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

Twenty-Third Annual Report

**U.S. Nuclear Regulatory Commission**

**Office of Nuclear Regulatory Research**

C. T. Raddatz, D. Hagemeyer

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

Twenty-Third Annual Report

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| NUREG-0713 | Occupational Radiation Exposure At Commercial Nuclear Power Reactors and Other Facilities 1988, Vol. 10, U.S. Nuclear Regulatory Commission, July 1991. |
| NUREG-0713 | Occupational Radiation Exposure At Commercial Nuclear Power Reactors and Other Facilities 1989, Vol. 11, U.S. Nuclear Regulatory Commission, April 1992. |

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

| | |
|---|---|
| WASH-1350-R1 through WASH-1350-R6 | First through Sixth Annual Reports of the Operation of the U.S. AEC's Centralized Ionizing Radiation Exposure Records and Reporting System, U.S. Atomic Energy Commission. |
| NUREG-75/108 | Seventh Annual Occupational Radiation Exposure Report for Certain NRC Licensees - 1974, U.S. Nuclear Regulatory Commission, October 1975. |
| NUREG-0119 | Eighth Annual Occupational Radiation Exposure Report for 1975, U.S. Nuclear Regulatory Commission, October 1976. |
| NUREG-0322 | Ninth Annual Occupational Radiation Exposure Report for 1976, U.S. Nuclear Regulatory Commission, October 1977. |
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| NUREG-0714 | Occupational Radiation Exposure, Thirteenth and Fourteenth Annual Reports, 1980 and 1981, Vols. 2 and 3, U.S. Nuclear Regulatory Commission, October 1983. |
| NUREG-0714 | Occupational Radiation Exposure, Fifteenth and Sixteenth Annual Reports, 1982 and 1983, Vols. 4 and 5, U.S. Nuclear Regulatory Commission, October 1985. |

## ABSTRACT

This report summarizes the occupational exposure data that are maintained in the U.S. Nuclear Regulatory Commission's (NRC) Radiation Exposure Information and Reporting System (REIRS). The bulk of the information contained in the report was extracted from the 1990 annual statistical reports submitted by six of the seven categories[1] of NRC licensees subject to the reporting requirements of 10 CFR § 20.407. Since there are no geologic repositories for high level waste currently licensed, only six categories will be considered in this report. These six categories of licensees also submit personal identification and exposure information for terminating employees pursuant to 10 CFR § 20.408, and some analysis of this "termination" data is also presented in this report.

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

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


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

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

## EDITOR'S NOTE

The NRC currently has a three-year contract with Science Applications International Corporation (SAIC) to assist the NRC Staff in the preparation of the NUREG-0713 series. Mr. Charles Hinson (NRR) assisted in the preparation of this NUREG, serving as the NRC Technical Reviewer. SAIC will be suggesting changes in the presentation of certain data in these reports. Readers should be alert to these changes, and the NRC welcomes responses, especially where these changes can be improved upon.

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## PREFACE

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

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

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

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

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

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

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

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

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

## FOREWORD

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

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

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

# 1 INTRODUCTION

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

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

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

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

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

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

## 2 LIMITATIONS OF THE DATA

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

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

One source of error that is present in the calculation of the annual collective dose (i.e., the summation of each monitored person's whole body dose) incurred by workers is the assumption that the midpoint of the dose range is the mean dose of the individuals reported in each dose range (dose ranges are shown in Table 3.2). This allows the collective dose to be calculated without knowing each person's actual annual dose. Comparison of calculated collective dose with actual reported TLD dose totals shows that the actual mean dose of the individuals reported in each range is usually less than the midpoint. Thus, the collective doses presented for categories of licensees shown in this report may be as much as 10% higher than the sum of the actual individual doses. However, 85% of the nuclear power reactors reported the actual collective dose in 1990 so the total collective dose used in this report is more accurate than if the collective dose would have been calculated for each site.

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

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

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

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

Companies that conduct these types of activities in Agreement States[4] are licensed by the state and are not required to submit occupational exposure reports to the NRC. Approximately twice as many facilities are licensed to Agreement States than the number licensed by the NRC. This report also does not include non-occupational exposure such as medical x-rays, flouroscopy, and accelerators. Information shown for these categories does not reflect the total U.S. experience.

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

# 3 ANNUAL PERSONNEL MONITORING REPORTS - 10 CFR § 20.407

## 3.1 Definition of Terms and Sources of Data

### 3.1.1 Statistical Summary Reports

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

### 3.1.2 Number of Monitored Individuals

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

### 3.1.3 Number of Workers with Measurable Doses

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

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

### 3.1.4 Collective Dose

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

### 3.1.5 Average Individual Dose

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

### 3.1.6 Average Measurable Dose

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

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

### 3.1.7 Number of Licensees Reporting

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

### 3.1.8 CR

One of the parameters that the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) recommends be calculated for occupational dose distributions to aid in the comparison of exposure data is a ratio "CR." CR is defined to be the ratio of the annual collective dose incurred by individuals whose annual doses exceed 1.5[7] rem to the total annual collective dose. One UNSCEAR report [Ref. 10] states that normal values of CR should be between 0.05 and 0.50. This means that, usually, no more than 50% of the collective dose should be due to individual doses that exceed 1.5 rem. The last column in Table 3.1 shows the values of CR for the different types of licensees; one can see that most categories now have a CR that is less than 0.50 and that 1990 is the sixth year in a row the CR for commercial LWRs and the grand total for all licensees has dropped below 0.50.

## 3.2 Annual Whole Body Dose Distributions

Table 3.2 is a compilation of the statistical summary reports currently being submitted by six categories of licensees (see Section 3.3 for a description of licensee categories). In nearly every category a large number of the doses are less than measurable, and very few doses exceed 4 or 5 rem (cSv). About 90% of the reported individuals continue to be monitored by nuclear power facilities where they receive about 90% of the total collective dose.

It should be pointed out that annual exposures that exceed 5 rem (cSv) are not necessarily classified as personnel overexposures. Although 1.25 rem (cSv) is the quarterly limit set forth in paragraph (a) of 10 CFR § 20.101, paragraph (b) permits licensees, under certain conditions, to allow a worker

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7 The collective dose of workers with doses exceeding 1.5 rems (cSv) was calculated by assuming that half of the collective dose incurred by workers with doses between 1 and 2 rems (cSv) was due to doses greater than 1.5 rems (cSv). This value was then added to the collective dose incurred by workers in the higher ranges.

TABLE 3.1
ANNUAL EXPOSURE DATA FOR CERTAIN CATEGORIES OF LICENSEES
1981-1990

| License Category+ | Calendar Year | Number of Licensees Reporting | Number of Monitored Individuals | Number of Workers With Measurable Doses | Collective Dose (person-rems or person-cSv) | Average Individual Dose (rems or cSv) | Average Measurable Dose per Worker (rems or cSv) | CR* |
|---|---|---|---|---|---|---|---|---|
| Industrial Radiography | 1990 | 258 | 6,523 | 4,458 | 2,120 | 0.33 | 0.48 | 0.42 |
| | 1989 | 276 | 6,745 | 4,352 | 2,067 | 0.31 | 0.47 | 0.42 |
| | 1988 | 286 | 6,878 | 4,223 | 1,981 | 0.29 | 0.47 | 0.43 |
| | 1987 | 312 | 7,236 | 4,454 | 1,835 | 0.25 | 0.41 | 0.36 |
| | 1986 | 335 | 7,952 | 5,130 | 2,108 | 0.26 | 0.41 | 0.39 |
| | 1985 | 340 | 8,476 | 5,550 | 2,374 | 0.28 | 0.43 | 0.45 |
| | 1984 | 361 | 8,458 | 5,446 | 2,490 | 0.30 | 0.46 | 0.46 |
| | 1983 | 340 | 8,624 | 5,131 | 2,384 | 0.28 | 0.46 | 0.45 |
| | 1982 | 353 | 9,235 | 6,160 | 2,998 | 0.32 | 0.49 | 0.46 |
| | 1981 | 266 | 9,938 | 5,486 | 2,652 | 0.27 | 0.48 | 0.48 |
| Manufacturing and Distribution | 1990 | 55 | 4,195 | 2,272 | 693 | 0.17 | 0.31 | 0.55 |
| | 1989 | 48 | 4,554 | 2,345 | 770 | 0.17 | 0.33 | 0.53 |
| | 1988 | 16 | 2,177 | 868 | 343 | 0.16 | 0.40 | 0.62 |
| | 1987 | 24 | 3,589 | 2,317 | 716 | 0.20 | 0.31 | 0.54 |
| | 1986 | 33 | 4,042 | 2,065 | 745 | 0.18 | 0.36 | 0.49 |
| | 1985 | 33 | 3,958 | 2,250 | 755 | 0.19 | 0.34 | 0.50 |
| | 1984 | 40 | 5,076 | 1,977 | 671 | 0.13 | 0.34 | 0.46 |
| | 1983 | 33 | 5,051 | 2,003 | 824 | 0.16 | 0.41 | 0.54 |
| | 1982 | 34 | 5,453 | 2,199 | 890 | 0.16 | 0.40 | 0.51 |
| | 1981 | 29 | 4,846 | 2,395 | 904 | 0.19 | 0.38 | 0.52 |
| Low-Level Waste Disposal | 1990 | 2 | 784 | 115 | 26 | 0.03 | 0.23 | 0.17 |
| | 1989 | 2 | 925 | 119 | 35 | 0.04 | 0.29 | 0.17 |
| | 1988 | 2 | 864 | 171 | 27 | 0.03 | 0.16 | 0.06 |
| | 1987 | 2 | 778 | 173 | 24 | 0.03 | 0.14 | 0.00 |
| | 1986 | 2 | 996 | 175 | 31 | 0.03 | 0.18 | 0.05 |
| | 1985 | 2 | 1,240 | 252 | 70 | 0.06 | 0.28 | 0.24 |
| | 1984 | 2 | 925 | 297 | 72 | 0.08 | 0.24 | 0.16 |
| | 1983 | 1 | 612 | 358 | 71 | 0.12 | 0.20 | 0.14 |
| | 1982 | 1 | 680 | 251 | 53 | 0.08 | 0.21 | 0.20 |
| Independent Spent Fuel Storage | 1990 | 2 | 56 | 22 | 6 | 0.11 | 0.27 | 0.00 |
| | 1989 | 2 | 190 | 102 | 33 | 0.17 | 0.33 | 0.09 |
| | 1988 | 2 | 217 | 57 | 25 | 0.12 | 0.44 | 0.27 |
| | 1987 | 2 | 129 | 64 | 41 | 0.32 | 0.64 | 0.60 |
| | 1986 | 1 | 32 | 32 | 34 | 1.06 | 1.06 | 0.46 |
| | 1985 | 1 | 32 | 32 | 34 | 1.06 | 1.06 | 0.51 |
| | 1984 | 1 | 32 | 32 | 13 | 0.41 | 0.41 | 0.06 |
| | 1983 | 1 | 33 | 27 | 8 | 0.24 | 0.30 | 0.00 |
| | 1982 | 1 | 35 | 32 | 9 | 0.26 | 0.28 | 0.00 |
| Fuel Fabrication and Processing | 1990 | 10 | 13,756 | 3,233 | 287 | 0.02 | 0.09 | 0.01 |
| | 1989 | 8 | 11,583 | 2,992 | 243 | 0.02 | 0.08 | 0.00 |
| | 1988 | 10 | 11,994 | 3,869 | 455 | 0.04 | 0.12 | 0.01 |
| | 1987 | 10 | 10,370 | 3,994 | 514 | 0.05 | 0.13 | 0.01 |
| | 1986 | 10 | 8,017 | 3,790 | 466 | 0.06 | 0.12 | 0.01 |
| | 1985 | 11 | 8,596 | 5,032 | 643 | 0.07 | 0.13 | 0.05 |
| | 1984 | 14 | 9,488 | 5,772 | 818 | 0.09 | 0.14 | 0.04 |
| | 1983 | 15 | 9,023 | 5,013 | 835 | 0.09 | 0.17 | 0.19 |
| | 1982 | 16 | 9,808 | 5,433 | 831 | 0.08 | 0.15 | 0.20 |
| | 1981 | 18 | 10,552 | 5,942 | 940 | 0.09 | 0.16 | 0.09 |
| Commercial Light Water Reactors*** | 1990 | 116 | 189,254** | 100,104** | 36,607 | 0.19 | 0.37 | 0.34 |
| | 1989 | 113 | 188,477** | 100,080** | 35,939 | 0.19 | 0.36 | 0.33 |
| | 1988 | 111 | 193,532** | 96,653** | 40,164 | 0.21 | 0.42 | 0.38 |
| | 1987 | 105 | 205,895** | 97,992** | 39,708 | 0.19 | 0.41 | 0.37 |
| | 1986 | 101 | 191,978** | 96,535** | 41,932 | 0.22 | 0.43 | 0.44 |
| | 1985 | 93 | 180,254** | 94,873** | 43,624 | 0.24 | 0.46 | 0.47 |
| | 1984 | 88 | 165,803** | 95,224** | 55,353 | 0.33 | 0.58 | 0.57 |
| | 1983 | 80 | 139,885** | 83,546** | 56,758 | 0.41 | 0.68 | 0.60 |
| | 1982 | 79 | 127,904** | 80,871** | 52,227 | 0.41 | 0.65 | 0.57 |
| | 1981 | 73 | 123,978** | 80,664** | 54,271 | 0.44 | 0.67 | 0.58 |
| Grand Totals and Averages | 1990 | 443 | 214,568** | 110,204** | 39,739 | 0.19 | 0.36 | 0.34 |
| | 1989 | 449 | 212,474** | 109,990** | 39,087 | 0.18 | 0.36 | 0.34 |
| | 1988 | 427 | 215,662** | 105,841** | 42,995 | 0.20 | 0.41 | 0.38 |
| | 1987 | 455 | 227,997** | 108,994** | 42,838 | 0.19 | 0.39 | 0.37 |
| | 1986 | 482 | 213,017** | 107,727** | 45,316 | 0.21 | 0.42 | 0.43 |
| | 1985 | 480 | 202,556** | 107,989** | 47,474 | 0.23 | 0.44 | 0.46 |
| | 1984 | 506 | 189,782** | 108,748** | 59,421 | 0.31 | 0.55 | 0.56 |
| | 1983 | 470 | 163,238** | 96,878** | 60,880 | 0.37 | 0.63 | 0.59 |
| | 1982 | 482 | 153,118** | 94,946** | 57,008 | 0.37 | 0.60 | 0.56 |
| | 1981 | 385 | 149,314** | 94,490** | 58,767 | 0.39 | 0.62 | 0.56 |

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

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

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

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

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

| LICENSE CATEGORY (# reporting) | *Number of Individuals with Whole Body Doses in the Ranges (rems or cSv) | | | | | | | | | | | | | | | | TOTAL NUMBER MONI-TORED | NUMBER WITH MEAS. EXPOSURE | TOTAL COLLECTIVE DOSE (Person-rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No Mea-surable | Meas. <0.10 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.00-5.00 | 5.00-6.00 | 6.00-7.00 | 7.00-8.00 | 8.00-9.00 | 9.00-12.00 | >12.0 | | | |
| INDUSTRIAL RADIOGRAPHY | | | | | | | | | | | | | | | | | | | |
| Single Location (66) | 528 | 194 | 79 | 20 | 6 | 4 | 1 | | | | | | | | | | 832 | 304 | 41 |
| Multiple Locations (192) | 1,537 | 1,661 | 671 | 569 | 354 | 251 | 459 | 140 | 33 | 13 | 3 | | | | | | 5,691 | 4,154 | 2,079 |
| Total (258) | 2,065 | 1,855 | 750 | 589 | 360 | 255 | 460 | 140 | 33 | 13 | 3 | | | | | | 6,523 | 4,458 | 2,120 |
| MANUFACTURING AND DISTRIBUTION | | | | | | | | | | | | | | | | | | | |
| "A"-Broad (10) | 1,229 | 1,227 | 243 | 106 | 56 | 31 | 97 | 59 | 37 | 6 | | | | | | | 3,091 | 1,862 | 655 |
| Limited (45) | 694 | 345 | 40 | 16 | 7 | 1 | | | 1 | | | | | | | | 1,104 | 410 | 38 |
| Total (55) | 1,923 | 1,572 | 283 | 122 | 63 | 32 | 97 | 59 | 38 | 6 | | | | | | | 4,195 | 2,272 | 693 |
| LOW-LEVEL WASTE DISPOSAL | | | | | | | | | | | | | | | | | | | |
| Total (2) | 669 | 74 | 10 | 19 | 2 | 4 | 6 | | | | | | | | | | 784 | 115 | 26 |
| INDEPENDENT SPENT FUEL STORAGE | | | | | | | | | | | | | | | | | | | |
| Total (2) | 34 | 2 | 12 | 6 | 2 | | | | | | | | | | | | 56 | 22 | 6 |
| FUEL FABRICATION | | | | | | | | | | | | | | | | | | | |
| Total (10) | 10,523 | 2,563 | 511 | 133 | 19 | 4 | 3 | | | | | | | | | | 13,756 | 3,233 | 287 |
| **COMMERCIAL POWER REACTORS | | | | | | | | | | | | | | | | | | | |
| Boiling Water (38) | 39,347 | 17,233 | 7,336 | 5,992 | 3,717 | 2,493 | 4,162 | 625 | 41 | 1 | | | | | | | 80,947 | 41,600 | 15,781 |
| Pressurized Water (78) | 58,733 | 29,988 | 13,051 | 10,750 | 5,759 | 3,384 | 4,712 | 607 | 43 | | | | | | | | 127,027 | 68,294 | 20,826 |
| GRAND TOTALS | 113,294 | 53,287 | 21,953 | 17,611 | 9,922 | 6,172 | 9,440 | 1,431 | 155 | 20 | 3 | | | | | | 233,288 | 119,994 | 39,739 |

*Dose values exactly equal to the values separating ranges are reported in the next higher range.
**Includes all reactors in commercial operation, although some of them may not have been in operation for a full year, and these values have not been adjusted for the multiple counting of transient reactor workers.

to receive a whole body dose of 3 rem (cSv) per calendar quarter [up to 12 rem (cSv) annually]. The conditions are that the licensee must have determined and recorded the worker's prior accumulated occupational dose to the whole body and that the worker's whole body dose when added to his accumulated occupational dose does not exceed 5(N - 18) rem (cSv), where N equals the individual's age in years. Although there is currently no annual limit, annual exposures that exceed 12 rem (cSv) indicate that an exposure in excess of regulatory limits has occurred.

A summary of the annual whole body exposures reported to the Commission by certain categories of NRC licensees required to submit reports pursuant to 10 CFR § 20.407 is presented in Table 3.3, which shows that about 95% of the exposures have consistently remained less than 2 rem (cSv) between 1967 and 1984. For the past 3 years the percentage of workers with less than 2 rem (cSv) has been greater than 98%. The number of individuals receiving an annual exposure in excess of 5 rem (cSv) has been gradually declining since 1971 and has been less than 0.01% since 1985.

### 3.2.1 Log Probability Plots

Since personnel monitoring data have been found to have log-normal distributions [Ref. 11], trends in the data reported by licensees may be observed from log probability plots[8] of data. Figure 3.1 displays such a plot of the doses incurred by workers monitored by certain NRC licensees (see Section 3.1.1) for the year 1990. There are a few characteristics of these distributions readers should keep in mind. First, each single plotted point represents the total cumulative percent of all workers with measurable doses up to the plotted value. All measurable doses up to 0.1 rem are included in the value plotted at 0.1 rem, and the values shown on the "Annual Dose" axis are derived from the dose ranges specified in 10 CFR § 20.407(b). Second, because it is not possible to plot 100% on these figures, the data for the highest dose group are plotted at 99.99% and can be said to account for all of the workers.

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

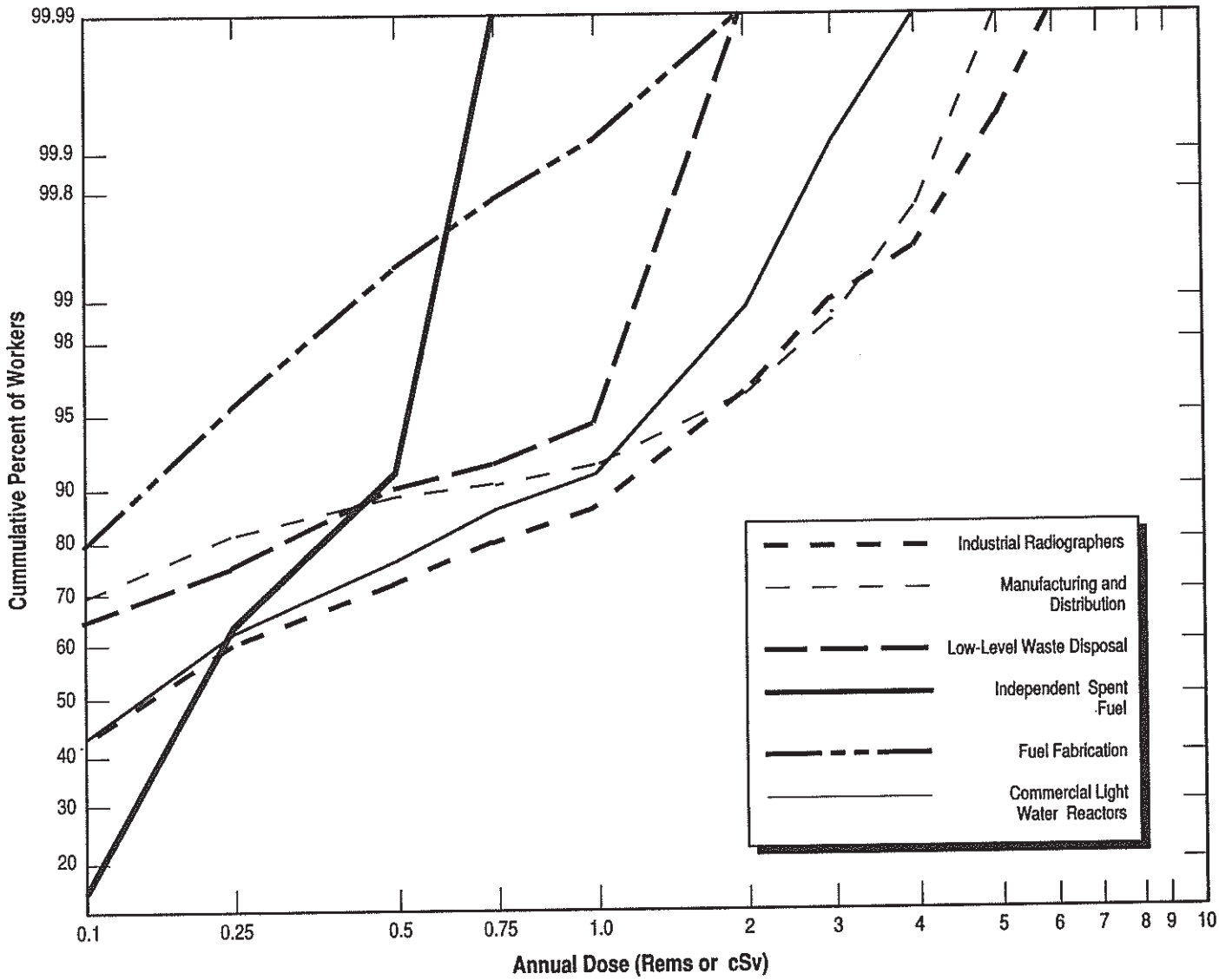
TABLE 3.3
SUMMARY OF ANNUAL DOSE DISTRIBUTIONS FOR CERTAIN NRC LICENSEES

1968-1990

| Year | Total Number of Monitored Persons: Reported Number | Total Number of Monitored Persons: Corrected Number* | Percent of Individuals With Doses <2 rems* | Percent of Individuals With Doses <5 rems* | Number of Individuals With Doses >12 rems* |
|---|---|---|---|---|---|
| 1968 | 36,836 | | 97.2% | 99.5% | 3 |
| 1969 | 31,176 | | 96.5% | 99.5% | 7 |
| 1970 | 36,164 | | 96.1% | 99.4% | 0 |
| 1971 | 36,311 | | 96.3% | 99.3% | 1 |
| 1972 | 44,690 | | 95.7% | 99.5% | 8 |
| 1973 | 67,862 | | 95.0% | 99.5% | 1 |
| 1974 | 85,097 | | 96.4% | 99.7% | 1 |
| 1975 | 78,713 | | 94.8% | 99.5% | 1 |
| 1976 | 92,773 | | 95.0% | 99.6% | 3 |
| 1977 | 98,212 | 93,438 | 93.8% | 99.6% | 1 |
| 1978 | 105,893 | 100,818 | 94.6% | 99.8% | 3 |
| 1979 | 131,027 | 125,316 | 95.2% | 99.8% | 1 |
| 1980 | 159,177 | 150,675 | 94.6% | 99.7% | 0 |
| 1981 | 157,874 | 149,314 | 94.6% | 99.8% | 1 |
| 1982 | 162,456 | 154,117 | 94.9% | 99.9% | 0 |
| 1983 | 172,927 | 164,239 | 94.6% | 99.9% | 0 |
| 1984 | 181,627 | 168,899 | 95.1% | 99.9% | 0 |
| 1985 | 212,217 | 201,339 | 97.5% | >99.99% | 2 |
| 1986 | 225,582 | 213,017 | 98.0% | >99.99% | 0 |
| 1987 | 243,562 | 228,013 | 98.7% | >99.99% | 1 |
| 1988 | 231,234 | 215,662 | 98.6% | >99.99% | 0 |
| 1989 | 229,353 | 212,454 | 98.9% | >99.99% | 1 |
| 1990 | 233,288 | 214,568 | 98.9% | >99.99% | 0 |

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

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




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

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

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

Another feature of these types of graphs is that several comparisons of various dose distributions can be made quickly. For example, one can easily see in Figure 3.1 that in 1990 about 90% of the workers monitored by firms licensed for independent spent fuel storage received doses that were less than 0.50 rem (cSv), while all of the workers monitored at fuel-fabrication facilities received doses less than 2.00 rem (cSv). One should also note that the doses at which the 50 percentile line crosses the plot corresponds to the median dose, i.e. the dose below which half of the dose fell and above which half fell. For industrial radiography and commercial light water reactors, the median dose is near 0.10 rem (cSv), while for manufacturing and distribution, fuel fabrication facilities, and low-level waste disposal facilities, the median measurable dose is considerably less.

The relative positions and curvature of the graphs are indicative of certain characteristics of the dose distributions. The positions of the 1990 plots of the dose distribution of workers at fuel fabrication facilities and independent fuel storage facilities above that of the other plots indicate smaller values of the average doses and CR (as shown in the chart at the bottom of the graph). This is due to the lower number of workers with doses that exceeded 1.5 rem (cSv) in 1990 as compared to other licensed activities. The tendency of the plots to curve upward for doses greater than one rem (cSv) is typical of distributions having several workers with doses in the higher dose ranges [Refs. 10, 11], and indicates that the entire distribution is not a log-normal one. Another theoretical analysis of occupational dose distributions [Ref. 12] has found that these data may be fitted by a hybrid log-normal distribution. At low doses, this distribution is log-normal, but at higher doses, where radiation control programs very closely monitor each worker's total dose so that the frequency of doses approaching the dose limits is reduced, the distribution is normal.

An example of this "feedback" mechanism which reduces exposures reported at higher doses can be seen in the plot for independent spent fuel storage and low-level waste disposal facilities. The relatively low points on the curve between 0.10 and 0.25 rem (cSv) indicate a large percentage of individuals receiving dose in this range, while the curve takes a steep upwards turn at 0.50 rem (cSv) indicating tighter controls limiting exposure above this level. This distribution characteristic is further reflected in the relatively high average measurable dose of 0.27 rem (cSv), but a CR value of zero for these facilities.

## 3.3 Summary of Occupational Exposure Data by License Category

### 3.3.1 Industrial Radiography Licenses, Single and Multiple Locations

These licenses are issued to allow the use of sealed radioactive materials, usually in exposure devices or "cameras," that primarily emit gamma rays for nondestructive testing of pipeline weld joints, steel structures, boilers, air craft and ship parts, and other high-stress alloy parts. Some firms are licensed to conduct such activities in one location, usually in a permanent facility which was designed and shielded for radiography, and others perform radiography at multiple, temporary sites in the field. The radioisotopes most commonly used are cobalt-60 and iridium-192. As shown in Table 3.1, annual reports were received for 258 radiography licensees in 1990, which is 18 less than those reporting in 1989.

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

TABLE 3.4
ANNUAL EXPOSURE INFORMATION FOR INDUSTRIAL RADIOGRAPHERS

1988-1990

| Year | Type of License | Number of Licenses | Number of Monitored Individuals | Workers with Measurable Doses | Collective Dose (person-rems or person-cSv) | Average Measurable Dose (rems or cSv) |
|---|---|---|---|---|---|---|
| 1990 | Single location | 66 | 832 | 304 | 41 | 0.13 |
| | Multiple locations | 192 | 5,691 | 4,154 | 2,079 | 0.50 |
| | Total | 258 | 6,523 | 4,458 | 2,120 | 0.48 |
| 1989 | Single location | 72 | 989 | 324 | 38 | 0.12 |
| | Multiple locations | 204 | 5,756 | 4,028 | 1,990 | 0.50 |
| | Total | 276 | 6,745 | 4,352 | 2,028 | 0.47 |
| 1988 | Single location | 77 | 1,182 | 395 | 60 | 0.15 |
| | Multiple locations | 209 | 5,696 | 3,828 | 1,921 | 0.50 |
| | Total | 286 | 6,878 | 4,223 | 1,981 | 0.47 |

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

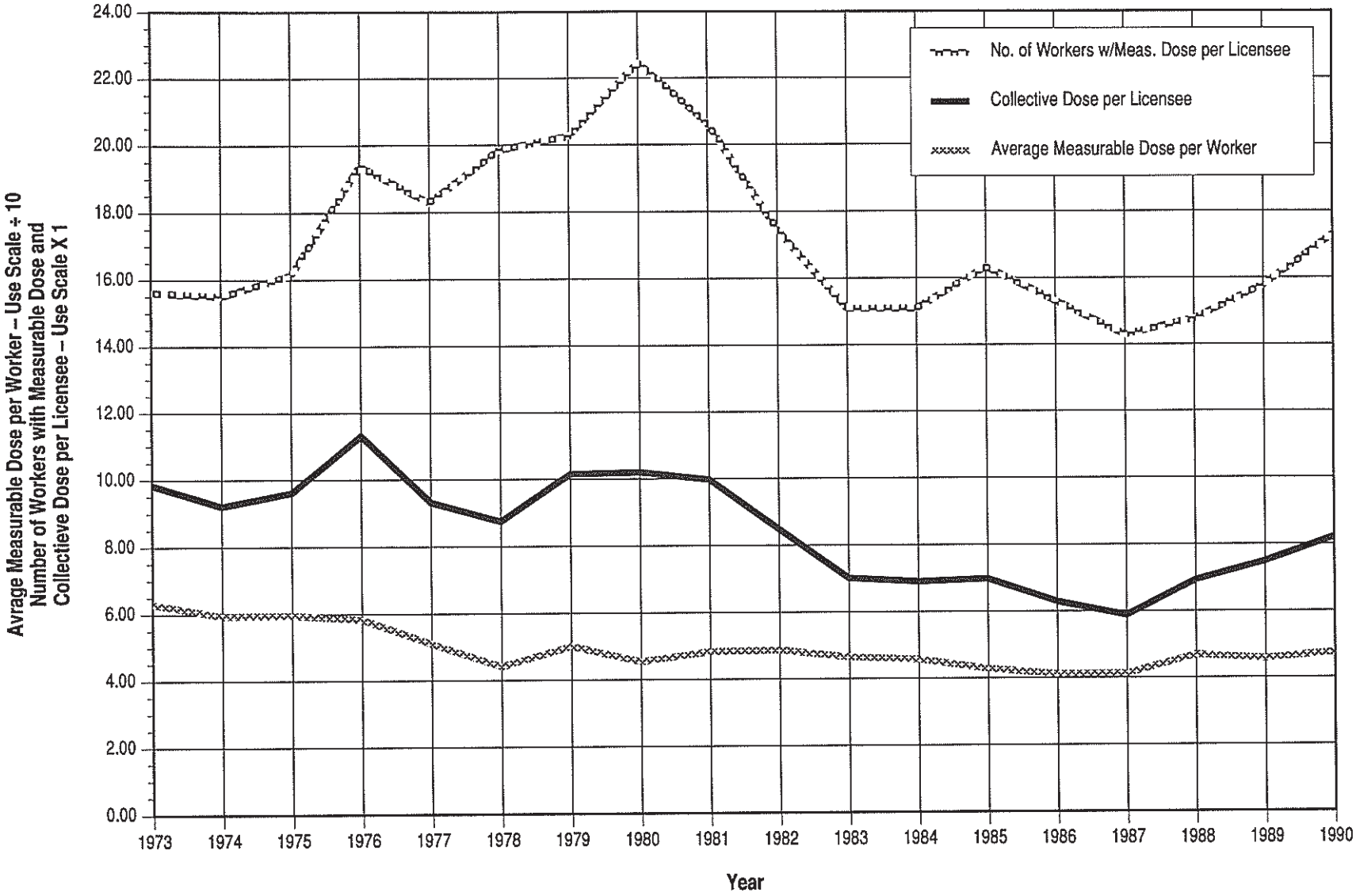
At firms having multiple-location licenses in 1990, the number of monitored workers with measurable dose increased by 3%, and the collective dose increased by 4% from the 1989 values. This resulted in the average measurable dose remaining at 0.50 rem (cSv) for the third straight year. However, the average dose for workers performing radiography at a single location was one-fourth that amount. This was probably due to the fact that it is more difficult for workers to avoid exposure to radiation in the field, where conditions are not the best and may change every day. In order to see the contribution that each radiography licensee made to the total collective dose, a summary of the information reported by each of these licensees in 1990 is presented in Appendix A in descending order of average measurable dose.

Figure 3.2 shows the number of personnel with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose for both types of industrial radiography facilities from 1973 through 1990. All three parameters have remained fairly stable since 1983 with the increase from 1987 through 1990 due primarily to an increase in the total collective dose and a decrease in the number of licensees.

### 3.3.2 Manufacturer and Distributor Licenses, Type "A" Broad and Limited

Manufacturer and distributor licenses are issued to allow the manufacture and distribution of radionuclides in various forms for a number of diverse purposes. The products are usually distributed to persons specifically licensed by the NRC or an Agreement State. Type "A" Broad licenses are issued to larger organizations who may use many different radionuclides in many different ways and who have a comprehensive radiation protection program. The Limited licenses are usually issued to smaller firms requiring a more restrictive license. Some firms are medical suppliers that process, package, or distribute such products as diagnostic test kits, radioactive surgical implants, and tagged radiochemicals for use in medical research, diagnosis, and therapy. Limited firms are suppliers of industrial radionuclides and are involved in the processing, encapsulation, packaging, and distribution of the radionuclides that they have purchased in bulk quantities from production reactors and cyclotrons. Major products include gamma radiography sources, cobalt irradiation sources, well-logging sources, sealed sources for gauges

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



and smoke detectors, and radiochemicals for non-medical research. However, only those NRC licensees that possess or use at any one time specified quantities of the nuclides listed in paragraph 20.408(a)(6) are required to submit annual (10 CFR § 20.407) and termination (10 CFR § 20.408) reports.

Table 3.5 presents the annual data that were reported by the two types of licensees for 1990 and the previous two years. The total number of workers receiving measurable doses as reported by these types of licensees decreased by about 3% to 2,272 workers in 1990. The collective dose also decreased resulting in an average dose of 0.31 rem (cSv). Looking at the information shown separately for the Type "A" Broad and Limited licensees, one can see that the values of all of the parameters remain higher for the Broad licensees. However, when attempting to examine trends in the data presented for this category of licensees, one should note that the types and quantities of radionuclides may fluctuate from year to year, and even during the year, so that some licensees may report dose data one year and not the next and may be included as a Broad licensee one year and a Limited licensee at other times. Since the number of reporting licensees is quite small, these fluctuations may have a significant impact on the values of the parameters.

TABLE 3.5
ANNUAL EXPOSURE INFORMATION FOR MANUFACTURERS AND DISTRIBUTORS

1988-1990

| Year | Type of License | Number of Licenses | Number of Monitored Individuals | Workers with Measurable Doses | Collective Dose (person-rems or person-cSv) | Average Measurable Dose (rems or cSv) |
|---|---|---|---|---|---|---|
| 1990 | M & D-"A"-Broad | 10 | 3,091 | 1,862 | 655 | 0.35 |
| | M & D-Limited | 45 | 1,104 | 410 | 38 | 0.09 |
| | Total | 55 | 4,195 | 2,272 | 693 | 0.31 |
| 1989 | M & D-"A"-Broad | 11 | 3,617 | 1,956 | 721 | 0.37 |
| | M & D-Limited | 37 | 937 | 389 | 49 | 0.13 |
| | Total | 48 | 4,554 | 2,345 | 770 | 0.33 |
| 1988 | M & D-"A"-Broad | 10 | 2,119 | 837 | 340 | 0.41 |
| | M & D-Limited | 6 | 58 | 31 | 3 | 0.10 |
| | Total | 16 | 2,177 | 868 | 343 | 0.40 |

Figure 3.3 shows the number of personnel with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose for both Type "A" Broad and Limited manufacturing and distribution facilities. While the collective dose per licensee has decreased considerably from a value of 62.5 person-rem (cSv) in 1975 to a value of 12.6 person-rem (cSv) in 1990, the number of workers with measurable dose per licensee has fluctuated greatly over the years with the largest yearly decrease occurring between 1987 and 1989. This value decreased in 1990 to a value of 41.3, which is the lowest value recorded since before 1973.

In order to see the contribution that each of these licensees made toward the total values of the number of persons monitored, number of workers, and collective dose, Appendix A lists the values of these parameters for each licensee in descending order of average measurable dose for 1990.

### 3.3.3 Low-Level Waste Disposal Licenses

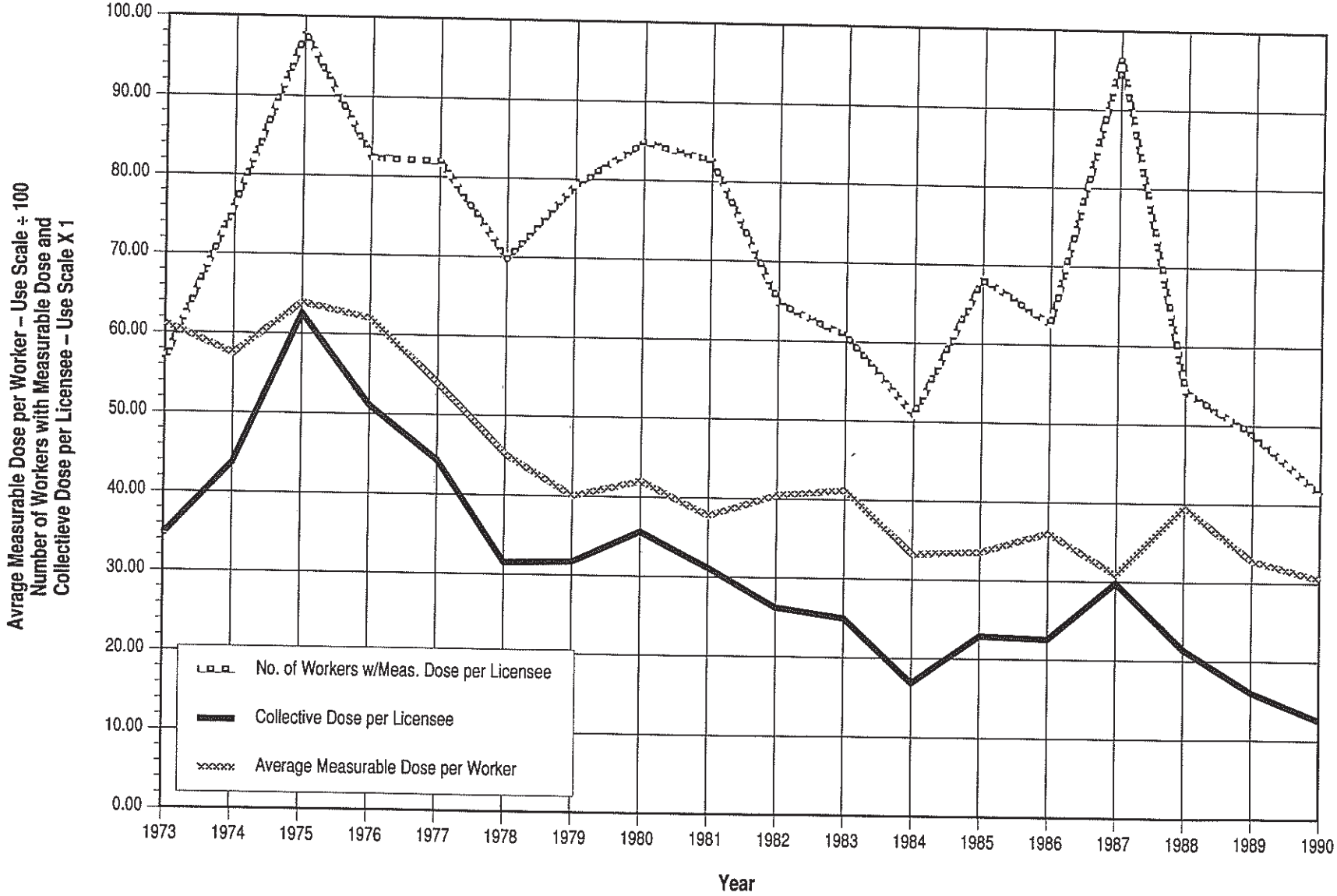
These licenses are issued to allow the receipt, possession, and disposal of low-level radioactive wastes at a land disposal facility. The licensee has the appropriate facilities to receive wastes from such places as hospitals and laboratories, store them for a short time, and dispose of them in a properly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

The requirement for this category of NRC licensee to file annual reports became effective in January 1983. While in 1982 and 1983 there was only one licensee in this category, there have been two licensees in this category since 1984. Table 3.1 summarizes the data reported for 1982 through 1990.

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

Figure 3.4 shows the number of personnel with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose for low-level waste disposal facilities from 1982 through 1990. As one would expect, since only two licensees have been involved in this activity over the

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



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

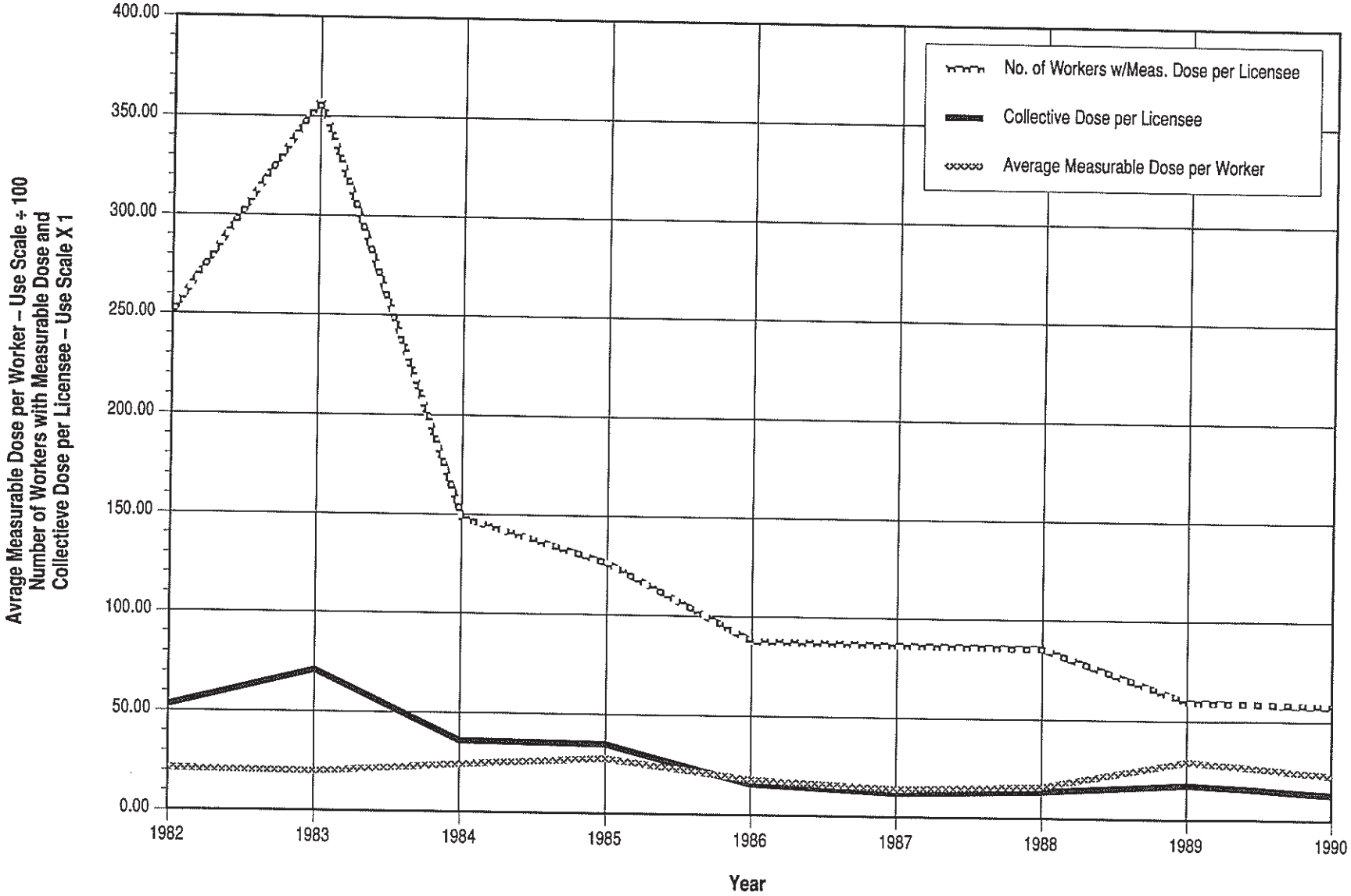
### 3.3.4 Independent Spent Fuel Storage Installation Licenses

These licenses are issued to allow the possession of power reactor spent fuel and other associated radioactive materials for the purpose of storage of such fuel in an independent spent fuel storage installation (ISFSI). Here, the spent fuel, which has undergone at least one year of decay since being used as a source of energy in a power reactor, is provided interim storage, protection, and safeguarding for a limited time pending its ultimate disposal. There have been three licenses issued for these activities, two at nuclear power plants and one at an independent facility. In 1987, one reactor licensee began reporting the dose distribution information for the spent fuel storage activities separately, while the other reactor licensee combined the data with the report for all activities at the site. Only those two licensees (one reactor and one independent) that reported dose distribution information separately are included in this analysis of independent spent fuel storage installation facilities for 1990.

For 1982 through 1986, table 3.1 summarizes the data submitted by the only ISFSI that is separate from a nuclear power plant. For 1987 through 1990 this table also includes data from the ISFSI located at the power plant. The number of individuals receiving measurable dose in 1990 was 22, a significant decrease from the 102 individuals reported in 1989. The collective dose also decreased from a value of 30 person-rem (-cSv) in 1989 to a value of 6 person-rem (-cSv) in 1990. The average measurable dose decreased for the fourth year in a row to a value of 0.27 rem (cSv). The value of CR has also decreased to zero. A contributing factor to the relatively high average dose reported in previous years was that the licensees reported the doses of only those workers <u>required</u> to be monitored for exposure to radiation, unlike most other licensees which report the doses of all individuals for whom monitoring was <u>provided</u>. This had a tendency to result in the calculation of a higher average dose.

Figure 3.5 shows the number of personnel with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose per worker for independent spent fuel storage facilities. The values for all three of these parameters decreased in 1990. Appendix A summarizes the exposure information reported by the two installations that reported in 1990.

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



### 3.3.5 Fuel Fabrication and Reprocessing Licenses

The fuel fabrication licenses are issued to allow the processing and fabrication of reactor fuels. In most uranium facilities where light water reactor fuels are processed, uranium hexafluoride enriched in the isotope U-235 is converted to solid uranium dioxide pellets and inserted into zirconium alloy tubes. The tubes are fabricated into fuel assemblies which are shipped to nuclear power plants. Some facilities also perform chemical operations to recover the uranium from scrap and other off-specification materials. On a much smaller scale, fuel assemblies containing plutonium oxide pellets can be similarly fabricated and used in reactors for experimental purposes. However, there are no NRC licensees engaged in this activity at this time.

Table 3.6 shows that there were 10 fuel fabrication facilities in 1990. A number of licensees were involved in decontamination and decommissioning of their plutonium facilities, and for several years the data for these licensees were shown in the "Decommissioning" category in Table 3.1. Since these facilities have ceased to fabricate plutonium fuel, they are not required to file annual reports and are no longer shown in the tables.

Table 3.6 also shows that in 1990, the collective dose increased by about 18% to 287 person-rem (-cSv), up from 243 person-rem (-cSv) in 1989. The number of workers with measurable external doses decreased, resulting in the average measurable dose increasing slightly to 0.09 rem (cSv) in 1990.

Figure 3.6 shows the number of personnel with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose for fuel fabrication licensees. For the past three years the number of personnel with measurable dose per licensee, collective dose per licensee, and average measurable dose has experienced a decreasing trend. Appendix A lists each of the eight licensees reporting in 1990, with the number of persons monitored, the number of workers receiving measurable external doses, and the collective dose for each licensee in descending order of average measurable dose.

Fuel reprocessing licenses are issued to allow the separation of usable uranium and plutonium from spent nuclear fuel. There was only one commercial facility that was ever licensed to reprocess fuel, and it has been shut down since 1972. However, the licensee did some decontamination work and stored radioactive waste at the facility for several years, and the annual report that was submitted each year was usually grouped with those of the fuel fabricators. In February 1982, the Department of Energy assumed possession

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

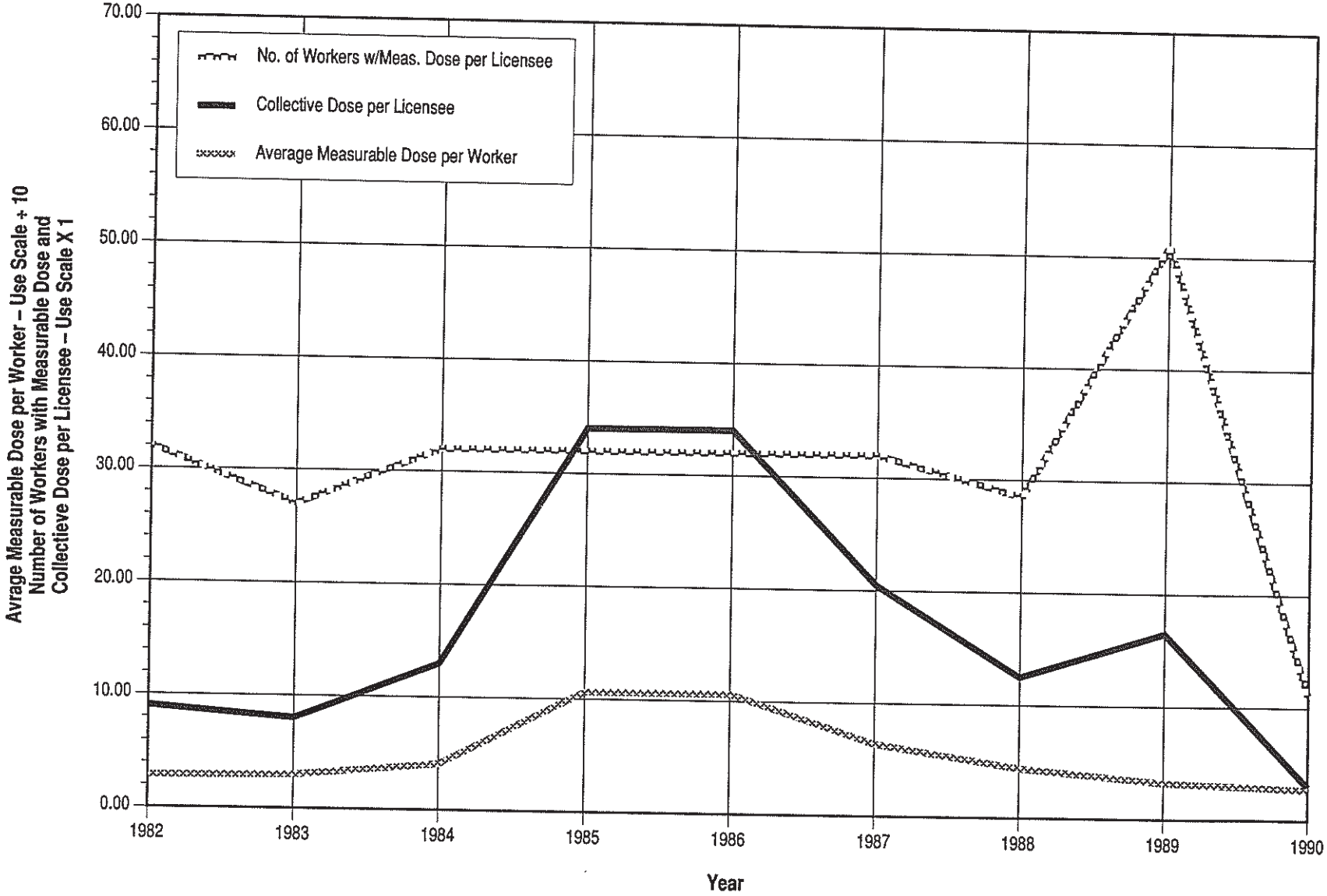


TABLE 3.6
ANNUAL EXPOSURE INFORMATION FOR FUEL FABRICATORS

1988-1990

| Year | Type of License | Number of Licenses | Number of Monitored Individuals | Workers with Measurable Doses | Collective Dose (person-rems or person-cSv) | Average Measurable Dose (rems or cSv) |
|---|---|---|---|---|---|---|
| 1990 | Uranium Fuel Fab | 10 | 13,756 | 3,233 | 287 | 0.09 |
| 1989 | Uranium Fuel Fab | 8 | 11,583 | 2,992 | 243 | 0.08 |
| 1988 | Uranium Fuel Fab | 10 | 11,994 | 3,869 | 455 | 0.12 |

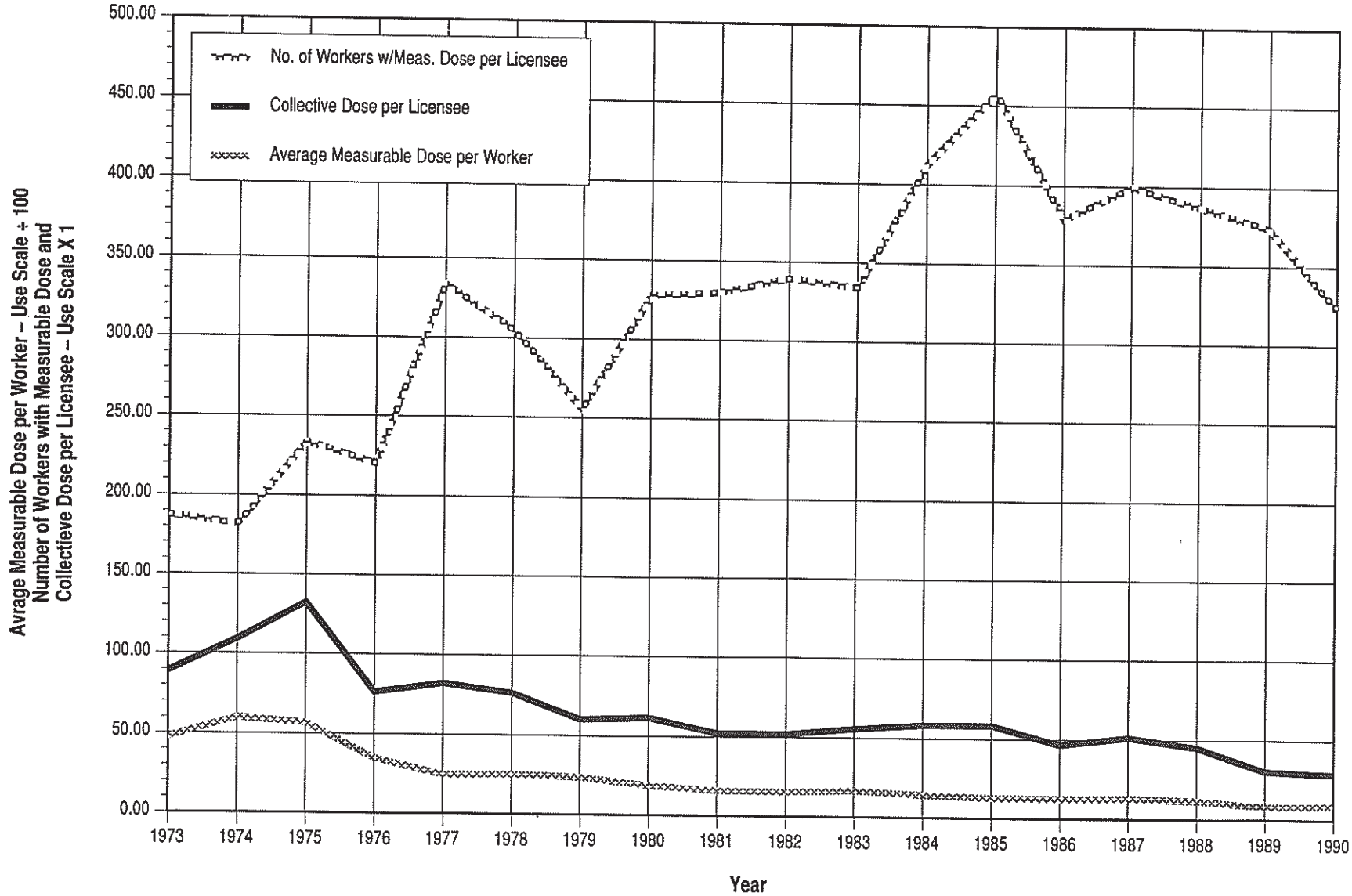
and control of the reprocessing facility to conduct waste solidification activities necessary for final decommissioning. During this period, the NRC license will, in effect, be suspended, and no reports will be filed with the NRC.

### 3.3.6 Light Water-Cooled Power Reactor (LWR) Licenses

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

As shown in Table 3.1, annual reports were received from nuclear power facilities for 116 licensed LWRs where 189,254 individuals were monitored for exposure to radiation in 1990. Of this number, 100,104 workers received a measurable dose and incurred a collective dose of 36,607 person-rem (person-cSv). This is slight increase (<2%) over the collective dose of 35,939 reported for 1989. The number of workers with measurable doses has increased somewhat which has resulted in the average measurable dose increasing to 0.37 rem (cSv) in 1990. It is important to note that these figures have been adjusted for the multiple counting of transient reactors workers (see Section 5). The reported dose distribution of workers monitored at each plant site is presented in alphabetical order by site name in Appendix B.

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



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

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

A license to operate a power reactor is issued to utilities to allow them to use special nuclear material in a reactor to produce heat to generate electricity to be sold to consumers. In the HTGR, a gas, usually helium, is used as the primary coolant. Fort St. Vrain near Greeley, Colorado, was the only such reactor in operation in the U.S. but has not been in commercial operation since 1989. As shown in Table 3.7, annual whole body doses incurred by workers at the plant have been minimal.

No one exceeded an annual dose of 0.25 rem (cSv) until 1985 when the highest annual dose was between 1 and 2 rem (cSv). In 1986 the average dose per worker dropped back down to 0.03 rem (cSv), along with a large decrease in the number of workers at the site. Although the 1986 maintenance activities resulted in the largest collective and average annual doses in the history of the plant, these doses remain much smaller than those for PWRs and BWRs. In 1990 the number of workers with measurable doses was 30 with an average measurable dose of 0.02 rem.

## TABLE 3.7
## ANNUAL EXPOSURE INFORMATION FOR FORT ST. VRAIN

## 1974-1990

| Year | No. of Individuals with Annual Doses in Ranges (rems or cSv) | | | | Total No. of Individuals Monitored | Annual Collective Dose (person-rems or person-cSv) | Gross Electricity Generated (MW-yr) | Average Measurable Dose per Worker (rem or cSv) |
|---|---|---|---|---|---|---|---|---|
| | No Meas'ble Dose | Meas'ble Dose <0.10 | 0.10-0.25 | 0.25-2.00 | | | | |
| 1974 | 1,597 | 63 | 1 | 0 | 1,661 | 3.3 | 0.0 | 0.05 |
| 1975 | 1,263 | 0 | 0 | 0 | 1,263 | 0.0 | 0.0 | 0.00 |
| 1976 | 1,362 | 25 | 0 | 0 | 1,387 | 1.3 | 2.8 | 0.05 |
| 1977 | 946 | 55 | 1 | 0 | 1,002 | 2.9 | 29.8 | 0.05 |
| 1978 | 896 | 34 | 0 | 0 | 930 | 1.7 | 75.7 | 0.05 |
| 1979 | 1,149 | 120 | 2 | 0 | 1,271 | 6.4 | 28.6 | 0.05 |
| 1980 | 902 | 57 | 1 | 0 | 960 | 3.0 | 83.2 | 0.05 |
| 1981 | 1,096 | 31 | 0 | 0 | 1,127 | 1.0 | 93.6 | 0.03 |
| 1982 | 978 | 22 | 0 | 0 | 1,000 | 0.4 | 72.6 | 0.02 |
| 1983 | 965 | 48 | 0 | 0 | 1,013 | 1.0 | 94.4 | 0.02 |
| 1984 | 1,616 | 62 | 8 | 0 | 1,686 | 3.0 | 10.9 | 0.04 |
| 1985 | 1,929 | 370 | 40 | 33 | 2,372 | 35.0 | 3.8 | 0.08 |
| 1986 | 221 | 66 | 4 | 0 | 291 | 1.8 | 9.7 | 0.03 |
| 1987 | 155 | 52 | 2 | 0 | 209 | 1.2 | 23.8 | 0.02 |
| 1988 | 238 | 24 | 0 | 0 | 262 | 0.7 | 81.8 | 0.03 |
| 1989 | 316 | 47 | 6 | 2 | 371 | 2.7 | 0.0 | 0.05 |
| 1990 | 226 | 30 | 0 | 0 | 256 | 0.6 | 0.0 | 0.02 |

# 4 COMMERCIAL LIGHT WATER REACTORS - FURTHER ANALYSIS

## 4.1 Introduction

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

## 4.2 Definition of Terms and Sources of Data

### 4.2.1 Number of Reactors

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

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

### 4.2.2 Electric Energy Generated

The electric energy generated in gross megawatt-years (MW-yr) each year by each facility is shown in Appendix C and graphically represented in Appendix E. This number was obtained by dividing the gross megawatt-hours of electricity annually produced by each facility by 8,760, the number of hours in the year, except for leap years when the number is 8,784 hours. The gross megawatt-years of generated electricity that are presented in Tables 4.1, 4.2, and 4.3 are the sums of that produced by the number of reactors included in

## TABLE 4.1

## SUMMARY OF ANNUAL INFORMATION REPORTED BY COMMERCIAL BOILING WATER REACTORS+

## 1973-1990

| Year | Number of Reactors Included | Annual Collective Doses (person-rems or person-cSv) | No. of Workers With Measurable Doses | Gross Electricity Generated (MW-yr) | Average Dose Per Worker (rems or cSv) | Average Collective Dose Per Reactor (person-rems or person-cSv) | Average No. Personnel With Measurable Doses Per Reactor | Average Collective Dose per MW-yr (person-rem /MW-yr) | Average Electricity Generated Per Reactor (MW-yr) | Average Maximum Dependable Capacity Net (MWe) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1973 | 12 | 4,564 | 5,340 | 3,393.9 | 0.85 | 380 | 445 | 1.3 | 283 | 438 |
| 1974 | 14 | 7,095 | 8,769 | 4,060.2 | 0.81 | 507 | 626 | 1.7 | 290 | 485 |
| 1975 | 18 | 12,611 | 14,607 | 5,786.4 | 0.86 | 701 | 812 | 2.2 | 321 | 595 |
| 1976 | 22 | 12,300 | 16,604 | 8,137.9 | 0.74 | 559 | 755 | 1.5 | 370 | 630 |
| 1977 | 23 | 19,041 | 21,388 | 9,102.5 | 0.89 | 828 | 930 | 2.1 | 396 | 637 |
| 1978 | 25 | 15,273 | 20,278 | 11,856.0 | 0.75 | 611 | 811 | 1.3 | 474 | 660 |
| 1979 | 25 | 18,325 | 25,245 | 11,671.0 | 0.73 | 733 | 1,010 | 1.6 | 467 | 660 |
| 1980 | 26 | 29,530 | 34,094 | 10,868.2 | 0.87 | 1,136 | 1,311 | 2.7 | 418 | 663 |
| 1981 | 26 | 25,471 | 34,755 | 10,899.2 | 0.73 | 980 | 1,337 | 2.3 | 419 | 663 |
| 1982 | 26 | 24,437 | 32,235 | 10,614.6 | 0.76 | 940 | 1,240 | 2.3 | 408 | 663 |
| 1983 | 26 | 27,455 | 33,473 | 9,730.1 | 0.82 | 1,056 | 1,287 | 2.8 | 374 | 663 |
| 1984 | 27* | 27,097 | 41,105 | 10,019.2 | 0.66 | 1,004 | 1,522 | 2.7 | 371 | 754 |
| 1985 | 29** | 20,573 | 38,237 | 12,284.0 | 0.54 | 709 | 1,319 | 1.7 | 424 | 775 |
| 1986 | 30 | 19,349 | 37,928 | 12,102.1 | 0.51 | 645 | 1,264 | 1.6 | 403 | 786 |
| 1987 | 32*** | 16,717 | 41,737 | 15,109.0 | 0.40 | 522 | 1,304 | 1.1 | 472 | 832 |
| 1988 | 34 | 18,092 | 40,305 | 16,665.4 | 0.45 | 532 | 1,185 | 1.1 | 490 | 845 |
| 1989 | 36 | 15,558 | 44,360 | 17,543.5 | 0.35 | 432 | 1,232 | 0.9 | 487 | 857 |
| 1990 | 37 | 15,780 | 41,577 | 21,336.1 | 0.38 | 426 | 1,124 | 0.7 | 577 | 862 |

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

*In 1984 it was decided that Humboldt Bay, a plant that has been shut down since 7/76, would no longer be included in the count of reactors.

**In 1985 it was decided that Dresden 1, a plant that has been shut down since 10/78, would no longer be included in the count of reactors.

***In 1987 it was decided that LaCrosse, a plant that has been shut down since 4/30/87, would no longer be included in the count of reactors.

