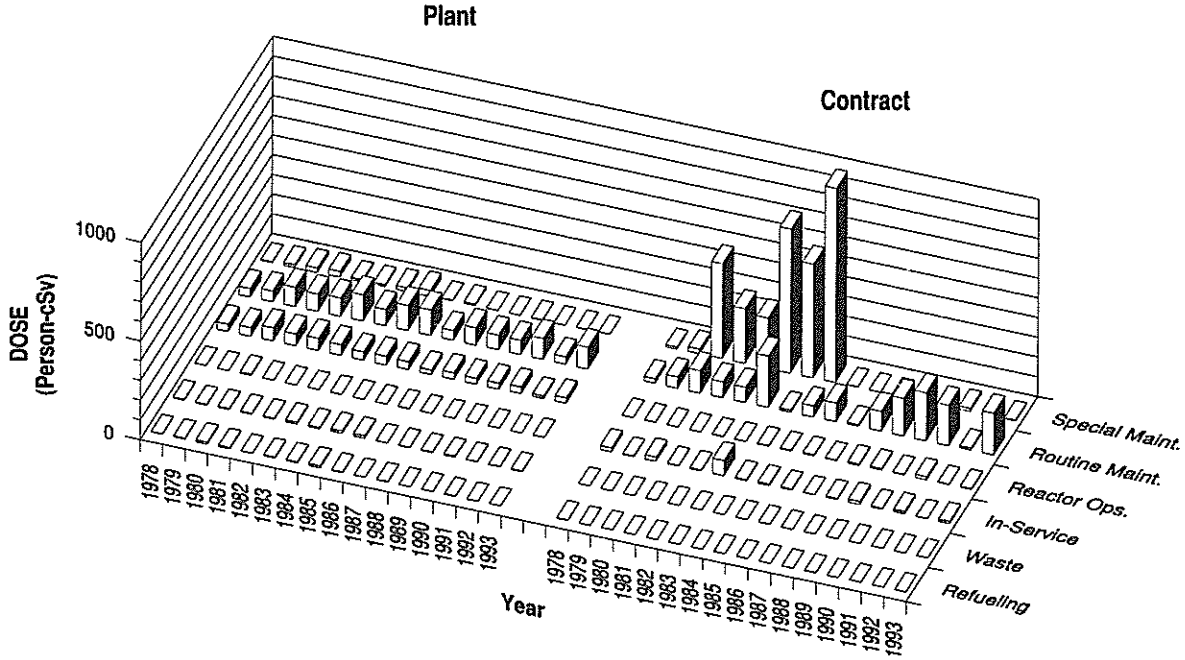
APPENDIX E (continued)

COOPER STATION

Dose-Performance Indicators **BWR**



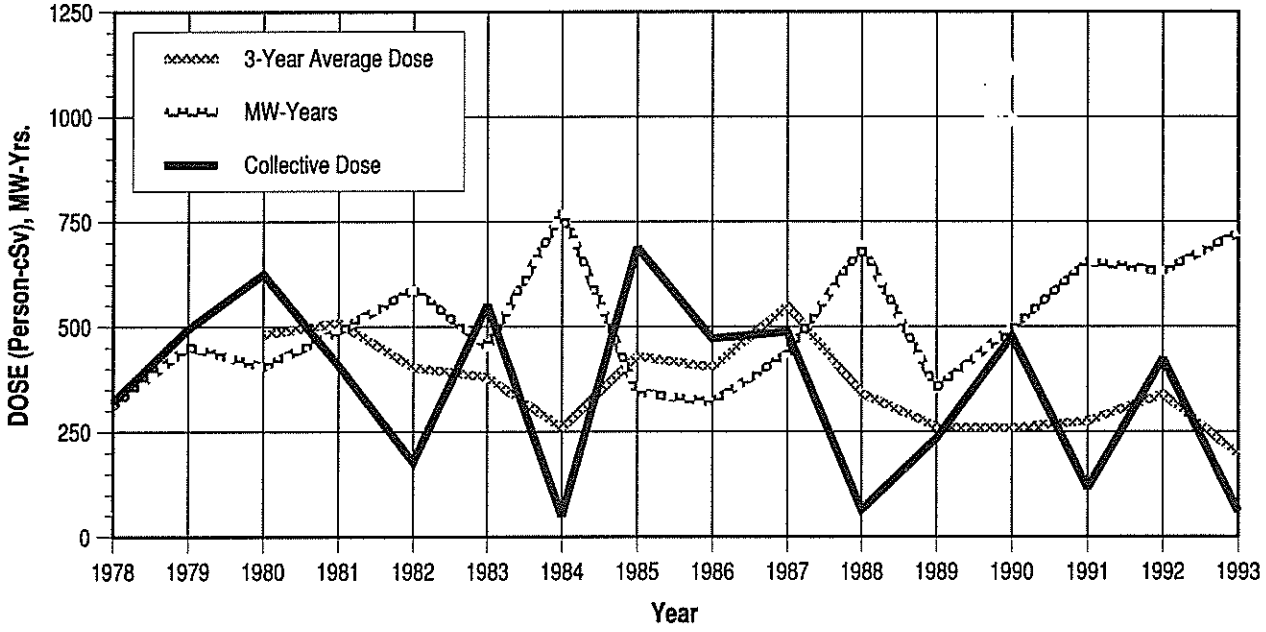
Breakdown by Job Function



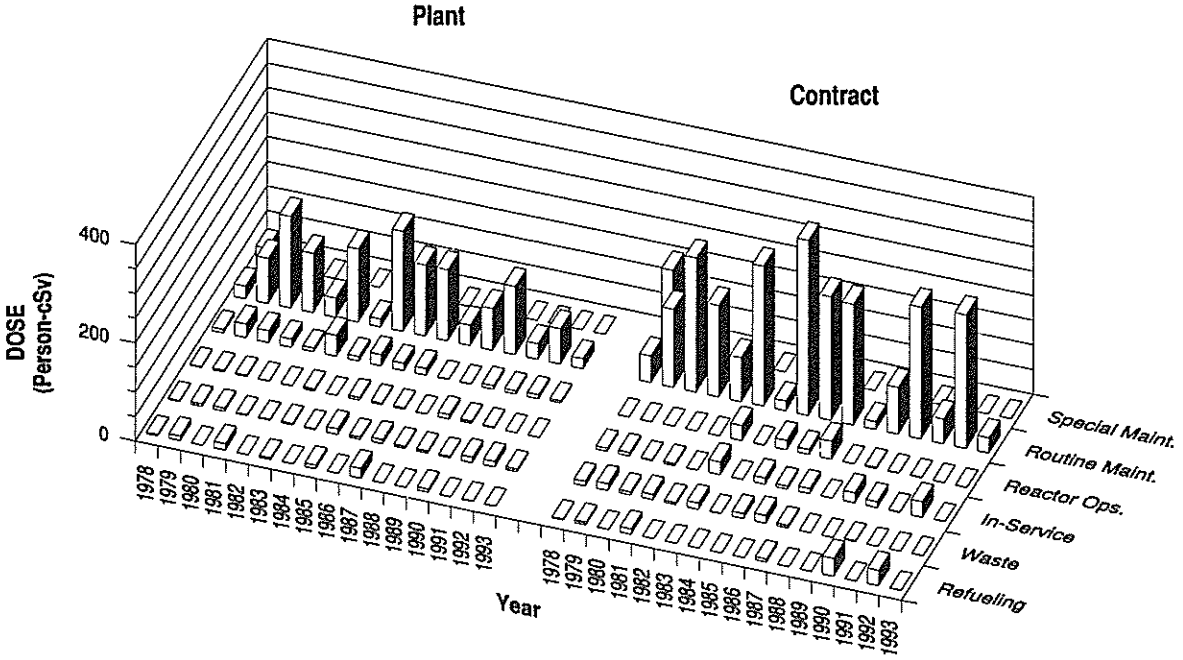
APPENDIX E (continued)

CRYSTAL RIVER 3

Dose-Performance Indicators **PWR**



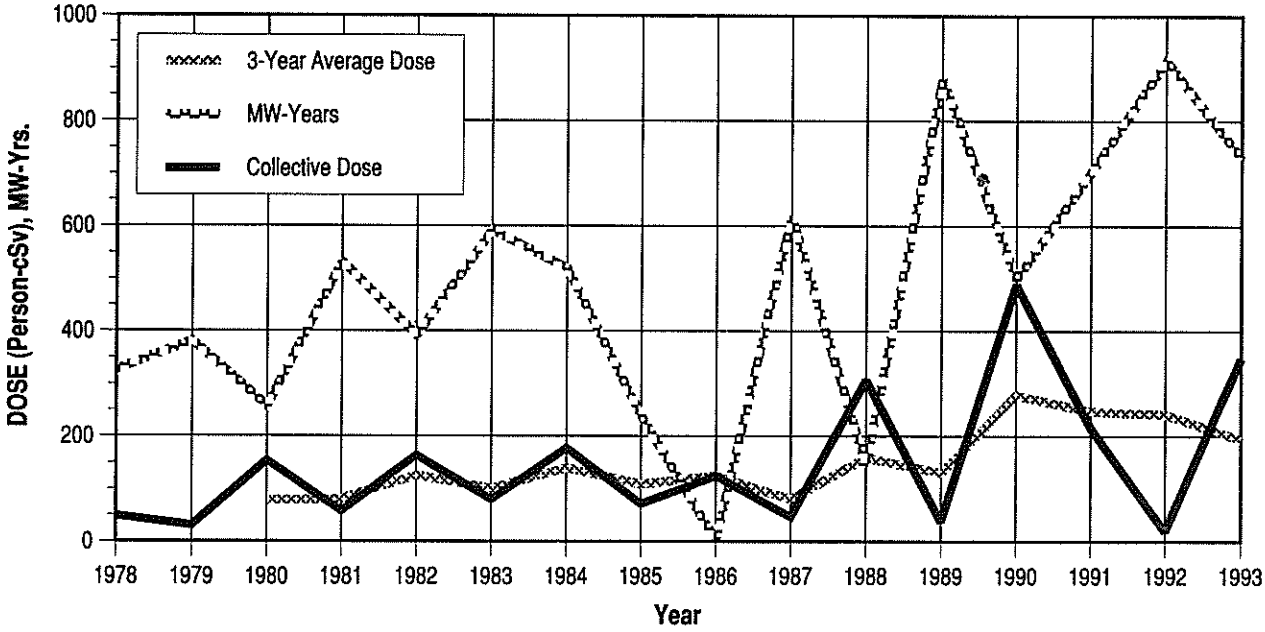
Breakdown by Job Function



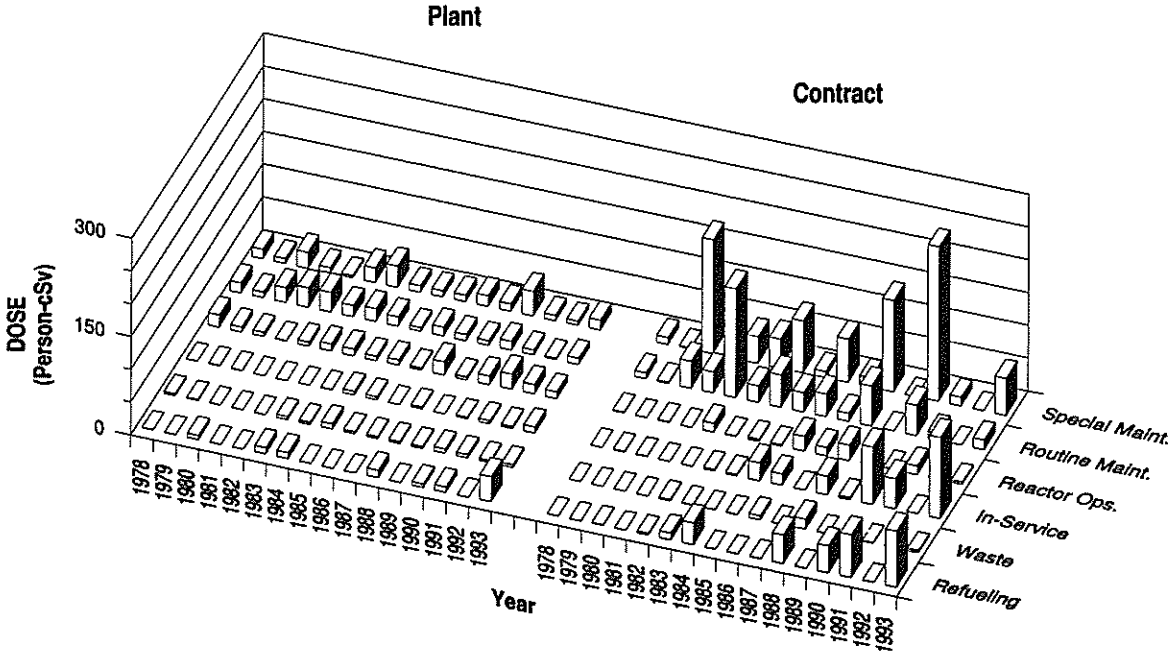
APPENDIX E (continued)

DAVIS-BESSE

Dose-Performance Indicators **PWR**



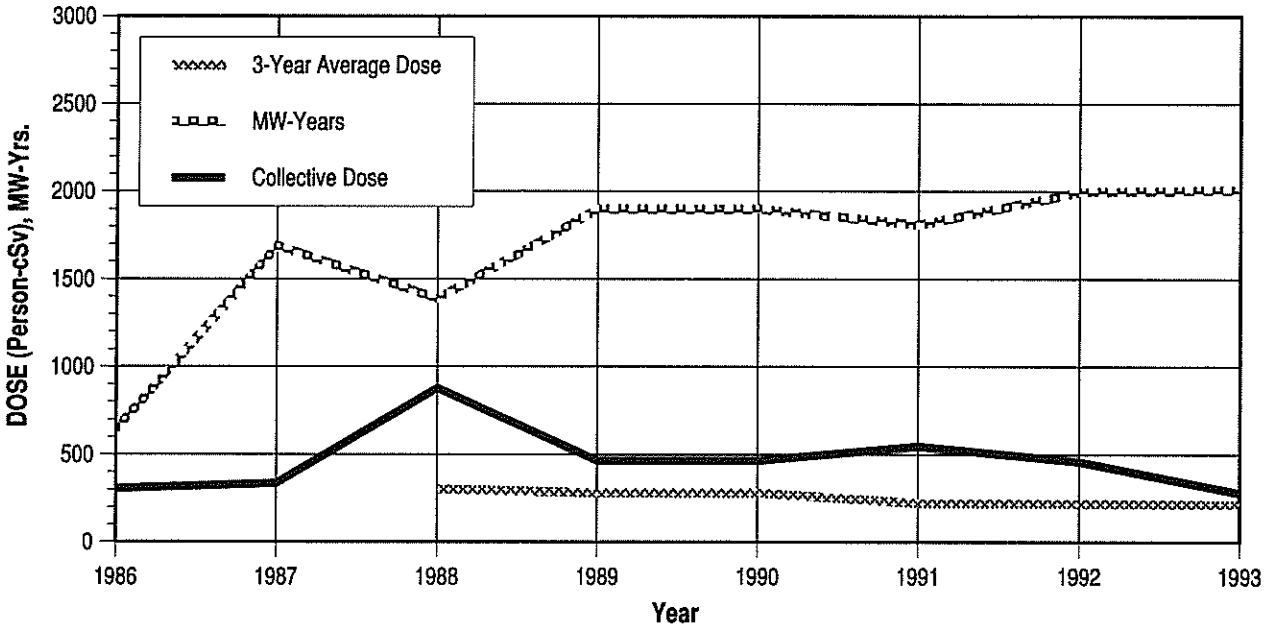
Breakdown by Job Function



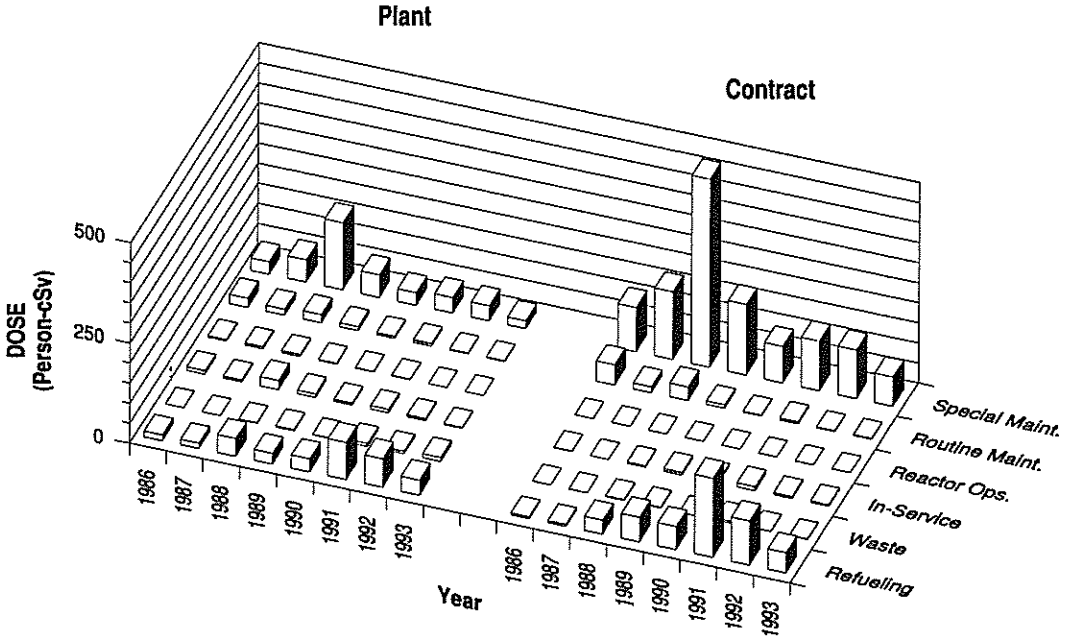
APPENDIX E (continued)

DIABLO CANYON 1, 2

Dose-Performance Indicators **PWR**



Breakdown by Job Function

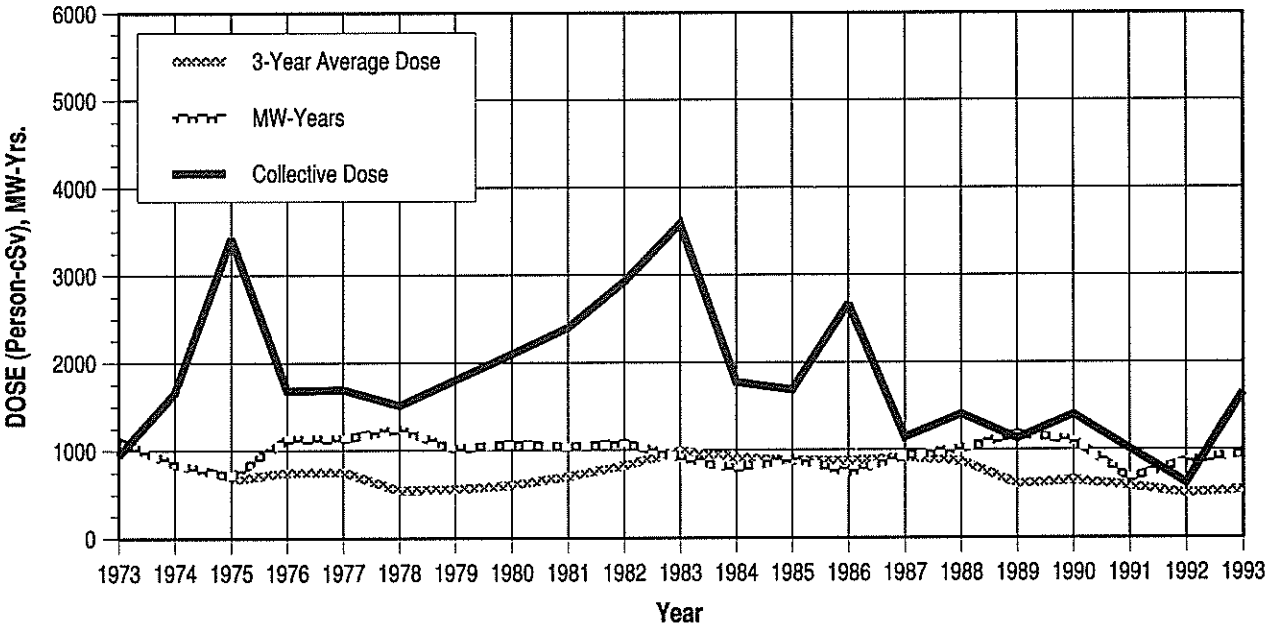


APPENDIX E (continued)

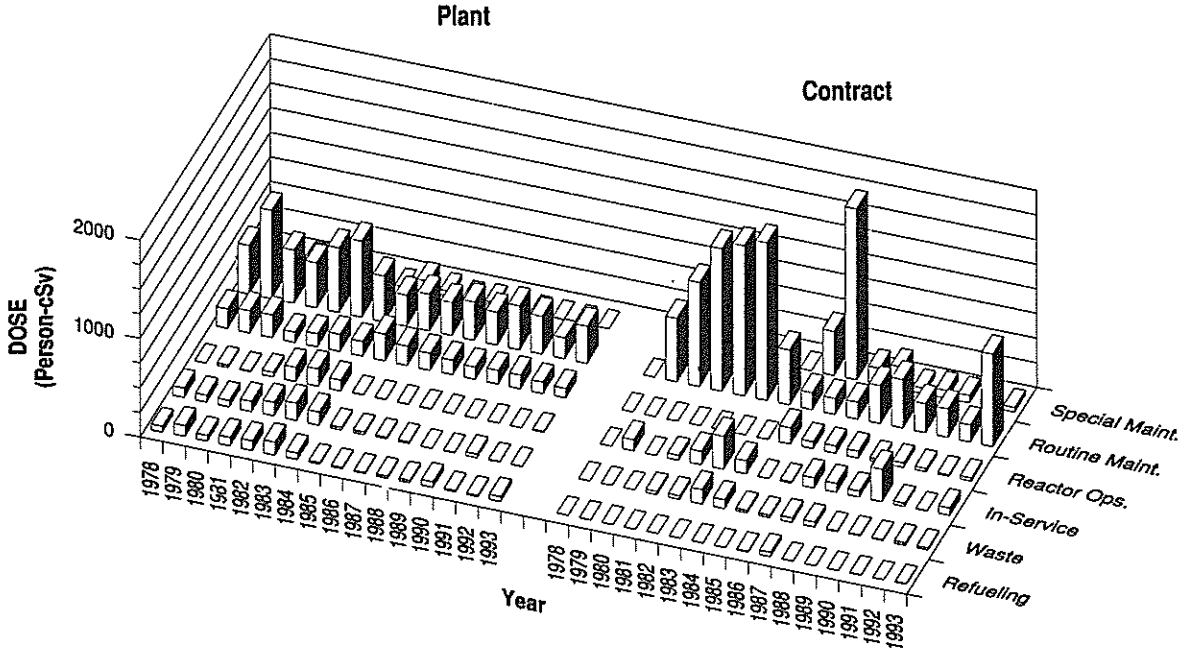
DRESDEN 2, 3

Dose-Performance Indicators

BWR



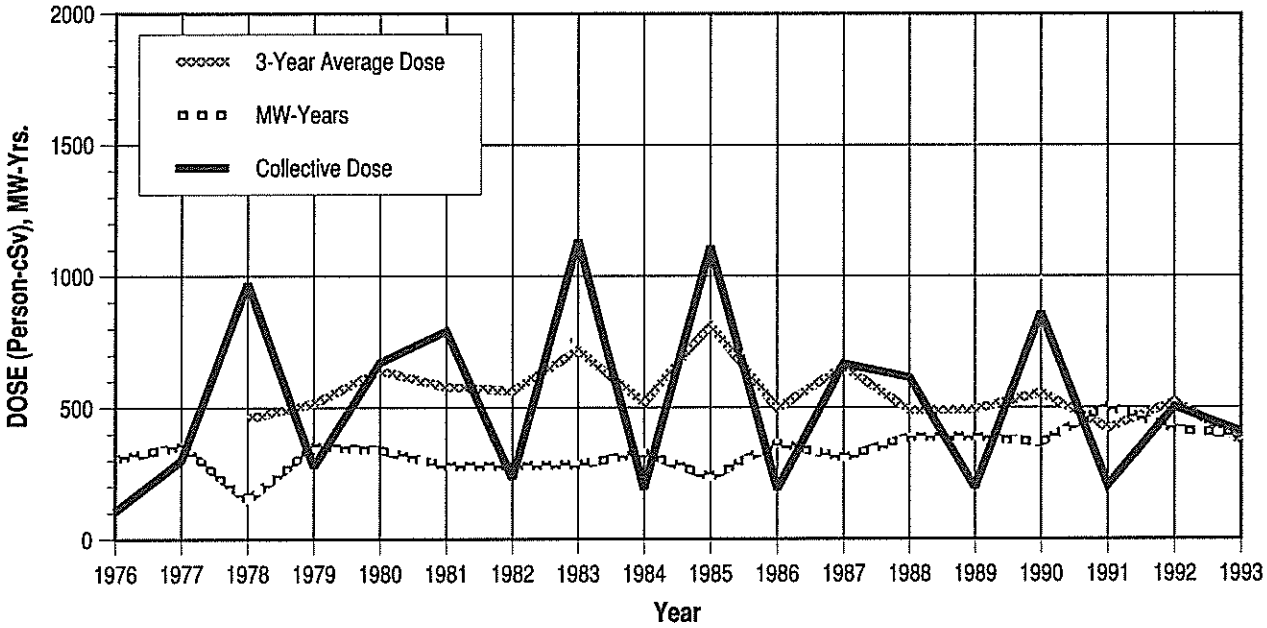
Breakdown by Job Function



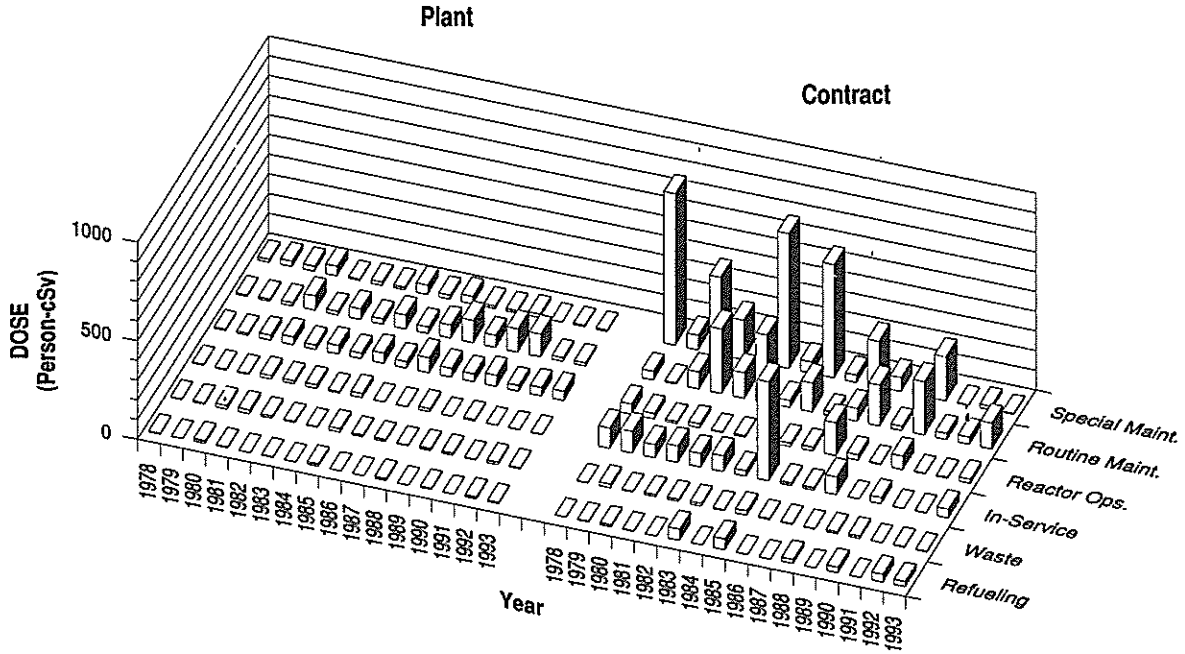
APPENDIX E (continued)

DUANE ARNOLD

Dose-Performance Indicators **BWR**



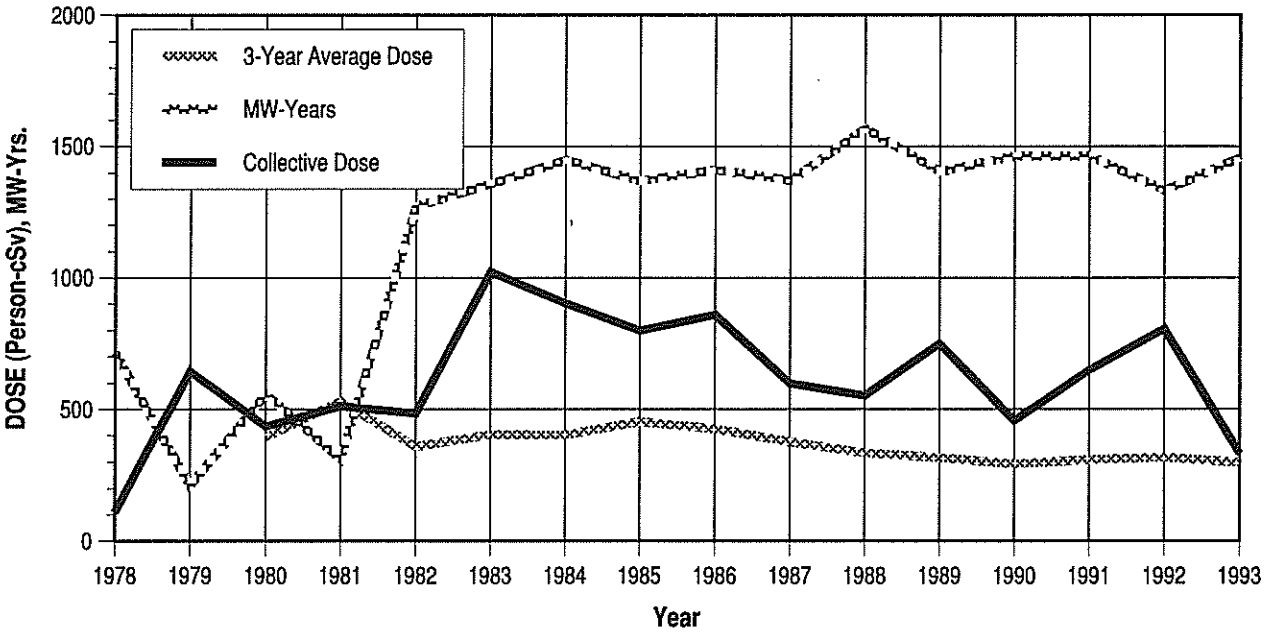
Breakdown by Job Function



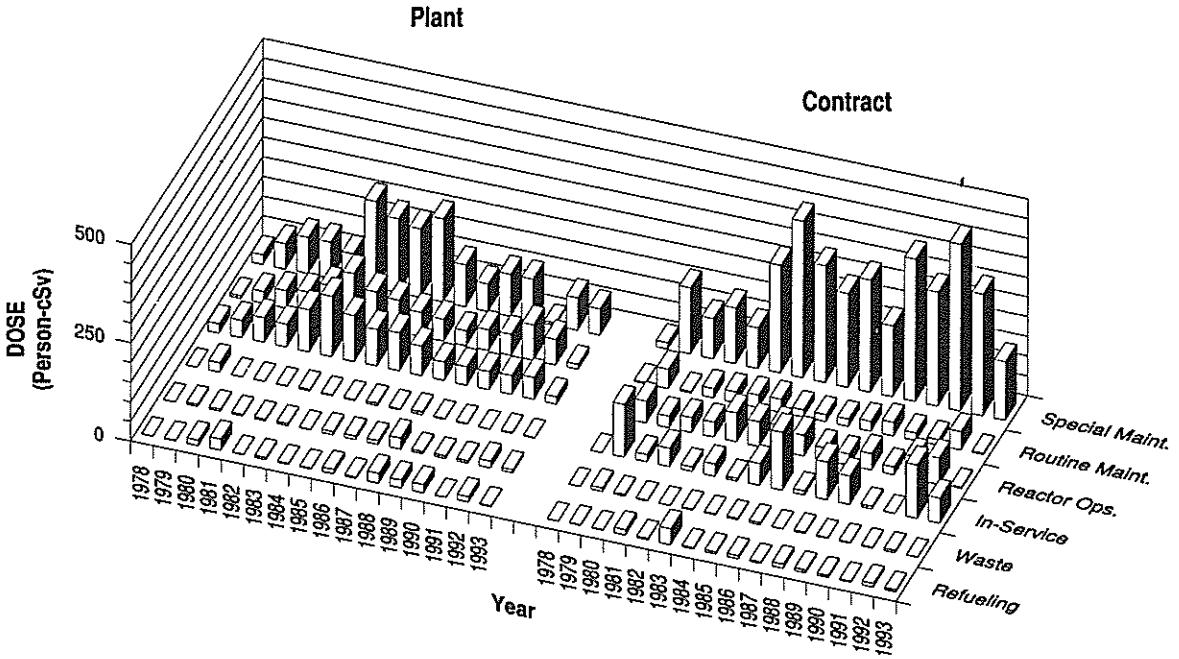
APPENDIX E (continued)

FARLEY 1, 2

Dose-Performance Indicators **PWR**



Breakdown by Job Function

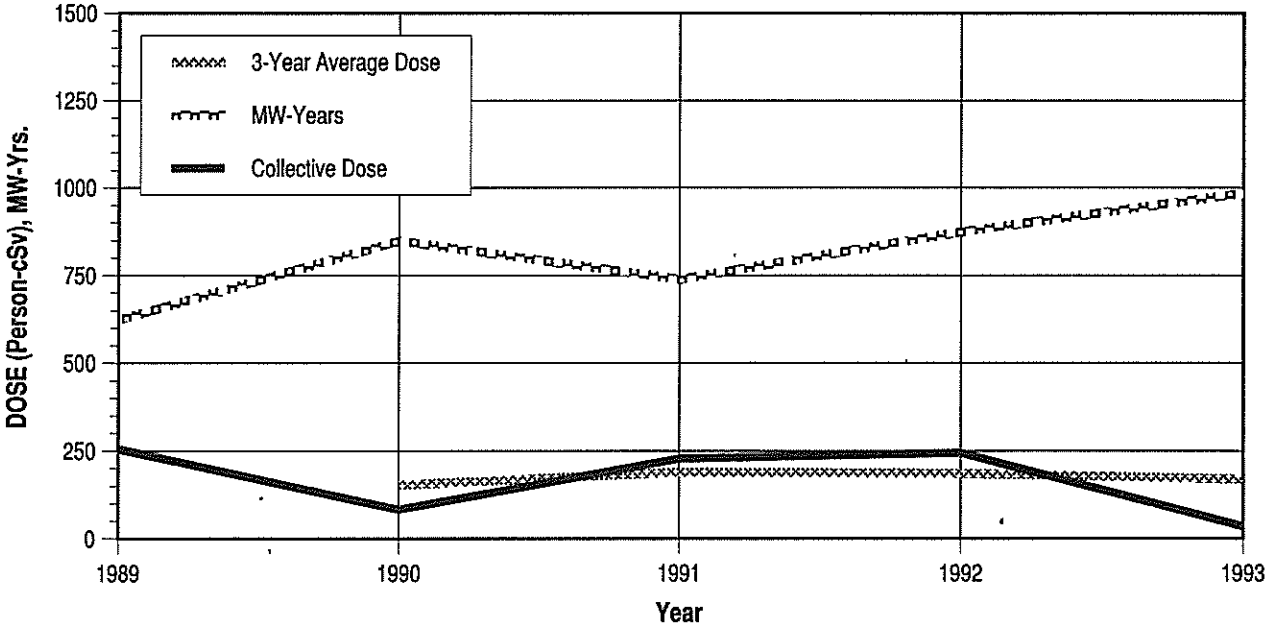


APPENDIX E (continued)