## TABLE 4.2

## SUMMARY OF ANNUAL INFORMATION REPORTED BY COMMERCIAL PRESSURIZED WATER REACTORS+

## 1973-1990

| Year | Number of Reactors Included | Annual Collective Doses (person-rems or person-cSv) | No. of Workers With Measurable Doses | Gross Electricity Generated (MW-yr) | Average Dose Per Worker (rems or cSv) | Average Collective Dose Per Reactor (person-rems or person-cSv) | Average No. Personnel With Measurable Doses Per Reactor | Average Collective Dose per MW-yr (person-rem /MW-yr) | Average Electricity Generated Per Reactor (MW-yr) | Average Maximum Dependable Capacity Net (MWe) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1973 | 12 | 9,398 | 9,440 | 3,770.2 | 1.00 | 783 | 787 | 2.5 | 314 | 544 |
| 1974 | 19 | 6,555 | 9,370 | 6,530.7 | 0.70 | 345 | 493 | 1.0 | 344 | 591 |
| 1975 | 26 | 8,268 | 10,884 | 11,982.5 | 0.76 | 318 | 419 | 0.7 | 461 | 647 |
| 1976 | 30 | 13,807 | 17,588 | 13,325.0 | 0.79 | 460 | 586 | 1.0 | 444 | 701 |
| 1977 | 34 | 13,467 | 20,878 | 17,345.8 | 0.65 | 396 | 614 | 0.8 | 510 | 688 |
| 1978 | 39 | 16,528 | 25,700 | 19,840.5 | 0.64 | 424 | 659 | 0.8 | 509 | 706 |
| 1979 | 42 | 21,657 | 38,828 | 18,255.0 | 0.56 | 516 | 924 | 1.2 | 435 | 746 |
| 1980 | 42 | 24,265 | 46,237 | 18,289.3 | 0.52 | 578 | 1,101 | 1.3 | 435 | 746 |
| 1981 | 44 | 28,673 | 47,351 | 20,553.7 | 0.61 | 652 | 1,076 | 1.4 | 467 | 752 |
| 1982 | 48 | 27,753 | 52,146 | 22,140.6 | 0.53 | 578 | 1,086 | 1.3 | 461 | 777 |
| 1983 | 49 | 29,017 | 52,173 | 23,195.5 | 0.56 | 592 | 1,065 | 1.3 | 473 | 785 |
| 1984 | 51 | 28,138 | 56,994 | 26,478.4 | 0.49 | 552 | 1,118 | 1.1 | 519 | 809 |
| 1985 | 53* | 22,469 | 54,633 | 29,470.7 | 0.41 | 424 | 1,031 | 0.8 | 556 | 820 |
| 1986 | 60 | 23,032 | 62,995 | 33,593.0 | 0.37 | 384 | 1,050 | 0.7 | 560 | 878 |
| 1987 | 64 | 23,684 | 62,597 | 37,007.3 | 0.38 | 370 | 978 | 0.6 | 578 | 900 |
| 1988 | 68 | 22,786 | 62,921 | 42,929.7 | 0.36 | 335 | 925 | 0.5 | 631 | 885 |
| 1989 | 71 | 20,381 | 63,894 | 44,679.5 | 0.32 | 287 | 900 | 0.5 | 629 | 897 |
| 1990 | 73 | 20,812 | 68,073 | 46,955.6 | 0.31 | 285 | 933 | 0.4 | 643 | 907 |

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

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

TABLE 4.3

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

1973-1990

| Year | Number of Reactors Included | Annual Collective Doses (person-rems or person-cSv) | No. of Workers With Measurable Doses | Gross Electricity Generated (MW-yr) | Average Dose Per Worker (rems or cSv) | Average Collective Dose Per Reactor (person-rems or person-cSv) | Average No. Personnel With Measurable Doses Per Reactor | Average Collective Dose per MW-yr (person-rem /MW-yr) | Average Electricity Generated Per Reactor (MW-yr) | Average Maximum Dependable Capacity Net (MWe) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1973 | 24 | 13,962 | 14,780 | 7,164.1 | 0.94 | 582 | 616 | 1.9 | 299 | 491 |
| 1974 | 33 | 13,650 | 18,139 | 10,590.9 | 0.75 | 414 | 550 | 1.3 | 321 | 546 |
| 1975 | 44 | 20,879 | 25,491 | 17,768.9 | 0.82 | 475 | 579 | 1.2 | 404 | 626 |
| 1976 | 52 | 26,107 | 34,192 | 21,462.9 | 0.76 | 502 | 658 | 1.2 | 413 | 671 |
| 1977 | 57 | 32,508 | 42,266 | 26,448.3 | 0.77 | 570 | 742 | 1.2 | 464 | 667 |
| 1978 | 64 | 31,801 | 45,978 | 31,696.5 | 0.69 | 497 | 718 | 1.0 | 495 | 688 |
| 1979 | 67 | 39,982 | 64,073 | 29,926.0 | 0.62 | 597 | 956 | 1.3 | 447 | 714 |
| 1980 | 68 | 53,795 | 80,331 | 29,157.5 | 0.67 | 791 | 1,181 | 1.8 | 429 | 714 |
| 1981 | 70 | 54,144 | 82,106 | 31,452.9 | 0.66 | 773 | 1,173 | 1.7 | 449 | 719 |
| 1982 | 74 | 52,190 | 84,381 | 32,755.2 | 0.62 | 705 | 1,140 | 1.6 | 443 | 737 |
| 1983 | 75 | 56,472 | 85,646 | 32,925.6 | 0.66 | 753 | 1,142 | 1.7 | 439 | 743 |
| 1984 | 78 | 55,235 | 98,099 | 36,497.6 | 0.56 | 708 | 1,258 | 1.5 | 468 | 790 |
| 1985 | 82 | 43,042 | 92,870 | 41,754.7 | 0.46 | 525 | 1,133 | 1.0 | 509 | 804 |
| 1986 | 90 | 42,381 | 100,923 | 45,695.1 | 0.42 | 471 | 1,121 | 0.9 | 508 | 847 |
| 1987 | 96 | 40,401 | 104,334 | 52,116.3 | 0.39 | 421 | 1,087 | 0.8 | 543 | 877 |
| 1988 | 102 | 40,878 | 103,226 | 59,595.1 | 0.40 | 401 | 1,012 | 0.7 | 584 | 871 |
| 1989 | 107 | 35,939 | 108,254 | 62,223.0 | 0.33 | 336 | 1,012 | 0.6 | 582 | 883 |
| 1990 | 110 | 36,592 | 109,650 | 68,291.7 | 0.33 | 333 | 997 | 0.5 | 621 | 892 |

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

each year. These sums are divided by the number of those reactors included in each year to yield the average amount of electric energy generated (MW-yr) per reactor, which is also shown in Tables 4.1, 4.2, and 4.3. The number of gross megawatt-hours of electricity produced each year was found in Reference 14.

### 4.2.3 Collective Dose per Megawatt-Year

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

### 4.2.4 Average Maximum Dependable Capacity

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

## 4.3 Annual Whole Body Dose Distributions

Table 4.4 summarizes the distribution of the annual whole body doses received by workers at all commercial LWRs during each of the years 1977 through 1990. This distribution is the sum of the annual dose distributions reported by each licensed LWR each year. As previously mentioned, the distribution reported by each LWR site for 1990 is shown in Appendix B. Table 4.4 shows the reported dose distributions corrected for the number of transient workers that were reported by more than one site (see Section 5). The table shows that the total number of individuals monitored increased every year since 1981 to a value of 184,604 in 1990. The number of individuals with measurable dose also decreased to a value of 99,860 in 1990. The total collective dose, after leveling off through the years 1980-1984, declined sharply in 1985. It has continued to exhibit a moderate decreasing trend since that time, but increased to a value of 36,592 person-rem (-cSv) in 1990. The value of CR (see Section 3.1.8) also increased slightly to a value of 0.34. This is the

TABLE 4.4

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

1977 - 1990

| | | Number of Individuals with Whole Body Doses in the Ranges (rems or cSv) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Year | No Meas'ble Exposure | Meas'ble <0.10 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.0 | 1.0-2.0 | 2.0-3.0 | 3.0-4.0 | 4.0-5.0 | 5.0-6.0 | 6.0-7.0 | 7.0-8.0 | 8.0-9.0 | 9.0-10.0 | 10.0-12.0 | >12.0 | Total Number Monitored | Number with Measurable Exposure | Collective Dose** (person-rems or cSv) | CR*** |
| 1977 | 23,562 | 12,395 | 6,030 | 4,518 | 2,890 | 2,220 | 5,649 | 2,856 | 1,288 | 661 | 186 | 89 | 47 | 23 | 6 | | | 62,420 | 38,858 | 32,508 | 0.65 |
| 1978 | 28,372 | 15,101 | 6,342 | 4,998 | 3,088 | 2,247 | 5,995 | 3,034 | 1,197 | 514 | 109 | 37 | 9 | 0 | 1 | 0 | 2 | 71,046 | 42,674 | 31,801 | 0.61 |
| 1979 | 43,330 | 22,508 | 8,985 | 7,469 | 4,797 | 3,259 | 7,572 | 3,404 | 1,400 | 545 | 117 | 42 | 17 | 3 | 1 | | | 103,449 | 60,119 | 39,982 | 0.57 |
| 1980 | 50,873 | 26,903 | 10,676 | 8,904 | 5,570 | 4,134 | 10,671 | 4,607 | 1,816 | 831 | 235 | 119 | 29 | 7 | 1 | | | 125,376 | 74,503 | 53,795 | 0.59 |
| 1981 | 39,265 | 26,836 | 11,226 | 9,330 | 6,042 | 4,497 | 11,170 | 4,811 | 1,999 | 533 | 103 | 93 | 9 | 3 | 1 | 0 | 1 | 115,919 | 76,654 | 54,144 | 0.57 |
| 1982 | 41,713 | 29,225 | 11,713 | 9,903 | 6,229 | 4,420 | 10,220 | 4,716 | 2,066 | 596 | 97 | 31 | 5 | 0 | 1 | 1 | | 120,936 | 79,223 | 52,190 | 0.58 |
| 1983 | 47,048 | 29,107 | 11,195 | 9,344 | 5,851 | 4,276 | 11,345 | 5,332 | 2,269 | 716 | 121 | 38 | 8 | 2 | | | | 126,652 | 79,604 | 56,472 | 0.60 |
| 1984 | 54,670 | 36,296 | 13,427 | 10,275 | 6,336 | 4,804 | 11,283 | 5,206 | 2,122 | 487 | 52 | 22 | | | | | | 144,980 | 90,310 | 55,235 | 0.57 |
| 1985 | 59,634 | 36,831 | 13,008 | 11,041 | 6,627 | 4,547 | 10,040 | 3,575 | 1,001 | 157 | 1 | | | | | | | 146,462 | 86,828 | 43,042 | 0.48 |
| 1986 | 67,701 | 41,467 | 14,570 | 11,842 | 7,016 | 4,693 | 10,241 | 3,062 | 868 | 146 | | | | | | | | 161,606 | 93,905 | 42,381 | 0.45 |
| 1987 | 85,181 | 41,222 | 15,834 | 12,839 | 7,586 | 5,332 | 10,611 | 2,192 | 477 | 69 | | | | | | | | 181,343 | 96,162 | 40,401 | 0.38 |
| 1988 | 87,254 | 40,225 | 15,913 | 13,153 | 7,903 | 5,461 | 10,310 | 2,442 | 511 | 26 | | 1 | | | | | | 183,199 | 95,945 | 40,878 | 0.39 |
| 1989 | 83,947 | 45,282 | 17,267 | 13,777 | 7,945 | 5,137 | 8,634 | 1,614 | 370 | 34 | | | | | | | | 184,007 | 100,060 | 35,939 | 0.33 |
| 1990 | 84,744 | 42,851 | 17,664 | 14,407 | 8,427 | 5,408 | 8,985 | 1,785 | 312 | 21 | | | | | | | | 184,604 | 99,860 | 36,592 | 0.34 |

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

**The collective dose, when not reported by the utilities, was calculated by the NRC staff using methods described in this document.

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

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

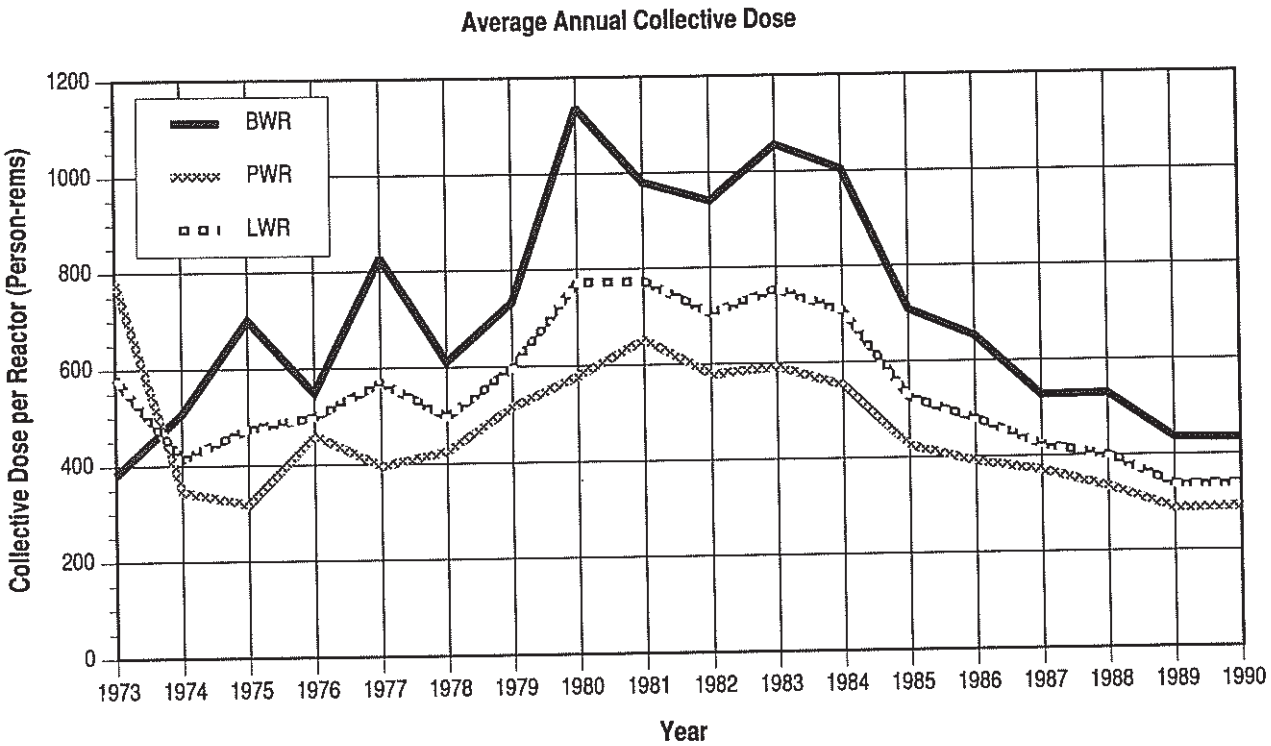
## 4.4 Average Annual Whole Body Doses

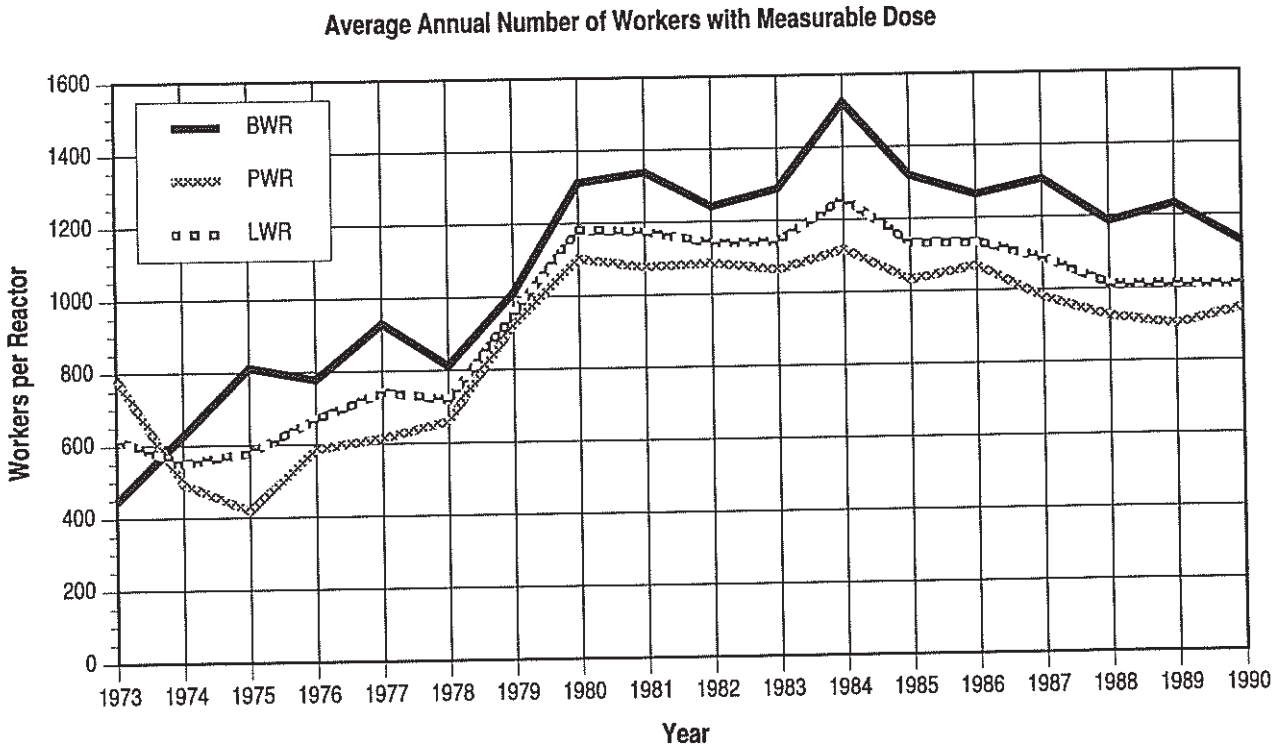
Some of the data presented in Tables 4.1, 4.2, and 4.3 are graphically displayed in Figure 4.1, where it can be seen that the average collective dose and average number of workers per BWR have been higher than those for PWRs since 1974 and that the values of both parameters, in general, continued to rise at both types of facilities until 1983. Between 1983 and 1989, the average collective dose per reactor dropped by 55%. In 1990, the collective dose per reactor for PWRs decreased slightly from 287 person-rem (-cSv) in 1989 to 285 person-rem (-cSv) in 1990. The collective dose per reactor for BWRs also decreased slightly to 426 person-rem (-cSv) in 1990, resulting in an overall increase for LWRs to 333 person-rem (-cSv) per reactor. The number of workers with measurable dose per reactor has decreased to 1124 for BWRs and increased to 933 for PWRs in 1990.

Figures 4.2 and 4.3 are plots of most of the other information that is given in Tables 4.1, 4.2, and 4.3. The value for the total collective dose for all LWRs increased from a value of 35,939 person-rem (-cSv) in 1989 to 36,592 person-rem (-cSv) in 1990. Together with the increase in the number of workers with measurable dose, this resulted in the average measurable dose remaining at 0.33 rem (cSv) in 1990. Power generation indicators such as gross electricity and average maximum dependable capacity net continued to increase for the tenth straight year, while the average collective dose per megawatt-year dropped to less than half the 1980 values during the same time period.

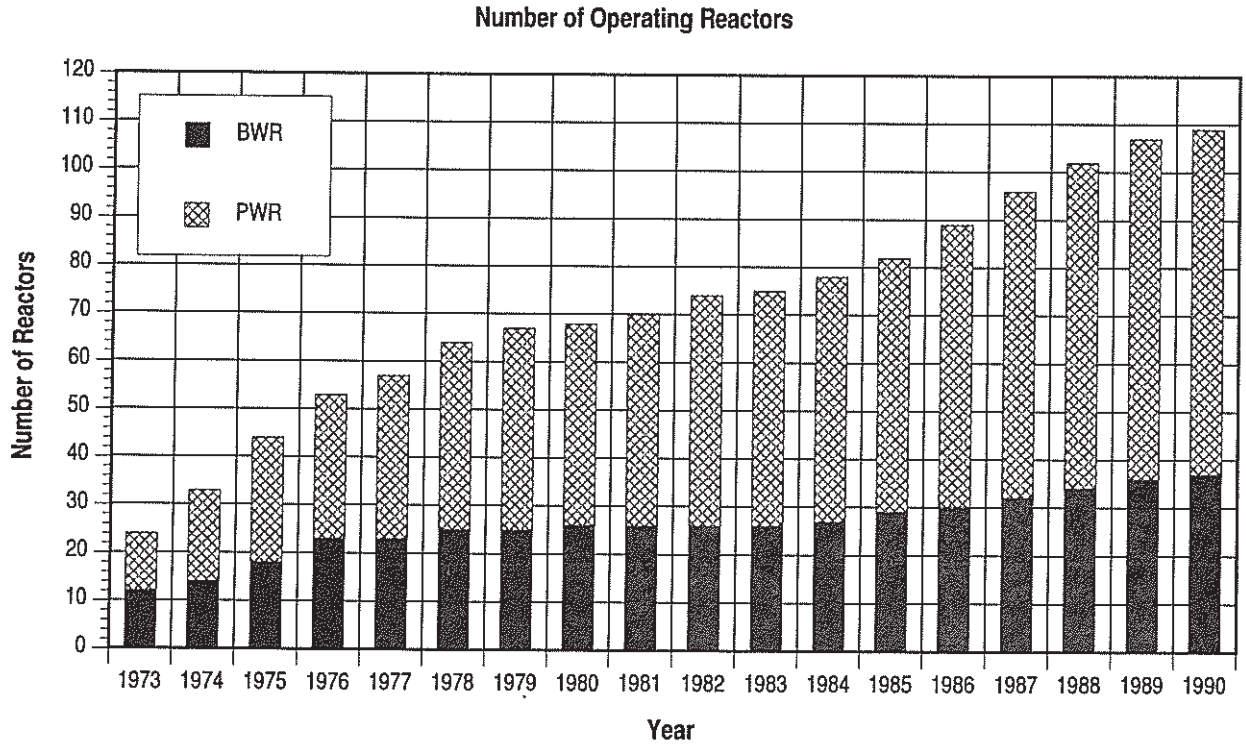
The fluctuations in the parameters for the years following the accident at the Three Mile Island plant in 1979 may reflect some of the impact that this incident had on the nuclear power industry. The decrease seen in dose trends since 1983 may be attributable to several factors. Utilities have completed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

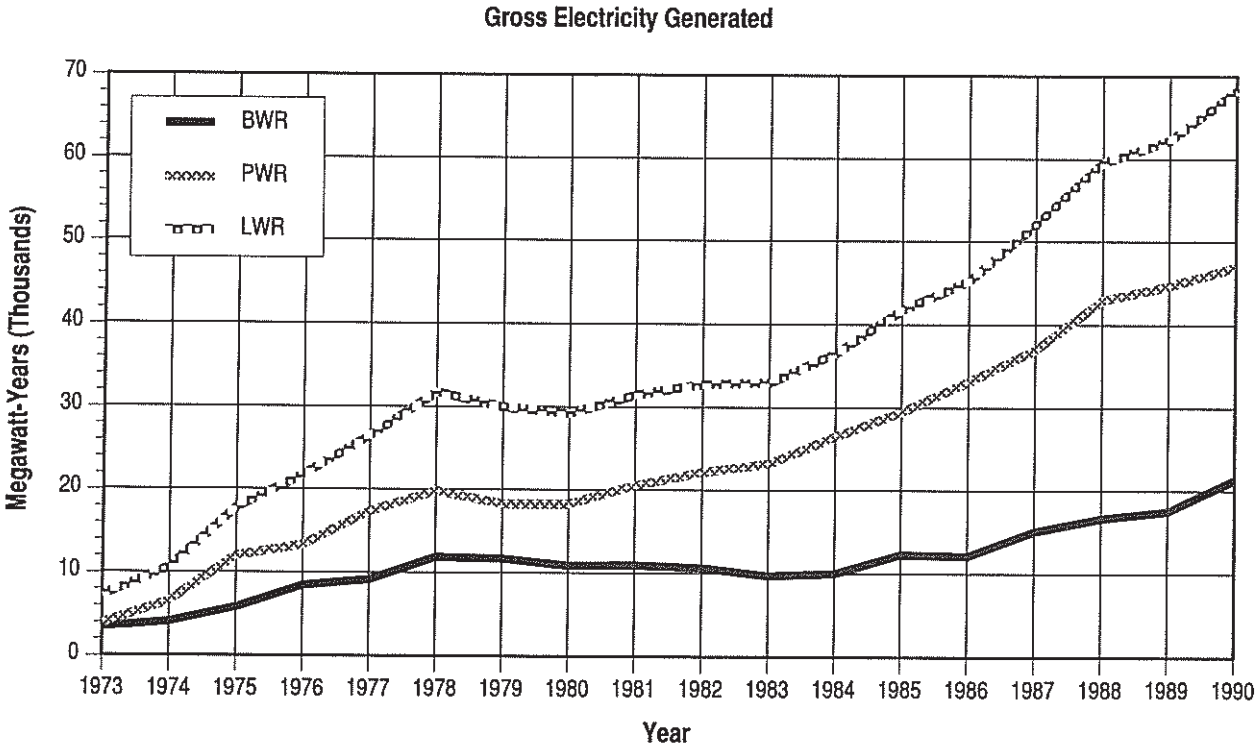
## Figure 4.1
## Average Collective Dose and Number of Workers per Reactor 1973 – 1990



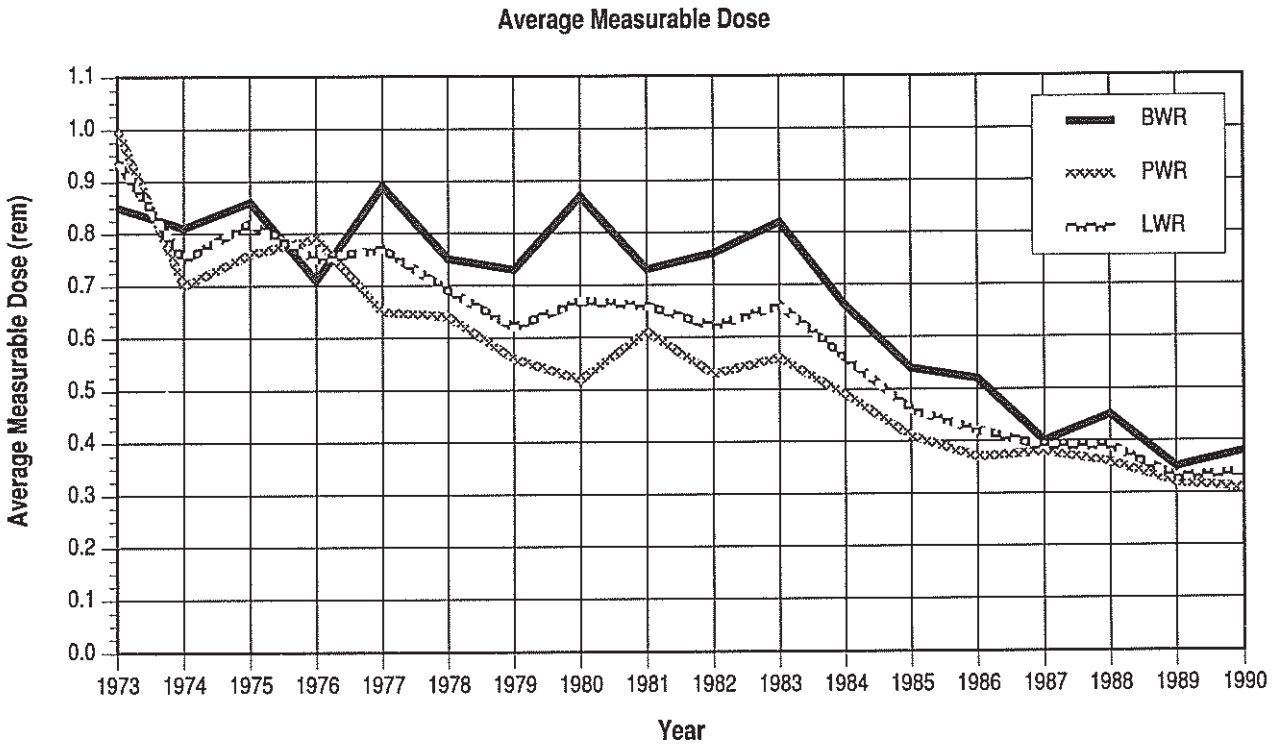



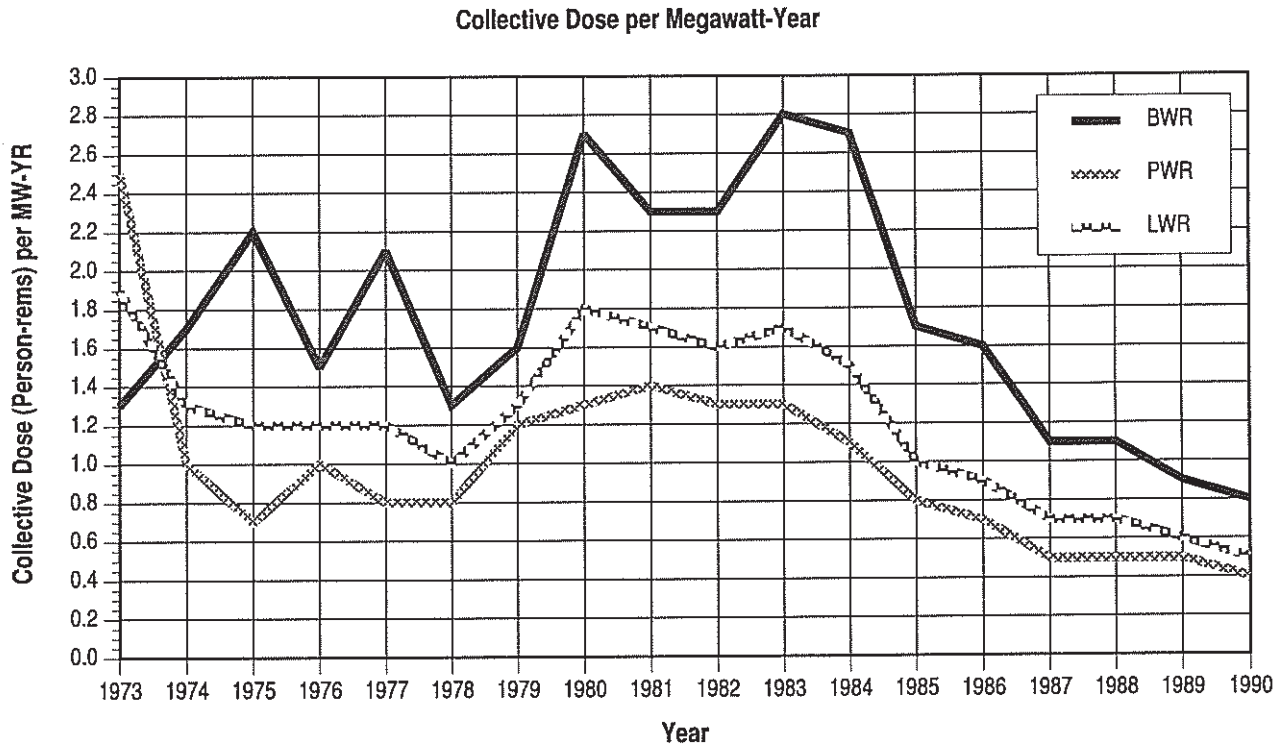
## Figure 4.2
## Number of Operating Reactors and Gross Electricity Generated 1973 – 1990



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



To further assist in the identification of any trends that might exist, Figure 4.4 displays the average and median[9] values of the collective dose per reactor for BWRs and for PWRs for the years 1973 through 1990. The ranges of the values reported each year are shown by the vertical lines with a small bar at each end marking the two extreme values. The rectangles indicate the range of values of the collective dose exhibited by those plants ranked in the twenty-fifth through the seventy-fifth percentiles. Since the median values usually are not as greatly affected by the extreme values of the collective doses, they do not normally fluctuate as much from year to year as do the average values. The median collective dose for PWRs experienced an increase from 239 person-rem (-cSv) in 1989 to 288 person-rem (-cSv) in 1990. At BWRs the median fluctuates more from year to year, and in 1990 the median collective dose increased to 437 person-rem (-cSv). Figure 4.4 also shows that in 1990 50% of the PWRs reported collective doses between 162 and 365 person-rem (-cSv) while 50% of the BWRs reported collective doses between 220 and 553 person-rem (-cSv). Nearly every year, the median collective dose is less than the average, which indicates that the collective dose for most plants is less than the average collective dose per reactor (the value that is widely quoted).

## 4.5 Plant Rankings by Collective Dose per Reactor

The number of reactors from which data have been collected is still rather small, and the information reported by a few reactors where unusual conditions or problems may have occurred could have a large impact on some of the statistics presented in this report. In an effort to identify those plants, Tables 4.5 and 4.6 list the BWRs and PWRs in ascending order of collective dose per reactor for each of the five years from 1986 through 1990. The total collective dose per site is listed in the tables even though the dose per reactor was used for all ranking. Two other parameters, average measurable dose per worker and collective dose per megawatt-year, are also given for each plant and could have been used in ranking the plants as well. Also shown is a parameter CR, which is defined as the ratio of the annual collective dose delivered at individual doses exceeding 1.5 rem (cSv) to the total annual collective dose. In 1990 the value of CR continued to decline for most plants, and the CR for all but two of the U.S. LWRs, one BWR and one PWR, fell between 0.05 to 0.50, the range recommended by the UNSCEAR [Ref. 10].

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

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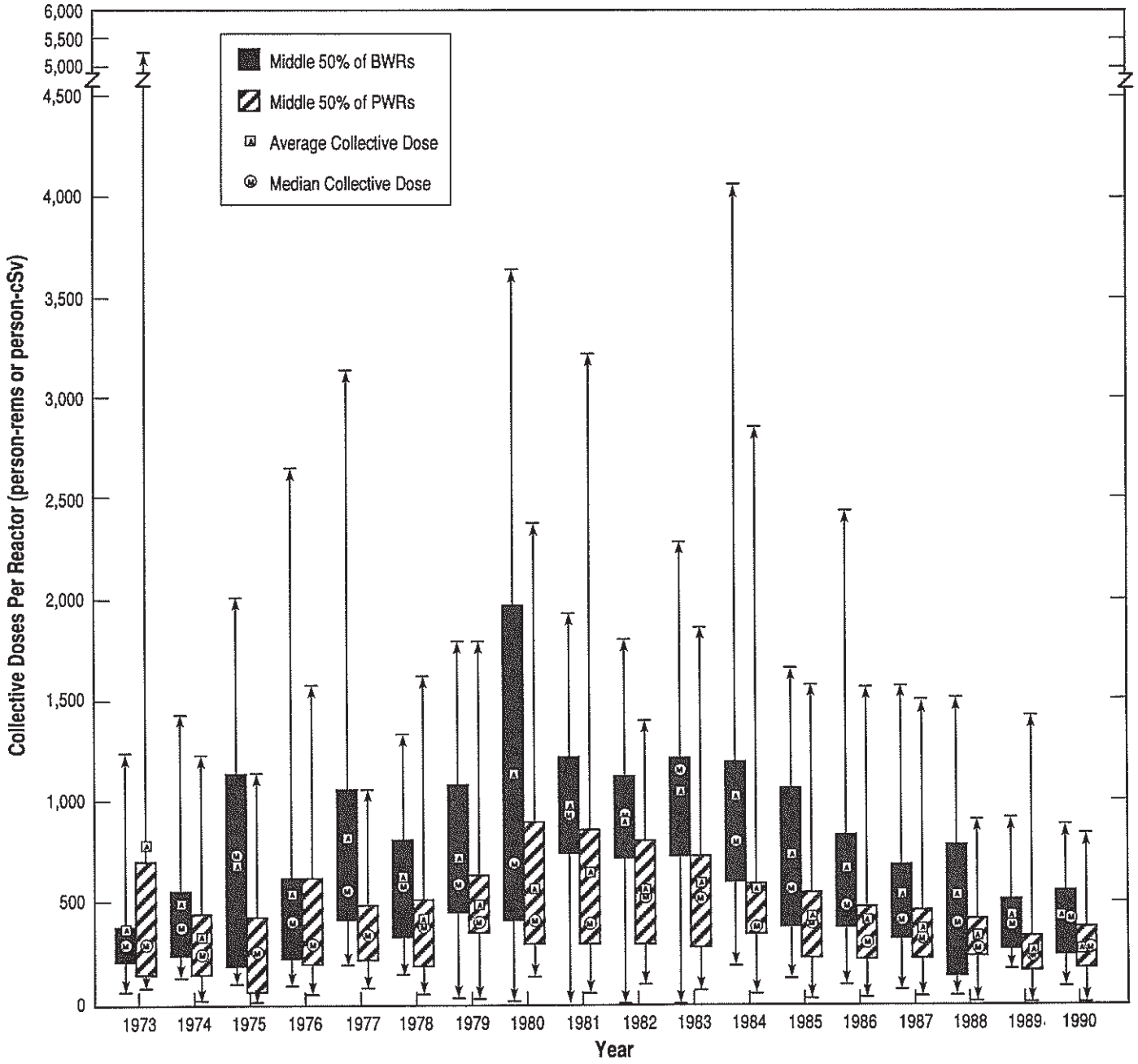
9 The value at which 50% of the reactors reported greater collective doses and the other 50% reported smaller collective doses.

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



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

**1986**

| Site Name | Coll. Dose per Site* | Dose per Worker (rems or cSv) | Col. Dose per MW-Yr | CR** |
|---|---|---|---|---|
| Big Rock Point | 84 | 0.42 | 1.4 | 0.33 |
| Millstone Point 1 | 150 | 0.39 | 0.2 | 0.30 |
| Duane Arnold | 187 | 0.39 | 0.5 | 0.22 |
| Washington Nuclear 2 | 222 | 0.22 | 0.4 | 0.14 |
| La Crosse | 290 | 1.12 | 14.8 | 0.89 |
| Cooper Station | 320 | 0.36 | 0.7 | 0.34 |
| Browns Ferry 1,2,3 | 1,050 | 0.35 | – | 0.30 |
| Fitzpatrick | 411 | 0.35 | 0.6 | 0.32 |
| Susquehanna 1,2 | 828 | 0.28 | 0.6 | 0.16 |
| Grand Gulf | 436 | 0.29 | 0.9 | 0.23 |
| La Salle 1,2 | 898 | 0.56 | 1.0 | 0.39 |
| Quad Cities 1,2 | 950 | 0.65 | 0.9 | 0.46 |
| Peach Bottom 2,3 | 1,080 | 0.44 | 0.8 | 0.36 |
| Monticello | 596 | 0.67 | 1.5 | 0.40 |
| Hatch 1,2 | 1,497 | 0.43 | 1.7 | 0.32 |
| Pilgrim | 874 | 0.33 | 7.2 | 0.31 |
| Brunswick 1,2 | 1,909 | 0.57 | 1.8 | 0.52 |
| Vermont Yankee | 1,188 | 0.86 | 4.8 | 0.56 |
| Nine Mile Point 1 | 1,275 | 0.68 | 3.4 | 0.58 |
| Dresden 2,3 | 2,668 | 0.86 | 3.6 | 0.62 |
| Oyster Creek | 2,436 | 0.65 | 15.5 | 0.58 |

**1987**

| Site Name | Coll. Dose per Site* | Dose per Worker (rems or cSv) | Col. Dose per MW-Yr | CR** |
|---|---|---|---|---|
| Cooper Station | 103 | 0.19 | 0.2 | 0.17 |
| Hope Creek 1 | 117 | 0.20 | 0.1 | 0.31 |
| Nine Mile Point 1 | 141 | 0.12 | 0.3 | 0.04 |
| Limerick 1 | 174 | 0.08 | 0.3 | 0.00 |
| Big Rock Point | 222 | 0.88 | 4.9 | 0.57 |
| Vermont Yankee | 303 | 0.37 | 0.7 | 0.17 |
| Susquehanna 1,2 | 621 | 0.24 | 0.4 | 0.07 |
| Quad Cities 1,2 | 720 | 0.50 | 0.6 | 0.34 |
| River Bend 1 | 378 | 0.30 | 0.6 | 0.17 |
| Browns Ferry 1,2,3 | 1,181 | 0.38 | – | 0.31 |
| Washington Nuclear 2 | 406 | 0.34 | 0.6 | 0.25 |
| Hatch 1,2 | 816 | 0.37 | 0.6 | 0.30 |
| Grand Gulf | 420 | 0.31 | 0.5 | 0.14 |
| Oyster Creek | 522 | 0.27 | 1.4 | 0.31 |
| Monticello | 568 | 0.60 | 1.3 | 0.32 |
| Dresden 2,3 | 1,145 | 0.56 | 1.2 | 0.38 |
| Duane Arnold | 667 | 0.61 | 2.2 | 0.37 |
| Millstone Point 1 | 684 | 0.43 | 1.3 | 0.28 |
| La Salle 1,2 | 1,396 | 0.80 | 1.4 | 0.54 |
| Brunswick 1,2 | 1,419 | 0.46 | 1.2 | 0.43 |
| Fitzpatrick | 940 | 0.60 | 1.9 | 0.50 |
| Peach Bottom 2,3 | 2,195 | 0.50 | 6.0 | 0.35 |
| Pilgrim | 1,579 | 0.34 | – | 0.34 |

**1988**

| Site Name | Coll. Dose per Site* | Dose per Worker (rems or cSv) | Col. Dose per MW-Yr | CR** |
|---|---|---|---|---|
| Limerick 1 | 52 | 0.05 | 0.1 | 0.00 |
| Perry | 105 | 0.13 | 0.1 | 0.02 |
| River Bend 1 | 107 | 0.21 | 0.1 | 0.08 |
| Monticello | 110 | 0.29 | 0.2 | 0.27 |
| Vermont Yankee | 124 | 0.33 | 0.3 | 0.15 |
| Clinton | 130 | 0.17 | 0.2 | 0.14 |
| Millstone Point 1 | 144 | 0.44 | 0.2 | 0.36 |
| Grand Gulf | 147 | 0.21 | 0.1 | 0.28 |
| Big Rock Point | 170 | 0.56 | 3.7 | 0.45 |
| Cooper Station | 251 | 0.27 | 0.5 | 0.17 |
| Susquehanna 1,2 | 516 | 0.27 | 0.2 | 0.06 |
| Hope Creek | 287 | 0.17 | 0.3 | 0.08 |
| Washington Nuclear 2 | 353 | 0.34 | 0.5 | 0.29 |
| Browns Ferry 1,2,3 | 1,155 | 0.35 | – | 0.26 |
| Pilgrim | 392 | 0.19 | – | 0.16 |
| Quad Cities 1,2 | 827 | 0.56 | 0.4 | 0.34 |
| Duane Arnold | 614 | 0.54 | 1.6 | 0.29 |
| Hatch 1,2 | 1,401 | 0.56 | 0.7 | 0.41 |
| Dresden 2,3 | 1,409 | 0.58 | 0.7 | 0.40 |
| Fitzpatrick | 786 | 0.51 | 1.5 | 0.44 |
| Nine Mile Point | 854 | 0.33 | – | 0.48 |
| Brunswick 1,2 | 1,747 | 0.66 | 0.9 | 0.51 |
| Peach Bottom 2,3 | 2,436 | 0.58 | – | 0.42 |
| Lasalle 1,2 | 2,471 | 0.90 | 0.9 | 0.58 |
| Oyster Creek | 1,504 | 0.52 | 3.6 | 0.49 |

**1989**

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

**1990**

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

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

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

# TABLE 4.6

## PRESSURIZED WATER REACTORS LISTED IN ASCENDING ORDER OF COLLECTIVE DOSE PER REACTOR

## 1986-1990

**1986**

| Site Name | Coll. Dose per Site* | Dose per Worker (rems or cSv) | Col. Dose per MW-Yr | CR** |
|---|---|---|---|---|
| Summer 1 | 23 | 0.06 | 0.0 | 0.00 |
| Yankee-Rowe | 45 | 0.12 | 0.3 | 0.05 |
| Fort Calhoun | 74 | 0.10 | 0.2 | 0.17 |
| Byron 1 | 76 | 0.07 | 0.1 | 0.06 |
| Maine Yankee | 100 | 0.20 | 0.1 | 0.17 |
| Davis-Besse | 124 | 0.13 | 37.6 | 0.03 |
| Prairie Island 1,2 | 255 | 0.31 | 0.3 | 0.27 |
| Wolf Creek 1 | 143 | 0.21 | 0.2 | 0.03 |
| Kewaunee | 169 | 0.34 | 0.4 | 0.21 |
| Calvert Cliffs 1,2 | 347 | 0.27 | 0.2 | 0.19 |
| Point Beach 1,2 | 402 | 0.61 | 0.5 | 0.33 |
| Indian Point 3 | 202 | 0.34 | 0.3 | 0.20 |
| Three Mile Island 1 | 213 | 0.16 | 0.4 | 0.10 |
| Waterford 3 | 223 | 0.18 | 0.3 | 0.17 |
| Callaway 1 | 225 | 0.21 | 0.3 | 0.04 |
| St. Lucie 1,2 | 491 | 0.38 | 0.3 | 0.23 |
| Zion 1,2 | 474 | 0.49 | 0.3 | 0.29 |
| Sequoyah 1,2 | 526 | 0.30 | – | 0.24 |
| San Onofre 1,2,3 | 824 | 0.23 | 0.5 | 0.15 |
| Catawba 1 | 286 | 0.17 | 0.4 | 0.04 |
| Salem 1,2 | 599 | 0.17 | 0.4 | 0.21 |
| Diablo Canyon | 304 | 0.24 | 0.5 | 0.16 |
| Oconee 1,2,3 | 949 | 0.38 | 0.5 | 0.30 |
| Ginna | 357 | 0.40 | 0.8 | 0.27 |
| North Anna 1,2 | 722 | 0.26 | 0.5 | 0.40 |
| Cook 1,2 | 745 | 0.42 | 0.6 | 0.27 |
| Trojan | 381 | 0.29 | 0.4 | 0.15 |
| Rancho Seco | 402 | 0.27 | – | 0.22 |
| Farley 1,2 | 858 | 0.37 | 0.6 | 0.35 |
| Crystal River 3 | 472 | 0.45 | 1.5 | 0.38 |
| Turkey Point 3,4 | 946 | 0.52 | 1.3 | 0.36 |
| Millstone Point 2,3 | 993 | 0.41 | 0.8 | 0.30 |
| McGuire 1,2 | 1,015 | 0.44 | 0.7 | 0.37 |
| Robinson 2 | 539 | 0.34 | 0.9 | 0.26 |
| Arkansas 1,2 | 1,141 | 0.53 | 1.1 | 0.47 |
| Beaver Valley | 627 | 0.40 | 1.1 | 0.35 |
| Palisades | 672 | 0.47 | 6.6 | 0.44 |
| Three Mile Island 2 | 915 | 0.61 | – | 0.59 |
| Surry 1,2 | 2,356 | 0.63 | 2.2 | 0.64 |
| Indian Point 2 | 1,250 | 0.65 | 2.7 | 0.45 |
| Haddam Neck | 1,567 | 0.81 | 5.3 | 0.53 |

**1987**

| Site Name | Coll. Dose per Site* | Dose per Worker (rems or cSv) | Col. Dose per MW-Yr | CR** |
|---|---|---|---|---|
| Davis-Besse | 47 | 0.08 | 0.1 | 0.00 |
| Prairie Island 1,2 | 135 | 0.23 | 0.1 | 0.09 |
| Wolf Creek 1 | 138 | 0.20 | 0.2 | 0.07 |
| Three Mile Island 1 | 149 | 0.12 | 0.2 | 0.05 |
| Waterford 3 | 156 | 0.16 | 0.2 | 0.05 |
| Diablo Canyon 1,2 | 336 | 0.29 | 0.2 | 0.15 |
| Arkansas 1,2 | 382 | 0.34 | 0.3 | 0.23 |
| Calvert Cliffs 1,2 | 412 | 0.30 | 0.3 | 0.22 |
| Beaver Valley | 210 | 0.16 | 0.3 | 0.04 |
| Sequoyah 1,2 | 420 | 0.20 | – | 0.12 |
| Yankee Rowe | 217 | 0.37 | 1.6 | 0.22 |
| Catawba 1,2 | 449 | 0.24 | 0.3 | 0.10 |
| Kewaunee | 226 | 0.30 | 0.5 | 0.17 |
| San Onofre 1,2,3 | 696 | 0.33 | 0.4 | 0.21 |
| Millstone Point 2,3 | 505 | 0.35 | 0.3 | 0.34 |
| Point Beach 1,2 | 554 | 0.77 | 0.6 | 0.46 |
| Farley 1,2 | 598 | 0.32 | 0.4 | 0.23 |
| Rancho Seco | 300 | 0.20 | – | 0.10 |
| Salem 1,2 | 600 | 0.24 | 0.4 | 0.25 |
| Zion 1,2 | 653 | 0.62 | 0.5 | 0.39 |
| Cook 1,2 | 666 | 0.39 | 0.6 | 0.21 |
| Palo Verde 1,2 | 669 | 0.37 | 0.4 | 0.41 |
| Ginna | 344 | 0.45 | 0.7 | 0.29 |
| Surry 1,2 | 712 | 0.27 | 0.6 | 0.38 |
| Trojan | 363 | 0.30 | 0.7 | 0.13 |
| Oconee 1,2,3 | 1,142 | 0.43 | 0.6 | 0.29 |
| Fort Calhoun | 388 | 0.31 | 1.1 | 0.35 |
| Callaway 1 | 393 | 0.36 | 0.5 | 0.22 |
| Palisades | 456 | 0.41 | 1.4 | 0.24 |
| St. Lucie 1,2 | 951 | 0.47 | 0.7 | 0.35 |
| Crystal River 3 | 488 | 0.35 | 1.1 | 0.21 |
| Robinson 2 | 499 | 0.36 | 1.0 | 0.29 |
| Indian Point 3 | 500 | 0.38 | 0.9 | 0.20 |
| McGuire 1,2 | 1,043 | 0.36 | 0.6 | 0.31 |
| Summer 1 | 560 | 0.52 | 0.9 | 0.42 |
| Turkey Point 3,4 | 1,371 | 0.69 | 3.2 | 0.42 |
| Maine Yankee | 722 | 0.66 | 1.5 | 0.39 |
| Haddam Neck | 750 | 0.43 | 2.5 | 0.38 |
| North Anna 1,2 | 1,521 | 0.58 | 1.4 | 0.54 |
| Byron 1 | 769 | 0.42 | 1.2 | 0.33 |
| Three Mile Island 2 | 977 | 0.71 | – | 0.59 |
| Indian Point 2 | 1,217 | 0.61 | 2.0 | 0.37 |

**1988**

| Site Name | Coll. Dose per Site* | Dose per Worker (rems or cSv) | Col. Dose per MW-Yr | CR** |
|---|---|---|---|---|
| Callaway 1 | 27 | 0.08 | 0.0 | 0.00 |
| North Anna 1,2 | 112 | 0.11 | 0.1 | 0.05 |
| Crystal River 3 | 64 | 0.11 | 0.1 | 0.00 |
| Rancho Seco | 78 | 0.11 | 0.2 | 0.03 |
| Indian Point 3 | 93 | 0.21 | 0.1 | 0.10 |
| Prairie Island 1,2 | 199 | 0.27 | 0.2 | 0.16 |
| Vogtle 1 | 138 | 0.12 | 0.2 | 0.01 |
| Calvert Cliffs 1,2 | 291 | 0.22 | 0.2 | 0.14 |
| Harris | 169 | 0.23 | 0.3 | 0.08 |
| Point Beach 1,2 | 410 | 0.56 | 0.5 | 0.31 |
| Kewaunee | 210 | 0.30 | 0.4 | 0.17 |
| Three Mile Island 1 | 210 | 0.21 | 0.3 | 0.11 |
| Yankee-Rowe | 227 | 0.31 | 1.7 | 0.20 |
| Byron 1,2 | 459 | 0.38 | 0.3 | 0.17 |
| Indian Point 2 | 235 | 0.26 | 0.3 | 0.19 |
| Haddam Neck | 237 | 0.32 | 0.6 | 0.28 |
| Salem 1,2 | 503 | 0.31 | 0.3 | 0.02 |
| Waterford 3 | 259 | 0.21 | 0.3 | 0.06 |
| San Onofre 1,2,3 | 781 | 0.34 | 0.4 | 0.28 |
| Beaver Valley 1,2 | 530 | 0.30 | 0.4 | 0.21 |
| Fort Calhoun | 272 | 0.17 | 0.9 | 0.12 |
| Farley 1,2 | 552 | 0.30 | 0.4 | 0.24 |
| Catawba 1,2 | 556 | 0.28 | 0.3 | 0.15 |
| Oconee 1,2,3 | 871 | 0.33 | 0.4 | 0.16 |
| Ginna | 295 | 0.33 | 0.7 | 0.18 |
| Wolf Creek 1 | 297 | 0.29 | 0.4 | 0.19 |
| St. Lucie 1,2 | 611 | 0.42 | 0.4 | 0.20 |
| Davis-Besse | 307 | 0.26 | 2.1 | 0.14 |
| Sequoyah 1,2 | 678 | 0.28 | 1.4 | 0.14 |
| Palo Verde 1,2 | 688 | 0.32 | 0.4 | 0.29 |
| Turkey Point 3,4 | 738 | 0.40 | 0.9 | 0.17 |
| Trojan | 401 | 0.28 | 0.5 | 0.14 |
| Millstone Point 2,3 | 804 | 0.44 | 0.5 | 0.36 |
| Cook 1,2 | 867 | 0.38 | 0.7 | 0.33 |
| Diablo Canyon 1,2 | 877 | 0.48 | 0.6 | 0.33 |
| Summer 1 | 511 | 0.45 | 0.8 | 0.26 |
| Mcguire 1,2 | 1,104 | 0.39 | 0.6 | 0.28 |
| Robinson 2 | 564 | 0.42 | 1.5 | 0.25 |
| Zion 1,2 | 1,260 | 0.65 | 0.8 | 0.40 |
| Arkansas 1,2 | 1,387 | 0.57 | 1.3 | 0.46 |
| Maine Yankee | 725 | 0.69 | 1.2 | 0.40 |
| Palisades | 730 | 0.50 | 1.8 | 0.44 |
| Surry 1,2 | 1,542 | 0.48 | 2.1 | 0.50 |
| Three Mile Island 2 | 917 | 0.74 | – | 0.66 |

**1989**

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

**1990**

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

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

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

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

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

Tables 4.7a&b list the sites that had been in commercial operation for at least five years as of December 31, 1990, and show the values of several parameters for each of the sites. They also give a number of averages for the two types of reactors. Based on the 147 reactor-years of operation accumulated by the 30 BWRs listed, the average annual collective dose per reactor was found to be 536 person-rem (person-cSv), the average measurable dose was 0.44 rem (cSv), and the average collective dose per megawatt-year was 1.2.

Based on the 309 reactor-years of operation at the 63 PWRs listed, the average annual collective dose per reactor, average measurable dose, and average collective dose per megawatt-year were found to be 335 person-rem (person-cSv), 0.35 rem (cSv), and 0.6 person-rem/megawatt-year, respectively. All of these values, at both types of facilities, are lower than those found for the five year period ending in 1989.

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

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

### 1986 - 1990

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

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

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

### 1986 - 1990

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

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

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

Usually, the combination of a large annual collective dose and a large collective dose to megawatt-year ratio for a plant indicates that extensive maintenance or modifications were undertaken during the year. For example, maintenance jobs that were large contributors to BWR doses in 1990 included recirculation pipe replacement/crack repair, valve repair and maintenance, intergranular stress corrosion cracking related in-service inspection, refueling work, and the installation and removal of scaffolding and shielding.

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

## 4.6 Collective Dose by Work Function and Employee Type

A second type of annual statistical report that is required by each plant's technical specifications provides the collective dose of workers monitored at each plant site by employee type (plant, utility, or contractor) and by work and job functions. A copy of the report submitted for each reactor site is provided in Appendix D, and much of the data are graphically represented for each site in Appendix E. Tables 4.8 through 4.13 summarize the 1990 data for BWRs, PWRs, and LWRs. Table 4.8 shows that at both BWRs and PWRs about 65-70% of the collective dose is incurred during routine and special maintenance activities. Also, the portion of the collective dose incurred during most of the other activities is similar at the two types of plants. In 1990, refueling activities at PWRs accounted for a larger percentage (10%) of the collective dose than for BWRs (4.2%). Reactor operations and surveillance at BWRs accounted for 15.8% as opposed to only 9.8% at PWRs.

One should note that the collective doses obtained from these reports are not used in any other tables in this document for the following reasons: the technical specification of each plant requires only 80% of the plant's collective dose be accounted for, and some utilities may use the results of self-reading pocket dosimeters instead of the results of the official dosimeter (usually thermoluminescent dosimeters) in compiling the data. Also, when examining the number of personnel shown on these reports, it should be

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

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

kept in mind that individuals who perform tasks in more than one category may be counted more than once.

Table 4.9 shows that workers performing special maintenance have historically incurred the largest portion (35%-45%) of the collective dose and that workers performing routine maintenance activities usually incurred between 30% and 35% of the total each year since 1979. However, for the past four years in a row, the percentage of collective dose attributed to routine maintenance has been greater than that of special maintenance. This may be indicative of a trend showing a reduction in TMI-related activities and a greater emphasis on steady-state routine maintenance. Overall, figures have been fairly stable over the years with these two categories, special maintenance and routine maintenance, always accounting for the majority of the collective dose. Some of the fluctuations shown in the percentage of the dose incurred during refueling activities (particularly in 1987 and 1988 when it increased to over 8%) is due to the fact that some sites include doses other than those directly associated with fuel movement in this category.

Figure 4.5 graphically shows the trends in the collective dose by work function and type of personnel for the years 1986 through 1990 for BWRs and PWRs separately. Contractor personnel still incur most of the collective dose during special maintenance and in-service inspection, but, at least in recent years, the collective dose is more equally divided between contractor and plant and utility personnel during routine maintenance, reactor operations, waste processing, and refueling activities. The general decrease in collective dose is also apparent among most of these activities.

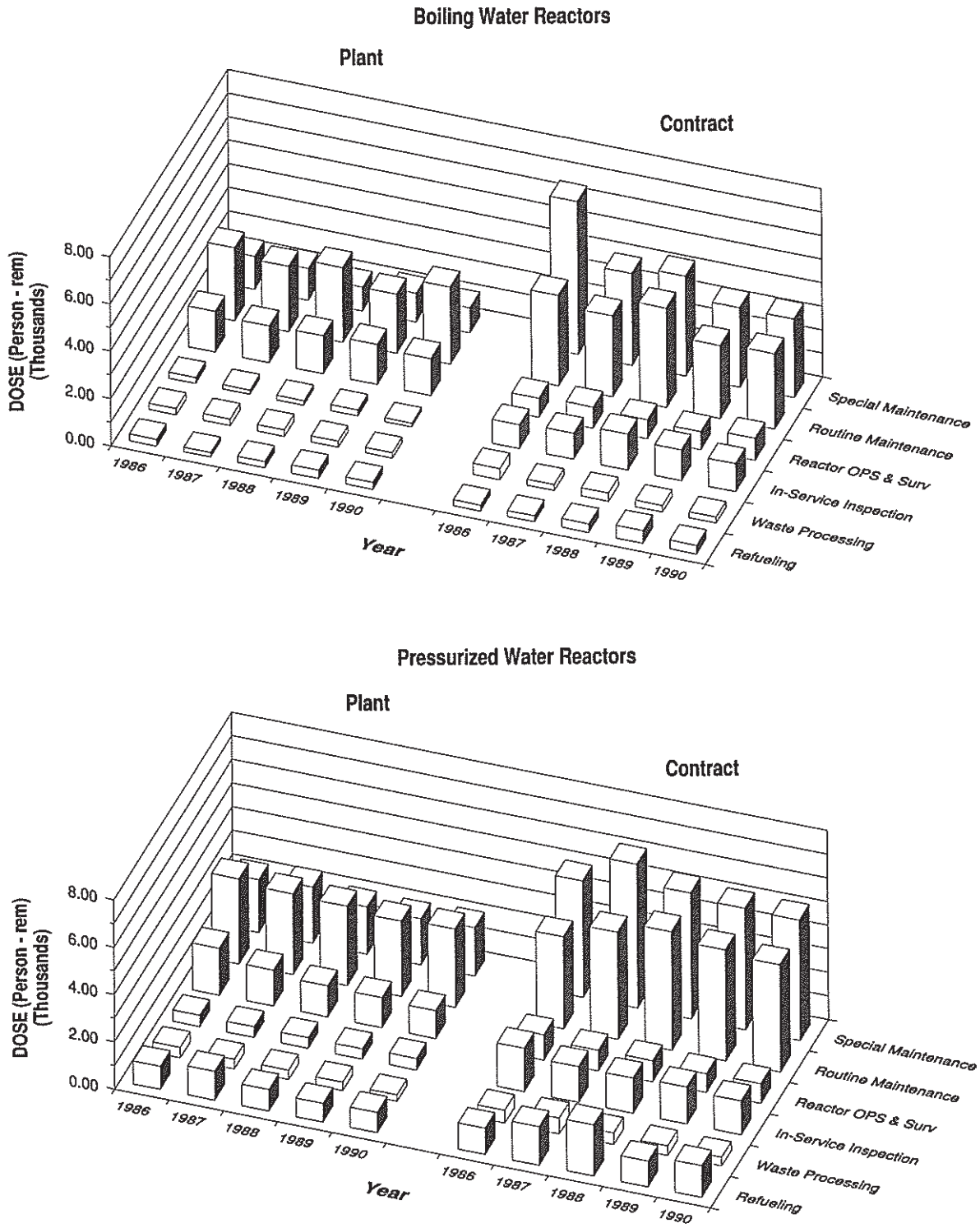
Table 4.10 presents the distribution of the collective dose for 1990 at all LWRs among five occupational categories. As in past years, maintenance personnel incurred the majority (66%) of the collective dose with contractor maintenance personnel receiving about twice as much as the station and utility maintenance employees combined. In 1990, supervisory personnel received 3.3% of the dose, while workers in the remaining three occupations--operations, health physics, and engineering--received 7.5%, 14.0%, and 8.7% respectively, of the collective dose. None of these values changed significantly from those found for 1986 through 1989. The collective doses shown in Tables 4.8 and 4.10 do not equal those shown in other tables in the report because they are the sum of the doses taken from the type of annual reports shown in Appendix D rather than the collective dose that was obtained or calculated from the annual reports required to be submitted pursuant to 10 CFR Part 20.407.

TABLE 4.9

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

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

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



# TABLE 4.10
# ANNUAL COLLECTIVE DOSE
# BY OCCUPATION AND PERSONNEL TYPE
# 1990

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

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

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

(2) The ratio of this dose to the total collective dose (the last number in the last column in Appendix D) was calculated and multiplied by the total collective dose that had been calculated or obtained from the 10 CFR 20.407 annual report. This product is the collective dose shown in the column headed "Operations" in Appendix C.

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

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

## 4.7 Number of Personnel by Work Function and Employee Type

Half of the information presented in the statistical annual reports shown in Appendix D concerns the number of various types of personnel that performed certain work functions. Tables 4.11 and 4.12 sum this information to show the percentage of personnel by work function and occupation. The major problem in interpreting the figures shown in these tables is the fact that the same person may perform several work functions during the year so that the total number of personnel obtained by summing those shown in the various work functions would be inflated. However, Table 4.11 is still useful in showing the percentage of personnel associated with each of the six work functions shown. About 60% of the personnel performed routine or special maintenance functions, about 18% were involved with reactor operations and surveillance, and the remaining 22% were divided among the other three work functions.

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

| WORK AND JOB FUNCTION | STATION EMPLOYEES NUMBER | STATION EMPLOYEES % OF TOTAL | UTILITY EMPLOYEES NUMBER | UTILITY EMPLOYEES % OF TOTAL | CONTRACT WORKERS NUMBER | CONTRACT WORKERS % OF TOTAL | TOTAL PER WORK FUNCTION NUMBER | TOTAL PER WORK FUNCTION % OF TOTAL |
|---|---|---|---|---|---|---|---|---|
| BOILING WATER REACTORS | | | | | | | | |
| REACTOR OPS & SURV | 10,475 | 11.7% | 921 | 1.0% | 5,846 | 6.5% | 17,242 | 19.3% |
| ROUTINE MAINTENANCE | 14,526 | 16.2% | 1,890 | 2.1% | 21,335 | 23.8% | 37,751 | 42.2% |
| IN-SERVICE INSPECTION | 741 | 0.8% | 301 | 0.3% | 5,947 | 6.6% | 6,989 | 7.8% |
| SPECIAL MAINTENANCE | 3,917 | 4.4% | 963 | 1.1% | 12,039 | 13.4% | 16,919 | 18.9% |
| WASTE PROCESSING | 2,870 | 3.2% | 263 | 0.3% | 1,832 | 2.0% | 4,965 | 5.5% |
| REFUELING | 2,509 | 2.8% | 391 | 0.4% | 2,778 | 3.1% | 5,678 | 6.3% |
| TOTAL | 35,038 | 39.1% | 4,729 | 5.3% | 49,777 | 55.6% | 89,544 | 100.0% |
| PRESSURIZED WATER REACTORS** | | | | | | | | |
| REACTOR OPS & SURV | 7,046 | 8.5% | 1,740 | 2.1% | 6,049 | 7.3% | 14,835 | 17.9% |
| ROUTINE MAINTENANCE | 9,802 | 11.8% | 2,893 | 3.5% | 14,799 | 17.9% | 27,494 | 33.2% |
| IN-SERVICE INSPECTION | 1,740 | 2.1% | 808 | 1.0% | 4,682 | 5.7% | 7,230 | 8.7% |
| SPECIAL MAINTENANCE | 5,979 | 7.2% | 1,795 | 2.2% | 13,286 | 16.1% | 21,060 | 25.4% |
| WASTE PROCESSING | 1,749 | 2.1% | 247 | 0.3% | 1,952 | 2.4% | 3,948 | 4.8% |
| REFUELING | 3,549 | 4.3% | 615 | 0.7% | 4,043 | 4.9% | 8,207 | 9.9% |
| TOTAL | 29,865 | 36.1% | 8,098 | 9.8% | 44,811 | 54.1% | 82,774 | 100.0% |
| ALL LIGHT WATER REACTORS** | | | | | | | | |
| REACTOR OPS & SURV | 17,521 | 10.2% | 2,661 | 1.5% | 11,895 | 6.9% | 32,077 | 18.6% |
| ROUTINE MAINTENANCE | 24,328 | 14.1% | 4,783 | 2.8% | 36,134 | 21.0% | 65,245 | 37.9% |
| IN-SERVICE INSPECTION | 2,481 | 1.4% | 1,109 | 0.6% | 10,629 | 6.2% | 14,219 | 8.3% |
| SPECIAL MAINTENANCE | 9,896 | 5.7% | 2,758 | 1.6% | 25,325 | 14.7% | 37,979 | 22.0% |
| WASTE PROCESSING | 4,619 | 2.7% | 510 | 0.3% | 3,784 | 2.2% | 8,913 | 5.2% |
| REFUELING | 6,058 | 3.5% | 1,006 | 0.6% | 6,821 | 4.0% | 13,885 | 8.1% |
| TOTAL | 64,903 | 37.7% | 12,827 | 7.4% | 94,588 | 54.9% | 172,318 | 100.0% |

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

** Table 4.11 does not include the number of personnel from the PWRs at Point Beach 1,2 (429 people), because the data were not submitted in the suggested format.

Table 4.12 shows the percentage of personnel in each of five occupational categories at BWRs, PWRs, and LWRs. The workers were similarly distributed at BWRs and PWRs, the largest difference occurred in the maintenance and health physics categories with 60% and 11% at BWRs and 55% and 16% at PWRs, respectively. A large part of these two categories were contractor personnel whereas station and utility personnel formed the majority of the "operations" category. Overall, 56% of the personnel were contractors, 37% were station employees, and 7% were utility employees in 1990.

Table 4.13 presents the average annual dose incurred by workers in the five occupational categories in 1990. These averages were calculated by dividing the collective dose reported for these groups (see Table 4.10) by the number of individuals shown in Table 4.12. It shows that in most instances, the maintenance and health physics personnel incur the highest average doses and that supervisory and engineering personnel usually have the lowest. When examining the values of the averages that are given in Table 4.13, one should bear in mind the several sources of error to which they are subject: (1) the number of individuals may be inflated because the same plant contractor employee may work at several plants so that the employee would be counted more than once in a summary such as Table 4.13; (2) the occupations are not clearly defined so that workers performing certain tasks in one plant may be classified as being in one occupation and be included in a different one at another plant; (3) some plants count only those workers whose doses exceed 0.10 rem (cSv) while other plants count all workers regardless of the dose received. It is because of these reasons that the usefulness of the numbers of individuals obtained from the reports provided in Appendix D is rather limited, and they are not used to develop any other statistics in this document.

## 4.8 Graphical Representation of Dose Trends in Appendix E

Appendix E is a recent addition to this report series. Each page of Appendix E presents two types of graphs for one site. One graph plots certain dose- performance indicators from 1973 through 1990, and the other indicates the collective dose by job function for 1978 through 1990. The dose and performance indicators shown in the top graph illustrate the history of the collective dose for the site, the rolling three-year average collective dose per reactor, and the gross electricity generated at the site. These data are plotted, beginning with the plant's first full year of commercial operation, and continuing through 1990. However, any data reported prior to 1973 are not included. The three-year average collective dose per reactor data is included because it appears to provide a better overall indication of the plant's general trend in collective dose. This average is determined by summing the

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

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

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

# TABLE 4.13
# AVERAGE DOSES BY OCCUPATION AND PERSONNEL TYPE*
# 1990

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

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

collective dose for the current year and the previous two years and then dividing this sum by the number of reactors in operation during those years. This reduces the sporadic effects on annual doses of refueling operations (usually a three-year cycle) and occasional high-dose maintenance activities, and gives a better idea of collective dose trends over the life of the plant. One should note that for sites with more than one reactor, the plot of the three-year rolling average will lie below that of the plot of the annual collective dose for the site because it is calculated on a per-reactor basis.

The second type of graph at the bottom of each page in Appendix E displays the breakdown of collective dose by job function and employee type for the years 1978 through 1990. The horizontal axis lists the six job functions of reactor operations, routine maintenance, in-service inspection, special maintenance, waste management and refueling operations, and the vertical axis indicates collective dose at each site. This representation quickly shows the job functions where most of the dose was accumulated as well as the division of the collective dose among plant and contract workers. The data are taken from the submittals presented in Appendix D and therefore represent at least 80% of the collective dose at each site. Only those reactors that have completed at least one full year of commercial operation are presented in Appendix E.

## 4.9 Health Implications of Average Annual Doses

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

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

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

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

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

The Committee on the Biological Effects of Ionizing Radiations (BEIR) of the National Academy of Sciences (NAS) National Research Council has been conducting an ongoing study of the health effects of ionizing radiation. Its latest report, BEIR V, was published in 1990. Based on this report, the 110,204 workers receiving the average dose of 0.36 rem (cSv) or the maximum accidental dose of 24 rem (cSv) to the whole body during 1990 (see Section 6) might expect an increased cancer death risk of about 11 chances in a thousand for the average dose and 18 chances per thousand for the maximum dose.[10] Should a worker receive 0.36 rem (cSv) continuously during an entire working career (working from age 18 until age 65), the lifetime risk of dying from cancer is estimated to increase by less than 5%. Since the American Cancer Society estimates that an individual's risk of dying of cancer is about 20% (one in five), the risk to an individual receiving 0.36 rem (cSv) would be approximately 21%.

The potential genetic effects from a worker population receiving 39,739 person-rem (person-cSv) (Table 3.1) are small compared to genetic damages that normally occur spontaneously in a population of this size. Approximately 110,204 serious genetic defects occur normally in one million live births, i.e., an average of about one serious defect in every ten live births. Theoretically, the total genetic damage in the first generation children of the 110,791 exposed workers would, according to the report NUREG/CR-4214 [Ref. 17], be an increase of about 1.2 cases (approximately

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

0.01%) compared to the expected 10,000 cases that occur normally.[11] No significant increase in the number of genetic defects has been observed in the children of individuals exposed to much higher levels of ionizing radiation at Hiroshima and Nagasaki, Japan.

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

# 5 TERMINATION DATA SUBMITTED PURSUANT TO 10 CFR § 20.408

## 5.1 Termination Reports, 1969-1990

In 1969, the Atomic Energy Commission (predecessor of the NRC) began requiring certain categories of licensees[12] to submit personal identification and exposure information upon the termination of each monitored person's employment or work assignment at their facilities. The appropriate information on each report has been manually coded and entered into the Commission's computerized Radiation Exposure Information Reporting System (REIRS) for permanent retention. The data are retrievable by several criteria - social security number, name, facility, etc. - which allow statistical analysis of the data as well as the tracing of individual dose histories. During the years that this information has been collected, nearly 1.7 million reports have been received for the 663,712 individuals who have been reported as having terminated their employment at facilities in one or more of the categories of covered licensees. The figures given for the number of reports and the number of individuals are different because thousands of individuals have worked at more than one facility over the years and a termination report was submitted to the NRC each time they left a facility.

Table 5.1 provides a breakdown of this information for individuals terminating during each of these 22 years and, since the majority of termination reports are submitted by nuclear power facilities, the number of individuals terminating from power reactors is displayed separately. The number of individuals terminating employment or work assignments at nuclear power plants has decreased by 17% since 1987 to a value of 74,488 in 1990. However, the 1990 data are subject to revision as more termination reports covering this period are received and processed into REIRS. For this reason, each year that this report is produced, the previous year's termination data are revised to reflect all of the reports that have been processed to date.

## 5.2 Limitations of Termination Data

When examining or using the statistics that are based on the termination data, one should keep in mind that these data have various limitations: (1) some licensees submit a termination report for each monitoring period rather than waiting until the individual actually completes a work assignment at the

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

facility; (2) the reports contain no indication of the tasks the workers may have performed nor of the type of employees (contractor, plant part-time, etc.) they were while monitored by the licensee; (3) the period(s) of exposure that is reported for terminating individuals may indicate the monitoring period during which they may have been exposed to radiation rather than the actual dates of exposure; (4) some licensees report cumulative periods of exposure and doses rather than the actual periods and dose incurred during each period; and (5) licensees having more than one licensed facility sometimes include in the termination report, submitted when individuals leave the

TABLE 5.1
TERMINATION REPORTS SUBMITTED TO THE NRC

1969 - 1990

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

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

second facility, the dose that they incurred at the first facility, which may already have been reported. Although attempts have been made to correct for some of these problems, they are still a source of error in any statistics developed from the termination data.

## 5.3 Transient Workers per Calendar Quarter

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

Table 5.2 displays some of the information gathered from these termination reports that were submitted by all covered licensees and by licensed nuclear power facilities, separately. One can quickly see that the vast majority of these individuals are monitored by nuclear power facilities. The number of these individuals at all licensees has increased during the past ten years from 2,344 in 1981 to 3,859 in 1990. The average individual dose (which is approximately equal to a quarterly dose for these workers) has decreased over these years to an all-time low of 0.20 rem (cSv).

The bottom half of the table separates the information shown for power reactor licensees into that for reactor workers employed by two, three, and four or more different reactor licensees. The table shows that most of these transients were reported by two different licensees during a quarter and that their average quarterly dose has decreased from 0.40 rem (cSv) in 1981 to a value of 0.21 rem (cSv) in 1990. The average dose incurred by persons terminated by three licensees decreased to an all-time low value of 0.15 rem (cSv) in 1990. All of these average doses are considerably less than those incurred 10 years ago. This is believed to be a reflection of the industry's continuing efforts to reduce the exposure of all individuals working at their facilities and their efforts to limit the workers' annual doses to less than 5 rem regardless of the number of facilities at which they work during the year.

Examination of these records also revealed that some individuals have worked for as many as six different NRC licensees during one calendar quarter, and examination of their doses revealed **no instances during the last nine years in which a worker exceeded the quarterly limit of 3 rem (cSv) as a result of**

TABLE 5.2
TRANSIENT WORKERS PER CALENDAR QUARTER
1981 - 1990

| All Covered Licensees | | | | Power Reactor Facilities | | | |
|---|---|---|---|---|---|---|---|
| Year | No. of Persons Terminated by Two or more Licensees Within One Quarter | Collective Dose (person-rems person-cSv) | Average Individual Dose (rem or cSv) | Year | No. of Persons Terminated by Two or more Licensees Within One Quarter | Collective Dose (person-rems person-cSv) | Average Individual Dose (rem or cSv) |
| 1981 | 2,344 | 955 | 0.41 | 1981 | 2,335 | 952 | 0.41 |
| 1982 | 2,428 | 935 | 0.39 | 1982 | 2,396 | 914 | 0.38 |
| 1983 | 2,774 | 913 | 0.33 | 1983 | 2,728 | 886 | 0.32 |
| 1984 | 3,414 | 1,123 | 0.33 | 1984 | 3,356 | 1,083 | 0.32 |
| 1985 | 2,791 | 700 | 0.25 | 1985 | 2,746 | 674 | 0.25 |
| 1986 | 3,069 | 921 | 0.30 | 1986 | 3,033 | 910 | 0.30 |
| 1987 | 3,543 | 1,022 | 0.29 | 1987 | 3,517 | 1,011 | 0.29 |
| 1988 | 3,840 | 1,019 | 0.27 | 1988 | 3,799 | 1,011 | 0.27 |
| 1989 | 3,649 | 768 | 0.21 | 1989 | 3,604 | 762 | 0.21 |
| 1990 | 3,859 | 769 | 0.20 | 1990 | 3,786 | 751 | 0.20 |

Power Reactor Facilities

| Year | No. of Persons Terminated by Two Licensees | Collective Dose | Average Dose | No. of Persons Terminated by Three Licensees | Collective Dose | Average Dose | No. of Persons Terminated by >Three Licensees | Collective Dose | Average Dose |
|---|---|---|---|---|---|---|---|---|---|
| 1981 | 1,967 | 780 | 0.40 | 308 | 145 | 0.47 | 60 | 27 | 0.45 |
| 1982 | 2,047 | 789 | 0.39 | 288 | 113 | 0.39 | 61 | 12 | 0.20 |
| 1983 | 2,276 | 767 | 0.34 | 362 | 101 | 0.28 | 90 | 18 | 0.20 |
| 1984 | 2,782 | 901 | 0.32 | 431 | 147 | 0.34 | 143 | 35 | 0.24 |
| 1985 | 2,340 | 597 | 0.26 | 335 | 67 | 0.20 | 71 | 10 | 0.14 |
| 1986 | 2,612 | 785 | 0.30 | 362 | 115 | 0.32 | 59 | 10 | 0.17 |
| 1987 | 2,992 | 875 | 0.29 | 425 | 121 | 0.28 | 100 | 16 | 0.16 |
| 1988 | 3,081 | 826 | 0.27 | 573 | 162 | 0.28 | 145 | 23 | 0.16 |
| 1989 | 2,967 | 620 | 0.21 | 504 | 109 | 0.22 | 133 | 33 | 0.25 |
| 1990 | 3,126 | 656 | 0.21 | 516 | 76 | 0.15 | 144 | 19 | 0.13 |

working at two or more different licensed facilities within one calendar quarter. However, because some facilities do not report the workers' doses in quarterly increments in the termination reports that are submitted to the NRC, it is not always possible to determine, from the data in REIRS, the portion of the dose received during each quarter. This inability could have allowed any of these doses that exceeded 3 rem to go undetected by the analyses presented in this document. Regulations require that each licensee take measures to ensure that such exposures do not occur, and if they do occur, they are reported to the Commission separately (see Section 6).

## 5.4 Transient Workers per Calendar Year at Nuclear Power Facilities

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

Table 5.3 summarizes the number and doses of the transients found among the individuals terminating during the ten years from 1981 through 1990. The number of these individuals increased from 5,425 in 1981 to 11,083 in 1990. The average dose remained at about 1 rem (cSv) until 1985 when the average dose decreased by about 30% to 0.77 rem (cSv). The average dose increased from a value of 0.64 rem (cSv) in 1989 to a value of 0.67 rem (cSv) in 1990.

The lower portion of Table 5.3 shows the number and doses of workers who were terminated by two, three, and four or more different licensees during each calendar year. The average dose of workers terminating from two plants has decreased to about 0.5 rem (cSv) and the average dose of workers terminating at three plants decreased to about 0.8, while the average dose of individuals terminating from three or more facilities remains at about 1 rem (cSv).

Another way in which the distribution of the doses received by transient workers can be useful is in the determination of the impact that the inclusion of these individuals in each of two or more licensees' annual reports had on the annual summary (Table 4.4) for all nuclear power facilities (one of the problems mentioned in Section 2). Table 5.4a shows the correct distribution of transient worker doses as determined from the above-mentioned termination

TABLE 5.3

TRANSIENT WORKERS PER CALENDAR YEAR AT NUCLEAR POWER FACILITIES

1981 - 1990

| Year | No. of Commercial Reactors | No. of Persons Terminated by Two or More Licensees | Collective Dose (person-rems person-cSv) | Average Dose (rems or cSv) |
|---|---|---|---|---|
| 1981 | 71 | 5,425 | 5,381 | 0.99 |
| 1982 | 75 | 5,303 | 5,610 | 1.06 |
| 1983 | 76 | 6,340 | 6,675 | 1.05 |
| 1984 | 79 | 7,760 | 8,045 | 1.04 |
| 1985 | 83 | 6,871 | 5,319 | 0.77 |
| 1986 | 90 | 7,816 | 5,954 | 0.76 |
| 1987 | 97 | 9,469 | 6,712 | 0.71 |
| 1988 | 103 | 9,295 | 5,875 | 0.63 |
| 1989 | 107 | 10,509 | 6,776 | 0.64 |
| 1990 | 109 | 11,083 | 7,382 | 0.67 |

| Year | No. of Persons Terminated by Two Licensees | Collective Dose | Average Dose | No. of Persons Terminated by Three Licensees | Collective Dose | Average Dose | No. of Persons Terminated by >Three Licensees | Collective Dose | Average Dose |
|---|---|---|---|---|---|---|---|---|---|
| 1981 | 3,745 | 3,033 | 0.81 | 924 | 1,172 | 1.27 | 756 | 1,176 | 1.56 |
| 1982 | 3,645 | 3,349 | 0.92 | 913 | 1,131 | 1.24 | 745 | 1,130 | 1.52 |
| 1983 | 4,203 | 3,624 | 0.86 | 1,256 | 1,694 | 1.39 | 881 | 1,357 | 1.53 |
| 1984 | 5,118 | 4,224 | 0.83 | 1,461 | 1,945 | 1.33 | 1,181 | 1,875 | 1.59 |
| 1985 | 4,584 | 3,000 | 0.65 | 1,357 | 1,400 | 1.03 | 930 | 920 | 0.99 |
| 1986 | 5,079 | 2,907 | 0.57 | 1,490 | 1,508 | 1.01 | 1,247 | 1,539 | 1.23 |
| 1987 | 6,107 | 3,339 | 0.55 | 1,852 | 1,693 | 0.91 | 1,510 | 1,680 | 1.11 |
| 1988 | 5,889 | 2,880 | 0.49 | 1,899 | 1,529 | 0.81 | 1,507 | 1,465 | 0.97 |
| 1989 | 6,721 | 3,362 | 0.50 | 2,111 | 1,738 | 0.82 | 1,677 | 1,676 | 1.00 |
| 1990 | 6,772 | 3,452 | 0.51 | 2,444 | 2,032 | 0.83 | 1,867 | 1,897 | 1.02 |

reports and compares it with the distribution of the doses of these workers as they would have appeared in a summation of the annual statistical reports submitted by each of the nuclear power facilities. During each of the years shown, each of the transient workers was counted an average of 2.6 times so that in 1990, the 11,083 transients would have been counted as 29,803 individuals. This was not surprising because some individuals were reported by as many as 24 different facilities.

Table 5.4b illustrates the impact that the multiple reporting of these transient individuals had on the staff's summation of the annual statistical reports for the years 1984 through 1990. Since each nuclear power facility reports the distribution of the doses received by workers while monitored by the particular facility during the year, one would expect that a summation of these reports would result in individuals being counted several times in dose ranges lower than the range in which their total accumulated dose (the sum of the personnel monitoring results incurred at each facility during the year) would actually place them. Thus, while the total collective dose would remain the same, the number of workers, their dose distribution, and average dose would be affected by this multiple reporting. This was found to be true because too few workers were reported in the higher dose ranges. For example, in 1990, Table 5.4b shows that the summation of annual reports indicated that 109,650 workers received a measurable dose (203,324 monitored minus 93,674 with no measurable exposure), 1,317 of whom received doses greater than 2 rem (cSv). After accounting for those individuals who were reported more than once, the corrected distribution indicated that there were really only 99,860 workers who received a measurable dose and that 2,118 of them received doses greater than 2 rem (cSv). Thus, 2.1% of the workers with measurable dose received an annual dose greater than 2 rem rather than 1.2% that would have been computed from the "Reported Statistical Distribution" shown in the first row of Table 5.4b for 1990.

Since the number of transient workers receiving measurable doses and the collective dose they receive are only about 9% and 20% of the total number of workers and of the total collective dose, respectively, for 1990, their impact on <u>most</u> of the statistics derived from compilations of the annual summary reports is not very great. However, when examining the number of annual doses in the higher dose ranges (Table 5.4b), one finds that the correct statistical distribution indicates that the number of workers who received doses greater than 4 rem (cSv) is usually about two to three times the number found in the reported statistical distribution. But there is still a clear trend for the number of higher doses to decrease; in 1990, there were only 333 annual doses that exceeded 3 rem, which is less than the number for 1989 (404). Table 5.5 shows that no doses greater than 5 rem were reported in 1990 and that since

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

| Type of Distribution and Year | Number of Individuals with Whole Body Doses in the Ranges (rems or cSv) | | | | | | | | | | | | | | | | Total Individuals | **Collective Dose (Person-rem or -cSv) | Avg. Dose (rem or cSv) | Avg. Meas. Dose (rem or cSv) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Less than Measurable | Meas'ble <0.10 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.00-5.00 | 5.0-6.0 | 6.0-7.0 | 7.0-8.0 | 8.0-9.0 | 9.0-10.0 | >10 | | | | |
| Correct Distribution of Transients - 1984 | 1,108 | 1,852 | 557 | 540 | 425 | 387 | 1,193 | 878 | 544 | 202 | 52 | 22 | | | | | 7,760 | 8,045 | 1.04 | 1.21 |
| Reported Distribution of Transients - 1984 | 6,054 | 5,440 | 1,894 | 1,757 | 1,255 | 979 | 2,370 | 639 | 97 | 10 | | | | | | | 20,495 | 8,045 | 0.39 | 0.56 |
| Correct Distribution of Transients - 1985 | 1,201 | 1,854 | 518 | 521 | 455 | 314 | 967 | 629 | 336 | 74 | 1 | | | | | | 6,870 | 5,319 | 0.77 | 0.94 |
| Reported Distribution of Transients - 1985 | 6,037 | 5,014 | 1,625 | 1,459 | 1,042 | 664 | 1,484 | 371 | 51 | 1 | | | | | | | 17,748 | 5,319 | 0.30 | 0.45 |
| Correct Distribution of Transients - 1986 | 1,319 | 2,006 | 648 | 656 | 472 | 369 | 1,248 | 691 | 325 | 72 | | | | | | | 7,806 | 5,954 | 0.76 | 0.92 |
| Reported Distribution of Transients - 1986 | 6,866 | 5,372 | 2,071 | 1,935 | 1,236 | 856 | 1,685 | 299 | 50 | 1 | | | | | | | 20,371 | 5,954 | 0.29 | 0.44 |
| Correct Distribution of Transients - 1987 | 1,992 | 1,717 | 773 | 922 | 767 | 632 | 1,681 | 670 | 266 | 48 | | | | | | | 9,468 | 6,712 | 0.70 | 0.88 |
| Reported Distribution of Transients - 1987 | 9,369 | 5,276 | 2,762 | 2,650 | 1,780 | 1,125 | 1,835 | 189 | 30 | 1 | | | | | | | 25,017 | 6,712 | 0.26 | 0.42 |
| Correct Distribution of Transients - 1988 | 2,601 | 1,276 | 866 | 900 | 679 | 610 | 1,544 | 628 | 174 | 17 | | | | | | | 9,295 | 5,875 | 0.63 | 0.88 |
| Reported Distribution of Transients - 1988 | 10,892 | 4,272 | 2,703 | 2,616 | 1,650 | 1,087 | 1,498 | 144 | 5 | | | | | | | | 24,867 | 5,875 | 0.24 | 0.42 |
| Correct Distribution of Transients - 1989 | 2,544 | 1,640 | 1,009 | 1,128 | 933 | 665 | 1,621 | 659 | 278 | 24 | | | | | | | 10,501 | 6,776 | 0.65 | 0.85 |
| Reported Distribution of Transients - 1989 | 11,249 | 5,120 | 3,220 | 3,010 | 1,802 | 1,069 | 1,688 | 234 | 7 | 1 | | | | | | | 27,400 | 6,776 | 0.25 | 0.42 |
| Correct Distribution of Transients - 1990 | 2,443 | 1,554 | 1,129 | 1,268 | 988 | 796 | 1,930 | 719 | 236 | 20 | | | | | | | 11,083 | 7,382 | 0.67 | 0.85 |
| Reported Distribution of Transients - 1990 | 11,373 | 5,704 | 3,831 | 3,600 | 2,037 | 1,265 | 1,819 | 166 | 8 | | | | | | | | 29,803 | 7,382 | 0.25 | 0.40 |

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

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

| Type of Distribution and Year | Number of Individuals with Whole Body Doses in the Ranges (rems or cSv) | | | | | | | | | | | | | | | Total Individuals | **Collective Dose (Person-rem or -cSv) | Avg. Dose (rem or cSv) | Avg. Meas. Dose (rem or cSv) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Less than Measurable | Meas'ble <0.10 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.00-5.00 | 5.0-6.0 | 6.0-7.0 | 7.0-8.0 | 8.0-9.0 | 9.0-10.0 | >10 | | | | |
| Reported Statistical Distribution - 1984 | 61,232 | 39,946 | 14,772 | 11,492 | 7,166 | 5,396 | 12,453 | 4,967 | 1,675 | 295 | | | | | | | 159,394 | 55,238 | 0.35 | 0.56 |
| **Correct Statistical Distribution - 1984 | 56,286 | 36,358 | 13,435 | 10,275 | 6,336 | 4,804 | 11,283 | 5,206 | 2,122 | 487 | 52 | 22 | | | | | 146,666 | 55,238 | 0.38 | 0.61 |
| Reported Statistical Distribution - 1985 | 66,399 | 40,361 | 14,155 | 12,012 | 7,214 | 4,897 | 10,557 | 3,317 | 716 | 84 | | | | | | | 159,712 | 43,077 | 0.27 | 0.46 |
| **Correct Statistical Distribution - 1985 | 61,563 | 37,201 | 13,048 | 11,074 | 6,627 | 4,547 | 10,040 | 3,575 | 1001 | 157 | 1 | | | | | | 148,834 | 43,077 | 0.29 | 0.49 |
| Reported Statistical Distribution - 1986 | 73,469 | 44,899 | 15,997 | 13,121 | 7,780 | 5,180 | 10,678 | 2,670 | 593 | 75 | | | | | | | 174,462 | 42,383 | 0.24 | 0.42 |
| **Correct Statistical Distribution - 1986 | 67,922 | 41,533 | 14,574 | 11,842 | 7,016 | 4,693 | 10,241 | 3,062 | 868 | 146 | | | | | | | 161,897 | 42,383 | 0.26 | 0.45 |
| Reported Statistical Distribution - 1987 | 92,559 | 44,782 | 17,823 | 14,567 | 8,599 | 5,825 | 10,765 | 1,711 | 241 | 22 | | | | | | | 196,894 | 40,402 | 0.21 | 0.39 |
| **Correct Statistical Distribution - 1987 | 85,182 | 41,223 | 15,834 | 12,839 | 7,586 | 5,332 | 10,611 | 2,192 | 477 | 69 | | | | | | | 181,345 | 40,402 | 0.22 | 0.42 |
| Reported Statistical Distribution - 1988 | 95,783 | 43,245 | 17,750 | 14,869 | 8,874 | 5,938 | 10,264 | 1,958 | 342 | 9 | | 1 | | | | | 199,033 | 40,879 | 0.21 | 0.40 |
| **Correct Statistical Distribution - 1988 | 87,492 | 40,249 | 15,913 | 13,153 | 7,903 | 5,461 | 10,310 | 2,442 | 511 | 26 | | 1 | | | | | 183,461 | 40,879 | 0.22 | 0.43 |
| Reported Statistical Distribution - 1989 | 92,968 | 48,809 | 19,484 | 15,661 | 8,814 | 5,541 | 8,701 | 1,189 | 99 | 11 | | | | | | | 201,277 | 35,942 | 0.18 | 0.33 |
| **Correct Statistical Distribution - 1989 | 84,263 | 45,329 | 17,273 | 13,779 | 7,945 | 5,137 | 8,634 | 1,614 | 370 | 34 | | | | | | | 184,378 | 35,942 | 0.19 | 0.36 |
| Reported Statistical Distribution - 1990 | 93,674 | 47,001 | 20,366 | 16,739 | 9,476 | 5,877 | 8,874 | 1,232 | 84 | 1 | | | | | | | 203,324 | 36,592 | 0.18 | 0.33 |
| **Correct Statistical Distribution - 1990 | 84,744 | 42,851 | 17,664 | 14,407 | 8,427 | 5,408 | 8,985 | 1,785 | 312 | 21 | | | | | | | 184,604 | 36,592 | 0.20 | 0.37 |

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

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

TABLE 5.5

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

| Year | Reported Number >5 Rems (cSv) | Corrected Number >5 Rems (cSv) | Difference |
|---|---|---|---|
| 1977 | 270 | 351 | 81 |
| 1978 | 103 | 158 | 55 |
| 1979 | 130 | 180 | 50 |
| 1980 | 311 | 391 | 80 |
| 1981 | 189 | 235 | 46 |
| 1982 | 74 | 135 | 61 |
| 1983 | 85 | 169 | 84 |
| 1984 | 0 | 74 | 74 |
| 1985 | 0 | 1 | 1 |
| 1986 | 0 | 0 | 0 |
| 1987 | 0 | 0 | 0 |
| 1988 | 1 | 1 | 0 |
| 1989 | 0 | 0 | 0 |
| 1990 | 0 | 0 | 0 |

## 5.5 Temporary Workers per Calendar Year at Nuclear Power Facilities

To complete the examination of the doses received by the short-term workers employed at nuclear power facilities, Table 5.6 summarizes the data compiled on "temporary workers." For purposes of this report, temporary workers were defined to be those individuals who began and ended a period of employment or work assignment at only one nuclear power facility during the calendar year. Table 5.6 shows that the number of these temporary individuals increased by about 60% between 1978 and 1990 while the number of reactors increased by 70% during this time. The number of temporary workers receiving a measurable dose, however, increased by only 38%. The collective dose reached a high of

TABLE 5.6

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

| Year | No. of Reactors | Number of Temps. Monitored | Number with Measurable Doses | Collective Dose (person-rems person-cSv) | Average Dose (rem or cSv) | Average Measurable Dose (rem or cSv) |
|---|---|---|---|---|---|---|
| 1978 | 64 | 28,864 | 17,110 | 9,821 | 0.34 | 0.57 |
| 1979 | 67 | 38,347 | 21,491 | 9,488 | 0.25 | 0.44 |
| 1980 | 68 | 48,383 | 28,305 | 16,168 | 0.33 | 0.57 |
| 1981 | 70 | 48,265 | 28,675 | 16,755 | 0.35 | 0.58 |
| 1982 | 74 | 44,503 | 25,646 | 14,266 | 0.32 | 0.56 |
| 1983 | 75 | 50,903 | 26,682 | 16,007 | 0.31 | 0.60 |
| 1984 | 78 | 53,438 | 29,988 | 15,856 | 0.30 | 0.52 |
| 1985 | 82 | 48,678 | 24,991 | 10,418 | 0.21 | 0.42 |
| 1986 | 90 | 47,108 | 22,911 | 8,014 | 0.17 | 0.35 |
| 1987 | 96 | 51,365 | 22,433 | 8,303 | 0.16 | 0.37 |
| 1988 | 102 | 44,812 | 20,575 | 7,618 | 0.17 | 0.37 |
| 1989 | 107 | 47,041 | 22,252 | 7,134 | 0.15 | 0.32 |
| 1990 | 110 | 46,303 | 23,544 | 8,270 | 0.18 | 0.35 |

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

One apparent discrepancy in the above analysis of termination data is that not all of the individuals who terminated during each of the calendar years are included. When one compares the total number of persons terminating during a year (Table 5.1) to the sum of workers terminating from one facility (temporary workers, Table 5.6) and the number of individuals terminating from two or more facilities (transient workers, Table 5.3), one finds a considerable difference in these figures. This is because of the criteria that are used to determine which individuals should be included in the "temporary" and "transient" worker groups. To be included in either of these

groups in this analysis, the individuals' periods of employment must begin and end during the same calendar year. Any individual whose beginning or ending dates of employment overlap the beginning and ending dates of the calendar year are not included in these analyses. In 1990, for example, one finds that the number of individuals not included in these analyses is approximately 17,000. However, there is no indication that the exclusion of these individuals significantly impacts the statistics presented here.

# 6 EXPOSURES TO PERSONNEL IN EXCESS OF REGULATORY LIMITS

## 6.1 Control Levels

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

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

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

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

10 CFR 20.403 and 20.405 require that all persons licensed by the NRC submit reports of all occurrences involving personnel radiation exposures that exceed certain control levels, thus providing for investigations and corrective actions as necessary. Based on the magnitude of the exposure, the occurrence may be placed into one of three categories:

(1) Category A

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

(2) Category B

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

(3) Category C

10 CFR § 20.405 - Exposure of any individual to radiation or concentrations of radioactive material that exceeds any applicable quarterly limit in Part 20 [§§ 20.101, 20.104(b), 20.103(a)(1), or 20.103(a)(2)] or in the licensee's license, but is less than the values given above. This includes reports of whole body exposures that exceed 1.25 rem (cSv), or that exceed 3 rem (cSv), as discussed in § 3.2 of this document. Reports of skin exposures that exceed 7.5 rem (cSv) and extremity exposures that exceed 18.75 rem (cSv) are included, and reports of exposures of individuals to concentrations in excess of the levels given in 10 CFR § 20.103 and Appendix B (internal exposures) usually fall into this category as well. These reports must be submitted to the Commission in writing within thirty days of the occurrence. Written reports of events required to be reported under Category A or B must also be submitted within 30 days.

## 6.2 Summary of Exposures In Excess of Regulatory Limits

Table 6.1 summarizes all of the occupational exposures in excess of regulatory limits to external sources of radiation as reported by Commission licensees pursuant to §§ 20.403 and 20.405 during the years 1982 through 1990. For 1987 through 1990 it shows the number of individuals who exceeded various limits while employed by one of several types of licensees. For the years 1982 through 1986, only the exposures in excess of regulatory limits reported by licensed industrial radiography firms are shown separately. Most of the occurrences included in the "Others" category come from research facilities, universities, and measuring and well-logging activities. In 1990, thirteen individuals received external doses that exceeded applicable quarterly limits with the highest external whole body dose being 24 rem (cSv). In each of the years from 1985 through 1990, the highest external whole body dose was 27.0, 4.2, 7.5, 14, 93, and 24 rem (cSv), respectively.

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

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

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

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

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

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

| YEAR | LICENSE CATEGORY | PERSONS AND DOSES (REM) | TYPES OF EXPOSURES AND DOSES | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | WHOLE BODY (REM) | | | SKIN (REMS) | | | EXTREMITY (REMS) | | |
| | | | (<5) | (>5<25) | (>25) | (>7.5<30) | (>30<150) | (>150) | (>18.75<75) | (>75<375) | (>375) |
| 1990 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS | 3 | 3[a,b] | | | | 1[a] | | 1 | 2[a] |
| | | SUM OF DOSES | 7.2 | 49.9 | | | | 6000 | | 111 | 3962 |
| | POWER REACTORS | NO. OF PERSONS | | | | | | | 1 | | |
| | | SUM OF DOSES | | | | | | | 48.8 | | |
| | MEDICAL FACILITIES | NO. OF PERSONS | 3[c] | | | | | | | | |
| | | SUM OF DOSES | 8.9 | | | | | | | | |
| | MARKETING & MANUFACT. | NO. OF PERSONS | | | | | | | | | |
| | | SUM OF DOSES | | | | | | | | | |
| | OTHER | NO. OF PERSONS | 1 | | | | | | | | |
| | | SUM OF DOSES | 2.3 | | | | | | | | |
| 1989 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS | 3 | | 1 | | | | 1 | | |
| | | SUM OF DOSES | 8.1 | | 93 | | | | 72 | | |
| | POWER REACTORS | NO. OF PERSONS | | | | | | | 1 | | |
| | | SUM OF DOSES | | | | | | | 55 | | |
| | MEDICAL FACILITIES | NO. OF PERSONS | 3 | | | | | | 1 | | |
| | | SUM OF DOSES | 5.3 | | | | | | 50 | | |
| | MARKETING & MANUFACT. | NO. OF PERSONS | | | | | | | | | |
| | | SUM OF DOSES | | | | | | | | | |
| | OTHER | NO. OF PERSONS | 1 | | | 1 | | | | 1 | |
| | | SUM OF DOSES | 1.3 | | | 9.2 | | | | 178 | |
| 1988 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS | 3 | 1 | | | | | | 1 | |
| | | SUM OF DOSES | 8.1 | 6.1 | | | | | | 118 | |
| | POWER REACTORS | NO. OF PERSONS | 6 | | | 3 | 1 | 1 | | | |
| | | SUM OF DOSES | 15.7 | | | 52.8 | 61 | 278 | | | |
| | MEDICAL FACILITIES | NO. OF PERSONS | | | | 1 | | | | 1 | |
| | | SUM OF DOSES | | | | 14.0 | | | | 127 | |
| | MARKETING & MANUFACT. | NO. OF PERSONS | 1 | | | | | | 1 | | |
| | | SUM OF DOSES | 3.64 | | | | | | 58 | | |
| | OTHER | NO. OF PERSONS | | | | | | | | | |
| | | SUM OF DOSES | | | | | | | | | |
| 1987 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS | 1 | | | | | | | 1 | |
| | | SUM OF DOSES | 3.1 | | | | | | | 180 | |
| | POWER REACTORS | NO. OF PERSONS | 1 | | | 2 | | | 1 | | |
| | | SUM OF DOSES | 1.3 | | | 34.8 | | | 30.3 | | |
| | MEDICAL FACILITIES | NO. OF PERSONS | | 1 | | | | | | | |
| | | SUM OF DOSES | | 7.5 | | | | | | | |
| | MARKETING & MANUFACT. | NO. OF PERSONS | | | | | | | 2 | | 1 |
| | | SUM OF DOSES | | | | | | | 41.7 | | 650 |
| | OTHER | NO. OF PERSONS | 1 | | | 3 | | | | | |
| | | SUM OF DOSES | 1.5 | | | 93.6 | | | | | |
| 1986 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS | 2 | | | | | | | | |
| | | SUM OF DOSES | 4.4 | | | | | | | | |
| | ALL OTHER | NO. OF PERSONS | 3 | | | | | | 1 | 1 | 2 |
| | | SUM OF DOSES | 9.6 | | | | | | 41.2 | 115 | 930 |
| 1985 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS | 6 | 3 | 1 | | | | | 1 | |
| | | SUM OF DOSES | 16.7 | 32.6 | 27.0 | | | | | 288 | |
| | ALL OTHER | NO. OF PERSONS | 7 | | | | | | 3 | 1 | |
| | | SUM OF DOSES | 11.8 | | | | | | 60.2 | 93 | |
| 1984 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS | 3 | 1 | | 1 | 1 | | 3 | | |
| | | SUM OF DOSES | 12.5 | 8.2 | | 10.8 | 38.0 | | 127.9 | | |
| | ALL OTHER | NO. OF PERSONS | 6 | 1 | | | | | 5 | | |
| | | SUM OF DOSES | 15.0 | 5.2 | | | | | 110.7 | | |
| 1983 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS | 1 | | | | | | | | 1 |
| | | SUM OF DOSES | 4.7 | | | | | | | | 650 |
| | ALL OTHER | NO. OF PERSONS | 11 | 1[d] | | | | | 27 | 2 | |
| | | SUM OF DOSES | 20.1 | 25 | | | | | 887 | 228 | |
| 1982 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS | 6 | 3 | | | | | | | |
| | | SUM OF DOSES | 16.1 | 20.7 | | | | | | | |
| | ALL OTHER | NO. OF PERSONS | 5[e] | 1 | | | | | 15 | 2 | |
| | | SUM OF DOSES | 12.5 | 9.4 | | | | | 569 | 206 | |

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

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

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# APPENDIX A

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

1990

# APPENDIX A

## INDUSTRIAL RADIOGRAPHERS Single Location - 1990

| Licensee Name Program Code - 03310 | License Number | Total Individuals Monitored | Workers with Measurable Exposure | Collective Dose (person-rem) | Average Meas'ble Dose (rems or cSv) |
|---|---|---|---|---|---|
| BRIGHTON CORP. | 34-21480-01 | 6 | 3 | 2.800 | 0.93 |
| MAYNARD ELECTRIC STEEL CASTING CO. | 48-07080-01 | 5 | 3 | 2.500 | 0.83 |
| WISCONSIN CENTRIFUGAL, INC. | 48-11641-01 | 5 | 5 | 2.025 | 0.41 |
| SOUTHWESTERN ENGINEERING CO. | 24-19500-01 | 4 | 2 | 0.750 | 0.38 |
| MINNESOTA VALLEY ENGINEERING | 22-24393-01 | 7 | 3 | 0.800 | 0.27 |
| STRUTHERS WELLS CORPORATION | 37-11152-01 | 16 | 4 | 1.025 | 0.26 |
| LUCIUS PITKIN INC. | 29-27816-01 | 18 | 10 | 2.550 | 0.26 |
| THIOKOL CORPORATION | 01-00856-02 | 40 | 11 | 2.575 | 0.23 |
| MANOIR - ELECTRO ALLOYS, INC. | 34-24346-01 | 15 | 11 | 2.450 | 0.22 |
| LYNCHBURG FOUNDRY COMPANY | 45-17464-01 | 9 | 9 | 1.975 | 0.22 |
| AIR PRODUCTS AND CHEMICALS, INC. | 37-05105-05 | 18 | 2 | 0.350 | 0.18 |
| COPES-VULCAN | 37-19530-01 | 1 | 1 | 0.175 | 0.18 |
| TRANS WORLD AIRLINES, INC. | 24-05151-05 | 61 | 6 | 1.050 | 0.18 |
| CONNEX PIPE SYSTEMS | 34-00850-02 | 5 | 4 | 0.650 | 0.16 |
| HARRISON STEEL CASTINGS COMPANY | 13-02141-01 | 5 | 3 | 0.400 | 0.13 |
| QUAKER ALLOY | 37-03671-01 | 11 | 7 | 0.925 | 0.13 |
| NAVY, DEPT. OF THE | 28-00102-A1NP | 42 | 41 | 5.175 | 0.13 |
| DURALOY COMPANY (THE) | 37-02279-02 | 9 | 7 | 0.850 | 0.12 |
| NAVY, DEPT. OF THE | 59-45249-A1NP | 18 | 13 | 1.475 | 0.11 |
| AMERICAN FOUNDRY, NUCLEAR DIV. | 35-26893-01 | 6 | 4 | 0.450 | 0.11 |
| DURIRON CO., INC FOUNDRY DIV. | 34-06398-01 | 4 | 4 | 0.450 | 0.11 |
| P. X. ENGINEERING COMPANY INC. | 20-15102-01 | 5 | 3 | 0.275 | 0.09 |
| REFINERY PRODUCTS CORPORATION | 48-03665-02 | 5 | 3 | 0.275 | 0.09 |
| CARONDELET FOUNDRY COMPANY | 24-26136-01 | 9 | 8 | 0.725 | 0.09 |
| NAVY, DEPT. OF THE | 37-00151-A1NP | 52 | 21 | 1.675 | 0.08 |
| ATLANTIC RESEARCH CORPORATION | 45-02808-04 | 26 | 26 | 2.050 | 0.08 |
| NATIONAL AERONAUTICS AND SPACE ADMIN. | 34-00507-04 | 31 | 6 | 0.425 | 0.07 |
| ABEX CORP. WAUKESHA FOUNDRY DIV. | 48-13776-01 | 7 | 1 | 0.050 | 0.05 |
| ARROW TANK & ENGINEERING COMPANY | 22-13253-01 | 5 | 2 | 0.100 | 0.05 |
| BABCOCK & WILCOX COMPANY | 34-02160-03 | 51 | 17 | 0.850 | 0.05 |
| BUCKEYE STEEL CASTINGS | 34-06627-01 | 2 | 1 | 0.050 | 0.05 |
| CONNECTICUT, STATE OF | 06-06472-03 | 23 | 1 | 0.050 | 0.05 |
| DRESSER IND., WORTHINGTON PUMP DIV. | 29-02210-02 | 3 | 3 | 0.150 | 0.05 |
| EMPIRE STEEL CASTINGS, INC. | 37-02448-01 | 5 | 2 | 0.100 | 0.05 |
| GENERAL ELECTRIC CO. | 45-24957-01 | 34 | 1 | 0.050 | 0.05 |
| GTE LABS, INC. | 20-15610-02 | 4 | 4 | 0.200 | 0.05 |
| HIGH STEEL STRUCTURES, INC. | 37-17534-01 | 16 | 8 | 0.400 | 0.05 |
| INGERSOLL-RAND COMPANY | 29-02015-02 | 2 | 2 | 0.100 | 0.05 |
| MASON & HANGER-SILAS CO., INC. | 14-24479-01 | 7 | 3 | 0.150 | 0.05 |
| MORTON THIOKOL | 17-16380-01 | 43 | 5 | 0.250 | 0.05 |
| NAVY, DEPT. OF THE | 04-60258-A1NP | 11 | 11 | 0.550 | 0.05 |
| NAVY, DEPT. OF THE | 46-00253-A1NP | 4 | 2 | 0.100 | 0.05 |

## APPENDIX A (cont.)

## INDUSTRIAL RADIOGRAPHERS Single Location - 1990

| Licensee Name | Program Code - 03310 | License Number | Total Individuals Monitored | Workers with Measurable Exposure | Collective Dose (person-rem) | Average Meas'ble Dose (rems or cSv) |
|---|---|---|---|---|---|---|
| NAVY, DEPT. OF THE | | 39-52903-A1NP | 13 | 5 | 0.250 | 0.05 |
| NAVY, DEPT. OF THE | | 45-32732-A1NP | 13 | 2 | 0.100 | 0.05 |
| NAVY, DEPT. OF THE | | 59-45255-A1NP | 5 | 2 | 0.100 | 0.05 |
| SAWYER RESEARCH PRODUCTS, INC. | | 34-02044-01 | 5 | 3 | 0.150 | 0.05 |
| SHAFER VALVE CO. | | 34-21198-01 | 4 | 2 | 0.100 | 0.05 |
| ST. LOUIS STEEL CASTING, INC. | | 24-01587-01 | 4 | 4 | 0.200 | 0.05 |
| TAYLOR AND FENN COMPANY | | 06-02024-01 | 2 | 2 | 0.100 | 0.05 |
| WILLIAM POWELL COMPANY (THE) | | 34-02963-01 | 6 | 1 | 0.050 | 0.05 |
| ARMY, DEPT. OF THE | | 13-18235-01 | 10 | 0 | 0.000 | 0.00 |
| ARMY, DEPT. OF THE | | 35-19189-02 | 35 | 0 | 0.000 | 0.00 |
| DAY & ZIMMERMAN, INC. | | 42-15051-02 | 4 | 0 | 0.000 | 0.00 |
| E.I. DUPONT DE NEMOURS & CO. | | 07-00455-30 | 0 | 0 | 0.000 | 0.00 |
| GENERAL MOTORS CORPORATION | | 21-02392-01 | 3 | 0 | 0.000 | 0.00 |
| IONICS INC | | 37-20757-02 | 9 | 0 | 0.000 | 0.00 |
| MISSOURI PRECISION CASTINGS, INC | | 24-15152-01 | 5 | 0 | 0.000 | 0.00 |
| MISSOURI STEEL CASTINGS CO. | | 25-15152-01 | 5 | 0 | 0.000 | 0.00 |
| NAVY, DEPT. OF THE | | 19-0464A-A1NP | 4 | 0 | 0.000 | 0.00 |
| NILES STEEL TANK COMPANY | | 21-04741-01 | 4 | 0 | 0.000 | 0.00 |
| NORTHWEST AIRLINES INC. | | 22-12080-01 | 31 | 0 | 0.000 | 0.00 |
| PELTON CASTEEL INC | | 48-02669-02 | 4 | 0 | 0.000 | 0.00 |
| PRYOR FOUNDRY, INC. | | 35-18099-01 | 3 | 0 | 0.000 | 0.00 |
| VOLLRATH COMPANY, FOUNDRY DIV. | | 48-05395-01 | 3 | 0 | 0.000 | 0.00 |
| WESTINGHOUSE ELECTRIC CORPORATION | | 37-05809-02 | 10 | 0 | 0.000 | 0.00 |
| WORD INDUSTRIES PIPE FABRICATING INC. | | 35-15458-01 | 0 | 0 | 0.000 | 0.00 |
| | | | 832 | 304 | 41.025 | 0.13 |

# APPENDIX A (cont.)

## INDUSTRIAL RADIOGRAPHERS Multiple Location - 1990

| Licensee Name Program Code - 03320 | License Number | Total Individuals Monitored | Workers with Measurable Exposure | Collective Dose (person-rem) | Average Meas'ble Dose (rems or cSv) |
|---|---|---|---|---|---|
| CTL ENGINEERING, INC. | 34-08331-01 | 2 | 2 | 4.000 | 2.00 |
| CAPITAL X-RAY SERVICE, INC. | 35-11114-01 | 24 | 24 | 38.900 | 1.62 |
| H&H X-RAY SERVICES INC. | 17-19236-01 | 8 | 8 | 12.750 | 1.59 |
| H&G INSPECTION CO., INC. | 42-26838-01 | 9 | 9 | 13.925 | 1.55 |
| TRI-STATE INSPECTION & CONSULTANTS | 37-19640-01 | 4 | 3 | 4.500 | 1.50 |
| INDEPENDENT INSPECTION CORP. INC. | 35-26824-01 | 5 | 5 | 7.250 | 1.45 |
| TULSA GAMMA RAY, INC. | 35-17178-01 | 36 | 35 | 49.250 | 1.41 |
| BARNETT INDUSTRIAL X-RAY | 35-26953-01 | 8 | 8 | 10.875 | 1.36 |
| QUALITY ENGINEERING SERV.& TESTS. | 35-26815-01 | 11 | 8 | 10.875 | 1.36 |
| TRI STATE ASSOCIATES, INC. | 45-24967-01 | 8 | 7 | 9.350 | 1.34 |
| INTERMOUNTAIN TESTING COMPANY | 05-07872-01 | 18 | 18 | 23.100 | 1.28 |
| PIPELINE INSPECTION & ENGINEERING | 21-26060-01 | 10 | 10 | 12.625 | 1.26 |
| BILL MILLER, INC. | 35-19048-01 | 45 | 41 | 51.275 | 1.25 |
| HIGH MOUNTAIN INSPECTION SERV., INC. | 49-26808-01 | 104 | 78 | 91.425 | 1.17 |
| WESTERN X-RAY COMPANY | 35-19993-01 | 16 | 16 | 18.475 | 1.15 |
| TECHNICAL WELDING & INSPECTION SERV. | 16-24812-01 | 4 | 4 | 4.500 | 1.13 |
| CLEVELAND X-RAY INSPECTION, INC. | 35-15205-01 | 124 | 119 | 132.200 | 1.11 |
| O'CONNELL LIMITED PARTNERSHIP | 35-13735-01 | 4 | 4 | 4.350 | 1.09 |
| MIDWEST INSPECTION SERVICES | 35-27005-01 | 29 | 29 | 29.675 | 1.02 |
| FROEHLING & ROBERTSON INC. | 45-08890-01 | 11 | 11 | 10.925 | 0.99 |
| NONDESTRUCTIVE INSPECTION SERVICE | 47-11883-01 | 5 | 5 | 4.925 | 0.99 |
| SCIENTIFIC INSPECTION TECH., INC. | 41-25027-01 | 44 | 41 | 38.950 | 0.95 |
| MET-CHEM TESTING LABS OF UTAH, INC. | 43-26821-01 | 32 | 32 | 30.350 | 0.95 |
| NORTH AMERICAN INSPECTION, INC. | 37-23370-01 | 64 | 64 | 60.475 | 0.94 |
| COLBY & THIELMEIER TESTING CO | 24-13737-01 | 9 | 9 | 8.100 | 0.90 |
| D & S TESTING, INC. | 34-21458-01 | 11 | 9 | 7.925 | 0.88 |
| MATTINGLY TESTING SERVICES, INC. | 25-21479-01 | 9 | 8 | 6.925 | 0.87 |
| INSPECTION SERVICES & TESTING | 50-23257-01 | 33 | 32 | 27.450 | 0.86 |
| GLOBE X-RAY SERVICES, INC. | 35-15194-01 | 40 | 37 | 31.225 | 0.84 |
| PENN INSPECTION CO. | 35-21144-01 | 16 | 15 | 12.575 | 0.84 |
| EDWARDS PIPELINE TESTING, INC. | 35-23193-01 | 101 | 101 | 83.675 | 0.83 |
| CENTURY INSPECTION, INC. | 42-08456-02 | 96 | 89 | 73.525 | 0.83 |
| TWIN PORTS TESTING, INC. | 48-23476-01 | 39 | 26 | 21.475 | 0.83 |
| CONSOLIDATED NDE, INC. | 29-21452-01 | 126 | 122 | 98.575 | 0.81 |
| QUALITY SYSTEMS NDE, LTD. | 37-28085-01 | 21 | 18 | 14.425 | 0.80 |
| ST. LOUIS TESTING LABORATORIES INC. | 24-00188-02 | 16 | 15 | 11.850 | 0.79 |
| ARROW NDE CO, INC. | 35-23198-01 | 4 | 4 | 3.100 | 0.78 |
| FEWELL GEOTECHNICAL ENGINEER., LTD. | 53-23288-01 | 2 | 2 | 1.550 | 0.78 |
| PROFESSIONAL SERVICES INDUSTRIES, INC. | 37-00276-25 | 20 | 15 | 11.375 | 0.76 |
| TEI ANALYTICAL SERVICES, INC. | 37-28004-01 | 61 | 57 | 41.200 | 0.72 |
| JAN X-RAY SERVICE INC | 21-16560-01 | 53 | 48 | 34.150 | 0.71 |
| ALLIED INSPECTION SERVICES INC. | 21-18428-01 | 8 | 5 | 3.550 | 0.71 |

# APPENDIX A (cont.)

## INDUSTRIAL RADIOGRAPHERS Multiple Location - 1990

| Licensee Name Program Code - 03320 | License Number | Total Individuals Monitored | Workers with Measurable Exposure | Collective Dose (person-rem) | Average Meas'ble Dose (rems or cSv) |
|---|---|---|---|---|---|
| ALLEGHENY LABS. | 37-20734-01 | 10 | 7 | 4.825 | 0.69 |
| AKRON INDUSTRIAL SERVICE, INC. | 34-24673-01 | 4 | 4 | 2.700 | 0.68 |
| ADVEX CORPORATION | 45-16452-01 | 13 | 11 | 7.125 | 0.65 |
| CALUMET TESTING SERVICES INC. | 13-16347-01 | 40 | 25 | 15.740 | 0.63 |
| HOUSTON INSPECTION, INC. | 42-26962-01 | 3 | 3 | 1.850 | 0.62 |
| WISCONSIN INDUSTRIAL TESTING INC. | 48-17480-01 | 80 | 75 | 46.100 | 0.61 |
| SIERRA TESTING, INC. | 35-26950-01 | 64 | 61 | 37.400 | 0.61 |
| TESTMASTER INSPECTION CO., INC. | 34-24872-01 | 11 | 10 | 5.975 | 0.60 |
| ALASKA INDUSTRIAL X-RAY | 50-16084-01 | 10 | 8 | 4.725 | 0.59 |
| AMERICAN INSPECTION CO. INC. | 12-24801-01 | 94 | 85 | 49.725 | 0.59 |
| SPEC CONSULTANTS, INC. | 37-27891-01 | 14 | 11 | 6.325 | 0.58 |
| X-RAY, INC. | 46-03414-03 | 31 | 30 | 17.250 | 0.58 |
| CTI, INC. | 50-19202-01 | 70 | 55 | 30.700 | 0.56 |
| EASTERN TESTING AND INSPECTION, INC. | 29-09814-01 | 26 | 22 | 12.000 | 0.55 |
| COMO TECH INSPECTION | 15-26978-01 | 5 | 5 | 2.650 | 0.53 |
| SAMSON INSPECTION TECHNICAL SERVICES, INC. | 34-25898-01 | 27 | 22 | 11.625 | 0.53 |
| LEHIGH TESTING LABORATORIES, INC. | 07-01173-03 | 5 | 4 | 2.050 | 0.51 |
| H. R. INSPECTION SERVICE INC. | 15-06209-01 | 10 | 9 | 4.525 | 0.50 |
| NDT SPECIALISTS, INC. | 48-25917-01 | 2 | 2 | 1.000 | 0.50 |
| TWIN CITY TESTING AND ENGINEERING LAB. | 22-01376-02 | 26 | 23 | 11.450 | 0.50 |
| MQS INSPECTION | 12-00622-07 | 620 | 494 | 244.575 | 0.50 |
| TESTING TECHNOLOGIES, INC. | 45-25007-01 | 12 | 11 | 5.375 | 0.49 |
| HUNTINGTON TESTING LAB, INC. | 47-23076-01 | 31 | 31 | 15.125 | 0.49 |
| TUMBLEWEED X-RAY CO. | 03-23185-01 | 51 | 38 | 18.050 | 0.48 |
| PROGRESS SERVICES,INC. | 34-19592-01 | 16 | 13 | 6.150 | 0.47 |
| BASIN SERVICES, INC | 33-27023-01 | 23 | 21 | 9.725 | 0.46 |
| INDUSTRIAL NDT SERVICES DIVISION | 13-06147-04 | 16 | 12 | 5.500 | 0.46 |
| WALASHEK ENTERPRISES, INC. | 53-23225-01 | 12 | 10 | 4.500 | 0.45 |
| SPACE SCIENCE SERVICES, INC. | 09-07550-01 | 104 | 74 | 31.490 | 0.43 |
| PROFESSIONAL WELDING ASSOC., INC. | 48-25806-01 | 10 | 10 | 4.250 | 0.43 |
| MIDWEST INSPECTION SERVICE LTD | 48-16296-01 | 17 | 10 | 4.200 | 0.42 |
| JACKSONVILLE SHIPYARDS INC. | 09-15611-01 | 7 | 2 | 0.800 | 0.40 |
| OLD DOMINION FABRICATORS | 45-15581-01 | 6 | 6 | 2.400 | 0.40 |
| GLITSCH FIELD SERVICES/NDE, INC | 34-14071-01 | 51 | 36 | 14.075 | 0.39 |
| MONTANA X-RAY INC. | 25-21134-01 | 4 | 4 | 1.550 | 0.39 |
| MATERIALS TESTING LABORATORIES, INC. | 45-17151-01 | 12 | 10 | 3.800 | 0.38 |
| ELPASO NATURAL GAS COMPANY | 42-03201-02 | 7 | 7 | 2.650 | 0.38 |
| CARROLL ENGINEERS, INC. | 20-13042-02 | 4 | 1 | 0.375 | 0.38 |
| LABARGE PIPE & STEEL CO. | 35-26836-01 | 4 | 2 | 0.750 | 0.38 |
| WOS TESTING CO. | 12-24959-01 | 2 | 1 | 0.375 | 0.38 |
| CONAM INSPECTION, INC | 12-16559-01 | 80 | 52 | 19.400 | 0.37 |
| N.V. ENTERPRISES | 49-26888-01 | 7 | 7 | 2.450 | 0.35 |

# APPENDIX A (cont.)

## INDUSTRIAL RADIOGRAPHERS Multiple Location - 1990

| Licensee Name | Program Code - 03320 | License Number | Total Individuals Monitored | Workers with Measurable Exposure | Collective Dose (person-rem) | Average Meas'ble Dose (rems or cSv) |
|---|---|---|---|---|---|---|
| CONSTRUCTION ENGINEERING CONSULTANT | | 37-18456-01 | 50 | 37 | 12.625 | 0.34 |
| QUALITY ASSURANCE LABORATORIES, INC. | | 18-19078-01 | 8 | 5 | 1.675 | 0.34 |
| Q.C. LABORATORIES, INC. | | 09-11579-03 | 28 | 25 | 8.350 | 0.33 |
| INDUSTRIAL METAL TREATING CORPORATION | | 07-28478-01 | 13 | 4 | 1.300 | 0.33 |
| WESTERN STRESS, INC. | | 42-26900-01 | 80 | 46 | 14.600 | 0.32 |
| SCIENTIFIC TECHNICAL, INC. | | 45-24882-01 | 6 | 5 | 1.525 | 0.31 |
| PITT-DES MOINES, INC. | | 37-27878-01 | 24 | 23 | 6.975 | 0.30 |
| AMERICAN OIL COMPANY (THE) (AMOCO) | | 13-00155-10 | 27 | 24 | 7.275 | 0.30 |
| INDUSTRIAL NDT CO., INC. | | 39-24888-01 | 48 | 39 | 10.725 | 0.28 |
| INSPECTION SERVICE CORP | | 37-11636-01 | 3 | 3 | 0.800 | 0.27 |
| BRANCH RADIOGRAPHIC LABORATORIES, INC. | | 29-03405-02 | 22 | 22 | 5.550 | 0.25 |
| ABC TESTING | | 20-19778-01 | 7 | 6 | 1.450 | 0.24 |
| RELIANCE TESTING LABORATORIES INC. | | 19-17176-01 | 28 | 21 | 4.825 | 0.23 |
| NAVY, DEPT. OF THE | | 59-20635-A1NP | 11 | 8 | 1.825 | 0.23 |
| ACCU-TECH EVALUATION SERVICES INC | | 29-28358-01 | 18 | 13 | 2.950 | 0.23 |
| NDE SERVICES, INC. | | 05-19821-01 | 8 | 7 | 1.575 | 0.23 |
| STANDARD TESTING & ENGINEERING CO. | | 35-17054-02 | 4 | 4 | 0.900 | 0.23 |
| VENEGAS INDUSTRIAL TESTING | | 28-14847-02 | 4 | 4 | 0.900 | 0.23 |
| CBI INDUSTRIES, INC. | | 42-13553-02 | 168 | 129 | 27.700 | 0.21 |
| S&ME, INC./AIRPORT STA. | | 41-24965-01 | 32 | 19 | 4.050 | 0.21 |
| ANR PIPELINE CO, LABORATORY SERVICES | | 21-24502-01 | 6 | 2 | 0.425 | 0.21 |
| INDESERV, INC | | 45-25074-01 | 8 | 8 | 1.625 | 0.20 |
| ATEC ASSOC. OF VA., INC. | | 45-16546-03 | 11 | 6 | 1.200 | 0.20 |
| TENNESSEE VALLEY AUTHORITY | | 41-06832-06 | 27 | 17 | 3.390 | 0.20 |
| INSPECTION SERVICES, INC. | | 41-21154-01 | 21 | 10 | 1.950 | 0.20 |
| X-R-I TESTING | | 21-05472-01 | 160 | 60 | 11.625 | 0.19 |
| UNIVERSAL TECHNICAL TESTING, INC. | | 37-00453-03 | 19 | 14 | 2.700 | 0.19 |
| NAVY, DEPT. OF THE, (USS CANOPUS) | | 59-04720-A1NP | 16 | 11 | 2.025 | 0.18 |
| CRAMER & LINDELL ENGINEERS, INC. | | 06-20794-01 | 22 | 21 | 3.800 | 0.18 |
| PLANT INSPECTION CO | | 04-21032-01 | 12 | 7 | 1.250 | 0.18 |
| NONDESTRUCTIVE TESTING CORP | | 29-19742-01 | 22 | 15 | 2.550 | 0.17 |
| NEWPORT NEWS SHIPBUILDING AND DRY DOCK | | 45-09428-02 | 82 | 71 | 11.875 | 0.17 |
| NOVA DATA TESTING LABS, INC. | | 45-24872-01 | 12 | 10 | 1.650 | 0.17 |
| DAYTON X-RAY COMPANY | | 34-06943-01 | 10 | 8 | 1.300 | 0.16 |
| ASTROTECH, INC. | | 37-09928-01 | 11 | 10 | 1.600 | 0.16 |
| CONSUMERS POWER COMPANY | | 21-08606-03 | 18 | 14 | 2.225 | 0.16 |
| HERRON TESTING LABORATORY INC. | | 34-00681-03 | 14 | 11 | 1.700 | 0.15 |
| ARNOLD GREENE TESTING LABORATORIES | | 20-01074-02 | 30 | 18 | 2.700 | 0.15 |
| PARKER INDUSTRIAL X-RAY LABORATORY CORP. | | 06-01337-03 | 13 | 9 | 1.350 | 0.15 |
| ANCHOR/DARLING VALVE COMPANY | | 37-15476-01 | 8 | 6 | 0.800 | 0.13 |
| MAGNA CHEK, INC. | | 21-19111-02 | 31 | 17 | 2.250 | 0.13 |
| AMERICON, INC. | | 34-02160-04 | 43 | 9 | 1.150 | 0.13 |

# APPENDIX A (cont.)

## INDUSTRIAL RADIOGRAPHERS Multiple Location - 1990

| Licensee Name | Program Code - 03320 | License Number | Total Individuals Monitored | Workers with Measurable Exposure | Collective Dose (person-rem) | Average Meas'ble Dose (rems or cSv) |
|---|---|---|---|---|---|---|
| NOOTER CORPORATION | | 24-03783-01 | 18 | 7 | 0.800 | 0.11 |
| NAVY, DEPT. OF THE | | 59-05851-A1NP | 12 | 9 | 1.025 | 0.11 |
| EBASCO SERVICES, INC. | | 29-07056-03 | 15 | 6 | 0.675 | 0.11 |
| FOSTER WHEELER CONSTRUCTORS,INC. | | 29-28016-01 | 6 | 2 | 0.225 | 0.11 |
| NAVY, DEPT. OF THE | | 59-04697-A1NP | 13 | 10 | 1.125 | 0.11 |
| POWER PIPING COMPANY | | 37-09945-01 | 7 | 4 | 0.450 | 0.11 |
| QC SERVICES | | 04-14875-02 | 24 | 8 | 0.900 | 0.11 |
| NAVY, DEPT. OF THE | | 46-00251-A1NP | 65 | 64 | 6.900 | 0.11 |
| NAVY, DEPT. OF THE | | 59-04696-A1NP | 16 | 13 | 1.400 | 0.11 |
| NAVY, DEPT. OF THE | | 04-00221-A1NP | 27 | 22 | 2.350 | 0.11 |
| NAVY, DEPT. OF THE | | 39-00191-A1NP | 64 | 60 | 6.250 | 0.10 |
| ALONSO & CARUS IRON WORKS, INC. | | 52-21350-01 | 7 | 5 | 0.500 | 0.10 |
| NAVY, DEPT. OF THE | | 06-68316-A1NP | 21 | 19 | 1.850 | 0.10 |
| BAKER TESTING SERVICES INC. | | 20-19067-01 | 12 | 8 | 0.775 | 0.10 |
| NORFOLK SHIPBUILDING AND DRYDOCK CORP. | | 45-12042-01 | 16 | 15 | 1.375 | 0.09 |
| PUBLIC SERVICE OF INDIANA | | 13-15544-06 | 5 | 3 | 0.275 | 0.09 |
| COLUMBIA GAS TRANSMISSION CORPORATION | | 47-16060-01 | 5 | 4 | 0.325 | 0.08 |
| NAVY, DEPT. OF THE | | 45-00181-A1NP | 73 | 69 | 5.300 | 0.08 |
| BATH IRON WORKS CORPORATION | | 18-00828-04 | 21 | 5 | 0.375 | 0.08 |
| BRIGGS ASSOCIATES INC. | | 20-16401-01 | 32 | 14 | 0.950 | 0.07 |
| EG & G FLORIDA, INC., BOC-005 | | 09-21233-01 | 40 | 17 | 1.100 | 0.06 |
| NAVY, DEPT. OF THE | | 53-00311-A1NP | 31 | 28 | 1.650 | 0.06 |
| STONE & WEBSTER ENGINEERING CORP. | | 20-05600-02 | 24 | 14 | 0.825 | 0.06 |
| HUTCHINSON AREA VO-TECH INSTITUTE | | 22-15554-01 | 304 | 167 | 9.300 | 0.06 |
| AMERICAN AIRLINES, INC | | 35-13964-01 | 51 | 5 | 0.250 | 0.05 |
| AMOCO OIL COMPANY | | 45-01378-02 | 18 | 1 | 0.050 | 0.05 |
| ARMY, DEPT. OF THE | | 30-02405-05 | 4 | 2 | 0.100 | 0.05 |
| C & R LABORATORIES | | 53-19179-01 | 3 | 3 | 0.150 | 0.05 |
| CENTERIOR SERVICE CO | | 34-23406-01 | 5 | 3 | 0.150 | 0.05 |
| FACTORY MUTUAL RESEARCH CORPORATION | | 20-04007-02 | 5 | 3 | 0.150 | 0.05 |
| FOSTER WHEELER ENERGY CORP. | | 31-01776-05 | 12 | 7 | 0.350 | 0.05 |
| INTERNATIONAL TESTING LAB. | | 29-14027-01 | 6 | 6 | 0.300 | 0.05 |
| NAVY, DEPT. OF THE | | 38-68829-A1NP | 12 | 5 | 0.250 | 0.05 |
| NAVY, DEPT. OF THE | | 82-62770-A1NP | 13 | 6 | 0.300 | 0.05 |
| NAVY, DEPT. OF THE | | 53-00314-A1NP | 15 | 3 | 0.150 | 0.05 |
| NAVY, DEPT. OF THE | | 04-68828-A1NP | 6 | 3 | 0.150 | 0.05 |
| NAVY, DEPT. OF THE | | 04-0581A-A1NP | 88 | 12 | 0.600 | 0.05 |
| NAVY, DEPT. OF THE | | 53-68251-A1NP | 13 | 6 | 0.300 | 0.05 |
| NAVY, DEPT. OF THE | | 04-65918-A1NP | 26 | 22 | 1.100 | 0.05 |
| NAVY, DEPT. OF THE | | 45-32770-A1NP | 31 | 3 | 0.150 | 0.05 |
| NAVY, DEPT. OF THE | | 46-68438-A1NP | 41 | 24 | 1.200 | 0.05 |
| NAVY, DEPT. OF THE | | 59-21047-A1NP | 26 | 26 | 1.300 | 0.05 |

## APPENDIX A (cont.)

## INDUSTRIAL RADIOGRAPHERS Multiple Location - 1990

| Licensee Name | Program Code - 03320 | License Number | Total Individuals Monitored | Workers with Measurable Exposure | Collective Dose (person-rem) | Average Meas'ble Dose (rems or cSv) |
|---|---|---|---|---|---|---|
| NAVY, DEPT. OF THE | | 59-21063-A1NP | 21 | 9 | 0.450 | 0.05 |
| NAVY, DEPT. OF THE | | 59-20132-A1NP | 18 | 7 | 0.350 | 0.05 |
| NAVY, DEPT. OF THE | | 59-45247-A1NP | 16 | 6 | 0.300 | 0.05 |
| NAVY, DEPT. OF THE | | 59-68780-A1NP | 13 | 10 | 0.500 | 0.05 |
| NAVY, DEPT. OF THE | | 59-04628-A1NP | 14 | 7 | 0.350 | 0.05 |
| NAVY, DEPT. OF THE | | 59-04620-A1NP | 14 | 9 | 0.450 | 0.05 |
| NAVY, DEPT. OF THE | | 59-04629-A1NP | 13 | 6 | 0.300 | 0.05 |
| NAVY, DEPT. OF THE | | 59-04648-A1NP | 20 | 5 | 0.250 | 0.05 |
| NAVY, DEPT. OF THE | | 59-21098-A1NP | 12 | 3 | 0.150 | 0.05 |
| NAVY, DEPT. OF THE | | 59-04638-A1NP | 6 | 4 | 0.200 | 0.05 |
| NAVY, DEPT. OF THE | | 59-08808-A1NP | 10 | 1 | 0.050 | 0.05 |
| NAVY, DEPT. OF THE | | 59-21046-A1NP | 10 | 2 | 0.100 | 0.05 |
| NAVY, DEPT. OF THE | | 59-04639-A1NP | 10 | 1 | 0.050 | 0.05 |
| PIPING SPECIALISTS | | 24-24826-01 | 2 | 2 | 0.100 | 0.05 |
| SPECTRUM LABORATORIES, INC. | | 29-07266-01 | 5 | 4 | 0.200 | 0.05 |
| UNIVERSAL TESTING LABORATORIES, INC | | 41-25097-01 | 19 | 2 | 0.100 | 0.05 |
| PRECISION COMPONENTS CORPORATION | | 37-16280-01 | 68 | 30 | 1.270 | 0.04 |
| VOITH HYDRO, INC. | | 37-16280-03 | 21 | 18 | 0.570 | 0.03 |
| ANVIL CORP | | 46-23236-01 | 0 | 0 | 0.000 | 0.00 |
| BMY, DIV. OF HARSCO CORP. | | 37-20684-02 | 6 | 0 | 0.000 | 0.00 |
| INDUSTRIAL TESTING LAB. SERVICES CORP | | 37-16406-01 | 11 | 0 | 0.000 | 0.00 |
| NAVY, DEPT. OF THE | | 04-60036-A1NP | 0 | 0 | 0.000 | 0.00 |
| NAVY, DEPT. OF THE | | 59-08810-A1NP | 19 | 0 | 0.000 | 0.00 |
| NAVY, DEPT. OF THE | | 59-05837-A1NP | 14 | 0 | 0.000 | 0.00 |
| | | | 5,691 | 4,154 | 2,079.035 | 0.50 |