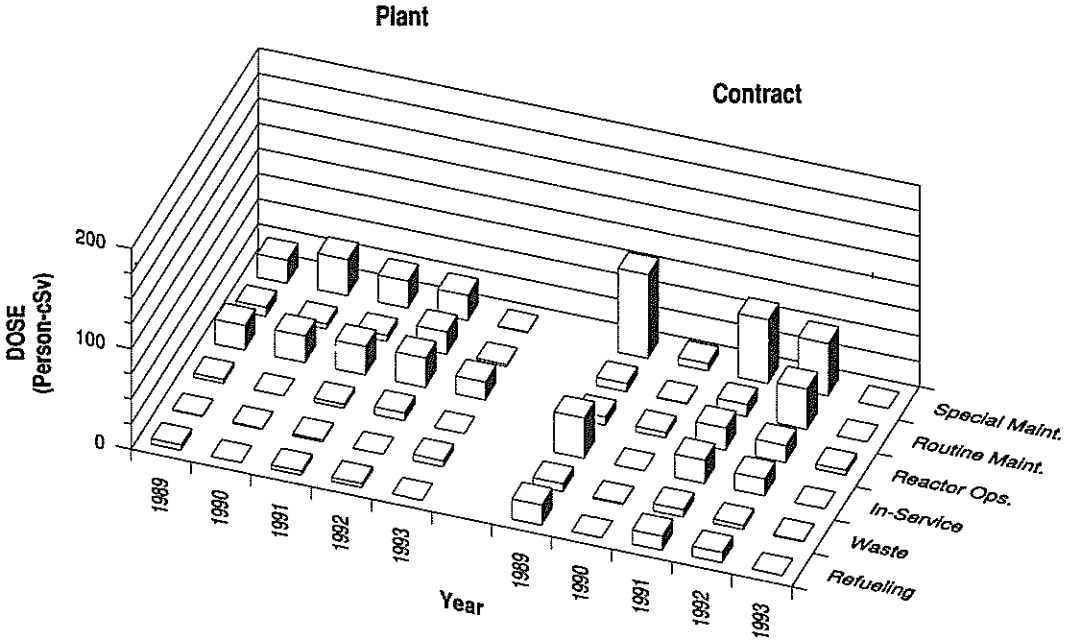
FERMI 2

Dose-Performance Indicators

BWR



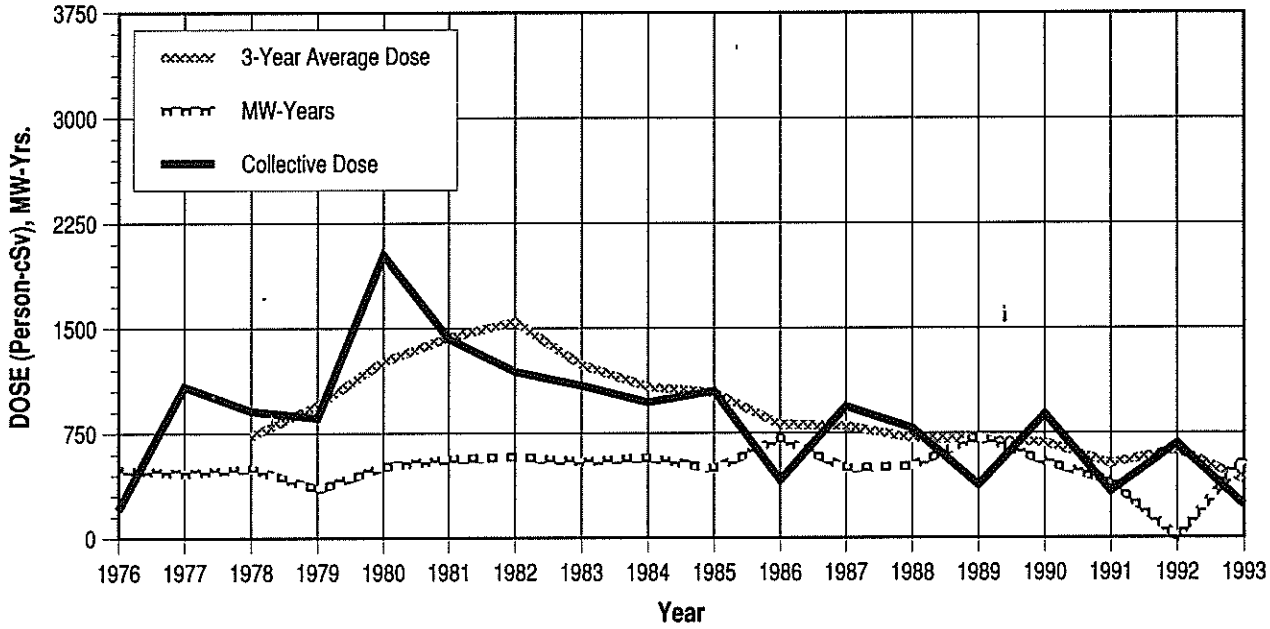
Breakdown by Job Function



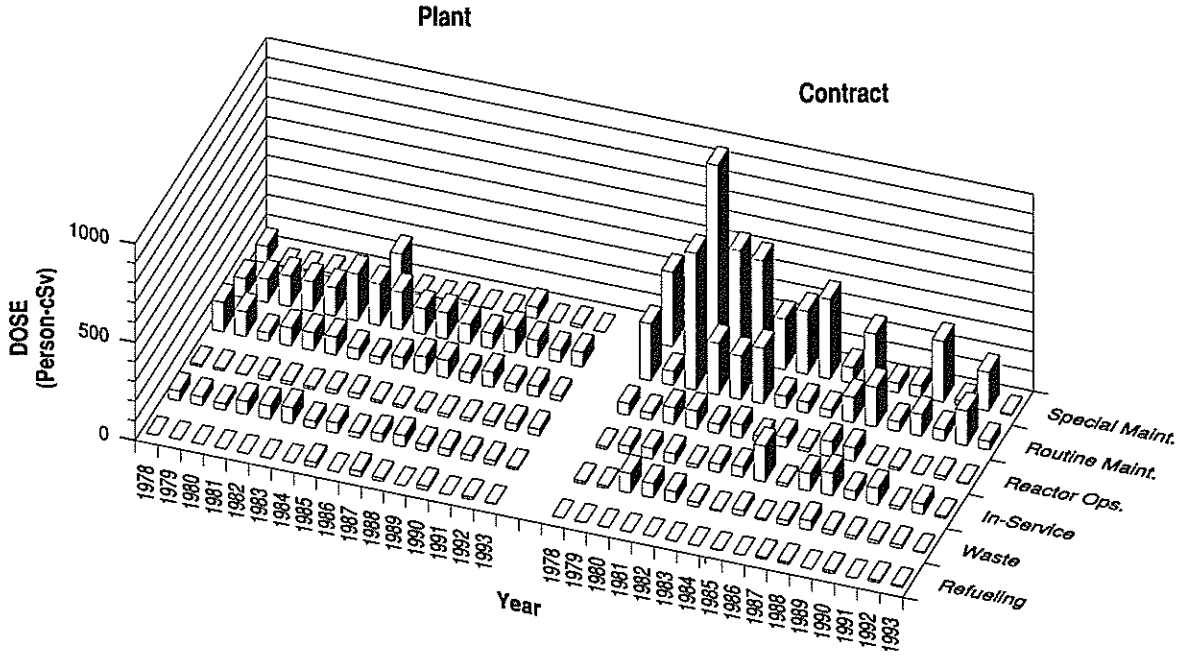
APPENDIX E (continued)

FITZPATRICK

Dose-Performance Indicators **BWR**



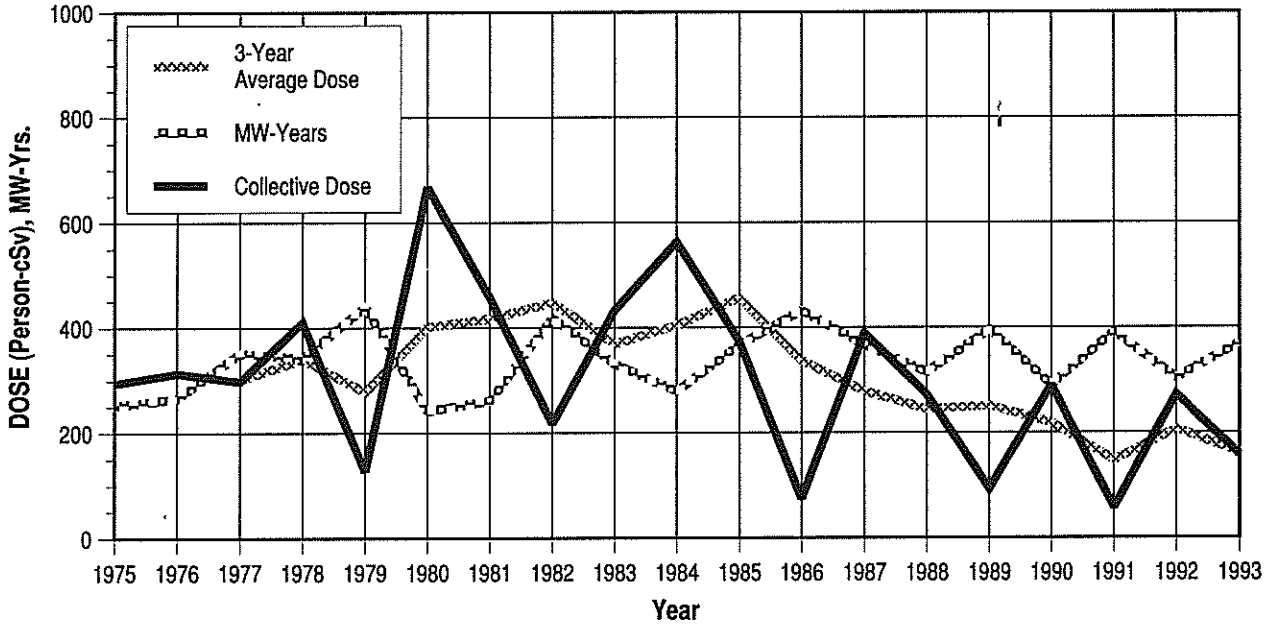
Breakdown by Job Function



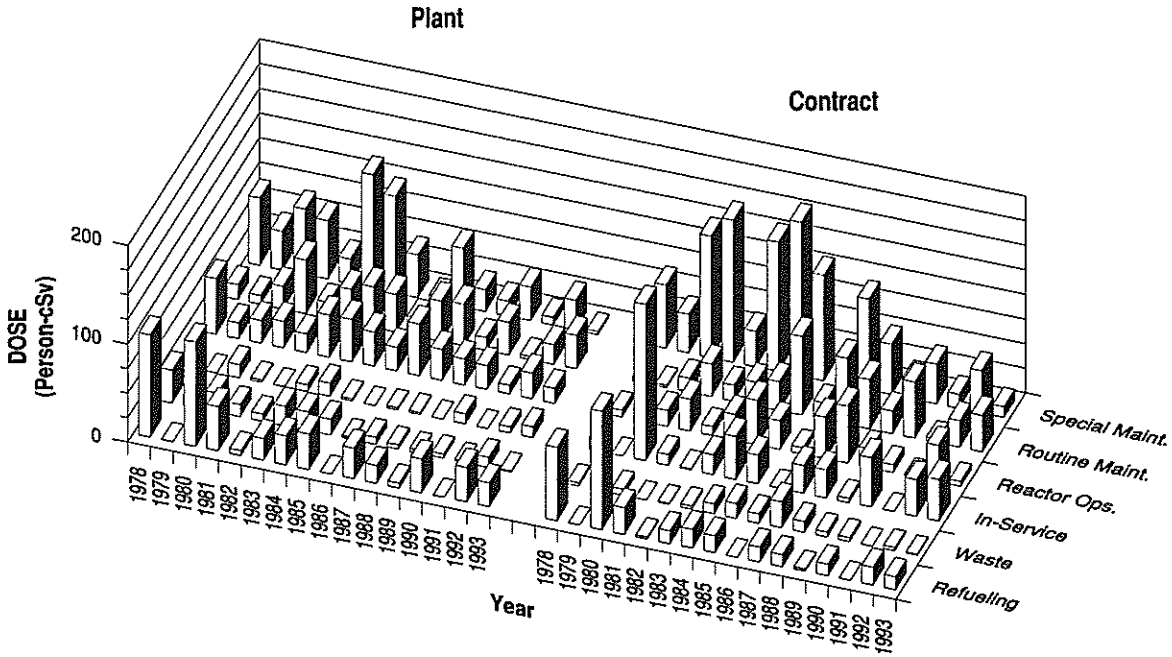
APPENDIX E (continued)

FORT CALHOUN

Dose-Performance Indicators **PWR**



Breakdown by Job Function

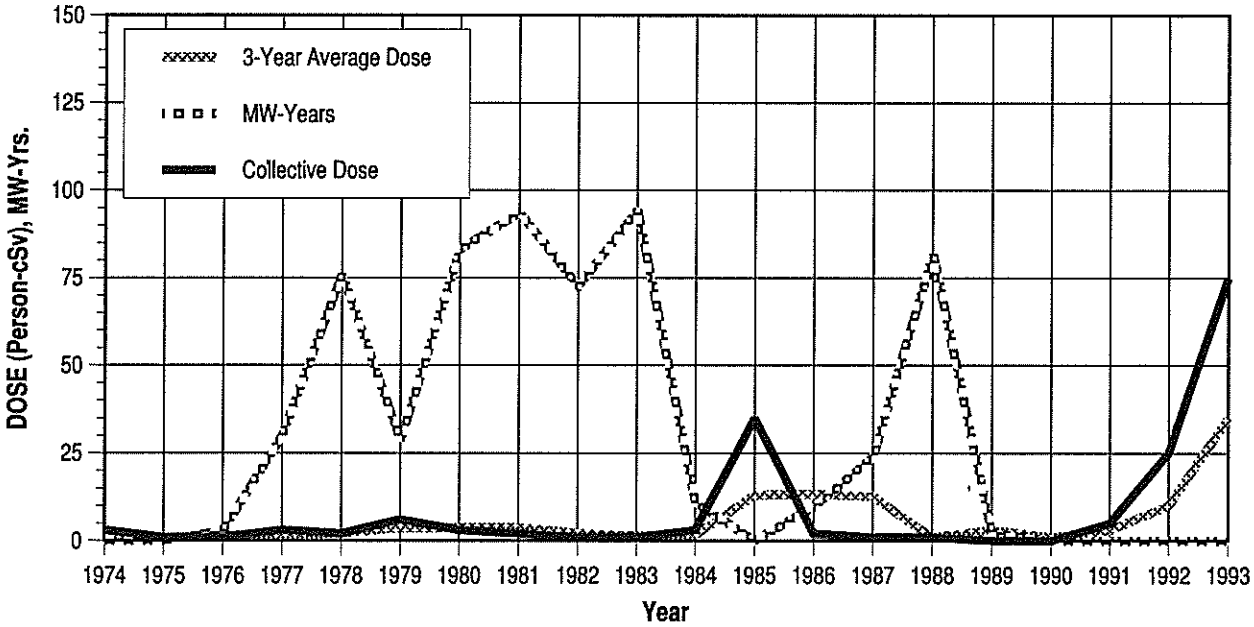


APPENDIX E (continued)

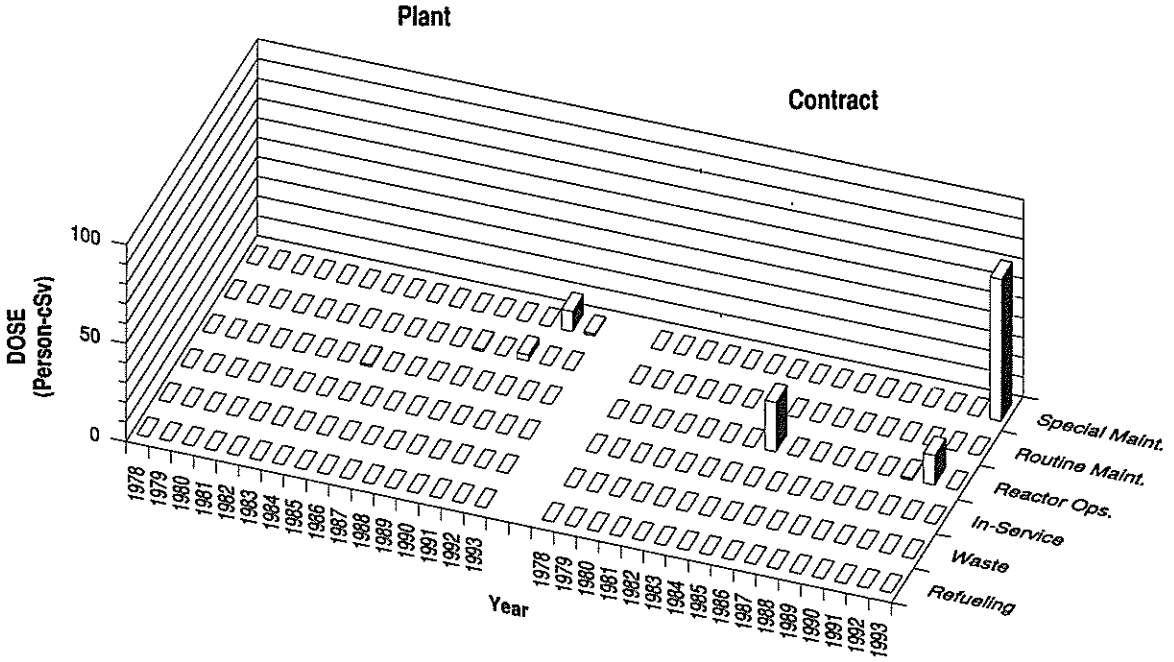
FORT ST. VRAIN

Dose-Performance Indicators

HTGR



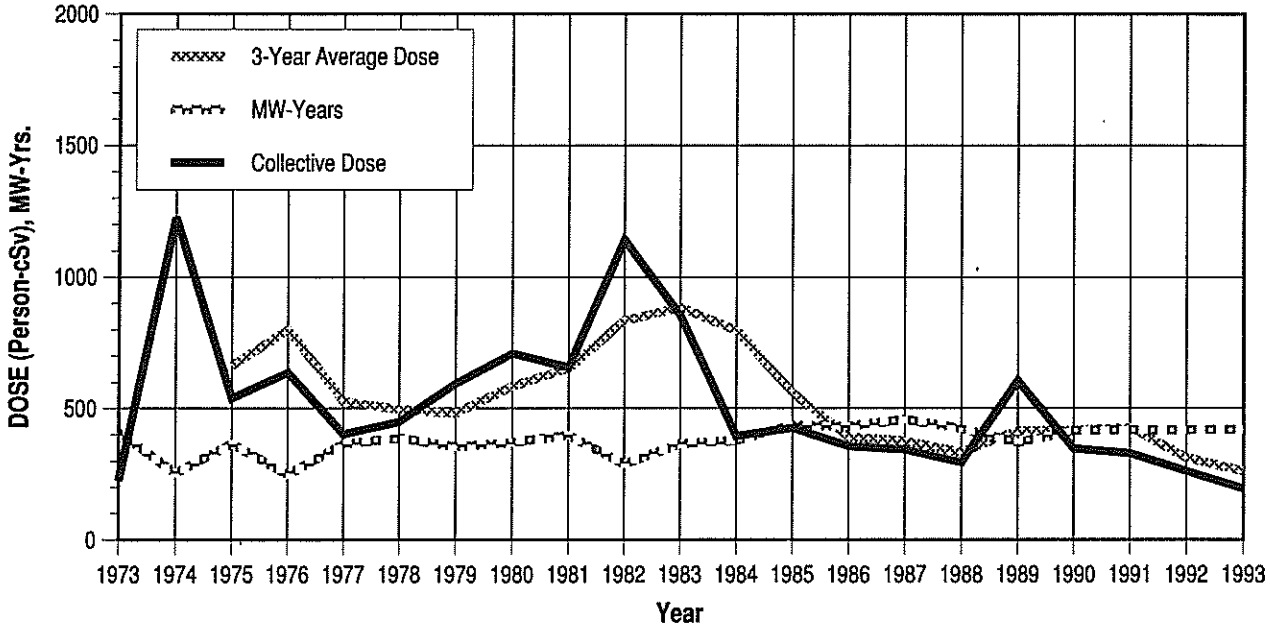
Breakdown by Job Function



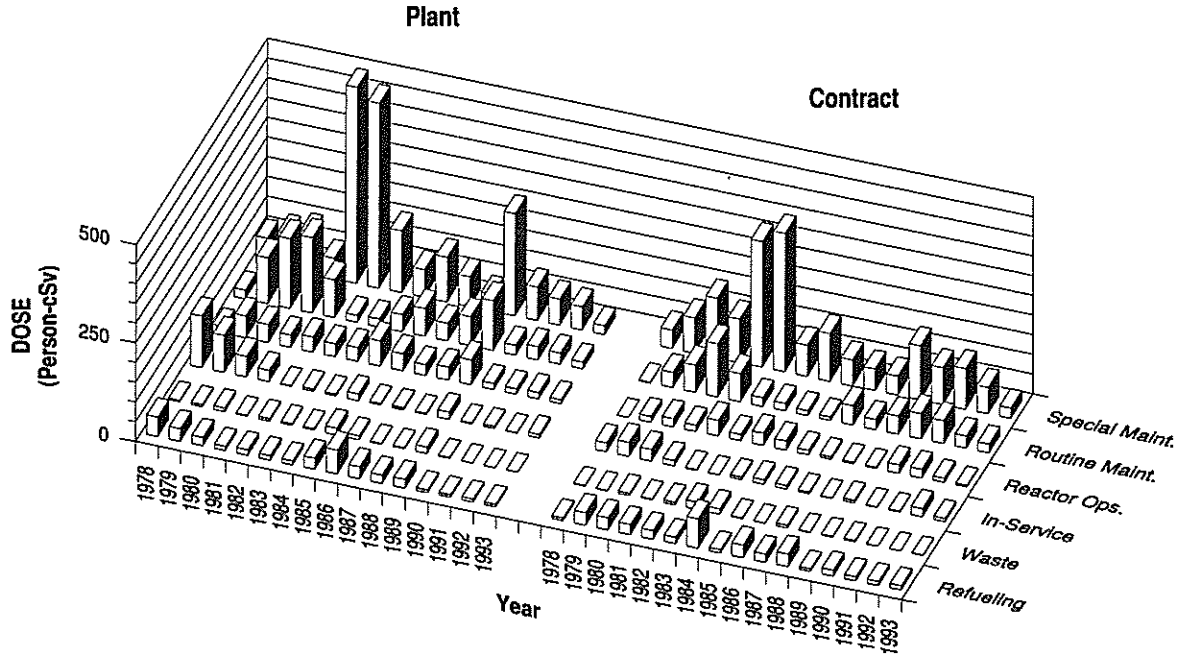
APPENDIX E (continued)

GINNA

Dose-Performance Indicators **PWR**



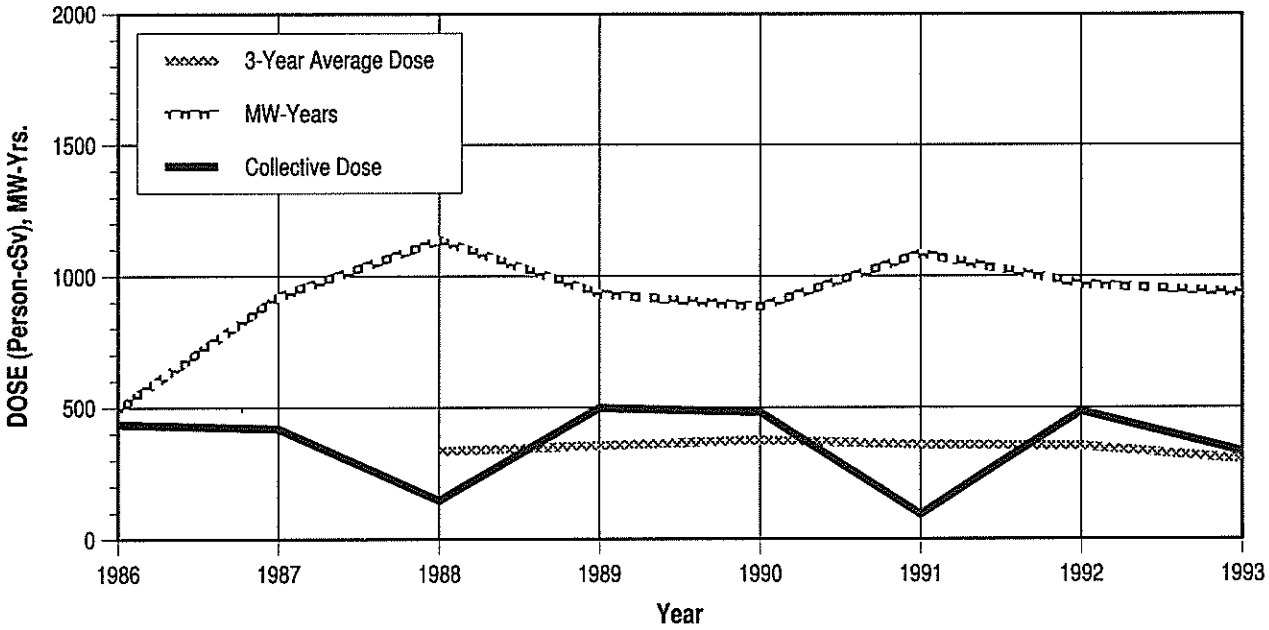
Breakdown by Job Function



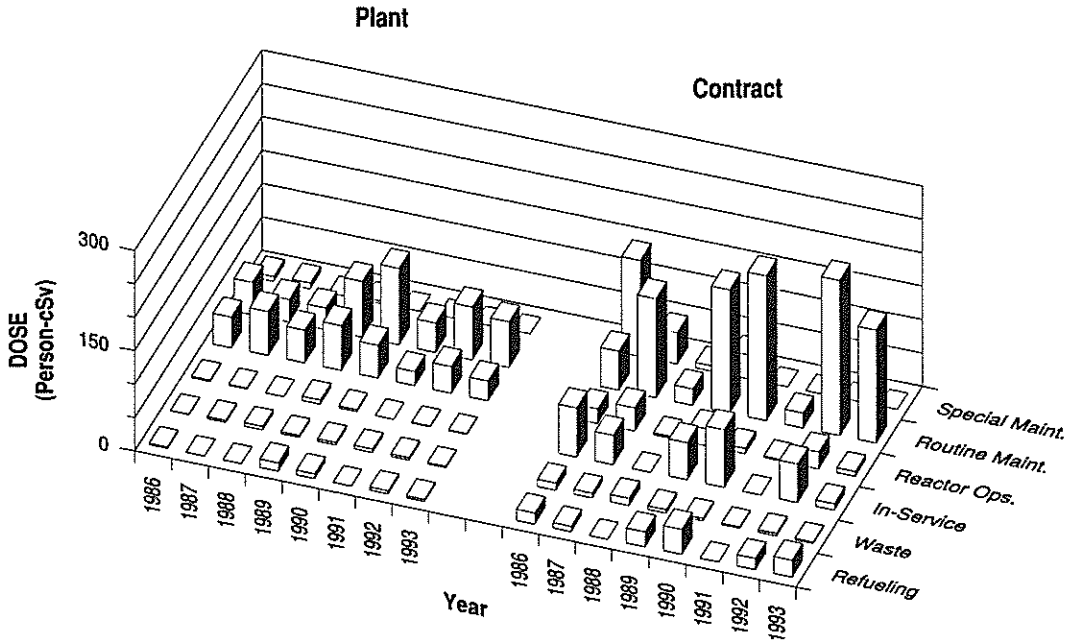
APPENDIX E (continued)

GRAND GULF

Dose-Performance Indicators **BWR**



Breakdown by Job Function

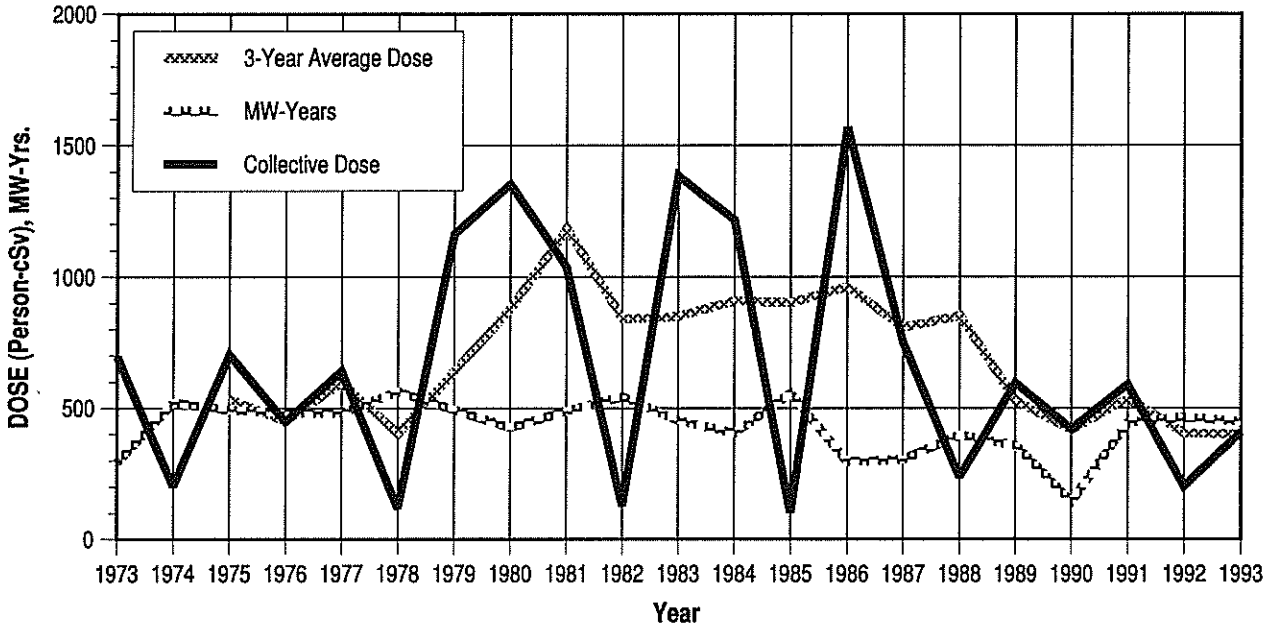


APPENDIX E (continued)

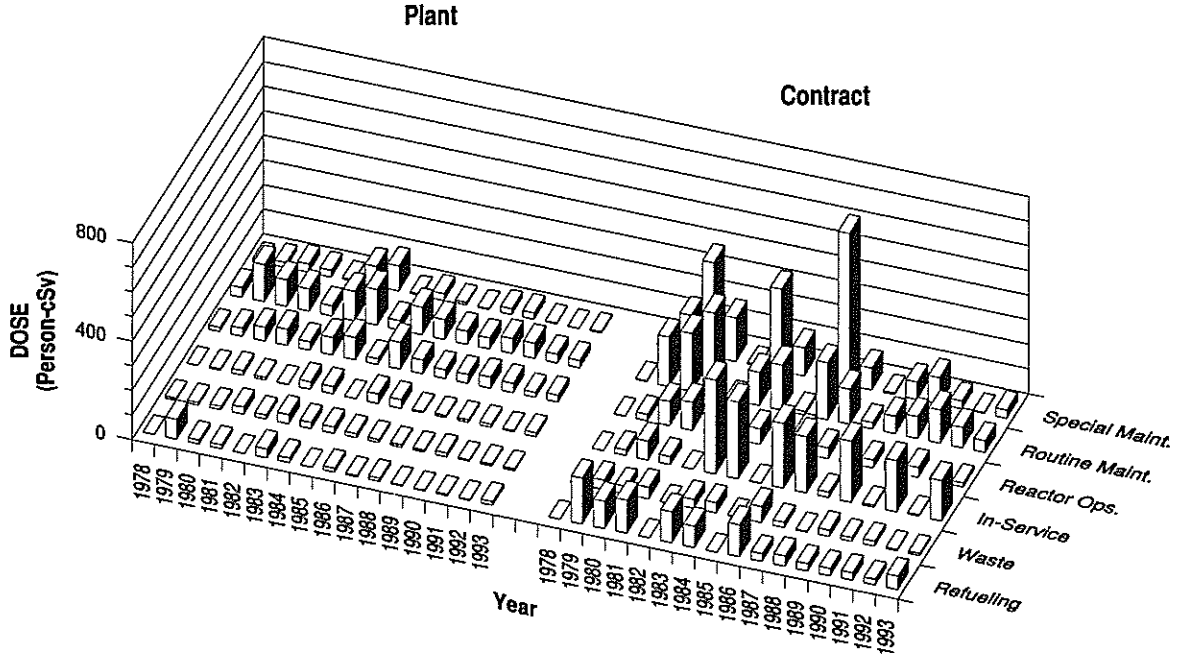
HADDAM NECK

Dose-Performance Indicators

PWR



Breakdown by Job Function

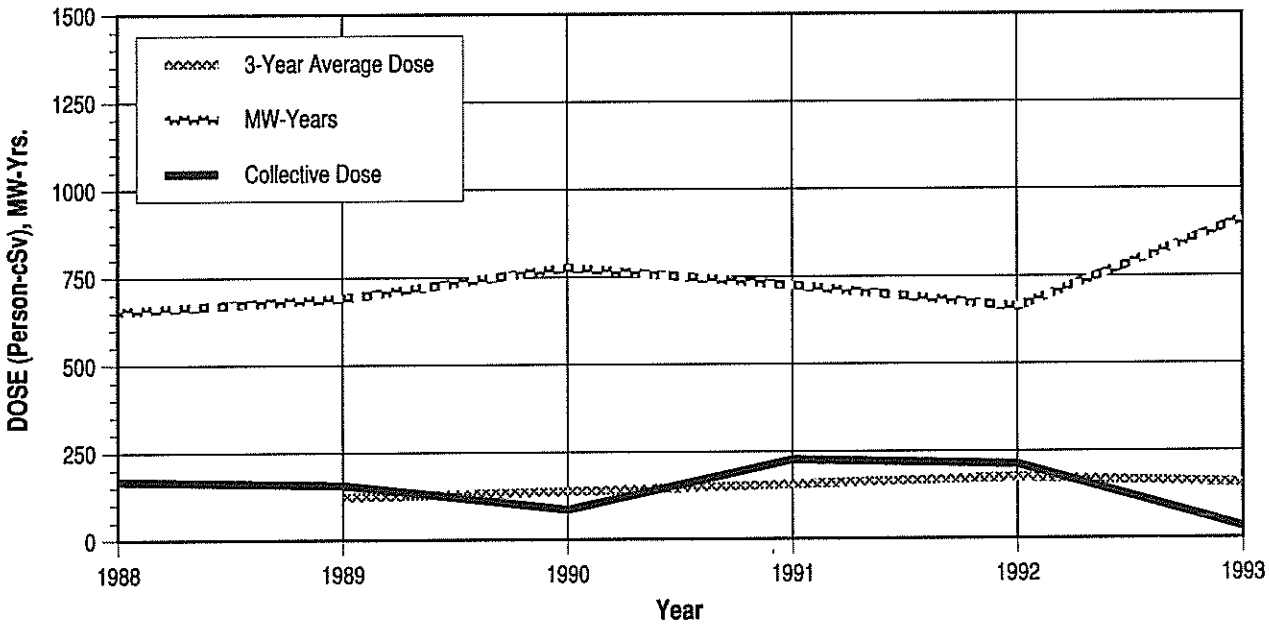


APPENDIX E (continued)

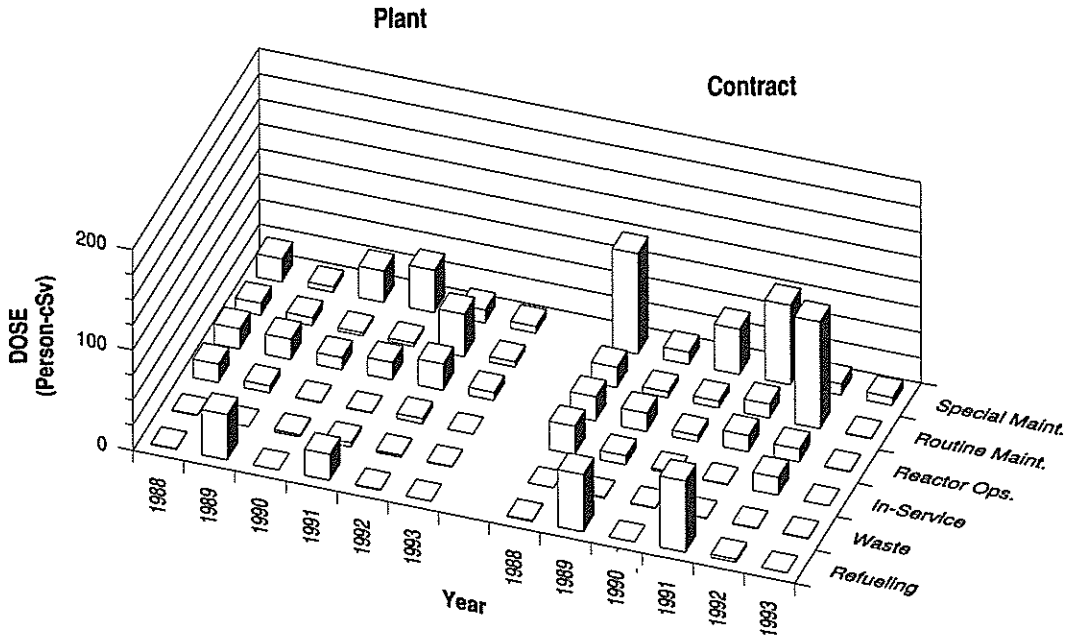
HARRIS

Dose-Performance Indicators

PWR



Breakdown by Job Function

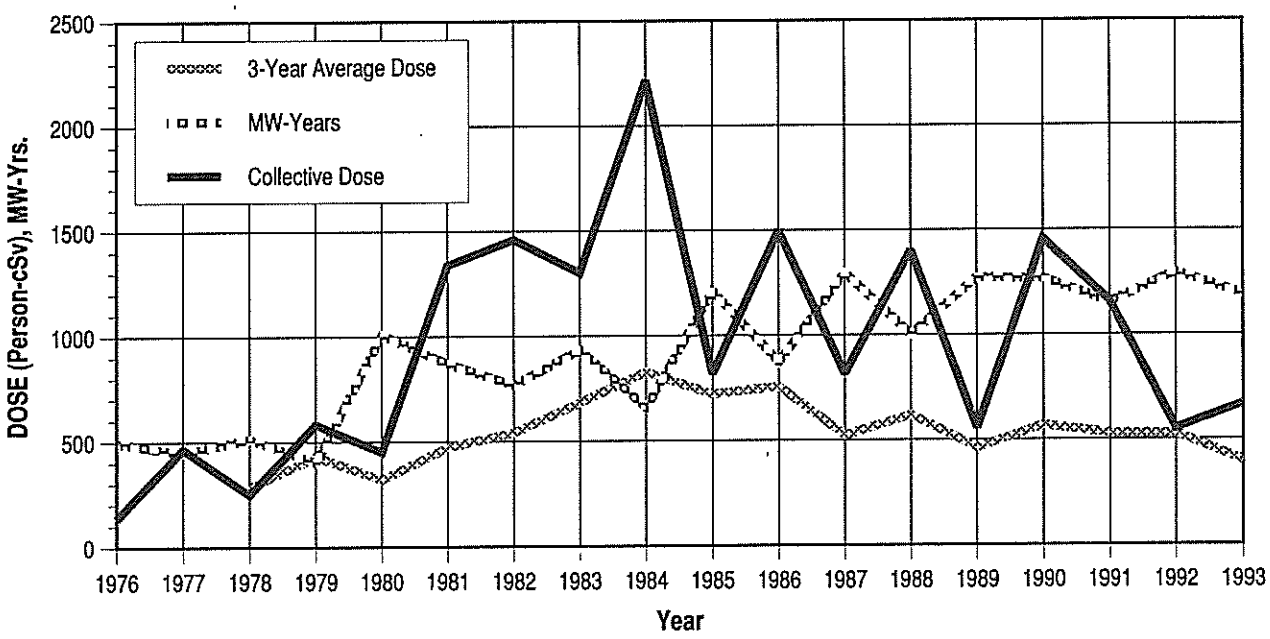


APPENDIX E (continued)