# APPENDIX A (cont.)

## MANUFACTURERS AND DISTRIBUTORS - 1990

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

## APPENDIX A (cont.)

## MANUFACTURERS AND DISTRIBUTORS - 1990

| Licensee Name | Program Type | Program Code | License Number | Total Individuals Monitored | Workers with Measurable Exposure | Collective Dose (person-rem) | Average Meas'ble Dose (rems or cSv) |
|---|---|---|---|---|---|---|---|
| STOCKER & YALE, INC | OTHER | 03214 | 20-16532-01 | 46 | 46 | 2.300 | 0.05 |
| VARIAN/BEVERLY MICROWAVE DIV. | OTHER | 03214 | 20-02237-04 | 18 | 1 | 0.050 | 0.05 |
| BIOQUANT, INC | OTHER | 03214 | 21-25897-02 | 9 | 0 | 0.000 | 0.00 |
| DISPLAYS INC | OTHER | 03214 | 37-19629-04 | 3 | 0 | 0.000 | 0.00 |
| ENSECO INCORPORATED | OTHER | 03214 | 29-09801-02 | 2 | 0 | 0.000 | 0.00 |
| GENERAL NUCLEONICS, INC | OTHER | 03214 | 04-12071-02 | 12 | 0 | 0.000 | 0.00 |
| LASERMIKE, INC | OTHER | 03214 | 34-25899-01 | 18 | 0 | 0.000 | 0.00 |
| PHARMACIA, INC | OTHER | 03214 | 29-13915-05 | 14 | 0 | 0.000 | 0.00 |
| WING CORPORATION | OTHER | 03214 | 29-13180-01 | 16 | 0 | 0.000 | 0.00 |
| | | | | 485 | 206 | 18.725 | 0.09 |
| SYNCOR CORPORATION | PHARMACIES | 02500 | 34-16654-01MD | 27 | 10 | 1.200 | 0.12 |
| SYNCOR CORPORATION | PHARMACIES | 02500 | 45-17769-01MD | 14 | 6 | 0.425 | 0.07 |
| SYNCOR CORPORATION | PHARMACIES | 02500 | 34-18484-01MD | 20 | 7 | 0.390 | 0.06 |
| MPI PHARMACY SERVICES, INC | PHARMACIES | 02500 | 34-26239-01MD | 9 | 2 | 0.100 | 0.05 |
| NUCLEAR PHARMACY, INC. | PHARMACIES | 02500 | 20-21227-01MD | 19 | 5 | 0.250 | 0.05 |
| RADIOPHARMACY INCORPORATED | PHARMACIES | 02500 | 13-26246-01MD | 5 | 1 | 0.050 | 0.05 |
| SYNCOR CORPORATION | PHARMACIES | 02500 | 29-19608-01MD | 55 | 15 | 0.750 | 0.05 |
| SYNCOR CORPORATION | PHARMACIES | 02500 | 35-19583-01MD | 9 | 2 | 0.100 | 0.05 |
| | | | | 158 | 48 | 3.265 | 0.07 |

## APPENDIX A (cont.)

## FUEL FABRICATORS AND PROCESSORS - 1990

| Licensee Name | Program Code - 21210 | License Number | Total Individuals Monitored | Workers with Measurable Exposure | Collective Dose (person-rem) | Average Meas'ble Dose (rems or cSv) |
|---|---|---|---|---|---|---|
| ROCKWELL INTERNATIONAL CORP | | SNM-0021 | 78 | 34 | 13.450 | 0.40 |
| COMBUSTION ENGINEERING, INC. | | SNM-0033 | 111 | 74 | 10.150 | 0.14 |
| GENERAL ELECTRIC CO. | | SNM-1097 | 1,028 | 588 | 76.125 | 0.13 |
| BABCOCK AND WILCOX FUEL CO. | | SNM-1168 | 172 | 124 | 14.250 | 0.11 |
| ADVANCED NUCLEAR FUELS CORP. | | SNM-1227 | 468 | 364 | 41.700 | 0.11 |
| GENERAL ATOMICS | | SNM-0696 | 925 | 84 | 7.750 | 0.09 |
| COMBUSTION ENGINEERING INC. | | SNM-1067 | 260 | 103 | 8.825 | 0.09 |
| NUCLEAR FUEL SERVICES INC, | | SNM-0124 | 7,373 | 739 | 46.025 | 0.06 |
| BABCOCK AND WILCOX CO. | | SNM-0042 | 3,118 | 1,070 | 66.275 | 0.06 |
| UNITED NUCLEAR CORPORATION, INC. | | SNM-0368 | 223 | 53 | 2.775 | 0.05 |
| | | | 13,756 | 3,233 | 287.325 | 0.09 |

## INDEPENDENT SPENT FUEL STORAGE INSTALLATION - 1990

| Licensee Name | Program Code - 23200 | License Number | Total Individuals Monitored | Workers with Measurable Exposure | Collective Dose (person-rem) | Average Meas'ble Dose (rems or cSv) |
|---|---|---|---|---|---|---|
| GENERAL ELECTRIC COMPANY | | SNM-2500 | 38 | 22 | 5.700 | 0.26 |
| CAROLINA POWER AND LIGHT CO. | | SNM-2502 | 18 | 0 | 0.000 | 0.00 |
| VIRGINIA ELECTRIC POWER* | | SNM-2501 | 0 | 0 | 0.000 | 0.00 |
| | | | 56 | 22 | 5.700 | 0.26 |

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

## LOW LEVEL WASTE DISPOSAL FACILITIES - 1990

| Licensee Name | Program Code - 03231 | License Number | Total Individuals Monitored | Workers with Measurable Exposure | Collective Dose (person-rem) | Average Meas'ble Dose (rems or cSv) |
|---|---|---|---|---|---|---|
| U.S. ECOLOGY, INC. | | 16-19204-01 | 217 | 27 | 4.600 | 0.17 |
| CHEM-NUCLEAR SYSTEMS | | 12-13536-01 | 567 | 88 | 21.725 | 0.25 |
| | | | 784 | 115 | 26.325 | 0.23 |

# APPENDIX B

## Annual Whole Body Doses at Licensed Nuclear Power Facilities

## 1990

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

| PLANT NAME | TYPE | Number of Individuals with Whole Body Doses in the Ranges (rems or cSv) | | | | | | | | | | | | | | TOTAL NUMBER MONI-TORED | NUMBER WITH MEAS. EXPOSURE | TOTAL COLLECTIVE DOSE (Person-rem,cSv) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Mea-surable | Meas. <0.10 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.00-5.00 | 5.00-6.00 | 6.00-7.00 | 7.00-12.00 | >12.0 | | | |
| ARKANSAS 1,2 | PWR | 1,924 | 968 | 544 | 454 | 236 | 130 | 160 | 1 | | | | | | | 4,417 | 2,493 | 762 ** |
| BEAVER VALLEY 1,2 | PWR | 1,277 | 815 | 382 | 279 | 119 | 46 | 34 | | | | | | | | 2,952 | 1,675 | 348 ** |
| BIG ROCK POINT | BWR | 83 | 168 | 31 | 33 | 18 | 15 | 49 | 22 | 15 | | | | | | 434 | 351 | 232 |
| BRAIDWOOD 1,2 | PWR | 1,385 | 500 | 309 | 208 | 48 | 13 | 3 | | | | | | | | 2,466 | 1,081 | 186 ** |
| BROWNS FERRY 1,2,3 | BWR | 2,644 | 823 | 592 | 456 | 260 | 167 | 304 | 111 | 4 | | | | | | 5,361 | 2,717 | 1,310 ** |
| BRUNSWICK 1,2 | BWR | 1,076 | 1,432 | 415 | 350 | 248 | 136 | 426 | 175 | | | | | | | 4,258 | 3,182 | 1,548 ** |
| BYRON 1,2 | PWR | 1,838 | 557 | 325 | 222 | 108 | 79 | 99 | 6 | | | | | | | 3,234 | 1,396 | 434 ** |
| CALLAWAY 1 | PWR | 743 | 374 | 212 | 237 | 125 | 67 | 111 | 8 | | | | | | | 1,877 | 1,134 | 442 ** |
| CALVERT CLIFFS 1,2 | PWR | 1,220 | 1,346 | 290 | 210 | 79 | 46 | 48 | | | | | | | | 3,239 | 2,019 | 304 ** |
| CATAWBA 1,2 | PWR | 1,224 | 853 | 383 | 350 | 216 | 138 | 224 | 10 | | | | | | | 3,398 | 2,174 | 809 ** |
| CLINTON | BWR | 1,537 | 449 | 256 | 209 | 220 | 117 | 130 | 9 | | | | | | | 2,927 | 1,390 | 553 ** |
| COOK 1,2 | PWR | 1,178 | 694 | 388 | 350 | 202 | 110 | 103 | 4 | | | | | | | 3,029 | 1,851 | 580 ** |
| COOPER STATION | BWR | 2,852 | 479 | 245 | 180 | 94 | 73 | 103 | | | | | | | | 4,026 | 1,174 | 379 ** |
| CRYSTAL RIVER 3 | PWR | 1,047 | 525 | 332 | 266 | 111 | 89 | 113 | 5 | | | | | | | 2,488 | 1,441 | 476 ** |
| DAVIS-BESSE | PWR | 1,106 | 542 | 285 | 174 | 131 | 92 | 153 | | | | | | | | 2,483 | 1,377 | 489 ** |
| DIABLO CANYON 1,2 | PWR | 2,019 | 648 | 344 | 294 | 100 | 39 | 16 | | | | | | | | 3,460 | 1,441 | 323 |
| DRESDEN 2,3 | BWR | 1,379 | 569 | 387 | 359 | 195 | 129 | 493 | 91 | 12 | | | | | | 3,614 | 2,235 | 1,400 ** |
| DUANE ARNOLD | BWR | 2,083 | 309 | 205 | 237 | 215 | 172 | 306 | 16 | | | | | | | 3,543 | 1,460 | 861 ** |
| FARLEY 1,2 | PWR | 519 | 796 | 364 | 263 | 144 | 42 | 65 | 26 | | | | | | | 2,219 | 1,700 | 457 ** |
| FERMI 2 | BWR | 1,632 | 247 | 106 | 58 | 32 | 18 | 1 | | | | | | | | 2,094 | 462 | 83 ** |
| FITZPATRICK | BWR | 703 | 597 | 193 | 132 | 124 | 117 | 298 | 70 | 5 | | | | | | 2,239 | 1,536 | 884 ** |
| FORT CALHOUN | PWR | 854 | 295 | 149 | 120 | 74 | 44 | 76 | 2 | | | | | | | 1,614 | 760 | 290 |
| GINNA | PWR | 903 | 349 | 183 | 201 | 125 | 62 | 67 | 4 | | | | | | | 1,894 | 991 | 347 ** |
| GRAND GULF | BWR | 1,852 | 760 | 366 | 320 | 155 | 83 | 75 | 6 | | | | | | | 3,617 | 1,765 | 482 ** |
| HADDAM NECK | PWR | 731 | 392 | 167 | 131 | 82 | 64 | 118 | 25 | | | | | | | 1,710 | 979 | 421 ** |
| HARRIS | PWR | 979 | 252 | 89 | 61 | 31 | 10 | 10 | | | | | | | | 1,432 | 453 | 85 ** |
| HATCH 1,2 | BWR | 1,160 | 829 | 492 | 438 | 315 | 317 | 484 | 22 | 4 | 1 | | | | | 4,062 | 2,902 | 1,455 ** |
| HOPE CREEK 1 | BWR | 1,039 | 949 | 194 | 140 | 67 | 19 | 25 | | | | | | | | 2,433 | 1,394 | 196 ** |
| INDIAN POINT 2 | PWR | 1,295 | 482 | 274 | 298 | 222 | 182 | 501 | 90 | 4 | | | | | | 3,348 | 2,053 | 608 ** |
| INDIAN POINT 3 | PWR | 765 | 391 | 248 | 197 | 104 | 60 | 61 | 5 | | | | | | | 1,831 | 1,066 | 358 |
| KEWAUNEE | PWR | 388 | 180 | 117 | 91 | 50 | 28 | 24 | | | | | | | | 878 | 490 | 145 ** |
| LASALLE 1,2 | BWR | 1,058 | 630 | 274 | 194 | 200 | 176 | 312 | 44 | | | | | | | 2,888 | 1,830 | 948 ** |
| LIMERICK 1,2* | BWR | 2,568 | 876 | 336 | 160 | 43 | 5 | 2 | | | | | | | | 3,990 | 1,422 | 175 ** |
| MAINE YANKEE | PWR | 482 | 374 | 212 | 234 | 178 | 135 | 209 | 16 | 1 | | | | | | 1,841 | 1,359 | 682 ** |
| MCGUIRE 1,2 | PWR | 1,656 | 898 | 468 | 437 | 226 | 116 | 121 | 23 | | | | | | | 3,945 | 2,289 | 727 ** |

* Indicates plants counted for the first time in 1990 after completing their first full year of operation.
** Indicates actual collective dose reported by facility, otherwise calculated by staff.

# APPENDIX B (Continued)
# ANNUAL WHOLE BODY DOSES AT LICENSED NUCLEAR POWER FACILITIES
# CY 1990

| PLANT NAME | TYPE | Number of Individuals with Whole Body Doses in the Ranges (rems or cSv) | | | | | | | | | | | | | | TOTAL NUMBER MONI-TORED | NUMBER WITH MEAS. EXPOSURE | TOTAL COLLECTIVE DOSE (Person-rem,cSv) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Mea-surable | Meas. <0.10 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.00-5.00 | 5.00-6.00 | 6.00-7.00 | 7.00-12.00 | >12.0 | | | |
| MILLSTONE POINT 1 | BWR | 283 | 160 | 63 | 59 | 32 | 16 | 32 | 3 | | | | | | | 648 | 365 | 131 |
| MILLSTONE POINT 2,3 | PWR | 1,279 | 722 | 287 | 269 | 143 | 71 | 146 | 14 | | | | | | | 2,931 | 1,652 | 593 |
| MONTICELLO | BWR | 1,390 | 157 | 61 | 55 | 22 | 22 | 17 | 2 | | | | | | | 1,726 | 336 | 94 ** |
| NINE MILE POINT 1,2 | BWR | 1,603 | 1,148 | 416 | 356 | 196 | 104 | 177 | 8 | | | | | | | 4,008 | 2,405 | 699 ** |
| NORTH ANNA 1,2 | PWR | 1,172 | 1,304 | 267 | 195 | 131 | 96 | 117 | 46 | 5 | | | | | | 3,333 | 2,161 | 590 ** |
| OCONEE 1,2,3 | PWR | 1,440 | 885 | 485 | 392 | 112 | 41 | 31 | 2 | | | | | | | 3,388 | 1,948 | 404 ** |
| OYSTER CREEK | BWR | 205 | 1,362 | 199 | 158 | 96 | 67 | 55 | 4 | | | | | | | 2,146 | 1,941 | 310 ** |
| PALISADES | PWR | 574 | 1,179 | 359 | 330 | 203 | 128 | 186 | 27 | 2 | | | | | | 2,988 | 2,414 | 766 ** |
| PALO VERDE 1,2,3 | PWR | 2,842 | 1,179 | 476 | 310 | 119 | 50 | 102 | | | | | | | | 5,078 | 2,236 | 499 ** |
| PEACH BOTTOM 2,3 | BWR | 3,741 | 681 | 392 | 264 | 141 | 55 | 51 | 1 | | | | | | | 5,326 | 1,585 | 377 ** |
| PERRY | BWR | 1,000 | 402 | 282 | 363 | 206 | 134 | 148 | 2 | | | | | | | 2,537 | 1,537 | 638 ** |
| PILGRIM | BWR | 1,869 | 1,425 | 198 | 152 | 70 | 33 | 20 | | | | | | | | 3,767 | 1,898 | 225 ** |
| POINT BEACH 1,2 | PWR | 383 | 186 | 86 | 100 | 66 | 44 | 101 | 34 | | | | | | | 1,000 | 617 | 378 |
| PRAIRIE ISLAND 1,2 | PWR | 632 | 276 | 200 | 135 | 78 | 31 | 17 | | | | | | | | 1,369 | 737 | 188 ** |
| QUAD CITIES 1,2 | BWR | 1,333 | 669 | 460 | 291 | 188 | 205 | 360 | 13 | | | | | | | 3,519 | 2,186 | 1,028 ** |
| RANCHO SECO | PWR | 555 | 73 | 27 | 8 | 3 | | | | | | | | | | 666 | 111 | 13 |
| RIVER BEND 1 | BWR | 1,273 | 643 | 355 | 287 | 182 | 80 | 69 | | | | | | | | 2,889 | 1,616 | 489 |
| ROBINSON 2 | PWR | 967 | 739 | 302 | 277 | 124 | 104 | 80 | | | | | | | | 2,593 | 1,626 | 437 ** |
| SALEM 1,2 | PWR | 2,160 | 3,033 | 353 | 144 | 49 | 14 | 28 | 15 | | | | | | | 5,796 | 3,636 | 272 ** |
| SAN ONOFRE 1,2,3 | PWR | 1,968 | 849 | 381 | 313 | 258 | 192 | 187 | 44 | | | | | | | 4,192 | 2,224 | 885 ** |
| SEQUOYAH 1,2 | PWR | 1,929 | 777 | 531 | 507 | 353 | 197 | 405 | 134 | 30 | | | | | | 4,863 | 2,934 | 1,678 ** |
| SOUTH TEXAS 1,2* | PWR | 1,704 | 562 | 268 | 205 | 77 | 18 | 6 | | | | | | | | 2,840 | 1,136 | 206 ** |
| ST. LUCIE 1,2 | PWR | 1,201 | 667 | 383 | 346 | 157 | 94 | 206 | 23 | | | | | | | 3,077 | 1,876 | 777 |
| SUMMER 1 | PWR | 1,037 | 320 | 242 | 261 | 134 | 67 | 66 | | | | | | | | 2,127 | 1,090 | 376 ** |
| SURRY 1,2 | PWR | 1,749 | 913 | 333 | 286 | 189 | 97 | 115 | 14 | | | | | | | 3,696 | 1,947 | 575 ** |
| SUSQUEHANNA 1,2 | BWR | 2,062 | 684 | 368 | 328 | 189 | 77 | 45 | | | | | | | | 3,753 | 1,691 | 440 ** |
| THREE MILE ISLAND 1 | PWR | 435 | 685 | 294 | 195 | 60 | 41 | 44 | | | | | | | | 1,754 | 1,319 | 264 ** |
| TROJAN | PWR | 1,228 | 555 | 254 | 199 | 85 | 44 | 32 | | | | | | | | 2,397 | 1,169 | 258 ** |
| TURKEY POINT 3,4 | PWR | 2,199 | 781 | 406 | 365 | 219 | 153 | 172 | 3 | | | | | | | 4,298 | 2,099 | 730 ** |
| VERMONT YANKEE | BWR | 985 | 230 | 224 | 204 | 84 | 57 | 48 | 2 | | | | | | | 1,834 | 849 | 307 |
| VOGTLE 1,2* | PWR | 1,272 | 569 | 407 | 314 | 165 | 74 | 71 | 2 | | | | | | | 2,874 | 1,602 | 466 ** |
| WASHINGTON NUCLEAR 2 | BWR | 1,692 | 532 | 226 | 209 | 125 | 99 | 132 | 24 | 1 | | | | | | 3,040 | 1,348 | 536 ** |
| WATERFORD 3 | PWR | 1,068 | 304 | 96 | 22 | 9 | 1 | | | | | | | | | 1,500 | 432 | 47 |
| WOLF CREEK 1 | PWR | 759 | 324 | 216 | 157 | 58 | 30 | 13 | | | | | | | | 1,557 | 798 | 195 |
| YANKEE-ROWE | PWR | 549 | 246 | 126 | 148 | 81 | 49 | 47 | 5 | | | | | | | 1,251 | 702 | 246 ** |

* Indicates plants counted for the first time in 1990 after completing their first full year of operation.
** Indicates actual collective dose reported by facility, otherwise calculated by staff.

# APPENDIX B (Continued)
# ANNUAL WHOLE BODY DOSES AT LICENSED NUCLEAR POWER FACILITIES
# CY 1990

| PLANT NAME | TYPE | Number of Individuals with Whole Body Doses in the Ranges (rems or cSv) | | | | | | | | | | | | | | TOTAL NUMBER MONI-TORED | NUMBER WITH MEAS. EXPOSURE | TOTAL COLLECTIVE DOSE (Person-rem,cSv) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Mea-surable | Meas. <0.10 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.00-5.00 | 5.00-6.00 | 6.00-7.00 | 7.00-12.00 | >12.0 | | | |
| ZION 1,2 | PWR | 1,937 | 432 | 186 | 192 | 175 | 156 | 224 | 19 | 1 | | | | | | 3,322 | 1,385 | 696 ** |
| TOTALS: 73 PWRs | | 54,572 | 29,791 | 13,030 | 10,747 | 5,759 | 3,384 | 4,712 | 607 | 43 | | | | | | 122,645 | 68,073 | 20,812 |
| TOTALS: 37 BWRs | | 39,102 | 17,210 | 7,336 | 5,992 | 3,717 | 2,493 | 4,162 | 625 | 41 | 1 | | | | | 80,679 | 41,577 | 15,780 |
| TOTALS: 110 LWRs | | 93,674 | 47,001 | 20,366 | 16,739 | 9,476 | 5,877 | 8,874 | 1,232 | 84 | 1 | | | | | 203,324 | 109,650 | 36,592 |

* Indicates plants counted for the first time in 1990 after completing their first full year of operation.
** Indicates actual collective dose reported by facility, otherwise calculated by staff.

# APPENDIX B (Continued)
## ANNUAL WHOLE BODY DOSES AT LICENSED NUCLEAR POWER FACILITIES
## FACILITIES NOT IN OPERATION OR IN OPERATION LESS THAN ONE YEAR
## CY 1990

| PLANT NAME | TYPE | Number of Individuals with Whole Body Doses in the Ranges (rems or cSv) | | | | | | | | | | | | | | TOTAL NUMBER MONI-TORED | NUMBER WITH MEAS. EXPOSURE | TOTAL COLLECTIVE DOSE (Person-rem,cSv) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Mea-surable | Meas. <0.10 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.00-5.00 | 5.00-6.00 | 6.00-7.00 | 7.00-12.00 | >12.0 | | | |
| BELLEFONTE | PWR | 11 | | | | | | | | | | | | | | 11 | 0 | 0 |
| COMANCHE PEAK | PWR | 2,706 | 124 | 10 | 1 | | | | | | | | | | | 2,841 | 135 | 8 |
| FORT ST. VRAIN * | HTGR | 226 | 30 | | | | | | | | | | | | | 256 | 30 | 1 ** |
| LACROSSE * | BWR | 506 | 25 | 12 | 12 | 2 | | | | | | | | | | 557 | 51 | 9 |
| SEABROOK | PWR | 1,334 | 73 | 11 | 2 | | | | | | | | | | | 1,420 | 86 | 6 |
| SHOREHAM | BWR | 245 | 23 | | | | | | | | | | | | | 268 | 23 | 1 |
| THREE MILE ISLAND 2* | PWR | 168 | 265 | 48 | 45 | 51 | 28 | 47 | | | | | | | | 652 | 484 | 136 ** |
| WATTS BAR 1,2 | PWR | 110 | | | | | | | | | | | | | | 110 | 0 | 0 |
| TOTALS: 9 | | 5,306 | 540 | 81 | 60 | 53 | 28 | 47 | | | | | | | | 6,115 | 809 | 161 |

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

# APPENDIX C*

## Personnel, Dose and Power Generation Summary

## 1969-1990

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

# APPENDIX C
## PERSONNEL, DOSE AND POWER GENERATION SUMMARY

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function: Opera-tions | Person-rems (-cSv) per Work Function: Maint. & Others | Person-rems (-cSv) per Personnel Type: Contrac-tor | Person-rems (-cSv) per Personnel Type: Station & Utility | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ 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 |
| BEAVER VALLEY 1,2 | 1977 | 355.6 | 57.0 | 331 | 87 | 8 | 79 | 58 | 29 | 0.26 | 0.2 |
| Docket 50-334, 50-412; DPR-66, NPF-73 | 1978 | 304.2 | 40.8 | 646 | 190 | 11 | 179 | 151 | 39 | 0.29 | 0.6 |
| 1st commercial operation 10/76, 11/87 | 1979 | 221.0 | 40.0 | 704 | 132 | 22 | 110 | 67 | 65 | 0.19 | 0.6 |
| Type - PWRs | 1980 | 39.8 | 6.8 | 1,817 | 553 | 76 | 477 | 477 | 76 | 0.30 | 13.9 |
| Capacity - 810, 820 | 1981 | 573.4 | 73.6 | 1,237 | 229 | 38 | 191 | 142 | 87 | 0.19 | 0.4 |
| | 1982 | 326.7 | 41.6 | 1,755 | 599 | 126 | 473 | 481 | 118 | 0.34 | 1.8 |
| | 1983 | 561.2 | 68.2 | 1,485 | 772 | 158 | 614 | 615 | 157 | 0.52 | 1.4 |
| | 1984 | 576.7 | 71.8 | 1,393 | 504 | 124 | 380 | 302 | 202 | 0.36 | 0.9 |
| | 1985 | 717.7 | 91.9 | 619 | 60 | 17 | 43 | 12 | 48 | 0.10 | 0.1 |
| | 1986 | 581.3 | 70.7 | 1,575 | 627 | 82 | 545 | 456 | 171 | 0.40 | 1.1 |
| | 1987 | 684.1 | 83.8 | 1,282 | 210 | 43 | 167 | 137 | 73 | 0.16 | 0.3 |
| | 1988 | 1,386.1 | 87.4 | 1,764 | 530 | 90 | 440 | 438 | 92 | 0.30 | 0.4 |
| | 1989 | 1,017.4 | 69.6 | 2,349 | 1,378 | 197 | 1,181 | 1,151 | 227 | 0.59 | 1.4 |
| | 1990 | 1,271.0 | 85.3 | 1,675 | 348 | 33 | 315 | 268 | 80 | 0.21 | 0.3 |
| BIG ROCK POINT | 1969 | 48.1 | | 165 | 136 | | | | | 0.82 | 2.8 |
| Docket 50-155; DPR-6 | 1970 | 43.5 | | 290 | 194 | | | | | 0.67 | 4.5 |
| 1st commercial operation 3/63 | 1971 | 44.4 | | 260 | 184 | | | | | 0.71 | 4.1 |
| Type - BWR | 1972 | 43.5 | | 195 | 181 | | | | | 0.93 | 4.2 |
| Capacity - 67 MWe | 1973 | 50.9 | | 241 | 285 | | | 119 | 166 | 1.18 | 5.6 |
| | 1974 | 40.7 | 70.3 | 281 | 276 | 54 | 222 | 42 | 234 | 6.8 | |
| | 1975 | 35.1 | 59.8 | 300 | 180 | 58 | 122 | 20 | 160 | 5.1 | |

# APPENDIX C
## PERSONNEL, DOSE AND POWER GENERATION SUMMARY

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| BIG ROCK POINT (Continued) | 1976 | 29.5 | 50.1 | 488 | 289 | 82 | 207 | 105 | 184 | 0.59 | 9.8 |
| | 1977 | 43.6 | 73.4 | 465 | 334 | 94 | 240 | 60 | 274 | 0.72 | 7.7 |
| | 1978 | 48.5 | 77.9 | 285 | 175 | 93 | 82 | 9 | 166 | 0.61 | 3.6 |
| | 1979 | 13.0 | 23.5 | 623 | 455 | 89 | 366 | 102 | 353 | 0.73 | 35.0 |
| | 1980 | 48.9 | 79.0 | 599 | 354 | 91 | 263 | 91 | 263 | 0.59 | 7.2 |
| | 1981 | 56.9 | 90.6 | 479 | 160 | 58 | 102 | 38 | 122 | 0.33 | 2.8 |
| | 1982 | 43.6 | 70.8 | 521 | 328 | 129 | 199 | 67 | 261 | 0.63 | 7.5 |
| | 1983 | 42.3 | 71.0 | 493 | 263 | 32 | 231 | 55 | 208 | 0.53 | 6.2 |
| | 1984 | 50.3 | 78.6 | 297 | 155 | 37 | 118 | 21 | 134 | 0.52 | 3.1 |
| | 1985 | 43.8 | 73.5 | 435 | 291 | 54 | 237 | 60 | 231 | 0.67 | 6.6 |
| | 1986 | 61.0 | 95.5 | 202 | 84 | 34 | 50 | 17 | 67 | 0.42 | 1.4 |
| | 1987 | 45.3 | 71.0 | 251 | 222 | 45 | 177 | 35 | 187 | 0.88 | 4.9 |
| | 1988 | 46.1 | 72.8 | 303 | 170 | 34 | 136 | 25 | 145 | 0.56 | 3.7 |
| | 1989 | 50.2 | 79.0 | 418 | 177 | 38 | 139 | 32 | 145 | 0.42 | 3.5 |
| | 1990 | 51.3 | 77.2 | 351 | 232 | 33 | 199 | 45 | 187 | 0.66 | 4.5 |
| BRAIDWOOD 1,2<br>Docket 50-456, 50-457; NPF-72, NPF-77<br>1st commercial operation 7/88, 10/88<br>Type - PWRs<br>Capacity - 1120, 1120 MWe | 1989 | 1,381.8 | 75.4 | 1,460 | 296 | 7 | 289 | 198 | 98 | 0.20 | 0.2 |
| | 1990 | 1,740.2 | 84.1 | 1,081 | 176 | 10 | 186 | 107 | 79 | 0.17 | 0.1 |
| BROWNS FERRY 1,2,3<br>Docket 50-259, 50-260, 50-296<br>DPR - 33, - 52, - 68<br>1st commercial operation 8/74, 3/75, 3/77<br>Type - BWRs<br>Capacity - 1065,1065,1065 MWe | 1975 | 161.7 | 17.8 | 2,380 | 325 | | | | | 0.14 | 2.0 |
| | 1976 | 337.6 | 26.9 | 2,207 | 234 | | | | | 0.11 | 0.7 |
| | 1977 | 1,327.5 | 73.7 | 1,858 | 863 | 60 | 803 | 249 | 614 | 0.46 | 0.7 |
| | 1978 | 1,992.1 | 73.5 | 2,376 | 1,792 | 4 | 1,788 | 261 | 1,531 | 0.75 | 0.9 |
| | 1979 | 2,393.0 | 79.1 | 2,689 | 1,667 | 0 | 1,667 | 289 | 1,378 | 0.62 | 0.7 |
| | 1980 | 2,182.1 | 73.6 | 2,712 | 1,826 | 4 | 1,822 | 50 | 1,776 | 0.67 | 0.8 |
| | 1981 | 2,132.9 | 69.5 | 3,379 | 2,380 | 100 | 2,280 | 404 | 1,976 | 0.70 | 1.1 |
| | 1982 | 2,025.4 | 67.6 | 3,277 | 2,220 | 181 | 2,039 | 317 | 1,903 | 0.68 | 1.1 |
| | 1983 | 1,641.0 | 54.3 | 3,302 | 3,363 | 276 | 3,087 | 909 | 2,454 | 1.02 | 2.0 |
| | 1984 | 1,431.9 | 54.2 | 2,962 | 1,940 | 229 | 1,711 | 541 | 1,399 | 0.65 | 1.4 |
| | 1985 | 368.2 | 11.9 | 2,755 | 1,159 | 201 | 958 | 306 | 853 | 0.42 | 3.1 |
| | 1986 | 0.0 | 0.0 | 3,003 | 1,050 | 196 | 854 | 343 | 707 | 0.35 | --- |
| | 1987 | 0.0 | 0.0 | 3,115 | 1,181 | 187 | 994 | 222 | 959 | 0.38 | --- |
| | 1988 | 0.0 | 0.0 | 3,324 | 1,155 | 234 | 921 | 109 | 1,046 | 0.35 | --- |
| | 1989 | 0.0 | 0.0 | 2,683 | 656 | 97 | 559 | 131 | 525 | 0.24 | --- |
| | 1990 | 0.0 | 0.0 | 2,717 | 1,310 | 64 | 1,246 | 68 | 1,242 | 0.48 | --- |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| BRUNSWICK 1,2 | 1976 | 297.2 | 56.0 | 1,265 | 326 | 15 | 311 | 222 | 104 | 0.26 | 1.1 |
| Docket 50-324, 50-325; DPR-62, -71 | 1977 | 291.1 | 55.7 | 1,512 | 1,120 | 48 | 1,071 | 782 | 337 | 0.74 | 3.8 |
| 1st commercial operation 3/77, 11/75 | 1978 | 1,173.1 | 83.7 | 1,458 | 1,004 | 99 | 905 | 695 | 309 | 0.69 | 0.9 |
| Type - BWRs | 1979 | 810.0 | 60.1 | 2,891 | 2,602 | 97 | 2,505 | 2,074 | 528 | 0.90 | 3.2 |
| Capacity - 790, 790 MWe | 1980 | 687.2 | 52.2 | 3,788 | 3,870 | 111 | 3,759 | 3,098 | 772 | 1.02 | 5.6 |
| | 1981 | 925.2 | 56.9 | 3,854 | 2,638 | 159 | 2,479 | 1,890 | 748 | 0.68 | 2.9 |
| | 1982 | 540.3 | 50.3 | 4,957 | 3,792 | 162 | 3,630 | 2,841 | 951 | 0.76 | 7.0 |
| | 1983 | 636.7 | 44.3 | 5,602 | 3,475 | 152 | 3,323 | 2,428 | 1,047 | 0.62 | 5.5 |
| | 1984 | 761.3 | 51.5 | 5,046 | 3,260 | 143 | 3,117 | 2,363 | 897 | 0.65 | 4.3 |
| | 1985 | 822.2 | 58.4 | 4,057 | 2,804 | 120 | 2,684 | 2,077 | 727 | 0.69 | 3.4 |
| | 1986 | 1,051.3 | 69.1 | 3,370 | 1,909 | 97 | 1,812 | 1,273 | 636 | 0.57 | 1.8 |
| | 1987 | 1,152.4 | 80.6 | 3,052 | 1,419 | 144 | 1,275 | 861 | 558 | 0.46 | 1.2 |
| | 1988 | 990.8 | 70.1 | 2,648 | 1,747 | 219 | 1,528 | 1,051 | 696 | 0.66 | 1.8 |
| | 1989 | 990.9 | 65.8 | 3,844 | 1,786 | 181 | 1,605 | 1,295 | 491 | 0.46 | 1.8 |
| | 1990 | 991.6 | 67.8 | 3,182 | 1,548 | 152 | 1,396 | 1,156 | 392 | 0.49 | 1.6 |
| BYRON 1,2 | 1986 | 894.5 | 88.6 | 1,081 | 76 | 12 | 64 | 47 | 29 | .07 | 0.1 |
| Docket 50-454, 50-455; NPF-37, NPF-66 | 1987 | 650.9 | 70.9 | 1,826 | 769 | 11 | 758 | 667 | 102 | 0.42 | 1.2 |
| 1st commercial operation 9/85,8/87 | 1988 | 1,534.7 | 86.3 | 1,222 | 459 | 0 | 459 | 333 | 126 | 0.38 | 0.3 |
| Type - PWRS | 1989 | 1,812.6 | 90.2 | 1,109 | 172 | 21 | 151 | 105 | 67 | 0.16 | 0.1 |
| Capacity - 1105, 1105 | 1990 | 1,567.3 | 78.8 | 1,396 | 434 | 38 | 396 | 266 | 168 | 0.31 | 0.3 |
| CALLAWAY 1 | 1985 | 967.4 | 90.0 | 964 | 36 | 16 | 20 | 7 | 29 | 0.04 | 0.0 |
| Docket 50-483; NPF-30 | 1986 | 865.2 | 81.3 | 1,052 | 225 | 53 | 172 | 129 | 96 | 0.21 | 0.3 |
| 1st commercial operation 12/84 | 1987 | 759.0 | 71.1 | 1,082 | 393 | 89 | 304 | 249 | 144 | 0.36 | 0.5 |
| Type - PWR | 1988 | 1,069.2 | 93.4 | 353 | 27 | 12 | 15 | 2 | 25 | 0.08 | 0.0 |
| Capacity - 1125 MWe | 1989 | 1,000.3 | 85.4 | 1,055 | 283 | 46 | 237 | 191 | 92 | 0.27 | 0.3 |
| | 1990 | 960.7 | 84.1 | 1,134 | 442 | 50 | 392 | 332 | 110 | 0.39 | 0.5 |
| CALVERT CLIFFS 1,2 | 1976 | 753.4 | 95.2 | 507 | 74 | 28 | 46 | 8 | 66 | 0.15 | 0.1 |
| Docket 50-317, 50-318; DPR-53, -69 | 1977 | 583.0 | 72.1 | 2,265 | 547 | 36 | 511 | 224 | 323 | 0.24 | 0.9 |
| 1st commercial operation 5/75, 4/77 | 1978 | 1,188.5 | 75.8 | 1,391 | 500 | 13 | 487 | 143 | 357 | 0.36 | 0.4 |
| Type - PWRs | 1979 | 1,161.0 | 74.0 | 1,428 | 805 | 32 | 773 | 426 | 379 | 0.56 | 0.7 |
| Capacity - 825, 825 MWe | 1980 | 1,309.9 | 84.1 | 1,496 | 677 | 15 | 662 | 402 | 275 | 0.45 | 0.5 |
| | 1981 | 1,379.7 | 83.1 | 1,555 | 607 | 29 | 578 | 378 | 229 | 0.39 | 0.4 |
| | 1982 | 1,238.3 | 73.7 | 1,805 | 1,057 | 84 | 973 | 402 | 655 | 0.59 | 0.9 |
| | 1983 | 1,397.2 | 81.6 | 1,915 | 668 | 5 | 663 | 143 | 525 | 0.35 | 0.5 |
| | 1984 | 1,389.4 | 79.3 | 1,369 | 479 | 61 | 418 | 79 | 400 | 0.35 | 0.3 |
| | 1985 | 1,189.8 | 68.4 | 1,598 | 694 | 69 | 625 | 144 | 550 | 0.43 | 0.6 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| CALVERT CLIFFS 1,2 (Continued) | 1986 | 1,530.0 | 87.2 | 1,296 | 347 | 2 | 345 | 101 | 246 | 0.27 | 0.2 |
| | 1987 | 1,207.3 | 71.8 | 1,384 | 412 | 29 | 383 | 110 | 302 | 0.30 | 0.3 |
| | 1988 | 1,397.7 | 81.0 | 1,296 | 291 | 30 | 261 | 90 | 201 | 0.22 | 0.2 |
| | 1989 | 333.6 | 20.1 | 1,786 | 346 | 11 | 335 | 216 | 130 | 0.19 | 1.0 |
| | 1990 | 161.1 | 11.0 | 2,019 | 304 | 12 | 292 | 203 | 101 | 0.15 | 1.9 |
| CATAWBA 1,2 | 1986 | 638.9 | 49.9 | 1,724 | 286 | 27 | 259 | 68 | 218 | 0.17 | 0.4 |
| Docket 50-413, 50-414; NPF-35, NPF-52 | 1987 | 1,651.2 | 75.9 | 1,865 | 449 | 32 | 417 | 161 | 288 | 0.24 | 0.3 |
| 1st commercial operation 6/85, 8/86 | 1988 | 1,675.2 | 77.2 | 2,009 | 556 | 71 | 485 | 200 | 356 | 0.28 | 0.3 |
| Type - PWR | 1989 | 1,733.6 | 79.5 | 1,660 | 334 | 48 | 286 | 110 | 224 | 0.20 | 0.2 |
| Capacity - 1129, 1129 MWe | 1990 | 1,616.3 | 70.8 | 2,174 | 809 | 58 | 751 | 292 | 517 | 0.37 | 0.5 |
| CLINTON | 1988 | 701.3 | 84.2 | 769 | 130 | 48 | 82 | 64 | 66 | 0.17 | 0.2 |
| Docket 50-461; NPF-62 | 1989 | 348.3 | 48.5 | 1,196 | 372 | 91 | 281 | 261 | 111 | 0.31 | 1.1 |
| 1st commercial operation 11/87 | 1990 | 435.8 | 55.1 | 1,390 | 553 | 407 | 146 | 438 | 115 | 0.40 | 1.3 |
| Type - BWR | | | | | | | | | | | |
| Capacity - 930 MWe | | | | | | | | | | | |
| COOK 1,2 | 1976 | 807.4 | 83.1 | 395 | 116 | 13 | 103 | 71 | 45 | 0.29 | 0.1 |
| Docket 5-315; DPR-58, -74 | 1977 | 573.0 | 76.1 | 802 | 300 | 21 | 278 | 138 | 161 | 0.37 | 0.5 |
| 1st commercial operation 8/75, 7/78 | 1978 | 744.8 | 73.6 | 778 | 336 | 49 | 287 | 139 | 197 | 0.43 | 0.5 |
| Type - PWRs | 1979 | 1,373.0 | 65.3 | 1,445 | 718 | 45 | 673 | 454 | 264 | 0.50 | 0.5 |
| Capacity - 1020, 1060 MWe | 1980 | 1,552.4 | 74.1 | 1,345 | 493 | 46 | 447 | 323 | 170 | 0.37 | 0.3 |
| | 1981 | 1,557.3 | 73.4 | 1,341 | 656 | 48 | 608 | 443 | 213 | 0.49 | 0.4 |
| | 1982 | 1,461.6 | 69.8 | 1,527 | 699 | 67 | 632 | 472 | 227 | 0.46 | 0.5 |
| | 1983 | 1,456.5 | 71.2 | 1,418 | 658 | 50 | 608 | 467 | 191 | 0.46 | 0.5 |
| | 1984 | 1,526.0 | 75.3 | 1,559 | 762 | 43 | 719 | 597 | 165 | 0.49 | 0.5 |
| | 1985 | 925.4 | 47.6 | 1,984 | 945 | 92 | 853 | 758 | 187 | 0.48 | 1.0 |
| | 1986 | 1,307.1 | 73.4 | 1,774 | 745 | 64 | 681 | 585 | 160 | 0.42 | 0.6 |
| | 1987 | 1,199.5 | 70.2 | 1,696 | 666 | 79 | 587 | 525 | 141 | 0.39 | 0.6 |
| | 1988 | 1,160.4 | 63.5 | 2,266 | 867 | 52 | 815 | 762 | 105 | 0.38 | 0.7 |
| | 1989 | 1,433.1 | 72.8 | 1,575 | 493 | 50 | 443 | 421 | 72 | 0.31 | 0.3 |
| | 1990 | 1,318.5 | 67.9 | 1,851 | 580 | 87 | 493 | 504 | 76 | 0.31 | 0.4 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| COOPER STATION | 1975 | 456.4 | 83.6 | 579 | 117 | 30 | 87 | 19 | 98 | 0.20 | 0.3 |
| Docket 50-298; DPR-46 | 1976 | 433.3 | 75.5 | 763 | 350 | 39 | 311 | 210 | 140 | 0.46 | 0.8 |
| 1st commercial operation 7/74 | 1977 | 538.2 | 86.2 | 315 | 198 | 50 | 147 | 66 | 131 | 0.63 | 0.4 |
| Type - BWR | 1978 | 576.0 | 91.0 | 297 | 158 | 40 | 118 | 58 | 100 | 0.53 | 0.3 |
| Capacity - 764 MWe | 1979 | 591.0 | 87.6 | 426 | 221 | 50 | 171 | 90 | 131 | 0.52 | 0.4 |
| | 1980 | 448.3 | 71.2 | 785 | 859 | 71 | 788 | 644 | 215 | 1.09 | 1.9 |
| | 1981 | 457.1 | 71.2 | 935 | 579 | 63 | 516 | 382 | 197 | 0.62 | 1.3 |
| | 1982 | 622.3 | 84.6 | 743 | 542 | 66 | 476 | 361 | 181 | 0.73 | 0.9 |
| | 1983 | 396.6 | 63.3 | 1,383 | 1,293 | 57 | 1,236 | 1,081 | 212 | 0.93 | 3.3 |
| | 1984 | 411.9 | 67.2 | 1,598 | 799 | 46 | 753 | 635 | 164 | 0.50 | 1.9 |
| | 1985 | 127.3 | 21.5 | 1,980 | 1,333 | 49 | 1,284 | 1,104 | 229 | 0.67 | 10.5 |
| | 1986 | 480.0 | 74.7 | 895 | 320 | 49 | 271 | 115 | 205 | 0.36 | 0.7 |
| | 1987 | 652.3 | 96.2 | 549 | 103 | 26 | 77 | 11 | 92 | 0.19 | 0.2 |
| | 1988 | 493.4 | 67.9 | 942 | 251 | 40 | 211 | 118 | 133 | 0.27 | 0.5 |
| | 1989 | 564.3 | 76.2 | 1,202 | 343 | 40 | 303 | 228 | 115 | 0.29 | 0.6 |
| | 1990 | 602.0 | 79.4 | 1,174 | 379 | 34 | 345 | 265 | 114 | 0.32 | 0.6 |
| CRYSTAL RIVER 3 | 1978 | 311.5 | 41.4 | 643 | 321 | 8 | 313 | 244 | 77 | 0.50 | 1.0 |
| Docket 50-302; DPR-72 | 1979 | 453.0 | 58.9 | 1,150 | 495 | 29 | 466 | 346 | 149 | 0.43 | 1.1 |
| 1st commercial operation 3/77 | 1980 | 404.1 | 53.2 | 1,053 | 625 | 24 | 601 | 382 | 243 | 0.59 | 1.5 |
| Type - PWR | 1981 | 490.4 | 62.2 | 1,120 | 408 | 18 | 390 | 236 | 172 | 0.36 | 0.8 |
| Capacity - 821 MWe | 1982 | 589.8 | 76.0 | 780 | 177 | 9 | 168 | 116 | 61 | 0.23 | 0.3 |
| | 1983 | 452.1 | 58.8 | 1,720 | 552 | 71 | 481 | 353 | 199 | 0.32 | 1.2 |
| | 1984 | 774.2 | 94.5 | 549 | 49 | 10 | 39 | 22 | 27 | 0.09 | 0.1 |
| | 1985 | 344.2 | 47.6 | 1,976 | 689 | 44 | 645 | 424 | 265 | 0.35 | 2.0 |
| | 1986 | 319.5 | 41.8 | 1,057 | 472 | 25 | 447 | 298 | 174 | 0.45 | 1.5 |
| | 1987 | 436.0 | 60.9 | 1,384 | 488 | 49 | 439 | 302 | 186 | 0.35 | 1.1 |
| | 1988 | 690.2 | 84.0 | 569 | 64 | 2 | 62 | 17 | 47 | 0.11 | 0.1 |
| | 1989 | 352.8 | 48.8 | 880 | 234 | 5 | 229 | 128 | 106 | 0.27 | 0.7 |
| | 1990 | 497.8 | 63.8 | 1,441 | 476 | 8 | 468 | 318 | 158 | 0.33 | 1.0 |
| DAVIS-BESSE 1 | 1978 | 326.4 | 48.7 | 421 | 48 | 13 | 35 | 14 | 34 | 0.11 | 0.1 |
| Docket 50-346; NPF-3 | 1979 | 381.0 | 67.0 | 304 | 30 | 8 | 22 | 5 | 25 | 0.10 | 0.1 |
| 1st commercial operation 7/78 | 1980 | 256.4 | 36.2 | 1,283 | 154 | 4 | 150 | 121 | 33 | 0.12 | 0.6 |
| Type - PWR | 1981 | 531.4 | 67.4 | 578 | 58 | 1 | 57 | 32 | 26 | 0.10 | 0.1 |
| Capacity - 874 MWe | 1982 | 390.8 | 51.5 | 1,350 | 164 | 12 | 152 | 139 | 25 | 0.12 | 0.4 |
| | 1983 | 592.1 | 73.0 | 718 | 80 | 6 | 74 | 46 | 34 | 0.11 | 0.1 |
| | 1984 | 518.5 | 62.5 | 1,088 | 177 | 10 | 167 | 122 | 55 | 0.16 | 0.3 |
| | 1985 | 238.3 | 31.2 | 718 | 71 | 5 | 66 | 44 | 27 | 0.10 | 0.3 |
| | 1986 | 3.3 | 1.3 | 981 | 124 | 22 | 102 | 103 | 21 | 0.13 | 37.6 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| DAVIS-BESSE 1 (Continued) | 1987 | 618.0 | 89.6 | 625 | 47 | 11 | 36 | 27 | 20 | 0.08 | 0.1 |
| | 1988 | 144.1 | 27.1 | 1,183 | 307 | 36 | 271 | 255 | 52 | 0.26 | 2.1 |
| | 1989 | 880.0 | 98.6 | 404 | 38 | 5 | 33 | 5 | 33 | 0.09 | 0.0 |
| | 1990 | 500.0 | 56.7 | 1,377 | 489 | 14 | 475 | 414 | 75 | 0.36 | 1.0 |
| DIABLO CANYON 1,2 | 1986 | 641.5 | 80.6 | 1,260 | 304 | 4 | 300 | 206 | 98 | 0.24 | 0.5 |
| Docket 50-275, 50-323; DPR-80, DPR-82 | 1987 | 1,688.6 | 83.0 | 1,170 | 336 | 5 | 331 | 226 | 110 | 0.29 | 0.2 |
| 1st commercial operation 5/85, 3/86 | 1988 | 1,386.1 | 67.6 | 1,826 | 877 | 4 | 873 | 593 | 284 | 0.48 | 0.6 |
| Type - PWRs | 1989 | 1,899.0 | 87.5 | 1,646 | 465 | 3 | 462 | 329 | 136 | 0.28 | 0.2 |
| Capacity - 1073, 1087 MWe | 1990 | 1,952.6 | 91.0 | 1,441 | 323 | 1 | 322 | 220 | 103 | 0.22 | 0.2 |
| DRESDEN 1*,2,3 | 1969 | 99.7 | | | 286 | | | | | | 2.9 |
| Docket 50-010, 50-237, 50-249; | 1970 | 163.1 | | | 143 | | | | | | 0.9 |
| DPR-2, -19, -25 | 1971 | 394.5 | | | 715 | | | | | | 1.8 |
| 1st commercial operation 7/60, 6/70, | 1972 | 1,243.7 | | | 728 | | | | | | 0.6 |
| 11/71 | 1973 | 1,112.2 | | 1,341 | 939 | 143 | 796 | 344 | 595 | 0.70 | 0.8 |
| Type - BWRs | 1974 | 842.5 | 54.9 | 1,594 | 1,662 | | | 57 | 1,605 | 1.04 | 2.0 |
| Capacity - 197, 772, 773 MWe | 1975 | 708.1 | 54.6 | 2,310 | 3,423 | 271 | 3,152 | 2,252 | 1,171 | 1.48 | 4.8 |
| | 1976 | 1,127.2 | 80.8 | 1,746 | 1,680 | 228 | 1,452 | 749 | 931 | 0.96 | 1.5 |
| | 1977 | 1,132.9 | 77.0 | 1,862 | 1,694 | 316 | 1,377 | 693 | 1,000 | 0.91 | 1.5 |
| | 1978 | 1,242.2 | 79.5 | 1,946 | 1,529 | 359 | 1,170 | 619 | 1,529 | 0.79 | 1.2 |
| | 1979 | 1,013.0 | 74.7 | 2,407 | 1,800 | 191 | 1,609 | 641 | 1,159 | 0.75 | 1.8 |
| | 1980 | 1,074.4 | 55.0 | 2,717 | 2,105 | 236 | 1,869 | 1,093 | 1,012 | 0.77 | 2.0 |
| | 1981 | 1,035.7 | 51.5 | 2,331 | 2,802 | 120 | 2,682 | 1,850 | 952 | 1.20 | 2.7 |
| | 1982 | 1,085.3 | 77.9 | 2,572 | 2,923 | 136 | 2,787 | 1,731 | 1,192 | 1.14 | 2.7 |
| | 1983 | 913.6 | 65.6 | 2,854 | 3,582 | 176 | 3,406 | 2,127 | 1,455 | 1.26 | 3.9 |
| | 1984 | 789.8 | 55.3 | 2,261 | 1,774 | 153 | 1,621 | 815 | 959 | 0.78 | 2.2 |
| | 1985 | 903.0 | 64.5 | 2,817 | 1,686 | 474 | 1,212 | 879 | 807 | 0.60 | 1.9 |
| | 1986 | 740.5 | 52.6 | 3,111 | 2,668 | 268 | 2,400 | 2,009 | 659 | 0.86 | 3.6 |
| | 1987 | 933.9 | 74.0 | 2,052 | 1,145 | 241 | 904 | 593 | 552 | 0.56 | 1.2 |
| | 1988 | 1,014.7 | 75.8 | 2,414 | 1,409 | 215 | 1,194 | 808 | 601 | 0.58 | 1.4 |
| | 1989 | 1,184.2 | 83.1 | 2,259 | 1,130 | 154 | 976 | 641 | 489 | 0.50 | 1.0 |
| | 1990 | 1,107.8 | 76.6 | 2,235 | 1,400 | 176 | 1,224 | 753 | 647 | 0.63 | 1.3 |

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

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| DUANE ARNOLD | 1976 | 305.2 | 78.0 | 350 | 105 | 14 | 91 | 62 | 43 | 0.30 | 0.3 |
| Docket 50-331; DPR-49 | 1977 | 353.6 | 78.9 | 538 | 299 | 36 | 263 | 220 | 79 | 0.56 | 0.8 |
| 1st commercial operation 2/75 | 1978 | 149.2 | 33.2 | 1,112 | 974 | 59 | 915 | 932 | 42 | 0.88 | 6.5 |
| Type - BWR | 1979 | 352.0 | 78.0 | 757 | 275 | 35 | 240 | 219 | 56 | 0.36 | 0.8 |
| Capacity - 538 MWe | 1980 | 339.1 | 73.3 | 1,108 | 671 | 32 | 639 | 570 | 101 | 0.61 | 2.0 |
| | 1981 | 277.7 | 69.8 | 1,286 | 790 | 56 | 734 | 598 | 192 | 0.61 | 2.8 |
| | 1982 | 278.5 | 74.7 | 524 | 229 | 18 | 211 | 175 | 54 | 0.44 | 0.8 |
| | 1983 | 283.0 | 62.9 | 1,468 | 1,135 | 42 | 1,093 | 1,016 | 119 | 0.77 | 4.0 |
| | 1984 | 329.4 | 72.9 | 611 | 189 | 28 | 161 | 117 | 72 | 0.31 | 0.6 |
| | 1985 | 236.2 | 53.8 | 1,414 | 1,112 | 49 | 1,063 | 954 | 158 | 0.79 | 4.7 |
| | 1986 | 365.5 | 82.0 | 476 | 187 | 49 | 138 | 94 | 93 | 0.39 | 0.5 |
| | 1987 | 308.4 | 64.7 | 1,094 | 667 | 241 | 426 | 478 | 189 | 0.61 | 2.2 |
| | 1988 | 386.5 | 75.2 | 1,136 | 614 | 71 | 543 | 416 | 198 | 0.54 | 1.6 |
| | 1989 | 388.5 | 79.0 | 425 | 194 | 49 | 145 | 58 | 136 | 0.46 | 0.5 |
| | 1990 | 367.4 | 75.8 | 1,460 | 861 | 126 | 735 | 644 | 217 | 0.59 | 2.3 |
| FARLEY 1,2 | 1978 | 713.8 | 86.5 | 527 | 108 | 39 | 69 | 34 | 74 | 0.20 | 0.2 |
| Docket 50-348, 50-364; NPF-2, -8 | 1979 | 211.0 | 28.6 | 1,227 | 643 | 108 | 535 | 460 | 183 | 0.52 | 3.0 |
| 1st commercial operation 12/77, 7/81 | 1980 | 557.3 | 69.3 | 1,330 | 435 | 106 | 329 | 185 | 250 | 0.33 | 0.8 |
| Type - PWR | 1981 | 310.2 | 41.4 | 1,331 | 512 | 96 | 416 | 270 | 242 | 0.38 | 1.7 |
| Capacity - 824, 828 MWe | 1982 | 1,271.5 | 79.2 | 1,453 | 484 | 155 | 329 | 196 | 288 | 0.33 | 0.4 |
| | 1983 | 1,356.5 | 83.0 | 1,938 | 1,021 | 241 | 780 | 479 | 542 | 0.53 | 0.8 |
| | 1984 | 1,447.0 | 86.6 | 2,046 | 902 | 178 | 724 | 505 | 397 | 0.44 | 0.6 |
| | 1985 | 1,368.2 | 81.1 | 2,551 | 799 | 158 | 641 | 442 | 357 | 0.31 | 0.6 |
| | 1986 | 1,409.4 | 83.8 | 2,314 | 858 | 148 | 710 | 464 | 394 | 0.37 | 0.6 |
| | 1987 | 1,369.7 | 84.7 | 1,871 | 598 | 105 | 493 | 347 | 251 | 0.32 | 0.4 |
| | 1988 | 1,567.7 | 92.3 | 1,840 | 552 | 74 | 478 | 340 | 212 | 0.30 | 0.4 |
| | 1989 | 1,402.9 | 84.6 | 2,206 | 749 | 88 | 661 | 516 | 233 | 0.34 | 0.5 |
| | 1990 | 1,464.0 | 86.7 | 1,700 | 457 | 47 | 410 | 342 | 115 | 0.27 | 0.3 |
| FERMI 2 | 1989 | 624.0 | 68.5 | 1,270 | 255 | 35 | 220 | 182 | 73 | 0.20 | 0.4 |
| Docket 50-341; NPF-43 | 1990 | 848.2 | 84.7 | 462 | 83 | 31 | 52 | 14 | 69 | 0.18 | 0.1 |
| 1st commercial operation 1/88 | | | | | | | | | | | |
| Type - BWR | | | | | | | | | | | |
| Capacity - 1047 MWe | | | | | | | | | | | |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| FITZPATRICK | 1976 | 489.0 | 71.6 | 600 | 202 | | | | | 0.34 | 0.4 |
| Docket 50-333; DPR-59 | 1977 | 460.5 | 68.4 | 1,380 | 1,080 | 14 | 1,066 | 937 | 143 | 0.78 | 2.3 |
| 1st commercial operation 7/75 | 1978 | 497.0 | 72.1 | 904 | 909 | 166 | 743 | 597 | 312 | 1.01 | 1.8 |
| Type - BWR | 1979 | 349.0 | 50.8 | 850 | 859 | 169 | 690 | 538 | 321 | 1.01 | 2.5 |
| Capacity - 782 MWe | 1980 | 509.5 | 70.3 | 2,056 | 2,040 | 118 | 1,922 | 1,808 | 232 | 0.99 | 4.0 |
| | 1981 | 562.9 | 74.7 | 2,490 | 1,425 | 187 | 1,238 | 1,072 | 353 | 0.57 | 2.5 |
| | 1982 | 583.6 | 75.0 | 2,322 | 1,190 | 136 | 1,054 | 863 | 327 | 0.51 | 2.0 |
| | 1983 | 546.2 | 70.6 | 1,715 | 1,090 | 158 | 932 | 667 | 423 | 0.64 | 2.0 |
| | 1984 | 576.2 | 76.8 | 1,610 | 971 | 82 | 889 | 467 | 504 | 0.60 | 1.7 |
| | 1985 | 492.3 | 63.7 | 1,845 | 1,051 | 85 | 966 | 718 | 333 | 0.57 | 2.1 |
| | 1986 | 711.2 | 90.6 | 1,185 | 411 | 81 | 330 | 168 | 243 | 0.35 | 0.6 |
| | 1987 | 496.2 | 70.3 | 1,578 | 940 | 164 | 776 | 616 | 324 | 0.60 | 1.9 |
| | 1988 | 514.0 | 69.0 | 1,553 | 786 | 162 | 624 | 506 | 280 | 0.51 | 1.5 |
| | 1989 | 727.5 | 92.3 | 1,027 | 377 | 58 | 319 | 191 | 186 | 0.37 | 0.5 |
| | 1990 | 543.8 | 72.6 | 1,536 | 884 | 92 | 792 | 557 | 327 | 0.58 | 1.6 |
| FORT CALHOUN | 1975 | 252.3 | 67.4 | 469 | 294 | | | 92 | 202 | 0.63 | 1.2 |
| Docket 50-285; DPR-40 | 1976 | 265.9 | 69.5 | 516 | 313 | 28 | 285 | 38 | 275 | 0.61 | 1.2 |
| 1st commercial operation 6/74 | 1977 | 351.8 | 79.4 | 535 | 297 | 33 | 264 | 72 | 225 | 0.56 | 0.8 |
| Type - PWR | 1978 | 342.3 | 75.1 | 596 | 410 | 59 | 351 | 151 | 259 | 0.69 | 1.2 |
| Capacity - 478 MWe | 1979 | 440.0 | 95.7 | 451 | 126 | 19 | 107 | 47 | 79 | 0.28 | 0.3 |
| | 1980 | 242.3 | 60.4 | 891 | 668 | 38 | 630 | 426 | 242 | 0.75 | 2.8 |
| | 1981 | 260.9 | 72.3 | 822 | 458 | 61 | 397 | 254 | 204 | 0.56 | 1.8 |
| | 1982 | 418.0 | 89.7 | 604 | 217 | 45 | 172 | 102 | 115 | 0.36 | 0.5 |
| | 1983 | 330.4 | 73.1 | 860 | 433 | 66 | 367 | 205 | 228 | 0.50 | 1.3 |
| | 1984 | 279.2 | 59.9 | 913 | 563 | 91 | 472 | 313 | 250 | 0.62 | 2.0 |
| | 1985 | 367.0 | 73.7 | 982 | 373 | 54 | 319 | 231 | 142 | 0.38 | 1.0 |
| | 1986 | 431.8 | 94.3 | 756 | 74 | 26 | 48 | 30 | 44 | 0.10 | 0.2 |
| | 1987 | 366.0 | 75.4 | 1,247 | 388 | 78 | 310 | 226 | 162 | 0.31 | 1.1 |
| | 1988 | 315.5 | 74.1 | 1,594 | 272 | 74 | 198 | 173 | 99 | 0.17 | 0.9 |
| | 1989 | 395.7 | 89.2 | 1,210 | 93 | 31 | 62 | 50 | 43 | 0.08 | 0.2 |
| | 1990 | 290.0 | 64.2 | 760 | 290 | 30 | 260 | 160 | 130 | 0.38 | 1.0 |
| GINNA | 1971 | 327.8 | | 340 | 430 | 69 | 361 | 108 | 322 | 1.26 | 1.3 |
| Docket 50-244; DPR-18 | 1972 | 293.6 | | 677 | 1,032 | 71 | 961 | 278 | 754 | 1.52 | 3.5 |
| 1st commercial operation 7/70 | 1973 | 409.5 | | 319 | 224 | 55 | 169 | 84 | 140 | 0.70 | 0.5 |
| Type - PWR | 1974 | 253.7 | 62.4 | 884 | 1,225 | | | | | 1.39 | 4.8 |
| Capacity - 470 MWe | 1975 | 365.2 | 76.7 | 685 | 538 | | | | | 0.79 | 1.5 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| GINNA (Continued) | 1976 | 248.8 | 58.2 | 758 | 636 | 29 | 607 | 210 | 426 | 0.84 | 2.6 |
| | 1977 | 365.6 | 85.5 | 530 | 401 | 15 | 386 | 120 | 281 | 0.76 | 1.1 |
| | 1978 | 386.5 | 80.6 | 657 | 450 | 20 | 430 | 98 | 352 | 0.68 | 1.2 |
| | 1979 | 355.0 | 72.8 | 878 | 592 | 68 | 524 | 206 | 386 | 0.67 | 1.7 |
| | 1980 | 370.5 | 76.0 | 1,073 | 708 | 64 | 644 | 302 | 406 | 0.66 | 1.9 |
| | 1981 | 399.0 | 82.1 | 925 | 655 | 49 | 606 | 321 | 334 | 0.71 | 1.6 |
| | 1982 | 289.0 | 58.8 | 1,117 | 1,140 | 80 | 1,060 | 471 | 669 | 1.02 | 3.9 |
| | 1983 | 365.0 | 74.6 | 969 | 855 | 42 | 813 | 378 | 477 | 0.88 | 2.3 |
| | 1984 | 378.1 | 77.2 | 713 | 395 | 58 | 337 | 195 | 200 | 0.55 | 1.0 |
| | 1985 | 436.7 | 87.9 | 845 | 426 | 89 | 337 | 183 | 243 | 0.50 | 1.0 |
| | 1986 | 433.3 | 87.4 | 901 | 357 | 45 | 312 | 107 | 250 | 0.40 | 0.8 |
| | 1987 | 459.0 | 91.5 | 773 | 344 | 35 | 309 | 151 | 193 | 0.45 | 0.7 |
| | 1988 | 423.1 | 87.4 | 897 | 295 | 37 | 258 | 114 | 181 | 0.33 | 0.7 |
| | 1989 | 369.2 | 75.9 | 1,254 | 605 | 57 | 548 | 172 | 433 | 0.48 | 1.6 |
| | 1990 | 414.3 | 84.4 | 991 | 347 | 38 | 309 | 207 | 140 | 0.35 | 0.8 |
| GRAND GULF | 1986 | 494.7 | 60.9 | 1,486 | 436 | 68 | 368 | 329 | 107 | 0.29 | 0.9 |
| Docket 50-416; NPF-29 | 1987 | 920.7 | 82.2 | 1,358 | 420 | 106 | 314 | 303 | 117 | 0.31 | 0.5 |
| 1st commercial operation 7/85 | 1988 | 1,136.6 | 96.7 | 692 | 147 | 57 | 90 | 52 | 95 | 0.21 | 0.1 |
| Type - BWR | 1989 | 932.6 | 80.0 | 1,972 | 498 | 93 | 405 | 333 | 165 | 0.25 | 0.5 |
| Capacity - 1142 MWe | 1990 | 883.5 | 78.9 | 1,765 | 482 | 52 | 430 | 321 | 161 | 0.27 | 0.5 |
| HADDAM NECK | 1969 | 438.5 | | 138 | 106 | | | 27 | 79 | 0.77 | 0.2 |
| Docket 50-213; DPR-61 | 1970 | 424.7 | | 734 | 689 | | | 463 | 226 | 0.94 | 1.6 |
| 1st commercial operation 1/68 | 1971 | 502.2 | | 289 | 342 | | | 166 | 176 | 1.18 | 0.7 |
| Type -PWR | 1972 | 515.6 | | 355 | 325 | | | 181 | 144 | 0.91 | 0.6 |
| Capacity - 565 MWe | 1973 | 293.1 | | 951 | 697 | | | 544 | 153 | 0.73 | 2.4 |
| | 1974 | 521.4 | 91.2 | 550 | 201 | | | | | 0.37 | 0.4 |
| | 1975 | 494.3 | 89.9 | 795 | 703 | 20 | 683 | | | 0.88 | 1.4 |
| | 1976 | 482.9 | 82.5 | 644 | 449 | 5 | 444 | 253 | 196 | 0.70 | 0.9 |
| | 1977 | 480.7 | 83.9 | 894 | 641 | 59 | 582 | 440 | 201 | 0.72 | 1.3 |
| | 1978 | 563.4 | 98.6 | 216 | 117 | 25 | 92 | 18 | 99 | 0.54 | 0.2 |
| | 1979 | 493.0 | 87.5 | 1,226 | 1,162 | 74 | 1,088 | 783 | 379 | 0.95 | 2.4 |
| | 1980 | 426.8 | 75.0 | 1,860 | 1,353 | 175 | 1,178 | 1,076 | 277 | 0.73 | 3.2 |
| | 1981 | 487.5 | 84.3 | 1,554 | 1,036 | 174 | 862 | 809 | 227 | 0.67 | 2.1 |
| | 1982 | 543.9 | 93.4 | 559 | 126 | 46 | 80 | 22 | 104 | 0.23 | 0.2 |
| | 1983 | 453.7 | 77.8 | 1,645 | 1,384 | 107 | 1,277 | 1,022 | 362 | 0.84 | 3.1 |
| | 1984 | 404.0 | 71.7 | 1,430 | 1,216 | 154 | 1,062 | 803 | 413 | 0.85 | 3.0 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| HADDAM NECK (Continued) | 1985 | 556.1 | 98.4 | 384 | 101 | 21 | 80 | 22 | 79 | 0.26 | 0.2 |
| | 1986 | 294.8 | 53.6 | 1,945 | 1,567 | 179 | 1,388 | 1,274 | 293 | 0.81 | 5.3 |
| | 1987 | 304.6 | 54.0 | 1,763 | 750 | 99 | 651 | 553 | 197 | 0.43 | 0.5 |
| | 1988 | 397.4 | 70.3 | 735 | 237 | 43 | 194 | 107 | 130 | 0.32 | 0.6 |
| | 1989 | 356.4 | 67.2 | 1,455 | 596 | 68 | 528 | 472 | 124 | 0.41 | 1.7 |
| | 1990 | 142.7 | 32.2 | 979 | 421 | 75 | 346 | 268 | 153 | 0.43 | 3.0 |
| HARRIS 1 | 1988 | 652.9 | 75.0 | 721 | 169 | 29 | 140 | 118 | 51 | 0.23 | 0.3 |
| Docket 50-400; NPF-63 | 1989 | 690.6 | 79.5 | 929 | 156 | 32 | 124 | 85 | 71 | 0.17 | 0.2 |
| 1st commercial operation 5/87 | 1990 | 776.4 | 89.6 | 453 | 85 | 13 | 72 | 47 | 38 | 0.19 | 0.1 |
| Type - PWR | | | | | | | | | | | |
| Capacity - 860 MWe | | | | | | | | | | | |
| HATCH 1,2 | 1976 | 496.3 | 83.8 | 630 | 134 | 79 | 55 | 4 | 130 | 0.21 | 0.3 |
| Docket 50-321, 50-366; DPR-57; | 1977 | 446.8 | 66.3 | 1,303 | 465 | 96 | 369 | 220 | 245 | 0.36 | 1.0 |
| NPF-05 | 1978 | 513.0 | 72.8 | 1,304 | 248 | 88 | 160 | 52 | 196 | 0.19 | 0.5 |
| 1st commercial operation 12/75, 9/79 | 1979 | 401.0 | 54.6 | 2,131 | 582 | 85 | 497 | 381 | 201 | 0.27 | 1.5 |
| Type - BWRs | 1980 | 1,008.7 | 70.9 | 1,930 | 449 | 143 | 306 | 163 | 286 | 0.23 | 0.4 |
| Capacity - 753, 766 MWe | 1981 | 870.9 | 64.3 | 2,899 | 1,337 | 200 | 1,137 | 792 | 545 | 0.46 | 1.5 |
| | 1982 | 768.0 | 56.6 | 3,418 | 1,460 | 218 | 1,242 | 1,064 | 396 | 0.43 | 1.9 |
| | 1983 | 934.7 | 68.6 | 3,428 | 1,299 | 253 | 1,046 | 851 | 448 | 0.38 | 1.4 |
| | 1984 | 658.6 | 47.3 | 4,110 | 2,218 | 311 | 1,907 | 1,861 | 357 | 0.54 | 3.4 |
| | 1985 | 1,211.0 | 79.6 | 2,841 | 818 | 182 | 636 | 508 | 310 | 0.29 | 0.7 |
| | 1986 | 872.0 | 64.8 | 3,486 | 1,497 | 347 | 1,150 | 1,107 | 390 | 0.43 | 1.7 |
| | 1987 | 1,295.4 | 89.7 | 2,202 | 816 | 207 | 609 | 435 | 381 | 0.37 | 0.6 |
| | 1988 | 1,001.4 | 70.4 | 2,509 | 1,401 | 275 | 1,126 | 927 | 474 | 0.56 | 1.4 |
| | 1989 | 1,271.1 | 87.1 | 1,350 | 556 | 154 | 402 | 305 | 251 | 0.41 | 0.4 |
| | 1990 | 1,268.0 | 83.5 | 2,902 | 1,455 | 224 | 1,231 | 1,074 | 381 | 0.50 | 1.1 |
| HOPE CREEK 1 | 1987 | 869.2 | 86.4 | 589 | 117 | 21 | 96 | 40 | 77 | 0.20 | 0.1 |
| Docket 50-354; NPF-57 | 1988 | 832.7 | 80.7 | 1,734 | 287 | 38 | 249 | 163 | 124 | 0.17 | 0.3 |
| 1st commercial operation 12/86 | 1989 | 791.1 | 77.8 | 1,873 | 465 | 40 | 425 | 292 | 173 | 0.25 | 0.6 |
| Type - BWR | 1990 | 966.4 | 91.6 | 1,394 | 196 | 26 | 170 | 89 | 107 | 0.14 | 0.2 |
| Capacity - 1031 MWe | | | | | | | | | | | |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| HUMBOLDT BAY* | 1969 | 44.6 | | 125 | 164 | 69 | 95 | 12 | 152 | 1.31 | 3.7 |
| Docket 50-133; DPR-7 | 1970 | 49.3 | | 115 | 209 | 130 | 79 | 37 | 172 | 1.82 | 4.2 |
| 1st commercial operation 8/63 | 1971 | 39.6 | | 140 | 292 | 114 | 178 | 65 | 227 | 2.09 | 7.4 |
| Type - BWR | 1972 | 43.1 | | 127 | 253 | 81 | 172 | 57 | 196 | 1.99 | 5.9 |
| Capacity - 63 MWe | 1973 | 50.1 | | 210 | 266 | 60 | 206 | | | 1.27 | 5.3 |
| | 1974 | 43.4 | 83.8 | 296 | 318 | 103 | 215 | | | 1.07 | 7.3 |
| | 1975 | 45.3 | 83.9 | 265 | 339 | 131 | 208 | 112 | 227 | 1.28 | 7.5 |
| | 1976 | 23.5 | 46.4 | 523 | 683 | 37 | 646 | 50 | 633 | 1.31 | 29.1 |
| | 1977 | 0.0 | 0.0 | 1,063 | 1,905 | 24 | 1,880 | 973 | 931 | 1.79 | --- |
| | 1978 | 0.0 | 0.0 | 320 | 335 | 13 | 322 | 145 | 190 | 1.05 | --- |
| | 1979 | 0.0 | 0.0 | 135 | 31 | 11 | 20 | 2 | 29 | 0.23 | --- |
| | 1980 | 0.0 | 0.0 | 142 | 22 | 10 | 12 | 3 | 19 | 0.15 | --- |
| | 1981 | 0.0 | 0.0 | 75 | 9 | 3 | 6 | 3 | 6 | 0.12 | --- |
| | 1982 | 0.0 | 0.0 | 71 | 19 | 5 | 14 | 0 | 19 | 0.27 | --- |
| | 1983 | 0.0 | 0.0 | 84 | 17 | 4 | 13 | 0 | 17 | 0.20 | --- |
| INDIAN POINT 1**,2,3*** | 1969 | 206.2 | | | 298 | | | | | | 1.4 |
| Docket 50-3, 50-247, 50-286; | 1970 | 43.3 | | | 1,639 | | | | | | 37.8 |
| DPR-5, -26, -64 | 1971 | 154.0 | | | 768 | | | | | | 5.0 |
| 1st commercial operation 10/62, 8/74, | 1972 | 142.3 | | | 967 | | | | | | 6.8 |
| 8/76 | 1973 | 0.0 | | 2,998 | 5,262 | 709 | 4,553 | 2,847 | 2,415 | 1.76 | --- |
| Type - PWR | 1974 | 556.1 | 59.4 | 1,019 | 910 | | | | | 0.89 | 1.6 |
| Capacity - 0, 939, 965 | 1975 | 584.4 | 74.8 | 891 | 705 | 166 | 539 | 47 | 658 | 0.79 | 1.2 |
| | 1976 | 273.9 | 34.8 | 1,590 | 1,950 | 154 | 1,796 | 172 | 1,778 | 1.23 | 7.1 |
| | 1977 | 1,278.3 | 75.3 | 1,391 | 1,070 | 189 | 881 | 383 | 687 | 0.77 | 0.8 |
| | 1978 | 1,172.3 | 67.8 | 1,909 | 2,006 | 260 | 1,746 | 759 | 1,247 | 1.05 | 1.7 |

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

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

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

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| INDIAN POINT 1**,2 | 1979 | 574.0 | 71.4 | 1,349 | 1,279 | 209 | 1,070 | 612 | 667 | 0.95 | 2.2 |
| | 1980 | 510.8 | 64.8 | 1,577 | 971 | 304 | 667 | 6 | 965 | 0.62 | 1.9 |
| | 1981 | 367.5 | 46.0 | 2,595 | 2,731 | 237 | 2,494 | 1,595 | 1,136 | 1.05 | 7.4 |
| | 1982 | 532.4 | 65.4 | 2,144 | 1,635 | 343 | 1,292 | 883 | 752 | 0.76 | 3.1 |
| | 1983 | 702.6 | 84.0 | 1,057 | 486 | 202 | 284 | 219 | 267 | 0.46 | 0.7 |
| INDIAN POINT 2<br>Docket 50-247; DPR-26<br>1st commercial operation 8/74<br>Type - PWR<br>Capacity - 939 MWe | 1984 | 416.7 | 51.9 | 2,919 | 2,644 | 650 | 1,994 | 1,863 | 781 | 0.91 | 6.3 |
| | 1985 | 791.4 | 95.7 | 708 | 192 | 123 | 69 | 95 | 97 | 0.27 | 0.2 |
| | 1986 | 457.5 | 56.2 | 1,926 | 1,250 | 350 | 900 | 349 | 901 | 0.65 | 2.7 |
| | 1987 | 611.4 | 73.4 | 1,980 | 1,217 | 128 | 1,089 | 805 | 412 | 0.61 | 2.0 |
| | 1988 | 719.3 | 86.9 | 890 | 235 | 51 | 184 | 117 | 118 | 0.26 | 0.3 |
| | 1989 | 532.5 | 64.6 | 2,093 | 1,436 | 208 | 1,228 | 813 | 623 | 0.69 | 2.7 |
| | 1990 | 618.0 | 66.6 | 2,053 | 608 | 66 | 542 | 450 | 158 | 0.30 | 1.0 |
| INDIAN POINT 3***<br>Docket 50-286; DPR-64<br>1st commercial operation 8/76<br>Type - PWR<br>Capacity - 965 MWe | 1979 | 574.0 | 66.5 | 808 | 636 | 63 | 573 | 482 | 154 | 0.79 | 1.1 |
| | 1980 | 367.3 | 53.2 | 977 | 308 | 47 | 261 | 210 | 98 | 0.32 | 0.8 |
| | 1981 | 367.5 | 59.8 | 677 | 364 | 46 | 318 | 255 | 109 | 0.54 | 1.0 |
| | 1982 | 171.5 | 22.5 | 1,477 | 1,226 | 42 | 1,184 | 1,093 | 133 | 0.83 | 7.1 |
| | 1983 | 7.8 | 2.6 | 941 | 607 | 38 | 569 | 494 | 113 | 0.65 | 77.8 |
| | 1984 | 714.4 | 76.3 | 658 | 230 | 48 | 182 | 127 | 103 | 0.35 | 0.3 |
| | 1985 | 566.5 | 66.0 | 1,093 | 570 | 35 | 535 | 455 | 115 | 0.52 | 1.0 |
| | 1986 | 655.3 | 73.4 | 588 | 202 | 34 | 168 | 123 | 79 | 0.34 | 0.3 |
| | 1987 | 574.6 | 62.7 | 1,308 | 500 | 84 | 416 | 365 | 135 | 0.38 | 0.9 |
| | 1988 | 792.5 | 83.3 | 451 | 93 | 41 | 52 | 39 | 54 | 0.21 | 0.1 |
| | 1989 | 587.8 | 61.1 | 1,800 | 876 | 130 | 746 | 776 | 100 | 0.49 | 1.5 |
| | 1990 | 595.3 | 62.9 | 1,066 | 358 | 69 | 289 | 230 | 128 | 0.34 | 0.6 |
| KEWAUNEE<br>Docket 50-305; DPR-43<br>1st commercial operation 6/74<br>Type - PWR<br>Capacity - 503 MWe | 1975 | 401.9 | 88.2 | 104 | 28 | 1 | 27 | 12 | 16 | 0.27 | 0.1 |
| | 1976 | 405.9 | 78.9 | 381 | 270 | 16 | 254 | 193 | 77 | 0.71 | 0.7 |
| | 1977 | 425.0 | 79.9 | 312 | 140 | 8 | 131 | 76 | 63 | 0.45 | 0.3 |
| | 1978 | 466.6 | 89.5 | 335 | 154 | 11 | 143 | 89 | 65 | 0.46 | 0.3 |
| | 1979 | 412.0 | 79.0 | 343 | 127 | 6 | 121 | 79 | 48 | 0.37 | 0.3 |
| | 1980 | 433.8 | 82.1 | 401 | 165 | 7 | 158 | 103 | 62 | 0.41 | 0.4 |
| | 1981 | 451.8 | 86.7 | 383 | 141 | 7 | 134 | 94 | 47 | 0.37 | 0.3 |
| | 1982 | 458.4 | 87.6 | 353 | 101 | 5 | 96 | 51 | 50 | 0.29 | 0.2 |
| | 1983 | 444.1 | 83.7 | 445 | 165 | 10 | 155 | 119 | 46 | 0.37 | 0.4 |
| | 1984 | 455.3 | 85.7 | 482 | 139 | 7 | 132 | 89 | 50 | 0.29 | 0.3 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function: Opera-tions | Person-rems (-cSv) per Work Function: Maint. & Others | Person-rems (-cSv) per Personnel Type: Contrac-tor | Person-rems (-cSv) per Personnel Type: Station & Utility | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| KEWAUNEE (Continued) | 1985 | 443.1 | 82.4 | 519 | 176 | 9 | 167 | 114 | 62 | 0.34 | 0.4 |
| | 1986 | 461.7 | 85.8 | 502 | 169 | 8 | 161 | 111 | 58 | 0.34 | 0.4 |
| | 1987 | 480.0 | 89.7 | 755 | 226 | 8 | 218 | 173 | 53 | 0.30 | 0.5 |
| | 1988 | 467.5 | 88.3 | 705 | 210 | 6 | 204 | 165 | 45 | 0.30 | 0.4 |
| | 1989 | 449.1 | 84.9 | 570 | 239 | 10 | 229 | 179 | 60 | 0.42 | 0.5 |
| | 1990 | 468.8 | 87.9 | 490 | 145 | 5 | 140 | 112 | 33 | 0.30 | 0.3 |
| LACROSSE* | 1970 | 15.3 | | | 111 | | | 40 | 71 | | 7.2 |
| Docket 50-409; DPR-45 | 1971 | 323.1 | | 218 | 158 | | | | | 0.72 | 4.8 |
| 1st commercial operation 11/69 | 1972 | 29.2 | | 151 | 172 | | | | | 1.14 | 5.9 |
| Type - BWR | 1973 | 24.4 | | 157 | 221 | | | | | 1.41 | 9.1 |
| Capacity - 48 MWe | 1974 | 37.9 | 81.0 | 115 | 139 | 89 | 50 | 6 | 133 | 1.21 | 3.7 |
| | 1975 | 32.0 | 69.6 | 165 | 234 | | | | | 1.42 | 7.3 |
| | 1976 | 21.2 | 47.6 | 118 | 110 | 40 | 71 | 6 | 105 | 0.93 | 5.2 |
| | 1977 | 11.3 | 33.7 | 141 | 225 | 60 | 164 | 8 | 216 | 1.60 | 19.9 |
| | 1978 | 21.6 | 62.0 | 182 | 164 | 69 | 95 | 6 | 158 | 0.90 | 7.6 |
| | 1979 | 24.0 | 71.8 | 153 | 186 | 65 | 121 | 21 | 165 | 1.22 | 7.8 |
| | 1980 | 26.4 | 68.5 | 124 | 218 | 63 | 155 | 11 | 207 | 1.76 | 8.3 |
| | 1981 | 29.6 | 76.0 | 187 | 123 | 62 | 61 | 3 | 120 | 0.66 | 4.2 |
| | 1982 | 17.2 | 44.6 | 148 | 205 | 65 | 140 | 16 | 189 | 1.39 | 11.9 |
| | 1983 | 24.8 | 59.7 | 160 | 313 | 103 | 210 | 31 | 282 | 1.96 | 12.6 |
| | 1984 | 38.5 | 80.5 | 288 | 252 | 141 | 111 | 5 | 247 | 0.88 | 6.5 |
| | 1985 | 39.2 | 86.7 | 373 | 173 | 76 | 97 | 22 | 151 | 0.46 | 4.4 |
| | 1986 | 19.6 | 46.1 | 260 | 290 | | | | | 1.12 | 14.8 |
| | 1987 | 0.0 | 0.0 | 127 | 68 | 42 | 26 | 2 | 66 | 0.54 | --- |
| LASALLE 1,2 | 1984 | 677.8 | 77.8 | 1,245 | 252 | 29 | 223 | 88 | 164 | 0.20 | 0.4 |
| Docket 50-373, -374; NPF-11, -18 | 1985 | 987.9 | 53.0 | 1,635 | 685 | 88 | 597 | 420 | 265 | 0.42 | 0.7 |
| 1st commercial operation 1/84, 6/84 | 1986 | 929.5 | 50.6 | 1,614 | 898 | 143 | 755 | 527 | 371 | 0.56 | 1.0 |
| Type - BWR | 1987 | 1,030.0 | 59.3 | 1,744 | 1,396 | 217 | 1,179 | 989 | 407 | 0.80 | 1.4 |
| Capacity - 1036, 1036 MWe | 1988 | 1,317.6 | 71.6 | 2,737 | 2,471 | 253 | 2,218 | 1,978 | 493 | 0.90 | 1.9 |
| | 1989 | 1,503.5 | 73.1 | 2,475 | 1,386 | 138 | 1,248 | 853 | 533 | 0.56 | 0.9 |
| | 1990 | 1,754.3 | 84.6 | 1,830 | 948 | 130 | 818 | 503 | 445 | 0.52 | 0.5 |

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

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| LIMERICK 1, 2 | 1987 | 636.1 | 70.2 | 2,156 | 174 | 7 | 167 | 114 | 60 | 0.08 | 0.3 |
| Docket 50-352, 50-353; NPF-39,-85 | 1988 | 794.9 | 96.5 | 950 | 52 | 20 | 32 | 23 | 29 | 0.05 | 0.1 |
| 1st commercial operation 2/86, 1/90 | 1989 | 628.4 | 66.0 | 1,818 | 266 | 70 | 196 | 156 | 110 | 0.15 | 0.4 |
| Type - BWRs | 1990 | 1,527.7 | 78.2 | 1,422 | 175 | 37 | 138 | 78 | 97 | 0.12 | 0.1 |
| Capacity - 1055, 1055 MWe | | | | | | | | | | | |
| MAINE YANKEE | 1973 | 408.7 | | 782 | 117 | | | 59 | 58 | 0.15 | 0.3 |
| Docket 50-309; DPR-36 | 1974 | 432.6 | 68.7 | 619 | 420 | 64 | 356 | 188 | 232 | 0.68 | 1.0 |
| 1st commercial operation 12/72 | 1975 | 542.9 | 79.9 | 440 | 319 | 15 | 304 | 181 | 138 | 0.72 | 0.6 |
| Type - PWR | 1976 | 712.2 | 95.0 | 244 | 85 | 27 | 58 | 26 | 59 | 0.35 | 0.1 |
| Capacity - 830 MWe | 1977 | 617.6 | 82.2 | 508 | 245 | 46 | 199 | 112 | 133 | 0.48 | 0.4 |
| | 1978 | 642.7 | 84.1 | 638 | 420 | 54 | 366 | 262 | 158 | 0.66 | 0.7 |
| | 1979 | 537.0 | 68.4 | 393 | 154 | 70 | 84 | 26 | 128 | 0.39 | 0.3 |
| | 1980 | 527.0 | 72.2 | 735 | 462 | 117 | 345 | 277 | 185 | 0.63 | 0.9 |
| | 1981 | 624.2 | 78.2 | 868 | 424 | 11 | 413 | 308 | 116 | 0.49 | 0.7 |
| | 1982 | 542.5 | 69.1 | 1,295 | 619 | 33 | 586 | 462 | 157 | 0.48 | 1.1 |
| | 1983 | 677.1 | 83.6 | 592 | 165 | 41 | 124 | 72 | 93 | 0.28 | 0.2 |
| | 1984 | 605.7 | 74.4 | 1,262 | 884 | 9 | 875 | 702 | 182 | 0.70 | 1.5 |
| | 1985 | 635.4 | 79.2 | 1,009 | 700 | 54 | 646 | 529 | 171 | 0.69 | 1.1 |
| | 1986 | 737.6 | 87.8 | 495 | 100 | 34 | 66 | 14 | 86 | 0.20 | 0.1 |
| | 1987 | 478.1 | 65.3 | 1,100 | 722 | 39 | 683 | 531 | 191 | 0.66 | 1.5 |
| | 1988 | 591.9 | 79.1 | 1,058 | 725 | 52 | 673 | 576 | 149 | 0.69 | 1.2 |
| | 1989 | 819.2 | 93.7 | 375 | 99 | 38 | 61 | 25 | 74 | 0.26 | 0.1 |
| | 1990 | 573.0 | 71.0 | 1,359 | 682 | 146 | 536 | 547 | 135 | 0.50 | 1.2 |
| MCGUIRE 1,2 | 1982 | 524.9 | 80.4 | 1,560 | 169 | 26 | 143 | 29 | 140 | 0.11 | 0.3 |
| Docket 50-369, -370; NPF-9, -17 | 1983 | 558.3 | 55.4 | 1,751 | 521 | 35 | 486 | 123 | 398 | 0.30 | 0.9 |
| 1st commercial operation 12/81, 3/84 | 1984 | 764.1 | 68.5 | 1,663 | 507 | 35 | 472 | 106 | 401 | 0.30 | 0.7 |
| Type - PWRS | 1985 | 808.4 | 77.0 | 2,217 | 771 | 92 | 679 | 277 | 494 | 0.35 | 1.0 |
| Capacity - 1129, 1129 MWe | 1986 | 1,360.0 | 60.1 | 2,326 | 1,015 | 47 | 968 | 389 | 626 | 0.44 | 0.7 |
| | 1987 | 1,774.7 | 79.2 | 2,865 | 1,043 | 38 | 1,005 | 510 | 533 | 0.36 | 0.6 |
| | 1988 | 1,830.7 | 80.2 | 2,808 | 1,104 | 65 | 1,039 | 592 | 512 | 0.39 | 0.6 |
| | 1989 | 1,810.2 | 80.8 | 1,994 | 620 | 44 | 576 | 252 | 368 | 0.31 | 0.3 |
| | 1990 | 1,340.3 | 61.3 | 2,289 | 727 | 63 | 664 | 288 | 439 | 0.32 | 0.5 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| MILLSTONE POINT 1 | 1972 | 377.6 | | 612 | 596 | 50 | 546 | 340 | 256 | 0.97 | 1.6 |
| Docket 50-245; DPR-21 | 1973 | 225.1 | | 1,184 | 663 | 125 | 538 | 422 | 241 | 0.56 | 2.9 |
| 1st commercial operation 3/71 | 1974 | 430.3 | 79.1 | 2,477 | 1,430 | | | | | 0.58 | 3.3 |
| Type - BWR | 1975 | 465.4 | 75.6 | 2,587 | 2,022 | | | | | 0.78 | 4.3 |
| Capacity - 654 MWe | 1976 | 449.8 | 76.1 | 1,387 | 1,194 | 54 | 1,140 | 955 | 239 | 0.86 | 2.7 |
| | 1977 | 575.7 | 89.6 | 1,075 | 394 | 118 | 274 | 159 | 233 | 0.37 | 0.7 |
| | 1978 | 556.6 | 87.6 | 1,391 | 1,416 | 160 | 1,256 | 1,036 | 380 | 1.02 | 2.5 |
| | 1979 | 505.0 | 77.3 | 2,001 | 1,795 | 198 | 1,597 | 1,327 | 468 | 0.90 | 3.6 |
| | 1980 | 405.8 | 69.0 | 3,024 | 2,157 | 100 | 2,057 | 1,863 | 294 | 0.71 | 5.3 |
| | 1981 | 304.3 | 51.6 | 2,506 | 1,496 | 96 | 1,400 | 1,201 | 295 | 0.60 | 4.9 |
| | 1982 | 490.2 | 79.9 | 1,370 | 929 | 78 | 851 | 587 | 342 | 0.68 | 1.9 |
| | 1983 | 640.1 | 95.6 | 309 | 244 | 63 | 181 | 74 | 170 | 0.79 | 0.4 |
| | 1984 | 516.1 | 78.8 | 1,992 | 836 | 80 | 756 | 531 | 305 | 0.42 | 1.6 |
| | 1985 | 548.5 | 83.6 | 732 | 608 | 65 | 543 | 369 | 239 | 0.83 | 1.1 |
| | 1986 | 626.8 | 95.4 | 389 | 150 | 47 | 103 | 53 | 97 | 0.39 | 0.2 |
| | 1987 | 523.4 | 79.6 | 1,588 | 684 | 56 | 628 | 523 | 161 | 0.43 | 1.3 |
| | 1988 | 658.8 | 98.6 | 327 | 144 | 31 | 113 | 60 | 84 | 0.44 | 0.2 |
| | 1989 | 554.6 | 84.2 | 852 | 462 | 40 | 422 | 334 | 128 | 0.54 | 0.8 |
| | 1990 | 608.3 | 91.6 | 365 | 131 | 42 | 89 | 58 | 73 | 0.36 | 0.2 |
| MILLSTONE POINT 2,3 | 1976 | 545.7 | 78.7 | 620 | 168 | 26 | 142 | 73 | 95 | 0.27 | 0.3 |
| Docket 50-336, 50-423; DPR-65, NPF-49 | 1977 | 518.7 | 65.7 | 667 | 242 | 38 | 204 | 153 | 89 | 0.36 | 0.5 |
| 1st commercial operation 12/75, 4/86 | 1978 | 536.6 | 67.3 | 1,420 | 1,444 | 65 | 1,379 | 1,366 | 78 | 1.02 | 2.7 |
| Type - PWR | 1979 | 520.0 | 62.8 | 525 | 471 | 81 | 390 | 304 | 167 | 0.90 | 0.9 |
| Capacity - 863, 1137 MWe | 1980 | 579.3 | 69.2 | 893 | 637 | 76 | 561 | 515 | 122 | 0.71 | 1.1 |
| | 1981 | 722.4 | 82.6 | 890 | 531 | 44 | 487 | 393 | 138 | 0.60 | 0.7 |
| | 1982 | 595.9 | 70.6 | 2,083 | 1,413 | 27 | 1,386 | 1,219 | 194 | 0.68 | 2.4 |
| | 1983 | 294.0 | 34.2 | 2,383 | 1,881 | 170 | 1,711 | 1,548 | 333 | 0.79 | 6.4 |
| | 1984 | 782.7 | 93.5 | 285 | 120 | 11 | 109 | 63 | 57 | 0.42 | 0.2 |
| | 1985 | 417.8 | 49.4 | 1,905 | 1,581 | 60 | 1,521 | 1,256 | 325 | 0.83 | 3.8 |
| | 1986 | 1,313.8 | 80.4 | 2,393 | 993 | 27 | 966 | 784 | 209 | 0.41 | 0.8 |
| | 1987 | 1,624.5 | 84.1 | 1,441 | 505 | 19 | 486 | 370 | 135 | 0.35 | 0.3 |
| | 1988 | 1,594.8 | 83.2 | 1,827 | 804 | 31 | 773 | 523 | 281 | 0.44 | 0.5 |
| | 1989 | 1,428.3 | 72.9 | 1,984 | 1,079 | 44 | 1,035 | 877 | 202 | 0.54 | 0.8 |
| | 1990 | 1,614.9 | 87.1 | 1,652 | 593 | 35 | 558 | 491 | 102 | 0.36 | 0.4 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| MONTICELLO | 1972 | 424.4 | | 99 | 61 | 40 | 21 | 1 | 60 | 0.62 | 0.1 |
| Docket 50-263; DPR-22 | 1973 | 389.5 | | 401 | 176 | 48 | 128 | 67 | 109 | 0.44 | 0.5 |
| 1st commercial operation 6/71 | 1974 | 349.3 | 74.9 | 842 | 349 | | | 91 | 258 | 0.41 | 1.0 |
| Type - BWR | 1975 | 344.8 | 72.2 | 1,353 | 1,353 | | | | | 1.00 | 3.9 |
| Capacity - 536 MWe | 1976 | 476.4 | 91.5 | 325 | 263 | 59 | 204 | 52 | 212 | 0.81 | 0.6 |
| | 1977 | 425.6 | 79.9 | 860 | 1,000 | 135 | 865 | 661 | 339 | 1.16 | 2.3 |
| | 1978 | 459.4 | 87.2 | 679 | 375 | 62 | 313 | 165 | 210 | 0.55 | 0.8 |
| | 1979 | 522.0 | 97.6 | 372 | 157 | 62 | 95 | 52 | 105 | 0.42 | 0.3 |
| | 1980 | 411.8 | 78.2 | 1,114 | 531 | 82 | 449 | 248 | 283 | 0.48 | 1.3 |
| | 1981 | 389.3 | 72.6 | 1,446 | 1,004 | 101 | 903 | 756 | 248 | 0.69 | 2.6 |
| | 1982 | 291.1 | 63.3 | 1,307 | 993 | 130 | 863 | 760 | 233 | 0.76 | 3.4 |
| | 1983 | 494.6 | 96.3 | 416 | 121 | 57 | 64 | 23 | 98 | 0.29 | 0.2 |
| | 1984 | 33.7 | 9.2 | 1,872 | 2,462 | 208 | 2,254 | 927 | 1,535 | 1.32 | 73.1 |
| | 1985 | 509.8 | 91.7 | 586 | 327 | 87 | 240 | 47 | 280 | 0.56 | 0.6 |
| | 1986 | 402.7 | 79.1 | 895 | 596 | 94 | 502 | 114 | 482 | 0.67 | 1.5 |
| | 1987 | 422.5 | 81.9 | 941 | 568 | 102 | 466 | 115 | 453 | 0.60 | 1.3 |
| | 1988 | 542.5 | 99.8 | 375 | 110 | 40 | 70 | 10 | 100 | 0.29 | 0.2 |
| | 1989 | 318.2 | 76.2 | 1,102 | 507 | 99 | 408 | 113 | 394 | 0.46 | 1.6 |
| | 1990 | 536.0 | 96.9 | 336 | 94 | 42 | 52 | 11 | 83 | 0.28 | 0.2 |
| NINE MILE POINT 1,2 | 1970 | 227.0 | | 821 | 44 | 12 | 32 | 17 | 27 | 0.05 | 0.2 |
| Docket 50-220, 50-410; DPR-63, NPF-69 | 1971 | 346.5 | | 1,006 | 195 | 43 | 152 | 63 | 132 | 0.19 | 0.6 |
| 1st commercial operation 12/69, 4/88 | 1972 | 381.8 | | 735 | 285 | 59 | 226 | 28 | 257 | 0.39 | 0.7 |
| Type - BWR | 1973 | 411.0 | | 550 | 567 | 139 | 428 | 118 | 449 | 1.03 | 1.4 |
| Capacity - 615, 1090 MWe | 1974 | 385.9 | 70.5 | 740 | 824 | 42 | 782 | 279 | 545 | 1.11 | 2.1 |
| | 1975 | 359.0 | 72.1 | 649 | 681 | 68 | 613 | 203 | 478 | 1.05 | 1.9 |
| | 1976 | 484.6 | 88.2 | 392 | 428 | 52 | 376 | 229 | 199 | 1.09 | 0.9 |
| | 1977 | 347.4 | 59.2 | 1,093 | 1,383 | 41 | 1,342 | 883 | 500 | 1.27 | 4.0 |
| | 1978 | 527.7 | 95.1 | 561 | 314 | 59 | 255 | 26 | 288 | 0.56 | 0.6 |
| | 1979 | 354.0 | 66.1 | 1,326 | 1,497 | 106 | 1,391 | 940 | 557 | 1.13 | 4.2 |
| | 1980 | 533.9 | 92.3 | 1,174 | 591 | 75 | 516 | 251 | 340 | 0.50 | 1.1 |
| | 1981 | 385.2 | 66.0 | 2,029 | 1,592 | 144 | 1,448 | 1,064 | 528 | 0.78 | 4.1 |
| | 1982 | 133.5 | 21.4 | 1,352 | 1,264 | 63 | 1,201 | 944 | 320 | 0.93 | 9.5 |
| | 1983 | 329.8 | 56.2 | 1,405 | 860 | 50 | 810 | 576 | 284 | 0.61 | 2.6 |
| | 1984 | 426.8 | 71.9 | 1,530 | 890 | 163 | 727 | 372 | 518 | 0.58 | 2.1 |
| | 1985 | 580.9 | 96.4 | 1,007 | 265 | 61 | 204 | 43 | 222 | 0.26 | 0.5 |
| | 1986 | 371.0 | 65.3 | 1,878 | 1,275 | 38 | 1,237 | 730 | 545 | 0.68 | 3.4 |
| | 1987 | 542.6 | 93.3 | 1,190 | 141 | 35 | 106 | 39 | 102 | 0.12 | 0.3 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| NINE MILE POINT 1,2 (Continued) | 1988 | 0.0 | 0.0 | 2,626 | 854 | 33 | 821 | 509 | 345 | 0.33 | --- |
| | 1989 | 527.5 | 29.7 | 2,737 | 564 | 53 | 511 | 382 | 182 | 0.21 | 1.1 |
| | 1990 | 656.2 | 46.6 | 2,405 | 699 | 85 | 614 | 467 | 232 | 0.29 | 1.1 |
| NORTH ANNA 1,2 | 1979 | 507.0 | 61.7 | 2,025 | 449 | 78 | 371 | 190 | 259 | 0.22 | 0.9 |
| Docket 50-338; NPF-04, -09 | 1980 | 681.8 | 86.5 | 2,086 | 218 | 128 | 90 | 85 | 133 | 0.10 | 0.3 |
| 1st commercial operation 6/78, 12/80 | 1981 | 1,241.9 | 71.5 | 2,416 | 680 | 188 | 492 | 343 | 337 | 0.28 | 0.5 |
| Type - PWRs | 1982 | 777.7 | 45.8 | 2,872 | 1,915 | 78 | 1,837 | 1,207 | 708 | 0.67 | 2.5 |
| Capacity - 911, 909 MWe | 1983 | 1,338.4 | 76.1 | 2,228 | 665 | 129 | 536 | 296 | 369 | 0.30 | 0.5 |
| | 1984 | 1,021.3 | 58.8 | 3,062 | 1,945 | 155 | 1,790 | 1,417 | 528 | 0.64 | 1.9 |
| | 1985 | 1,516.9 | 86.1 | 2,436 | 838 | 141 | 697 | 501 | 337 | 0.34 | 0.6 |
| | 1986 | 1,484.5 | 83.0 | 2,831 | 722 | 111 | 611 | 343 | 379 | 0.26 | 0.5 |
| | 1987 | 1,112.6 | 67.8 | 2,624 | 1,521 | 60 | 1,461 | 1,075 | 446 | 0.58 | 1.4 |
| | 1988 | 1,772.7 | 96.7 | 992 | 112 | 28 | 84 | 19 | 93 | 0.11 | 0.1 |
| | 1989 | 1,226.8 | 72.5 | 2,861 | 1,471 | 36 | 1,435 | 1,159 | 312 | 0.51 | 1.2 |
| | 1990 | 1,590.4 | 90.5 | 2,161 | 590 | 12 | 578 | 433 | 157 | 0.27 | 0.4 |
| OCONEE 1,2,3 | 1974 | 650.6 | 60.1 | 844 | 517 | 18 | 499 | 144 | 373 | 0.61 | 0.8 |
| Docket 50-269, 50-270, 50-287; | 1975 | 1,838.3 | 75.5 | 829 | 497 | 72 | 425 | 90 | 407 | 0.60 | 0.3 |
| DPR-38, -47, -55 | 1976 | 1,561.4 | 63.0 | 1,215 | 1,026 | 65 | 961 | 219 | 807 | 0.84 | 0.7 |
| 1st commercial operation 7/73, 9/74, | 1977 | 1,566.4 | 65.9 | 1,595 | 1,329 | 244 | 1,084 | 294 | 1,034 | 0.83 | 0.8 |
| 12/74 | 1978 | 1,909.0 | 75.8 | 1,636 | 1,393 | 179 | 1,214 | 340 | 1,053 | 0.85 | 0.7 |
| Type - PWRs | 1979 | 1,708.0 | 67.7 | 2,100 | 1,001 | 123 | 878 | 181 | 820 | 0.48 | 0.6 |
| Capacity - 846, 846, 846 MWe | 1980 | 1,703.7 | 70.1 | 2,124 | 1,055 | 117 | 938 | 162 | 893 | 0.50 | 0.6 |
| | 1981 | 1,661.5 | 66.8 | 2,445 | 1,211 | 113 | 1,098 | 275 | 936 | 0.50 | 0.7 |
| | 1982 | 1,293.1 | 52.5 | 2,445 | 1,792 | 97 | 1,695 | 364 | 1,428 | 0.73 | 1.4 |
| | 1983 | 2,141.5 | 82.2 | 1,902 | 1,207 | 88 | 1,119 | 316 | 891 | 0.63 | 0.6 |
| | 1984 | 2,242.9 | 85.7 | 2,085 | 1,106 | 63 | 1,043 | 260 | 846 | 0.53 | 0.5 |
| | 1985 | 2,036.3 | 80.5 | 2,729 | 1,304 | 144 | 1,160 | 378 | 926 | 0.48 | 0.6 |
| | 1986 | 1,995.6 | 79.0 | 2,499 | 949 | 36 | 913 | 261 | 688 | 0.38 | 0.5 |
| | 1987 | 1,962.6 | 82.4 | 2,672 | 1,142 | 51 | 1,091 | 376 | 766 | 0.43 | 0.6 |
| | 1988 | 2,228.9 | 87.2 | 2,672 | 871 | 51 | 820 | 317 | 554 | 0.33 | 0.4 |
| | 1989 | 2,188.6 | 85.4 | 2,205 | 684 | 53 | 631 | 200 | 484 | 0.31 | 0.3 |
| | 1990 | 2,405.2 | 91.4 | 1,948 | 404 | 36 | 368 | 132 | 272 | 0.21 | 0.2 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| OYSTER CREEK | 1970 | 413.6 | | 95 | 63 | 21 | 42 | 11 | 52 | 0.66 | 0.1 |
| Docket 50-219; DPR-16 | 1971 | 448.9 | | 249 | 240 | 50 | 190 | 92 | 148 | 0.96 | 0.5 |
| 1st commercial operation 12/69 | 1972 | 515.0 | | 339 | 582 | 150 | 432 | 167 | 415 | 1.72 | 1.1 |
| Type - BWR | 1973 | 424.6 | | 782 | 1,236 | 195 | 1,041 | 683 | 553 | 1.58 | 2.9 |
| Capacity - 620 MWe | 1974 | 434.5 | 70.4 | 935 | 984 | 166 | 818 | 162 | 822 | 1.05 | 2.3 |
| | 1975 | 373.6 | 73.3 | 1,210 | 1,140 | 169 | 971 | 271 | 869 | 0.94 | 3.1 |
| | 1976 | 456.5 | 79.3 | 1,582 | 1,078 | 70 | 1,008 | 587 | 491 | 0.68 | 2.4 |
| | 1977 | 385.7 | 70.1 | 1,673 | 1,614 | 76 | 1,538 | 1,048 | 566 | 0.96 | 4.2 |
| | 1978 | 431.8 | 74.3 | 1,411 | 1,279 | 134 | 1,145 | 696 | 583 | 0.91 | 3.0 |
| | 1979 | 541.0 | 85.9 | 842 | 467 | 95 | 372 | 135 | 332 | 0.55 | 0.9 |
| | 1980 | 232.9 | 41.4 | 1,966 | 1,733 | 97 | 1,636 | 1,183 | 550 | 0.88 | 7.4 |
| | 1981 | 314.8 | 59.8 | 1,689 | 917 | 48 | 869 | 479 | 438 | 0.54 | 2.9 |
| | 1982 | 242.7 | 62.5 | 1,270 | 865 | 33 | 832 | 491 | 374 | 0.68 | 3.6 |
| | 1983 | 27.9 | 11.5 | 2,303 | 2,257 | 65 | 2,192 | 1,863 | 394 | 0.98 | 80.9 |
| | 1984 | 37.1 | 9.6 | 2,369 | 2,054 | 134 | 1,920 | 1,537 | 517 | 0.87 | 55.4 |
| | 1985 | 446.1 | 89.4 | 2,342 | 748 | 116 | 632 | 318 | 430 | 0.32 | 1.7 |
| | 1986 | 157.3 | 31.5 | 3,740 | 2,436 | 288 | 2,148 | 1,924 | 512 | 0.65 | 15.5 |
| | 1987 | 371.0 | 64.2 | 1,932 | 522 | 112 | 410 | 211 | 311 | 0.27 | 1.4 |
| | 1988 | 419.6 | 65.9 | 2,875 | 1,504 | 135 | 1,369 | 1,232 | 272 | 0.52 | 3.6 |
| | 1989 | 287.5 | 57.3 | 2,395 | 910 | 138 | 772 | 566 | 344 | 0.38 | 3.2 |
| | 1990 | 511.8 | 89.1 | 1,941 | 310 | 76 | 234 | 131 | 179 | 0.16 | 0.6 |
| PALISADES | 1972 | 216.8 | | | 78 | | | | | | 0.4 |
| Docket 50-255; DPR-20 | 1973 | 286.8 | | 975 | 1,133 | 16 | 1,117 | 661 | 472 | 1.16 | 4.0 |
| 1st commercial operation 12/71 | 1974 | 10.7 | 5.5 | 774 | 627 | | | | | 0.81 | 58.6 |
| Type - PWR | 1975 | 302.0 | 64.5 | 495 | 306 | | | | | 0.62 | 1.0 |
| Capacity - 730 MWe | 1976 | 346.9 | 55.2 | 742 | 696 | 23 | 673 | 109 | 587 | 0.94 | 2.0 |
| | 1977 | 616.6 | 91.4 | 332 | 100 | 13 | 87 | 23 | 77 | 0.30 | 0.2 |
| | 1978 | 320.2 | 49.7 | 849 | 764 | 52 | 712 | 173 | 591 | 0.90 | 2.4 |
| | 1979 | 415.0 | 59.9 | 1,599 | 854 | 99 | 755 | 360 | 494 | 0.53 | 2.1 |
| | 1980 | 288.3 | 42.9 | 1,307 | 424 | 57 | 367 | 312 | 112 | 0.32 | 1.5 |
| | 1981 | 418.2 | 57.2 | 2,151 | 902 | 167 | 735 | 737 | 165 | 0.42 | 2.2 |
| | 1982 | 404.3 | 54.7 | 1,554 | 330 | 73 | 257 | 203 | 127 | 0.21 | 0.8 |
| | 1983 | 454.4 | 60.3 | 2,167 | 977 | 145 | 832 | 494 | 483 | 0.45 | 2.2 |
| | 1984 | 98.7 | 15.2 | 1,344 | 573 | 79 | 494 | 239 | 334 | 0.43 | 5.8 |
| | 1985 | 639.2 | 83.8 | 1,355 | 507 | 105 | 402 | 239 | 268 | 0.37 | 0.8 |
| | 1986 | 102.3 | 15.1 | 1,438 | 672 | 148 | 524 | 204 | 468 | 0.47 | 6.6 |
| | 1987 | 319.2 | 48.2 | 1,122 | 456 | 85 | 371 | 216 | 240 | 0.41 | 1.4 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function: Opera-tions | Person-rems (-cSv) per Work Function: Maint. & Others | Person-rems (-cSv) per Personnel Type: Contrac-tor | Person-rems (-cSv) per Personnel Type: Station & Utility | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| PALISADES (Continued) | 1988 | 413.4 | 56.8 | 1,472 | 730 | 138 | 592 | 466 | 264 | 0.50 | 1.8 |
| | 1989 | 442.8 | 69.1 | 1,026 | 314 | 70 | 244 | 190 | 124 | 0.31 | 0.7 |
| | 1990 | 366.7 | 58.7 | 2,414 | 766 | 109 | 657 | 629 | 137 | 0.32 | 2.1 |
| PALO VERDE 1,2,3 | 1987 | 1,638.1 | 66.1 | 1,792 | 669 | 101 | 568 | 437 | 232 | 0.37 | 0.4 |
| Docket 50-528, 50-529; 50-530; | 1988 | 1,700.9 | 65.5 | 2,173 | 688 | 77 | 611 | 472 | 216 | 0.32 | 0.4 |
| NPF-41, NPF-51, NPF-74 | 1989 | 965.3 | 26.5 | 2,615 | 720 | 87 | 633 | 559 | 161 | 0.28 | 0.7 |
| 1st commercial operation 1/86, 9/86, 1/88 | 1990 | 2,500.9 | 67.5 | 2,236 | 499 | 68 | 431 | 373 | 126 | 0.22 | 0.2 |
| Type - PWRs | | | | | | | | | | | |
| Capacity - 1221, 1221, 1221 MWe | | | | | | | | | | | |
| PEACH BOTTOM 2,3 | 1975 | 1,234.3 | 80.9 | 971 | 228 | | | | | 0.23 | 0.2 |
| Docket 50-277, 50-278; DPR-44, -56 | 1976 | 1,379.2 | 73.0 | 2,136 | 840 | 180 | 660 | 434 | 406 | 0.39 | 0.6 |
| 1st commercial operation 7/74, 12/74 | 1977 | 1,052.4 | 58.7 | 2,827 | 2,036 | 223 | 1,813 | 1,374 | 662 | 0.72 | 1.9 |
| Type - BWR | 1978 | 1,636.3 | 84.0 | 2,244 | 1,317 | 162 | 1,155 | 709 | 608 | 0.59 | 0.8 |
| Capacity - 1055, 1035 MWe | 1979 | 1,740.0 | 84.5 | 2,276 | 1,388 | 245 | 1,143 | 717 | 671 | 0.61 | 0.8 |
| | 1980 | 1,374.2 | 66.3 | 2,774 | 2,302 | 311 | 1,991 | 1,596 | 706 | 0.83 | 1.7 |
| | 1981 | 1,161.8 | 58.0 | 2,857 | 2,506 | 273 | 2,233 | 1,880 | 626 | 0.88 | 2.2 |
| | 1982 | 1,583.3 | 76.9 | 2,734 | 1,977 | 313 | 1,664 | 1,348 | 629 | 0.72 | 1.2 |
| | 1983 | 824.7 | 41.0 | 3,107 | 2,963 | 331 | 2,632 | 2,422 | 541 | 0.95 | 3.6 |
| | 1984 | 1,165.8 | 57.5 | 3,313 | 2,450 | 225 | 2,225 | 2,045 | 405 | 0.74 | 2.1 |
| | 1985 | 682.7 | 37.5 | 4,209 | 3,354 | 395 | 2,959 | 2,727 | 627 | 0.80 | 4.9 |
| | 1986 | 1,395.0 | 71.7 | 2,454 | 1,080 | 294 | 786 | 671 | 409 | 0.44 | 0.8 |
| | 1987 | 365.7 | 20.3 | 4,363 | 2,195 | 178 | 2,017 | 1,712 | 483 | 0.50 | 6.0 |
| | 1988 | 0.0 | 0.0 | 4,204 | 2,436 | 119 | 2,317 | 2,120 | 316 | 0.58 | --- |
| | 1989 | 491.0 | 35.0 | 2,301 | 738 | 248 | 490 | 362 | 376 | 0.32 | 1.5 |
| | 1990 | 1,684.0 | 85.7 | 1,585 | 377 | 99 | 278 | 179 | 198 | 0.24 | 0.2 |
| PERRY | 1988 | 869.3 | 79.0 | 782 | 105 | 34 | 71 | 36 | 69 | 0.13 | 0.1 |
| Docket 50-440; NPF-58 | 1989 | 642.2 | 57.0 | 1,883 | 767 | 113 | 654 | 604 | 163 | 0.41 | 1.2 |
| 1st commercial operation 11/87 | 1990 | 792.7 | 67.1 | 1,537 | 638 | 51 | 587 | 494 | 144 | 0.42 | 0.8 |
| Type - BWR | | | | | | | | | | | |
| Capacity - 1141 MWe | | | | | | | | | | | |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function: Opera-tions | Person-rems (-cSv) per Work Function: Maint. & Others | Person-rems (-cSv) per Personnel Type: Contrac-tor | Person-rems (-cSv) per Personnel Type: Station & Utility | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ 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 |
| POINT BEACH 1,2 | 1971 | 393.4 | | | 164 | | | | | | 0.4 |
| Docket 50-266, 50-301; DPR-24, -27 | 1972 | 378.3 | | | 580 | | | | | | 1.5 |
| 1st commercial operation 12/70, 10/72 | 1973 | 693.7 | | 501 | 588 | 72 | 516 | | | 1.17 | 0.8 |
| Type - PWRs | 1974 | 760.2 | 81.3 | 400 | 295 | 70 | 225 | 81 | 214 | 0.74 | 0.4 |
| Capacity - 485, 485 MWe | 1975 | 801.2 | 82.9 | 339 | 459 | | | | | 1.35 | 0.6 |
| | 1976 | 857.3 | 86.7 | 313 | 370 | 58 | 312 | 107 | 263 | 1.18 | 0.4 |
| | 1977 | 873.9 | 87.3 | 417 | 430 | 63 | 366 | 212 | 217 | 1.03 | 0.5 |
| | 1978 | 914.4 | 90.9 | 336 | 320 | 71 | 249 | 111 | 209 | 0.95 | 0.3 |
| | 1979 | 808.0 | 80.8 | 610 | 644 | 65 | 579 | 448 | 196 | 1.06 | 0.8 |
| | 1980 | 727.2 | 82.5 | 561 | 598 | 60 | 538 | 420 | 178 | 1.07 | 0.8 |
| | 1981 | 760.4 | 83.6 | 773 | 596 | 83 | 513 | 364 | 232 | 0.77 | 0.8 |
| | 1982 | 757.2 | 84.3 | 767 | 609 | 72 | 537 | 375 | 234 | 0.79 | 0.8 |
| | 1983 | 648.2 | 72.7 | 1,702 | 1,403 | 81 | 1,322 | 1,184 | 219 | 0.82 | 2.2 |
| | 1984 | 788.9 | 78.6 | 1,372 | 789 | 121 | 668 | 457 | 332 | 0.58 | 1.0 |
| | 1985 | 831.3 | 82.5 | 671 | 482 | 71 | 411 | 242 | 240 | 0.72 | 0.6 |
| | 1986 | 858.9 | 85.7 | 664 | 402 | 50 | 352 | 219 | 183 | 0.61 | 0.5 |
| | 1987 | 857.5 | 85.5 | 720 | 554 | 55 | 499 | 369 | 185 | 0.77 | 0.6 |
| | 1988 | 899.3 | 88.6 | 734 | 410 | 64 | 346 | 235 | 175 | 0.56 | 0.5 |
| | 1989 | 847.8 | 85.5 | 736 | 504 | 77 | 427 | 284 | 220 | 0.68 | 0.6 |
| | 1990 | 875.5 | 86.5 | 617 | 378 | 53 | 325 | 161 | 217 | 0.61 | 0.4 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| PRAIRIE ISLAND 1,2 | 1974 | 181.9 | 43.9 | 150 | 18 | | | 5 | 13 | 0.12 | 0.1 |
| Docket 50-282, 50-306; DPR-42, -60 | 1975 | 836.0 | 83.3 | 477 | 123 | | | | | 0.26 | 0.1 |
| 1st commercial operation 12/73, 12/74 | 1976 | 725.2 | 76.6 | 818 | 447 | 68 | 379 | 235 | 212 | 0.55 | 0.6 |
| Type - PWRs | 1977 | 922.9 | 87.2 | 718 | 300 | 73 | 227 | 60 | 240 | 0.42 | 0.3 |
| Capacity - 503, 500 MWe | 1978 | 941.1 | 92.2 | 546 | 221 | 43 | 178 | 48 | 173 | 0.40 | 0.2 |
| | 1979 | 865.0 | 86.0 | 594 | 180 | 29 | 151 | 49 | 131 | 0.30 | 0.2 |
| | 1980 | 800.7 | 79.9 | 983 | 353 | 40 | 313 | 141 | 212 | 0.36 | 0.4 |
| | 1981 | 844.9 | 80.5 | 836 | 329 | 37 | 292 | 128 | 201 | 0.39 | 0.4 |
| | 1982 | 944.9 | 90.4 | 645 | 229 | 30 | 199 | 68 | 161 | 0.36 | 0.2 |
| | 1983 | 921.1 | 86.8 | 654 | 233 | 14 | 219 | 73 | 160 | 0.36 | 0.3 |
| | 1984 | 972.4 | 91.7 | 546 | 147 | 18 | 129 | 52 | 95 | 0.27 | 0.2 |
| | 1985 | 882.6 | 84.0 | 1,082 | 416 | 31 | 385 | 136 | 280 | 0.38 | 0.5 |
| | 1986 | 930.6 | 90.3 | 818 | 255 | 18 | 237 | 80 | 175 | 0.31 | 0.3 |
| | 1987 | 969.6 | 91.6 | 593 | 135 | 9 | 126 | 51 | 84 | 0.23 | 0.1 |
| | 1988 | 932.0 | 89.1 | 732 | 199 | 17 | 182 | 62 | 137 | 0.27 | 0.2 |
| | 1989 | 1,001.8 | 94.7 | 476 | 99 | 10 | 89 | 28 | 71 | 0.21 | 0.1 |
| | 1990 | 925.4 | 89.2 | 737 | 188 | 8 | 180 | 74 | 114 | 0.26 | 0.2 |
| QUAD CITIES 1,2 | 1974 | 958.1 | 72.3 | 678 | 482 | | | 36 | 446 | 0.71 | 0.5 |
| Docket 50-254, 50-265; DPR-29, -30 | 1975 | 833.6 | 68.4 | 1,083 | 1,618 | 114 | 1,504 | 692 | 926 | 1.49 | 1.9 |
| 1st commercial operation 2/73, 3/73 | 1976 | 951.2 | 73.1 | 1,225 | 1,651 | 269 | 1,382 | 648 | 1,003 | 1.35 | 1.7 |
| Type - BWRs | 1977 | 970.1 | 84.0 | 907 | 1,031 | 108 | 923 | 373 | 658 | 1.14 | 1.1 |
| Capacity - 769, 769 MWe | 1978 | 1,124.5 | 88.6 | 1,207 | 1,618 | 358 | 1,260 | 722 | 1,618 | 1.34 | 1.4 |
| | 1979 | 1,075.0 | 84.6 | 1,688 | 2,158 | 215 | 1,943 | 1,250 | 908 | 1.28 | 2.0 |
| | 1980 | 866.9 | 64.4 | 3,089 | 4,838 | 291 | 4,547 | 3,657 | 1,181 | 1.57 | 5.6 |
| | 1981 | 1,156.9 | 81.1 | 2,246 | 3,146 | 100 | 3,046 | 2,623 | 523 | 1.40 | 2.7 |
| | 1982 | 1,018.7 | 76.0 | 2,314 | 3,757 | 177 | 3,580 | 2,653 | 1,104 | 1.62 | 3.7 |
| | 1983 | 1,088.5 | 79.2 | 1,802 | 2,491 | 168 | 2,323 | 1,898 | 593 | 1.38 | 2.3 |
| | 1984 | 994.6 | 65.7 | 1,678 | 1,579 | 122 | 1,457 | 1,075 | 504 | 0.94 | 1.6 |
| | 1985 | 1,268.0 | 82.7 | 1,184 | 990 | 172 | 818 | 27 | 963 | 0.84 | 0.8 |
| | 1986 | 1,093.2 | 71.0 | 1,451 | 950 | 128 | 822 | 568 | 382 | 0.65 | 0.9 |
| | 1987 | 1,126.6 | 75.3 | 1,429 | 720 | 79 | 641 | 435 | 285 | 0.50 | 0.6 |
| | 1988 | 1,173.7 | 84.1 | 1,486 | 827 | 136 | 691 | 545 | 282 | 0.56 | 0.7 |
| | 1989 | 1,196.3 | 85.9 | 1,721 | 900 | 143 | 757 | 616 | 284 | 0.52 | 0.8 |
| | 1990 | 1,148.9 | 77.8 | 2,186 | 1,028 | 183 | 845 | 713 | 315 | 0.47 | 0.9 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| RANCHO SECO | 1976 | 268.1 | 30.4 | 297 | 58 | 6 | 52 | 17 | 41 | 0.20 | 0.2 |
| Docket 50-312; DPR-54 | 1977 | 706.4 | 77.1 | 515 | 391 | 61 | 329 | 248 | 142 | 0.76 | 0.6 |
| 1st commercial operation 4/75 | 1978 | 607.7 | 80.5 | 508 | 323 | 76 | 247 | 176 | 147 | 0.64 | 0.5 |
| Type - PWR | 1979 | 687.0 | 91.1 | 287 | 126 | 27 | 99 | 64 | 62 | 0.44 | 0.2 |
| Capacity - 873 MWe | 1980 | 530.9 | 60.4 | 890 | 412 | 110 | 302 | 281 | 131 | 0.46 | 0.8 |
| | 1981 | 321.2 | 40.2 | 772 | 402 | 83 | 319 | 266 | 136 | 0.52 | 1.3 |
| | 1982 | 409.5 | 53.3 | 766 | 337 | 49 | 288 | 217 | 120 | 0.44 | 0.8 |
| | 1983 | 347.9 | 46.8 | 1,338 | 787 | 158 | 629 | 604 | 183 | 0.59 | 2.3 |
| | 1984 | 460.0 | 58.3 | 802 | 222 | 73 | 149 | 115 | 107 | 0.28 | 0.5 |
| | 1985 | 238.7 | 30.8 | 1,764 | 756 | 183 | 573 | 583 | 173 | 0.43 | 3.2 |
| | 1986 | 0.0 | 0.0 | 1,513 | 402 | 36 | 366 | 277 | 125 | 0.27 | --- |
| | 1987 | 0.0 | 0.0 | 1,533 | 300 | 52 | 248 | 216 | 84 | 0.20 | --- |
| | 1988 | 355.8 | 63.1 | 693 | 78 | 13 | 65 | 33 | 45 | 0.11 | 0.2 |
| | 1989 | 179.9 | 54.7 | 603 | 81 | 9 | 72 | 19 | 62 | 0.13 | 0.5 |
| | 1990 | 0.0 | 0.0 | 111 | 13 | 4 | 9 | 2 | 11 | 0.12 | --- |
| RIVER BEND 1 | 1987 | 605.2 | 68.4 | 1,268 | 378 | 70 | 308 | 249 | 129 | 0.30 | 0.6 |
| Docket 50-458; NPF-47 | 1988 | 880.7 | 94.3 | 513 | 107 | 30 | 77 | 34 | 73 | 0.21 | 0.1 |
| 1st commercial operation 6/86 | 1989 | 584.5 | 69.1 | 1,566 | 558 | 44 | 514 | 412 | 146 | 0.36 | 1.0 |
| Type - BWR | 1990 | 682.2 | 78.0 | 1,616 | 489 | 49 | 440 | 348 | 141 | 0.30 | 0.7 |
| Capacity - 936 MWe | | | | | | | | | | | |
| ROBINSON 2 | 1972 | 580.0 | | 245 | 215 | 42 | 173 | 137 | 78 | 0.88 | 0.4 |
| Docket 50-261; DPR-23 | 1973 | 455.1 | | 831 | 695 | | | | | 0.84 | 1.5 |
| 1st commercial operation 3/71 | 1974 | 578.1 | 83.3 | 853 | 672 | 185 | 487 | | | 0.79 | 1.2 |
| Type - PWR | 1975 | 501.8 | 72.7 | 849 | 1,142 | | | | | 1.35 | 2.3 |
| Capacity - 665 MWe | 1976 | 585.5 | 84.7 | 597 | 715 | 30 | 685 | 457 | 758 | 1.20 | 1.2 |
| | 1977 | 511.5 | 85.2 | 634 | 455 | 52 | 403 | 223 | 232 | 0.72 | 0.9 |
| | 1978 | 480.5 | 72.0 | 943 | 963 | 63 | 900 | 529 | 434 | 1.02 | 2.0 |
| | 1979 | 482.0 | 70.8 | 1,454 | 1,188 | 60 | 1,128 | 794 | 394 | 0.82 | 2.5 |
| | 1980 | 387.3 | 62.2 | 2,009 | 1,852 | 79 | 1,773 | 1,379 | 473 | 0.92 | 4.8 |
| | 1981 | 426.6 | 73.0 | 1,462 | 733 | 45 | 688 | 513 | 220 | 0.50 | 1.7 |
| | 1982 | 277.5 | 48.9 | 2,011 | 1,426 | 128 | 1,298 | 945 | 481 | 0.71 | 5.1 |
| | 1983 | 409.8 | 75.5 | 2,244 | 923 | 96 | 827 | 628 | 295 | 0.41 | 2.3 |
| | 1984 | 28.0 | 7.0 | 4,127 | 2,880 | 196 | 2,684 | 2,549 | 331 | 0.70 | 102.9 |
| | 1985 | 629.5 | 87.9 | 1,378 | 311 | 52 | 259 | 164 | 147 | 0.23 | 0.5 |
| | 1986 | 577.1 | 80.3 | 1,571 | 539 | 46 | 493 | 340 | 199 | 0.34 | 0.9 |
| | 1987 | 510.1 | 72.5 | 1,379 | 499 | 54 | 445 | 313 | 186 | 0.36 | 1.0 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| ROBINSON 2 (Continued) | 1988 | 385.0 | 65.9 | 1,351 | 564 | 44 | 520 | 370 | 194 | 0.42 | 1.5 |
| | 1989 | 336.6 | 48.7 | 1,098 | 195 | 31 | 164 | 88 | 107 | 0.18 | 0.6 |
| | 1990 | 400.3 | 64.8 | 1,626 | 437 | 33 | 404 | 356 | 81 | 0.27 | 1.1 |
| SALEM 1,2 | 1978 | 546.4 | 55.6 | 574 | 122 | 28 | 94 | 32 | 90 | 0.21 | 0.2 |
| Docket 50-272, -311; DPR-70, -75 | 1979 | 250.0 | 25.5 | 1,488 | 584 | 100 | 484 | 359 | 225 | 0.39 | 2.3 |
| 1st commercial operation 6/77 | 1980 | 680.6 | 69.2 | 1,704 | 449 | 55 | 394 | 281 | 168 | 0.26 | 0.7 |
| Type - PWRs | 1981 | 743.0 | 78.1 | 1,652 | 254 | 4 | 250 | 152 | 102 | 0.15 | 0.3 |
| Capacity - 1106, 1106 MWe | 1982 | 1,440.4 | 72.6 | 3,228 | 1,203 | 66 | 1,137 | 846 | 357 | 0.37 | 0.8 |
| | 1983 | 742.0 | 30.5 | 2,383 | 581 | 10 | 571 | 463 | 118 | 0.24 | 0.8 |
| | 1984 | 650.1 | 31.8 | 1,395 | 681 | 10 | 671 | 469 | 212 | 0.49 | 1.0 |
| | 1985 | 1,657.7 | 75.8 | 1,112 | 204 | 59 | 145 | 54 | 150 | 0.18 | 0.1 |
| | 1986 | 1,484.3 | 70.4 | 3,554 | 599 | 10 | 589 | 459 | 140 | 0.17 | 0.4 |
| | 1987 | 1,478.2 | 73.3 | 2,543 | 600 | 8 | 592 | 433 | 167 | 0.24 | 0.4 |
| | 1988 | 1,591.6 | 73.6 | 1,609 | 503 | 1 | 502 | 329 | 174 | 0.31 | 0.3 |
| | 1989 | 1,675.4 | 79.5 | 2,944 | 338 | 4 | 334 | 209 | 129 | 0.11 | 0.2 |
| | 1990 | 1,362.6 | 65.1 | 3,636 | 272 | 6 | 266 | 188 | 84 | 0.07 | 0.2 |
| SAN ONOFRE 1,2,3 | 1969 | 314.1 | | 123 | 42 | 10 | 32 | 5 | 37 | 0.34 | 0.1 |
| Docket 50-206, -361, -362; | 1970 | 365.9 | | 251 | 155 | 13 | 142 | 59 | 96 | 0.62 | 0.4 |
| DPR-13, NPF-10, NPF-15 | 1971 | 362.1 | | 121 | 50 | 12 | 38 | 3 | 47 | 0.41 | 0.1 |
| 1st commercial operation 1/68, 8/83, 4/84 | 1972 | 338.5 | | 326 | 256 | 29 | 227 | 117 | 139 | 0.79 | 0.8 |
| Type - PWR | 1973 | 273.7 | | 570 | 353 | 40 | 313 | 168 | 185 | 0.62 | 1.3 |
| Capacity - 436, 1070, 1080 MWe | 1974 | 377.8 | 86.1 | 219 | 71 | | | | | 0.32 | 0.2 |
| | 1975 | 389.0 | 87.4 | 424 | 292 | | | | | 0.69 | 0.8 |
| | 1976 | 297.9 | 70.2 | 1,330 | 880 | 147 | 733 | 629 | 251 | 0.66 | 3.0 |
| | 1977 | 281.2 | 63.7 | 985 | 847 | 77 | 770 | 451 | 396 | 0.86 | 3.0 |
| | 1978 | 323.2 | 80.2 | 764 | 401 | 25 | 376 | 234 | 167 | 0.52 | 1.2 |
| | 1979 | 401.0 | 90.2 | 521 | 139 | 23 | 116 | 65 | 74 | 0.27 | 0.3 |
| | 1980 | 97.3 | 22.3 | 3,063 | 2,386 | 219 | 2,167 | 2,017 | 369 | 0.78 | 24.5 |
| | 1981 | 95.9 | 26.7 | 2,902 | 3,223 | 100 | 3,123 | 3,104 | 119 | 1.11 | 33.6 |
| | 1982 | 61.6 | 15.7 | 3,055 | 832 | 81 | 751 | 730 | 102 | 0.27 | 13.5 |
| | 1983 | 0.0 | 0.0 | 1,701 | 155 | 31 | 124 | 113 | 42 | 0.09 | --- |
| | 1984 | 670.4 | 68.30 | 7,514 | 986 | 105 | 881 | 831 | 155 | 0.27 | 1.5 |
| | 1985 | 1,381.8 | 132.90 | 5,742 | 722 | 16 | 173 | 151 | 38 | 0.24 | 15.50 |
| | 1986 | 1,698.2 | 61.1 | 3,594 | 824 | 86 | 738 | 574 | 250 | 0.24 | 1.10 |
| | 1987 | 1,983.0 | 78.8 | 2,138 | 696 | 113 | 583 | 408 | 288 | 0.33 | 0.4 |
| | 1988 | 1,982.3 | 68.4 | 2,324 | 781 | 99 | 682 | 518 | 263 | 0.34 | 0.4 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| SAN ONOFRE 1,2,3 (Continued) | 1989 | 1,840.8 | 64.9 | 2,237 | 567 | 23 | 544 | 357 | 210 | 0.25 | 0.3 |
| | 1990 | 1,980.5 | 69.1 | 2,224 | 885 | 109 | 776 | 693 | 192 | 0.40 | 0.4 |
| SEQUOYAH 1,2 | 1982 | 583.5 | 52.8 | 1,965 | 570 | 73 | 497 | 61 | 509 | 0.29 | 1.0 |
| Docket 50-327, -328; DPR-77, -79 | 1983 | 1,663.7 | 75.1 | 1,772 | 491 | 74 | 417 | 46 | 445 | 0.28 | 0.3 |
| 1st commercial operation 7/81, 6/82 | 1984 | 1,481.9 | 69.0 | 2,373 | 1,117 | 152 | 965 | 111 | 1,006 | 0.47 | 0.8 |
| Type - PWR | 1985 | 1,151.3 | 51.3 | 1,854 | 1,071 | 118 | 953 | 243 | 828 | 0.58 | 0.9 |
| Capacity - 1148, 1148 MWe | 1986 | 0.0 | 0.0 | 1,735 | 526 | 101 | 425 | 70 | 456 | 0.30 | --- |
| | 1987 | 0.0 | 0.0 | 2,080 | 420 | 55 | 365 | 101 | 319 | 0.20 | --- |
| | 1988 | 490.8 | 31.8 | 2,439 | 678 | 73 | 605 | 115 | 563 | 0.28 | 1.4 |
| | 1989 | 1,851.7 | 85.7 | 2,007 | 657 | 71 | 586 | 140 | 517 | 0.33 | 0.4 |
| | 1990 | 1,662.6 | 77.2 | 2,934 | 1,678 | 102 | 1,576 | 352 | 1,326 | 0.57 | 1.0 |
| SOUTH TEXAS 1, 2 | 1989 | 769.3 | 65.6 | 989 | 161 | 10 | 151 | 114 | 47 | 0.16 | 0.2 |
| Docket 50-498, 50-499; NPF -76,-80 | 1990 | 1,504.1 | 65.9 | 1,136 | 206 | 18 | 188 | 126 | 80 | 0.18 | 0.1 |
| 1st commercial operation 8/88, 6/89 | | | | | | | | | | | |
| Type - PWRs | | | | | | | | | | | |
| Capacity - 1251, 1251 MWe | | | | | | | | | | | |
| ST. LUCIE 1,2 | 1977 | 649.1 | 84.7 | 445 | 152 | 26 | 126 | 92 | 60 | 0.34 | 0.2 |
| Docket 50-335, -389; DPR-67; NPF-16 | 1978 | 606.4 | 76.5 | 797 | 337 | 15 | 322 | 140 | 197 | 0.42 | 0.6 |
| 1st commercial operation 12/76, 8/83 | 1979 | 592.0 | 74.0 | 907 | 438 | 25 | 413 | 209 | 229 | 0.48 | 0.7 |
| Type - PWRs | 1980 | 627.9 | 77.5 | 1,074 | 532 | 82 | 450 | 195 | 337 | 0.50 | 0.8 |
| Capacity - 839, 839 MWe | 1981 | 599.1 | 72.7 | 1,473 | 929 | 20 | 909 | 556 | 373 | 0.63 | 1.6 |
| | 1982 | 816.8 | 94.0 | 1,045 | 272 | 17 | 255 | 105 | 167 | 0.26 | 0.3 |
| | 1983 | 290.3 | 15.4 | 2,211 | 1,204 | 5 | 1,199 | 924 | 280 | 0.54 | 4.1 |
| | 1984 | 1,183.0 | 69.6 | 2,090 | 1,263 | 40 | 1,223 | 807 | 456 | 0.60 | 1.1 |
| | 1985 | 1,445.8 | 82.5 | 1,971 | 1,344 | 294 | 1,050 | 810 | 534 | 0.68 | 0.9 |
| | 1986 | 1,588.6 | 89.1 | 1,279 | 491 | 81 | 410 | 322 | 169 | 0.38 | 0.3 |
| | 1987 | 1,407.9 | 81.9 | 2,012 | 951 | 1 | 950 | 560 | 391 | 0.47 | 0.7 |
| | 1988 | 1,639.7 | 93.0 | 1,448 | 611 | 54 | 557 | 371 | 240 | 0.42 | 0.4 |
| | 1989 | 1,493.1 | 85.1 | 1,414 | 495 | 24 | 471 | 298 | 197 | 0.35 | 0.3 |
| | 1990 | 1,188.4 | 70.0 | 1,876 | 777 | 83 | 694 | 482 | 295 | 0.41 | 0.7 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| SUMMER 1 | 1984 | 504.6 | 61.1 | 1,120 | 295 | 29 | 266 | 202 | 93 | 0.26 | 0.6 |
| Docket 50-395; NPF-12 | 1985 | 627.7 | 71.6 | 1,201 | 379 | 74 | 305 | 241 | 138 | 0.32 | 0.6 |
| 1st commercial operation 1/84 | 1986 | 853.7 | 95.3 | 392 | 23 | 5 | 18 | 12 | 11 | 0.06 | 0.03 |
| Type - PWR | 1987 | 618.7 | 71.0 | 1,075 | 560 | 34 | 526 | 454 | 106 | 0.52 | 0.9 |
| Capacity - 885 MWe | 1988 | 605.3 | 69.1 | 1,127 | 511 | 35 | 476 | 403 | 108 | 0.45 | 0.8 |
| | 1989 | 652.4 | 83.1 | 374 | 52 | 11 | 41 | 27 | 25 | 0.14 | 0.1 |
| | 1990 | 730.0 | 83.9 | 1,090 | 376 | 29 | 347 | 322 | 54 | 0.34 | 0.5 |
| SURRY 1,2 | 1973 | 420.6 | | 936 | 152 | | | | | 0.16 | 0.4 |
| Docket 50-280, 50-281; DPR-32, -37 | 1974 | 717.4 | 49.8 | 1,715 | 884 | 72 | 812 | | | 0.52 | 1.2 |
| 1st commercial operation 12/72, 5/73 | 1975 | 1,079.0 | 70.8 | 1,948 | 1,649 | 27 | 1,622 | 1,065 | 584 | 0.85 | 1.5 |
| Type - PWRs | 1976 | 930.7 | 60.4 | 2,753 | 3,165 | 444 | 2,721 | 1,873 | 1,292 | 1.15 | 3.4 |
| Capacity - 781, 781 MWe | 1977 | 1,139.0 | 72.2 | 1,860 | 2,307 | 348 | 1,959 | 1,380 | 927 | 1.24 | 2.0 |
| | 1978 | 1,210.6 | 77.2 | 2,203 | 1,837 | 530 | 1,307 | 1,248 | 589 | 0.83 | 1.5 |
| | 1979 | 343.0 | 42.3 | 5,065 | 3,584 | 173 | 3,411 | 2,975 | 609 | 0.71 | 10.4 |
| | 1980 | 568.2 | 40.3 | 5,317 | 3,836 | 353 | 3,483 | 3,117 | 719 | 0.72 | 6.8 |
| | 1981 | 907.6 | 59.3 | 3,753 | 4,244 | 428 | 3,816 | 3,040 | 1,204 | 1.13 | 4.7 |
| | 1982 | 1,323.3 | 88.5 | 1,878 | 1,490 | 399 | 1,091 | 506 | 984 | 0.79 | 1.1 |
| | 1983 | 916.2 | 61.3 | 2,754 | 3,220 | 571 | 2,649 | 1,786 | 1,434 | 1.17 | 3.5 |
| | 1984 | 1,026.7 | 71.0 | 3,198 | 2,247 | 536 | 1,711 | 1,575 | 672 | 0.70 | 2.2 |
| | 1985 | 1,166.4 | 78.2 | 3,206 | 1,815 | 509 | 1,306 | 1,232 | 583 | 0.57 | 1.6 |
| | 1986 | 1,080.5 | 69.0 | 3,763 | 2,356 | 430 | 1,926 | 1,677 | 679 | 0.63 | 2.2 |
| | 1987 | 1,132.7 | 72.7 | 2,675 | 712 | 192 | 520 | 325 | 387 | 0.27 | 0.6 |
| | 1988 | 750.4 | 50.0 | 3,184 | 1,542 | 68 | 1,474 | 1,117 | 425 | 0.48 | 2.1 |
| | 1989 | 489.3 | 33.0 | 3,100 | 836 | 27 | 809 | 530 | 306 | 0.27 | 1.7 |
| | 1990 | 1,276.4 | 83.9 | 1,947 | 575 | 53 | 522 | 389 | 186 | 0.30 | 0.5 |
| SUSQUEHANNA 1,2 | 1984 | 719.9 | 72.6 | 2,827 | 308 | 74 | 234 | 127 | 181 | 0.11 | 0.4 |
| Docket 50-387, 50-388; NPF-14; NPF-22 | 1985 | 1,452.2 | 76.4 | 3,669 | 1,106 | 78 | 1,028 | 790 | 316 | 0.30 | 0.8 |
| 1st commercial operation 6/83, 2/85 | 1986 | 1,344.8 | 67.0 | 2,996 | 828 | 50 | 778 | 402 | 426 | 0.28 | 0.6 |
| Type - BWR | 1987 | 1,749.5 | 85.3 | 2,548 | 621 | 36 | 585 | 341 | 280 | 0.24 | 0.4 |
| Capacity - 1033, 1039 MWe | 1988 | 1,691.0 | 83.5 | 1,904 | 516 | 52 | 464 | 281 | 235 | 0.27 | 0.3 |
| | 1989 | 1,572.5 | 77.1 | 2,063 | 704 | 32 | 672 | 332 | 372 | 0.34 | 0.4 |
| | 1990 | 1,746.9 | 85.4 | 1,691 | 440 | 30 | 410 | 179 | 261 | 0.26 | 0.3 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| THREE MILE ISLAND 1,2 | 1975 | 675.9 | 82.2 | 131 | 73 | | | 18 | 55 | 0.56 | 0.1 |
| Docket 50-289, -320; DPR-50, -73 | 1976 | 530.0 | 65.4 | 819 | 286 | 23 | 263 | 69 | 217 | 0.35 | 0.5 |
| 1st commercial operation 9/74, 12/78 | 1977 | 664.5 | 80.9 | 1,122 | 360 | 15 | 344 | 128 | 231 | 0.32 | 0.5 |
| Type - PWRs | 1978 | 690.0 | 85.1 | 1,929 | 504 | 32 | 472 | 235 | 269 | 0.26 | 0.7 |
| Capacity - 808, 880 MWe | 1979 | 266.0 | 21.9 | 3,975 | 1,392 | 197 | 1,195 | 907 | 485 | 0.35 | 5.2 |
| | 1980 | 0.0 | 0.0 | 2,328 | 394 | 29 | 365 | 239 | 155 | 0.17 | --- |
| | 1981 | 0.0 | 0.0 | 2,103 | 376 | 50 | 326 | 190 | 186 | 0.18 | --- |
| | 1982 | 0.0 | 0.0 | 2,123 | 1,004 | 62 | 942 | 433 | 571 | 0.47 | --- |
| | 1983 | 0.0 | 0.0 | 1,592 | 1,159 | 85 | 1,074 | 633 | 526 | 0.73 | --- |
| | 1984 | 0.0 | 0.0 | 1,079 | 688 | 50 | 638 | 330 | 358 | 0.64 | --- |
| | 1985 | 103.6 | 10.6 | 1,890 | 857 | 230 | 627 | 266 | 591 | 0.45 | 8.3 |
| THREE MILE ISLAND 1* | 1986 | 585.2 | 70.9 | 1,360 | 213 | 44 | 169 | 89 | 124 | 0.16 | 0.4 |
| Docket 50-289; DPR-50 | 1987 | 610.7 | 73.6 | 1,259 | 149 | 40 | 109 | 50 | 99 | 0.12 | 0.2 |
| 1st commercial operation 9/74 | 1988 | 661.0 | 77.8 | 1,012 | 210 | 40 | 170 | 88 | 122 | 0.21 | 0.3 |
| Type - PWR | 1989 | 871.3 | 100.0 | 670 | 54 | 22 | 32 | 3 | 51 | 0.08 | 0.1 |
| Capacity - 808 MWe | 1990 | 645.5 | 84.6 | 1,319 | 264 | 53 | 211 | 121 | 143 | 0.20 | 0.4 |
| THREE MILE ISLAND 2** | 1986 | 0.0 | 0.0 | 1,497 | 915 | 97 | 818 | 615 | 300 | 0.61 | --- |
| Docket 50-320; DPR-73 | 1987 | 0.0 | 0.0 | 1,378 | 977 | 90 | 887 | 687 | 290 | 0.71 | --- |
| 1st commercial operation 12/78 | 1988 | 0.0 | 0.0 | 1,247 | 917 | 26 | 891 | 691 | 226 | 0.74 | --- |
| Type - PWR | 1989 | 0.0 | 0.0 | 1,014 | 639 | 88 | 551 | 382 | 257 | 0.63 | --- |
| Capacity - 880 MWE | 1990 | 0.0 | 0.0 | 484 | 136 | 25 | 111 | 50 | 86 | 0.28 | --- |
| TROJAN | 1977 | 792.0 | 92.6 | 591 | 174 | 30 | 144 | 105 | 69 | 0.29 | 0.2 |
| Docket 50-344; NPF-1 | 1978 | 205.5 | 20.6 | 711 | 319 | 83 | 236 | 125 | 194 | 0.45 | 1.6 |
| 1st commercial operation 5/76 | 1979 | 631.0 | 58.1 | 736 | 258 | 74 | 184 | 113 | 145 | 0.35 | 0.4 |
| Type - PWR | 1980 | 727.5 | 72.5 | 1,159 | 421 | 77 | 344 | 305 | 116 | 0.36 | 0.6 |
| Capacity - 1095 MWe | 1981 | 775.6 | 74.1 | 1,311 | 609 | 113 | 496 | 363 | 246 | 0.46 | 0.8 |