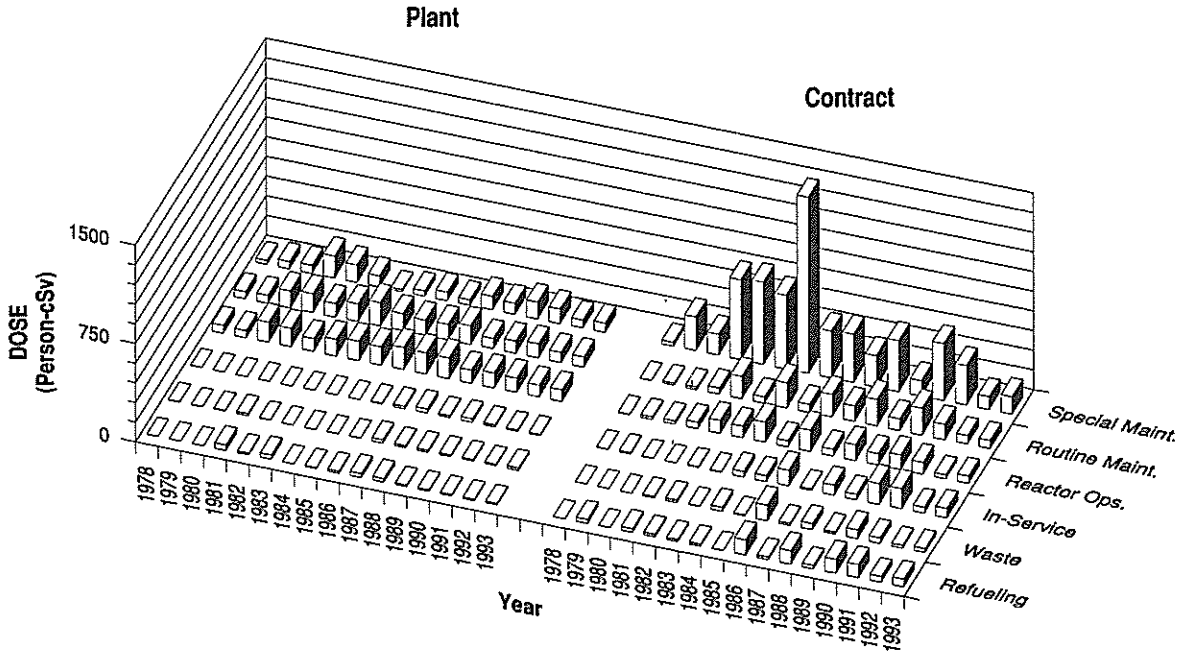
HATCH 1, 2

Dose-Performance Indicators

BWR



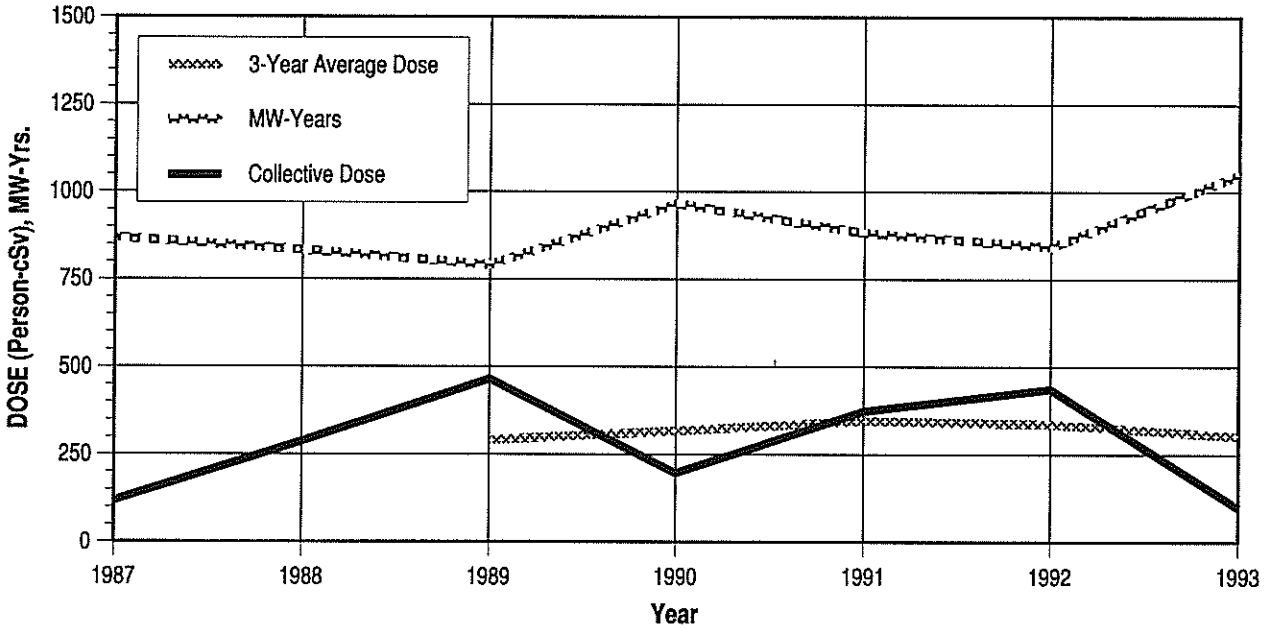
Breakdown by Job Function



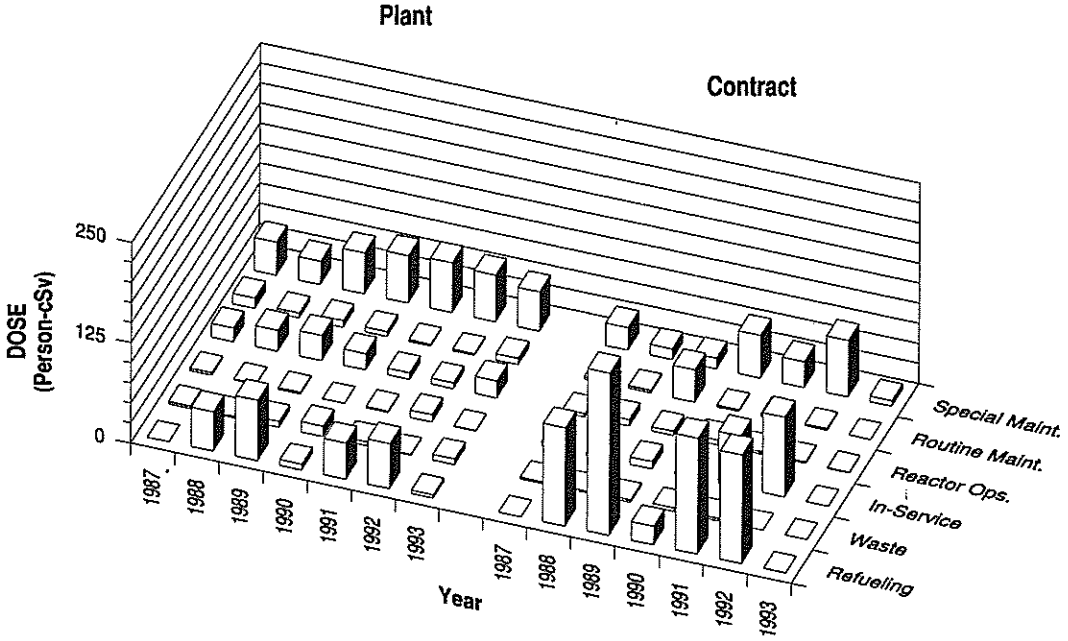
APPENDIX E (continued)

HOPE CREEK 1

Dose-Performance Indicators **BWR**



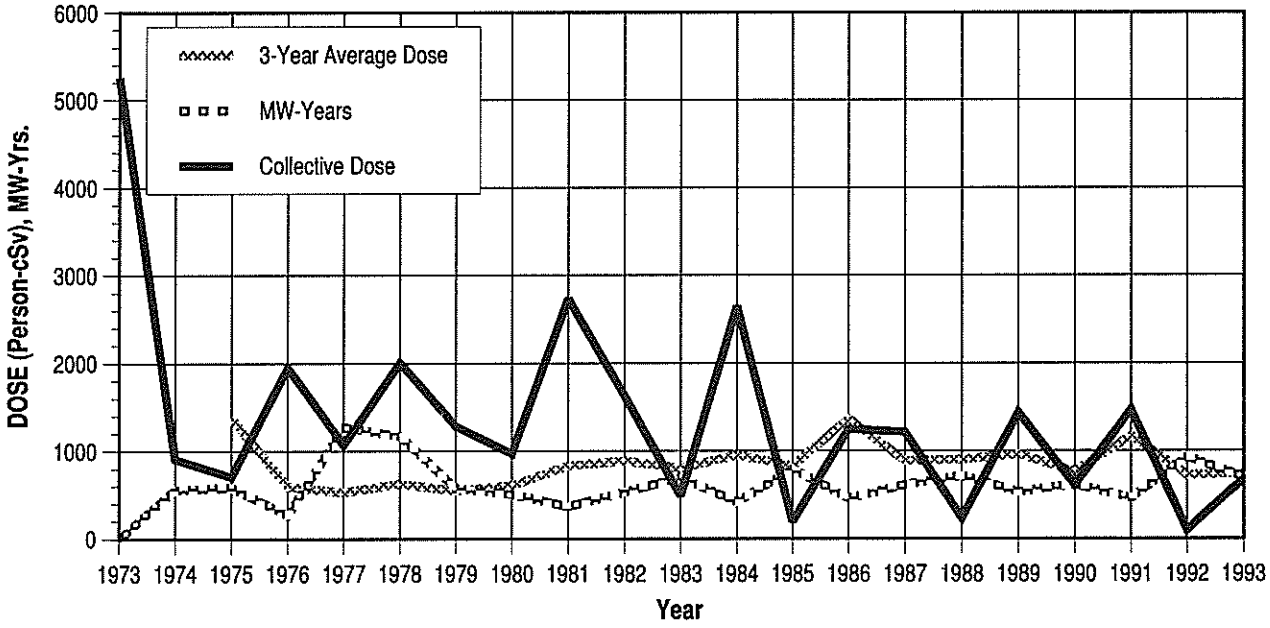
Breakdown by Job Function



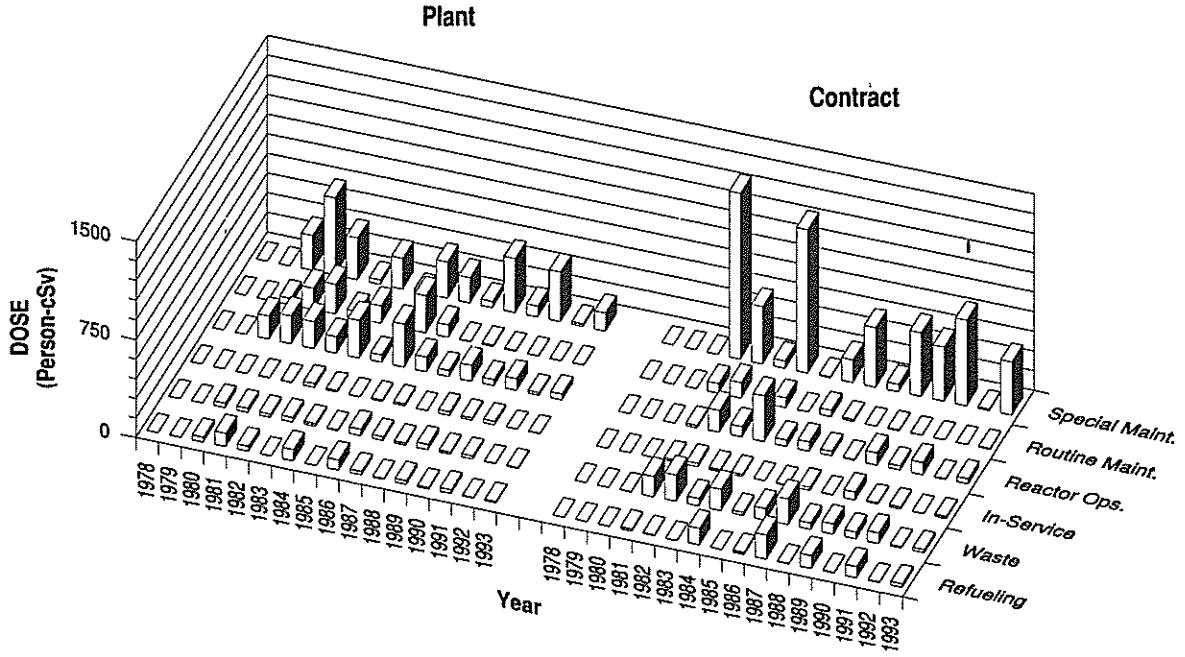
APPENDIX E (continued)

INDIAN POINT 2

Dose-Performance Indicators **PWR**



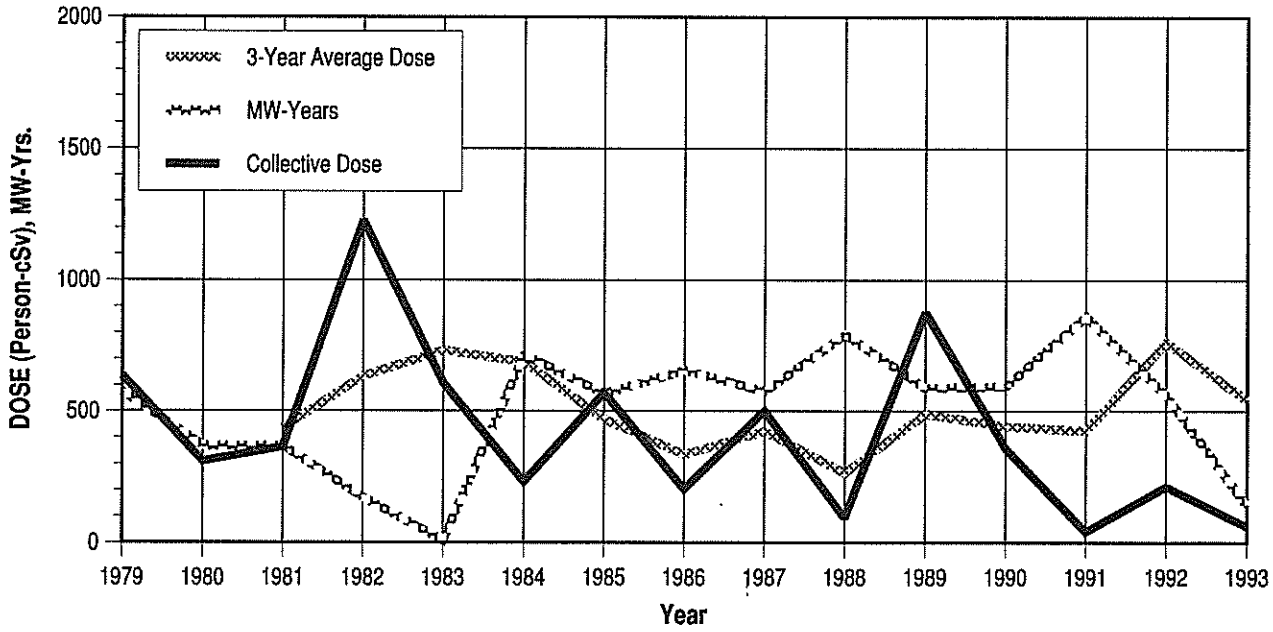
Breakdown by Job Function



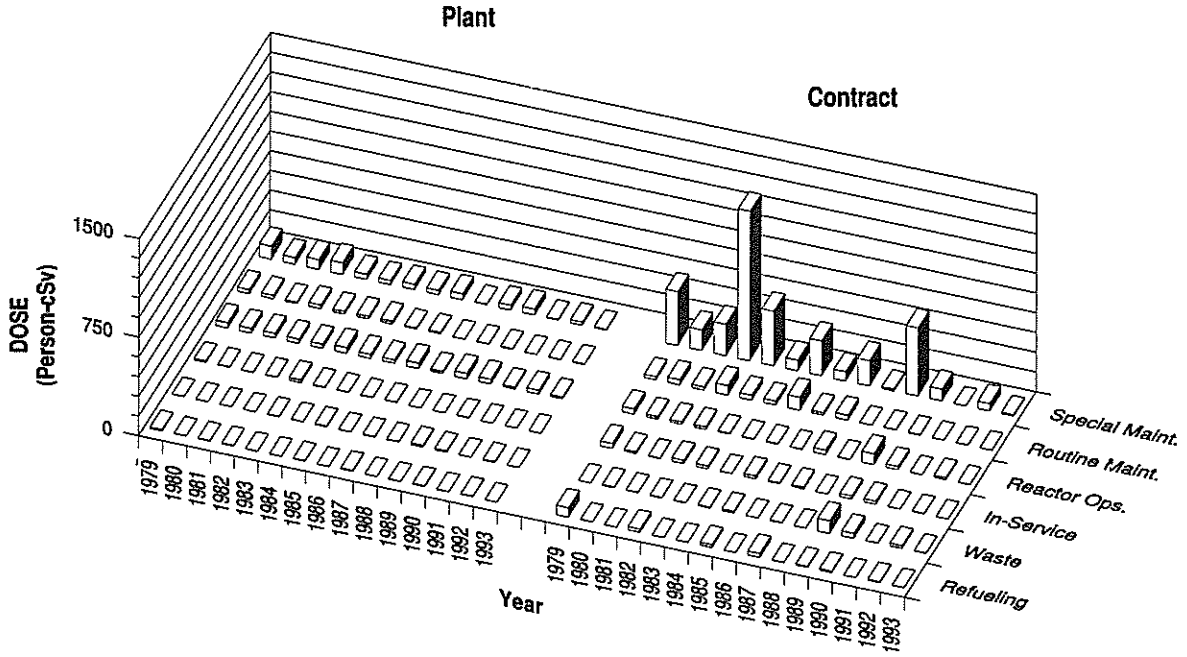
APPENDIX E (continued)

INDIAN POINT 3

Dose-Performance Indicators **PWR**



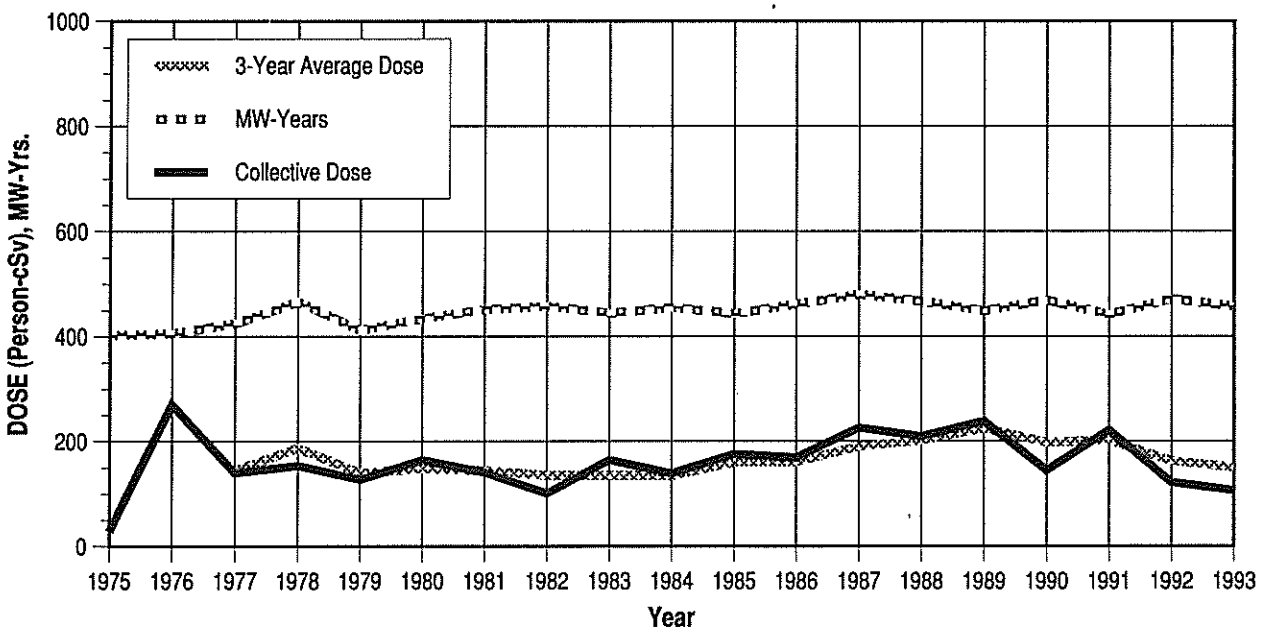
Breakdown by Job Function



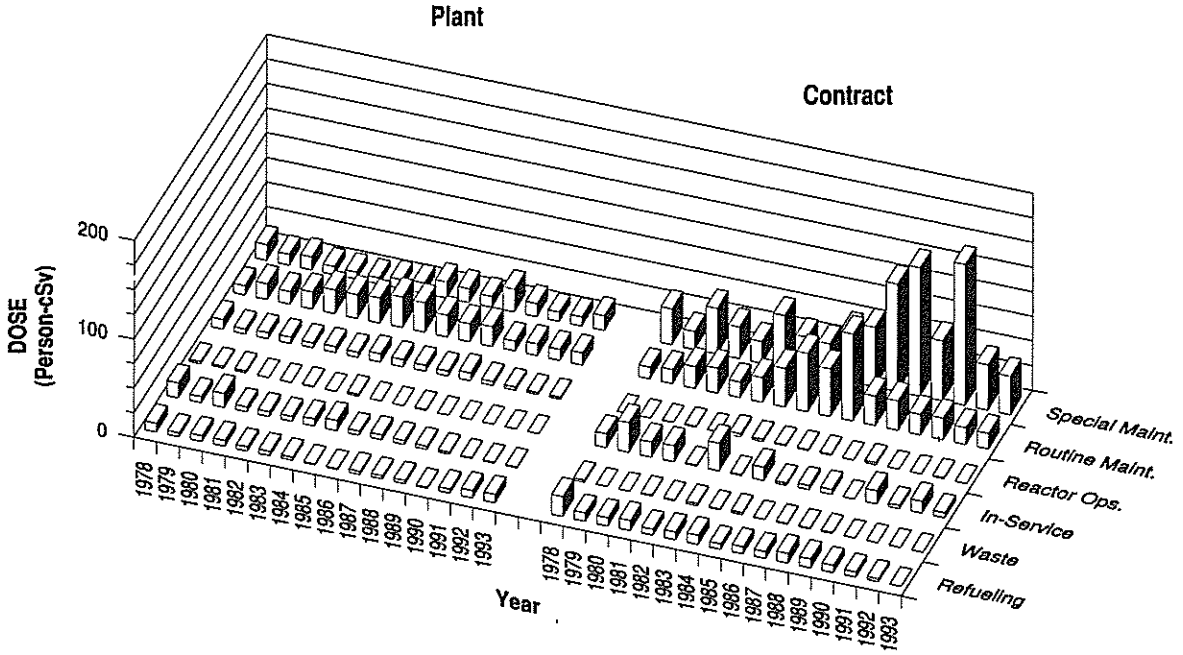
APPENDIX E (continued)

KEWAUNEE

Dose-Performance Indicators **PWR**



Breakdown by Job Function

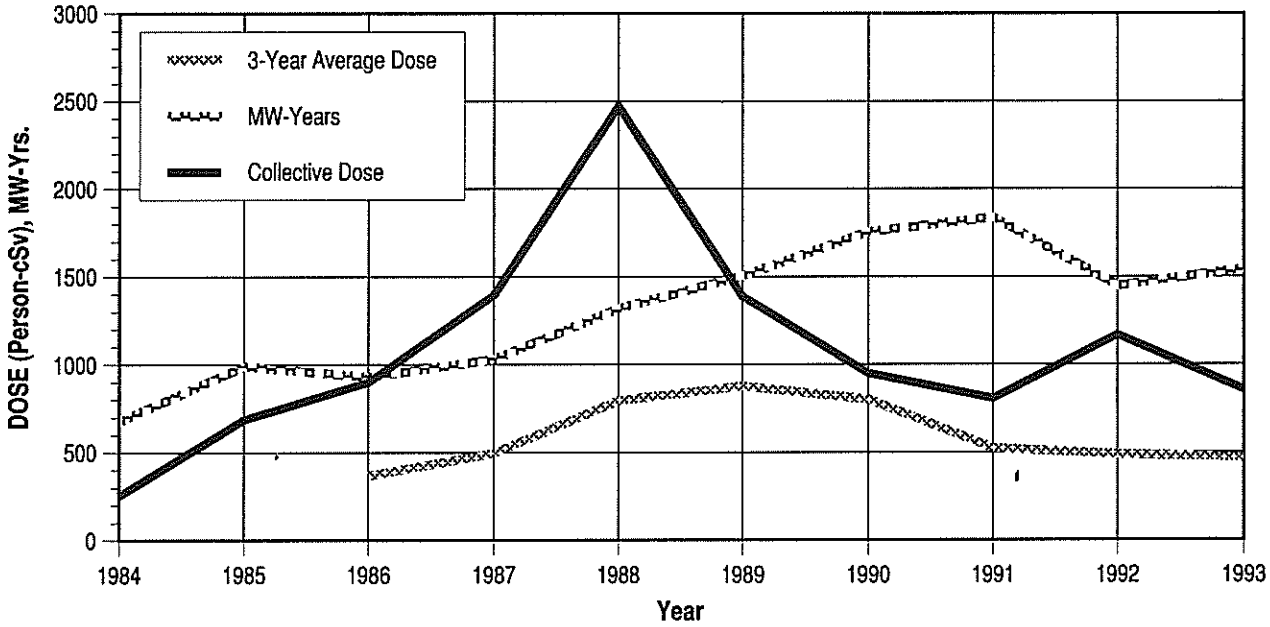


APPENDIX E (continued)

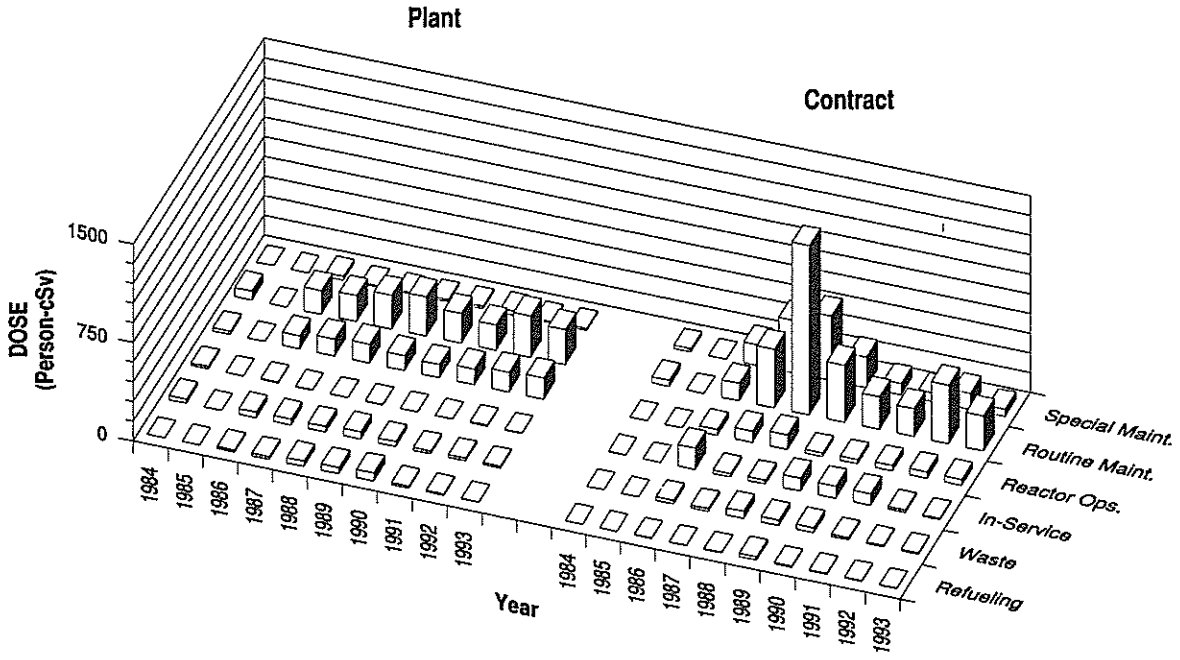
LASALLE 1, 2

Dose-Performance Indicators

BWR



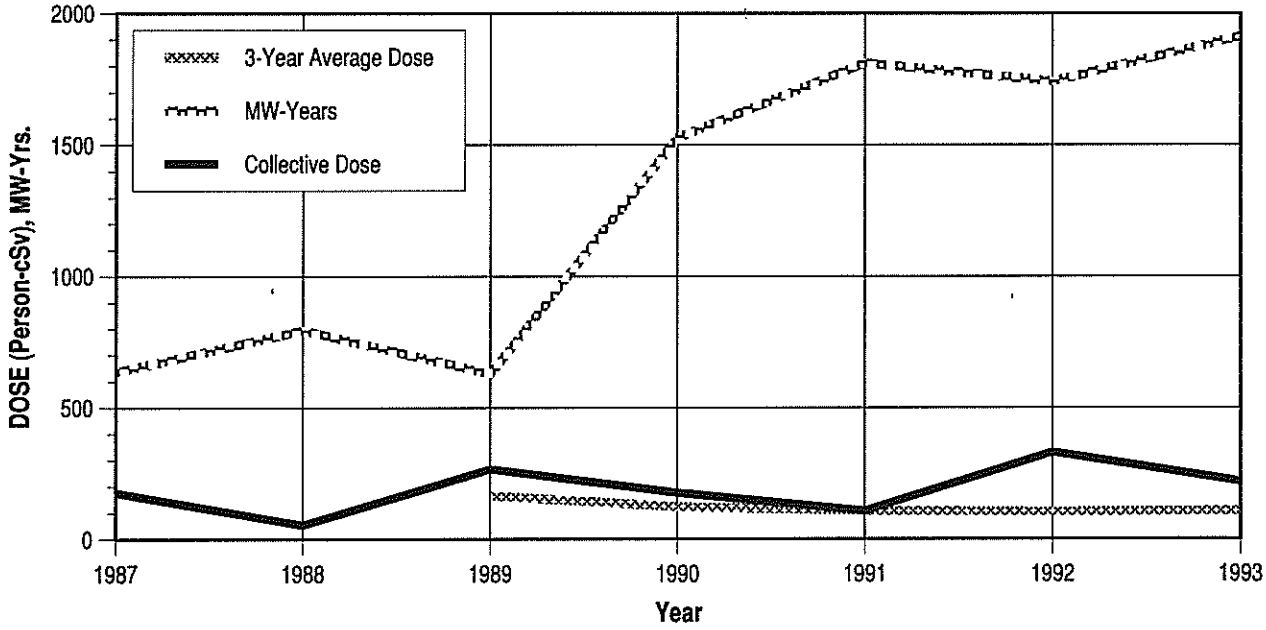
Breakdown by Job Function



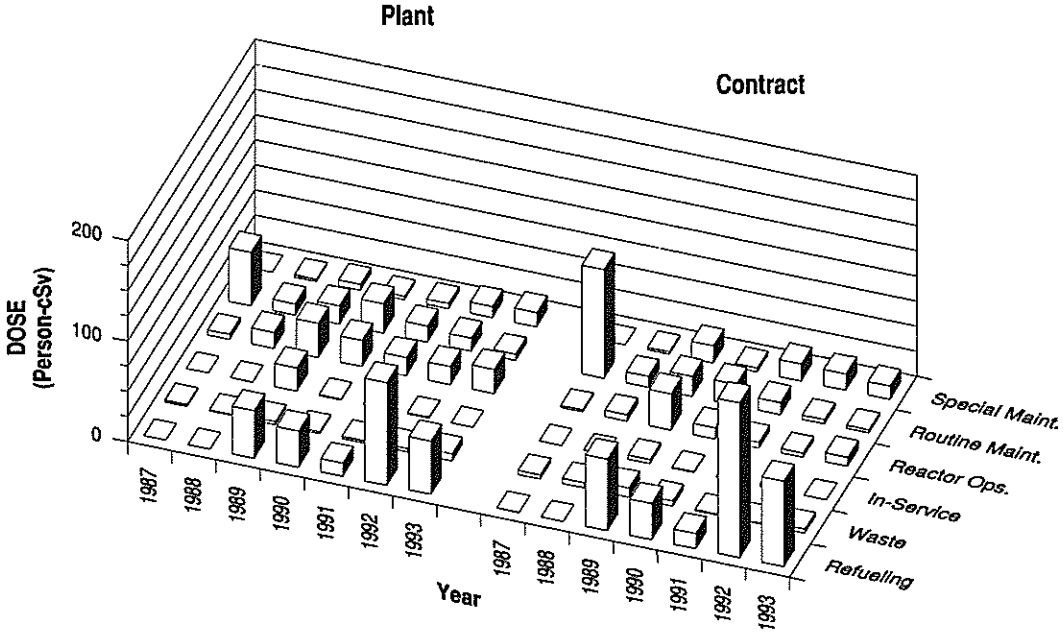
APPENDIX E (continued)

LIMERICK 1, 2

Dose-Performance Indicators **BWR**



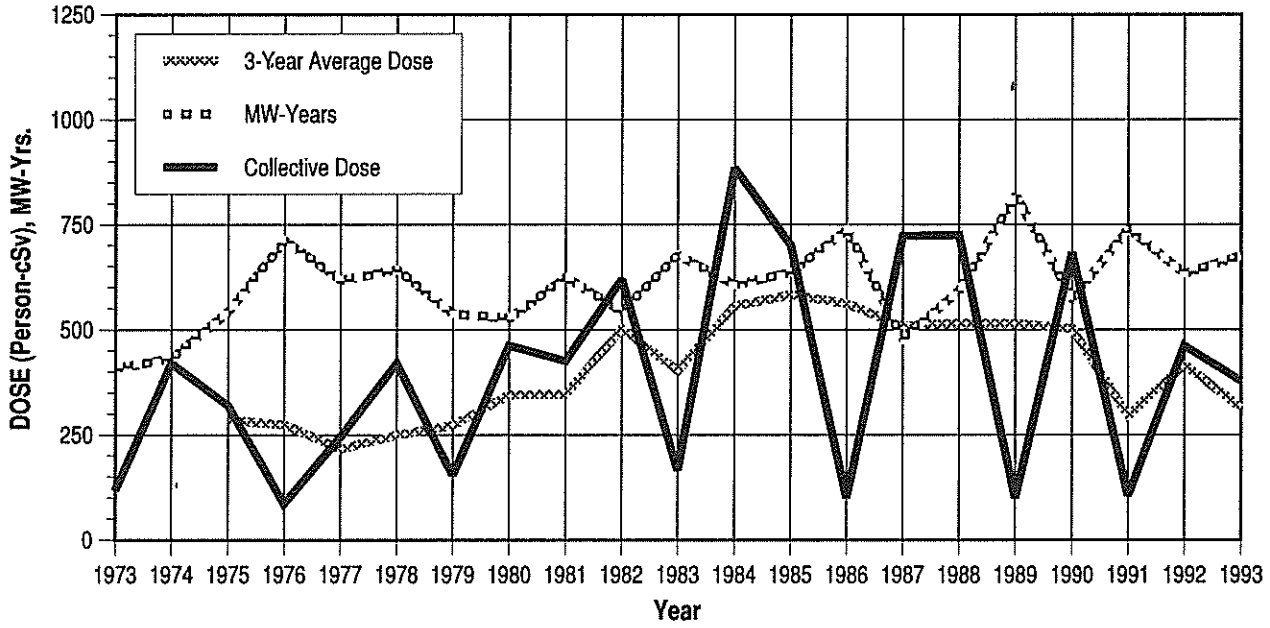
Breakdown by Job Function



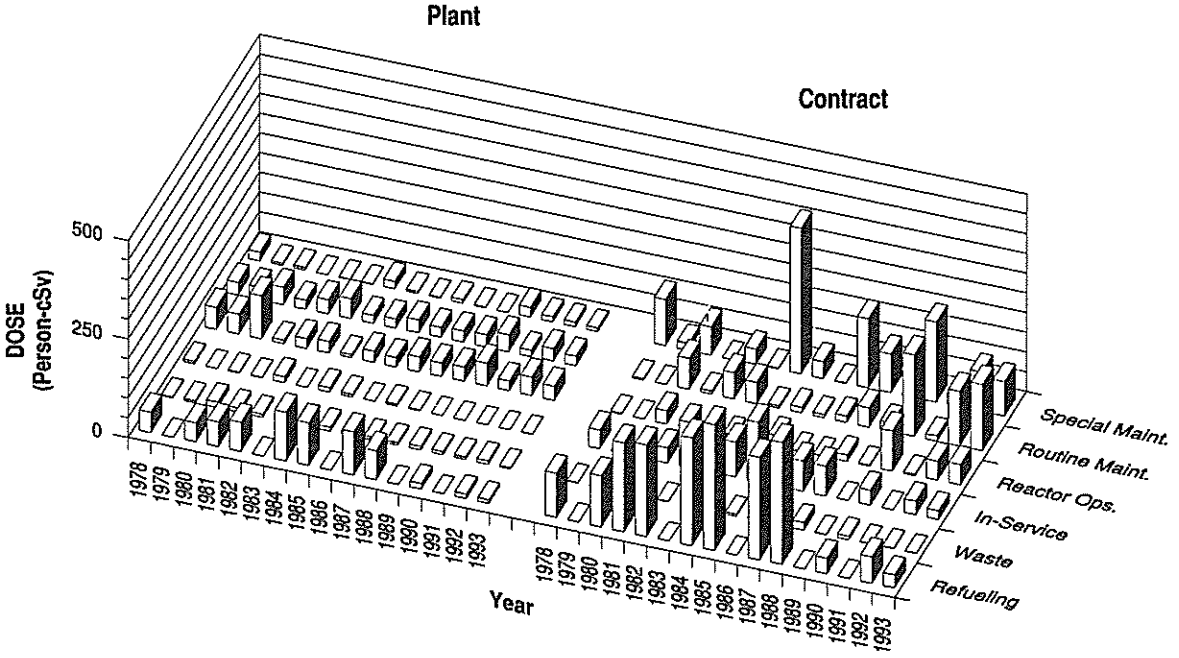
APPENDIX E (continued)

MAINE YANKEE

Dose-Performance Indicators **PWR**



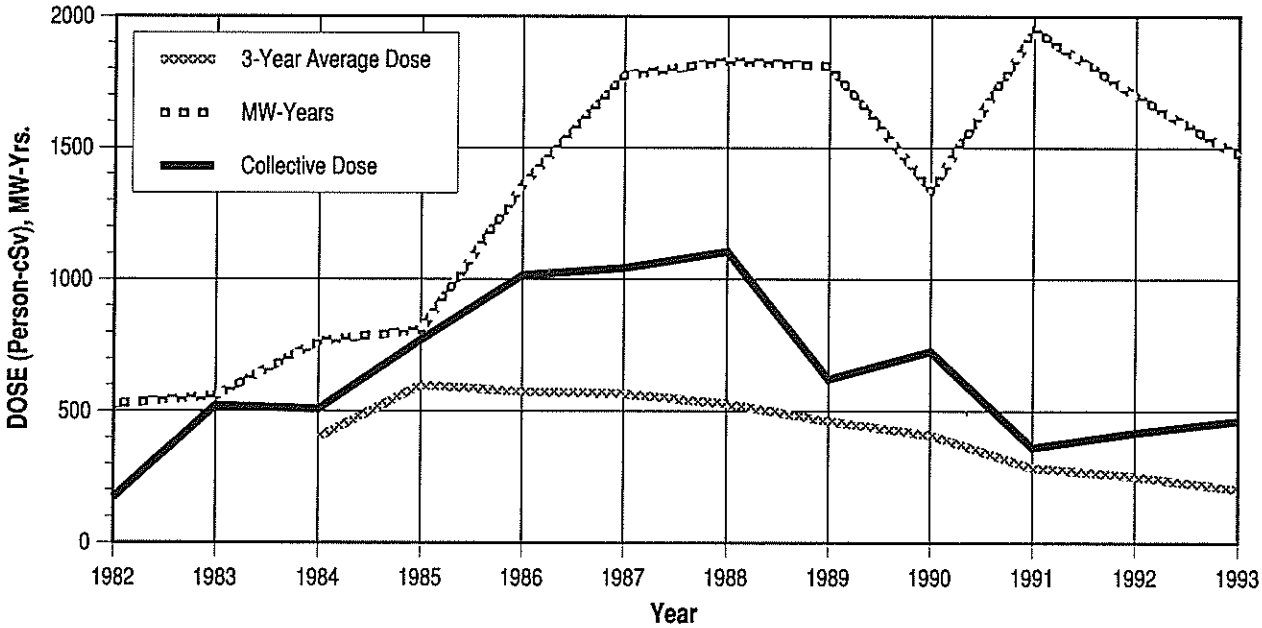
Breakdown by Job Function



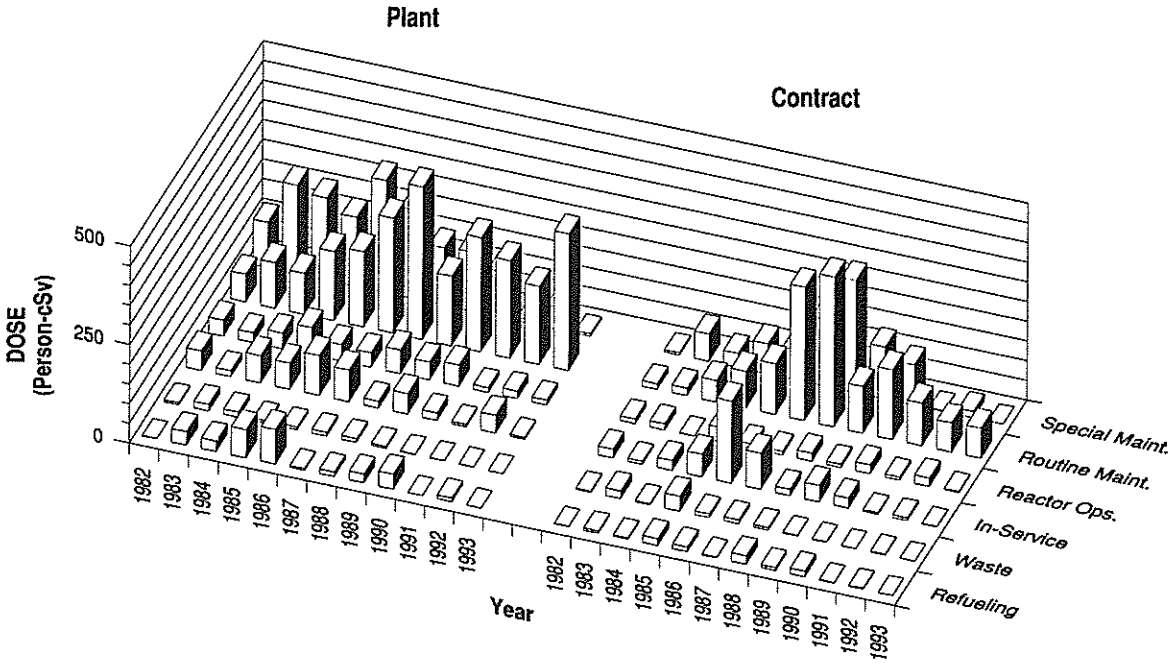
APPENDIX E (continued)