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

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

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function: Opera-tions | Person-rems (-cSv) per Work Function: Maint. & Others | Person-rems (-cSv) per Personnel Type: Contrac-tor | Person-rems (-cSv) per Personnel Type: Station & Utility | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| TROJAN (Continued) | 1982 | 579.5 | 60.8 | 977 | 419 | 76 | 343 | 168 | 251 | 0.43 | 0.7 |
| | 1983 | 494.2 | 62.4 | 969 | 307 | 35 | 272 | 129 | 178 | 0.32 | 0.6 |
| | 1984 | 567.0 | 54.4 | 1,042 | 433 | 41 | 392 | 230 | 203 | 0.42 | 0.8 |
| | 1985 | 829.1 | 76.7 | 852 | 363 | 31 | 332 | 210 | 153 | 0.43 | 0.4 |
| | 1986 | 852.4 | 79.7 | 1,321 | 381 | 46 | 335 | 274 | 107 | 0.29 | 0.4 |
| | 1987 | 525.5 | 54.0 | 1,209 | 363 | 66 | 297 | 266 | 97 | 0.30 | 0.7 |
| | 1988 | 758.6 | 67.5 | 1,408 | 401 | 108 | 293 | 311 | 90 | 0.28 | 0.5 |
| | 1989 | 666.8 | 61.9 | 1,360 | 421 | 37 | 384 | 317 | 104 | 0.31 | 0.6 |
| | 1990 | 732.4 | 66.3 | 1,169 | 258 | 9 | 249 | 185 | 73 | 0.22 | 0.4 |
| TURKEY POINT 3,4 | 1973 | 401.9 | | 444 | 78 | | | | | 0.18 | 0.2 |
| Docket 50-250, 50-251; DPR-31, -41 | 1974 | 953.6 | | 794 | 454 | 88 | 366 | 202 | 252 | 0.57 | 0.5 |
| 1st commercial operation 12/72, 9/73 | 1975 | 1,003.7 | 74.9 | 1,176 | 876 | 270 | 606 | 559 | 317 | 0.74 | 0.9 |
| Type - PWRs | 1976 | 974.2 | 71.2 | 1,647 | 1,184 | 89 | 1,095 | 868 | 316 | 0.72 | 1.2 |
| Capacity - 666, 666 MWe | 1977 | 979.5 | 72.1 | 1,319 | 1,036 | 94 | 942 | 522 | 514 | 0.79 | 1.1 |
| | 1978 | 1,000.2 | 78.8 | 1,336 | 1,032 | 90 | 942 | 546 | 486 | 0.77 | 1.0 |
| | 1979 | 811.0 | 62.4 | 2,002 | 1,680 | 299 | 1,381 | 997 | 683 | 0.84 | 2.1 |
| | 1980 | 990.6 | 73.6 | 1,803 | 1,651 | 232 | 1,419 | 1,218 | 433 | 0.92 | 1.7 |
| | 1981 | 654.0 | 46.8 | 2,932 | 2,251 | 274 | 1,977 | 1,854 | 397 | 0.77 | 3.4 |
| | 1982 | 915.7 | 65.2 | 2,956 | 2,119 | 197 | 1,922 | 1,656 | 463 | 0.72 | 2.3 |
| | 1983 | 878.4 | 62.8 | 2,930 | 2,681 | 272 | 2,409 | 2,119 | 562 | 0.92 | 3.1 |
| | 1984 | 946.7 | 68.5 | 2,010 | 1,255 | 217 | 1,038 | 876 | 379 | 0.62 | 1.3 |
| | 1985 | 1,034.9 | 74.7 | 1,905 | 1,253 | 91 | 1,162 | 817 | 436 | 0.66 | 1.2 |
| | 1986 | 754.1 | 54.9 | 1,808 | 946 | 71 | 875 | 716 | 230 | 0.52 | 1.3 |
| | 1987 | 431.3 | 36.6 | 1,980 | 1,371 | 79 | 1,292 | 987 | 384 | 0.69 | 3.2 |
| | 1988 | 809.8 | 59.5 | 1,841 | 738 | 18 | 720 | 523 | 215 | 0.40 | 0.9 |
| | 1989 | 689.9 | 56.8 | 1,625 | 433 | 25 | 408 | 281 | 152 | 0.27 | 0.6 |
| | 1990 | 933.1 | 69.0 | 2,099 | 730 | 140 | 590 | 475 | 255 | 0.35 | 0.8 |
| VERMONT YANKEE | 1973 | 222.1 | | 244 | 85 | | | | | 0.35 | 0.4 |
| Docket 50-271; DPR-28 | 1974 | 303.5 | | 357 | 216 | 24 | 192 | 103 | 113 | 0.61 | 0.7 |
| 1st commercial operation 11/72 | 1975 | 429.0 | 87.8 | 282 | 153 | 70 | 83 | 63 | 90 | 0.54 | 0.4 |
| Type - BWR | 1976 | 389.6 | 77.1 | 815 | 411 | 36 | 375 | 246 | 165 | 0.50 | 1.1 |
| Capacity - 504 MWe | 1977 | 423.5 | 85.1 | 641 | 258 | 83 | 175 | 90 | 168 | 0.40 | 0.6 |
| | 1978 | 387.5 | 75.9 | 934 | 339 | 78 | 261 | 158 | 181 | 0.36 | 0.9 |
| | 1979 | 414.0 | 82.1 | 1,220 | 1,170 | 546 | 624 | 642 | 528 | 0.96 | 2.8 |
| | 1980 | 357.8 | 71.5 | 1,443 | 1,338 | 141 | 1,197 | 926 | 412 | 0.93 | 3.7 |
| | 1981 | 429.1 | 84.6 | 1,264 | 731 | 121 | 610 | 408 | 323 | 0.58 | 1.7 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| VERMONT YANKEE (Continued) | 1982 | 501.0 | 96.0 | 481 | 205 | 60 | 145 | 80 | 125 | 0.43 | 0.4 |
| | 1983 | 346.1 | 69.3 | 1,316 | 1,527 | 215 | 1,312 | 787 | 740 | 1.16 | 4.4 |
| | 1984 | 398.1 | 79.0 | 954 | 626 | 83 | 543 | 318 | 308 | 0.66 | 1.6 |
| | 1985 | 361.4 | 71.8 | 1,392 | 1,051 | 163 | 888 | 898 | 153 | 0.76 | 2.9 |
| | 1986 | 248.1 | 48.9 | 1,389 | 1,188 | 44 | 1,144 | 1,091 | 97 | 0.86 | 4.8 |
| | 1987 | 423.6 | 84.2 | 827 | 303 | 37 | 266 | 226 | 77 | 0.37 | 0.7 |
| | 1988 | 492.1 | 95.7 | 379 | 124 | 27 | 97 | 67 | 57 | 0.33 | 0.3 |
| | 1989 | 432.8 | 84.7 | 832 | 288 | 43 | 245 | 220 | 68 | 0.35 | 0.7 |
| | 1990 | 433.1 | 85.9 | 849 | 307 | 37 | 270 | 236 | 71 | 0.36 | 0.7 |
| VOGTLE 1,2 | 1988 | 820.4 | 77.7 | 1,108 | 138 | 13 | 125 | 107 | 31 | 0.12 | 0.2 |
| Docket 50-424, 50-425; NPF-68, -81 | 1989 | 1,045.8 | 96.0 | 427 | 32 | 7 | 25 | 14 | 18 | 0.07 | 0.0 |
| 1st commercial operation 6/87, 5/89 | 1990 | 1,710.9 | 82.7 | 1,602 | 466 | 89 | 377 | 323 | 143 | 0.29 | 0.3 |
| Type - PWRs | | | | | | | | | | | |
| Capacity - 1079, 1110 MWe | | | | | | | | | | | |
| WASHINGTON NUCLEAR 2 | 1985 | 616.0 | 87.6 | 755 | 119 | 42 | 77 | 42 | 77 | 0.16 | 0.2 |
| Docket 50-397; NPF-21 | 1986 | 616.0 | 74.4 | 1,013 | 222 | 56 | 166 | 70 | 152 | 0.22 | 0.4 |
| 1st commercial operation 12/84 | 1987 | 639.0 | 70.8 | 1,201 | 406 | 95 | 311 | 143 | 263 | 0.34 | 0.6 |
| Type - BWR | 1988 | 707.7 | 71.8 | 1,050 | 353 | 81 | 272 | 93 | 260 | 0.34 | 0.5 |
| Capacity - 1095 MWe | 1989 | 727.2 | 78.3 | 1,299 | 492 | 161 | 331 | 216 | 276 | 0.38 | 0.7 |
| | 1990 | 684.7 | 67.5 | 1,348 | 536 | 121 | 415 | 209 | 327 | 0.40 | 0.8 |
| WATERFORD 3 | 1986 | 875.7 | 79.1 | 1,244 | 223 | 62 | 161 | 178 | 45 | 0.18 | 0.3 |
| Docket 50-382; NPF-38 | 1987 | 891.8 | 82.5 | 959 | 156 | 33 | 123 | 106 | 50 | 0.16 | 0.2 |
| 1st commercial operation 9/85 | 1988 | 784.3 | 75.4 | 1,246 | 259 | 79 | 180 | 207 | 52 | 0.21 | 0.3 |
| Type - PWR | 1989 | 909.8 | 82.6 | 1,306 | 265 | 70 | 195 | 231 | 34 | 0.20 | 0.3 |
| Capacity - 1075 MWe | 1990 | 1,027.9 | 92.8 | 432 | 47 | 0 | 47 | 24 | 23 | 0.11 | 0.0 |
| WOLF CREEK 1 | 1986 | 832.8 | 73.3 | 682 | 143 | 27 | 116 | 78 | 65 | 0.21 | 0.2 |
| Docket 50-482; NPF-42 | 1987 | 778.8 | 71.1 | 675 | 138 | 26 | 112 | 82 | 56 | 0.20 | 0.2 |
| 1st commercial operation 9/85 | 1988 | 794.7 | 70.7 | 1,010 | 297 | 62 | 235 | 177 | 120 | 0.29 | 0.4 |
| Type - PWR | 1989 | 1,108.4 | 99.5 | 186 | 18 | 4 | 14 | 8 | 10 | 0.10 | 0.0 |
| Capacity - 1135 MWe | 1990 | 940.2 | 81.0 | 798 | 195 | 29 | 166 | 130 | 65 | 0.24 | 0.2 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| YANKEE ROWE | 1969 | 138.3 | | 193 | 215 | 83 | 132 | 78 | 133 | 1.11 | 1.6 |
| Docket 50-29; DPR-3 | 1970 | 146.1 | | 355 | 255 | 90 | 165 | 158 | 97 | 0.72 | 1.7 |
| 1st commercial operation 7/61 | 1971 | 173.5 | | 155 | 90 | 46 | 44 | 19 | 71 | 0.58 | 0.5 |
| Type - PWR | 1972 | 78.7 | | 282 | 255 | 63 | 192 | 146 | 109 | 0.90 | 3.2 |
| Capacity - 167 MWe | 1973 | 127.1 | | 133 | 99 | | | 47 | 52 | 0.74 | 0.8 |
| | 1974 | 111.3 | | 243 | 205 | | | 99 | 106 | 0.84 | 1.8 |
| | 1975 | 145.1 | 82.4 | 249 | 116 | 52 | 64 | 66 | 50 | 0.47 | 0.8 |
| | 1976 | 152.2 | 89.8 | 152 | 59 | 17 | 42 | 4 | 55 | 0.39 | 0.4 |
| | 1977 | 124.6 | 73.9 | 725 | 356 | 28 | 328 | 174 | 182 | 0.49 | 2.9 |
| | 1978 | 145.0 | 81.0 | 565 | 282 | 24 | 258 | 95 | 187 | 0.50 | 1.9 |
| | 1979 | 149.0 | 81.6 | 441 | 127 | 16 | 111 | 52 | 75 | 0.29 | 0.9 |
| | 1980 | 35.6 | 22.0 | 502 | 213 | 6 | 207 | 90 | 123 | 0.42 | 6.0 |
| | 1981 | 109.0 | 74.4 | 515 | 302 | 8 | 294 | 136 | 166 | 0.59 | 2.8 |
| | 1982 | 108.6 | 73.4 | 814 | 474 | 7 | 467 | 215 | 259 | 0.58 | 4.4 |
| | 1983 | 163.5 | 91.4 | 395 | 68 | 18 | 50 | 7 | 61 | 0.17 | 0.4 |
| | 1984 | 124.8 | 71.4 | 654 | 348 | 15 | 333 | 141 | 207 | 0.53 | 2.8 |
| | 1985 | 144.3 | 85.3 | 653 | 211 | 17 | 194 | 81 | 130 | 0.32 | 1.5 |
| | 1986 | 169.7 | 95.0 | 384 | 45 | 20 | 25 | 2 | 43 | 0.12 | 0.3 |
| | 1987 | 138.7 | 82.7 | 593 | 217 | 37 | 180 | 126 | 91 | 0.37 | 1.6 |
| | 1988 | 136.4 | 85.2 | 738 | 227 | 35 | 192 | 148 | 79 | 0.31 | 1.7 |
| | 1989 | 159.4 | 92.9 | 496 | 62 | 20 | 42 | 19 | 43 | 0.12 | 0.4 |
| | 1990 | 101.1 | 61.5 | 702 | 246 | 32 | 214 | 170 | 76 | 0.35 | 2.4 |
| ZION 1,2 | 1974 | 425.3 | 71.1 | 306 | 56 | | | 13 | 43 | 0.18 | 0.1 |
| Docket 50-295, 50-304; DPR-39, -48 | 1975 | 1,181.5 | 74.9 | 436 | 127 | 17 | 110 | 49 | 78 | 0.29 | 0.1 |
| 1st commercial operation 12/73, 9/74 | 1976 | 1,134.9 | 61.9 | 774 | 571 | 64 | 507 | 257 | 314 | 0.74 | 0.5 |
| Type - PWRs | 1977 | 1,358.6 | 75.0 | 784 | 1,003 | 43 | 960 | 561 | 442 | 1.28 | 0.7 |
| Capacity - 1040, 1040 MWe | 1978 | 1,613.5 | 80.2 | 1,104 | 1,017 | 294 | 723 | 418 | 1,017 | 0.92 | 0.6 |
| | 1979 | 1,238.0 | 67.6 | 1,472 | 1,274 | 168 | 1,106 | 747 | 527 | 0.87 | 1.0 |
| | 1980 | 1,411.2 | 74.1 | 1,363 | 920 | 107 | 813 | 560 | 360 | 0.67 | 0.7 |
| | 1981 | 1,366.9 | 72.3 | 1,754 | 1,720 | 50 | 1,670 | 1,155 | 565 | 0.98 | 1.3 |
| | 1982 | 1,186.4 | 64.3 | 1,575 | 2,103 | 42 | 2,061 | 1,688 | 415 | 1.34 | 1.8 |
| | 1983 | 1,222.3 | 69.4 | 1,285 | 1,311 | 118 | 1,193 | 905 | 406 | 1.02 | 1.1 |
| | 1984 | 1,389.9 | 69.6 | 1,110 | 786 | 23 | 763 | 556 | 230 | 0.71 | 0.6 |
| | 1985 | 1,187.9 | 62.9 | 1,498 | 1,166 | 39 | 1,127 | 787 | 379 | 0.78 | 1.0 |
| | 1986 | 1,462.0 | 73.2 | 967 | 474 | 21 | 453 | 330 | 144 | 0.49 | 0.3 |

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

| Reporting Organization | Year | Mega-watt-Years (MW-Yr) | Unit Availa-bility Factor | Total Personnel With Measur-able Doses | Collective Dose (person-rems or cSv) | Person-rems (-cSv) per Work Function | | Person-rems (-cSv) per Personnel Type | | Average Meas'ble Dose (rems or cSv) | Person rems (-cSv)/ MW-Yr |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Opera-tions | Maint. & Others | Contrac-tor | Station & Utility | | |
| ZION 1,2 (Continued) | 1987 | 1,337.0 | 71.0 | 1,046 | 653 | 38 | 615 | 432 | 221 | 0.62 | 0.5 |
| | 1988 | 1,549.1 | 78.3 | 1,926 | 1,260 | 38 | 1,222 | 1,045 | 215 | 0.65 | 0.8 |
| | 1989 | 1,514.1 | 77.6 | 1,282 | 624 | 21 | 603 | 392 | 232 | 0.49 | 0.4 |
| | 1990 | 860.4 | 46.9 | 1,385 | 696 | 19 | 677 | 492 | 204 | 0.50 | 0.8 |

# APPENDIX D

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

## 1990

# APPENDIX D

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

## 1990

PLANT: *ARKANSAS 1,2 TYPE: PWR

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

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *BEAVER VALLEY 1,2

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 5 | 0 | 10 | 15 | 1.330 | 0.000 | 2.655 | 3.985 |
| OPERATIONS PERSONNEL | 33 | 0 | 0 | 33 | 7.640 | 0.000 | 0.000 | 7.640 |
| HEALTH PHYSICS PERSONNEL | 19 | 0 | 13 | 32 | 4.515 | 0.000 | 4.710 | 9.225 |
| SUPERVISORY PERSONNEL | 16 | 0 | 6 | 22 | 3.275 | 0.000 | 1.305 | 4.580 |
| ENGINEERING PERSONNEL | 7 | 0 | 0 | 7 | 1.290 | 0.000 | 0.000 | 1.290 |
| TOTAL | 80 | 0 | 29 | 109 | 18.050 | 0.000 | 8.670 | 26.720 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 113 | 0 | 91 | 204 | 28.385 | 0.000 | 30.035 | 58.420 |
| OPERATIONS PERSONNEL | 5 | 0 | 0 | 5 | 1.005 | 0.000 | 0.000 | 1.005 |
| HEALTH PHYSICS PERSONNEL | 12 | 0 | 40 | 52 | 3.150 | 0.000 | 14.510 | 17.660 |
| SUPERVISORY PERSONNEL | 6 | 0 | 14 | 20 | 0.930 | 0.000 | 2.830 | 3.760 |
| ENGINEERING PERSONNEL | 2 | 0 | 0 | 2 | 0.205 | 0.000 | 0.000 | 0.205 |
| TOTAL | 138 | 0 | 145 | 283 | 33.675 | 0.000 | 47.375 | 81.050 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 54 | 54 | 0.025 | 0.000 | 28.595 | 28.620 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 17 | 17 | 0.015 | 0.000 | 7.030 | 7.045 |
| SUPERVISORY PERSONNEL | 2 | 0 | 17 | 19 | 0.515 | 0.000 | 6.150 | 6.665 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 2 | 0 | 88 | 90 | 0.555 | 0.000 | 41.775 | 42.330 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 3 | 0 | 196 | 199 | 0.705 | 0.000 | 84.410 | 85.115 |
| OPERATIONS PERSONNEL | 0 | 0 | 1 | 1 | 0.000 | 0.000 | 0.150 | 0.150 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 22 | 23 | 0.115 | 0.000 | 10.340 | 10.455 |
| SUPERVISORY PERSONNEL | 5 | 0 | 27 | 32 | 1.225 | 0.000 | 7.885 | 9.110 |
| ENGINEERING PERSONNEL | 2 | 0 | 0 | 2 | 0.385 | 0.000 | 0.000 | 0.385 |
| TOTAL | 11 | 0 | 246 | 257 | 2.430 | 0.000 | 102.785 | 105.215 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 6 | 0 | 1 | 7 | 1.400 | 0.000 | 0.395 | 1.795 |
| OPERATIONS PERSONNEL | 5 | 0 | 0 | 5 | 2.925 | 0.000 | 0.000 | 2.925 |
| HEALTH PHYSICS PERSONNEL | 3 | 0 | 15 | 18 | 0.890 | 0.000 | 3.200 | 4.090 |
| SUPERVISORY PERSONNEL | 2 | 0 | 0 | 2 | 0.700 | 0.000 | 0.000 | 0.700 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 16 | 0 | 16 | 32 | 5.915 | 0.000 | 3.595 | 9.510 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 11 | 0 | 17 | 28 | 2.450 | 0.000 | 6.595 | 9.045 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 6 | 6 | 0.075 | 0.000 | 2.175 | 2.250 |
| SUPERVISORY PERSONNEL | 4 | 0 | 6 | 10 | 0.830 | 0.000 | 1.255 | 2.085 |
| ENGINEERING PERSONNEL | 1 | 0 | 0 | 1 | 0.430 | 0.000 | 0.000 | 0.430 |
| TOTAL | 16 | 0 | 29 | 45 | 3.785 | 0.000 | 10.025 | 13.810 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 138 | 0 | 369 | 507 | 34.295 | 0.000 | 152.685 | 186.980 |
| OPERATIONS PERSONNEL | 43 | 0 | 1 | 44 | 11.570 | 0.000 | 0.150 | 11.720 |
| HEALTH PHYSICS PERSONNEL | 35 | 0 | 113 | 148 | 8.760 | 0.000 | 41.965 | 50.725 |
| SUPERVISORY PERSONNEL | 35 | 0 | 70 | 105 | 7.475 | 0.000 | 19.425 | 26.900 |
| ENGINEERING PERSONNEL | 12 | 0 | 0 | 12 | 2.310 | 0.000 | 0.000 | 2.310 |
| GRAND TOTALS | 263 | 0 | 553 | 816 | 64.410 | 0.000 | 214.225 | 278.635 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *BIG ROCK POINT

TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 1 | 0 | 1 | 2 | 0.400 | 0.062 | 0.698 | 1.160 |
| OPERATIONS PERSONNEL | 32 | 1 | 0 | 33 | 21.258 | 0.182 | 0.085 | 21.525 |
| HEALTH PHYSICS PERSONNEL | 12 | 0 | 3 | 15 | 5.697 | 0.000 | 0.807 | 6.504 |
| SUPERVISORY PERSONNEL | 4 | 0 | 0 | 4 | 1.456 | 0.095 | 0.000 | 1.551 |
| ENGINEERING PERSONNEL | 1 | 0 | 0 | 1 | 0.124 | 0.000 | 0.000 | 0.124 |
| TOTAL | 50 | 1 | 4 | 55 | 28.935 | 0.339 | 1.590 | 30.864 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 23 | 0 | 0 | 23 | 6.323 | 0.104 | 0.221 | 6.648 |
| OPERATIONS PERSONNEL | 1 | 0 | 0 | 1 | 0.457 | 0.037 | 0.000 | 0.494 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.397 | 0.000 | 0.134 | 0.531 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.046 | 0.002 | 0.000 | 0.048 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.056 | 0.000 | 0.000 | 0.056 |
| TOTAL | 24 | 0 | 0 | 24 | 7.279 | 0.143 | 0.355 | 7.777 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 18 | 11 | 29 | 0.137 | 24.059 | 8.004 | 32.200 |
| OPERATIONS PERSONNEL | 0 | 1 | 0 | 1 | 0.003 | 0.482 | 0.034 | 0.519 |
| HEALTH PHYSICS PERSONNEL | 6 | 0 | 8 | 14 | 1.743 | 0.076 | 3.354 | 5.173 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.085 | 0.101 | 0.000 | 0.186 |
| ENGINEERING PERSONNEL | 2 | 0 | 0 | 2 | 1.396 | 0.000 | 0.000 | 1.396 |
| TOTAL | 8 | 19 | 19 | 46 | 3.364 | 24.718 | 11.392 | 39.474 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 30 | 33 | 24 | 87 | 38.227 | 39.907 | 18.048 | 96.182 |
| OPERATIONS PERSONNEL | 7 | 2 | 4 | 13 | 2.287 | 1.642 | 1.438 | 5.367 |
| HEALTH PHYSICS PERSONNEL | 11 | 0 | 11 | 22 | 10.692 | 0.000 | 8.237 | 18.929 |
| SUPERVISORY PERSONNEL | 7 | 3 | 0 | 10 | 2.179 | 3.183 | 0.000 | 5.362 |
| ENGINEERING PERSONNEL | 2 | 0 | 1 | 3 | 1.027 | 0.000 | 0.205 | 1.232 |
| TOTAL | 57 | 38 | 40 | 135 | 54.412 | 44.732 | 27.928 | 127.072 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 9 | 0 | 0 | 9 | 3.336 | 0.150 | 0.014 | 3.500 |
| OPERATIONS PERSONNEL | 1 | 0 | 0 | 1 | 0.780 | 0.062 | 0.000 | 0.842 |
| HEALTH PHYSICS PERSONNEL | 5 | 0 | 0 | 5 | 1.549 | 0.000 | 0.122 | 1.671 |
| SUPERVISORY PERSONNEL | 0 | 0 | 1 | 1 | 0.010 | 0.000 | 0.347 | 0.357 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.009 | 0.000 | 0.000 | 0.009 |
| TOTAL | 15 | 0 | 1 | 16 | 5.684 | 0.212 | 0.483 | 6.379 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.243 | 0.004 | 0.000 | 0.247 |
| OPERATIONS PERSONNEL | 19 | 0 | 0 | 19 | 4.506 | 0.018 | 0.000 | 4.524 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 1 | 1 | 0.142 | 0.000 | 0.221 | 0.363 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.003 | 0.000 | 0.000 | 0.003 |
| ENGINEERING PERSONNEL | 2 | 0 | 2 | 4 | 0.433 | 0.000 | 0.436 | 0.869 |
| TOTAL | 21 | 0 | 3 | 24 | 5.327 | 0.022 | 0.657 | 6.006 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 63 | 51 | 36 | 150 | 48.666 | 64.286 | 26.985 | 139.937 |
| OPERATIONS PERSONNEL | 60 | 4 | 4 | 68 | 29.291 | 2.423 | 1.557 | 33.271 |
| HEALTH PHYSICS PERSONNEL | 34 | 0 | 23 | 57 | 20.220 | 0.076 | 12.875 | 33.171 |
| SUPERVISORY PERSONNEL | 11 | 3 | 1 | 15 | 3.779 | 3.381 | 0.347 | 7.507 |
| ENGINEERING PERSONNEL | 7 | 0 | 3 | 10 | 3.045 | 0.000 | 0.641 | 3.686 |
| GRAND TOTALS | 175 | 58 | 67 | 300 | 105.001 | 70.166 | 42.405 | 217.572 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *BRAIDWOOD 1,2

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 9 | 7 | 2 | 18 | 1.532 | 0.052 | 0.232 | 1.816 |
| OPERATIONS PERSONNEL | 83 | 0 | 61 | 144 | 5.074 | 0.000 | 0.607 | 5.681 |
| HEALTH PHYSICS PERSONNEL | 3 | 0 | 0 | 3 | 1.224 | 0.000 | 0.004 | 1.228 |
| SUPERVISORY PERSONNEL | 14 | 0 | 0 | 14 | 0.497 | 0.000 | 0.000 | 0.497 |
| ENGINEERING PERSONNEL | 22 | 2 | 0 | 24 | 0.818 | 0.005 | 0.007 | 0.830 |
| TOTAL | 131 | 9 | 63 | 203 | 9.145 | 0.057 | 0.850 | 10.052 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 119 | 20 | 607 | 746 | 20.965 | 0.148 | 58.182 | 79.295 |
| OPERATIONS PERSONNEL | 136 | 0 | 81 | 217 | 8.299 | 0.000 | 0.805 | 9.104 |
| HEALTH PHYSICS PERSONNEL | 30 | 0 | 83 | 113 | 10.668 | 0.000 | 11.286 | 21.954 |
| SUPERVISORY PERSONNEL | 173 | 27 | 106 | 306 | 6.205 | 0.058 | 17.215 | 23.478 |
| ENGINEERING PERSONNEL | 91 | 165 | 59 | 315 | 3.439 | 0.476 | 3.748 | 7.663 |
| TOTAL | 549 | 212 | 936 | 1697 | 49.576 | 0.682 | 91.236 | 141.494 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 77 | 77 | 0.019 | 0.000 | 7.370 | 7.389 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.005 | 0.000 | 0.006 | 0.011 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 1 | 1 | 0.007 | 0.000 | 0.086 | 0.093 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.005 | 0.000 | 0.009 | 0.014 |
| ENGINEERING PERSONNEL | 8 | 0 | 0 | 8 | 0.294 | 0.002 | 0.004 | 0.300 |
| TOTAL | 8 | 0 | 78 | 86 | 0.330 | 0.002 | 7.475 | 7.807 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 13 | 0 | 37 | 50 | 2.318 | 0.000 | 3.506 | 5.824 |
| OPERATIONS PERSONNEL | 16 | 0 | 2 | 18 | 0.999 | 0.000 | 0.022 | 1.021 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 4 | 5 | 0.361 | 0.000 | 0.543 | 0.904 |
| SUPERVISORY PERSONNEL | 19 | 18 | 0 | 37 | 0.678 | 0.037 | 0.000 | 0.715 |
| ENGINEERING PERSONNEL | 1 | 5 | 0 | 6 | 0.030 | 0.013 | 0.000 | 0.043 |
| TOTAL | 50 | 23 | 43 | 116 | 4.386 | 0.050 | 4.071 | 8.507 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 1 | 1 | 0.033 | 0.000 | 0.110 | 0.143 |
| OPERATIONS PERSONNEL | 12 | 0 | 157 | 169 | 0.705 | 0.000 | 1.562 | 2.267 |
| HEALTH PHYSICS PERSONNEL | 3 | 0 | 0 | 3 | 1.048 | 0.000 | 0.035 | 1.083 |
| SUPERVISORY PERSONNEL | 17 | 0 | 0 | 17 | 0.599 | 0.000 | 0.000 | 0.599 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.006 | 0.000 | 0.017 | 0.023 |
| TOTAL | 32 | 0 | 158 | 190 | 2.391 | 0.000 | 1.724 | 4.115 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 46 | 0 | 27 | 73 | 8.139 | 0.000 | 2.540 | 10.679 |
| OPERATIONS PERSONNEL | 24 | 0 | 0 | 24 | 1.434 | 0.000 | 0.000 | 1.434 |
| HEALTH PHYSICS PERSONNEL | 3 | 0 | 3 | 6 | 0.979 | 0.000 | 0.366 | 1.345 |
| SUPERVISORY PERSONNEL | 53 | 0 | 2 | 55 | 1.903 | 0.000 | 0.312 | 2.215 |
| ENGINEERING PERSONNEL | 5 | 10 | 0 | 15 | 0.209 | 0.028 | 0.000 | 0.237 |
| TOTAL | 131 | 10 | 32 | 173 | 12.664 | 0.028 | 3.218 | 15.910 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 187 | 27 | 751 | 965 | 33.006 | 0.200 | 71.940 | 105.146 |
| OPERATIONS PERSONNEL | 271 | 0 | 301 | 572 | 16.516 | 0.000 | 3.002 | 19.518 |
| HEALTH PHYSICS PERSONNEL | 40 | 0 | 91 | 131 | 14.287 | 0.000 | 12.320 | 26.607 |
| SUPERVISORY PERSONNEL | 276 | 45 | 108 | 429 | 9.887 | 0.095 | 17.536 | 27.518 |
| ENGINEERING PERSONNEL | 127 | 182 | 59 | 368 | 4.796 | 0.524 | 3.776 | 9.096 |
| GRAND TOTALS | 901 | 254 | 1310 | 2465 | 78.492 | 0.819 | 108.574 | 187.885 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

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

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 711 | 9 | 6 | 726 | 9.427 | 0.135 | 0.041 | 9.603 |
| OPERATIONS PERSONNEL | 24 | 4 | 1 | 29 | 2.685 | 0.008 | 0.005 | 2.698 |
| HEALTH PHYSICS PERSONNEL | 96 | 11 | 0 | 107 | 37.927 | 0.067 | 0.000 | 37.994 |
| SUPERVISORY PERSONNEL | 21 | 0 | 2 | 23 | 0.250 | 0.000 | 0.023 | 0.273 |
| ENGINEERING PERSONNEL | 77 | 9 | 58 | 144 | 3.108 | 0.039 | 1.795 | 4.942 |
| TOTAL | 929 | 33 | 67 | 1029 | 53.397 | 0.249 | 1.864 | 55.510 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 1317 | 10 | 44 | 1371 | 854.334 | 2.881 | 20.213 | 877.428 |
| OPERATIONS PERSONNEL | 23 | 1 | 1 | 25 | 0.556 | 0.000 | 0.097 | 0.653 |
| HEALTH PHYSICS PERSONNEL | 115 | 4 | 1 | 120 | 9.000 | 0.000 | 0.087 | 9.087 |
| SUPERVISORY PERSONNEL | 34 | 0 | 4 | 38 | 5.964 | 0.000 | 0.556 | 6.520 |
| ENGINEERING PERSONNEL | 116 | 12 | 101 | 229 | 16.712 | 1.602 | 33.062 | 51.376 |
| TOTAL | 1605 | 27 | 151 | 1783 | 886.566 | 4.483 | 54.015 | 945.064 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 17 | 0 | 0 | 17 | 0.601 | 0.000 | 0.000 | 0.601 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 22 | 0 | 0 | 22 | 0.069 | 0.000 | 0.000 | 0.069 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 3 | 2 | 0 | 5 | 0.132 | 0.055 | 0.000 | 0.187 |
| TOTAL | 42 | 2 | 0 | 44 | 0.802 | 0.055 | 0.000 | 0.857 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 866 | 2 | 12 | 880 | 126.569 | 0.074 | 0.288 | 126.931 |
| OPERATIONS PERSONNEL | 2 | 0 | 0 | 2 | 0.025 | 0.000 | 0.000 | 0.025 |
| HEALTH PHYSICS PERSONNEL | 77 | 1 | 0 | 78 | 1.313 | 0.015 | 0.000 | 1.328 |
| SUPERVISORY PERSONNEL | 27 | 0 | 1 | 28 | 1.614 | 0.000 | 0.030 | 1.644 |
| ENGINEERING PERSONNEL | 69 | 8 | 55 | 132 | 3.027 | 0.219 | 3.241 | 6.487 |
| TOTAL | 1041 | 11 | 68 | 1120 | 132.548 | 0.308 | 3.559 | 136.415 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 5 | 0 | 0 | 5 | 0.088 | 0.000 | 0.000 | 0.088 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 8 | 0 | 0 | 8 | 0.463 | 0.000 | 0.000 | 0.463 |
| TOTAL | 13 | 0 | 0 | 13 | 0.551 | 0.000 | 0.000 | 0.551 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 29 | 0 | 0 | 29 | 0.214 | 0.000 | 0.000 | 0.214 |
| OPERATIONS PERSONNEL | 7 | 0 | 0 | 7 | 0.279 | 0.000 | 0.000 | 0.279 |
| HEALTH PHYSICS PERSONNEL | 16 | 0 | 0 | 16 | 0.202 | 0.000 | 0.000 | 0.202 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 3 | 0 | 0 | 3 | 0.003 | 0.000 | 0.000 | 0.003 |
| TOTAL | 55 | 0 | 0 | 55 | 0.698 | 0.000 | 0.000 | 0.698 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 2940 | 21 | 62 | 3023 | 991.145 | 3.090 | 20.542 | 1014.777 |
| OPERATIONS PERSONNEL | 56 | 5 | 2 | 63 | 3.545 | 0.008 | 0.102 | 3.655 |
| HEALTH PHYSICS PERSONNEL | 331 | 16 | 1 | 348 | 48.599 | 0.082 | 0.087 | 48.768 |
| SUPERVISORY PERSONNEL | 82 | 0 | 7 | 89 | 7.828 | 0.000 | 0.609 | 8.437 |
| ENGINEERING PERSONNEL | 276 | 31 | 214 | 521 | 23.445 | 1.915 | 38.098 | 63.458 |
| GRAND TOTALS | 3685 | 73 | 286 | 4044 | 1074.562 | 5.095 | 59.438 | 1139.095 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *BRUNSWICK 1,2

TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 3 | 0 | 7 | 10 | 1.800 | 0.170 | 2.152 | 4.122 |
| OPERATIONS PERSONNEL | 89 | 0 | 39 | 128 | 58.277 | 0.000 | 19.632 | 77.909 |
| HEALTH PHYSICS PERSONNEL | 65 | 1 | 79 | 145 | 40.484 | 0.160 | 37.963 | 78.607 |
| SUPERVISORY PERSONNEL | 18 | 0 | 0 | 18 | 6.436 | 0.015 | 0.125 | 6.576 |
| ENGINEERING PERSONNEL | 0 | 1 | 5 | 6 | 0.975 | 0.150 | 1.806 | 2.931 |
| TOTAL | 175 | 2 | 130 | 307 | 107.972 | 0.495 | 61.678 | 170.145 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 205 | 63 | 410 | 678 | 163.994 | 37.422 | 230.912 | 432.328 |
| OPERATIONS PERSONNEL | 0 | 0 | 17 | 17 | 1.064 | 0.005 | 10.062 | 11.131 |
| HEALTH PHYSICS PERSONNEL | 25 | 1 | 15 | 41 | 10.890 | 0.529 | 5.283 | 16.702 |
| SUPERVISORY PERSONNEL | 16 | 1 | 11 | 28 | 6.121 | 0.550 | 4.133 | 10.804 |
| ENGINEERING PERSONNEL | 58 | 6 | 118 | 182 | 21.104 | 3.511 | 67.545 | 92.160 |
| TOTAL | 304 | 71 | 571 | 946 | 203.173 | 42.017 | 317.935 | 563.125 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 4 | 9 | 12 | 25 | 1.702 | 3.215 | 4.850 | 9.767 |
| OPERATIONS PERSONNEL | 1 | 0 | 0 | 1 | 0.127 | 0.000 | 0.005 | 0.132 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 1 | 2 | 0.209 | 0.000 | 0.205 | 0.414 |
| SUPERVISORY PERSONNEL | 2 | 0 | 1 | 3 | 0.590 | 0.000 | 1.041 | 1.631 |
| ENGINEERING PERSONNEL | 5 | 2 | 38 | 45 | 2.422 | 0.559 | 28.478 | 31.459 |
| TOTAL | 13 | 11 | 52 | 76 | 5.050 | 3.774 | 34.579 | 43.403 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 55 | 32 | 542 | 629 | 17.348 | 12.918 | 645.292 | 675.558 |
| OPERATIONS PERSONNEL | 0 | 0 | 11 | 11 | 0.085 | 0.000 | 3.980 | 4.065 |
| HEALTH PHYSICS PERSONNEL | 13 | 0 | 33 | 46 | 6.192 | 0.040 | 27.208 | 33.440 |
| SUPERVISORY PERSONNEL | 3 | 1 | 33 | 37 | 0.951 | 0.185 | 27.729 | 28.865 |
| ENGINEERING PERSONNEL | 21 | 4 | 171 | 196 | 7.303 | 0.839 | 125.730 | 133.872 |
| TOTAL | 92 | 37 | 790 | 919 | 31.879 | 13.982 | 829.939 | 875.800 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 15 | 0 | 13 | 28 | 8.166 | 0.425 | 5.087 | 13.678 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.015 | 0.000 | 0.080 | 0.095 |
| HEALTH PHYSICS PERSONNEL | 6 | 0 | 4 | 10 | 1.610 | 0.000 | 0.930 | 2.540 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.054 | 0.000 | 0.010 | 0.064 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.120 | 0.010 | 0.140 | 0.270 |
| TOTAL | 21 | 0 | 17 | 38 | 9.965 | 0.435 | 6.247 | 16.647 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 20 | 0 | 72 | 92 | 17.058 | 0.080 | 29.034 | 46.172 |
| OPERATIONS PERSONNEL | 0 | 0 | 1 | 1 | 0.410 | 0.000 | 0.215 | 0.625 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 1 | 1 | 0.215 | 0.000 | 0.330 | 0.545 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.450 | 0.000 | 0.055 | 0.505 |
| ENGINEERING PERSONNEL | 0 | 0 | 25 | 25 | 0.520 | 0.025 | 9.889 | 10.434 |
| TOTAL | 20 | 0 | 99 | 119 | 18.653 | 0.105 | 39.523 | 58.281 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 302 | 104 | 1056 | 1462 | 210.068 | 54.230 | 917.327 | 1181.625 |
| OPERATIONS PERSONNEL | 90 | 0 | 68 | 158 | 59.978 | 0.005 | 33.974 | 93.957 |
| HEALTH PHYSICS PERSONNEL | 110 | 2 | 133 | 245 | 59.600 | 0.729 | 71.919 | 132.248 |
| SUPERVISORY PERSONNEL | 39 | 2 | 45 | 86 | 14.602 | 0.750 | 33.093 | 48.445 |
| ENGINEERING PERSONNEL | 84 | 13 | 357 | 454 | 32.444 | 5.094 | 233.588 | 271.126 |
| GRAND TOTALS | 625 | 121 | 1659 | 2405 | 376.692 | 60.808 | 1289.901 | 1727.401 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *BYRON 1,2 TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 2 | 1 | 2 | 5 | 0.051 | 0.009 | 0.302 | 0.362 |
| OPERATIONS PERSONNEL | 90 | 0 | 221 | 311 | 14.345 | 0.000 | 0.346 | 14.691 |
| HEALTH PHYSICS PERSONNEL | 27 | 0 | 34 | 61 | 12.102 | 0.000 | 6.486 | 18.588 |
| SUPERVISORY PERSONNEL | 44 | 12 | 0 | 56 | 2.282 | 0.013 | 0.000 | 2.295 |
| ENGINEERING PERSONNEL | 26 | 12 | 5 | 43 | 1.910 | 0.073 | 0.248 | 2.231 |
| TOTAL | 189 | 25 | 262 | 476 | 30.690 | 0.095 | 7.382 | 38.167 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 136 | 19 | 659 | 814 | 66.557 | 0.266 | 130.420 | 197.243 |
| OPERATIONS PERSONNEL | 62 | 0 | 1 | 63 | 9.671 | 0.000 | 0.002 | 9.673 |
| HEALTH PHYSICS PERSONNEL | 20 | 0 | 97 | 117 | 8.926 | 0.000 | 18.576 | 27.502 |
| SUPERVISORY PERSONNEL | 250 | 72 | 66 | 388 | 12.983 | 0.075 | 1.712 | 14.770 |
| ENGINEERING PERSONNEL | 18 | 97 | 49 | 164 | 1.319 | 0.583 | 2.316 | 4.218 |
| TOTAL | 486 | 188 | 872 | 1546 | 99.456 | 0.924 | 153.026 | 253.406 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 1 | 0 | 188 | 189 | 0.203 | 0.000 | 24.284 | 24.487 |
| OPERATIONS PERSONNEL | 1 | 0 | 0 | 1 | 0.113 | 0.000 | 0.000 | 0.113 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 1 | 2 | 0.465 | 0.000 | 0.018 | 0.483 |
| SUPERVISORY PERSONNEL | 33 | 10 | 1 | 44 | 1.747 | 0.010 | 0.082 | 1.839 |
| ENGINEERING PERSONNEL | 21 | 8 | 16 | 45 | 1.528 | 0.052 | 0.767 | 2.347 |
| TOTAL | 57 | 18 | 206 | 281 | 4.056 | 0.062 | 25.151 | 29.269 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 19 | 2 | 276 | 297 | 9.351 | 0.026 | 54.068 | 63.445 |
| OPERATIONS PERSONNEL | 12 | 0 | 0 | 12 | 1.929 | 0.000 | 0.000 | 1.929 |
| HEALTH PHYSICS PERSONNEL | 6 | 0 | 1 | 7 | 2.435 | 0.000 | 0.037 | 2.472 |
| SUPERVISORY PERSONNEL | 65 | 0 | 54 | 119 | 3.392 | 0.000 | 1.072 | 4.464 |
| ENGINEERING PERSONNEL | 10 | 20 | 15 | 45 | 0.708 | 0.120 | 0.771 | 1.599 |
| TOTAL | 112 | 22 | 346 | 480 | 17.815 | 0.146 | 55.948 | 73.909 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 3 | 0 | 176 | 179 | 0.231 | 0.000 | 22.604 | 22.835 |
| OPERATIONS PERSONNEL | 4 | 0 | 82 | 86 | 1.243 | 0.000 | 0.131 | 1.374 |
| HEALTH PHYSICS PERSONNEL | 2 | 0 | 0 | 2 | 0.191 | 0.000 | 0.000 | 0.191 |
| SUPERVISORY PERSONNEL | 3 | 0 | 2 | 5 | 0.149 | 0.000 | 0.010 | 0.159 |
| ENGINEERING PERSONNEL | 2 | 48 | 2 | 52 | 0.166 | 0.290 | 0.098 | 0.554 |
| TOTAL | 14 | 48 | 262 | 324 | 1.980 | 0.290 | 22.843 | 25.113 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 13 | 0 | 5 | 18 | 6.508 | 0.000 | 0.929 | 7.437 |
| OPERATIONS PERSONNEL | 12 | 0 | 0 | 12 | 1.934 | 0.000 | 0.000 | 1.934 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 2 | 3 | 0.298 | 0.000 | 0.010 | 0.308 |
| SUPERVISORY PERSONNEL | 41 | 0 | 2 | 43 | 2.106 | 0.000 | 0.098 | 2.204 |
| ENGINEERING PERSONNEL | 9 | 41 | 1 | 51 | 0.671 | 0.248 | 0.067 | 0.986 |
| TOTAL | 76 | 41 | 10 | 127 | 11.517 | 0.248 | 1.104 | 12.869 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 174 | 22 | 1306 | 1502 | 82.901 | 0.301 | 232.607 | 315.809 |
| OPERATIONS PERSONNEL | 181 | 0 | 304 | 485 | 29.235 | 0.000 | 0.479 | 29.714 |
| HEALTH PHYSICS PERSONNEL | 57 | 0 | 135 | 192 | 24.417 | 0.000 | 25.127 | 49.544 |
| SUPERVISORY PERSONNEL | 436 | 94 | 125 | 655 | 22.659 | 0.098 | 2.974 | 25.731 |
| ENGINEERING PERSONNEL | 86 | 226 | 88 | 400 | 6.302 | 1.366 | 4.267 | 11.935 |
| GRAND TOTALS | 934 | 342 | 1958 | 3234 | 165.514 | 1.765 | 265.454 | 432.733 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *CALLAWAY 1

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) STATION | UTILITY | CONTRACT | TOTAL | TOTAL PERSON-REM STATION | UTILITY | CONTRACT | TOTAL |
|---|---|---|---|---|---|---|---|---|
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 5 | 0 | 43 | 48 | 1.741 | 0.000 | 10.189 | 11.930 |
| OPERATIONS PERSONNEL | 60 | 0 | 5 | 65 | 17.900 | 0.044 | 1.125 | 19.069 |
| HEALTH PHYSICS PERSONNEL | 24 | 0 | 27 | 51 | 5.705 | 0.000 | 9.625 | 15.330 |
| SUPERVISORY PERSONNEL | 3 | 1 | 0 | 4 | 2.321 | 0.140 | 0.000 | 2.461 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.482 | 0.000 | 0.326 | 0.808 |
| TOTAL | 92 | 1 | 75 | 168 | 28.149 | 0.184 | 21.265 | 49.598 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 98 | 0 | 216 | 314 | 33.771 | 0.000 | 99.948 | 133.719 |
| OPERATIONS PERSONNEL | 21 | 0 | 2 | 23 | 8.105 | 0.202 | 0.848 | 9.155 |
| HEALTH PHYSICS PERSONNEL | 7 | 0 | 3 | 10 | 1.560 | 0.000 | 0.827 | 2.387 |
| SUPERVISORY PERSONNEL | 9 | 2 | 0 | 11 | 2.450 | 0.584 | 0.000 | 3.034 |
| ENGINEERING PERSONNEL | 10 | 0 | 3 | 13 | 2.553 | 0.022 | 1.113 | 3.688 |
| TOTAL | 145 | 2 | 224 | 371 | 48.439 | 0.808 | 102.736 | 151.983 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 3 | 0 | 59 | 62 | 0.742 | 0.000 | 25.523 | 26.265 |
| OPERATIONS PERSONNEL | 8 | 0 | 4 | 12 | 3.498 | 0.000 | 1.342 | 4.840 |
| HEALTH PHYSICS PERSONNEL | 3 | 0 | 12 | 15 | 1.041 | 0.000 | 4.701 | 5.742 |
| SUPERVISORY PERSONNEL | 4 | 0 | 0 | 4 | 1.660 | 0.032 | 0.000 | 1.692 |
| ENGINEERING PERSONNEL | 3 | 0 | 34 | 37 | 0.841 | 0.000 | 21.557 | 22.398 |
| TOTAL | 21 | 0 | 109 | 130 | 7.782 | 0.032 | 53.123 | 60.937 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 7 | 0 | 119 | 126 | 2.060 | 0.000 | 59.497 | 61.557 |
| OPERATIONS PERSONNEL | 13 | 0 | 1 | 14 | 5.590 | 0.000 | 0.160 | 5.750 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 4 | 4 | 0.000 | 0.000 | 1.760 | 1.760 |
| SUPERVISORY PERSONNEL | 0 | 3 | 0 | 3 | 0.046 | 2.332 | 0.000 | 2.378 |
| ENGINEERING PERSONNEL | 2 | 1 | 56 | 59 | 1.394 | 0.588 | 61.528 | 63.510 |
| TOTAL | 22 | 4 | 180 | 206 | 9.090 | 2.920 | 122.945 | 134.955 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.060 | 0.000 | 0.188 | 0.248 |
| OPERATIONS PERSONNEL | 17 | 0 | 2 | 19 | 4.891 | 0.000 | 0.493 | 5.384 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.498 | 0.000 | 0.229 | 0.727 |
| SUPERVISORY PERSONNEL | 1 | 0 | 0 | 1 | 0.249 | 0.000 | 0.000 | 0.249 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.029 | 0.000 | 0.157 | 0.186 |
| TOTAL | 18 | 0 | 2 | 20 | 5.727 | 0.000 | 1.067 | 6.794 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 13 | 0 | 50 | 63 | 3.199 | 0.000 | 25.629 | 28.828 |
| OPERATIONS PERSONNEL | 3 | 0 | 0 | 3 | 2.399 | 0.000 | 0.207 | 2.606 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 12 | 12 | 0.133 | 0.000 | 3.424 | 3.557 |
| SUPERVISORY PERSONNEL | 1 | 0 | 0 | 1 | 0.513 | 0.000 | 0.000 | 0.513 |
| ENGINEERING PERSONNEL | 3 | 0 | 2 | 5 | 0.957 | 0.000 | 1.268 | 2.225 |
| TOTAL | 20 | 0 | 64 | 84 | 7.201 | 0.000 | 30.528 | 37.729 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 126 (108) | 0 (0) | 487 (314) | 613 (422) | 41.573 | 0.000 | 220.974 | 262.547 |
| OPERATIONS PERSONNEL | 122 (113) | 0 (0) | 14 (11) | 136 (124) | 42.383 | 0.246 | 4.175 | 46.804 |
| HEALTH PHYSICS PERSONNEL | 34 (26) | 0 (0) | 58 (50) | 92 (76) | 8.937 | 0.000 | 20.566 | 29.503 |
| SUPERVISORY PERSONNEL | 18 (19) | 6 (4) | 0 (0) | 24 (23) | 7.239 | 3.088 | 0.000 | 10.327 |
| ENGINEERING PERSONNEL | 18 (19) | 1 (1) | 95 (95) | 114 (115) | 6.256 | 0.610 | 85.949 | 92.815 |
| GRAND TOTALS | 318 (285) | 7 (5) | 654 (470) | 979 (760) | 106.388 | 3.944 | 331.664 | 441.996 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *CALVERT CLIFFS 1,2 TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) 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 | 21 | 0 | 0 | 21 | 2.966 | 0.000 | 0.000 | 2.966 |
| HEALTH PHYSICS PERSONNEL | 4 | 0 | 30 | 34 | 0.717 | 0.000 | 6.163 | 6.880 |
| SUPERVISORY PERSONNEL | 1 | 0 | 0 | 1 | 0.144 | 0.000 | 0.000 | 0.144 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 26 | 0 | 30 | 56 | 3.827 | 0.000 | 6.163 | 9.990 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 5 | 0 | 16 | 21 | 1.227 | 0.000 | 2.616 | 3.843 |
| OPERATIONS PERSONNEL | 0 | 0 | 1 | 1 | 0.000 | 0.000 | 0.201 | 0.201 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | 0 | 1 | 1 | 0.000 | 0.000 | 0.108 | 0.108 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 5 | 0 | 18 | 23 | 1.227 | 0.000 | 2.925 | 4.152 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 6 | 15 | 19 | 40 | 0.793 | 5.916 | 5.539 | 12.248 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 7 | 8 | 0.118 | 0.000 | 1.416 | 1.534 |
| SUPERVISORY PERSONNEL | 0 | 1 | 1 | 2 | 0.000 | 0.446 | 0.114 | 0.560 |
| ENGINEERING PERSONNEL | 2 | 0 | 0 | 2 | 0.684 | 0.000 | 0.000 | 0.684 |
| TOTAL | 9 | 16 | 27 | 52 | 1.595 | 6.362 | 7.069 | 15.026 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 80 | 37 | 237 | 354 | 28.036 | 13.236 | 99.475 | 140.747 |
| OPERATIONS PERSONNEL | 11 | 0 | 3 | 14 | 2.528 | 0.000 | 0.489 | 3.017 |
| HEALTH PHYSICS PERSONNEL | 12 | 0 | 60 | 72 | 3.890 | 0.000 | 14.384 | 18.274 |
| SUPERVISORY PERSONNEL | 1 | 0 | 19 | 20 | 0.112 | 0.000 | 6.555 | 6.667 |
| ENGINEERING PERSONNEL | 6 | 0 | 14 | 20 | 1.260 | 0.000 | 3.814 | 5.074 |
| TOTAL | 110 | 37 | 333 | 480 | 35.826 | 13.236 | 124.717 | 173.779 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 2 | 0 | 7 | 9 | 0.340 | 0.000 | 1.135 | 1.475 |
| OPERATIONS PERSONNEL | 0 | 0 | 1 | 1 | 0.000 | 0.000 | 0.116 | 0.116 |
| HEALTH PHYSICS PERSONNEL | 15 | 0 | 30 | 45 | 3.557 | 0.000 | 6.617 | 10.174 |
| SUPERVISORY PERSONNEL | 1 | 0 | 0 | 1 | 0.155 | 0.000 | 0.000 | 0.155 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 18 | 0 | 38 | 56 | 4.052 | 0.000 | 7.868 | 11.920 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 17 | 6 | 12 | 35 | 9.769 | 2.033 | 3.519 | 15.321 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 9 | 0 | 49 | 58 | 2.387 | 0.000 | 11.367 | 13.754 |
| SUPERVISORY PERSONNEL | 2 | 0 | 0 | 2 | 1.331 | 0.000 | 0.000 | 1.331 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 28 | 6 | 61 | 95 | 13.487 | 2.033 | 14.886 | 30.406 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 110 (108) | 58 (51) | 291 (262) | 459 (421) | 40.165 | 21.185 | 112.284 | 173.634 |
| OPERATIONS PERSONNEL | 32 (35) | 0 (0) | 5 (8) | 37 (43) | 5.494 | 0.000 | 0.806 | 6.300 |
| HEALTH PHYSICS PERSONNEL | 41 (31) | 0 (0) | 176 (128) | 217 (159) | 10.669 | 0.000 | 39.947 | 50.616 |
| SUPERVISORY PERSONNEL | 5 (5) | 1 (1) | 21 (22) | 27 (28) | 1.742 | 0.446 | 6.777 | 8.965 |
| ENGINEERING PERSONNEL | 8 (10) | 0 (0) | 14 (17) | 22 (27) | 1.944 | 0.000 | 3.814 | 5.758 |
| GRAND TOTALS | 196 (189) | 59 (52) | 507 (437) | 762 (678) | 60.014 | 21.631 | 163.628 | 245.273 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *CATAWBA 1,2