MCGUIRE 1, 2

Dose-Performance Indicators **PWR**



Breakdown by Job Function

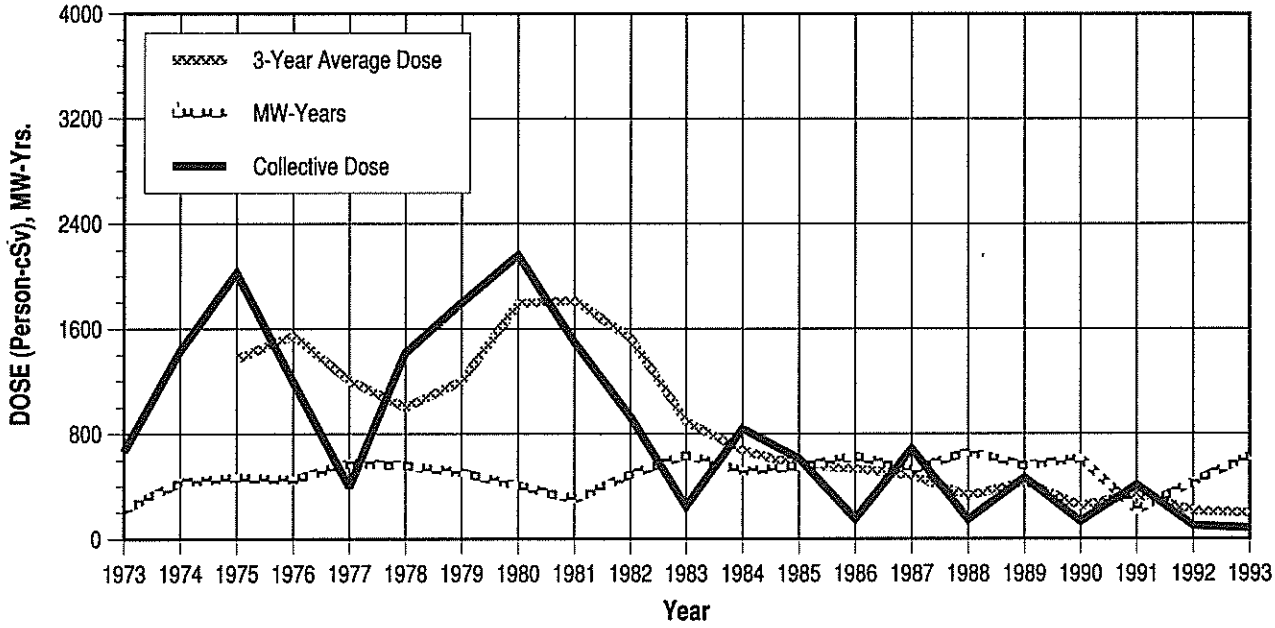


APPENDIX E (continued)

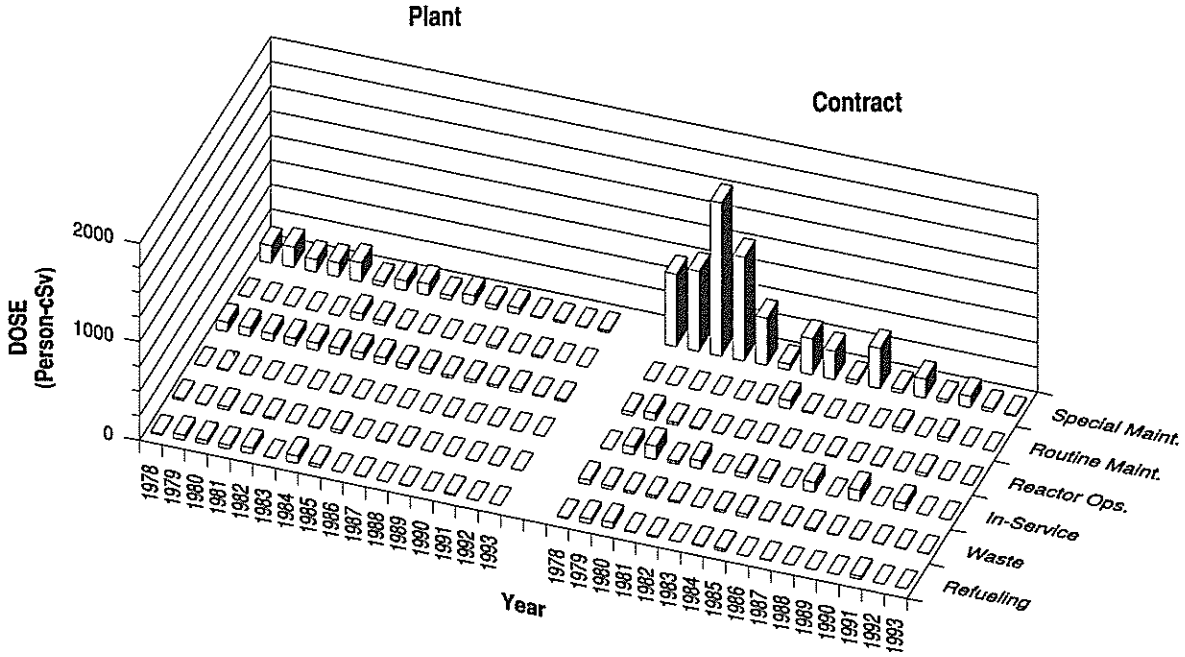
MILLSTONE POINT 1

Dose-Performance Indicators

BWR



Breakdown by Job Function

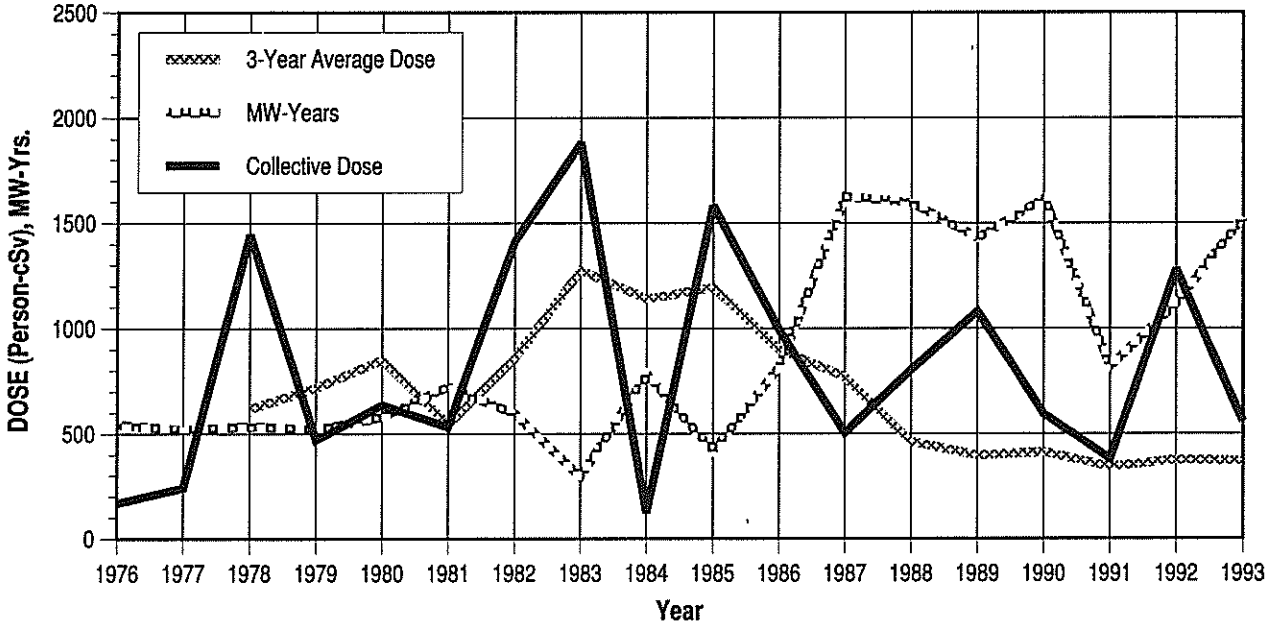


APPENDIX E (continued)

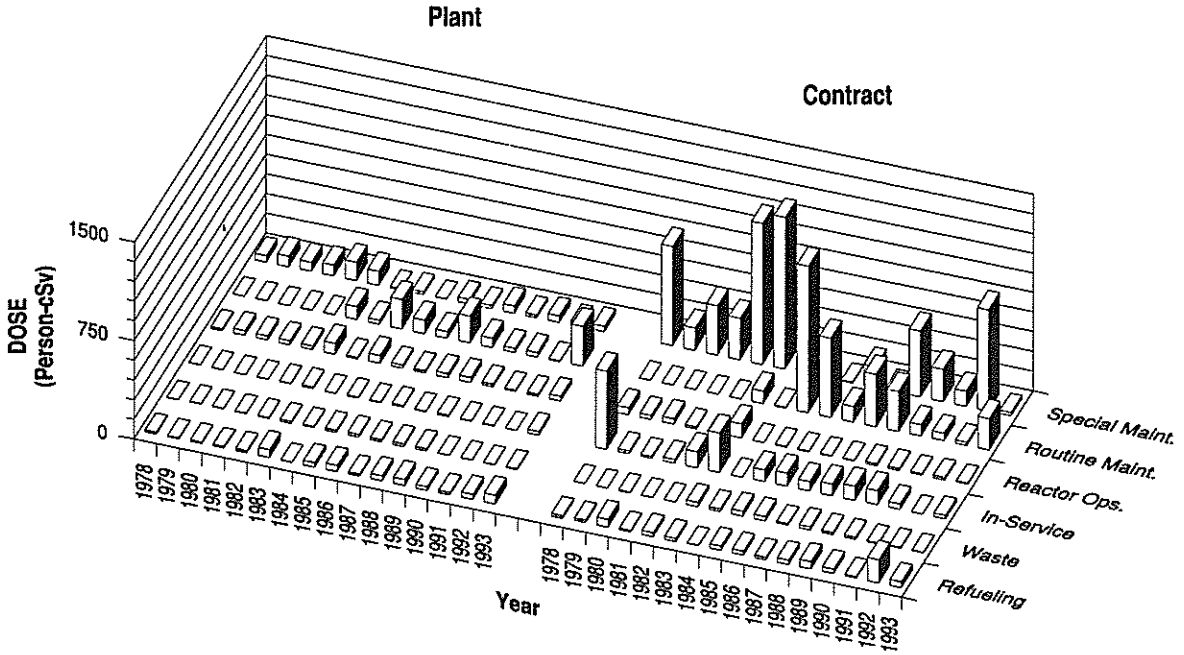
MILLSTONE POINT 2, 3

Dose-Performance Indicators

PWR



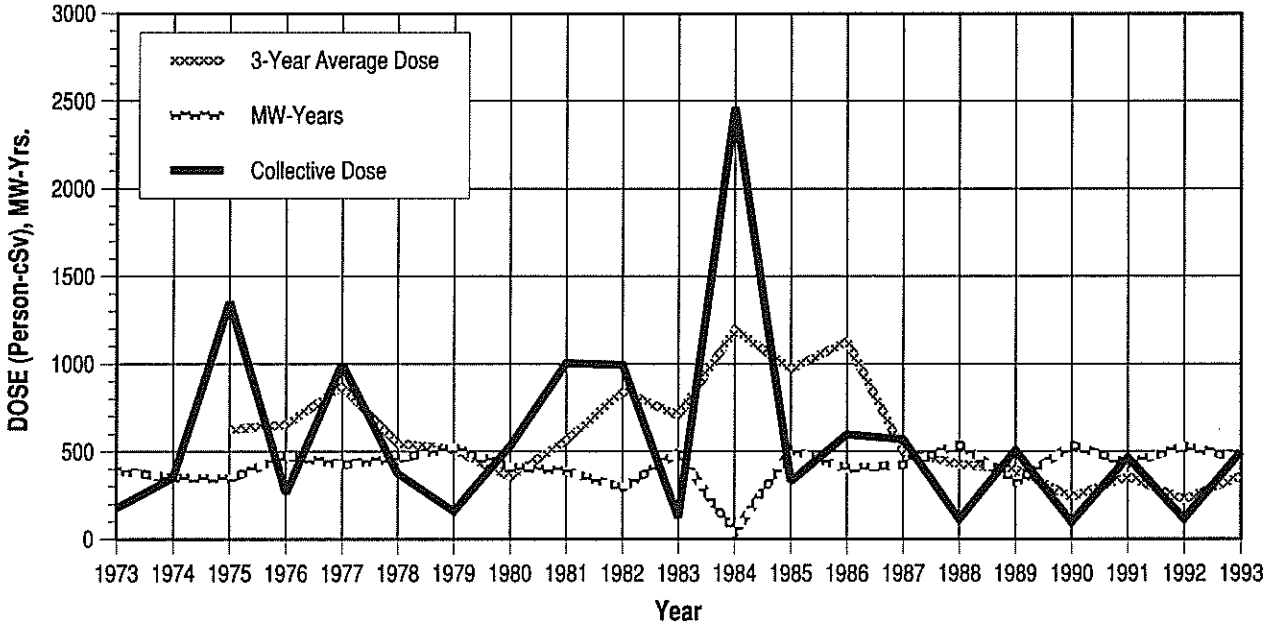
Breakdown by Job Function



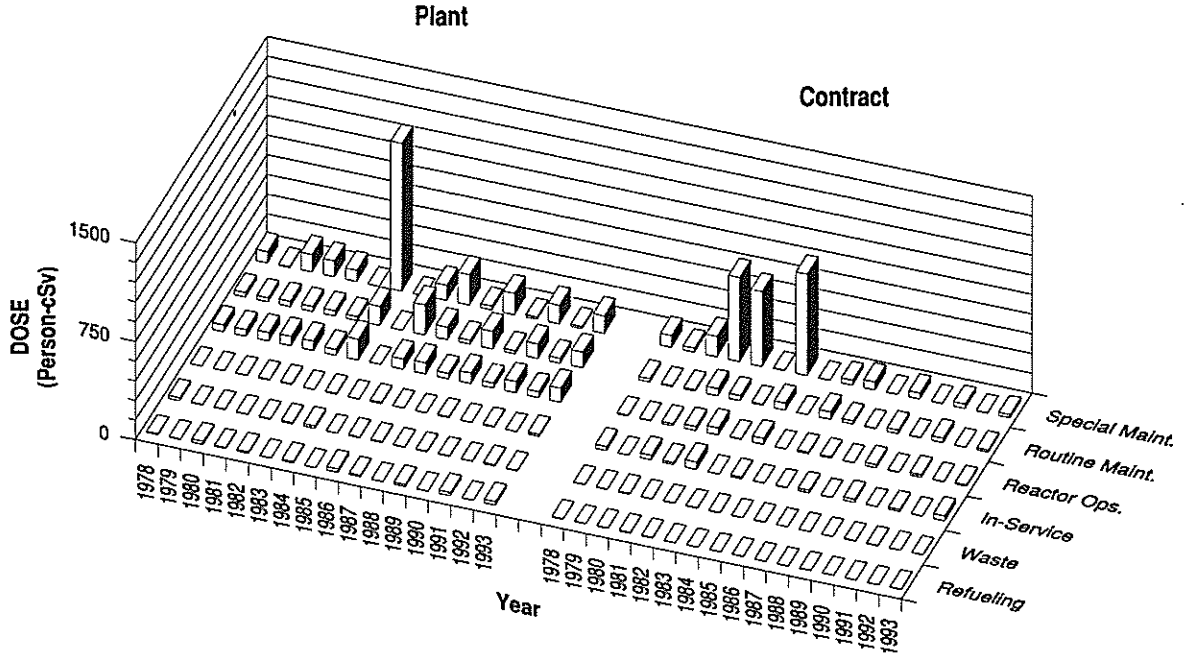
APPENDIX E (continued)

MONTICELLO

Dose-Performance Indicators **BWR**



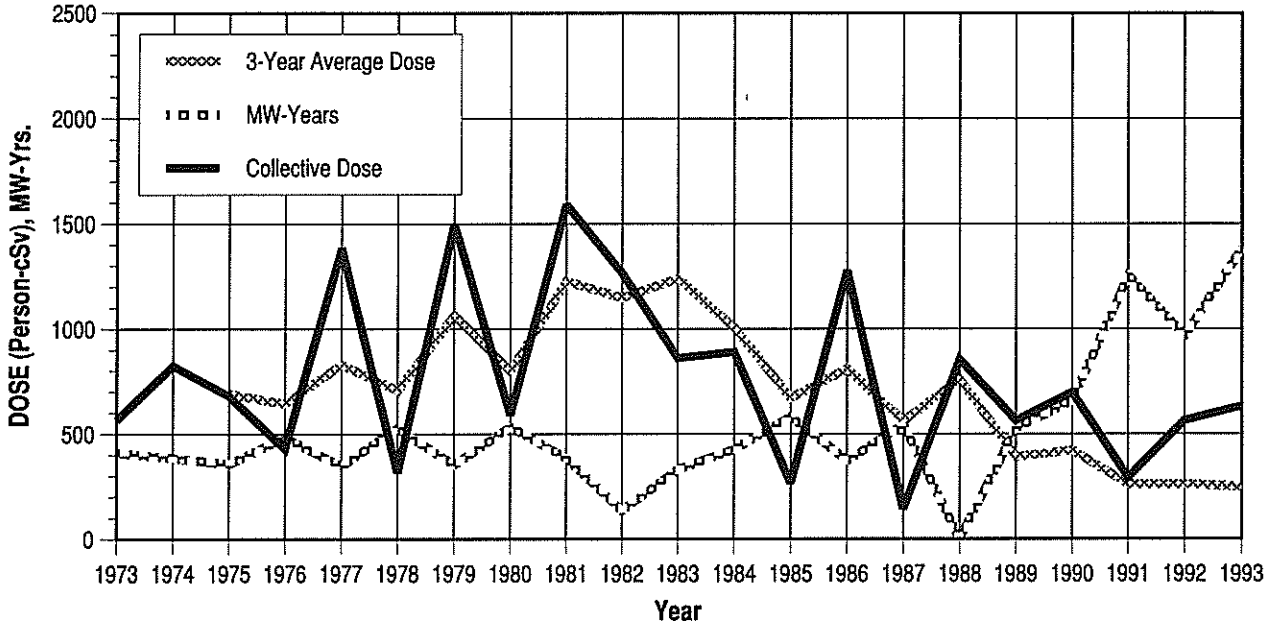
Breakdown by Job Function



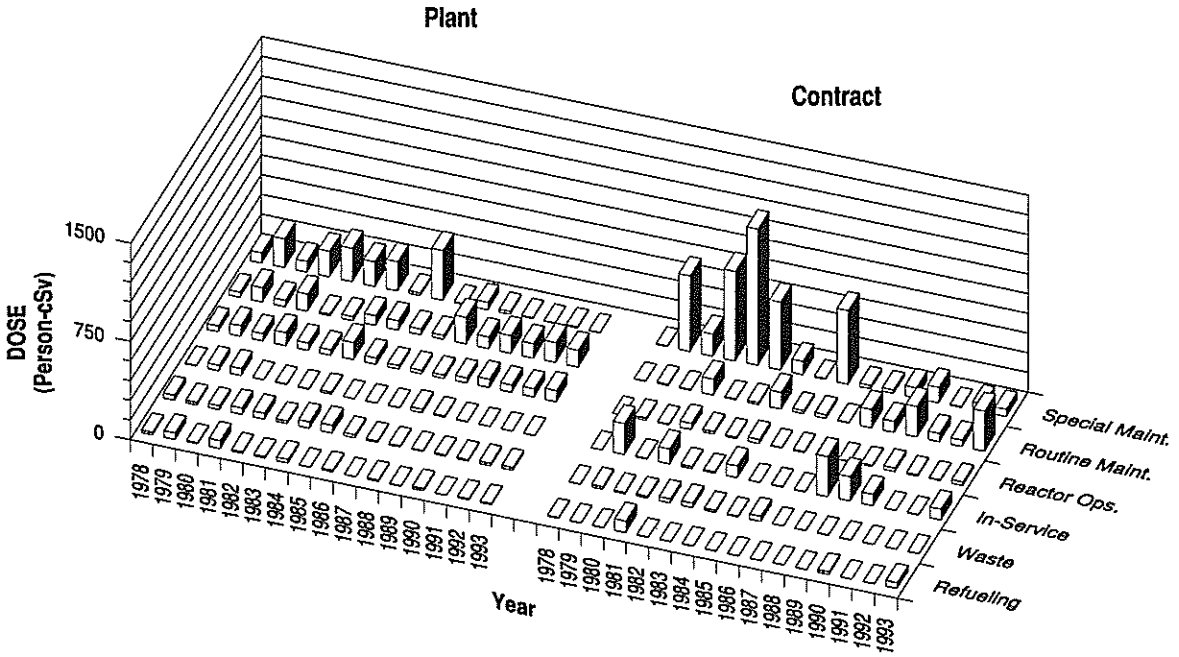
APPENDIX E (continued)

NINE MILE POINT 1, 2

Dose-Performance Indicators **BWR**



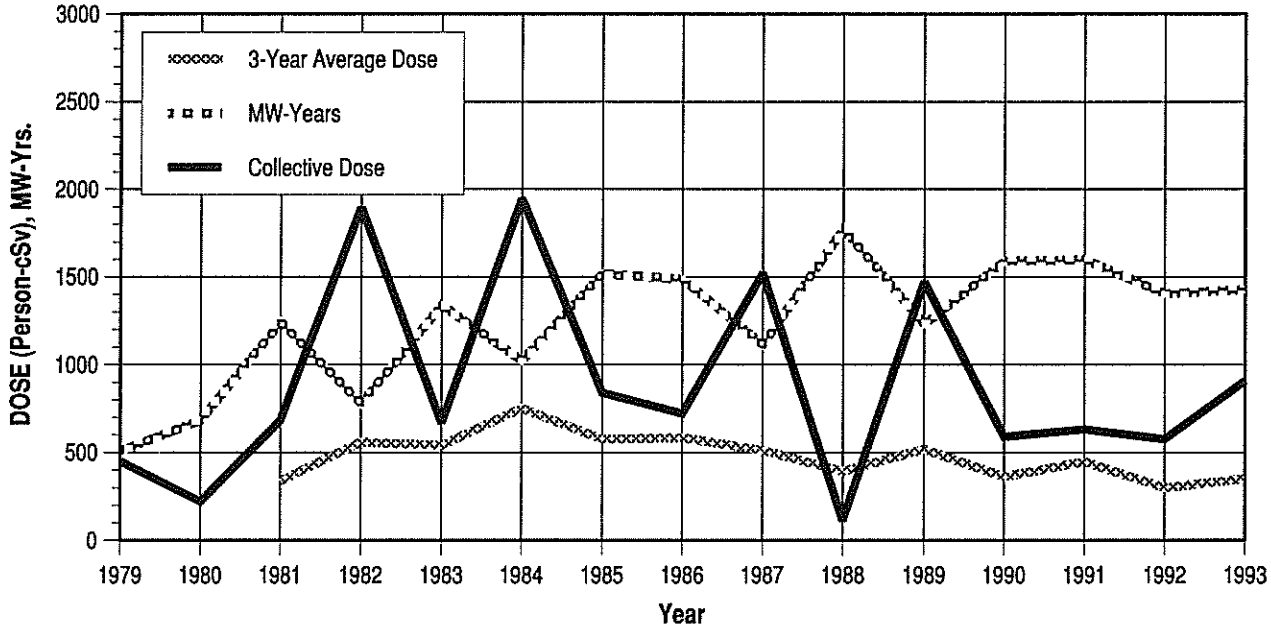
Breakdown by Job Function



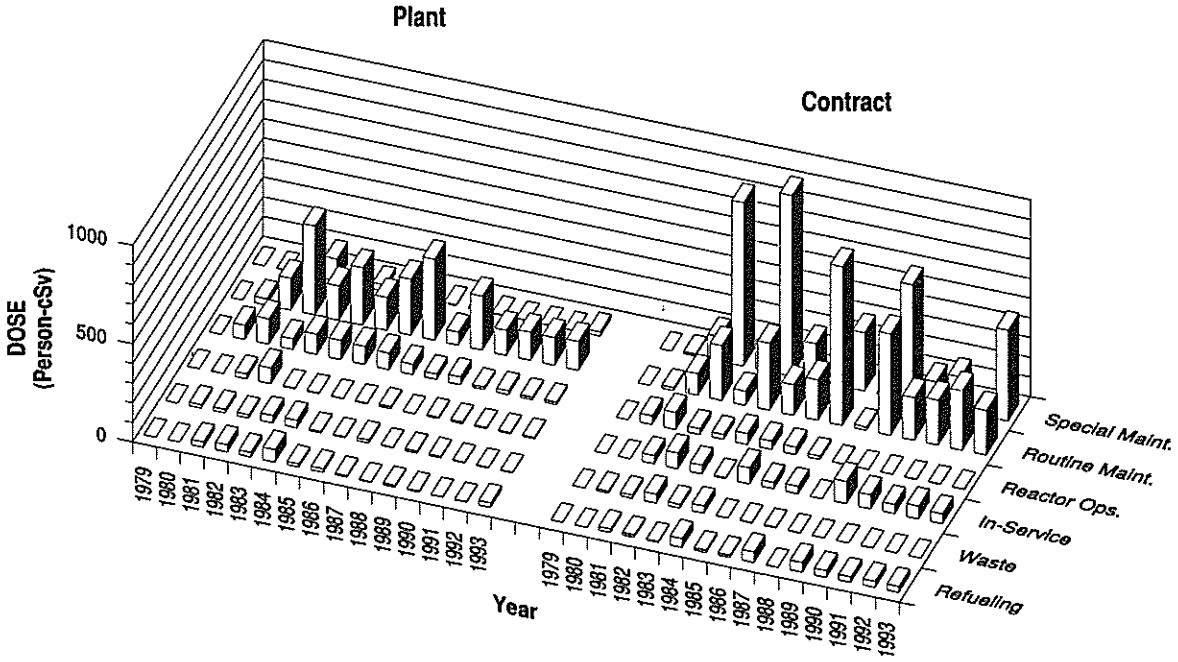
APPENDIX E (continued)

NORTH ANNA 1, 2

Dose-Performance Indicators **PWR**



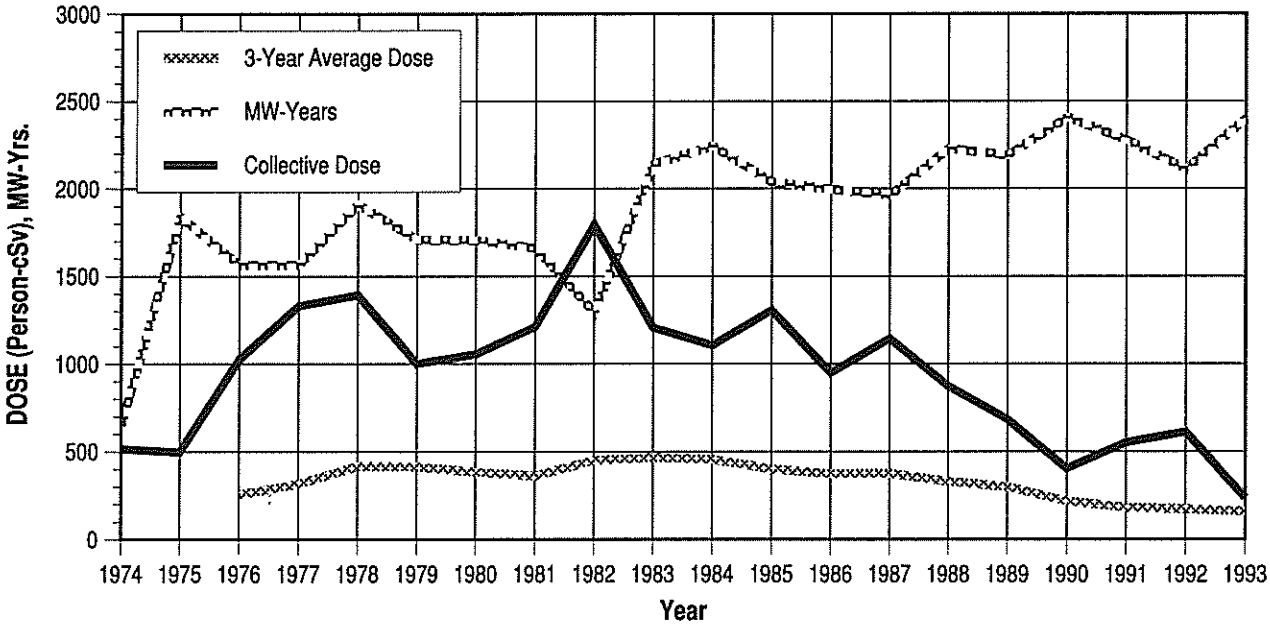
Breakdown by Job Function



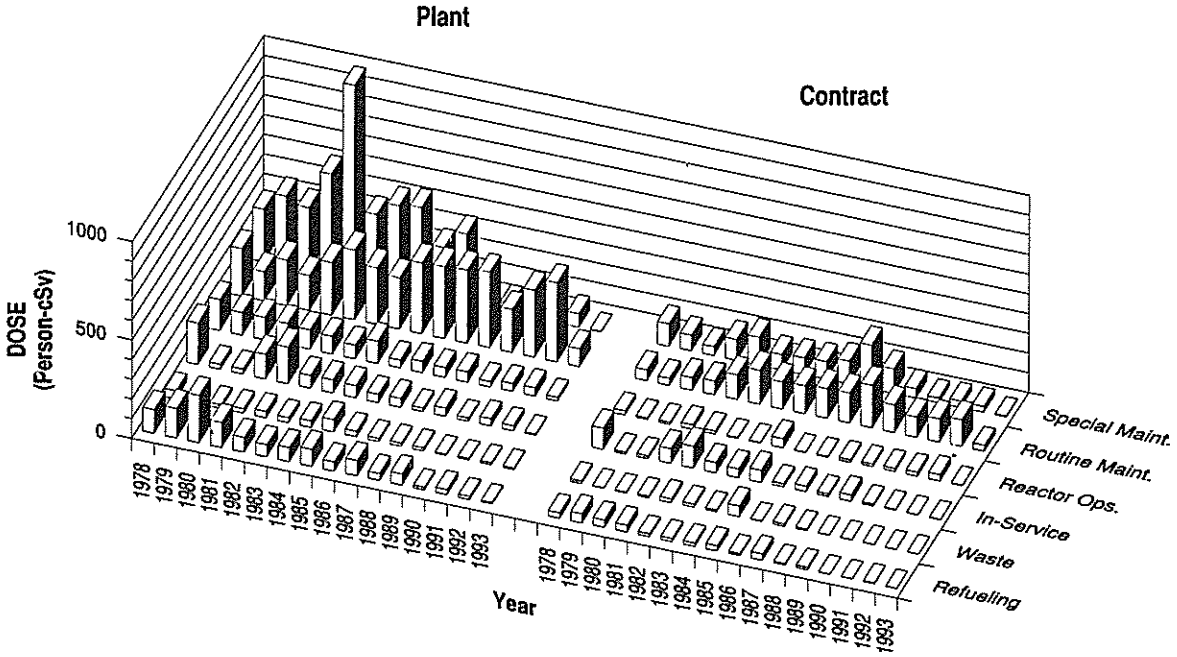
APPENDIX E (continued)

OCONEE 1, 2, 3

Dose-Performance Indicators **PWR**



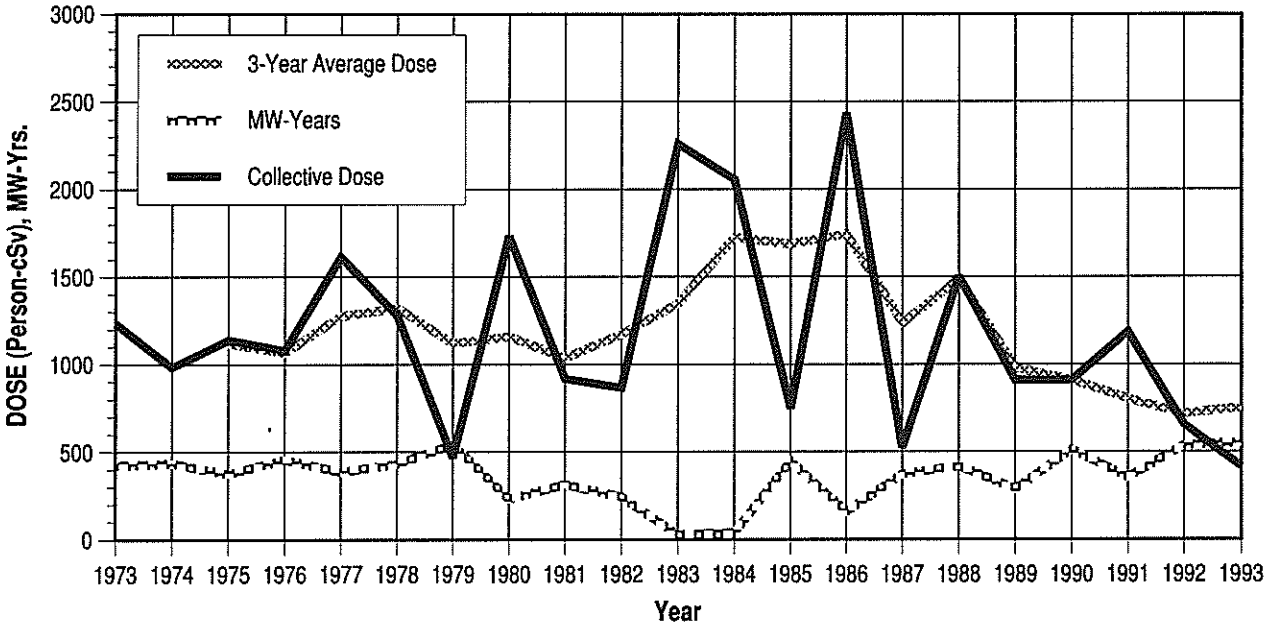
Breakdown by Job Function



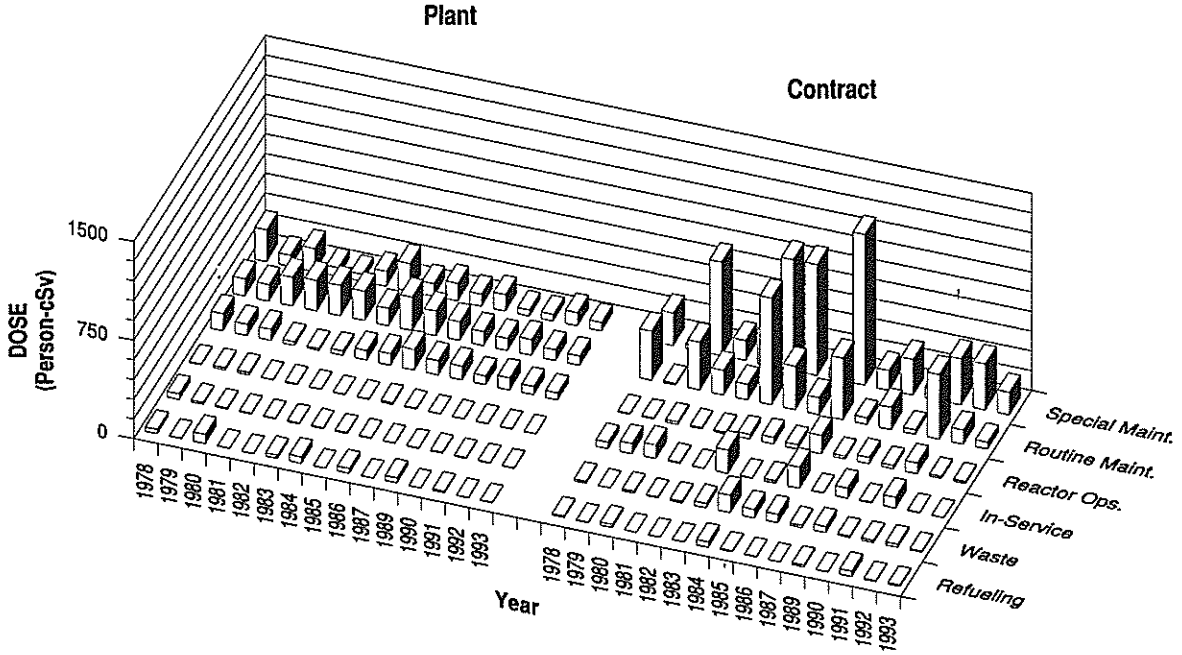
APPENDIX E (continued)

OYSTER CREEK

Dose-Performance Indicators **BWR**



Breakdown by Job Function

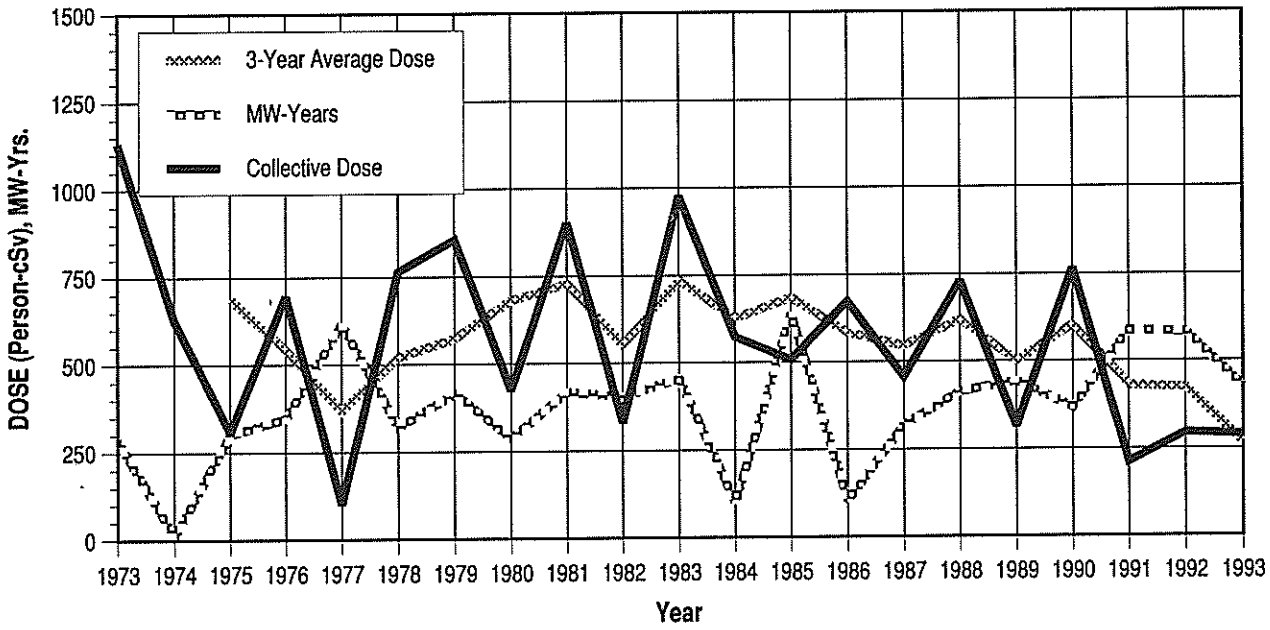


APPENDIX E (continued)