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) STATION | UTILITY | CONTRACT | TOTAL | TOTAL PERSON-REM STATION | UTILITY | CONTRACT | TOTAL |
|---|---|---|---|---|---|---|---|---|
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 245 | 449 | 254 | 948 | 4.600 | 3.906 | 2.615 | 11.121 |
| OPERATIONS PERSONNEL | 66 | 1 | 39 | 106 | 20.850 | 0.000 | 1.385 | 22.235 |
| HEALTH PHYSICS PERSONNEL | 46 | 2 | 139 | 187 | 10.560 | 0.000 | 15.654 | 26.214 |
| SUPERVISORY PERSONNEL | 0 | 0 | 4 | 4 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 97 | 19 | 13 | 129 | 6.910 | 0.015 | 0.245 | 7.170 |
| TOTAL | 454 | 471 | 449 | 1374 | 42.920 | 3.921 | 19.899 | 66.740 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 246 | 436 | 210 | 892 | 104.278 | 161.832 | 83.773 | 349.883 |
| OPERATIONS PERSONNEL | 62 | 1 | 46 | 109 | 1.425 | 0.200 | 29.215 | 30.840 |
| HEALTH PHYSICS PERSONNEL | 47 | 1 | 137 | 185 | 12.030 | 0.150 | 34.293 | 46.473 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 89 | 15 | 4 | 108 | 17.195 | 1.160 | 3.530 | 21.885 |
| TOTAL | 444 | 453 | 397 | 1294 | 134.928 | 163.342 | 150.811 | 449.081 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 80 | 209 | 82 | 371 | 4.530 | 42.227 | 20.445 | 67.202 |
| OPERATIONS PERSONNEL | 56 | 0 | 23 | 79 | 8.967 | 0.000 | 2.545 | 11.512 |
| HEALTH PHYSICS PERSONNEL | 16 | 0 | 69 | 85 | 1.645 | 0.000 | 15.965 | 17.610 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 65 | 15 | 16 | 96 | 20.830 | 15.110 | 7.675 | 43.615 |
| TOTAL | 217 | 224 | 190 | 631 | 35.972 | 57.337 | 46.630 | 139.939 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 207 | 400 | 145 | 752 | 19.460 | 123.412 | 91.930 | 234.802 |
| OPERATIONS PERSONNEL | 24 | 1 | 27 | 52 | 0.465 | 0.010 | 1.870 | 2.345 |
| HEALTH PHYSICS PERSONNEL | 36 | 0 | 105 | 141 | 3.505 | 0.000 | 20.876 | 24.381 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 53 | 6 | 4 | 63 | 5.105 | 0.265 | 0.040 | 5.410 |
| TOTAL | 320 | 407 | 281 | 1008 | 28.535 | 123.687 | 114.716 | 266.938 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 14 | 37 | 3 | 54 | 0.010 | 0.070 | 0.000 | 0.080 |
| OPERATIONS PERSONNEL | 2 | 1 | 42 | 45 | 0.000 | 0.000 | 2.135 | 2.135 |
| HEALTH PHYSICS PERSONNEL | 26 | 0 | 21 | 47 | 1.005 | 0.000 | 0.630 | 1.635 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 19 | 0 | 0 | 19 | 0.725 | 0.000 | 0.000 | 0.725 |
| TOTAL | 61 | 38 | 66 | 165 | 1.740 | 0.070 | 2.765 | 4.575 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 37 | 37 | 11 | 85 | 2.155 | 0.065 | 0.170 | 2.390 |
| OPERATIONS PERSONNEL | 8 | 0 | 3 | 11 | 0.280 | 0.000 | 0.140 | 0.420 |
| HEALTH PHYSICS PERSONNEL | 9 | 0 | 26 | 35 | 0.025 | 0.000 | 0.080 | 0.105 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 17 | 1 | 1 | 19 | 0.040 | 0.000 | 0.000 | 0.040 |
| TOTAL | 71 | 38 | 41 | 150 | 2.500 | 0.065 | 0.390 | 2.955 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 829 (247) | 1568 (456) | 705 (268) | 3102 (971) | 135.033 | 331.512 | 198.933 | 665.478 |
| OPERATIONS PERSONNEL | 218 (66) | 4 (1) | 180 (47) | 402 (114) | 31.987 | 0.210 | 37.290 | 69.487 |
| HEALTH PHYSICS PERSONNEL | 180 (47) | 3 (1) | 497 (138) | 680 (186) | 28.770 | 0.150 | 87.498 | 116.418 |
| SUPERVISORY PERSONNEL | 0 (0) | 0 (0) | 4 (0) | 4 (0) | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 340 (97) | 56 (19) | 38 (18) | 434 (134) | 50.805 | 16.550 | 11.490 | 78.845 |
| GRAND TOTALS | 1567 (457) | 1631 (477) | 1424 (471) | 4622(1405) | 246.595 | 348.422 | 335.211 | 930.228 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *CLINTON

TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 94 | 0 | 422 | 516 | 27.503 | 0.000 | 235.352 | 262.855 |
| OPERATIONS PERSONNEL | 34 | 0 | 31 | 65 | 13.031 | 0.000 | 12.026 | 25.057 |
| HEALTH PHYSICS PERSONNEL | 40 | 0 | 81 | 121 | 19.275 | 0.000 | 42.452 | 61.727 |
| SUPERVISORY PERSONNEL | 13 | 0 | 38 | 51 | 3.487 | 0.000 | 9.196 | 12.683 |
| ENGINEERING PERSONNEL | 3 | 0 | 57 | 60 | 0.919 | 0.000 | 31.200 | 32.119 |
| TOTAL | 184 | 0 | 629 | 813 | 64.215 | 0.000 | 330.226 | 394.441 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 10 | 0 | 31 | 41 | 5.042 | 0.000 | 10.622 | 15.664 |
| OPERATIONS PERSONNEL | 2 | 0 | 0 | 2 | 0.687 | 0.000 | 0.028 | 0.715 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 1 | 1 | 0.470 | 0.000 | 0.899 | 1.369 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.072 | 0.000 | 0.060 | 0.132 |
| ENGINEERING PERSONNEL | 0 | 0 | 2 | 2 | 0.104 | 0.000 | 0.489 | 0.593 |
| TOTAL | 12 | 0 | 34 | 46 | 6.375 | 0.000 | 12.098 | 18.473 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 1 | 0 | 8 | 9 | 0.241 | 0.000 | 3.757 | 3.998 |
| OPERATIONS PERSONNEL | 0 | 0 | 1 | 1 | 0.039 | 0.000 | 0.267 | 0.306 |
| HEALTH PHYSICS PERSONNEL | 3 | 0 | 0 | 3 | 0.748 | 0.000 | 0.346 | 1.094 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.125 | 0.125 |
| ENGINEERING PERSONNEL | 0 | 0 | 8 | 8 | 0.082 | 0.000 | 1.750 | 1.832 |
| TOTAL | 4 | 0 | 17 | 21 | 1.110 | 0.000 | 6.245 | 7.355 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 72 | 0 | 160 | 232 | 26.292 | 0.055 | 61.686 | 88.033 |
| OPERATIONS PERSONNEL | 9 | 0 | 4 | 13 | 2.235 | 0.000 | 0.886 | 3.121 |
| HEALTH PHYSICS PERSONNEL | 23 | 0 | 24 | 47 | 7.406 | 0.000 | 7.832 | 15.238 |
| SUPERVISORY PERSONNEL | 0 | 0 | 1 | 1 | 0.184 | 0.000 | 0.506 | 0.690 |
| ENGINEERING PERSONNEL | 3 | 0 | 1 | 4 | 1.132 | 0.000 | 0.303 | 1.435 |
| TOTAL | 107 | 0 | 190 | 297 | 37.249 | 0.055 | 71.213 | 108.517 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 2 | 2 | 0.661 | 0.000 | 1.823 | 2.484 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.189 | 0.000 | 0.000 | 0.189 |
| HEALTH PHYSICS PERSONNEL | 2 | 0 | 0 | 2 | 0.587 | 0.000 | 0.046 | 0.633 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.017 | 0.000 | 0.000 | 0.017 |
| ENGINEERING PERSONNEL | 0 | 0 | 1 | 1 | 0.000 | 0.000 | 0.350 | 0.350 |
| TOTAL | 2 | 0 | 3 | 5 | 1.454 | 0.000 | 2.219 | 3.673 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 3 | 3 | 0.702 | 0.000 | 2.420 | 3.122 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.119 | 0.000 | 0.029 | 0.148 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.058 | 0.000 | 0.167 | 0.225 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.094 | 0.000 | 0.143 | 0.237 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.022 | 0.000 | 0.270 | 0.292 |
| TOTAL | 0 | 0 | 3 | 3 | 0.995 | 0.000 | 3.029 | 4.024 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 177 | 0 | 626 | 803 | 60.441 | 0.055 | 315.660 | 376.156 |
| OPERATIONS PERSONNEL | 45 | 0 | 36 | 81 | 16.300 | 0.000 | 13.236 | 29.536 |
| HEALTH PHYSICS PERSONNEL | 68 | 0 | 106 | 174 | 28.544 | 0.000 | 51.742 | 80.286 |
| SUPERVISORY PERSONNEL | 13 | 0 | 39 | 52 | 3.854 | 0.000 | 10.030 | 13.884 |
| ENGINEERING PERSONNEL | 6 | 0 | 69 | 75 | 2.259 | 0.000 | 34.362 | 36.621 |
| GRAND TOTALS | 309 | 0 | 876 | 1185 | 111.398 | 0.055 | 425.030 | 536.483 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *COOK 1,2

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) STATION | UTILITY | CONTRACT | TOTAL | TOTAL PERSON-REM STATION | UTILITY | CONTRACT | TOTAL |
|---|---|---|---|---|---|---|---|---|
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 9 | 1 | 56 | 66 | 1.169 | 0.098 | 9.833 | 11.100 |
| OPERATIONS PERSONNEL | 67 | 1 | 14 | 82 | 13.600 | 0.401 | 3.468 | 17.469 |
| HEALTH PHYSICS PERSONNEL | 22 | 0 | 93 | 115 | 5.182 | 0.000 | 36.847 | 42.029 |
| SUPERVISORY PERSONNEL | 1 | 0 | 0 | 1 | 0.167 | 0.000 | 0.000 | 0.167 |
| ENGINEERING PERSONNEL | 7 | 0 | 1 | 8 | 2.068 | 0.000 | 0.086 | 2.154 |
| TOTAL | 106 | 2 | 164 | 272 | 22.186 | 0.499 | 50.234 | 72.919 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 83 | 1 | 362 | 446 | 24.680 | 0.346 | 142.976 | 168.002 |
| OPERATIONS PERSONNEL | 10 | 2 | 20 | 32 | 2.380 | 0.596 | 7.820 | 10.796 |
| HEALTH PHYSICS PERSONNEL | 9 | 0 | 34 | 43 | 1.405 | 0.000 | 8.427 | 9.832 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 5 | 0 | 2 | 7 | 0.936 | 0.000 | 0.308 | 1.244 |
| TOTAL | 107 | 3 | 418 | 528 | 29.401 | 0.942 | 159.531 | 189.874 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 9 | 0 | 146 | 155 | 1.164 | 0.000 | 51.425 | 52.589 |
| OPERATIONS PERSONNEL | 3 | 1 | 12 | 16 | 0.544 | 0.117 | 5.440 | 6.101 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 8 | 9 | 0.226 | 0.000 | 2.253 | 2.479 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 13 | 1 | 166 | 180 | 1.934 | 0.117 | 59.118 | 61.169 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 8 | 0 | 307 | 315 | 1.418 | 0.000 | 90.081 | 91.499 |
| OPERATIONS PERSONNEL | 2 | 0 | 12 | 14 | 0.728 | 0.000 | 2.313 | 3.041 |
| HEALTH PHYSICS PERSONNEL | 2 | 0 | 4 | 6 | 0.242 | 0.000 | 0.453 | 0.695 |
| SUPERVISORY PERSONNEL | 0 | 0 | 1 | 1 | 0.000 | 0.000 | 0.097 | 0.097 |
| ENGINEERING PERSONNEL | 4 | 4 | 9 | 17 | 0.604 | 0.635 | 1.545 | 2.784 |
| TOTAL | 16 | 4 | 333 | 353 | 2.992 | 0.635 | 94.489 | 98.116 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 73 | 73 | 0.000 | 0.000 | 20.635 | 20.635 |
| OPERATIONS PERSONNEL | 1 | 0 | 10 | 11 | 0.136 | 0.000 | 3.059 | 3.195 |
| HEALTH PHYSICS PERSONNEL | 4 | 0 | 16 | 20 | 0.427 | 0.000 | 3.856 | 4.283 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 1 | 0 | 0 | 1 | 0.194 | 0.000 | 0.000 | 0.194 |
| TOTAL | 6 | 0 | 99 | 105 | 0.757 | 0.000 | 27.550 | 28.307 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 7 | 0 | 50 | 57 | 0.852 | 0.000 | 9.668 | 10.520 |
| OPERATIONS PERSONNEL | 7 | 0 | 57 | 64 | 2.687 | 0.000 | 14.881 | 17.568 |
| HEALTH PHYSICS PERSONNEL | 2 | 0 | 23 | 25 | 0.212 | 0.000 | 5.269 | 5.481 |
| SUPERVISORY PERSONNEL | 1 | 0 | 0 | 1 | 0.098 | 0.000 | 0.000 | 0.098 |
| ENGINEERING PERSONNEL | 1 | 0 | 2 | 3 | 0.223 | 0.000 | 0.261 | 0.484 |
| TOTAL | 18 | 0 | 132 | 150 | 4.072 | 0.000 | 30.079 | 34.151 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 116 (93) | 2 (2) | 994 (700) | 1112 (795) | 29.283 | 0.444 | 324.618 | 354.345 |
| OPERATIONS PERSONNEL | 90 (81) | 4 (3) | 125 (105) | 219 (189) | 20.075 | 1.114 | 36.981 | 58.170 |
| HEALTH PHYSICS PERSONNEL | 40 (25) | 0 (0) | 178 (126) | 218 (151) | 7.694 | 0.000 | 57.105 | 64.799 |
| SUPERVISORY PERSONNEL | 2 (2) | 0 (0) | 1 (1) | 3 (3) | 0.265 | 0.000 | 0.097 | 0.362 |
| ENGINEERING PERSONNEL | 18 (17) | 4 (4) | 14 (13) | 36 (34) | 4.025 | 0.635 | 2.200 | 6.860 |
| GRAND TOTALS | 266 (218) | 10 (9) | 1312 (945) | 1588(1172) | 61.342 | 2.193 | 421.001 | 484.536 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *COOPER STATION

TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATION | | UTILITY | | CONTRACT | | TOTAL | | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | | | | | |
| MAINTENANCE PERSONNEL | 6 | | 0 | | 7 | | 13 | | 0.151 | 0.000 | 0.660 | 0.811 |
| OPERATIONS PERSONNEL | 49 | | 0 | | 0 | | 49 | | 18.115 | 0.000 | 0.000 | 18.115 |
| HEALTH PHYSICS PERSONNEL | 20 | | 0 | | 15 | | 35 | | 6.057 | 0.000 | 0.484 | 6.541 |
| SUPERVISORY PERSONNEL | 3 | | 0 | | 2 | | 5 | | 0.163 | 0.000 | 0.422 | 0.585 |
| ENGINEERING PERSONNEL | 18 | | 4 | | 13 | | 35 | | 4.717 | 0.033 | 1.319 | 6.069 |
| TOTAL | 96 | | 4 | | 37 | | 137 | | 29.203 | 0.033 | 2.885 | 32.121 |
| ROUTINE MAINTENANCE | | | | | | | | | | | | |
| MAINTENANCE PERSONNEL | 75 | | 0 | | 403 | | 478 | | 43.412 | 0.000 | 221.639 | 265.051 |
| OPERATIONS PERSONNEL | 4 | | 0 | | 0 | | 4 | | 0.051 | 0.000 | 0.000 | 0.051 |
| HEALTH PHYSICS PERSONNEL | 20 | | 0 | | 30 | | 50 | | 13.504 | 0.000 | 12.325 | 25.829 |
| SUPERVISORY PERSONNEL | 5 | | 0 | | 1 | | 6 | | 0.459 | 0.000 | 0.001 | 0.460 |
| ENGINEERING PERSONNEL | 6 | | 25 | | 32 | | 63 | | 0.799 | 13.240 | 9.755 | 23.794 |
| TOTAL | 110 | | 25 | | 466 | | 601 | | 58.225 | 13.240 | 243.720 | 315.185 |
| IN-SERVICE INSPECTION | | | | | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | | 0 | | 17 | | 17 | | 0.000 | 0.000 | 4.627 | 4.627 |
| OPERATIONS PERSONNEL | 1 | | 0 | | 0 | | 1 | | 0.054 | 0.000 | 0.000 | 0.054 |
| HEALTH PHYSICS PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 1 | | 0 | | 0 | | 1 | | 0.050 | 0.000 | 0.000 | 0.050 |
| TOTAL | 2 | | 0 | | 17 | | 19 | | 0.104 | 0.000 | 4.627 | 4.731 |
| SPECIAL MAINTENANCE | | | | | | | | | | | | |
| MAINTENANCE PERSONNEL | 1 | | 0 | | 5 | | 6 | | 0.092 | 0.000 | 1.057 | 1.149 |
| OPERATIONS PERSONNEL | 2 | | 0 | | 0 | | 2 | | 0.036 | 0.000 | 0.000 | 0.036 |
| HEALTH PHYSICS PERSONNEL | 9 | | 0 | | 3 | | 12 | | 1.198 | 0.000 | 0.324 | 1.522 |
| SUPERVISORY PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 4 | | 0 | | 2 | | 6 | | 0.328 | 0.000 | 0.238 | 0.566 |
| TOTAL | 16 | | 0 | | 10 | | 26 | | 1.654 | 0.000 | 1.619 | 3.273 |
| WASTE PROCESSING | | | | | | | | | | | | |
| MAINTENANCE PERSONNEL | 5 | | 0 | | 0 | | 5 | | 0.042 | 0.000 | 0.000 | 0.042 |
| OPERATIONS PERSONNEL | 6 | | 0 | | 0 | | 6 | | 2.936 | 0.000 | 0.000 | 2.936 |
| HEALTH PHYSICS PERSONNEL | 12 | | 0 | | 4 | | 16 | | 2.223 | 0.000 | 0.197 | 2.420 |
| SUPERVISORY PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 1 | | 0 | | 0 | | 1 | | 0.115 | 0.000 | 0.000 | 0.115 |
| TOTAL | 24 | | 0 | | 4 | | 28 | | 5.316 | 0.000 | 0.197 | 5.513 |
| REFUELING | | | | | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | | 0 | | 3 | | 3 | | 0.000 | 0.000 | 0.254 | 0.254 |
| OPERATIONS PERSONNEL | 30 | | 0 | | 0 | | 30 | | 1.083 | 0.000 | 0.000 | 1.083 |
| HEALTH PHYSICS PERSONNEL | 1 | | 0 | | 0 | | 1 | | 0.055 | 0.000 | 0.000 | 0.055 |
| SUPERVISORY PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 4 | | 0 | | 0 | | 4 | | 0.309 | 0.000 | 0.000 | 0.309 |
| TOTAL | 35 | | 0 | | 3 | | 38 | | 1.447 | 0.000 | 0.254 | 1.701 |
| TOTAL BY JOB FUNCTION | | | | | | | | | | | | |
| MAINTENANCE PERSONNEL | 87 | (75) | 0 | (0) | 435 | (420) | 522 | (495) | 43.697 | 0.000 | 228.237 | 271.934 |
| OPERATIONS PERSONNEL | 92 | (52) | 0 | (0) | 0 | (0) | 92 | (52) | 22.275 | 0.000 | 0.000 | 22.275 |
| HEALTH PHYSICS PERSONNEL | 62 | (25) | 0 | (0) | 52 | (30) | 114 | (55) | 23.037 | 0.000 | 13.330 | 36.367 |
| SUPERVISORY PERSONNEL | 8 | (6) | 0 | (0) | 3 | (2) | 11 | (8) | 0.622 | 0.000 | 0.423 | 1.045 |
| ENGINEERING PERSONNEL | 34 | (20) | 29 | (25) | 47 | (37) | 110 | (82) | 6.318 | 13.273 | 11.312 | 30.903 |
| GRAND TOTALS | 283 | (178) | 29 | (25) | 537 | (489) | 849 | (692) | 95.949 | 13.273 | 253.302 | 362.524 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *CRYSTAL RIVER 3

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 5 | 1 | 2 | 8 | 3.465 | 1.146 | 0.635 | 5.246 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.009 | 0.000 | 0.000 | 0.009 |
| HEALTH PHYSICS PERSONNEL | 2 | 0 | 0 | 2 | 1.845 | 0.000 | 0.162 | 2.007 |
| SUPERVISORY PERSONNEL | 0 | 1 | 0 | 1 | 0.198 | 0.146 | 0.360 | 0.704 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.039 | 0.000 | 0.007 | 0.046 |
| TOTAL | 7 | 2 | 2 | 11 | 5.556 | 1.292 | 1.164 | 8.012 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 137 | 112 | 303 | 552 | 42.340 | 51.607 | 173.256 | 267.203 |
| OPERATIONS PERSONNEL | 39 | 0 | 0 | 39 | 9.329 | 0.000 | 0.057 | 9.386 |
| HEALTH PHYSICS PERSONNEL | 45 | 0 | 121 | 166 | 27.656 | 0.080 | 71.204 | 98.940 |
| SUPERVISORY PERSONNEL | 5 | 1 | 21 | 27 | 2.734 | 0.626 | 6.652 | 10.012 |
| ENGINEERING PERSONNEL | 1 | 5 | 33 | 39 | 0.420 | 3.221 | 16.743 | 20.384 |
| TOTAL | 227 | 118 | 478 | 823 | 82.479 | 55.534 | 267.912 | 405.925 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 1 | 17 | 18 | 0.291 | 1.659 | 6.242 | 8.192 |
| OPERATIONS PERSONNEL | 2 | 0 | 0 | 2 | 1.619 | 0.000 | 0.000 | 1.619 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.059 | 0.000 | 0.354 | 0.413 |
| SUPERVISORY PERSONNEL | 0 | 1 | 4 | 5 | 0.071 | 0.150 | 1.971 | 2.192 |
| ENGINEERING PERSONNEL | 0 | 0 | 6 | 6 | 0.000 | 0.075 | 3.057 | 3.132 |
| TOTAL | 2 | 2 | 27 | 31 | 2.040 | 1.884 | 11.624 | 15.548 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 1 | 1 | 1.114 | 0.000 | 0.801 | 1.915 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 2 | 2 | 1.550 | 0.000 | 1.172 | 2.722 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.351 | 0.000 | 0.000 | 0.351 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 0 | 0 | 3 | 3 | 3.015 | 0.000 | 1.973 | 4.988 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 3 | 3 | 30 | 36 | 2.530 | 2.734 | 26.995 | 32.259 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.036 | 0.000 | 0.000 | 0.036 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.221 | 0.000 | 1.991 | 2.212 |
| SUPERVISORY PERSONNEL | 0 | 0 | 3 | 3 | 0.071 | 0.145 | 1.115 | 1.331 |
| ENGINEERING PERSONNEL | 0 | 0 | 4 | 4 | 0.000 | 0.102 | 5.581 | 5.683 |
| TOTAL | 3 | 3 | 37 | 43 | 2.858 | 2.981 | 35.682 | 41.521 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 145 | 117 | 353 | 615 | 49.740 | 57.146 | 207.929 | 314.815 |
| OPERATIONS PERSONNEL | 41 | 0 | 0 | 41 | 10.993 | 0.000 | 0.057 | 11.050 |
| HEALTH PHYSICS PERSONNEL | 47 | 0 | 123 | 170 | 31.331 | 0.080 | 74.883 | 106.294 |
| SUPERVISORY PERSONNEL | 5 | 3 | 28 | 36 | 3.425 | 1.067 | 10.098 | 14.590 |
| ENGINEERING PERSONNEL | 1 | 5 | 43 | 49 | 0.459 | 3.398 | 25.388 | 29.245 |
| GRAND TOTALS | 239 | 125 | 547 | 911 | 95.948 | 61.691 | 318.355 | 475.994 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *DAVIS-BESSE

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 8 | 0 | 134 | 142 | 0.096 | 0.000 | 0.609 | 0.705 |
| OPERATIONS PERSONNEL | 49 | 0 | 0 | 49 | 10.564 | 0.000 | 0.000 | 10.564 |
| HEALTH PHYSICS PERSONNEL | 39 | 0 | 6 | 45 | 1.515 | 0.000 | 0.036 | 1.551 |
| SUPERVISORY PERSONNEL | 2 | 0 | 2 | 4 | 0.009 | 0.000 | 0.088 | 0.097 |
| ENGINEERING PERSONNEL | 28 | 0 | 17 | 45 | 0.434 | 0.000 | 0.135 | 0.569 |
| TOTAL | 126 | 0 | 159 | 285 | 12.618 | 0.000 | 0.868 | 13.486 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 83 | 0 | 332 | 415 | 3.031 | 0.000 | 17.984 | 21.015 |
| OPERATIONS PERSONNEL | 5 | 0 | 0 | 5 | 0.105 | 0.000 | 0.000 | 0.105 |
| HEALTH PHYSICS PERSONNEL | 40 | 0 | 96 | 136 | 9.168 | 0.000 | 27.788 | 36.956 |
| SUPERVISORY PERSONNEL | 3 | 0 | 1 | 4 | 0.076 | 0.000 | 0.017 | 0.093 |
| ENGINEERING PERSONNEL | 23 | 0 | 4 | 27 | 0.661 | 0.000 | 0.204 | 0.865 |
| TOTAL | 154 | 0 | 433 | 587 | 13.041 | 0.000 | 45.993 | 59.034 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 30 | 0 | 320 | 350 | 0.232 | 0.000 | 78.747 | 78.979 |
| OPERATIONS PERSONNEL | 14 | 0 | 1 | 15 | 0.100 | 0.000 | 0.747 | 0.847 |
| HEALTH PHYSICS PERSONNEL | 16 | 0 | 28 | 44 | 0.652 | 0.000 | 1.602 | 2.254 |
| SUPERVISORY PERSONNEL | 1 | 0 | 2 | 3 | 0.020 | 0.000 | 0.039 | 0.059 |
| ENGINEERING PERSONNEL | 11 | 0 | 16 | 27 | 0.781 | 0.000 | 5.840 | 6.621 |
| TOTAL | 72 | 0 | 367 | 439 | 1.785 | 0.000 | 86.975 | 88.760 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 84 | 0 | 504 | 588 | 17.821 | 0.000 | 203.729 | 221.550 |
| OPERATIONS PERSONNEL | 24 | 0 | 0 | 24 | 0.118 | 0.000 | 0.000 | 0.118 |
| HEALTH PHYSICS PERSONNEL | 40 | 0 | 87 | 127 | 12.874 | 0.000 | 24.970 | 37.844 |
| SUPERVISORY PERSONNEL | 3 | 0 | 2 | 5 | 0.649 | 0.000 | 0.315 | 0.964 |
| ENGINEERING PERSONNEL | 26 | 0 | 17 | 43 | 5.061 | 0.000 | 5.632 | 10.693 |
| TOTAL | 177 | 0 | 610 | 787 | 36.523 | 0.000 | 234.646 | 271.169 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 5 | 0 | 2 | 7 | 0.002 | 0.000 | 0.039 | 0.041 |
| OPERATIONS PERSONNEL | 15 | 0 | 0 | 15 | 0.005 | 0.000 | 0.000 | 0.005 |
| HEALTH PHYSICS PERSONNEL | 28 | 0 | 39 | 67 | 5.575 | 0.000 | 1.471 | 7.046 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 48 | 0 | 41 | 89 | 5.582 | 0.000 | 1.510 | 7.092 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 30 | 0 | 208 | 238 | 1.057 | 0.000 | 36.593 | 37.650 |
| OPERATIONS PERSONNEL | 36 | 0 | 0 | 36 | 1.430 | 0.000 | 0.000 | 1.430 |
| HEALTH PHYSICS PERSONNEL | 28 | 0 | 29 | 57 | 1.369 | 0.000 | 3.536 | 4.905 |
| SUPERVISORY PERSONNEL | 2 | 0 | 1 | 3 | 0.010 | 0.000 | 0.020 | 0.030 |
| ENGINEERING PERSONNEL | 16 | 0 | 8 | 24 | 0.736 | 0.000 | 0.852 | 1.588 |
| TOTAL | 112 | 0 | 246 | 358 | 4.602 | 0.000 | 41.001 | 45.603 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 240 | 0 | 1500 | 1740 | 22.239 | 0.000 | 337.701 | 359.940 |
| OPERATIONS PERSONNEL | 143 | 0 | 1 | 144 | 12.322 | 0.000 | 0.747 | 13.069 |
| HEALTH PHYSICS PERSONNEL | 191 | 0 | 285 | 476 | 31.153 | 0.000 | 59.403 | 90.556 |
| SUPERVISORY PERSONNEL | 11 | 0 | 8 | 19 | 0.764 | 0.000 | 0.479 | 1.243 |
| ENGINEERING PERSONNEL | 104 | 0 | 62 | 166 | 7.673 | 0.000 | 12.663 | 20.336 |
| GRAND TOTALS | 689 | 0 | 1856 | 2545 | 74.151 | 0.000 | 410.993 | 485.144 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *DIABLO CANYON 1,2

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) 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 | 4 | 0 | 0 | 4 | 0.404 | 0.000 | 0.000 | 0.404 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 0 | 1 | 0.097 | 0.000 | 0.000 | 0.097 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 5 | 0 | 0 | 5 | 0.501 | 0.000 | 0.000 | 0.501 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 5 | 1 | 3 | 9 | 0.688 | 0.119 | 0.312 | 1.119 |
| OPERATIONS PERSONNEL | 4 | 0 | 2 | 6 | 0.486 | 0.000 | 0.246 | 0.732 |
| HEALTH PHYSICS PERSONNEL | 27 | 1 | 9 | 37 | 3.813 | 0.141 | 1.005 | 4.959 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 36 | 2 | 14 | 52 | 4.987 | 0.260 | 1.563 | 6.810 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 3 | 6 | 11 | 20 | 1.584 | 2.064 | 4.702 | 8.350 |
| OPERATIONS PERSONNEL | 4 | 0 | 0 | 4 | 0.678 | 0.000 | 0.000 | 0.678 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 2 | 2 | 0.000 | 0.000 | 0.268 | 0.268 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 1 | 0 | 4 | 5 | 0.211 | 0.000 | 1.521 | 1.732 |
| TOTAL | 8 | 6 | 17 | 31 | 2.473 | 2.064 | 6.491 | 11.028 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 46 | 14 | 205 | 265 | 11.732 | 2.840 | 66.143 | 80.715 |
| OPERATIONS PERSONNEL | 11 | 0 | 11 | 22 | 1.647 | 0.000 | 2.323 | 3.970 |
| HEALTH PHYSICS PERSONNEL | 49 | 1 | 64 | 114 | 14.003 | 0.282 | 17.734 | 32.019 |
| SUPERVISORY PERSONNEL | 1 | 0 | 1 | 2 | 0.106 | 0.000 | 0.515 | 0.621 |
| ENGINEERING PERSONNEL | 2 | 3 | 12 | 17 | 0.282 | 0.398 | 4.308 | 4.988 |
| TOTAL | 109 | 18 | 293 | 420 | 27.770 | 3.520 | 91.023 | 122.313 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 1 | 1 | 0.000 | 0.000 | 0.106 | 0.106 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 3 | 1 | 2 | 6 | 0.752 | 0.172 | 1.238 | 2.162 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 3 | 1 | 3 | 7 | 0.752 | 0.172 | 1.344 | 2.268 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 58 | 14 | 175 | 247 | 21.558 | 2.864 | 42.390 | 66.812 |
| OPERATIONS PERSONNEL | 10 | 0 | 7 | 17 | 1.727 | 0.000 | 1.298 | 3.025 |
| HEALTH PHYSICS PERSONNEL | 15 | 0 | 42 | 57 | 4.448 | 0.000 | 9.943 | 14.391 |
| SUPERVISORY PERSONNEL | 0 | 0 | 3 | 3 | 0.000 | 0.000 | 0.592 | 0.592 |
| ENGINEERING PERSONNEL | 4 | 1 | 13 | 18 | 0.752 | 0.242 | 3.012 | 4.006 |
| TOTAL | 87 | 15 | 240 | 342 | 28.485 | 3.106 | 57.235 | 88.826 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 112 (97) | 35 (34) | 395 (401) | 542 (532) | 35.562 | 7.887 | 113.653 | 157.102 |
| OPERATIONS PERSONNEL | 33 (42) | 0 (1) | 20 (20) | 53 (63) | 4.942 | 0.000 | 3.867 | 8.809 |
| HEALTH PHYSICS PERSONNEL | 95 (69) | 3 (2) | 119 (102) | 217 (173) | 23.113 | 0.595 | 30.188 | 53.896 |
| SUPERVISORY PERSONNEL | 1 (1) | 0 (0) | 4 (4) | 5 (5) | 0.106 | 0.000 | 1.107 | 1.213 |
| ENGINEERING PERSONNEL | 7 (9) | 4 (5) | 29 (31) | 40 (45) | 1.245 | 0.640 | 8.841 | 10.726 |
| GRAND TOTALS | 248 (218) | 42 (42) | 567 (558) | 857 (818) | 64.968 | 9.122 | 157.656 | 231.746 |

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

APPENDIX D (Continued)

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

1990

PLANT: *DRESDEN 2,3 TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 38 | 41 | 39 | 118 | 29.600 | 1.522 | 15.792 | 46.914 |
| OPERATIONS PERSONNEL | 132 | 0 | 118 | 250 | 64.525 | 0.000 | 14.936 | 79.461 |
| HEALTH PHYSICS PERSONNEL | 8 | 0 | 10 | 18 | 10.990 | 0.000 | 2.283 | 13.273 |
| SUPERVISORY PERSONNEL | 54 | 32 | 0 | 86 | 18.012 | 0.351 | 0.000 | 18.363 |
| ENGINEERING PERSONNEL | 33 | 45 | 18 | 96 | 8.262 | 1.538 | 7.926 | 17.726 |
| TOTAL | 265 | 118 | 185 | 568 | 131.389 | 3.411 | 40.937 | 175.737 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 329 | 77 | 620 | 1026 | 257.229 | 2.890 | 252.811 | 512.930 |
| OPERATIONS PERSONNEL | 69 | 0 | 48 | 117 | 33.632 | 0.000 | 6.086 | 39.718 |
| HEALTH PHYSICS PERSONNEL | 40 | 0 | 21 | 61 | 54.110 | 0.000 | 5.052 | 59.162 |
| SUPERVISORY PERSONNEL | 205 | 55 | 0 | 260 | 67.673 | 0.609 | 0.000 | 68.282 |
| ENGINEERING PERSONNEL | 80 | 168 | 67 | 315 | 20.339 | 5.698 | 29.349 | 55.386 |
| TOTAL | 723 | 300 | 756 | 1779 | 432.983 | 9.197 | 293.298 | 735.478 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 465 | 465 | 0.088 | 0.000 | 189.305 | 189.393 |
| OPERATIONS PERSONNEL | 1 | 0 | 3 | 4 | 0.339 | 0.000 | 0.356 | 0.695 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 4 | 4 | 0.379 | 0.000 | 0.972 | 1.351 |
| SUPERVISORY PERSONNEL | 1 | 7 | 0 | 8 | 0.459 | 0.074 | 0.000 | 0.533 |
| ENGINEERING PERSONNEL | 2 | 56 | 312 | 370 | 0.415 | 1.905 | 136.289 | 138.609 |
| TOTAL | 4 | 63 | 784 | 851 | 1.680 | 1.979 | 326.922 | 330.581 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 46 | 186 | 232 | 0.139 | 1.726 | 75.925 | 77.790 |
| OPERATIONS PERSONNEL | 0 | 0 | 5 | 5 | 0.088 | 0.000 | 0.614 | 0.702 |
| HEALTH PHYSICS PERSONNEL | 3 | 0 | 7 | 10 | 3.370 | 0.000 | 1.593 | 4.963 |
| SUPERVISORY PERSONNEL | 1 | 0 | 0 | 1 | 0.204 | 0.000 | 0.000 | 0.204 |
| ENGINEERING PERSONNEL | 0 | 6 | 0 | 6 | 0.014 | 0.189 | 0.172 | 0.375 |
| TOTAL | 4 | 52 | 198 | 254 | 3.815 | 1.915 | 78.304 | 84.034 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 1 | 1 | 20 | 22 | 0.297 | 0.012 | 7.953 | 8.262 |
| OPERATIONS PERSONNEL | 3 | 0 | 36 | 39 | 1.595 | 0.000 | 4.611 | 6.206 |
| HEALTH PHYSICS PERSONNEL | 2 | 0 | 0 | 2 | 3.105 | 0.000 | 0.000 | 3.105 |
| SUPERVISORY PERSONNEL | 4 | 0 | 0 | 4 | 1.264 | 0.000 | 0.000 | 1.264 |
| ENGINEERING PERSONNEL | 0 | 1 | 0 | 1 | 0.000 | 0.027 | 0.031 | 0.058 |
| TOTAL | 10 | 2 | 56 | 68 | 6.261 | 0.039 | 12.595 | 18.895 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 36 | 0 | 0 | 36 | 28.243 | 0.000 | 0.154 | 28.397 |
| OPERATIONS PERSONNEL | 36 | 0 | 0 | 36 | 17.864 | 0.000 | 0.032 | 17.896 |
| HEALTH PHYSICS PERSONNEL | 2 | 1 | 0 | 3 | 2.963 | 0.000 | 0.000 | 2.963 |
| SUPERVISORY PERSONNEL | 16 | 1 | 0 | 17 | 5.342 | 0.014 | 0.000 | 5.356 |
| ENGINEERING PERSONNEL | 1 | 1 | 1 | 3 | 0.188 | 0.044 | 0.073 | 0.305 |
| TOTAL | 91 | 3 | 1 | 95 | 54.600 | 0.058 | 0.259 | 54.917 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 404 | 165 | 1330 | 1899 | 315.596 | 6.150 | 541.940 | 863.686 |
| OPERATIONS PERSONNEL | 241 | 0 | 210 | 451 | 118.043 | 0.000 | 26.635 | 144.678 |
| HEALTH PHYSICS PERSONNEL | 55 | 1 | 42 | 98 | 74.917 | 0.000 | 9.900 | 84.817 |
| SUPERVISORY PERSONNEL | 281 | 95 | 0 | 376 | 92.954 | 1.048 | 0.000 | 94.002 |
| ENGINEERING PERSONNEL | 116 | 277 | 398 | 791 | 29.218 | 9.401 | 173.840 | 212.459 |
| GRAND TOTALS | 1097 | 538 | 1980 | 3615 | 630.728 | 16.599 | 752.315 | 1399.642 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *DUANE ARNOLD

TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) STATION | UTILITY | CONTRACT | TOTAL | TOTAL PERSON-REM STATION | UTILITY | CONTRACT | TOTAL |
|---|---|---|---|---|---|---|---|---|
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 12 | 18 | 61 | 91 | 7.369 | 13.475 | 58.399 | 79.243 |
| OPERATIONS PERSONNEL | 29 | 0 | 1 | 30 | 26.819 | 0.000 | 0.225 | 27.044 |
| HEALTH PHYSICS PERSONNEL | 7 | 0 | 12 | 19 | 4.520 | 0.000 | 5.159 | 9.679 |
| SUPERVISORY PERSONNEL | 3 | 0 | 1 | 4 | 0.773 | 0.000 | 0.171 | 0.944 |
| ENGINEERING PERSONNEL | 7 | 2 | 6 | 15 | 2.732 | 0.885 | 2.911 | 6.528 |
| TOTAL | 58 | 20 | 81 | 159 | 42.213 | 14.360 | 66.865 | 123.438 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 96 | 5 | 237 | 338 | 93.708 | 3.669 | 223.134 | 320.511 |
| OPERATIONS PERSONNEL | 3 | 0 | 0 | 3 | 2.008 | 0.000 | 0.192 | 2.200 |
| HEALTH PHYSICS PERSONNEL | 8 | 0 | 40 | 48 | 6.086 | 0.000 | 34.833 | 40.919 |
| SUPERVISORY PERSONNEL | 6 | 0 | 4 | 10 | 2.658 | 0.201 | 1.189 | 4.048 |
| ENGINEERING PERSONNEL | 15 | 1 | 16 | 32 | 6.764 | 0.531 | 13.022 | 20.317 |
| TOTAL | 128 | 6 | 297 | 431 | 111.224 | 4.401 | 272.370 | 387.995 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 2 | 2 | 29 | 33 | 2.128 | 1.450 | 26.604 | 30.182 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.143 | 0.000 | 0.000 | 0.143 |
| HEALTH PHYSICS PERSONNEL | 2 | 0 | 2 | 4 | 1.820 | 0.000 | 1.167 | 2.987 |
| SUPERVISORY PERSONNEL | 0 | 0 | 2 | 2 | 0.024 | 0.000 | 1.200 | 1.224 |
| ENGINEERING PERSONNEL | 2 | 0 | 3 | 5 | 1.599 | 0.000 | 2.071 | 3.670 |
| TOTAL | 6 | 2 | 36 | 44 | 5.714 | 1.450 | 31.042 | 38.206 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 9 | 7 | 235 | 251 | 7.773 | 5.666 | 203.421 | 216.860 |
| OPERATIONS PERSONNEL | 1 | 0 | 0 | 1 | 0.284 | 0.000 | 0.182 | 0.466 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 9 | 10 | 0.748 | 0.000 | 5.027 | 5.775 |
| SUPERVISORY PERSONNEL | 2 | 1 | 4 | 7 | 0.690 | 0.425 | 3.412 | 4.527 |
| ENGINEERING PERSONNEL | 5 | 1 | 13 | 19 | 1.835 | 0.196 | 10.956 | 12.987 |
| TOTAL | 18 | 9 | 261 | 288 | 11.330 | 6.287 | 222.998 | 240.615 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 8 | 0 | 2 | 10 | 4.664 | 0.044 | 6.476 | 11.184 |
| OPERATIONS PERSONNEL | 3 | 0 | 2 | 5 | 1.777 | 0.000 | 2.295 | 4.072 |
| HEALTH PHYSICS PERSONNEL | 3 | 0 | 1 | 4 | 3.347 | 0.000 | 1.097 | 4.444 |
| SUPERVISORY PERSONNEL | 0 | 0 | 1 | 1 | 0.067 | 0.005 | 2.521 | 2.593 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.170 | 0.000 | 0.040 | 0.210 |
| TOTAL | 14 | 0 | 6 | 20 | 10.025 | 0.049 | 12.429 | 22.503 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 5 | 0 | 23 | 28 | 3.426 | 0.056 | 21.940 | 25.422 |
| OPERATIONS PERSONNEL | 2 | 0 | 0 | 2 | 0.976 | 0.000 | 0.000 | 0.976 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 4 | 5 | 0.839 | 0.000 | 2.322 | 3.161 |
| SUPERVISORY PERSONNEL | 0 | 0 | 1 | 1 | 0.091 | 0.000 | 0.294 | 0.385 |
| ENGINEERING PERSONNEL | 2 | 0 | 5 | 7 | 0.570 | 0.000 | 2.932 | 3.502 |
| TOTAL | 10 | 0 | 33 | 43 | 5.902 | 0.056 | 27.488 | 33.446 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 132 (132) | 32 (32) | 587 (587) | 751 (751) | 119.068 | 24.360 | 539.974 | 683.402 |
| OPERATIONS PERSONNEL | 38 (40) | 0 (0) | 3 (3) | 41 (43) | 32.007 | 0.000 | 2.894 | 34.901 |
| HEALTH PHYSICS PERSONNEL | 22 (22) | 0 (0) | 68 (69) | 90 (91) | 17.360 | 0.000 | 49.605 | 66.965 |
| SUPERVISORY PERSONNEL | 11 (11) | 1 (1) | 13 (12) | 25 (24) | 4.303 | 0.631 | 8.787 | 13.721 |
| ENGINEERING PERSONNEL | 31 (30) | 4 (4) | 43 (45) | 78 (79) | 13.670 | 1.612 | 31.932 | 47.214 |
| GRAND TOTALS | 234 (235) | 37 (37) | 714 (716) | 985 (988) | 186.408 | 26.603 | 633.192 | 846.203 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *FARLEY 1,2 TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 36 | 1 | 55 | 92 | 0.625 | 0.008 | 2.576 | 3.209 |
| OPERATIONS PERSONNEL | 141 | 0 | 2 | 143 | 15.431 | 0.000 | 0.114 | 15.545 |
| HEALTH PHYSICS PERSONNEL | 56 | 0 | 95 | 151 | 8.487 | 0.000 | 14.785 | 23.272 |
| SUPERVISORY PERSONNEL | 28 | 8 | 7 | 43 | 1.037 | 0.173 | 0.139 | 1.349 |
| ENGINEERING PERSONNEL | 34 | 5 | 53 | 92 | 0.673 | 0.115 | 2.858 | 3.646 |
| TOTAL | 295 | 14 | 212 | 521 | 26.253 | 0.296 | 20.472 | 47.021 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 174 | 22 | 208 | 404 | 10.750 | 0.602 | 14.866 | 26.218 |
| OPERATIONS PERSONNEL | 40 | 0 | 4 | 44 | 3.645 | 0.000 | 0.089 | 3.734 |
| HEALTH PHYSICS PERSONNEL | 55 | 0 | 77 | 132 | 9.137 | 0.000 | 3.339 | 12.476 |
| SUPERVISORY PERSONNEL | 5 | 3 | 1 | 9 | 0.185 | 0.053 | 0.010 | 0.248 |
| ENGINEERING PERSONNEL | 20 | 1 | 26 | 47 | 0.488 | 0.001 | 1.090 | 1.579 |
| TOTAL | 294 | 26 | 316 | 636 | 24.205 | 0.656 | 19.394 | 44.255 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 4 | 2 | 68 | 74 | 0.020 | 0.062 | 4.231 | 4.313 |
| OPERATIONS PERSONNEL | 2 | 0 | 4 | 6 | 0.005 | 0.000 | 0.087 | 0.092 |
| HEALTH PHYSICS PERSONNEL | 6 | 0 | 12 | 18 | 0.245 | 0.000 | 0.188 | 0.433 |
| SUPERVISORY PERSONNEL | 2 | 1 | 2 | 5 | 0.017 | 0.008 | 0.030 | 0.055 |
| ENGINEERING PERSONNEL | 10 | 3 | 20 | 33 | 0.371 | 0.021 | 2.928 | 3.320 |
| TOTAL | 24 | 6 | 106 | 136 | 0.658 | 0.091 | 7.464 | 8.213 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 173 | 19 | 718 | 910 | 30.163 | 0.721 | 267.397 | 298.281 |
| OPERATIONS PERSONNEL | 48 | 0 | 7 | 55 | 2.456 | 0.000 | 1.055 | 3.511 |
| HEALTH PHYSICS PERSONNEL | 69 | 0 | 91 | 160 | 11.403 | 0.000 | 16.913 | 28.316 |
| SUPERVISORY PERSONNEL | 10 | 6 | 3 | 19 | 0.280 | 1.096 | 0.221 | 1.597 |
| ENGINEERING PERSONNEL | 20 | 7 | 47 | 74 | 0.895 | 0.162 | 2.392 | 3.449 |
| TOTAL | 320 | 32 | 866 | 1218 | 45.197 | 1.979 | 287.978 | 335.154 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 29 | 2 | 15 | 46 | 0.769 | 0.012 | 0.173 | 0.954 |
| OPERATIONS PERSONNEL | 15 | 0 | 1 | 16 | 0.401 | 0.000 | 0.005 | 0.406 |
| HEALTH PHYSICS PERSONNEL | 54 | 0 | 22 | 76 | 6.853 | 0.000 | 1.826 | 8.679 |
| SUPERVISORY PERSONNEL | 1 | 0 | 0 | 1 | 0.293 | 0.000 | 0.000 | 0.293 |
| ENGINEERING PERSONNEL | 2 | 0 | 2 | 4 | 0.003 | 0.000 | 0.015 | 0.018 |
| TOTAL | 101 | 2 | 40 | 143 | 8.319 | 0.012 | 2.019 | 10.350 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 48 | 3 | 14 | 65 | 6.415 | 0.074 | 0.955 | 7.444 |
| OPERATIONS PERSONNEL | 14 | 0 | 16 | 30 | 0.582 | 0.000 | 2.410 | 2.992 |
| HEALTH PHYSICS PERSONNEL | 8 | 0 | 12 | 20 | 0.249 | 0.000 | 0.320 | 0.569 |
| SUPERVISORY PERSONNEL | 4 | 0 | 3 | 7 | 0.040 | 0.000 | 0.090 | 0.130 |
| ENGINEERING PERSONNEL | 7 | 1 | 8 | 16 | 0.171 | 0.002 | 0.749 | 0.922 |
| TOTAL | 81 | 4 | 53 | 138 | 7.457 | 0.076 | 4.524 | 12.057 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 464 | 49 | 1078 | 1591 | 48.742 | 1.479 | 290.198 | 340.419 |
| OPERATIONS PERSONNEL | 260 | 0 | 34 | 294 | 22.520 | 0.000 | 3.760 | 26.280 |
| HEALTH PHYSICS PERSONNEL | 248 | 0 | 309 | 557 | 36.374 | 0.000 | 37.371 | 73.745 |
| SUPERVISORY PERSONNEL | 50 | 18 | 16 | 84 | 1.852 | 1.330 | 0.490 | 3.672 |
| ENGINEERING PERSONNEL | 93 | 17 | 156 | 266 | 2.601 | 0.301 | 10.032 | 12.934 |
| GRAND TOTALS | 1115 | 84 | 1593 | 2792 | 112.089 | 3.110 | 341.851 | 457.050 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *FERMI 2

TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 7 | 0 | 0 | 7 | 2.551 | 0.002 | 0.164 | 2.717 |
| OPERATIONS PERSONNEL | 46 | 0 | 0 | 46 | 12.575 | 0.000 | 0.257 | 12.832 |
| HEALTH PHYSICS PERSONNEL | 25 | 0 | 17 | 42 | 7.353 | 0.000 | 3.431 | 10.784 |
| SUPERVISORY PERSONNEL | 4 | 0 | 0 | 4 | 1.263 | 0.013 | 0.523 | 1.799 |
| ENGINEERING PERSONNEL | 9 | 0 | 0 | 9 | 2.355 | 0.192 | 0.458 | 3.005 |
| TOTAL | 91 | 0 | 17 | 108 | 26.097 | 0.207 | 4.833 | 31.137 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 10 | 0 | 0 | 10 | 4.835 | 0.000 | 0.698 | 5.533 |
| OPERATIONS PERSONNEL | 2 | 0 | 0 | 2 | 0.392 | 0.000 | 0.000 | 0.392 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.022 | 0.000 | 0.042 | 0.064 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.064 | 0.000 | 0.000 | 0.064 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.161 | 0.003 | 0.005 | 0.169 |
| TOTAL | 12 | 0 | 0 | 12 | 5.474 | 0.003 | 0.745 | 6.222 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 1 | 1 | 0.117 | 0.000 | 0.139 | 0.256 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.009 | 0.000 | 0.000 | 0.009 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.119 | 0.000 | 0.000 | 0.119 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.009 | 0.000 | 0.000 | 0.009 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.017 | 0.000 | 0.005 | 0.022 |
| TOTAL | 0 | 0 | 1 | 1 | 0.271 | 0.000 | 0.144 | 0.415 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 69 | 0 | 15 | 84 | 28.309 | 0.017 | 5.337 | 33.663 |
| OPERATIONS PERSONNEL | 6 | 0 | 6 | 12 | 2.205 | 0.000 | 1.138 | 3.343 |
| HEALTH PHYSICS PERSONNEL | 15 | 0 | 0 | 15 | 3.172 | 0.000 | 0.359 | 3.531 |
| SUPERVISORY PERSONNEL | 3 | 0 | 0 | 3 | 1.045 | 0.000 | 0.018 | 1.063 |
| ENGINEERING PERSONNEL | 4 | 0 | 0 | 4 | 1.429 | 0.136 | 0.000 | 1.565 |
| TOTAL | 97 | 0 | 21 | 118 | 36.160 | 0.153 | 6.852 | 43.165 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.009 | 0.009 |
| OPERATIONS PERSONNEL | 0 | 0 | 1 | 1 | 0.035 | 0.000 | 0.460 | 0.495 |
| HEALTH PHYSICS PERSONNEL | 3 | 0 | 3 | 6 | 0.888 | 0.000 | 0.959 | 1.847 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.070 | 0.000 | 0.000 | 0.070 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.042 | 0.000 | 0.000 | 0.042 |
| TOTAL | 3 | 0 | 4 | 7 | 1.035 | 0.000 | 1.428 | 2.463 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.042 | 0.000 | 0.003 | 0.045 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.001 | 0.000 | 0.000 | 0.001 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.009 | 0.009 |
| TOTAL | 0 | 0 | 0 | 0 | 0.043 | 0.000 | 0.012 | 0.055 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 86 | 0 | 16 | 102 | 35.812 | 0.019 | 6.347 | 42.178 |
| OPERATIONS PERSONNEL | 54 | 0 | 7 | 61 | 15.216 | 0.000 | 1.855 | 17.071 |
| HEALTH PHYSICS PERSONNEL | 43 | 0 | 20 | 63 | 11.596 | 0.000 | 4.794 | 16.390 |
| SUPERVISORY PERSONNEL | 7 | 0 | 0 | 7 | 2.452 | 0.013 | 0.541 | 3.006 |
| ENGINEERING PERSONNEL | 13 | 0 | 0 | 13 | 4.004 | 0.331 | 0.477 | 4.812 |
| GRAND TOTALS | 203 | 0 | 43 | 246 | 69.080 | 0.363 | 14.014 | 83.457 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *FITZPATRICK

TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 85 | 28 | 27 | 140 | 11.813 | 0.426 | 0.255 | 12.494 |
| OPERATIONS PERSONNEL | 118 | 7 | 2 | 127 | 49.396 | 0.161 | 0.035 | 49.592 |
| HEALTH PHYSICS PERSONNEL | 49 | 8 | 60 | 117 | 11.032 | 0.008 | 12.109 | 23.149 |
| SUPERVISORY PERSONNEL | 22 | 8 | 21 | 51 | 0.562 | 0.349 | 0.384 | 1.295 |
| ENGINEERING PERSONNEL | 11 | 8 | 13 | 32 | 1.858 | 0.173 | 1.161 | 3.192 |
| TOTAL | 285 | 59 | 123 | 467 | 74.661 | 1.117 | 13.944 | 89.722 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 128 | 55 | 453 | 636 | 83.918 | 0.738 | 79.532 | 164.188 |
| OPERATIONS PERSONNEL | 58 | 8 | 19 | 85 | 4.901 | 0.000 | 0.889 | 5.790 |
| HEALTH PHYSICS PERSONNEL | 46 | 8 | 83 | 137 | 22.874 | 0.000 | 20.405 | 43.279 |
| SUPERVISORY PERSONNEL | 31 | 9 | 57 | 97 | 1.496 | 0.111 | 5.654 | 7.261 |
| ENGINEERING PERSONNEL | 24 | 13 | 42 | 79 | 1.766 | 0.160 | 2.412 | 4.338 |
| TOTAL | 287 | 93 | 654 | 1034 | 114.955 | 1.009 | 108.892 | 224.856 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 68 | 11 | 300 | 379 | 6.545 | 0.152 | 57.398 | 64.095 |
| OPERATIONS PERSONNEL | 30 | 2 | 15 | 47 | 2.623 | 0.000 | 2.520 | 5.143 |
| HEALTH PHYSICS PERSONNEL | 32 | 6 | 52 | 90 | 2.517 | 0.000 | 3.468 | 5.985 |
| SUPERVISORY PERSONNEL | 18 | 6 | 70 | 94 | 0.377 | 0.335 | 18.922 | 19.634 |
| ENGINEERING PERSONNEL | 18 | 17 | 34 | 69 | 2.207 | 0.636 | 1.943 | 4.786 |
| TOTAL | 166 | 42 | 471 | 679 | 14.269 | 1.123 | 84.251 | 99.643 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 121 | 37 | 503 | 661 | 39.641 | 0.584 | 272.423 | 312.648 |
| OPERATIONS PERSONNEL | 43 | 4 | 17 | 64 | 2.019 | 0.000 | 0.757 | 2.776 |
| HEALTH PHYSICS PERSONNEL | 37 | 7 | 65 | 109 | 7.992 | 0.000 | 10.475 | 18.467 |
| SUPERVISORY PERSONNEL | 25 | 9 | 75 | 109 | 1.128 | 0.247 | 19.639 | 21.014 |
| ENGINEERING PERSONNEL | 29 | 13 | 43 | 85 | 3.967 | 0.586 | 3.865 | 8.418 |
| TOTAL | 255 | 70 | 703 | 1028 | 54.747 | 1.417 | 307.159 | 363.323 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 85 | 68 | 212 | 365 | 23.781 | 0.022 | 12.053 | 35.856 |
| OPERATIONS PERSONNEL | 19 | 7 | 12 | 38 | 7.387 | 0.000 | 2.180 | 9.567 |
| HEALTH PHYSICS PERSONNEL | 28 | 8 | 41 | 77 | 2.971 | 0.000 | 1.348 | 4.319 |
| SUPERVISORY PERSONNEL | 9 | 6 | 19 | 34 | 0.147 | 0.107 | 0.161 | 0.415 |
| ENGINEERING PERSONNEL | 6 | 1 | 5 | 12 | 0.062 | 0.000 | 0.059 | 0.121 |
| TOTAL | 147 | 90 | 289 | 526 | 34.348 | 0.129 | 15.801 | 50.278 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 79 | 19 | 91 | 189 | 11.393 | 0.068 | 6.321 | 17.782 |
| OPERATIONS PERSONNEL | 50 | 5 | 16 | 71 | 3.793 | 0.029 | 2.284 | 6.106 |
| HEALTH PHYSICS PERSONNEL | 28 | 6 | 27 | 61 | 5.181 | 0.000 | 2.850 | 8.031 |
| SUPERVISORY PERSONNEL | 13 | 4 | 26 | 43 | 0.140 | 0.031 | 0.432 | 0.603 |
| ENGINEERING PERSONNEL | 2 | 11 | 4 | 17 | 0.020 | 0.205 | 0.032 | 0.257 |
| TOTAL | 172 | 45 | 164 | 381 | 20.527 | 0.333 | 11.919 | 32.779 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 566 | 218 | 1586 | 2370 | 177.091 | 1.990 | 427.982 | 607.063 |
| OPERATIONS PERSONNEL | 318 | 33 | 81 | 432 | 70.119 | 0.190 | 8.665 | 78.974 |
| HEALTH PHYSICS PERSONNEL | 220 | 43 | 328 | 591 | 52.567 | 0.008 | 50.655 | 103.230 |
| SUPERVISORY PERSONNEL | 118 | 42 | 268 | 428 | 3.850 | 1.180 | 45.192 | 50.222 |
| ENGINEERING PERSONNEL | 90 | 63 | 141 | 294 | 9.880 | 1.760 | 9.472 | 21.112 |
| GRAND TOTALS | 1312 | 399 | 2404 | 4115 | 313.507 | 5.128 | 541.966 | 860.601 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *FORT CALHOUN

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 2 | 0 | 2 | 4 | 1.040 | 0.215 | 0.660 | 1.915 |
| OPERATIONS PERSONNEL | 25 | 0 | 2 | 27 | 8.944 | 0.000 | 0.305 | 9.249 |
| HEALTH PHYSICS PERSONNEL | 10 | 0 | 12 | 22 | 11.545 | 0.000 | 6.954 | 18.499 |
| SUPERVISORY PERSONNEL | 3 | 0 | 0 | 3 | 1.145 | 0.000 | 0.000 | 1.145 |
| ENGINEERING PERSONNEL | 3 | 0 | 1 | 4 | 1.380 | 0.010 | 0.360 | 1.750 |
| TOTAL | 43 | 0 | 17 | 60 | 24.054 | 0.225 | 8.279 | 32.558 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 28 | 15 | 52 | 95 | 14.858 | 9.010 | 32.467 | 56.335 |
| OPERATIONS PERSONNEL | 1 | 0 | 1 | 2 | 0.235 | 0.000 | 0.440 | 0.675 |
| HEALTH PHYSICS PERSONNEL | 6 | 0 | 26 | 32 | 6.210 | 0.000 | 20.063 | 26.273 |
| SUPERVISORY PERSONNEL | 3 | 0 | 0 | 3 | 0.490 | 0.000 | 0.000 | 0.490 |
| ENGINEERING PERSONNEL | 8 | 0 | 6 | 14 | 2.250 | 0.010 | 4.210 | 6.470 |
| TOTAL | 46 | 15 | 85 | 146 | 24.043 | 9.020 | 57.180 | 90.243 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 6 | 4 | 33 | 43 | 3.421 | 2.000 | 36.467 | 41.888 |
| OPERATIONS PERSONNEL | 2 | 0 | 0 | 2 | 0.275 | 0.000 | 0.060 | 0.335 |
| HEALTH PHYSICS PERSONNEL | 2 | 0 | 4 | 6 | 3.485 | 0.000 | 4.205 | 7.690 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.030 | 0.000 | 0.000 | 0.030 |
| ENGINEERING PERSONNEL | 2 | 0 | 10 | 12 | 0.710 | 0.010 | 9.572 | 10.292 |
| TOTAL | 12 | 4 | 47 | 63 | 7.921 | 2.010 | 50.304 | 60.235 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 22 | 8 | 44 | 74 | 17.240 | 5.370 | 28.412 | 51.022 |
| OPERATIONS PERSONNEL | 3 | 0 | 0 | 3 | 1.079 | 0.000 | 0.070 | 1.149 |
| HEALTH PHYSICS PERSONNEL | 6 | 0 | 5 | 11 | 6.860 | 0.000 | 4.380 | 11.240 |
| SUPERVISORY PERSONNEL | 3 | 0 | 0 | 3 | 0.855 | 0.000 | 0.000 | 0.855 |
| ENGINEERING PERSONNEL | 4 | 0 | 10 | 14 | 2.195 | 0.080 | 7.440 | 9.715 |
| TOTAL | 38 | 8 | 59 | 105 | 28.229 | 5.450 | 40.302 | 73.981 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 1 | 0 | 1 | 0.080 | 0.005 | 0.015 | 0.100 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.170 | 0.000 | 0.000 | 0.170 |
| HEALTH PHYSICS PERSONNEL | 5 | 0 | 6 | 11 | 3.655 | 0.000 | 4.220 | 7.875 |
| SUPERVISORY PERSONNEL | 1 | 0 | 0 | 1 | 0.175 | 0.000 | 0.000 | 0.175 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.005 | 0.000 | 0.000 | 0.005 |
| TOTAL | 6 | 1 | 6 | 13 | 4.085 | 0.005 | 4.235 | 8.325 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 15 | 17 | 14 | 46 | 12.598 | 16.906 | 8.445 | 37.949 |
| OPERATIONS PERSONNEL | 5 | 0 | 1 | 6 | 0.930 | 0.000 | 0.460 | 1.390 |
| HEALTH PHYSICS PERSONNEL | 2 | 0 | 3 | 5 | 2.455 | 0.000 | 2.900 | 5.355 |
| SUPERVISORY PERSONNEL | 2 | 0 | 0 | 2 | 0.365 | 0.000 | 0.000 | 0.365 |
| ENGINEERING PERSONNEL | 3 | 0 | 1 | 4 | 1.165 | 0.000 | 0.135 | 1.300 |
| TOTAL | 27 | 17 | 19 | 63 | 17.513 | 16.906 | 11.940 | 46.359 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 73 | 45 | 145 | 263 | 49.237 | 33.506 | 106.466 | 189.209 |
| OPERATIONS PERSONNEL | 36 | 0 | 4 | 40 | 11.633 | 0.000 | 1.335 | 12.968 |
| HEALTH PHYSICS PERSONNEL | 31 | 0 | 56 | 87 | 34.210 | 0.000 | 42.722 | 76.932 |
| SUPERVISORY PERSONNEL | 12 | 0 | 0 | 12 | 3.060 | 0.000 | 0.000 | 3.060 |
| ENGINEERING PERSONNEL | 20 | 0 | 28 | 48 | 7.705 | 0.110 | 21.717 | 29.532 |
| GRAND TOTALS | 172 | 45 | 233 | 450 | 105.845 | 33.616 | 172.240 | 311.701 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *FORT ST. VRAIN

TYPE: HTGR

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

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *GINNA

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) STATION | UTILITY | CONTRACT | TOTAL | TOTAL PERSON-REM STATION | UTILITY | CONTRACT | TOTAL |
|---|---|---|---|---|---|---|---|---|
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 36 | 84 | 205 | 325 | 1.641 | 0.401 | 1.261 | 3.303 |
| OPERATIONS PERSONNEL | 30 | 0 | 2 | 32 | 6.990 | 0.000 | 0.822 | 7.812 |
| HEALTH PHYSICS PERSONNEL | 14 | 4 | 53 | 71 | 2.669 | 0.265 | 16.935 | 19.869 |
| SUPERVISORY PERSONNEL | 16 | 9 | 35 | 60 | 2.462 | 1.000 | 1.901 | 5.363 |
| ENGINEERING PERSONNEL | 0 | 2 | 9 | 11 | 0.000 | 0.000 | 0.223 | 0.223 |
| TOTAL | 96 | 99 | 304 | 499 | 13.762 | 1.666 | 21.142 | 36.570 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 37 | 158 | 264 | 459 | 4.340 | 12.416 | 48.354 | 65.110 |
| OPERATIONS PERSONNEL | 21 | 0 | 2 | 23 | 1.074 | 0.000 | 0.000 | 1.074 |
| HEALTH PHYSICS PERSONNEL | 14 | 4 | 50 | 68 | 5.046 | 0.186 | 10.180 | 15.412 |
| SUPERVISORY PERSONNEL | 16 | 7 | 30 | 53 | 0.549 | 0.654 | 4.769 | 5.972 |
| ENGINEERING PERSONNEL | 0 | 2 | 8 | 10 | 0.000 | 0.197 | 1.170 | 1.367 |
| TOTAL | 88 | 171 | 354 | 613 | 11.009 | 13.453 | 64.473 | 88.935 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 20 | 28 | 48 | 96 | 0.176 | 0.803 | 1.007 | 1.986 |
| OPERATIONS PERSONNEL | 1 | 0 | 0 | 1 | 0.063 | 0.000 | 0.000 | 0.063 |
| HEALTH PHYSICS PERSONNEL | 2 | 0 | 9 | 11 | 0.181 | 0.000 | 0.064 | 0.245 |
| SUPERVISORY PERSONNEL | 8 | 6 | 14 | 28 | 0.318 | 0.127 | 0.710 | 1.155 |
| ENGINEERING PERSONNEL | 0 | 0 | 4 | 4 | 0.000 | 0.000 | 0.202 | 0.202 |
| TOTAL | 31 | 34 | 75 | 140 | 0.738 | 0.930 | 1.983 | 3.651 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 39 | 158 | 285 | 482 | 7.026 | 69.228 | 80.819 | 157.073 |
| OPERATIONS PERSONNEL | 22 | 0 | 2 | 24 | 1.519 | 0.000 | 0.017 | 1.536 |
| HEALTH PHYSICS PERSONNEL | 10 | 3 | 43 | 56 | 1.288 | 0.011 | 3.127 | 4.426 |
| SUPERVISORY PERSONNEL | 16 | 9 | 42 | 67 | 2.263 | 3.547 | 7.787 | 13.597 |
| ENGINEERING PERSONNEL | 0 | 2 | 9 | 11 | 0.000 | 0.108 | 1.120 | 1.228 |
| TOTAL | 87 | 172 | 381 | 640 | 12.096 | 72.894 | 92.870 | 177.860 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 6 | 9 | 28 | 43 | 0.035 | 0.011 | 1.131 | 1.177 |
| OPERATIONS PERSONNEL | 3 | 0 | 2 | 5 | 0.035 | 0.000 | 0.020 | 0.055 |
| HEALTH PHYSICS PERSONNEL | 3 | 2 | 15 | 20 | 1.244 | 0.098 | 1.806 | 3.148 |
| SUPERVISORY PERSONNEL | 3 | 2 | 2 | 7 | 0.117 | 0.003 | 0.006 | 0.126 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 15 | 13 | 47 | 75 | 1.431 | 0.112 | 2.963 | 4.506 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 13 | 23 | 83 | 119 | 1.477 | 1.123 | 13.181 | 15.781 |
| OPERATIONS PERSONNEL | 13 | 0 | 1 | 14 | 2.267 | 0.000 | 0.003 | 2.270 |
| HEALTH PHYSICS PERSONNEL | 4 | 1 | 11 | 16 | 1.034 | 0.012 | 1.703 | 2.749 |
| SUPERVISORY PERSONNEL | 3 | 3 | 4 | 10 | 0.443 | 0.153 | 0.187 | 0.783 |
| ENGINEERING PERSONNEL | 0 | 0 | 2 | 2 | 0.000 | 0.000 | 0.216 | 0.216 |
| TOTAL | 33 | 27 | 101 | 161 | 5.221 | 1.288 | 15.290 | 21.799 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 151 (37) | 460 (161) | 913 (277) | 1524 (475) | 14.695 | 83.982 | 145.753 | 244.430 |
| OPERATIONS PERSONNEL | 90 (30) | 0 (0) | 9 (2) | 99 (32) | 11.948 | 0.000 | 0.862 | 12.810 |
| HEALTH PHYSICS PERSONNEL | 47 (14) | 14 (4) | 181 (55) | 242 (73) | 11.462 | 0.572 | 33.815 | 45.849 |
| SUPERVISORY PERSONNEL | 62 (16) | 36 (9) | 127 (37) | 225 (62) | 6.152 | 5.484 | 15.360 | 26.996 |
| ENGINEERING PERSONNEL | 0 (0) | 6 (2) | 32 (10) | 38 (12) | 0.000 | 0.305 | 2.931 | 3.236 |
| GRAND TOTALS | 350 (97) | 516 (176) | 1262 (381) | 2128 (654) | 44.257 | 90.343 | 198.721 | 333.321 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *GRAND GULF