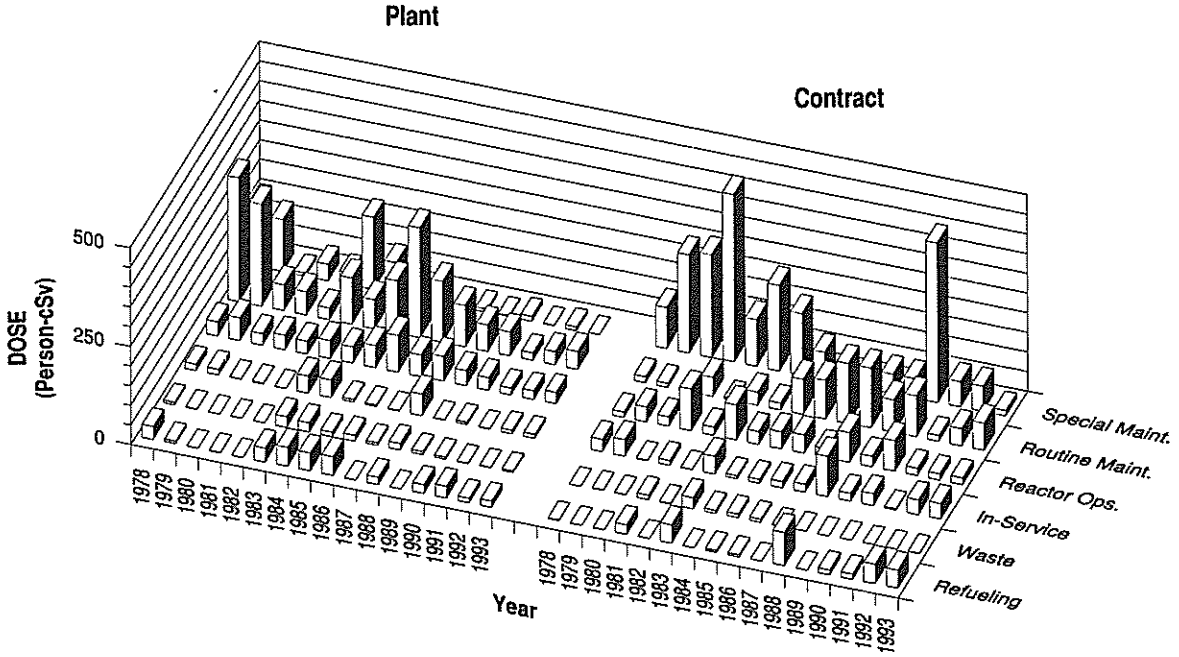
PALISADES

Dose-Performance Indicators

PWR



Breakdown by Job Function

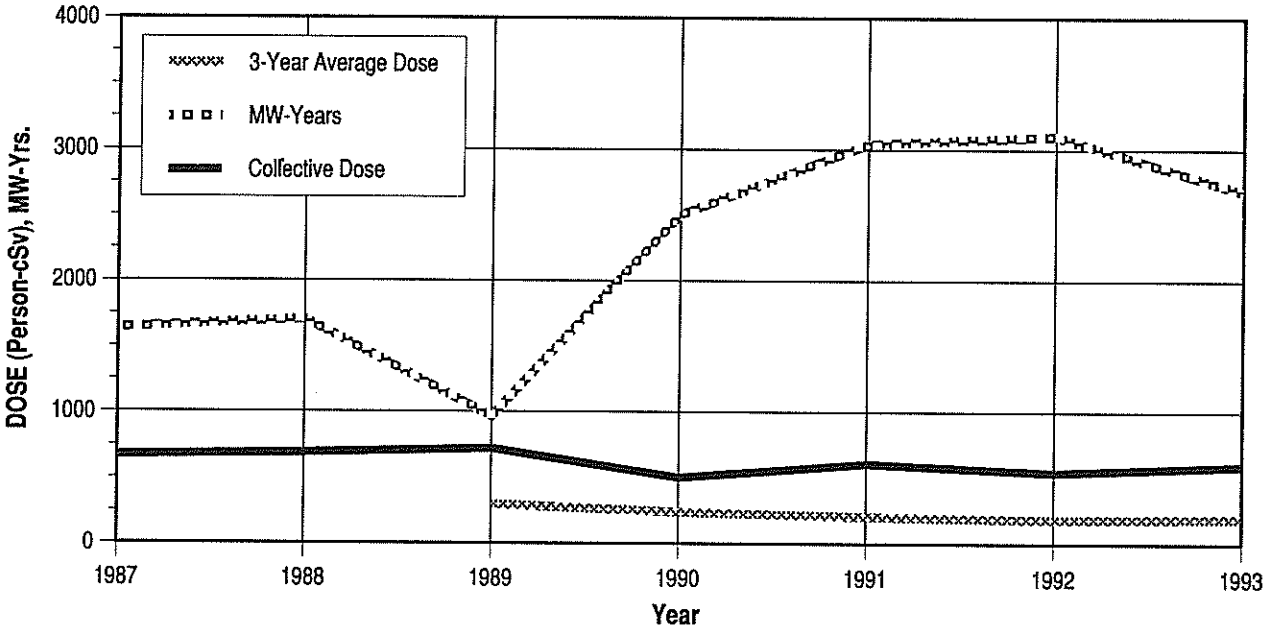


APPENDIX E (continued)

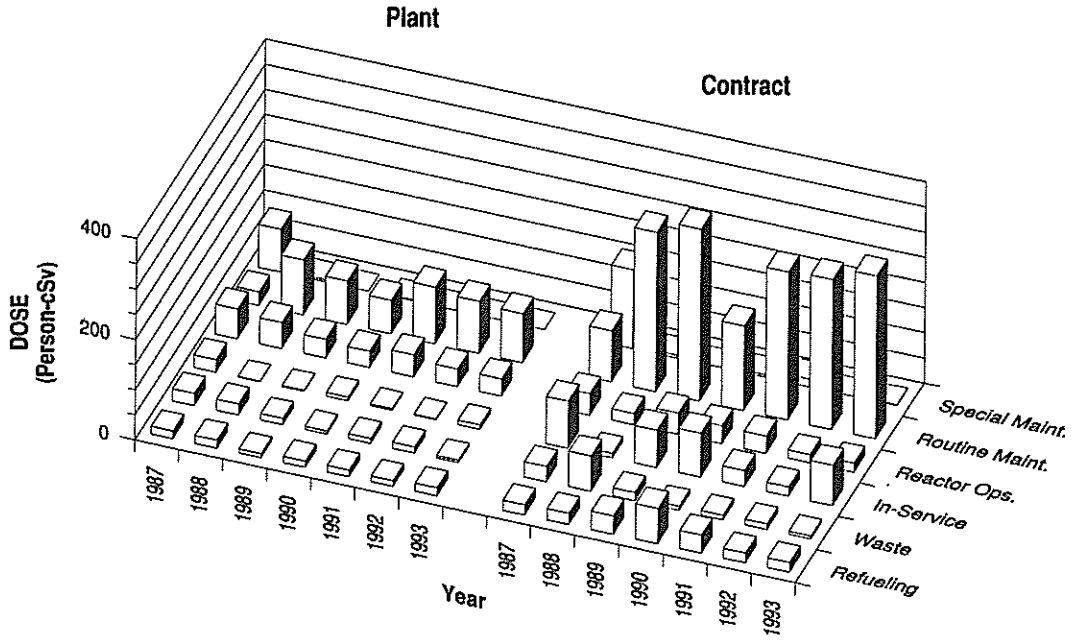
PALO VERDE 1, 2, 3

Dose-Performance Indicators

PWR



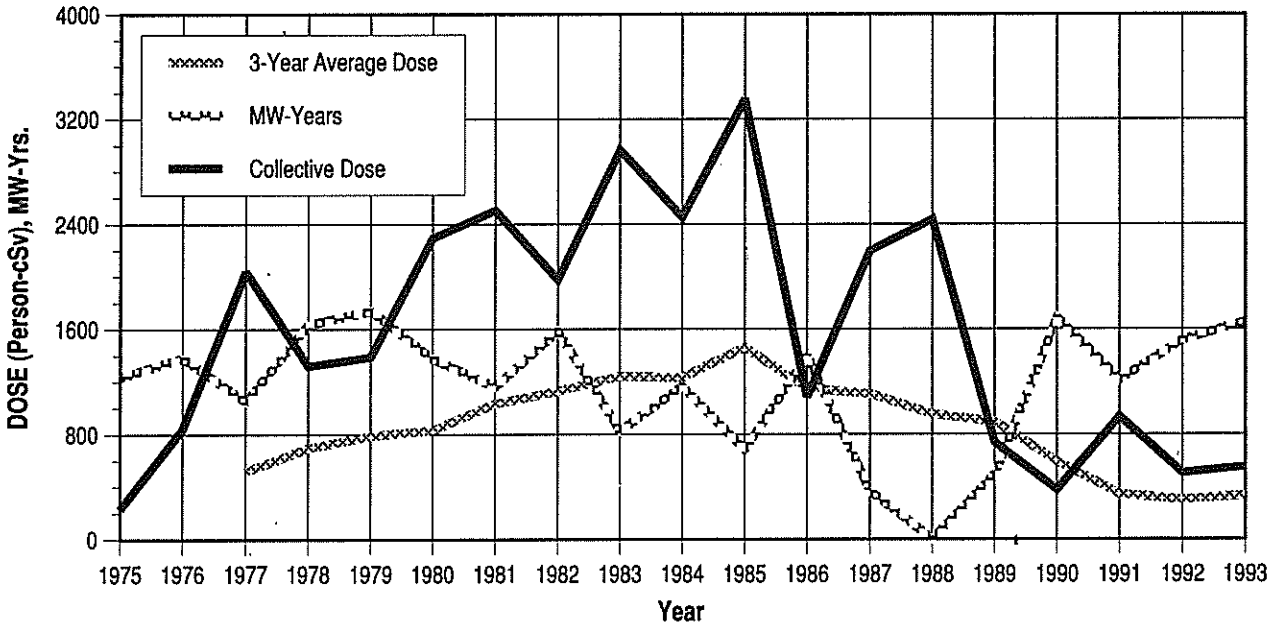
Breakdown by Job Function



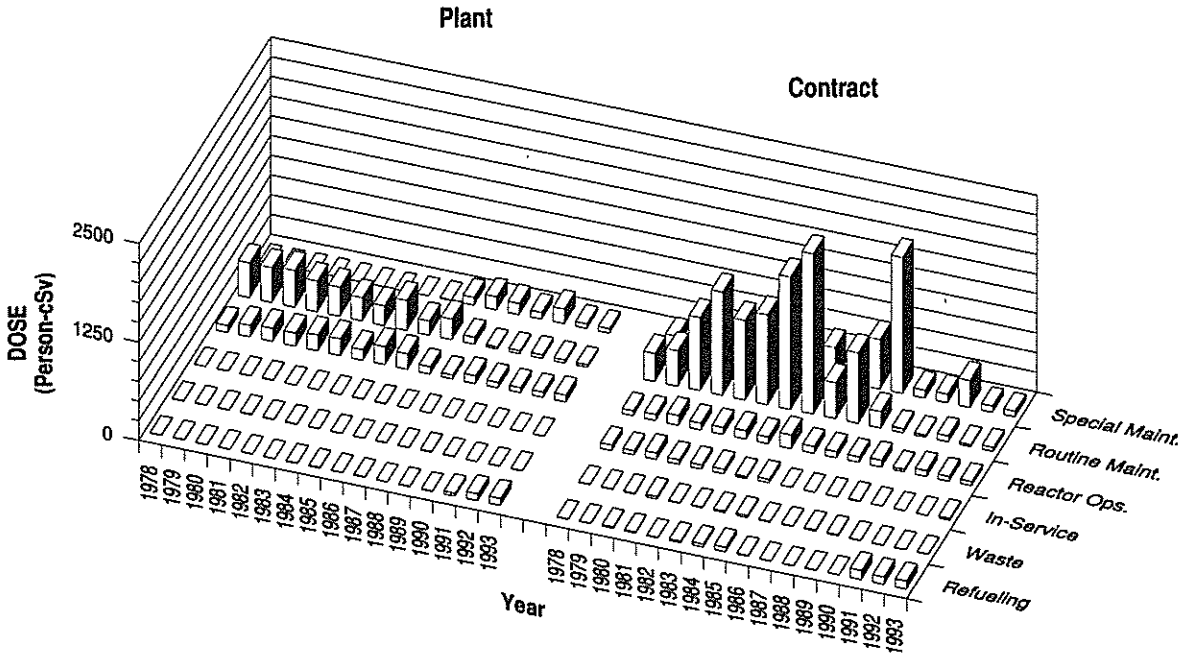
APPENDIX E (continued)

PEACH BOTTOM 2, 3

Dose-Performance Indicators **BWR**



Breakdown by Job Function

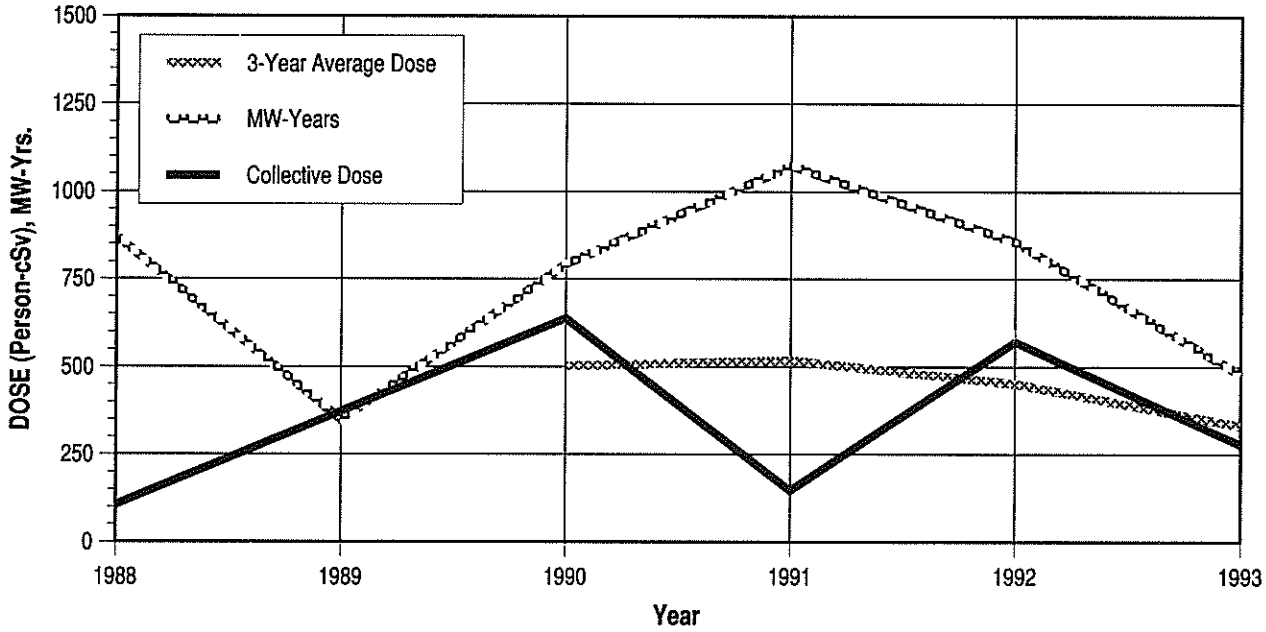


APPENDIX E (continued)

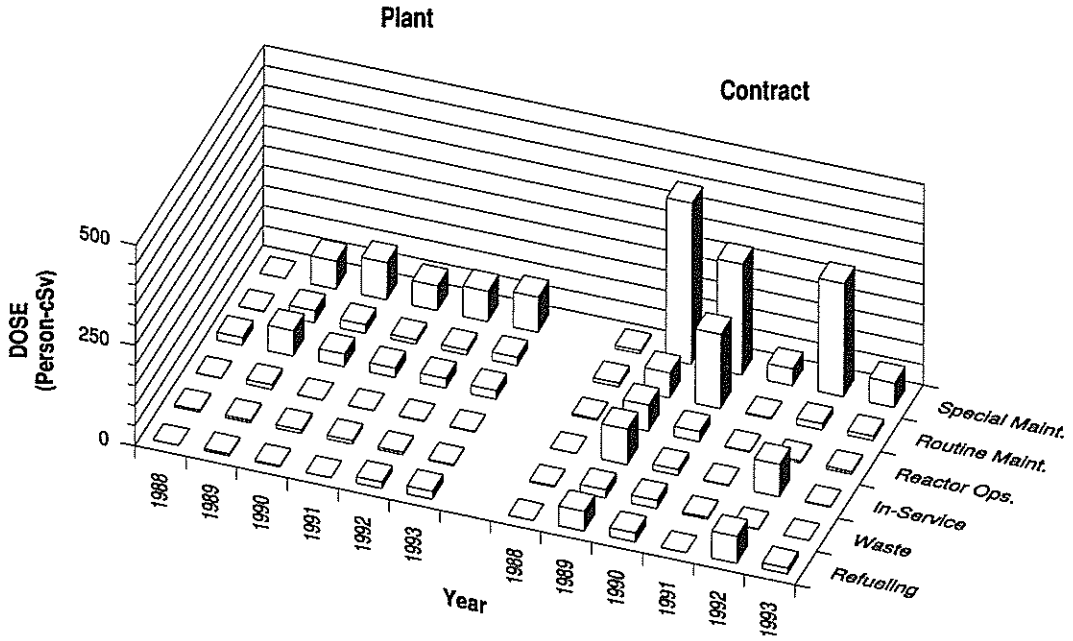
PERRY

Dose-Performance Indicators

BWR



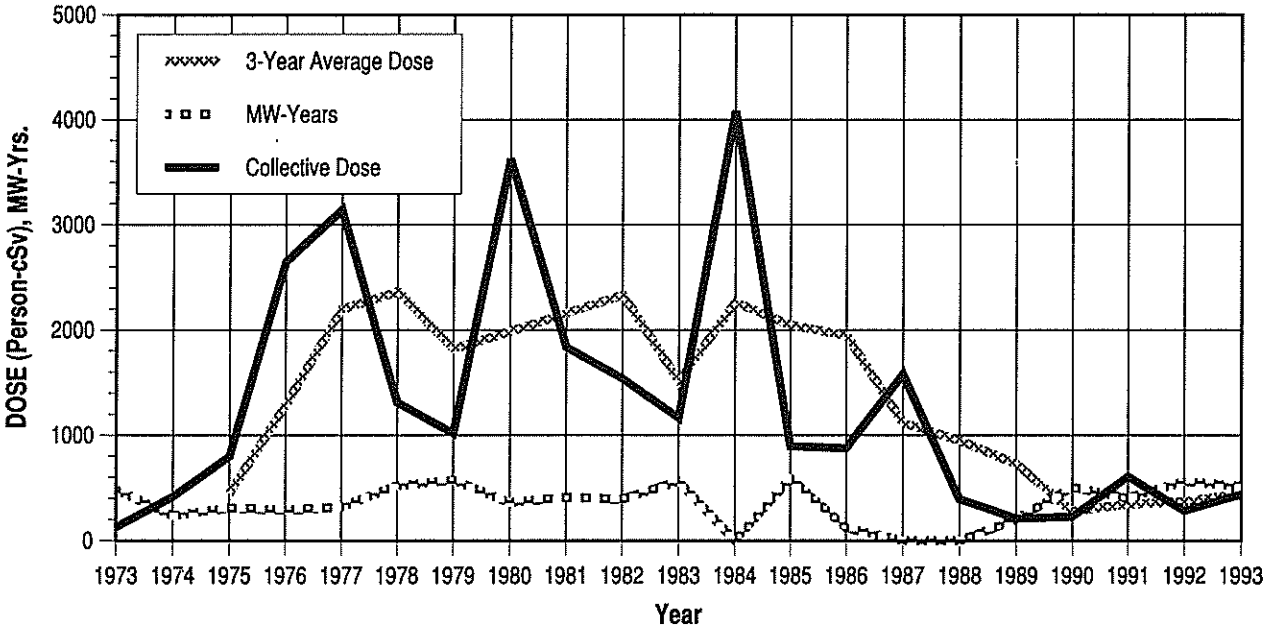
Breakdown by Job Function



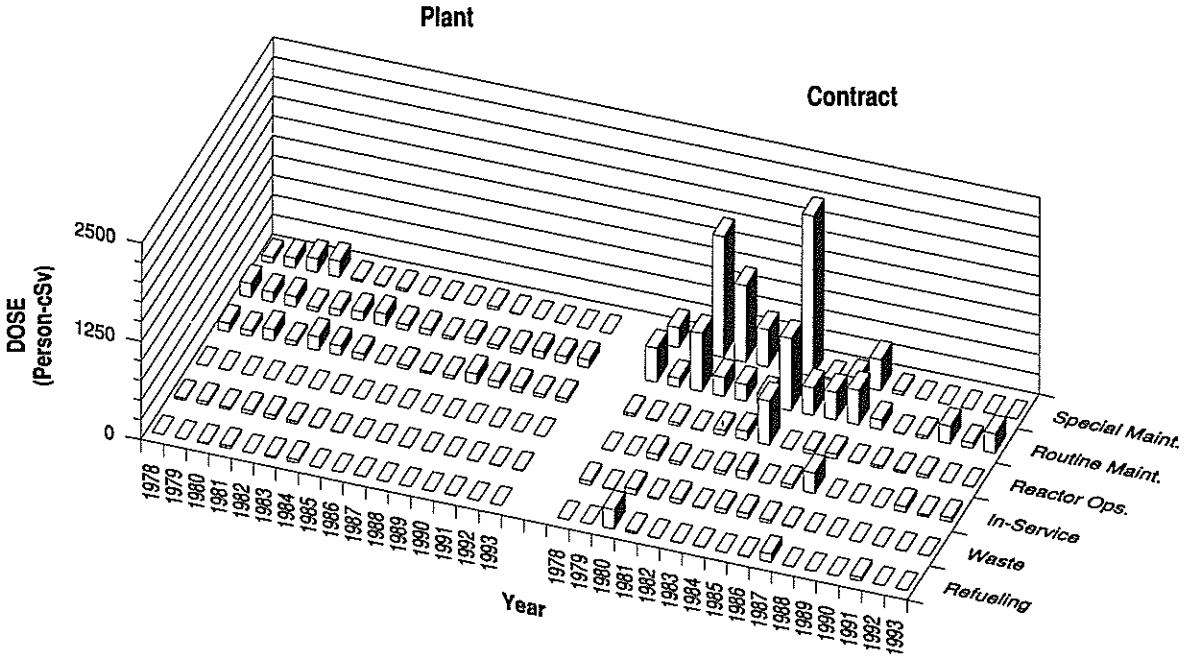
APPENDIX E (continued)

PILGRIM

Dose-Performance Indicators **BWR**



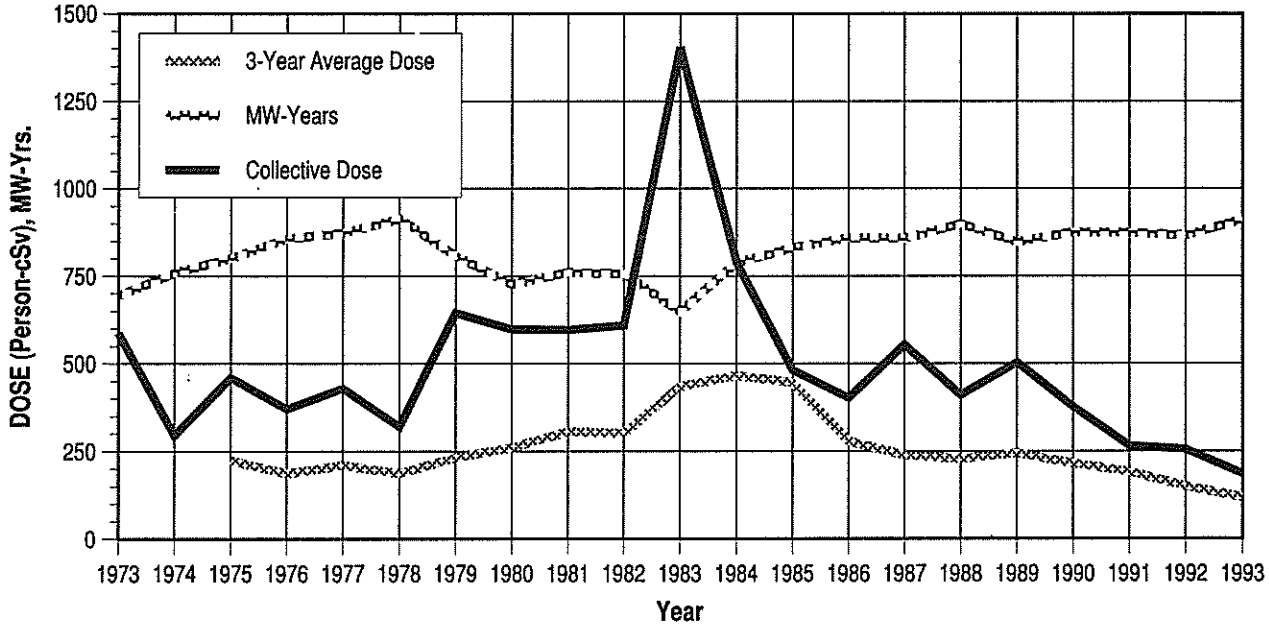
Breakdown by Job Function



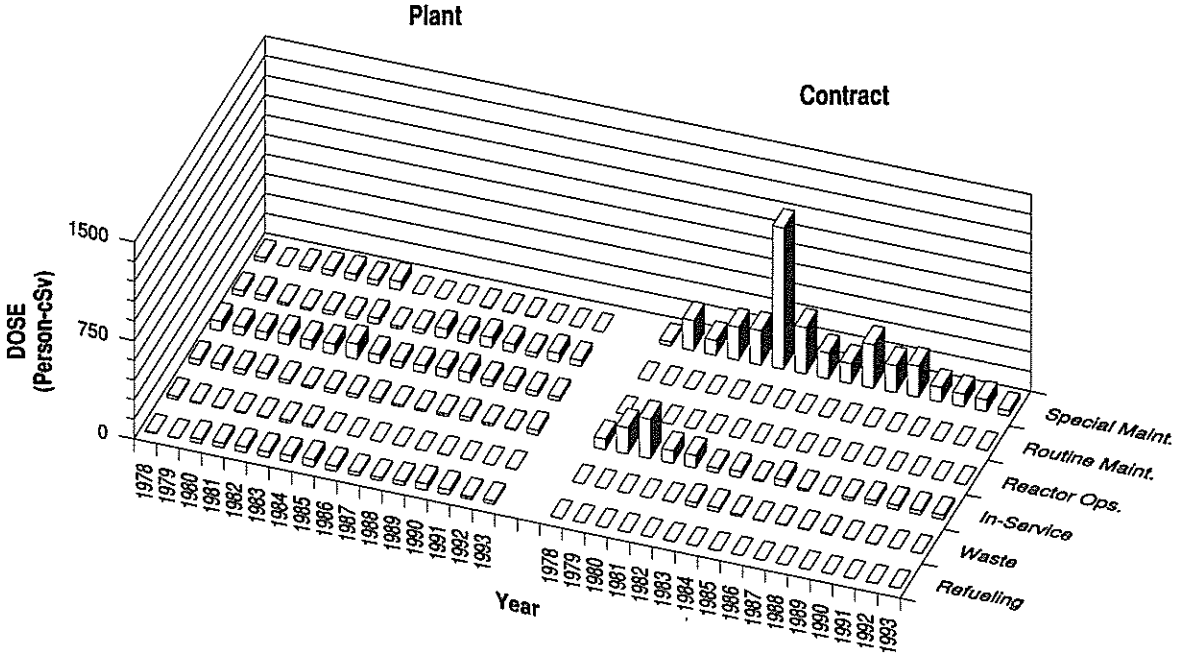
APPENDIX E (continued)

POINT BEACH 1, 2

Dose-Performance Indicators **PWR**



Breakdown by Job Function

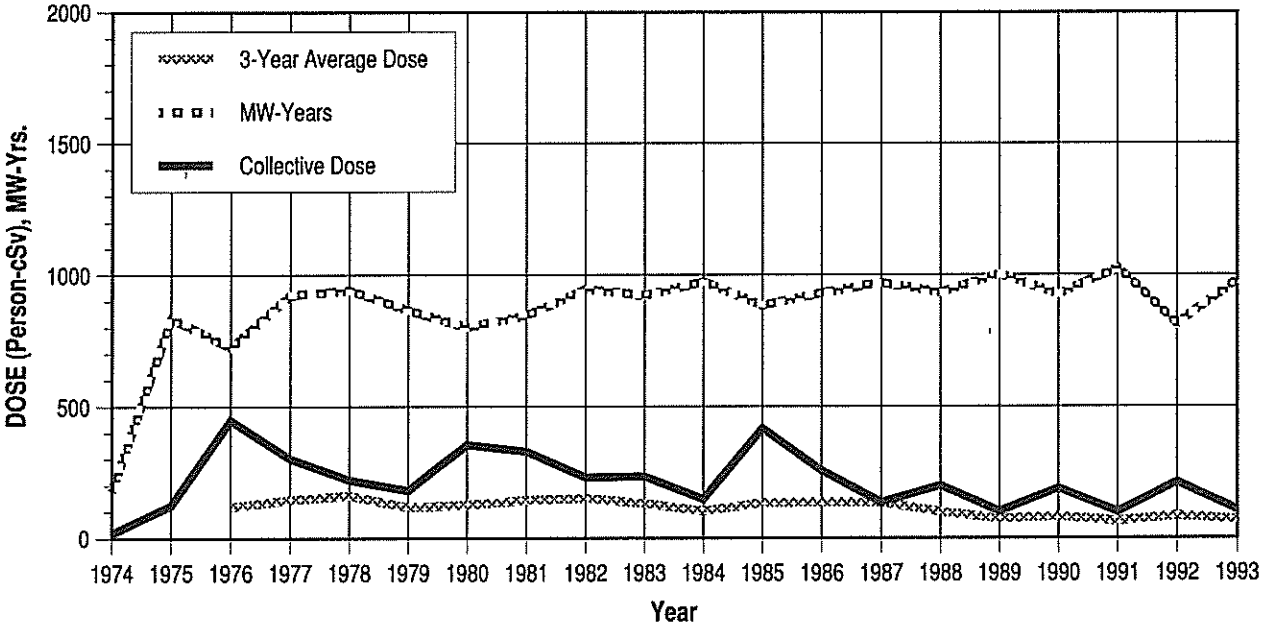


APPENDIX E (continued)

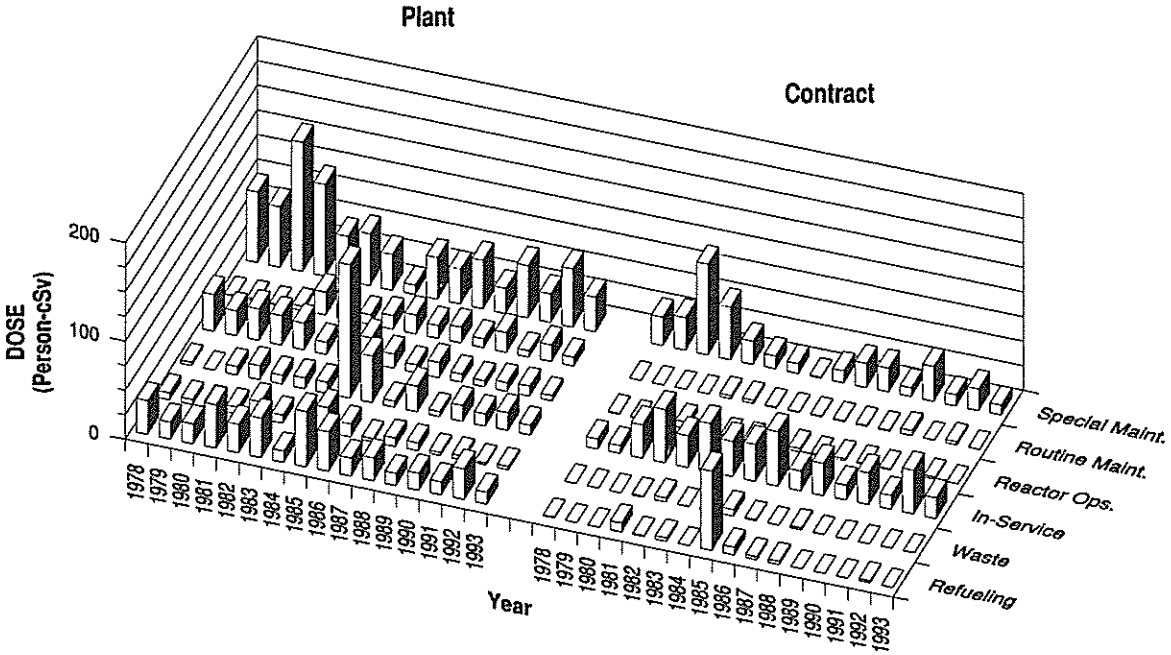
PRAIRIE ISLAND 1, 2

Dose-Performance Indicators

PWR



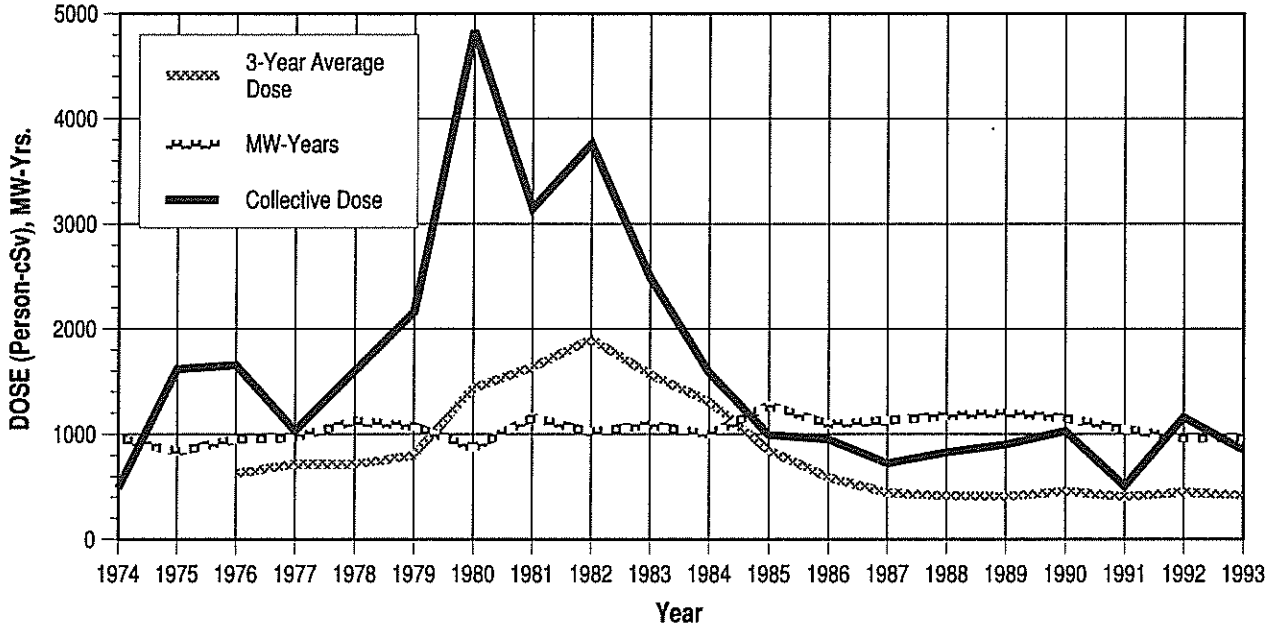
Breakdown by Job Function



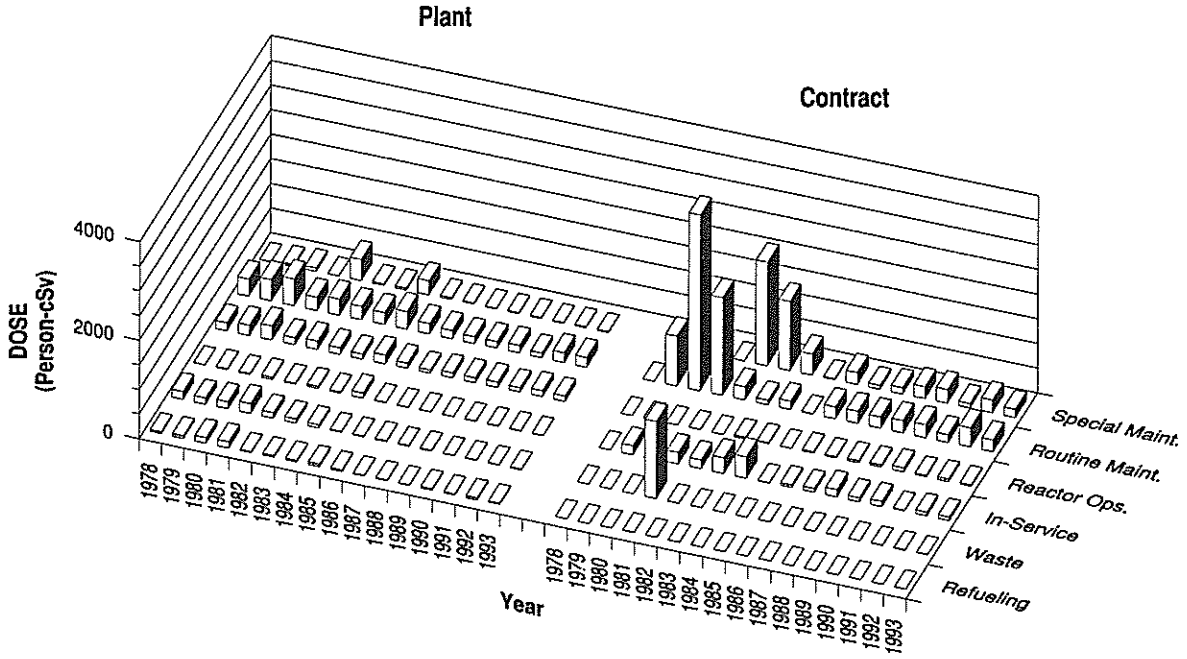
APPENDIX E (continued)

QUAD CITIES 1, 2

Dose-Performance Indicators **BWR**



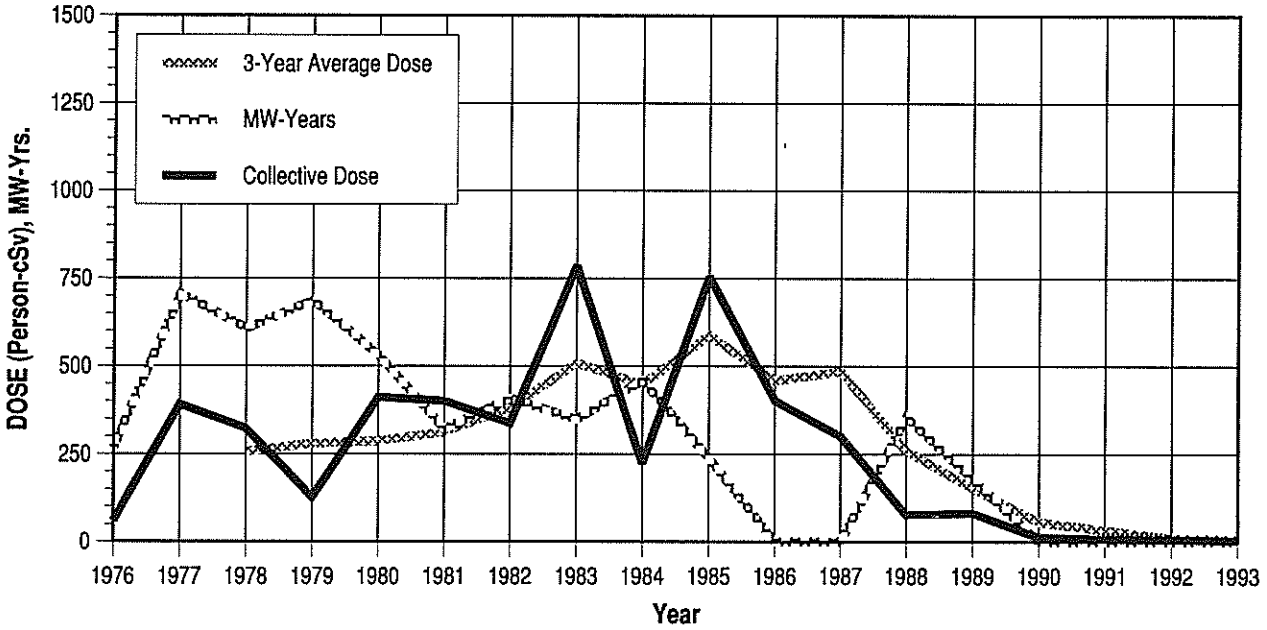
Breakdown by Job Function



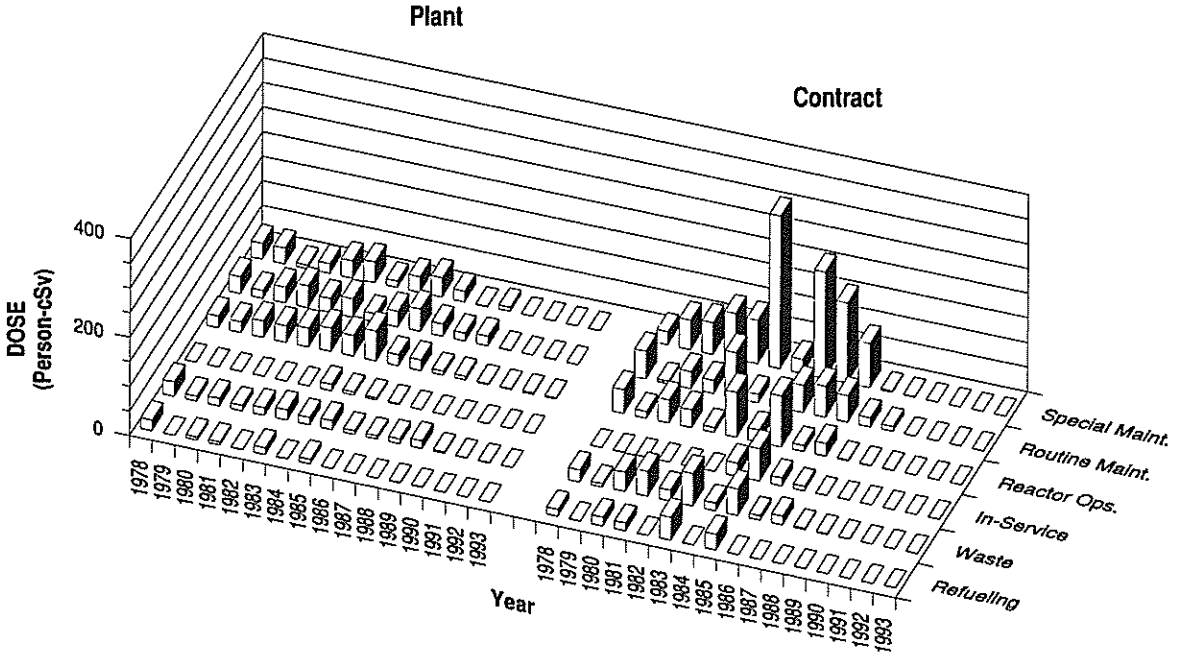
APPENDIX E (continued)

RANCHO SECO

Dose-Performance Indicators **PWR**



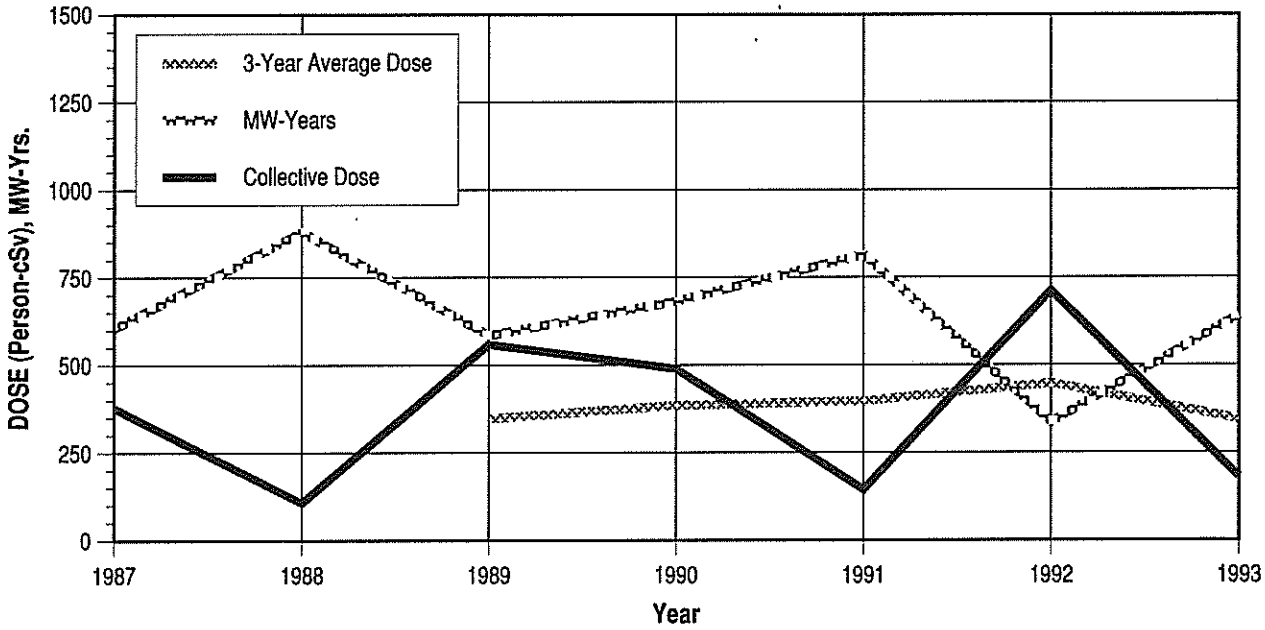
Breakdown by Job Function



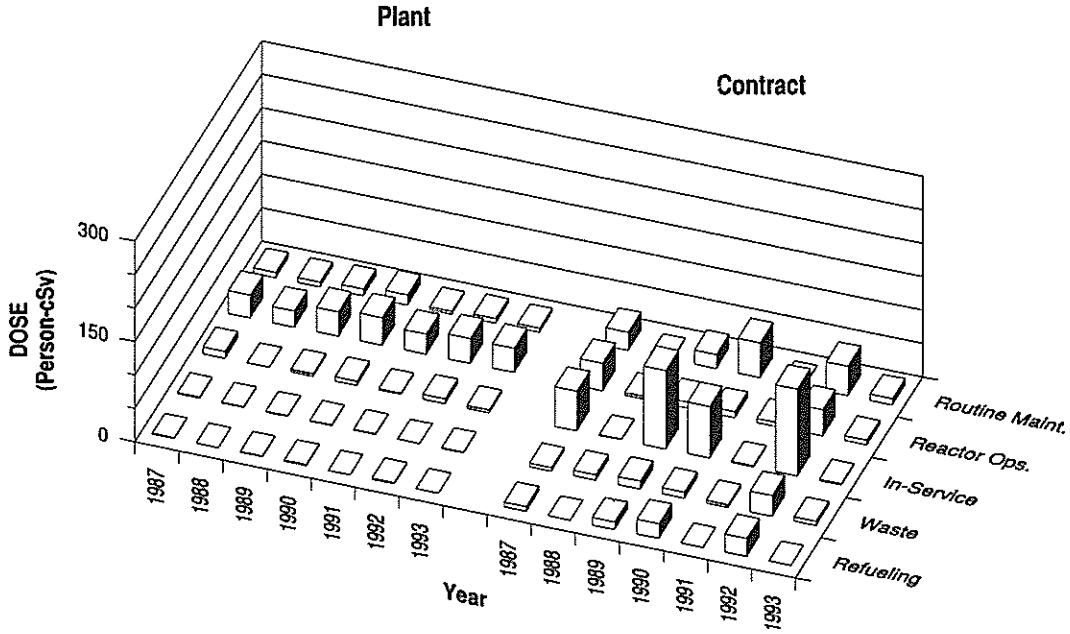
APPENDIX E (continued)

RIVER BEND 1

Dose-Performance Indicators **BWR**



Breakdown by Job Function

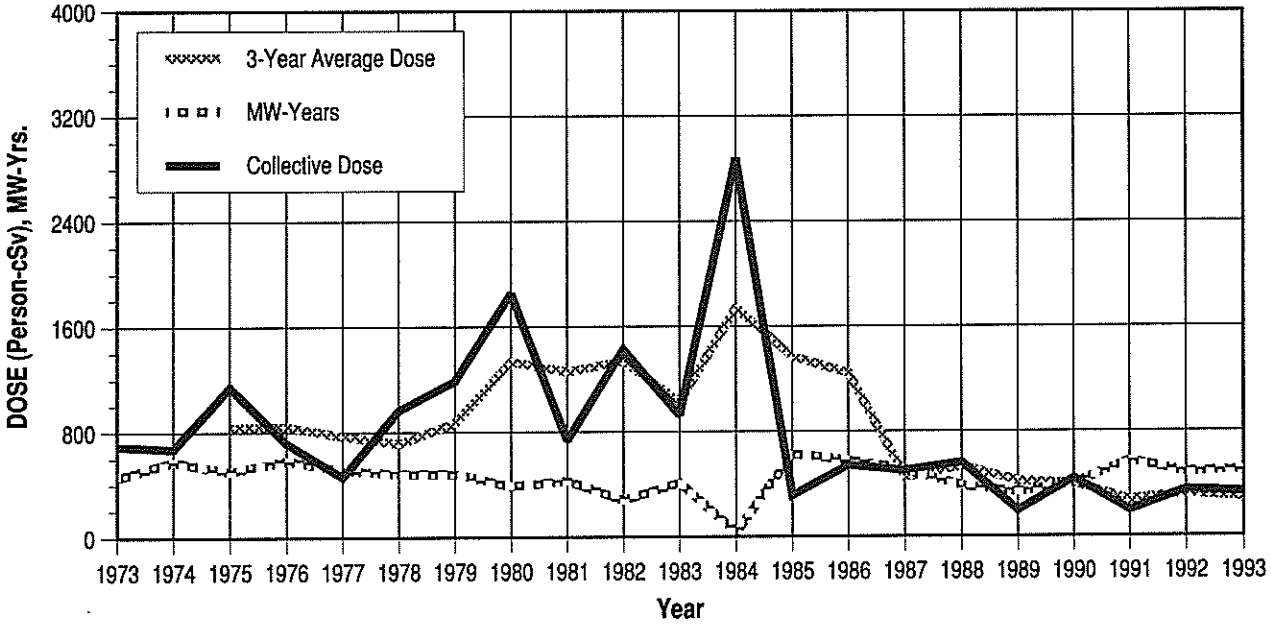


APPENDIX E (continued)

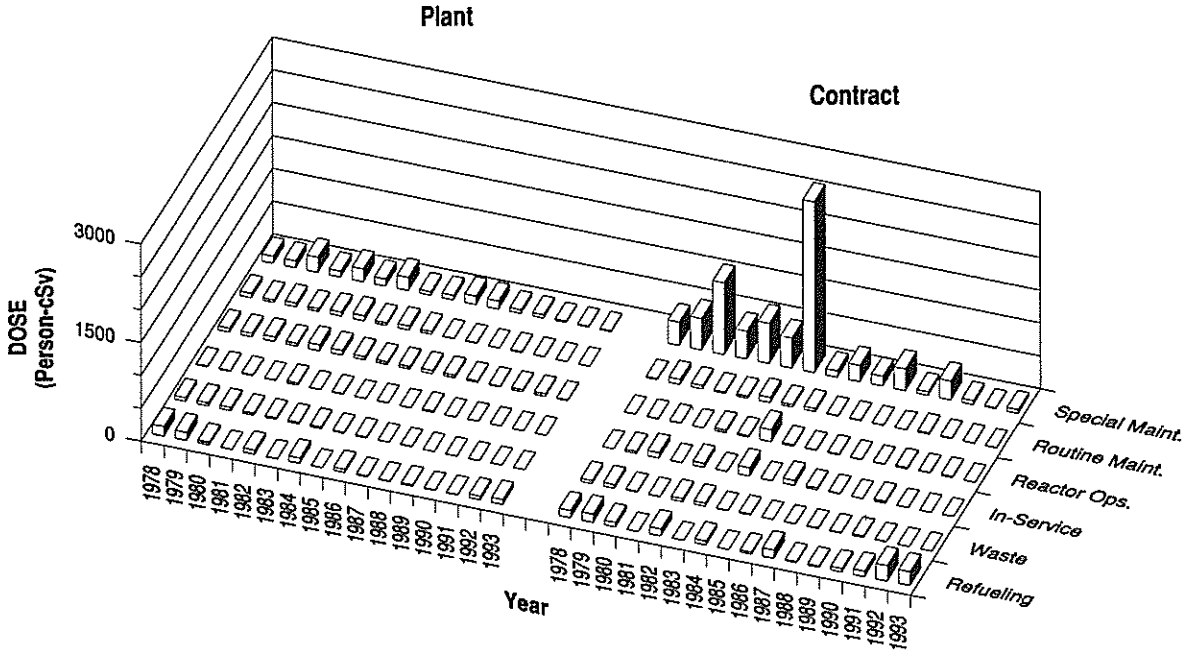
ROBINSON 2

Dose-Performance Indicators

PWR



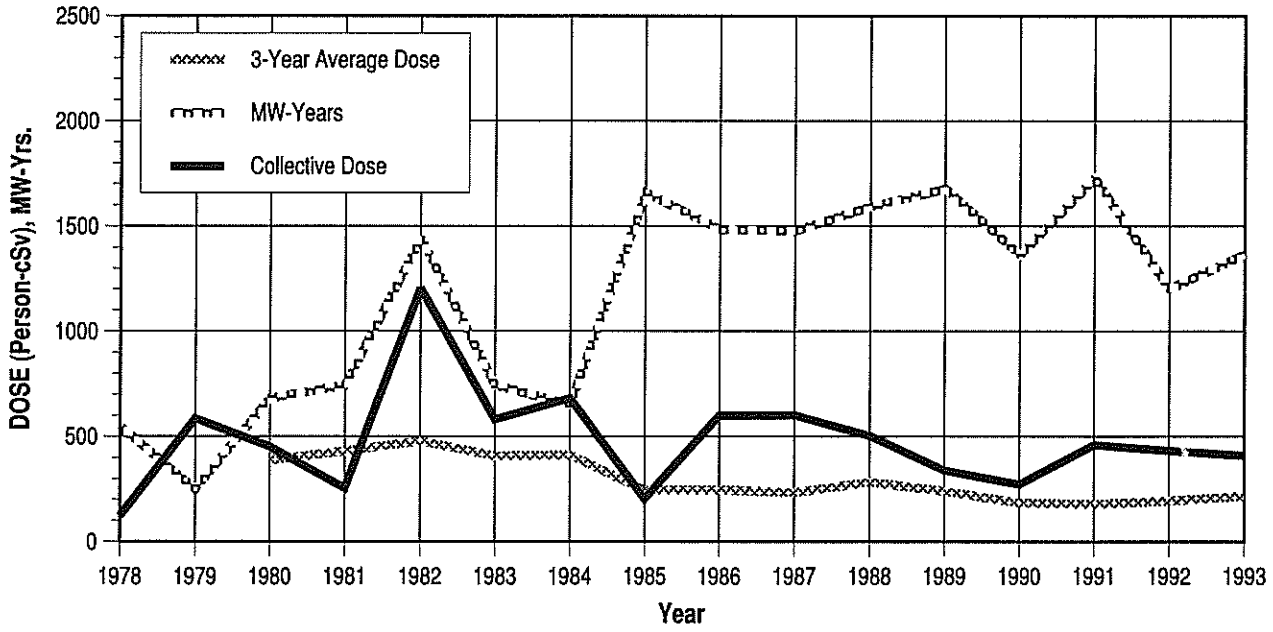
Breakdown by Job Function



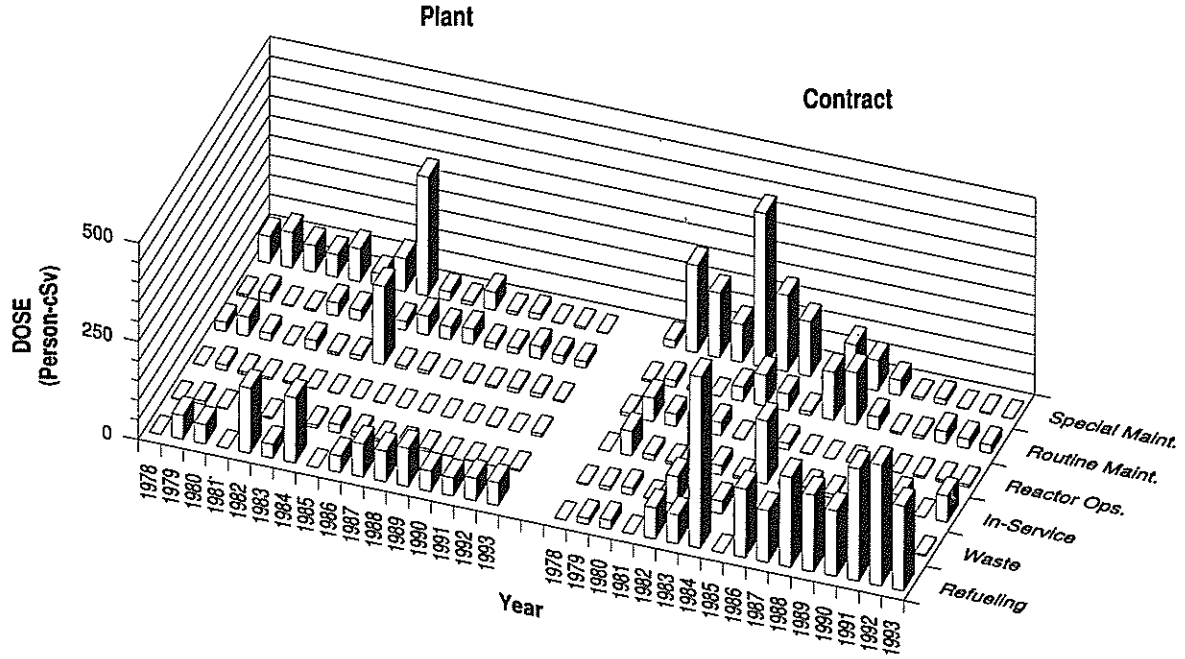
APPENDIX E (continued)

SALEM 1, 2

Dose-Performance Indicators **PWR**



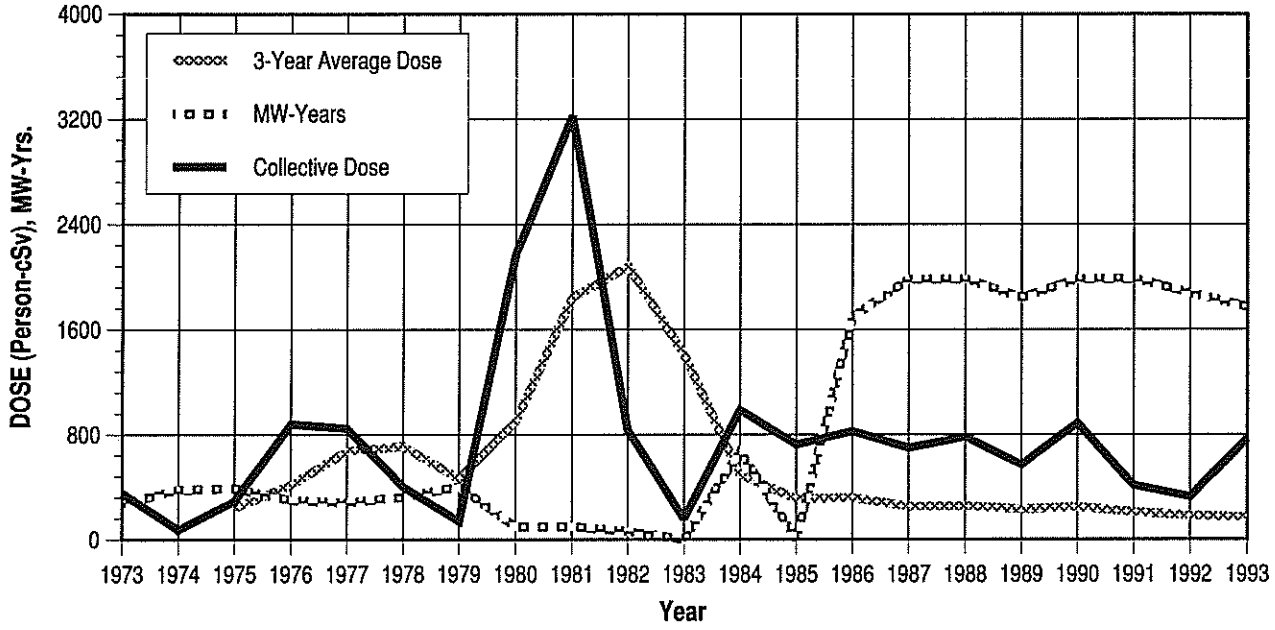
Breakdown by Job Function



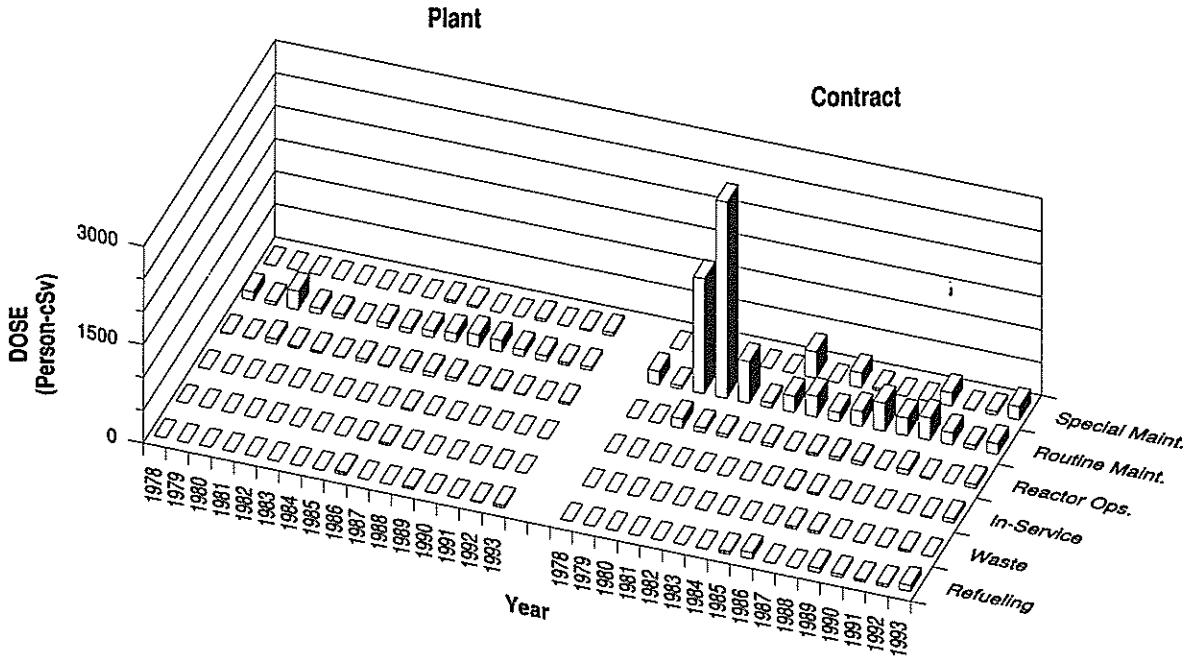
APPENDIX E (continued)

SAN ONOFRE 1, 2, 3

Dose-Performance Indicators **PWR**



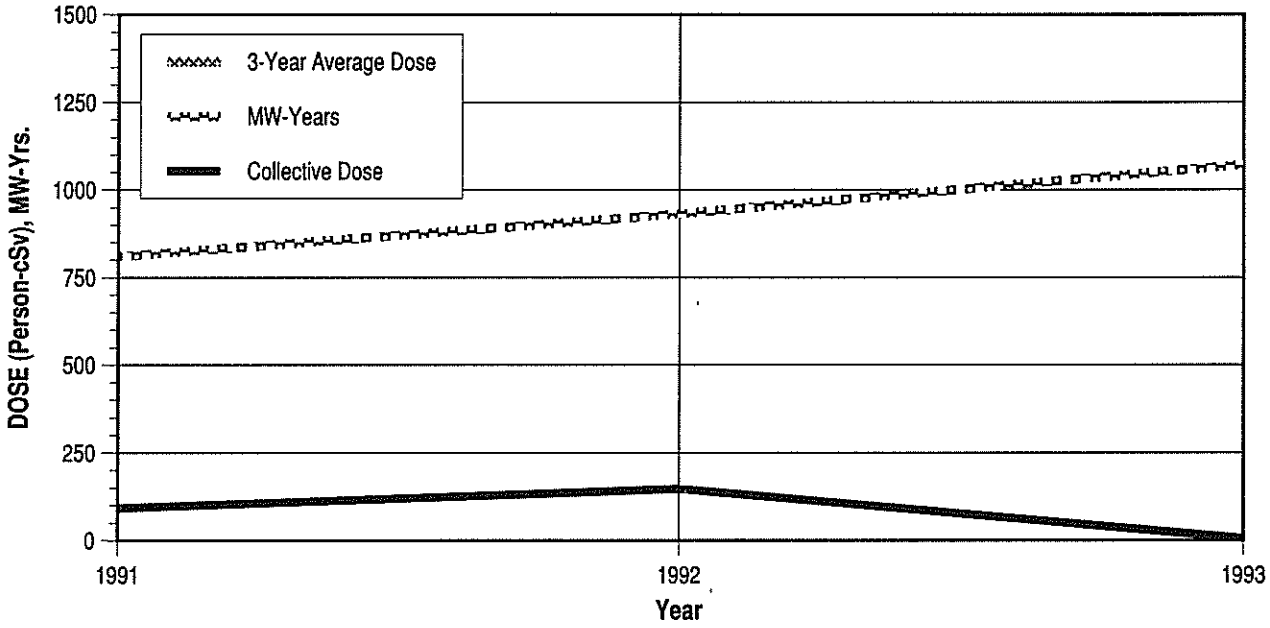
Breakdown by Job Function



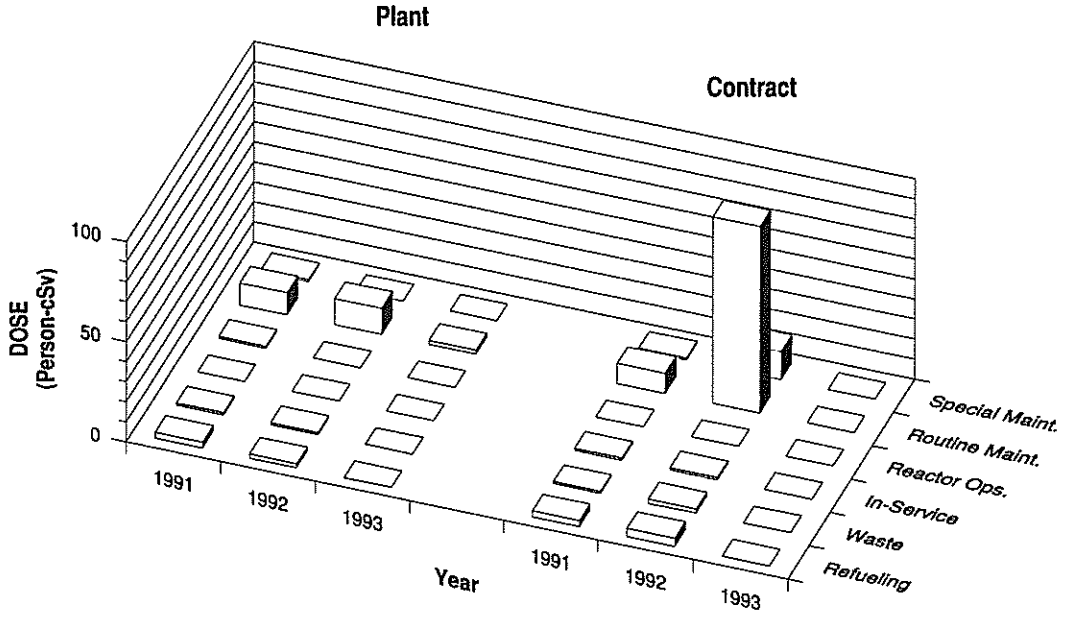
APPENDIX E (continued)

SEABROOK

Dose-Performance Indicators **PWR**



Breakdown by Job Function

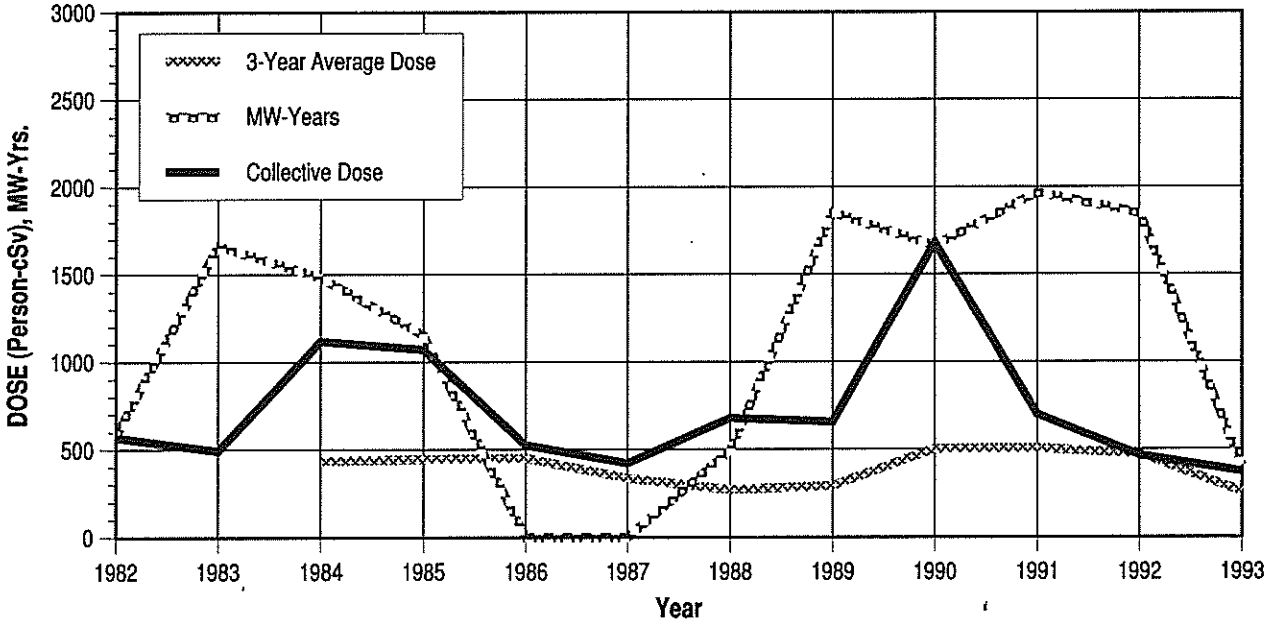


APPENDIX E (continued)

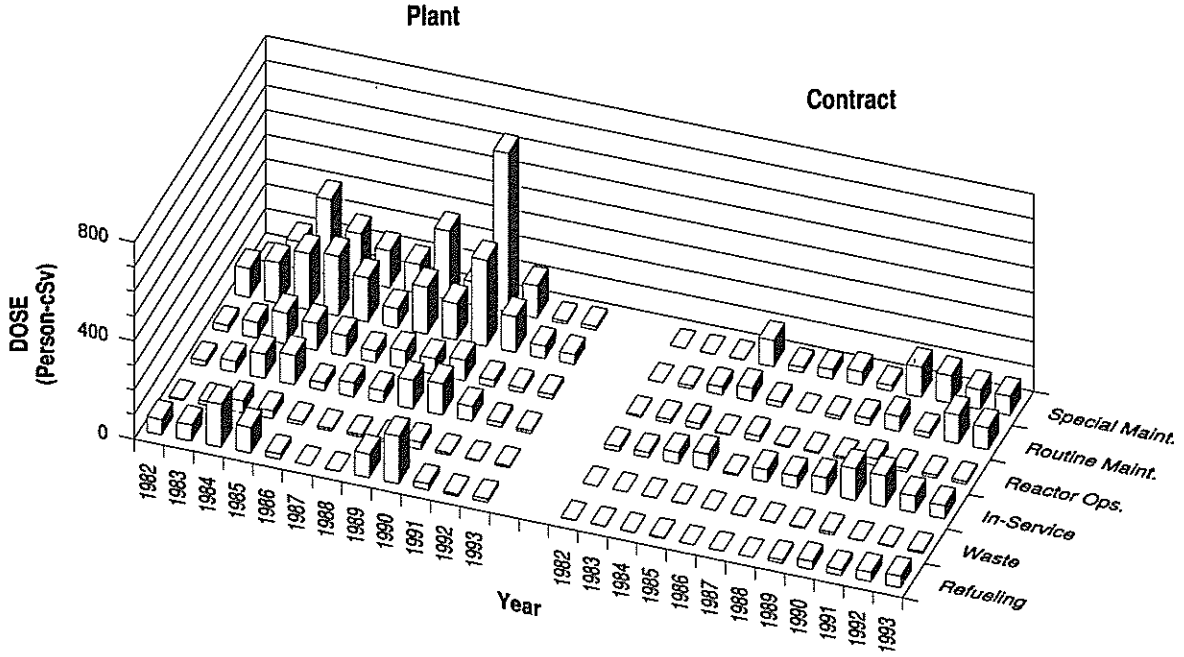
SEQUOYAH 1, 2

Dose-Performance Indicators

PWR



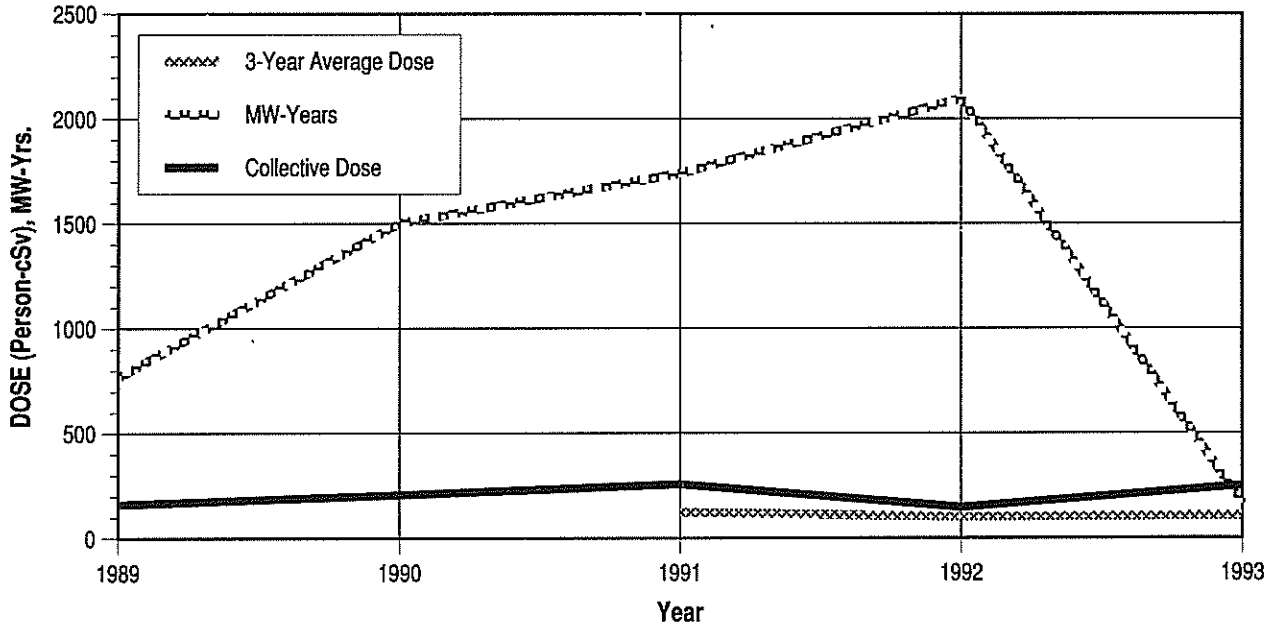
Breakdown by Job Function



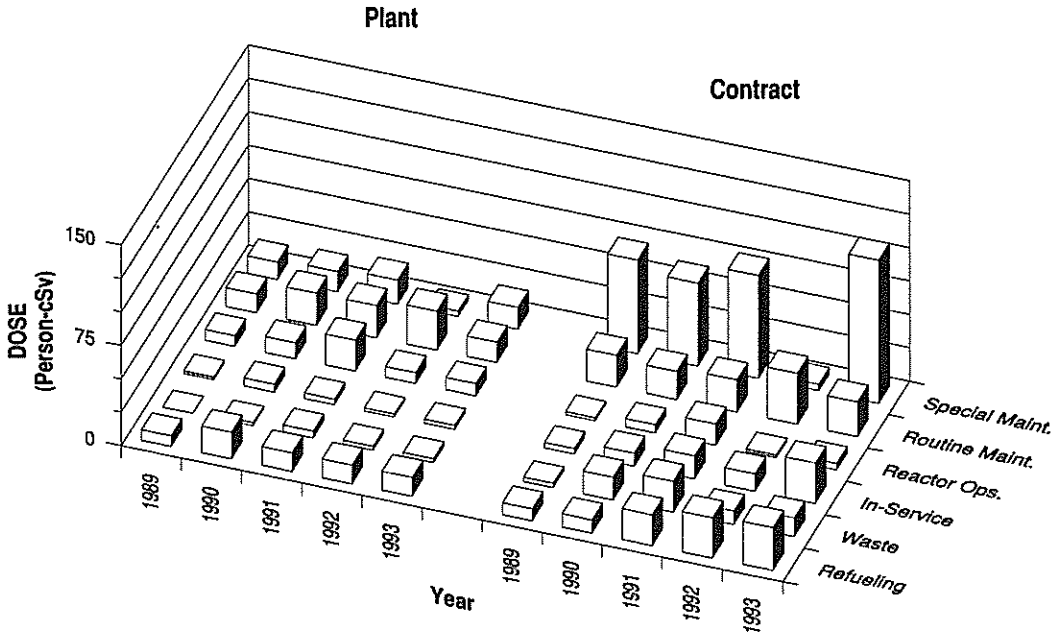
APPENDIX E (continued)

SOUTH TEXAS 1, 2

Dose-Performance Indicators **PWR**



Breakdown by Job Function

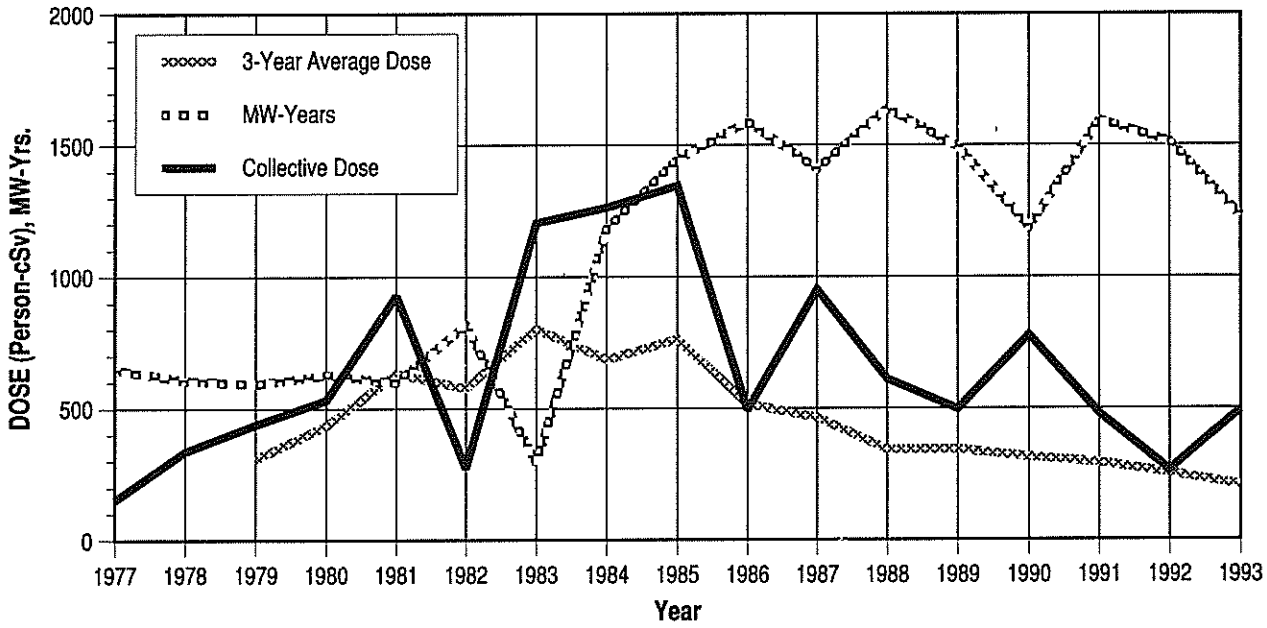


APPENDIX E (continued)

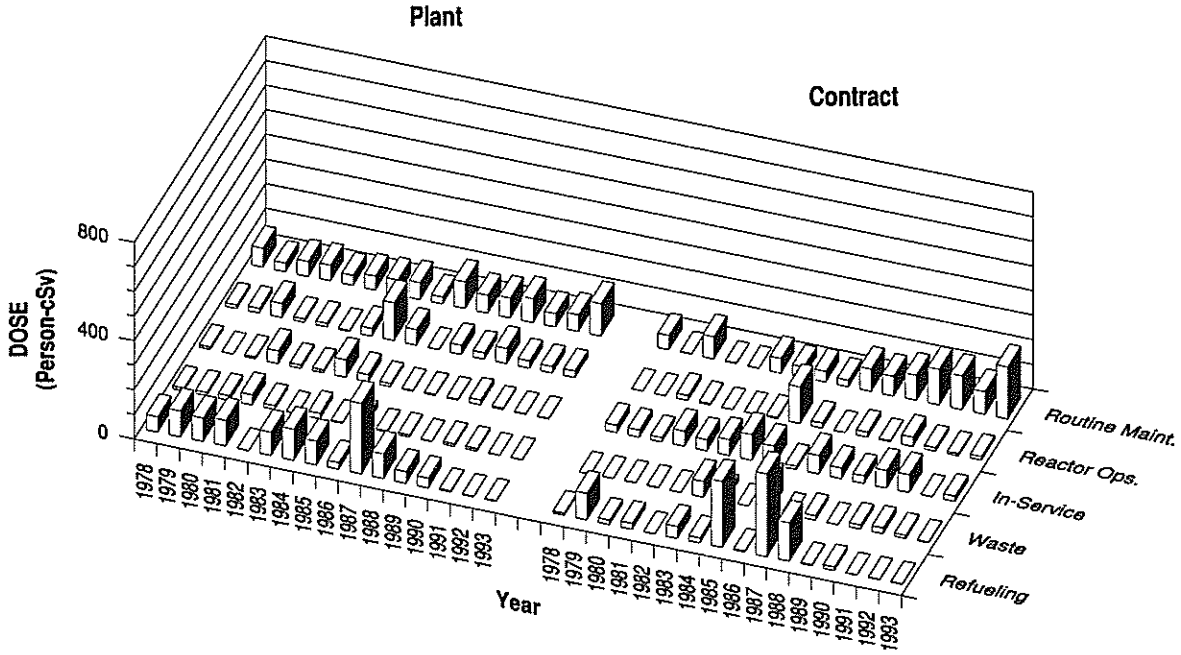
ST. LUCIE 1, 2

Dose-Performance Indicators

PWR



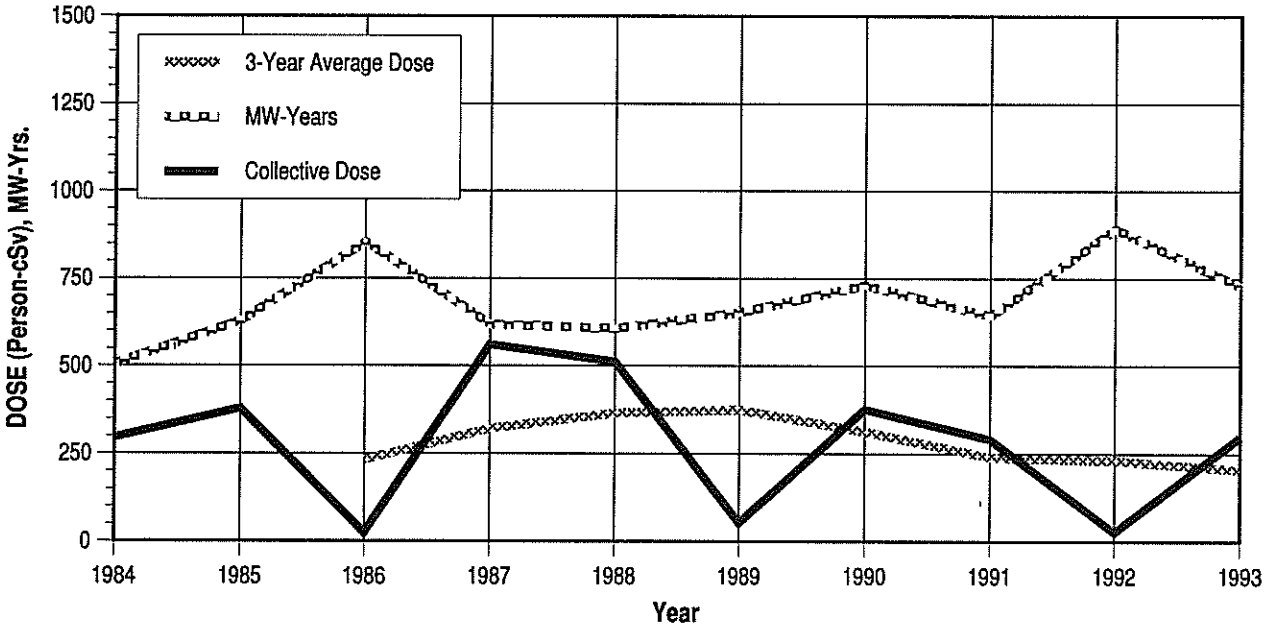
Breakdown by Job Function



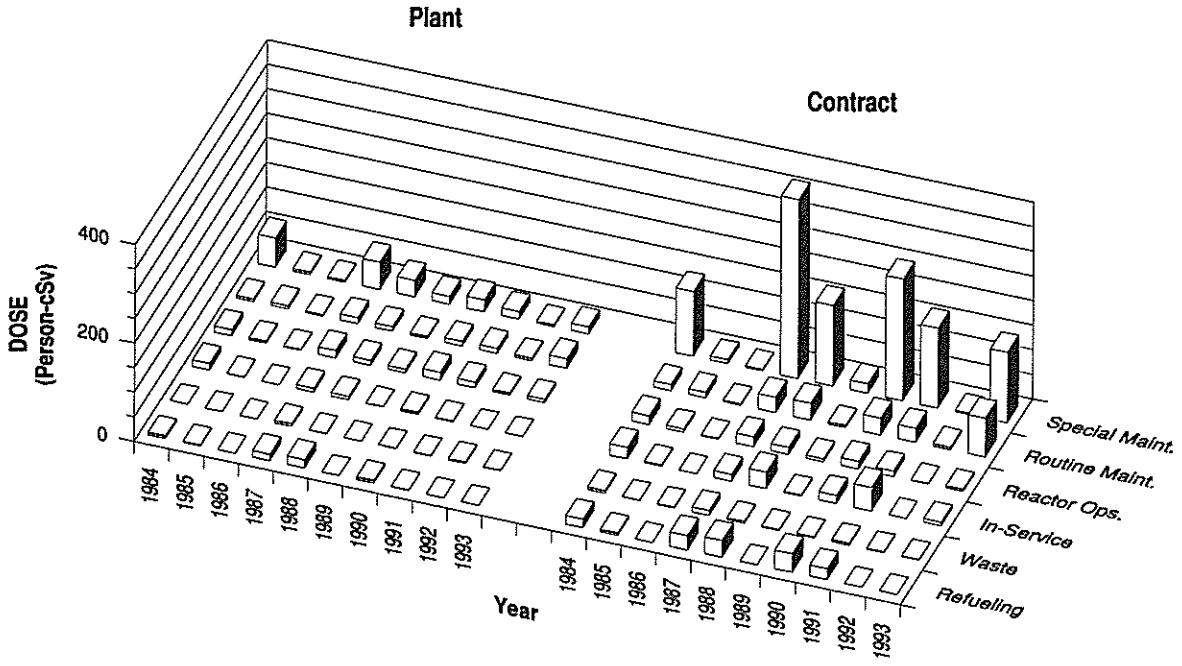
APPENDIX E (continued)

SUMMER 1

Dose-Performance Indicators **PWR**



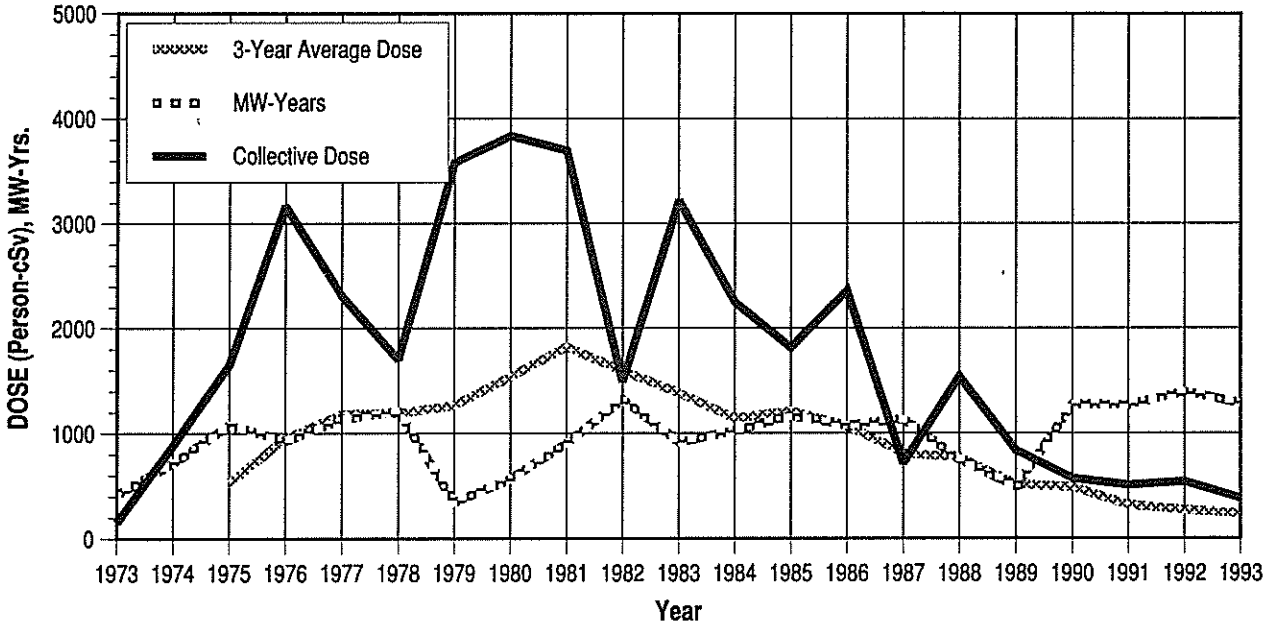
Breakdown by Job Function



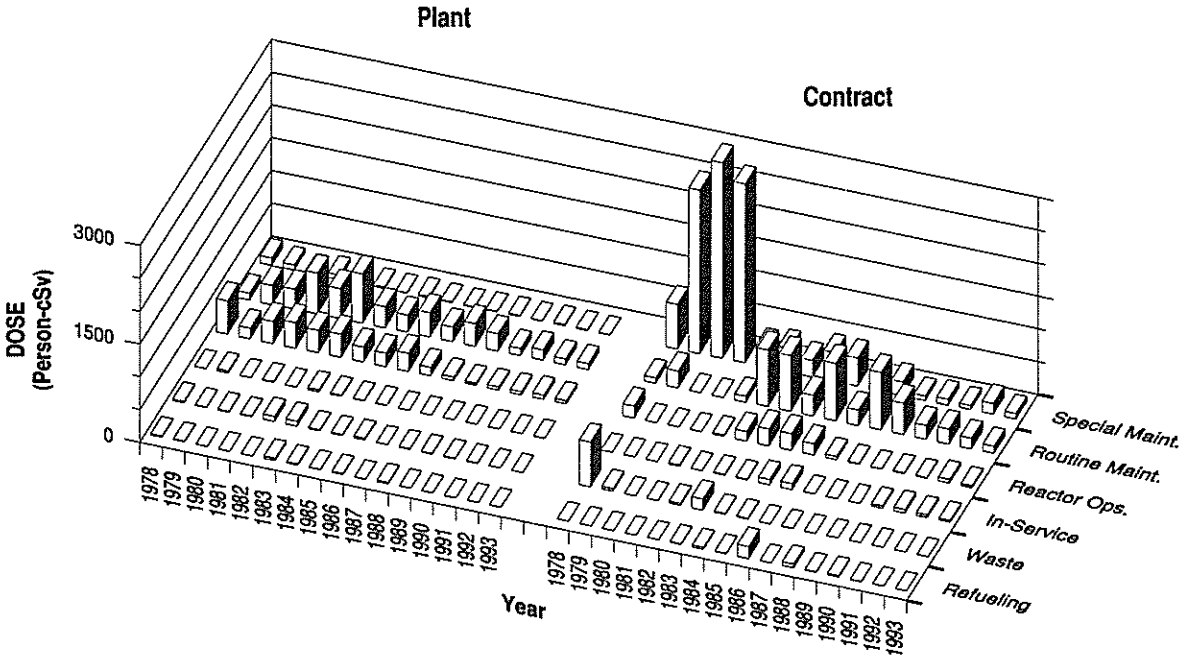
APPENDIX E (continued)

SURRY 1, 2

Dose-Performance Indicators **PWR**



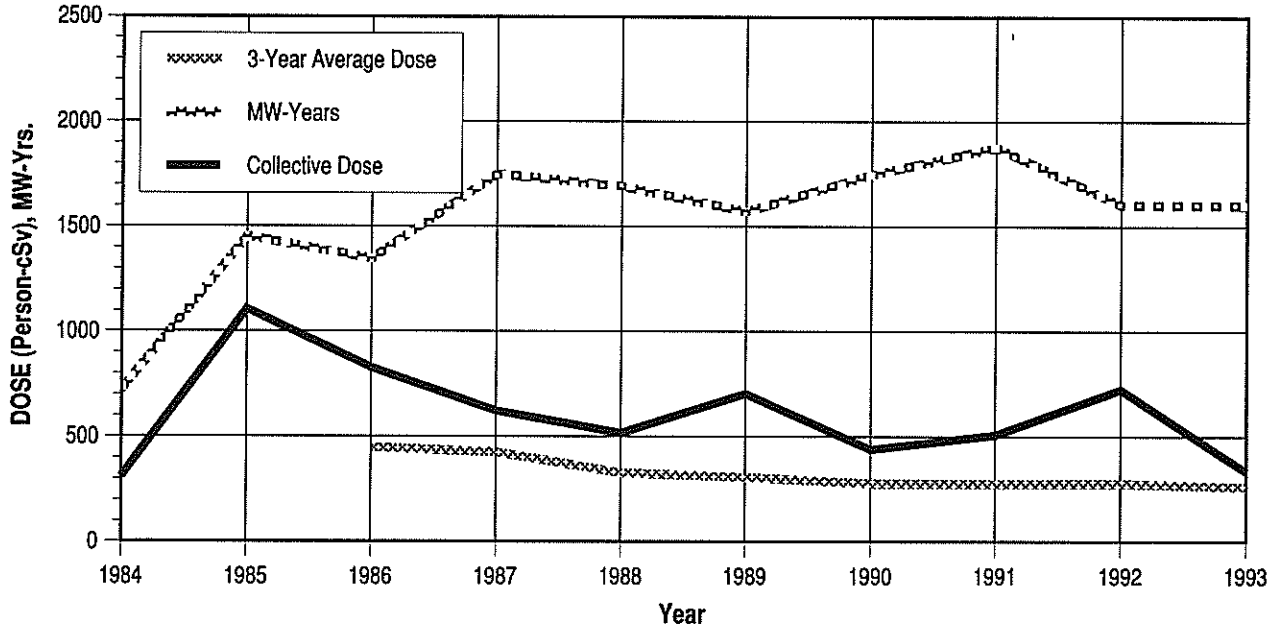
Breakdown by Job Function



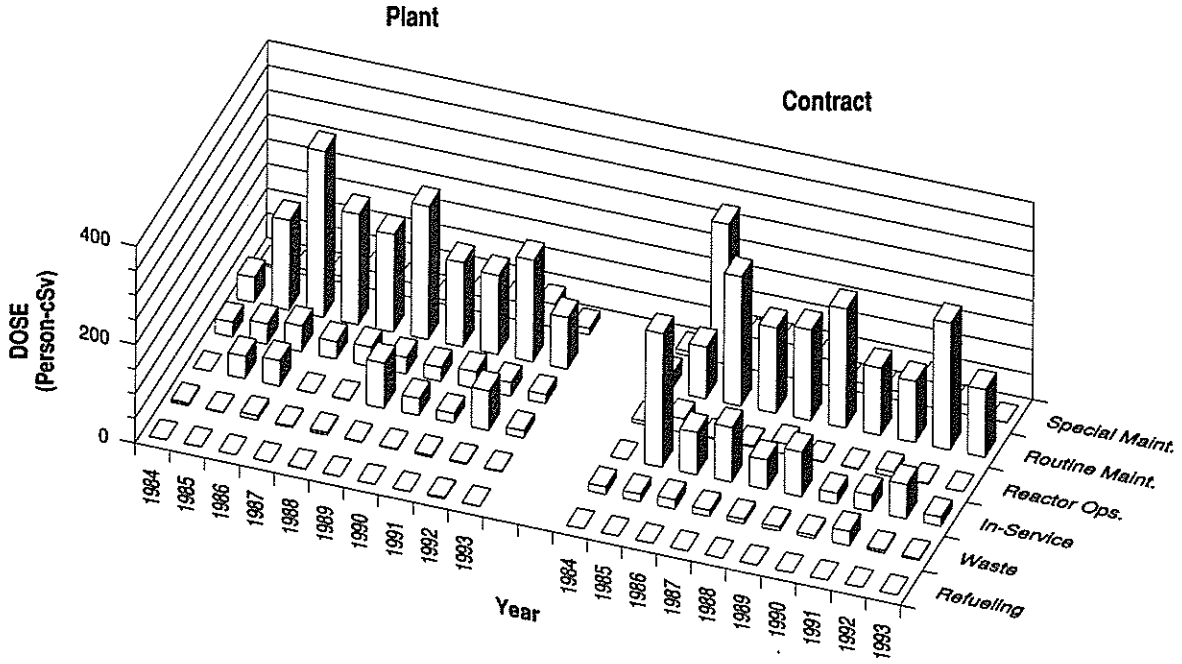
APPENDIX E (continued)

SUSQUEHANNA 1, 2

Dose-Performance Indicators **BWR**



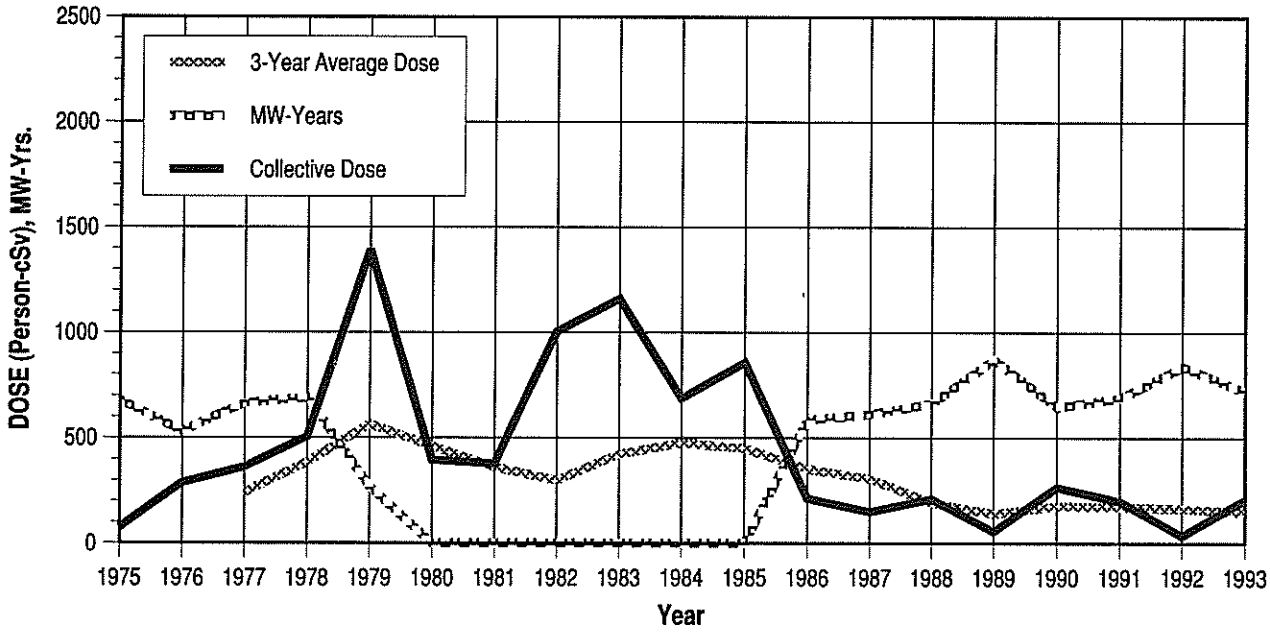
Breakdown by Job Function



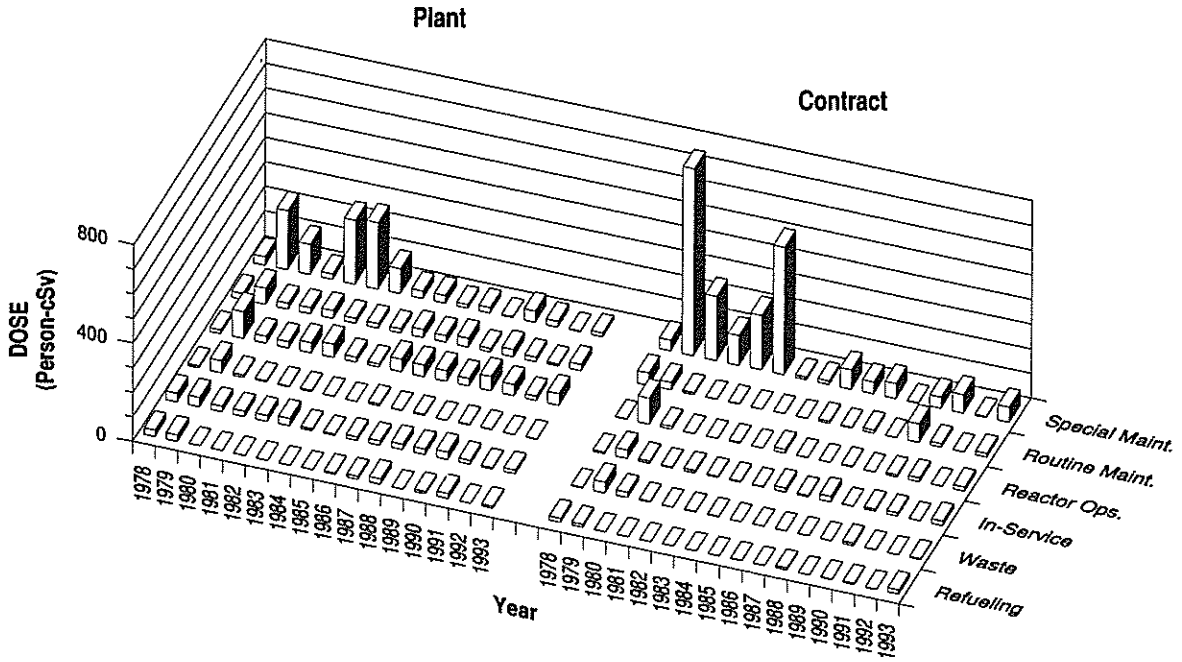
APPENDIX E (continued)

THREE MILE ISLAND 1

Dose-Performance Indicators **PWR**



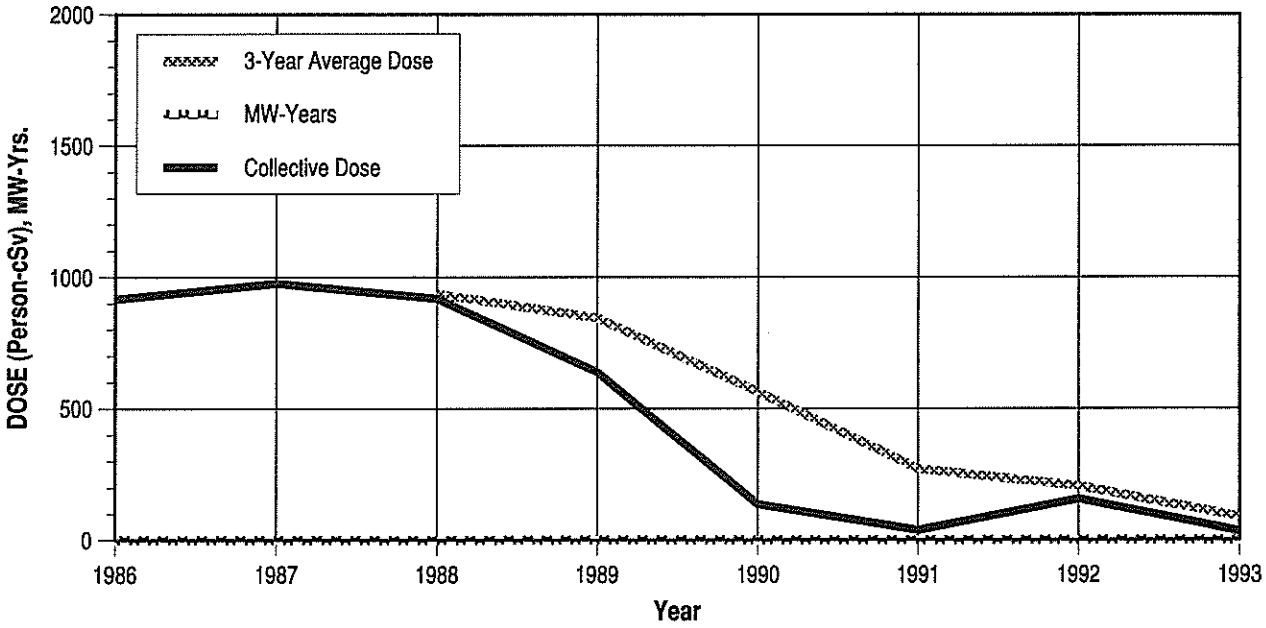
Breakdown by Job Function



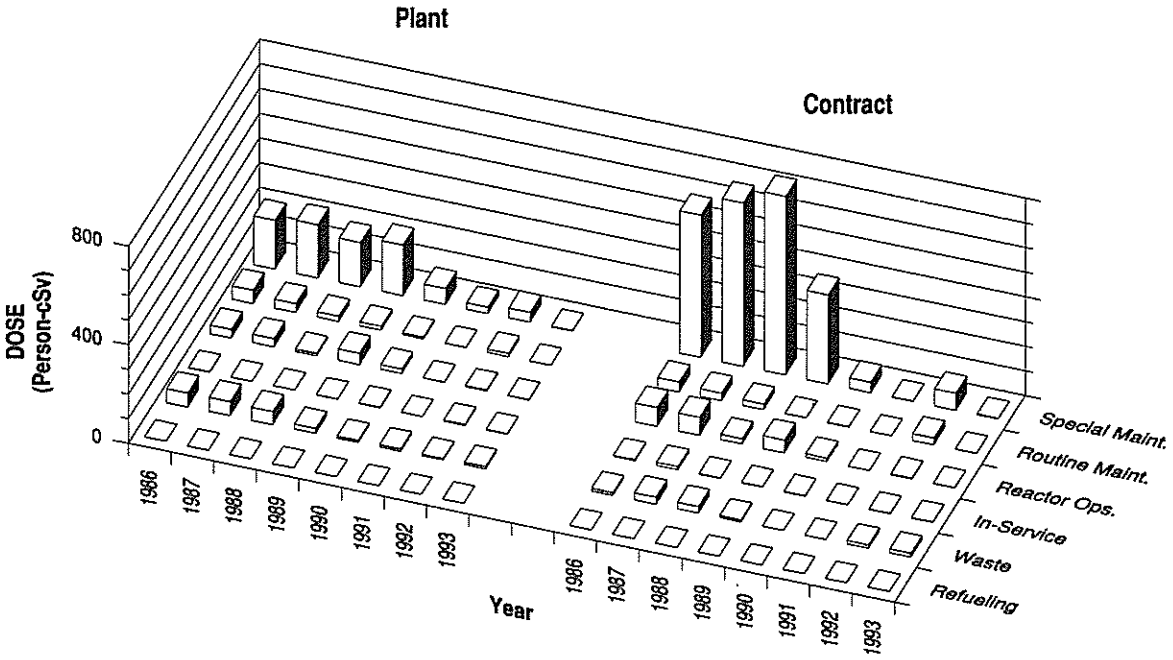
APPENDIX E (continued)

THREE MILE ISLAND 2

Dose-Performance Indicators **PWR**



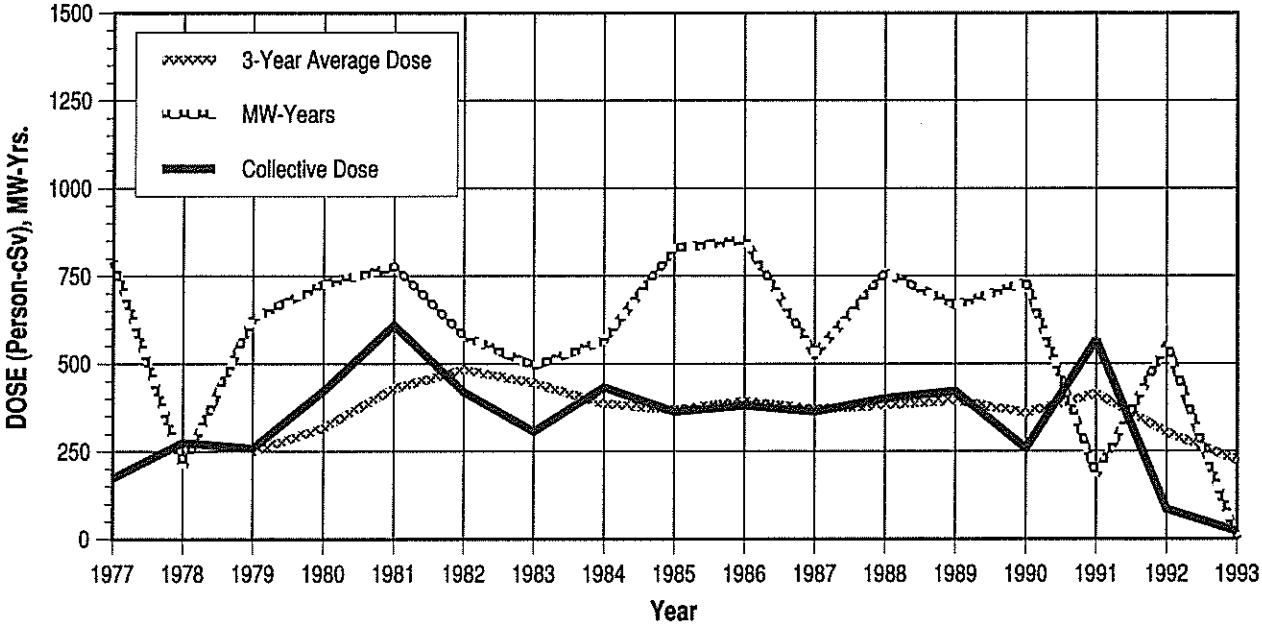
Breakdown by Job Function



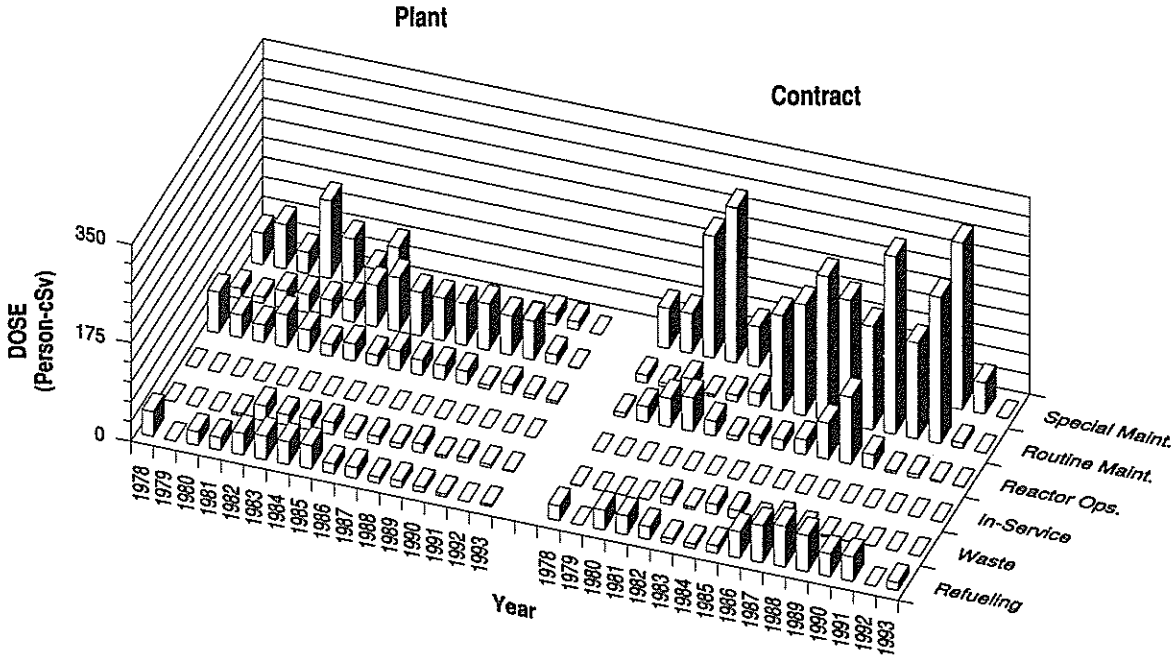
APPENDIX E (continued)

TROJAN

Dose-Performance Indicators **PWR**



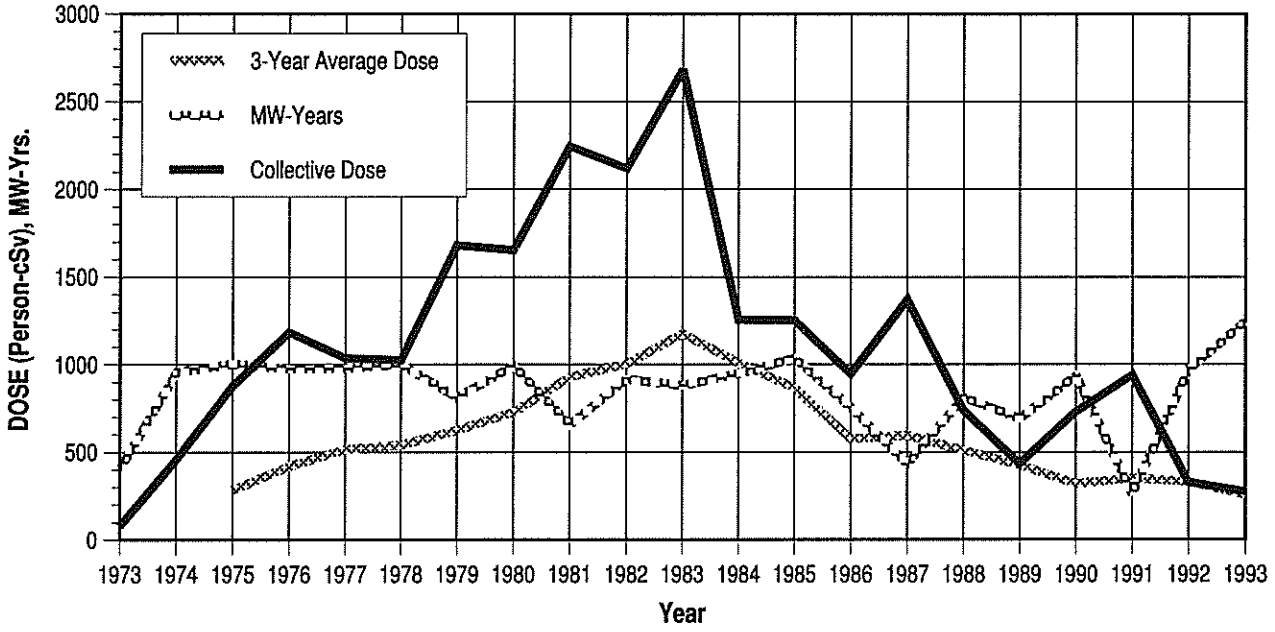
Breakdown by Job Function



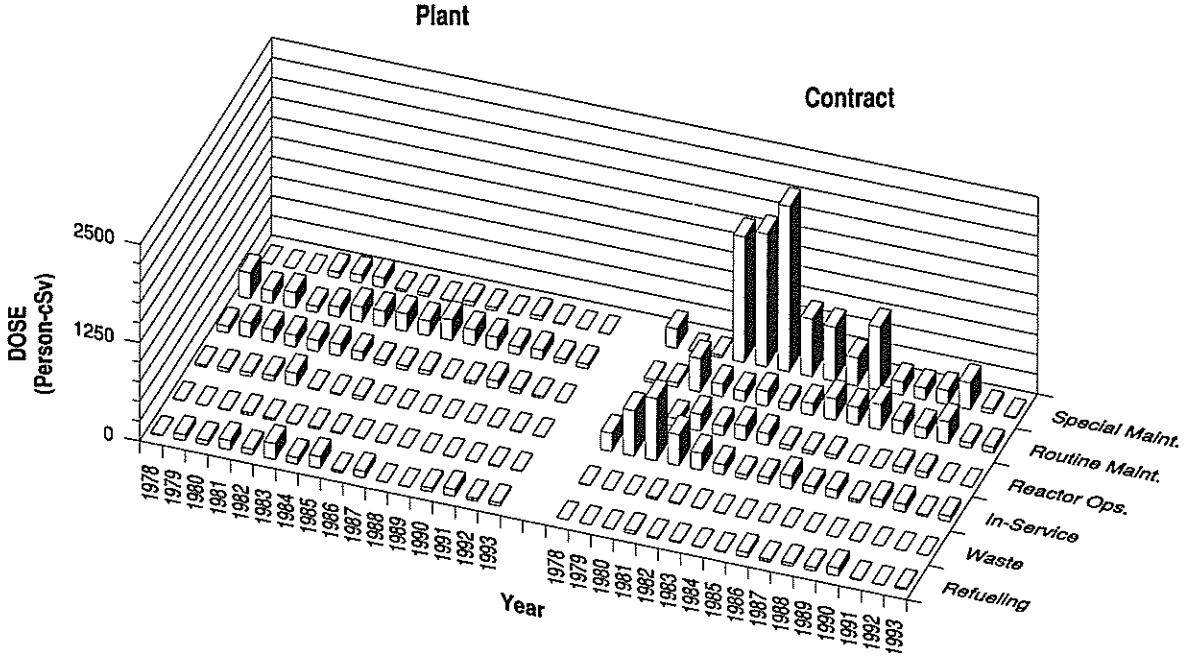
APPENDIX E (continued)

TURKEY POINT 3, 4

Dose-Performance Indicators **PWR**



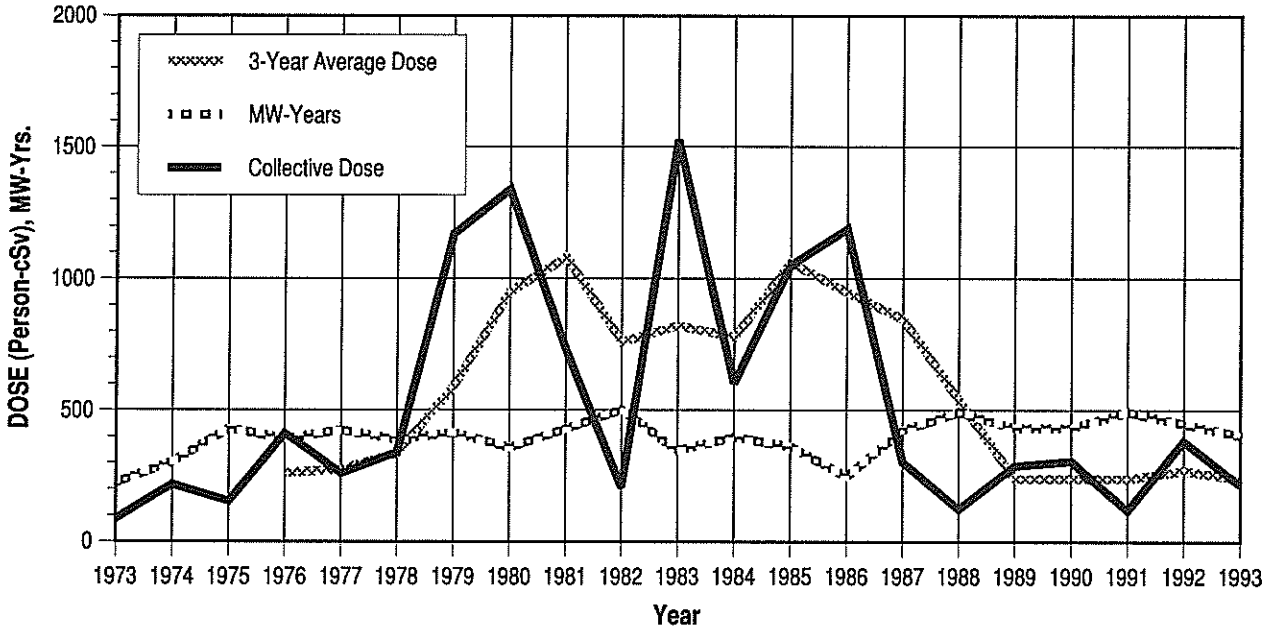
Breakdown by Job Function



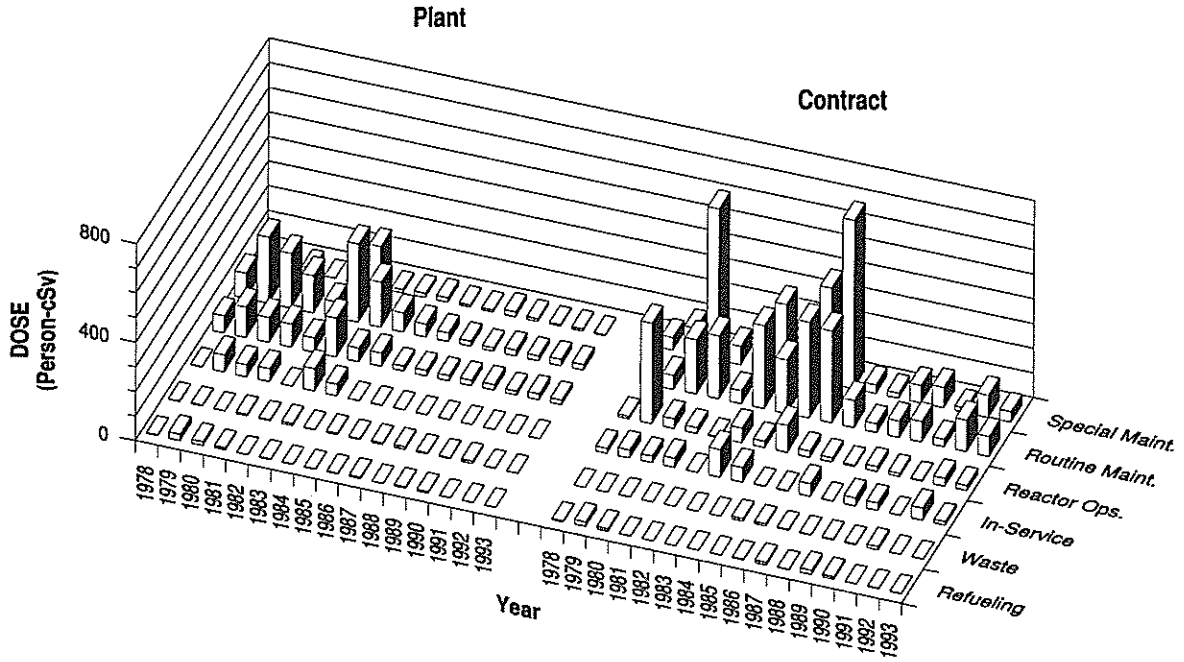
APPENDIX E (continued)

VERMONT YANKEE

Dose-Performance Indicators **BWR**



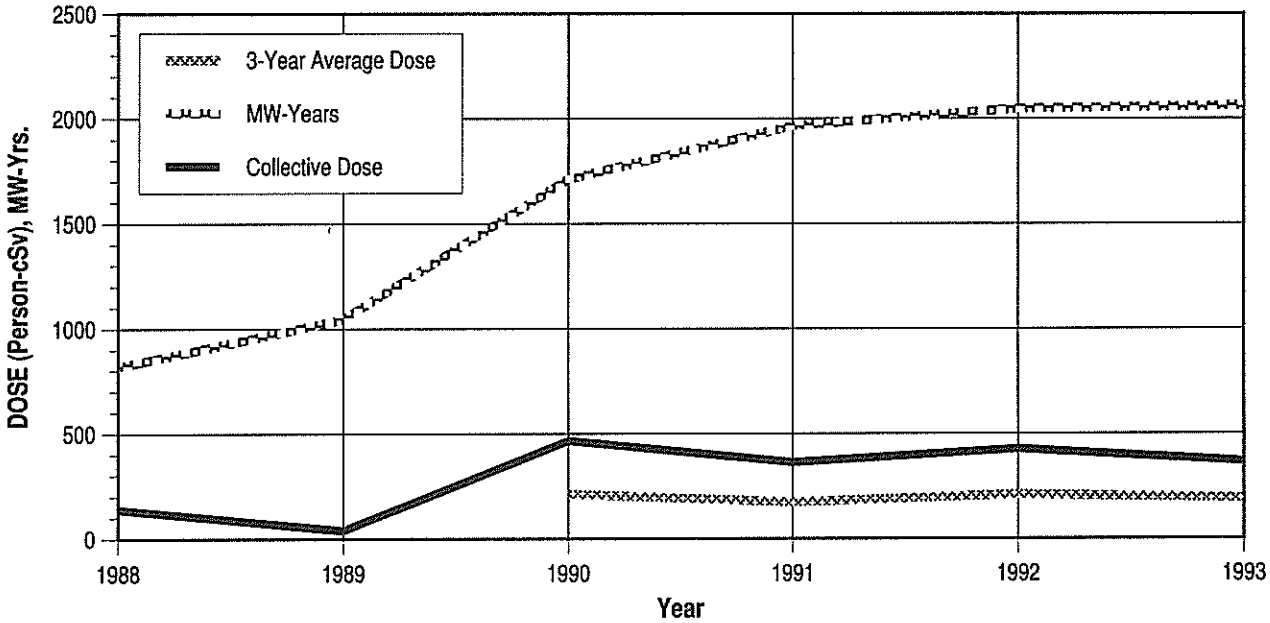
Breakdown by Job Function



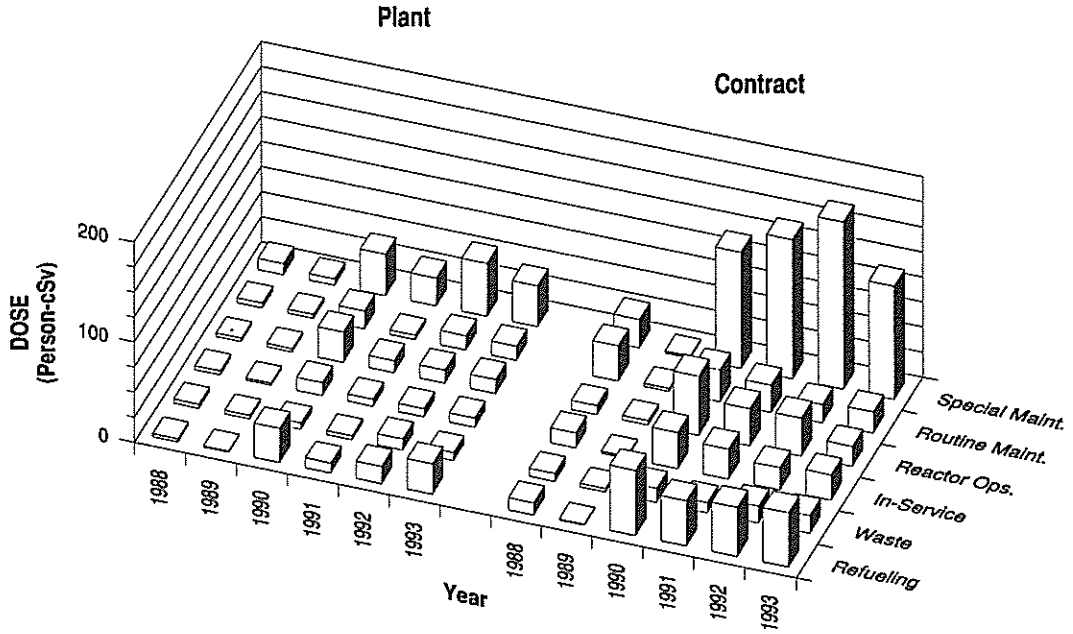
APPENDIX E (continued)

VOGTLE 1, 2

Dose-Performance Indicators **PWR**



Breakdown by Job Function

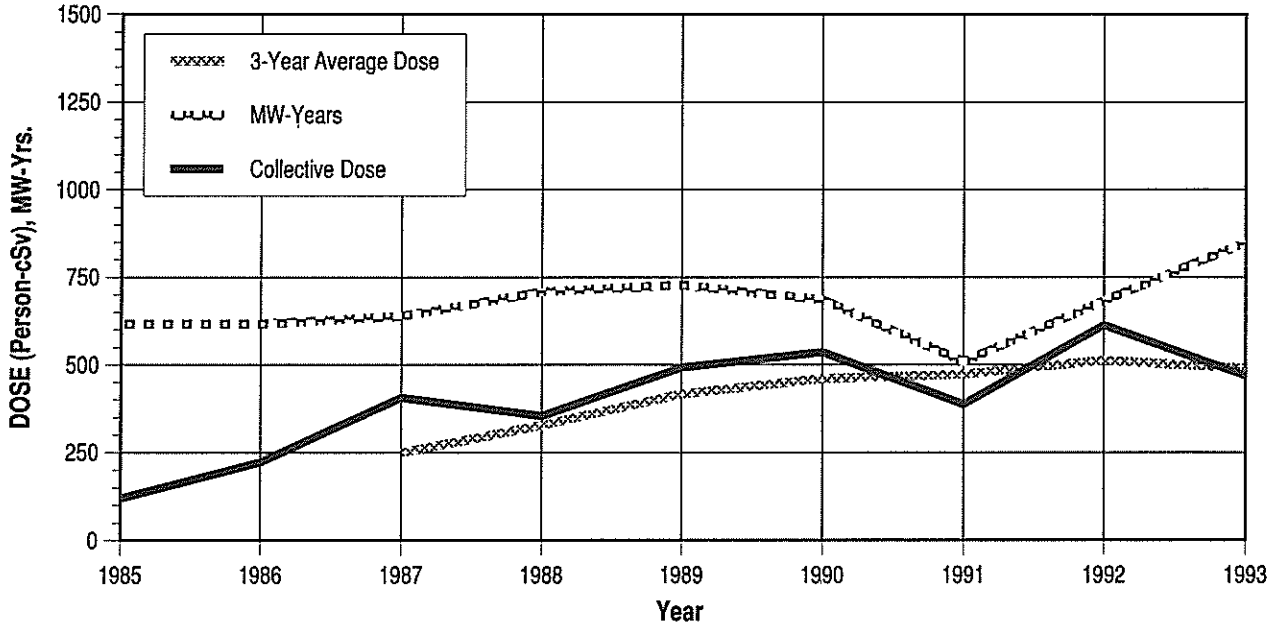


APPENDIX E (continued)

WASHINGTON NUCLEAR 2

Dose-Performance Indicators

BWR



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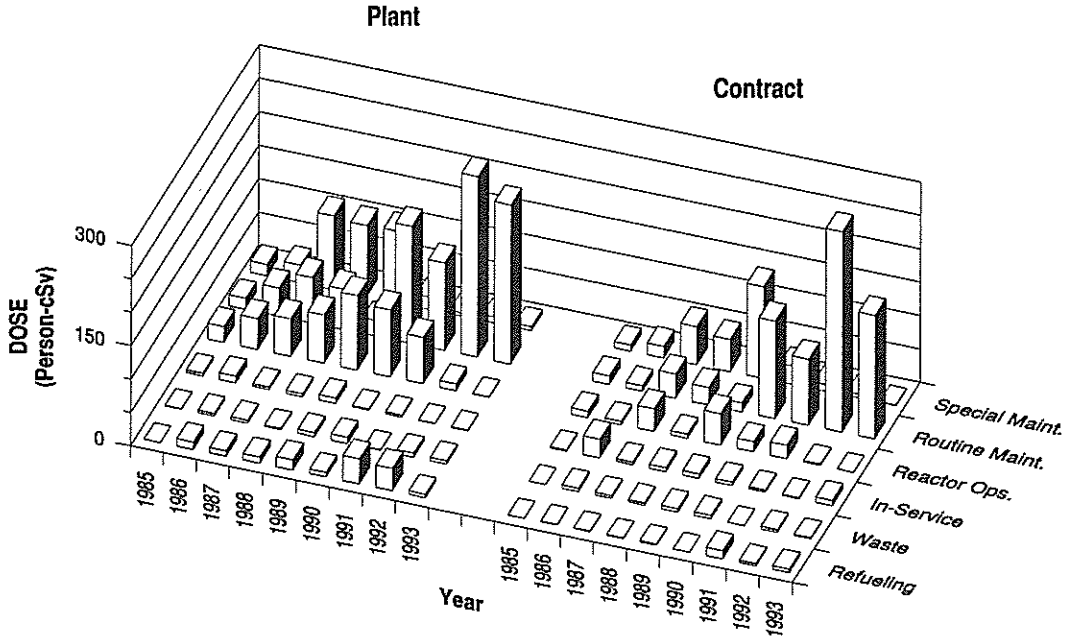
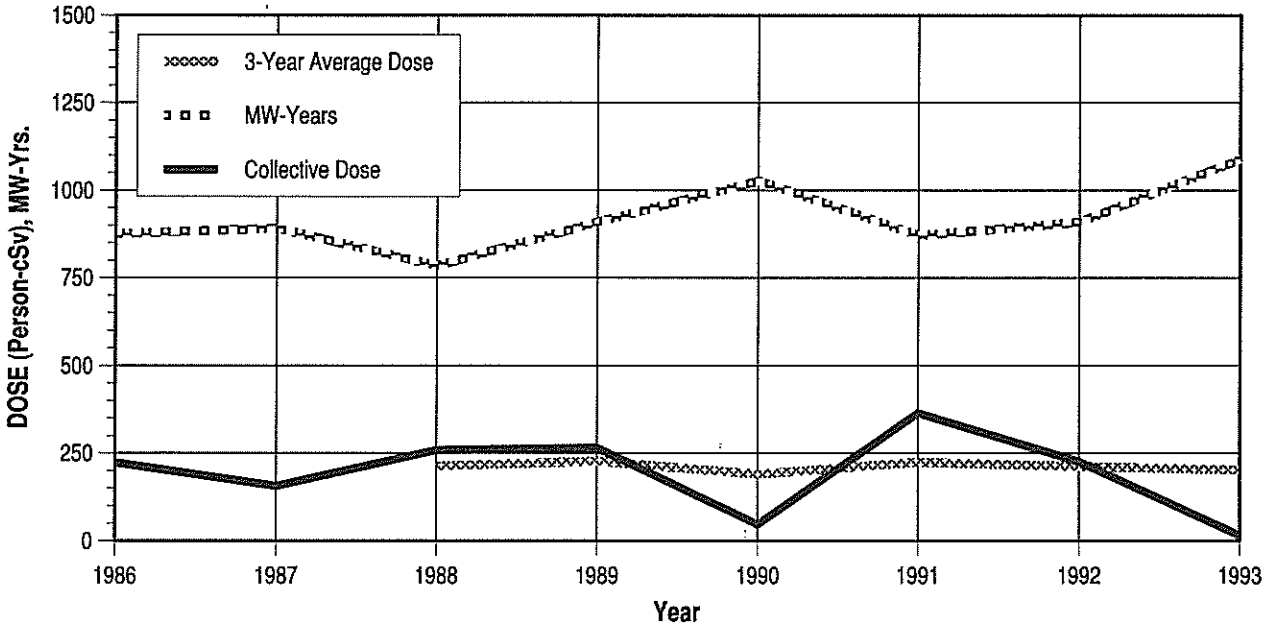


APPENDIX E (continued)

WATERFORD 3

Dose-Performance Indicators **PWR**



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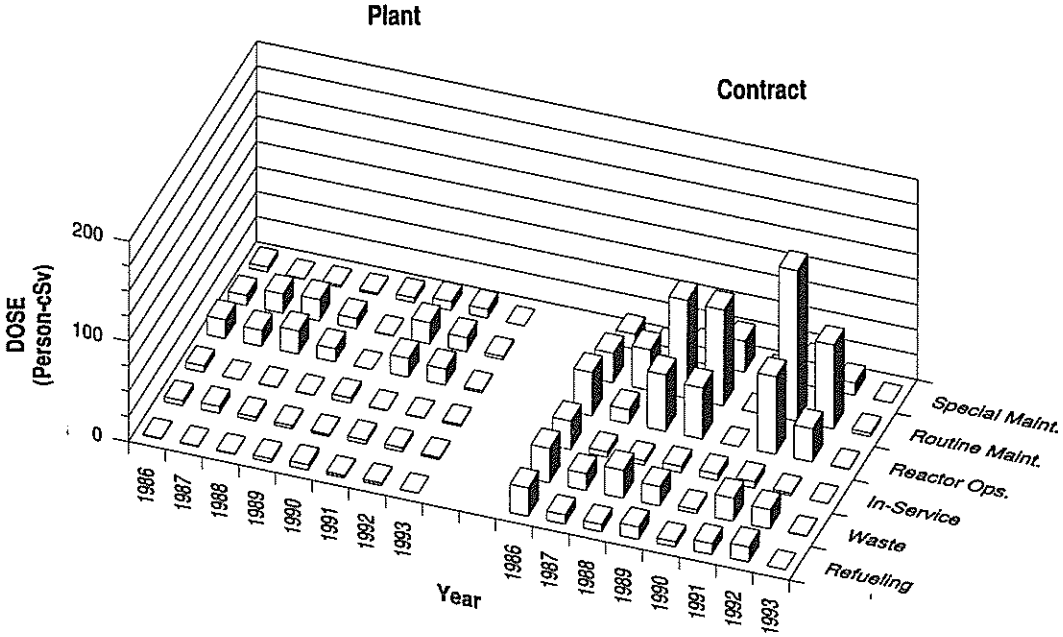
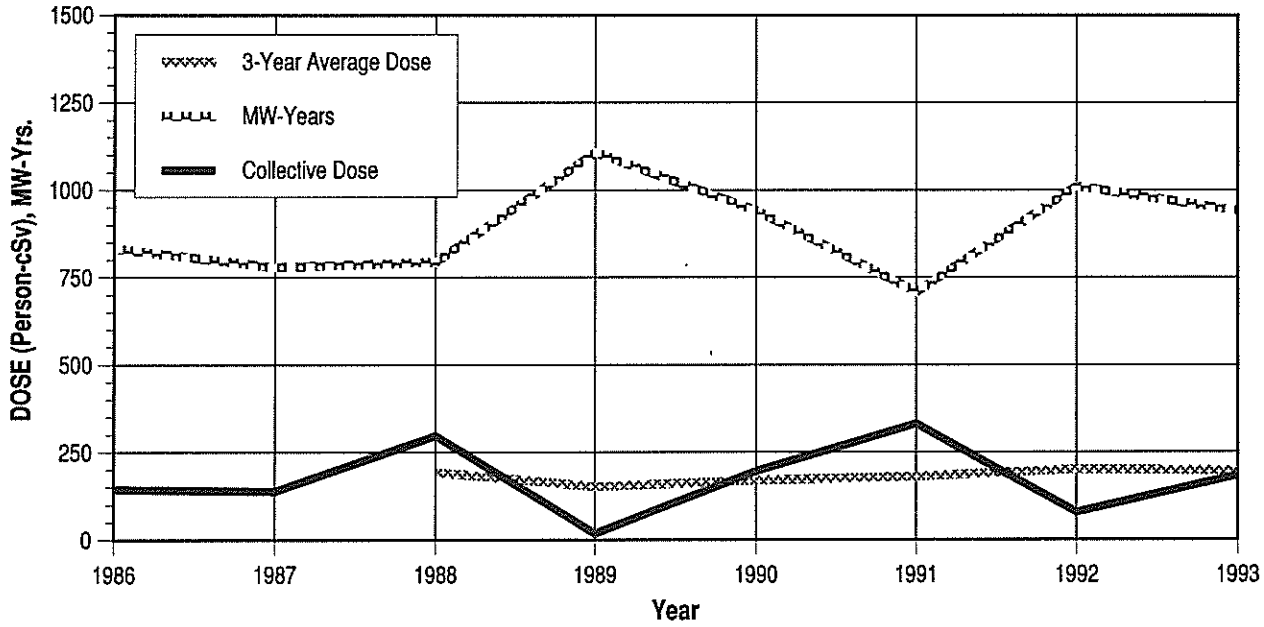


APPENDIX E (continued)

WOLF CREEK 1

Dose-Performance Indicators **PWR**



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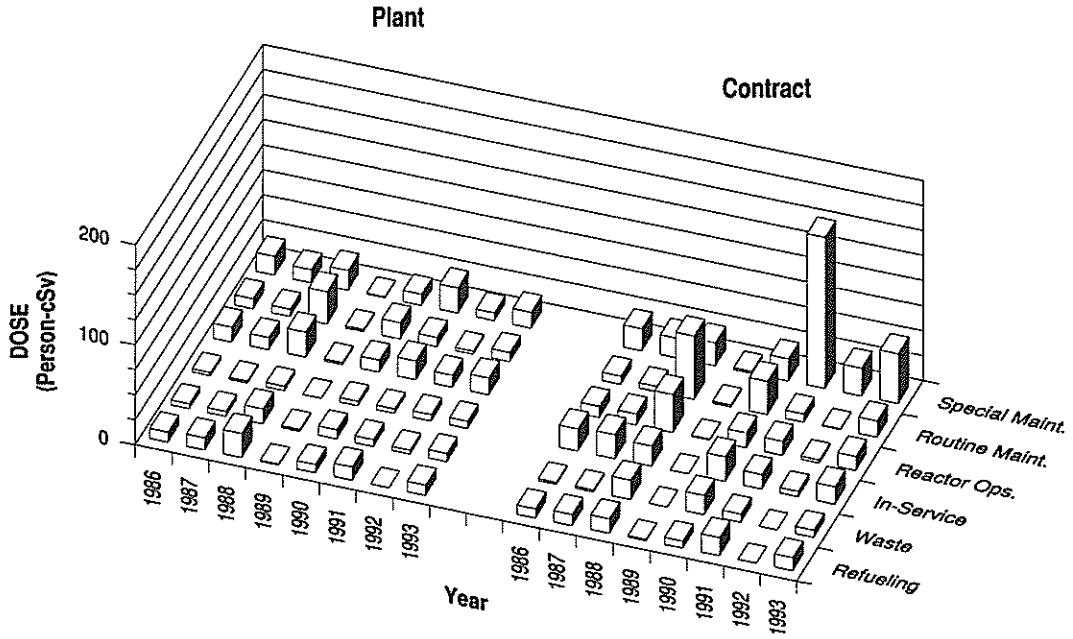
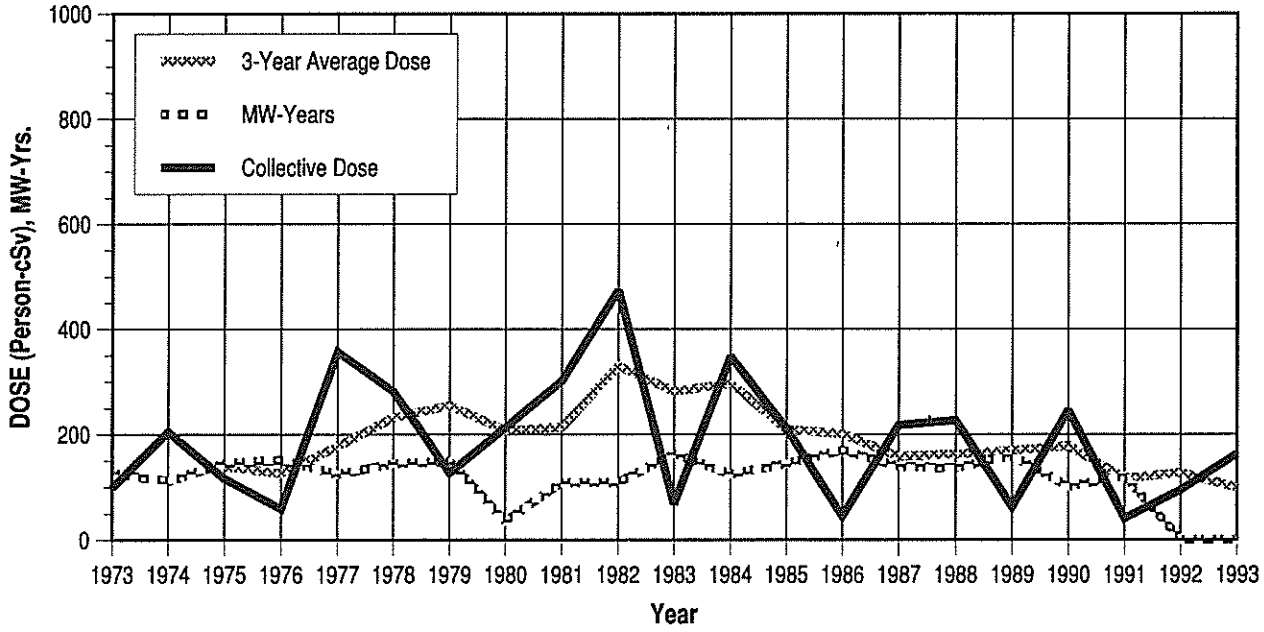


APPENDIX E (continued)

YANKEE-ROWE

Dose-Performance Indicators **PWR**



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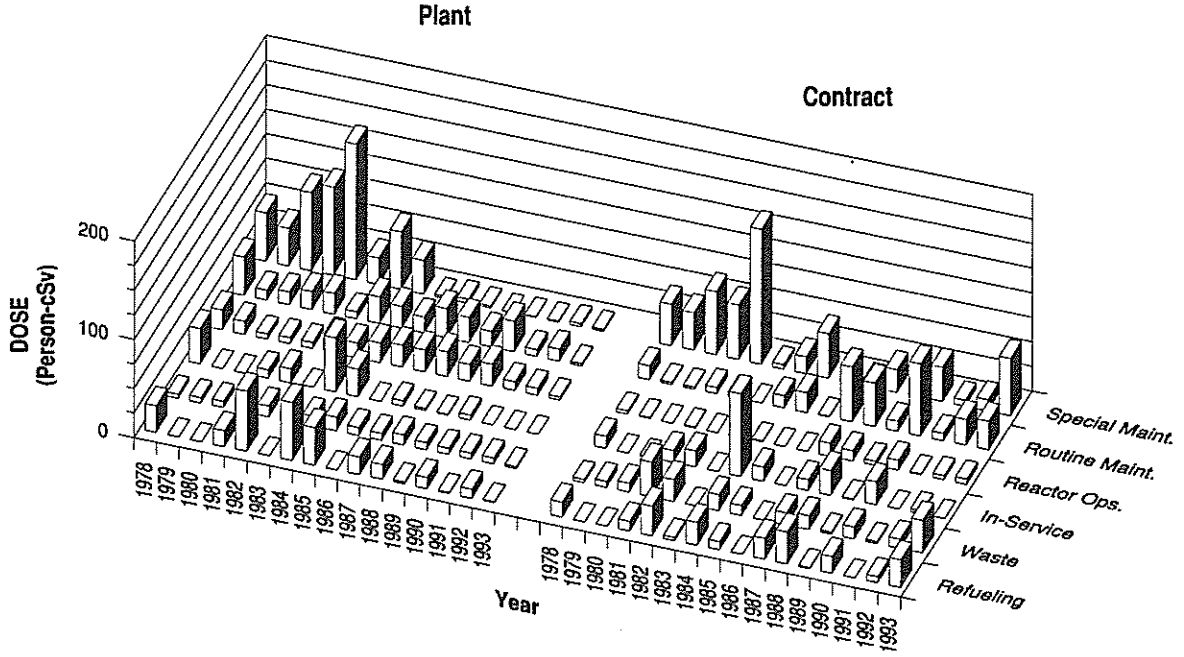
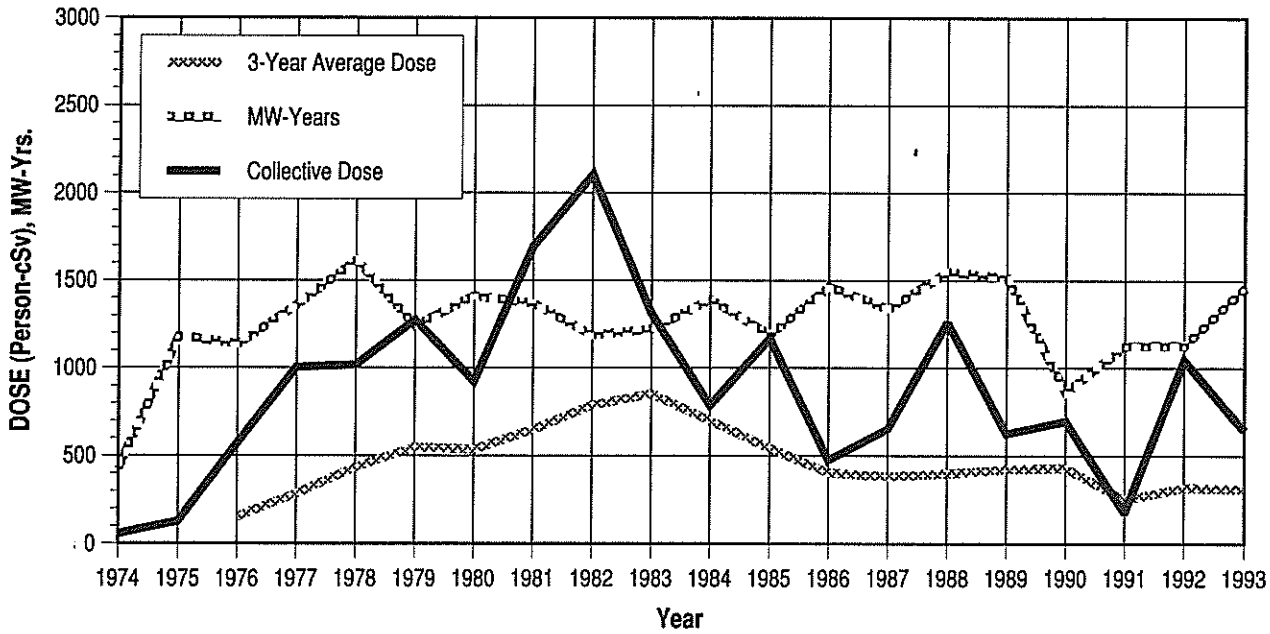


APPENDIX E (continued)

ZION 1, 2

Dose-Performance Indicators

PWR



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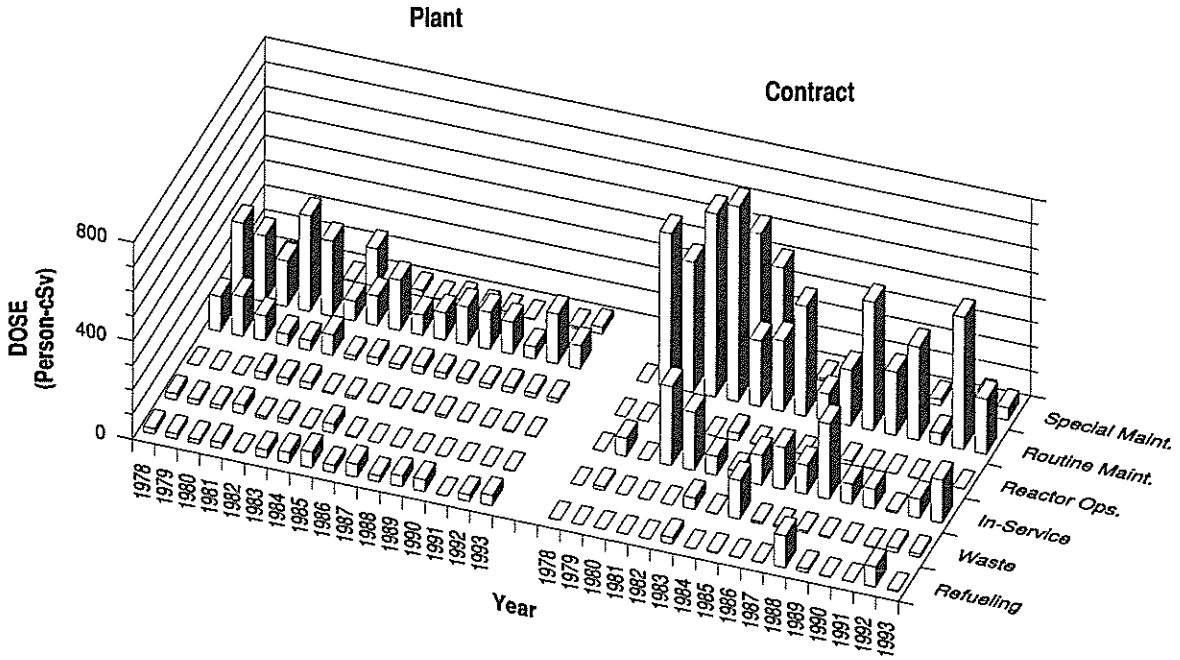

APPENDIX F

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

1987-1993

APPENDIX F*
SUMMARY OF ANNUAL WHOLE BODY DOSE DISTRIBUTIONS BY YEAR AND REACTOR TYPE
1987 - 1993

YEAR AND REACTOR TYPE	Number of Individuals with Whole Body Doses in the Ranges (cSv or rems)													TOTAL NUMBER MONI-TORED	NUMBER WITH MEAS. DOSE	TOTAL COLLECTIVE DOSE (person-rem, cSv)
	No Meas.	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	7.00-12.0	>12.0			
1993 - PWRs	57,216	25,579	12,348	9,665	4,636	2,224	2,052	83	1						113,804	56,588	14,142
1993 - BWRs	35,552	16,358	7,853	6,444	3,676	2,188	2,636	151	1	1					74,860	39,308	12,221
1993 - LWRs	92,768	41,937	20,201	16,109	8,312	4,412	4,688	234	2	1					188,664	95,896	26,363
1992 - PWRs	56,859	26,220	12,503	10,259	4,926	2,287	2,602	245	6						117,907	61,048	15,985
1992 - BWRs	39,594	17,740	8,094	6,883	3,955	2,339	2,866	204	11	3					81,689	42,095	13,309
1992 - LWRs	96,453	45,960	20,597	17,142	8,881	4,626	5,468	449	17	3					199,596	103,143	29,294
1991 - PWRs	57,815	28,514	11,876	9,387	4,657	2,462	2,972	371	30						118,084	60,269	16,510
1991 - BWRs	37,527	17,384	7,076	5,732	3,409	1,975	2,602	299	14	1					76,019	38,492	12,005
1991 - LWRs	95,342	45,898	18,952	15,119	8,066	4,437	5,574	670	44	1					194,103	98,761	28,515
1990 - PWRs	53,935	29,669	12,957	10,591	5,601	3,267	4,363	590	43						121,016	67,081	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	93,037	46,879	20,293	16,583	9,318	5,760	8,525	1,215	84	1					201,695	108,658	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	15,549
1989 - LWRs	92,652	48,762	19,478	15,659	8,814	5,541	8,701	1,189	99	11					200,906	108,254	35,930
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	17,983
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	40,769
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

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

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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 1993. 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 1993 annual reports submitted by about 360 licensees indicated that approximately 189,711 individuals were monitored, 169,872 of whom were monitored by nuclear power facilities. They incurred an average individual dose of 0.16 rem (cSv) and an average measurable dose of about 0.31 (cSv). Termination radiation exposure reports were analyzed to reveal that about 99,749 individuals completed their employment with one or more of the 360 covered licensees during 1993. Some 91,000 of these individuals terminated from power reactor facilities, and about 12,685 of them were considered to be transient workers who received an average dose of 0.49 rem (cSv).

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

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Power Reactors
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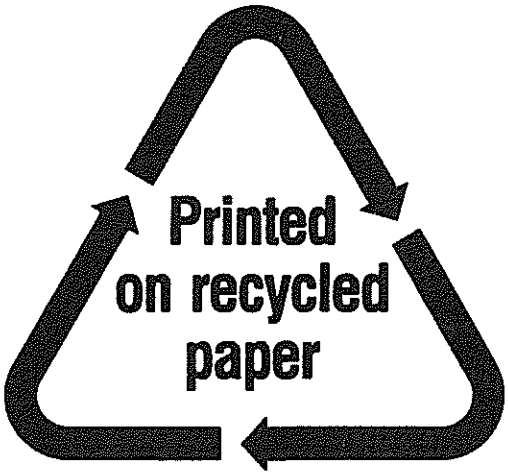

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