TYPE: BWR

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

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *HADDAM NECK

TYPE: PWR

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

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *HARRIS

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 1 | 1 | 0.221 | 0.000 | 0.475 | 0.696 |
| OPERATIONS PERSONNEL | 14 | 0 | 1 | 15 | 4.954 | 0.000 | 1.067 | 6.021 |
| HEALTH PHYSICS PERSONNEL | 19 | 0 | 13 | 32 | 5.317 | 0.000 | 3.841 | 9.158 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.125 | 0.010 | 0.010 | 0.145 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.789 | 0.180 | 0.207 | 1.176 |
| TOTAL | 33 | 0 | 15 | 48 | 11.406 | 0.190 | 5.600 | 17.196 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 4 | 1 | 19 | 24 | 2.916 | 0.180 | 6.233 | 9.329 |
| OPERATIONS PERSONNEL | 0 | 0 | 1 | 1 | 0.005 | 0.000 | 0.230 | 0.235 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.194 | 0.000 | 0.296 | 0.490 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.182 | 0.005 | 0.084 | 0.271 |
| TOTAL | 4 | 1 | 20 | 25 | 3.297 | 0.185 | 6.843 | 10.325 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 2 | 0 | 0 | 2 | 0.694 | 0.000 | 0.431 | 1.125 |
| OPERATIONS PERSONNEL | 1 | 0 | 2 | 3 | 0.218 | 0.000 | 0.570 | 0.788 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 2 | 2 | 0.280 | 0.000 | 0.683 | 0.963 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.010 | 0.000 | 0.000 | 0.010 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.092 | 0.020 | 0.075 | 0.187 |
| TOTAL | 3 | 0 | 4 | 7 | 1.294 | 0.020 | 1.759 | 3.073 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 38 | 1 | 74 | 113 | 16.847 | 0.533 | 32.652 | 50.032 |
| OPERATIONS PERSONNEL | 5 | 0 | 2 | 7 | 2.661 | 0.000 | 0.500 | 3.161 |
| HEALTH PHYSICS PERSONNEL | 18 | 0 | 23 | 41 | 7.067 | 0.000 | 7.945 | 15.012 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.025 | 0.025 |
| ENGINEERING PERSONNEL | 8 | 1 | 13 | 22 | 3.568 | 0.145 | 3.710 | 7.423 |
| TOTAL | 69 | 2 | 112 | 183 | 30.143 | 0.678 | 44.832 | 75.653 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.485 | 0.000 | 0.175 | 0.660 |
| OPERATIONS PERSONNEL | 1 | 0 | 0 | 1 | 0.225 | 0.000 | 0.000 | 0.225 |
| HEALTH PHYSICS PERSONNEL | 4 | 0 | 2 | 6 | 1.291 | 0.000 | 0.541 | 1.832 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 1 | 1 | 0.010 | 0.000 | 0.135 | 0.145 |
| TOTAL | 5 | 0 | 3 | 8 | 2.011 | 0.000 | 0.851 | 2.862 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 44 | 2 | 94 | 140 | 21.163 | 0.713 | 39.966 | 61.842 |
| OPERATIONS PERSONNEL | 21 | 0 | 6 | 27 | 8.063 | 0.000 | 2.367 | 10.430 |
| HEALTH PHYSICS PERSONNEL | 41 | 0 | 40 | 81 | 14.149 | 0.000 | 13.306 | 27.455 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.135 | 0.010 | 0.035 | 0.180 |
| ENGINEERING PERSONNEL | 8 | 1 | 14 | 23 | 4.641 | 0.350 | 4.211 | 9.202 |
| GRAND TOTALS | 114 | 3 | 154 | 271 | 48.151 | 1.073 | 59.885 | 109.109 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *HATCH 1,2

TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 84 | 0 | 280 | 364 | 40.382 | 0.181 | 88.958 | 129.521 |
| OPERATIONS PERSONNEL | 57 | 0 | 1 | 58 | 25.235 | 0.069 | 0.220 | 25.524 |
| HEALTH PHYSICS PERSONNEL | 44 | 1 | 34 | 79 | 26.657 | 0.289 | 14.202 | 41.148 |
| SUPERVISORY PERSONNEL | 48 | 2 | 2 | 52 | 12.106 | 1.497 | 1.658 | 15.261 |
| ENGINEERING PERSONNEL | 16 | 2 | 15 | 33 | 6.223 | 0.833 | 5.497 | 12.553 |
| TOTAL | 249 | 5 | 332 | 586 | 110.603 | 2.869 | 110.535 | 224.007 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 122 | 1 | 437 | 560 | 47.815 | 0.628 | 162.741 | 211.184 |
| OPERATIONS PERSONNEL | 17 | 1 | 0 | 18 | 8.185 | 0.217 | 0.003 | 8.405 |
| HEALTH PHYSICS PERSONNEL | 39 | 0 | 66 | 105 | 26.299 | 0.072 | 28.274 | 54.645 |
| SUPERVISORY PERSONNEL | 14 | 2 | 5 | 21 | 5.142 | 0.964 | 1.769 | 7.875 |
| ENGINEERING PERSONNEL | 4 | 1 | 23 | 28 | 2.014 | 0.238 | 9.954 | 12.206 |
| TOTAL | 196 | 5 | 531 | 732 | 89.455 | 2.119 | 202.741 | 294.315 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 27 | 0 | 343 | 370 | 13.342 | 0.137 | 141.367 | 154.846 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.054 | 0.000 | 0.003 | 0.057 |
| HEALTH PHYSICS PERSONNEL | 8 | 0 | 16 | 24 | 7.942 | 0.021 | 7.447 | 15.410 |
| SUPERVISORY PERSONNEL | 4 | 0 | 1 | 5 | 1.781 | 0.063 | 0.687 | 2.531 |
| ENGINEERING PERSONNEL | 2 | 0 | 17 | 19 | 1.990 | 0.057 | 6.578 | 8.625 |
| TOTAL | 41 | 0 | 377 | 418 | 25.109 | 0.278 | 156.082 | 181.469 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 118 | 4 | 710 | 832 | 57.906 | 3.750 | 347.326 | 408.982 |
| OPERATIONS PERSONNEL | 51 | 0 | 0 | 51 | 22.102 | 0.076 | 0.031 | 22.209 |
| HEALTH PHYSICS PERSONNEL | 31 | 5 | 88 | 124 | 17.612 | 1.862 | 48.110 | 67.584 |
| SUPERVISORY PERSONNEL | 19 | 9 | 14 | 42 | 6.952 | 6.930 | 7.789 | 21.671 |
| ENGINEERING PERSONNEL | 19 | 3 | 61 | 83 | 7.174 | 1.453 | 28.910 | 37.537 |
| TOTAL | 238 | 21 | 873 | 1132 | 111.746 | 14.071 | 432.166 | 557.983 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 20 | 0 | 223 | 243 | 7.712 | 0.137 | 58.804 | 66.653 |
| OPERATIONS PERSONNEL | 1 | 0 | 0 | 1 | 0.197 | 0.000 | 0.003 | 0.200 |
| HEALTH PHYSICS PERSONNEL | 9 | 0 | 16 | 25 | 4.280 | 0.021 | 5.917 | 10.218 |
| SUPERVISORY PERSONNEL | 2 | 0 | 1 | 3 | 0.760 | 0.063 | 0.969 | 1.792 |
| ENGINEERING PERSONNEL | 1 | 0 | 5 | 6 | 0.477 | 0.057 | 1.331 | 1.865 |
| TOTAL | 33 | 0 | 245 | 278 | 13.426 | 0.278 | 67.024 | 80.728 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 14 | 0 | 301 | 315 | 4.966 | 0.137 | 94.099 | 99.202 |
| OPERATIONS PERSONNEL | 9 | 0 | 0 | 9 | 2.831 | 0.046 | 0.003 | 2.880 |
| HEALTH PHYSICS PERSONNEL | 3 | 0 | 15 | 18 | 1.884 | 0.021 | 5.399 | 7.304 |
| SUPERVISORY PERSONNEL | 4 | 0 | 4 | 8 | 1.004 | 0.094 | 1.693 | 2.791 |
| ENGINEERING PERSONNEL | 1 | 0 | 8 | 9 | 0.406 | 0.057 | 3.809 | 4.272 |
| TOTAL | 31 | 0 | 328 | 359 | 11.091 | 0.355 | 105.003 | 116.449 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 385 | 5 | 2294 | 2684 | 172.123 | 4.970 | 893.295 | 1070.388 |
| OPERATIONS PERSONNEL | 135 | 1 | 1 | 137 | 58.604 | 0.408 | 0.263 | 59.275 |
| HEALTH PHYSICS PERSONNEL | 134 | 6 | 235 | 375 | 84.674 | 2.286 | 109.349 | 196.309 |
| SUPERVISORY PERSONNEL | 91 | 13 | 27 | 131 | 27.745 | 9.611 | 14.565 | 51.921 |
| ENGINEERING PERSONNEL | 43 | 6 | 129 | 178 | 18.284 | 2.695 | 56.079 | 77.058 |
| GRAND TOTALS | 788 | 31 | 2686 | 3505 | 361.430 | 19.970 | 1073.551 | 1454.951 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *HOPE CREEK 1 TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 5 | 0 | 9 | 14 | 3.336 | 0.249 | 3.507 | 7.092 |
| OPERATIONS PERSONNEL | 40 | 2 | 0 | 42 | 10.812 | 0.778 | 0.145 | 11.735 |
| HEALTH PHYSICS PERSONNEL | 19 | 1 | 6 | 26 | 4.170 | 0.282 | 2.162 | 6.614 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.035 | 0.011 | 0.022 | 0.068 |
| ENGINEERING PERSONNEL | 2 | 0 | 0 | 2 | 0.657 | 0.077 | 0.005 | 0.739 |
| TOTAL | 66 | 3 | 15 | 84 | 19.010 | 1.397 | 5.841 | 26.248 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 1.978 | 0.043 | 1.448 | 3.469 |
| OPERATIONS PERSONNEL | 3 | 0 | 0 | 3 | 0.890 | 0.074 | 0.037 | 1.001 |
| HEALTH PHYSICS PERSONNEL | 12 | 1 | 0 | 13 | 3.185 | 0.177 | 0.563 | 3.925 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.058 | 0.058 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.096 | 0.023 | 0.031 | 0.150 |
| TOTAL | 15 | 1 | 0 | 16 | 6.149 | 0.317 | 2.137 | 8.603 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 1 | 1 | 0.052 | 0.005 | 0.227 | 0.284 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.004 | 0.000 | 0.000 | 0.004 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.082 | 0.000 | 0.000 | 0.082 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.004 | 0.000 | 0.000 | 0.004 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.060 | 0.019 | 0.000 | 0.079 |
| TOTAL | 0 | 0 | 1 | 1 | 0.202 | 0.024 | 0.227 | 0.453 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 94 | 2 | 132 | 228 | 35.783 | 0.580 | 48.805 | 85.168 |
| OPERATIONS PERSONNEL | 3 | 0 | 1 | 4 | 1.998 | 0.027 | 0.223 | 2.248 |
| HEALTH PHYSICS PERSONNEL | 34 | 0 | 9 | 43 | 14.930 | 0.007 | 3.158 | 18.095 |
| SUPERVISORY PERSONNEL | 1 | 1 | 1 | 3 | 0.424 | 0.167 | 0.703 | 1.294 |
| ENGINEERING PERSONNEL | 3 | 3 | 2 | 8 | 1.117 | 4.020 | 0.399 | 5.536 |
| TOTAL | 135 | 6 | 145 | 286 | 54.252 | 4.801 | 53.288 | 112.341 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 3 | 0 | 7 | 10 | 1.756 | 0.031 | 3.512 | 5.299 |
| OPERATIONS PERSONNEL | 5 | 0 | 0 | 5 | 1.595 | 0.001 | 0.005 | 1.601 |
| HEALTH PHYSICS PERSONNEL | 21 | 0 | 0 | 21 | 9.406 | 0.008 | 0.200 | 9.614 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.134 | 0.002 | 0.059 | 0.195 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.360 | 0.000 | 0.000 | 0.360 |
| TOTAL | 29 | 0 | 7 | 36 | 13.251 | 0.042 | 3.776 | 17.069 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 8 | 0 | 52 | 60 | 4.098 | 0.144 | 20.587 | 24.829 |
| OPERATIONS PERSONNEL | 2 | 0 | 1 | 3 | 0.819 | 0.047 | 0.209 | 1.075 |
| HEALTH PHYSICS PERSONNEL | 6 | 0 | 11 | 17 | 1.572 | 0.000 | 2.483 | 4.055 |
| SUPERVISORY PERSONNEL | 0 | 0 | 1 | 1 | 0.012 | 0.004 | 0.131 | 0.147 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.136 | 0.029 | 0.000 | 0.165 |
| TOTAL | 16 | 0 | 65 | 81 | 6.637 | 0.224 | 23.410 | 30.271 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 110 | 2 | 201 | 313 | 47.003 | 1.052 | 78.086 | 126.141 |
| OPERATIONS PERSONNEL | 53 | 2 | 2 | 57 | 16.118 | 0.927 | 0.619 | 17.664 |
| HEALTH PHYSICS PERSONNEL | 92 | 2 | 26 | 120 | 33.345 | 0.474 | 8.566 | 42.385 |
| SUPERVISORY PERSONNEL | 1 | 1 | 2 | 4 | 0.609 | 0.184 | 0.973 | 1.766 |
| ENGINEERING PERSONNEL | 5 | 3 | 2 | 10 | 2.426 | 4.168 | 0.435 | 7.029 |
| GRAND TOTALS | 261 | 10 | 233 | 504 | 99.501 | 6.805 | 88.679 | 194.985 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *INDIAN POINT 2

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) STATION | UTILITY | CONTRACT | TOTAL | TOTAL PERSON-REM STATION | UTILITY | CONTRACT | TOTAL |
|---|---|---|---|---|---|---|---|---|
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 56 | 13 | 171 | 240 | 13.402 | 0.453 | 28.669 | 42.524 |
| OPERATIONS PERSONNEL | 49 | 0 | 0 | 49 | 22.265 | 0.000 | 0.000 | 22.265 |
| HEALTH PHYSICS PERSONNEL | 16 | 0 | 10 | 26 | 4.944 | 0.000 | 0.000 | 4.944 |
| SUPERVISORY PERSONNEL | 11 | 0 | 0 | 11 | 2.391 | 0.000 | 0.000 | 2.391 |
| ENGINEERING PERSONNEL | 12 | 1 | 1 | 14 | 2.289 | 0.131 | 0.771 | 3.191 |
| TOTAL | 144 | 14 | 182 | 340 | 45.291 | 0.584 | 29.440 | 75.315 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 46 | 15 | 30 | 91 | 4.034 | 0.392 | 1.625 | 6.051 |
| OPERATIONS PERSONNEL | 8 | 0 | 0 | 8 | 0.683 | 0.000 | 0.000 | 0.683 |
| HEALTH PHYSICS PERSONNEL | 6 | 0 | 0 | 6 | 0.335 | 0.000 | 0.000 | 0.335 |
| SUPERVISORY PERSONNEL | 2 | 0 | 1 | 3 | 0.235 | 0.000 | 0.005 | 0.240 |
| ENGINEERING PERSONNEL | 5 | 0 | 0 | 5 | 0.140 | 0.000 | 0.000 | 0.140 |
| TOTAL | 67 | 15 | 31 | 113 | 5.427 | 0.392 | 1.630 | 7.449 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 57 | 40 | 92 | 189 | 2.974 | 9.861 | 10.240 | 23.075 |
| OPERATIONS PERSONNEL | 7 | 0 | 0 | 7 | 0.972 | 0.000 | 0.000 | 0.972 |
| HEALTH PHYSICS PERSONNEL | 6 | 0 | 2 | 8 | 0.638 | 0.000 | 0.040 | 0.678 |
| SUPERVISORY PERSONNEL | 2 | 1 | 2 | 5 | 0.385 | 0.855 | 0.774 | 2.014 |
| ENGINEERING PERSONNEL | 7 | 2 | 1 | 10 | 0.122 | 0.595 | 0.005 | 0.722 |
| TOTAL | 79 | 43 | 97 | 219 | 5.091 | 11.311 | 11.059 | 27.461 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 92 | 81 | 392 | 565 | 36.743 | 34.515 | 408.914 | 480.172 |
| OPERATIONS PERSONNEL | 32 | 0 | 0 | 32 | 2.847 | 0.000 | 0.000 | 2.847 |
| HEALTH PHYSICS PERSONNEL | 9 | 0 | 4 | 13 | 3.182 | 0.000 | 0.000 | 3.182 |
| SUPERVISORY PERSONNEL | 9 | 1 | 1 | 11 | 1.795 | 0.084 | 0.341 | 2.220 |
| ENGINEERING PERSONNEL | 19 | 2 | 1 | 22 | 3.364 | 1.300 | 2.170 | 6.834 |
| TOTAL | 161 | 84 | 398 | 643 | 47.931 | 35.899 | 411.425 | 495.255 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 47 | 14 | 154 | 215 | 8.732 | 0.542 | 49.000 | 58.274 |
| OPERATIONS PERSONNEL | 14 | 0 | 0 | 14 | 0.202 | 0.000 | 0.000 | 0.202 |
| HEALTH PHYSICS PERSONNEL | 16 | 0 | 11 | 27 | 3.920 | 0.000 | 2.545 | 6.465 |
| SUPERVISORY PERSONNEL | 11 | 0 | 2 | 13 | 2.335 | 0.000 | 0.608 | 2.943 |
| ENGINEERING PERSONNEL | 13 | 1 | 2 | 16 | 1.694 | 0.030 | 0.180 | 1.904 |
| TOTAL | 101 | 15 | 169 | 285 | 16.883 | 0.572 | 52.333 | 69.788 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 22 | 2 | 33 | 57 | 2.786 | 1.971 | 4.205 | 8.962 |
| OPERATIONS PERSONNEL | 12 | 0 | 0 | 12 | 1.551 | 0.000 | 0.000 | 1.551 |
| HEALTH PHYSICS PERSONNEL | 10 | 0 | 8 | 18 | 0.850 | 0.000 | 0.869 | 1.719 |
| SUPERVISORY PERSONNEL | 4 | 2 | 0 | 6 | 0.336 | 1.190 | 0.000 | 1.526 |
| ENGINEERING PERSONNEL | 7 | 0 | 1 | 8 | 1.191 | 0.000 | 0.065 | 1.256 |
| TOTAL | 55 | 4 | 42 | 101 | 6.714 | 3.161 | 5.139 | 15.014 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 320 (106) | 165 (92) | 872 (442) | 1357 (640) | 68.671 | 47.734 | 502.653 | 619.058 |
| OPERATIONS PERSONNEL | 122 (53) | 0 (0) | 0 (0) | 122 (53) | 28.520 | 0.000 | 0.000 | 28.520 |
| HEALTH PHYSICS PERSONNEL | 63 (17) | 0 (0) | 35 (11) | 98 (28) | 13.869 | 0.000 | 3.454 | 17.323 |
| SUPERVISORY PERSONNEL | 39 (16) | 4 (3) | 6 (3) | 49 (22) | 7.477 | 2.129 | 1.728 | 11.334 |
| ENGINEERING PERSONNEL | 63 (23) | 6 (3) | 6 (2) | 75 (28) | 8.800 | 2.056 | 3.191 | 14.047 |
| GRAND TOTALS | 607 (215) | 175 (98) | 919 (458) | 1701 (771) | 127.337 | 51.919 | 511.026 | 690.282 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *INDIAN POINT 3 TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 3 | 0 | 10 | 13 | 0.300 | 0.000 | 1.390 | 1.690 |
| OPERATIONS PERSONNEL | 55 | 0 | 4 | 59 | 11.750 | 0.000 | 0.480 | 12.230 |
| HEALTH PHYSICS PERSONNEL | 26 | 0 | 57 | 83 | 18.200 | 0.000 | 20.960 | 39.160 |
| SUPERVISORY PERSONNEL | 6 | 0 | 0 | 6 | 1.320 | 0.000 | 0.000 | 1.320 |
| ENGINEERING PERSONNEL | 5 | 0 | 1 | 6 | 0.990 | 0.000 | 0.220 | 1.210 |
| TOTAL | 95 | 0 | 72 | 167 | 32.560 | 0.000 | 23.050 | 55.610 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 9 | 0 | 11 | 20 | 1.090 | 0.000 | 2.260 | 3.350 |
| OPERATIONS PERSONNEL | 17 | 0 | 15 | 32 | 2.750 | 0.000 | 2.460 | 5.210 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 2 | 0 | 0 | 2 | 0.510 | 0.000 | 0.000 | 0.510 |
| ENGINEERING PERSONNEL | 5 | 0 | 3 | 8 | 0.820 | 0.000 | 0.350 | 1.170 |
| TOTAL | 33 | 0 | 29 | 62 | 5.170 | 0.000 | 5.070 | 10.240 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 65 | 65 | 0.000 | 0.000 | 17.110 | 17.110 |
| OPERATIONS PERSONNEL | 11 | 0 | 10 | 21 | 2.990 | 0.000 | 2.450 | 5.440 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 1 | 1 | 0.000 | 0.000 | 0.690 | 0.690 |
| SUPERVISORY PERSONNEL | 2 | 0 | 0 | 2 | 0.820 | 0.000 | 0.000 | 0.820 |
| ENGINEERING PERSONNEL | 1 | 0 | 0 | 1 | 0.190 | 0.000 | 0.000 | 0.190 |
| TOTAL | 14 | 0 | 76 | 90 | 4.000 | 0.000 | 20.250 | 24.250 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 63 | 2 | 272 | 337 | 31.360 | 0.700 | 78.670 | 110.730 |
| OPERATIONS PERSONNEL | 25 | 4 | 32 | 61 | 6.750 | 0.670 | 6.180 | 13.600 |
| HEALTH PHYSICS PERSONNEL | 6 | 0 | 2 | 8 | 1.180 | 0.000 | 0.440 | 1.620 |
| SUPERVISORY PERSONNEL | 14 | 0 | 3 | 17 | 3.910 | 0.000 | 0.930 | 4.840 |
| ENGINEERING PERSONNEL | 3 | 1 | 5 | 9 | 0.750 | 0.140 | 2.270 | 3.160 |
| TOTAL | 111 | 7 | 314 | 432 | 43.950 | 1.510 | 88.490 | 133.950 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 14 | 0 | 76 | 90 | 8.790 | 0.000 | 37.180 | 45.970 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 2 | 2 | 0.000 | 0.000 | 0.350 | 0.350 |
| SUPERVISORY PERSONNEL | 3 | 0 | 2 | 5 | 0.970 | 0.000 | 0.320 | 1.290 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 17 | 0 | 80 | 97 | 9.760 | 0.000 | 37.850 | 47.610 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 9 | 0 | 21 | 30 | 1.130 | 0.000 | 9.500 | 10.630 |
| OPERATIONS PERSONNEL | 2 | 0 | 2 | 4 | 0.990 | 0.000 | 0.450 | 1.440 |
| HEALTH PHYSICS PERSONNEL | 7 | 0 | 3 | 10 | 1.350 | 0.000 | 0.330 | 1.680 |
| SUPERVISORY PERSONNEL | 5 | 0 | 1 | 6 | 1.830 | 0.000 | 0.810 | 2.640 |
| ENGINEERING PERSONNEL | 2 | 1 | 0 | 3 | 0.510 | 0.120 | 0.000 | 0.630 |
| TOTAL | 25 | 1 | 27 | 53 | 5.810 | 0.120 | 11.090 | 17.020 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 98 | 2 | 455 | 555 | 42.670 | 0.700 | 146.110 | 189.480 |
| OPERATIONS PERSONNEL | 110 | 4 | 63 | 177 | 25.230 | 0.670 | 12.020 | 37.920 |
| HEALTH PHYSICS PERSONNEL | 39 | 0 | 65 | 104 | 20.730 | 0.000 | 22.770 | 43.500 |
| SUPERVISORY PERSONNEL | 32 | 0 | 6 | 38 | 9.360 | 0.000 | 2.060 | 11.420 |
| ENGINEERING PERSONNEL | 16 | 2 | 9 | 27 | 3.260 | 0.260 | 2.840 | 6.360 |
| GRAND TOTALS | 295 | 8 | 598 | 901 | 101.250 | 1.630 | 185.800 | 288.680 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *KEWAUNEE

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 10 | 0 | 6 | 16 | 0.483 | 0.000 | 0.244 | 0.727 |
| OPERATIONS PERSONNEL | 21 | 0 | 0 | 21 | 3.150 | 0.000 | 0.000 | 3.150 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 4 | 3 | 1 | 8 | 0.301 | 0.074 | 0.105 | 0.480 |
| ENGINEERING PERSONNEL | 8 | 2 | 0 | 10 | 0.271 | 0.163 | 0.000 | 0.434 |
| TOTAL | 43 | 5 | 7 | 55 | 4.205 | 0.237 | 0.349 | 4.791 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 37 | 2 | 44 | 83 | 3.466 | 0.121 | 9.419 | 13.006 |
| OPERATIONS PERSONNEL | 10 | 0 | 10 | 20 | 0.665 | 0.000 | 1.752 | 2.417 |
| HEALTH PHYSICS PERSONNEL | 18 | 0 | 25 | 43 | 6.069 | 0.000 | 9.607 | 15.676 |
| SUPERVISORY PERSONNEL | 1 | 0 | 1 | 2 | 0.000 | 0.000 | 0.213 | 0.213 |
| ENGINEERING PERSONNEL | 1 | 1 | 4 | 6 | 0.000 | 0.012 | 0.223 | 0.235 |
| TOTAL | 67 | 3 | 84 | 154 | 10.200 | 0.133 | 21.214 | 31.547 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 5 | 0 | 32 | 37 | 0.132 | 0.000 | 9.413 | 9.545 |
| OPERATIONS PERSONNEL | 0 | 0 | 8 | 8 | 0.000 | 0.000 | 3.650 | 3.650 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 3 | 0 | 1 | 4 | 0.347 | 0.000 | 0.294 | 0.641 |
| TOTAL | 8 | 0 | 41 | 49 | 0.479 | 0.000 | 13.357 | 13.836 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 33 | 2 | 132 | 167 | 7.967 | 0.413 | 60.612 | 68.992 |
| OPERATIONS PERSONNEL | 2 | 0 | 3 | 5 | 0.356 | 0.000 | 0.330 | 0.686 |
| HEALTH PHYSICS PERSONNEL | 10 | 0 | 0 | 10 | 0.486 | 0.000 | 0.000 | 0.486 |
| SUPERVISORY PERSONNEL | 2 | 2 | 1 | 5 | 0.247 | 0.050 | 0.000 | 0.297 |
| ENGINEERING PERSONNEL | 7 | 5 | 3 | 15 | 1.270 | 1.883 | 0.409 | 3.562 |
| TOTAL | 54 | 9 | 139 | 202 | 10.326 | 2.346 | 61.351 | 74.023 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 15 | 2 | 7 | 24 | 0.172 | 0.011 | 0.049 | 0.232 |
| OPERATIONS PERSONNEL | 1 | 0 | 1 | 2 | 0.592 | 0.000 | 0.040 | 0.632 |
| HEALTH PHYSICS PERSONNEL | 5 | 0 | 2 | 7 | 0.727 | 0.000 | 0.113 | 0.840 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 21 | 2 | 10 | 33 | 1.491 | 0.011 | 0.202 | 1.704 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 14 | 1 | 16 | 31 | 1.061 | 0.000 | 6.733 | 7.794 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 1 | 0 | 0 | 1 | 0.072 | 0.000 | 0.000 | 0.072 |
| ENGINEERING PERSONNEL | 1 | 0 | 0 | 1 | 0.057 | 0.000 | 0.000 | 0.057 |
| TOTAL | 16 | 1 | 16 | 33 | 1.190 | 0.000 | 6.733 | 7.923 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 114 | 7 | 237 | 358 | 13.281 | 0.545 | 86.470 | 100.296 |
| OPERATIONS PERSONNEL | 34 | 0 | 22 | 56 | 4.763 | 0.000 | 5.772 | 10.535 |
| HEALTH PHYSICS PERSONNEL | 33 | 0 | 27 | 60 | 7.282 | 0.000 | 9.720 | 17.002 |
| SUPERVISORY PERSONNEL | 8 | 5 | 3 | 16 | 0.620 | 0.124 | 0.318 | 1.062 |
| ENGINEERING PERSONNEL | 20 | 8 | 8 | 36 | 1.945 | 2.058 | 0.926 | 4.929 |
| GRAND TOTALS | 209 | 20 | 297 | 526 | 27.891 | 2.727 | 103.206 | 133.824 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *LASALLE 1,2

TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 31 | 29 | 60 | 120 | 30.876 | 0.634 | 27.264 | 58.774 |
| OPERATIONS PERSONNEL | 77 | 0 | 11 | 88 | 30.702 | 0.000 | 1.114 | 31.816 |
| HEALTH PHYSICS PERSONNEL | 22 | 0 | 0 | 22 | 15.916 | 0.000 | 0.134 | 16.050 |
| SUPERVISORY PERSONNEL | 42 | 12 | 2 | 56 | 11.518 | 0.068 | 0.134 | 11.720 |
| ENGINEERING PERSONNEL | 52 | 19 | 16 | 87 | 8.921 | 0.370 | 0.986 | 10.277 |
| TOTAL | 224 | 60 | 89 | 373 | 97.933 | 1.072 | 29.632 | 128.637 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 113 | 79 | 489 | 681 | 113.412 | 1.737 | 222.320 | 337.469 |
| OPERATIONS PERSONNEL | 72 | 0 | 5 | 77 | 29.203 | 0.000 | 0.582 | 29.785 |
| HEALTH PHYSICS PERSONNEL | 35 | 0 | 39 | 74 | 25.526 | 0.000 | 15.111 | 40.637 |
| SUPERVISORY PERSONNEL | 148 | 54 | 74 | 276 | 40.695 | 0.308 | 5.594 | 46.597 |
| ENGINEERING PERSONNEL | 64 | 145 | 47 | 256 | 11.065 | 2.858 | 2.920 | 16.843 |
| TOTAL | 432 | 278 | 654 | 1364 | 219.901 | 4.903 | 246.527 | 471.331 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 193 | 193 | 0.229 | 0.000 | 87.859 | 88.088 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 2 | 3 | 0.869 | 0.000 | 0.622 | 1.491 |
| SUPERVISORY PERSONNEL | 0 | 0 | 13 | 13 | 0.079 | 0.000 | 0.969 | 1.048 |
| ENGINEERING PERSONNEL | 4 | 4 | 11 | 19 | 0.775 | 0.072 | 0.645 | 1.492 |
| TOTAL | 5 | 4 | 219 | 228 | 1.952 | 0.072 | 90.095 | 92.119 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 5 | 65 | 180 | 250 | 5.402 | 1.441 | 81.982 | 88.825 |
| OPERATIONS PERSONNEL | 1 | 0 | 0 | 1 | 0.300 | 0.000 | 0.000 | 0.300 |
| HEALTH PHYSICS PERSONNEL | 5 | 0 | 5 | 10 | 3.877 | 0.000 | 1.887 | 5.764 |
| SUPERVISORY PERSONNEL | 24 | 0 | 29 | 53 | 6.566 | 0.000 | 2.168 | 8.734 |
| ENGINEERING PERSONNEL | 2 | 52 | 1 | 55 | 0.264 | 1.015 | 0.081 | 1.360 |
| TOTAL | 37 | 117 | 215 | 369 | 16.409 | 2.456 | 86.118 | 104.983 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 1 | 35 | 40 | 76 | 0.400 | 0.774 | 18.103 | 19.277 |
| OPERATIONS PERSONNEL | 58 | 0 | 180 | 238 | 23.136 | 0.000 | 18.680 | 41.816 |
| HEALTH PHYSICS PERSONNEL | 11 | 0 | 0 | 11 | 8.118 | 0.000 | 0.010 | 8.128 |
| SUPERVISORY PERSONNEL | 14 | 0 | 0 | 14 | 3.657 | 0.000 | 0.050 | 3.707 |
| ENGINEERING PERSONNEL | 1 | 2 | 21 | 24 | 0.191 | 0.035 | 1.296 | 1.522 |
| TOTAL | 85 | 37 | 241 | 363 | 35.502 | 0.809 | 38.139 | 74.450 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 42 | 2 | 18 | 62 | 42.034 | 0.042 | 8.250 | 50.326 |
| OPERATIONS PERSONNEL | 13 | 0 | 0 | 13 | 5.264 | 0.000 | 0.000 | 5.264 |
| HEALTH PHYSICS PERSONNEL | 5 | 0 | 0 | 5 | 3.490 | 0.000 | 0.000 | 3.490 |
| SUPERVISORY PERSONNEL | 25 | 0 | 1 | 26 | 6.866 | 0.000 | 0.047 | 6.913 |
| ENGINEERING PERSONNEL | 9 | 45 | 0 | 54 | 1.585 | 0.873 | 0.005 | 2.463 |
| TOTAL | 94 | 47 | 19 | 160 | 59.239 | 0.915 | 8.302 | 68.456 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 192 | 210 | 980 | 1382 | 192.353 | 4.628 | 445.778 | 642.759 |
| OPERATIONS PERSONNEL | 221 | 0 | 196 | 417 | 88.605 | 0.000 | 20.376 | 108.981 |
| HEALTH PHYSICS PERSONNEL | 79 | 0 | 46 | 125 | 57.796 | 0.000 | 17.764 | 75.560 |
| SUPERVISORY PERSONNEL | 253 | 66 | 119 | 438 | 69.381 | 0.376 | 8.962 | 78.719 |
| ENGINEERING PERSONNEL | 132 | 267 | 96 | 495 | 22.801 | 5.223 | 5.933 | 33.957 |
| GRAND TOTALS | 877 | 543 | 1437 | 2857 | 430.936 | 10.227 | 498.813 | 939.976 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *LIMERICK 1,2

TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) STATION | UTILITY | CONTRACT | TOTAL | TOTAL PERSON-REM STATION | UTILITY | CONTRACT | TOTAL |
|---|---|---|---|---|---|---|---|---|
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 125 | 114 | 281 | 520 | 6.146 | 2.582 | 7.401 | 16.129 |
| OPERATIONS PERSONNEL | 159 | 16 | 40 | 215 | 9.515 | 0.475 | 1.253 | 11.243 |
| HEALTH PHYSICS PERSONNEL | 53 | 1 | 35 | 89 | 4.873 | 0.005 | 1.854 | 6.732 |
| SUPERVISORY PERSONNEL | 1 | 0 | 4 | 5 | 0.016 | 0.000 | 0.088 | 0.104 |
| ENGINEERING PERSONNEL | 40 | 7 | 21 | 68 | 1.910 | 0.131 | 0.382 | 2.423 |
| TOTAL | 378 | 138 | 381 | 897 | 22.460 | 3.193 | 10.978 | 36.631 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 121 | 131 | 412 | 664 | 10.788 | 10.369 | 17.490 | 38.647 |
| OPERATIONS PERSONNEL | 141 | 13 | 59 | 213 | 3.576 | 0.587 | 1.511 | 5.674 |
| HEALTH PHYSICS PERSONNEL | 45 | 1 | 41 | 87 | 2.416 | 0.005 | 1.867 | 4.288 |
| SUPERVISORY PERSONNEL | 1 | 2 | 4 | 7 | 0.002 | 0.126 | 0.059 | 0.187 |
| ENGINEERING PERSONNEL | 28 | 6 | 43 | 77 | 0.670 | 0.177 | 0.518 | 1.365 |
| TOTAL | 336 | 153 | 559 | 1048 | 17.452 | 11.264 | 21.445 | 50.161 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 23 | 8 | 23 | 54 | 0.242 | 0.027 | 0.171 | 0.440 |
| OPERATIONS PERSONNEL | 25 | 1 | 5 | 31 | 0.359 | 0.005 | 0.143 | 0.507 |
| HEALTH PHYSICS PERSONNEL | 22 | 0 | 7 | 29 | 0.486 | 0.000 | 0.241 | 0.727 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 1 | 2 | 1 | 4 | 0.011 | 0.007 | 0.007 | 0.025 |
| TOTAL | 71 | 11 | 36 | 118 | 1.098 | 0.039 | 0.562 | 1.699 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 33 | 35 | 127 | 195 | 1.415 | 0.533 | 2.834 | 4.782 |
| OPERATIONS PERSONNEL | 68 | 1 | 20 | 89 | 0.586 | 0.017 | 0.424 | 1.027 |
| HEALTH PHYSICS PERSONNEL | 36 | 1 | 24 | 61 | 0.463 | 0.005 | 0.220 | 0.688 |
| SUPERVISORY PERSONNEL | 1 | 0 | 3 | 4 | 0.000 | 0.000 | 0.117 | 0.117 |
| ENGINEERING PERSONNEL | 7 | 0 | 10 | 17 | 0.113 | 0.000 | 0.823 | 0.936 |
| TOTAL | 145 | 37 | 184 | 366 | 2.577 | 0.555 | 4.418 | 7.550 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 114 | 24 | 84 | 222 | 0.297 | 0.214 | 1.533 | 2.044 |
| OPERATIONS PERSONNEL | 133 | 5 | 24 | 162 | 0.686 | 0.023 | 2.596 | 3.305 |
| HEALTH PHYSICS PERSONNEL | 41 | 0 | 19 | 60 | 1.112 | 0.000 | 0.701 | 1.813 |
| SUPERVISORY PERSONNEL | 2 | 0 | 1 | 3 | 0.002 | 0.000 | 0.155 | 0.157 |
| ENGINEERING PERSONNEL | 31 | 0 | 2 | 33 | 0.077 | 0.000 | 0.002 | 0.079 |
| TOTAL | 321 | 29 | 130 | 480 | 2.174 | 0.237 | 4.987 | 7.398 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 138 | 149 | 348 | 635 | 7.212 | 16.489 | 26.955 | 50.656 |
| OPERATIONS PERSONNEL | 163 | 13 | 55 | 231 | 5.402 | 0.923 | 3.434 | 9.759 |
| HEALTH PHYSICS PERSONNEL | 56 | 0 | 45 | 101 | 2.729 | 0.000 | 1.987 | 4.716 |
| SUPERVISORY PERSONNEL | 2 | 2 | 8 | 12 | 0.043 | 0.195 | 0.574 | 0.812 |
| ENGINEERING PERSONNEL | 44 | 12 | 46 | 102 | 1.862 | 0.647 | 2.952 | 5.461 |
| TOTAL | 403 | 176 | 502 | 1081 | 17.248 | 18.254 | 35.902 | 71.404 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 554 (138) | 461 (164) | 1275 (482) | 2290 (784) | 26.100 | 30.214 | 56.384 | 112.698 |
| OPERATIONS PERSONNEL | 689 (163) | 49 (17) | 203 (83) | 941 (263) | 20.124 | 2.030 | 9.361 | 31.515 |
| HEALTH PHYSICS PERSONNEL | 253 (56) | 3 (1) | 171 (49) | 427 (106) | 12.079 | 0.015 | 6.870 | 18.964 |
| SUPERVISORY PERSONNEL | 7 (2) | 4 (2) | 20 (9) | 31 (13) | 0.063 | 0.321 | 0.993 | 1.377 |
| ENGINEERING PERSONNEL | 151 (44) | 27 (12) | 123 (56) | 301 (112) | 4.643 | 0.962 | 4.684 | 10.289 |
| GRAND TOTALS | 1654 (403) | 544 (196) | 1792 (679) | 3990(1278) | 63.009 | 33.542 | 78.292 | 174.843 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *MAINE YANKEE

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 16 | 0 | 10 | 26 | 5.050 | 0.000 | 4.836 | 9.886 |
| OPERATIONS PERSONNEL | 50 | 0 | 0 | 50 | 28.460 | 0.000 | 0.000 | 28.460 |
| HEALTH PHYSICS PERSONNEL | 29 | 0 | 157 | 186 | 15.940 | 0.000 | 91.368 | 107.308 |
| SUPERVISORY PERSONNEL | 1 | 0 | 8 | 9 | 0.520 | 0.000 | 3.755 | 4.275 |
| ENGINEERING PERSONNEL | 16 | 0 | 2 | 18 | 7.952 | 0.000 | 1.250 | 9.202 |
| TOTAL | 112 | 0 | 177 | 289 | 57.922 | 0.000 | 101.209 | 159.131 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 50 | 0 | 275 | 325 | 31.236 | 0.000 | 169.417 | 200.653 |
| OPERATIONS PERSONNEL | 5 | 0 | 1 | 6 | 2.893 | 0.000 | 0.445 | 3.338 |
| HEALTH PHYSICS PERSONNEL | 16 | 0 | 27 | 43 | 4.042 | 0.000 | 13.899 | 17.941 |
| SUPERVISORY PERSONNEL | 2 | 0 | 42 | 44 | 1.240 | 0.000 | 16.052 | 17.292 |
| ENGINEERING PERSONNEL | 7 | 0 | 18 | 25 | 2.534 | 0.000 | 6.861 | 9.395 |
| TOTAL | 80 | 0 | 363 | 443 | 41.945 | 0.000 | 206.674 | 248.619 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 13 | 13 | 0.085 | 0.000 | 11.879 | 11.964 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.015 | 0.000 | 0.065 | 0.080 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 5 | 5 | 0.005 | 0.000 | 3.440 | 3.445 |
| SUPERVISORY PERSONNEL | 0 | 0 | 5 | 5 | 0.000 | 0.000 | 2.700 | 2.700 |
| ENGINEERING PERSONNEL | 1 | 0 | 40 | 41 | 0.330 | 0.000 | 19.955 | 20.285 |
| TOTAL | 1 | 0 | 63 | 64 | 0.435 | 0.000 | 38.039 | 38.474 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 18 | 0 | 78 | 96 | 10.402 | 0.000 | 30.320 | 40.722 |
| OPERATIONS PERSONNEL | 14 | 0 | 0 | 14 | 4.087 | 0.000 | 0.050 | 4.137 |
| HEALTH PHYSICS PERSONNEL | 18 | 0 | 42 | 60 | 4.817 | 0.000 | 11.815 | 16.632 |
| SUPERVISORY PERSONNEL | 1 | 0 | 53 | 54 | 0.475 | 0.000 | 38.456 | 38.931 |
| ENGINEERING PERSONNEL | 10 | 0 | 156 | 166 | 5.225 | 0.000 | 121.368 | 126.593 |
| TOTAL | 61 | 0 | 329 | 390 | 25.006 | 0.000 | 202.009 | 227.015 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 6 | 0 | 5 | 11 | 2.415 | 0.000 | 3.090 | 5.505 |
| OPERATIONS PERSONNEL | 8 | 0 | 0 | 8 | 1.866 | 0.000 | 0.000 | 1.866 |
| HEALTH PHYSICS PERSONNEL | 5 | 0 | 9 | 14 | 2.795 | 0.000 | 3.498 | 6.293 |
| SUPERVISORY PERSONNEL | 0 | 0 | 4 | 4 | 0.040 | 0.000 | 1.058 | 1.098 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.020 | 0.000 | 0.145 | 0.165 |
| TOTAL | 19 | 0 | 18 | 37 | 7.136 | 0.000 | 7.791 | 14.927 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 18 | 0 | 71 | 89 | 7.950 | 0.000 | 33.378 | 41.328 |
| OPERATIONS PERSONNEL | 14 | 0 | 5 | 19 | 4.502 | 0.000 | 1.285 | 5.787 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 2 | 2 | 0.035 | 0.000 | 0.935 | 0.970 |
| SUPERVISORY PERSONNEL | 1 | 0 | 4 | 5 | 0.220 | 0.000 | 1.979 | 2.199 |
| ENGINEERING PERSONNEL | 3 | 0 | 7 | 10 | 1.520 | 0.000 | 1.725 | 3.245 |
| TOTAL | 36 | 0 | 89 | 125 | 14.227 | 0.000 | 39.302 | 53.529 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 108 | 0 | 452 | 560 | 57.138 | 0.000 | 252.920 | 310.058 |
| OPERATIONS PERSONNEL | 91 | 0 | 6 | 97 | 41.823 | 0.000 | 1.845 | 43.668 |
| HEALTH PHYSICS PERSONNEL | 68 | 0 | 242 | 310 | 27.634 | 0.000 | 124.955 | 152.589 |
| SUPERVISORY PERSONNEL | 5 | 0 | 116 | 121 | 2.495 | 0.000 | 64.000 | 66.495 |
| ENGINEERING PERSONNEL | 37 | 0 | 223 | 260 | 17.581 | 0.000 | 151.304 | 168.885 |
| GRAND TOTALS | 309 | 0 | 1039 | 1348 | 146.671 | 0.000 | 595.024 | 741.695 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *MCGUIRE 1,2

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) STATION | UTILITY | CONTRACT | TOTAL | TOTAL PERSON-REM STATION | UTILITY | CONTRACT | TOTAL |
|---|---|---|---|---|---|---|---|---|
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 215 | 394 | 302 | 911 | 6.975 | 1.845 | 0.530 | 9.350 |
| OPERATIONS PERSONNEL | 72 | 2 | 55 | 129 | 21.608 | 0.820 | 3.760 | 26.188 |
| HEALTH PHYSICS PERSONNEL | 51 | 2 | 136 | 189 | 15.243 | 0.840 | 17.586 | 33.669 |
| SUPERVISORY PERSONNEL | 3 | 0 | 0 | 3 | 0.245 | 0.000 | 0.000 | 0.245 |
| ENGINEERING PERSONNEL | 85 | 19 | 10 | 114 | 3.755 | 1.220 | 0.125 | 5.100 |
| TOTAL | 426 | 417 | 503 | 1346 | 47.826 | 4.725 | 22.001 | 74.552 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 226 | 422 | 396 | 1044 | 72.742 | 169.028 | 103.577 | 345.347 |
| OPERATIONS PERSONNEL | 61 | 5 | 57 | 123 | 0.915 | 0.015 | 38.938 | 39.868 |
| HEALTH PHYSICS PERSONNEL | 50 | 2 | 135 | 187 | 15.255 | 0.000 | 32.275 | 47.530 |
| SUPERVISORY PERSONNEL | 3 | 0 | 0 | 3 | 0.415 | 0.000 | 0.000 | 0.415 |
| ENGINEERING PERSONNEL | 79 | 21 | 12 | 112 | 25.505 | 5.945 | 1.243 | 32.693 |
| TOTAL | 419 | 450 | 600 | 1469 | 114.832 | 174.988 | 176.033 | 465.853 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 41 | 131 | 161 | 333 | 0.335 | 14.345 | 16.440 | 31.120 |
| OPERATIONS PERSONNEL | 12 | 1 | 10 | 23 | 0.245 | 0.015 | 0.200 | 0.460 |
| HEALTH PHYSICS PERSONNEL | 13 | 0 | 78 | 91 | 0.965 | 0.000 | 7.707 | 8.672 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 45 | 5 | 5 | 55 | 2.990 | 0.315 | 0.505 | 3.810 |
| TOTAL | 111 | 137 | 254 | 502 | 4.535 | 14.675 | 24.852 | 44.062 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 190 | 365 | 318 | 873 | 7.390 | 102.697 | 81.185 | 191.272 |
| OPERATIONS PERSONNEL | 31 | 1 | 38 | 70 | 0.430 | 0.030 | 1.491 | 1.951 |
| HEALTH PHYSICS PERSONNEL | 37 | 0 | 118 | 155 | 2.585 | 0.000 | 18.783 | 21.368 |
| SUPERVISORY PERSONNEL | 1 | 0 | 0 | 1 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 59 | 14 | 7 | 80 | 2.720 | 0.590 | 0.585 | 3.895 |
| TOTAL | 318 | 380 | 481 | 1179 | 13.125 | 103.317 | 102.044 | 218.486 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 3 | 21 | 9 | 33 | 0.000 | 0.180 | 0.020 | 0.200 |
| OPERATIONS PERSONNEL | 2 | 0 | 42 | 44 | 0.010 | 0.000 | 1.090 | 1.100 |
| HEALTH PHYSICS PERSONNEL | 24 | 0 | 18 | 42 | 0.585 | 0.000 | 0.080 | 0.665 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 12 | 0 | 0 | 12 | 0.515 | 0.000 | 0.000 | 0.515 |
| TOTAL | 41 | 21 | 69 | 131 | 1.110 | 0.180 | 1.190 | 2.480 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 69 | 145 | 91 | 305 | 3.300 | 32.280 | 4.956 | 40.536 |
| OPERATIONS PERSONNEL | 10 | 0 | 35 | 45 | 0.515 | 0.000 | 2.850 | 3.365 |
| HEALTH PHYSICS PERSONNEL | 17 | 0 | 65 | 82 | 0.825 | 0.000 | 6.085 | 6.910 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 36 | 2 | 3 | 41 | 0.890 | 0.020 | 0.000 | 0.910 |
| TOTAL | 132 | 147 | 194 | 473 | 5.530 | 32.300 | 13.891 | 51.721 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 744 (227) | 1478 (427) | 1277 (454) | 3499(1108) | 90.742 | 320.375 | 206.708 | 617.825 |
| OPERATIONS PERSONNEL | 188 (71) | 9 (2) | 237 (63) | 434 (136) | 23.723 | 0.880 | 48.329 | 72.932 |
| HEALTH PHYSICS PERSONNEL | 192 (52) | 4 (2) | 550 (137) | 746 (191) | 35.458 | 0.840 | 82.516 | 118.814 |
| SUPERVISORY PERSONNEL | 7 (3) | 0 (0) | 0 (0) | 7 (3) | 0.660 | 0.000 | 0.000 | 0.660 |
| ENGINEERING PERSONNEL | 316 (86) | 61 (21) | 37 (12) | 414 (119) | 36.375 | 8.090 | 2.458 | 46.923 |
| GRAND TOTALS | 1447 (439) | 1552 (452) | 2101 (666) | 5100(1557) | 186.958 | 330.185 | 340.011 | 857.154 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *MILLSTONE POINT 1

TYPE: BWR

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

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *MILLSTONE POINT 2,3

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 9 | 0 | 9 | 18 | 3.110 | 0.000 | 3.000 | 6.110 |
| OPERATIONS PERSONNEL | 35 | 0 | 0 | 35 | 11.710 | 0.000 | 0.080 | 11.790 |
| HEALTH PHYSICS PERSONNEL | 14 | 1 | 37 | 52 | 4.260 | 0.450 | 11.890 | 16.600 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.010 | 0.000 | 0.020 | 0.030 |
| ENGINEERING PERSONNEL | 2 | 1 | 0 | 3 | 0.890 | 0.460 | 0.330 | 1.680 |
| TOTAL | 60 | 2 | 46 | 108 | 19.980 | 0.910 | 15.320 | 36.210 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 46 | 4 | 191 | 241 | 18.830 | 2.010 | 70.850 | 91.690 |
| OPERATIONS PERSONNEL | 9 | 0 | 7 | 16 | 2.570 | 0.020 | 2.950 | 5.540 |
| HEALTH PHYSICS PERSONNEL | 11 | 0 | 22 | 33 | 4.190 | 0.220 | 6.810 | 11.220 |
| SUPERVISORY PERSONNEL | 0 | 0 | 1 | 1 | 0.000 | 0.000 | 0.140 | 0.140 |
| ENGINEERING PERSONNEL | 3 | 2 | 17 | 22 | 1.250 | 1.330 | 5.940 | 8.520 |
| TOTAL | 69 | 6 | 238 | 313 | 26.840 | 3.580 | 86.690 | 117.110 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 3 | 0 | 163 | 166 | 0.840 | 0.020 | 79.320 | 80.180 |
| OPERATIONS PERSONNEL | 0 | 0 | 1 | 1 | 0.000 | 0.010 | 0.560 | 0.570 |
| HEALTH PHYSICS PERSONNEL | 5 | 0 | 13 | 18 | 1.680 | 0.010 | 3.560 | 5.250 |
| SUPERVISORY PERSONNEL | 0 | 0 | 2 | 2 | 0.000 | 0.000 | 0.590 | 0.590 |
| ENGINEERING PERSONNEL | 1 | 1 | 30 | 32 | 0.360 | 0.410 | 23.670 | 24.440 |
| TOTAL | 9 | 1 | 209 | 219 | 2.880 | 0.450 | 107.700 | 111.030 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 27 | 0 | 227 | 254 | 8.520 | 0.020 | 185.380 | 193.920 |
| OPERATIONS PERSONNEL | 7 | 0 | 5 | 12 | 1.980 | 0.100 | 4.070 | 6.150 |
| HEALTH PHYSICS PERSONNEL | 11 | 0 | 29 | 40 | 3.960 | 0.000 | 9.450 | 13.410 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 3 | 6 | 54 | 63 | 3.170 | 2.450 | 45.720 | 51.340 |
| TOTAL | 48 | 6 | 315 | 369 | 17.630 | 2.570 | 244.620 | 264.820 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 21 | 21 | 0.330 | 0.010 | 5.180 | 5.520 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.280 | 0.000 | 0.030 | 0.310 |
| HEALTH PHYSICS PERSONNEL | 18 | 0 | 20 | 38 | 5.140 | 0.030 | 7.340 | 12.510 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.030 | 0.190 | 0.110 | 0.330 |
| TOTAL | 18 | 0 | 41 | 59 | 5.780 | 0.230 | 12.660 | 18.670 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 21 | 3 | 35 | 59 | 16.260 | 0.630 | 26.460 | 43.350 |
| OPERATIONS PERSONNEL | 18 | 0 | 1 | 19 | 4.550 | 0.000 | 0.560 | 5.110 |
| HEALTH PHYSICS PERSONNEL | 5 | 0 | 12 | 17 | 1.490 | 0.000 | 3.960 | 5.450 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.030 | 0.030 |
| ENGINEERING PERSONNEL | 1 | 0 | 6 | 7 | 0.510 | 0.170 | 3.110 | 3.790 |
| TOTAL | 45 | 3 | 54 | 102 | 22.810 | 0.800 | 34.120 | 57.730 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 106 | 7 | 646 | 759 | 47.890 | 2.690 | 370.190 | 420.770 |
| OPERATIONS PERSONNEL | 69 | 0 | 14 | 83 | 21.090 | 0.130 | 8.250 | 29.470 |
| HEALTH PHYSICS PERSONNEL | 64 | 1 | 133 | 198 | 20.720 | 0.710 | 43.010 | 64.440 |
| SUPERVISORY PERSONNEL | 0 | 0 | 3 | 3 | 0.010 | 0.000 | 0.780 | 0.790 |
| ENGINEERING PERSONNEL | 10 | 10 | 107 | 127 | 6.210 | 5.010 | 78.880 | 90.100 |
| GRAND TOTALS | 249 | 18 | 903 | 1170 | 95.920 | 8.540 | 501.110 | 605.570 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *MONTICELLO

TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 28 | 6 | 0 | 34 | 5.681 | 1.727 | 0.113 | 7.521 |
| OPERATIONS PERSONNEL | 40 | 0 | 1 | 41 | 17.119 | 0.000 | 0.523 | 17.642 |
| HEALTH PHYSICS PERSONNEL | 20 | 0 | 1 | 21 | 8.481 | 0.000 | 0.501 | 8.982 |
| SUPERVISORY PERSONNEL | 11 | 1 | 3 | 15 | 2.912 | 0.512 | 1.310 | 4.734 |
| ENGINEERING PERSONNEL | 9 | 0 | 0 | 9 | 2.457 | 0.011 | 0.000 | 2.468 |
| TOTAL | 108 | 7 | 5 | 120 | 36.650 | 2.250 | 2.447 | 41.347 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 36 | 10 | 3 | 49 | 14.640 | 3.177 | 3.951 | 21.768 |
| OPERATIONS PERSONNEL | 2 | 0 | 0 | 2 | 0.693 | 0.000 | 0.000 | 0.693 |
| HEALTH PHYSICS PERSONNEL | 7 | 0 | 0 | 7 | 2.112 | 0.000 | 0.062 | 2.174 |
| SUPERVISORY PERSONNEL | 3 | 0 | 1 | 4 | 1.345 | 0.032 | 0.395 | 1.772 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.109 | 0.000 | 0.000 | 0.109 |
| TOTAL | 48 | 10 | 4 | 62 | 18.899 | 3.209 | 4.408 | 26.516 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 21 | 4 | 3 | 28 | 5.820 | 2.614 | 0.736 | 9.170 |
| OPERATIONS PERSONNEL | 6 | 0 | 0 | 6 | 1.961 | 0.000 | 0.000 | 1.961 |
| HEALTH PHYSICS PERSONNEL | 8 | 0 | 0 | 8 | 2.111 | 0.000 | 0.000 | 2.111 |
| SUPERVISORY PERSONNEL | 5 | 1 | 3 | 9 | 1.347 | 0.500 | 1.137 | 2.984 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.221 | 0.000 | 0.000 | 0.221 |
| TOTAL | 40 | 5 | 6 | 51 | 11.460 | 3.114 | 1.873 | 16.447 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 14 | 2 | 0 | 16 | 4.138 | 0.343 | 0.000 | 4.481 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.161 | 0.000 | 0.000 | 0.161 |
| HEALTH PHYSICS PERSONNEL | 5 | 0 | 0 | 5 | 2.045 | 0.000 | 0.013 | 2.058 |
| SUPERVISORY PERSONNEL | 0 | 0 | 1 | 1 | 0.005 | 0.000 | 2.118 | 2.123 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 19 | 2 | 1 | 22 | 6.349 | 0.343 | 2.131 | 8.823 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.015 | 0.000 | 0.000 | 0.015 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.127 | 0.000 | 0.000 | 0.127 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.066 | 0.007 | 0.000 | 0.073 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 0 | 0 | 0 | 0 | 0.208 | 0.007 | 0.000 | 0.215 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 99 | 22 | 6 | 127 | 30.294 | 7.861 | 4.800 | 42.955 |
| OPERATIONS PERSONNEL | 48 | 0 | 1 | 49 | 20.061 | 0.000 | 0.523 | 20.584 |
| HEALTH PHYSICS PERSONNEL | 40 | 0 | 1 | 41 | 14.749 | 0.000 | 0.576 | 15.325 |
| SUPERVISORY PERSONNEL | 19 | 2 | 8 | 29 | 5.675 | 1.051 | 4.960 | 11.686 |
| ENGINEERING PERSONNEL | 9 | 0 | 0 | 9 | 2.787 | 0.011 | 0.000 | 2.798 |
| GRAND TOTALS | 215 | 24 | 16 | 255 | 73.566 | 8.923 | 10.859 | 93.348 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *NINE MILE POINT 1,2

TYPE: BWR

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

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *NORTH ANNA 1,2 TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 46 | 0 | 29 | 75 | 0.419 | 0.000 | 0.495 | 0.914 |
| OPERATIONS PERSONNEL | 115 | 4 | 2 | 121 | 10.379 | 0.001 | 0.000 | 10.380 |
| HEALTH PHYSICS PERSONNEL | 26 | 0 | 26 | 52 | 0.298 | 0.000 | 0.176 | 0.474 |
| SUPERVISORY PERSONNEL | 33 | 9 | 9 | 51 | 0.586 | 0.001 | 0.000 | 0.587 |
| ENGINEERING PERSONNEL | 13 | 1 | 3 | 17 | 0.045 | 0.001 | 0.021 | 0.067 |
| TOTAL | 233 | 14 | 69 | 316 | 11.727 | 0.003 | 0.692 | 12.422 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 276 | 6 | 786 | 1068 | 79.910 | 0.004 | 140.664 | 220.578 |
| OPERATIONS PERSONNEL | 247 | 7 | 40 | 294 | 19.408 | 0.040 | 0.138 | 19.586 |
| HEALTH PHYSICS PERSONNEL | 108 | 16 | 243 | 367 | 20.043 | 0.089 | 71.629 | 91.761 |
| SUPERVISORY PERSONNEL | 105 | 19 | 7 | 131 | 2.157 | 0.025 | 0.001 | 2.183 |
| ENGINEERING PERSONNEL | 125 | 74 | 104 | 303 | 4.112 | 0.438 | 4.255 | 8.805 |
| TOTAL | 861 | 122 | 1180 | 2163 | 125.630 | 0.596 | 216.687 | 342.913 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 35 | 0 | 166 | 201 | 4.952 | 0.000 | 49.761 | 54.713 |
| OPERATIONS PERSONNEL | 20 | 0 | 0 | 20 | 1.293 | 0.000 | 0.000 | 1.293 |
| HEALTH PHYSICS PERSONNEL | 10 | 0 | 78 | 88 | 0.482 | 0.000 | 7.145 | 7.627 |
| SUPERVISORY PERSONNEL | 3 | 0 | 0 | 3 | 0.012 | 0.000 | 0.000 | 0.012 |
| ENGINEERING PERSONNEL | 21 | 0 | 18 | 39 | 1.582 | 0.000 | 14.222 | 15.804 |
| TOTAL | 89 | 0 | 262 | 351 | 8.321 | 0.000 | 71.128 | 79.449 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 87 | 0 | 421 | 508 | 1.252 | 0.000 | 118.679 | 119.931 |
| OPERATIONS PERSONNEL | 17 | 0 | 0 | 17 | 0.280 | 0.000 | 0.000 | 0.280 |
| HEALTH PHYSICS PERSONNEL | 21 | 0 | 96 | 117 | 0.253 | 0.000 | 4.767 | 5.020 |
| SUPERVISORY PERSONNEL | 6 | 0 | 1 | 7 | 0.028 | 0.000 | 0.000 | 0.028 |
| ENGINEERING PERSONNEL | 19 | 0 | 14 | 33 | 0.200 | 0.000 | 0.081 | 0.281 |
| TOTAL | 150 | 0 | 532 | 682 | 2.013 | 0.000 | 123.527 | 125.540 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 78 | 0 | 53 | 131 | 2.627 | 0.000 | 0.067 | 2.694 |
| OPERATIONS PERSONNEL | 45 | 0 | 2 | 47 | 1.003 | 0.000 | 0.012 | 1.015 |
| HEALTH PHYSICS PERSONNEL | 44 | 0 | 37 | 81 | 3.063 | 0.000 | 0.875 | 3.938 |
| SUPERVISORY PERSONNEL | 9 | 1 | 0 | 10 | 0.622 | 0.000 | 0.000 | 0.622 |
| ENGINEERING PERSONNEL | 2 | 0 | 1 | 3 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 178 | 1 | 93 | 272 | 7.315 | 0.000 | 0.954 | 8.269 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 17 | 0 | 86 | 103 | 0.982 | 0.000 | 26.899 | 27.881 |
| OPERATIONS PERSONNEL | 54 | 3 | 0 | 57 | 3.570 | 0.059 | 0.000 | 3.629 |
| HEALTH PHYSICS PERSONNEL | 25 | 1 | 129 | 155 | 0.367 | 0.018 | 7.515 | 7.900 |
| SUPERVISORY PERSONNEL | 11 | 1 | 0 | 12 | 0.485 | 0.112 | 0.000 | 0.597 |
| ENGINEERING PERSONNEL | 4 | 6 | 5 | 15 | 0.397 | 0.221 | 0.079 | 0.697 |
| TOTAL | 111 | 11 | 220 | 342 | 5.801 | 0.410 | 34.493 | 40.704 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 539 | 6 | 1541 | 2086 | 90.142 | 0.004 | 336.565 | 426.711 |
| OPERATIONS PERSONNEL | 498 | 14 | 44 | 556 | 35.933 | 0.100 | 0.150 | 36.183 |
| HEALTH PHYSICS PERSONNEL | 234 | 17 | 609 | 860 | 24.506 | 0.107 | 92.107 | 116.720 |
| SUPERVISORY PERSONNEL | 167 | 30 | 17 | 214 | 3.890 | 0.138 | 0.001 | 4.029 |
| ENGINEERING PERSONNEL | 184 | 81 | 145 | 410 | 6.336 | 0.660 | 18.658 | 25.654 |
| GRAND TOTALS | 1622 | 148 | 2356 | 4126 | 160.807 | 1.009 | 447.481 | 609.297 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *OCONEE 1,2,3

TYPE: PWR

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

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *OYSTER CREEK

TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) STATION | UTILITY | CONTRACT | TOTAL | TOTAL PERSON-REM STATION | UTILITY | CONTRACT | TOTAL |
|---|---|---|---|---|---|---|---|---|
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 160 | 0 | 45 | 205 | 15.481 | 0.000 | 1.313 | 16.794 |
| OPERATIONS PERSONNEL | 146 | 0 | 9 | 155 | 38.110 | 0.000 | 3.125 | 41.235 |
| HEALTH PHYSICS PERSONNEL | 86 | 0 | 103 | 189 | 12.144 | 0.000 | 18.967 | 31.111 |
| SUPERVISORY PERSONNEL | 25 | 0 | 4 | 29 | 0.753 | 0.000 | 0.083 | 0.836 |
| ENGINEERING PERSONNEL | 32 | 1 | 6 | 39 | 0.958 | 0.000 | 0.086 | 1.044 |
| TOTAL | 449 | 1 | 167 | 617 | 67.446 | 0.000 | 23.574 | 91.020 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 363 | 8 | 420 | 791 | 63.641 | 0.002 | 25.796 | 89.439 |
| OPERATIONS PERSONNEL | 259 | 3 | 104 | 366 | 17.175 | 0.013 | 1.216 | 18.404 |
| HEALTH PHYSICS PERSONNEL | 70 | 0 | 76 | 146 | 3.729 | 0.000 | 3.399 | 7.128 |
| SUPERVISORY PERSONNEL | 123 | 2 | 73 | 198 | 3.383 | 0.002 | 0.679 | 4.064 |
| ENGINEERING PERSONNEL | 160 | 3 | 95 | 258 | 3.557 | 0.002 | 2.527 | 6.086 |
| TOTAL | 975 | 16 | 768 | 1759 | 91.485 | 0.019 | 33.617 | 125.121 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 63 | 0 | 33 | 96 | 0.657 | 0.000 | 4.801 | 5.458 |
| OPERATIONS PERSONNEL | 35 | 0 | 0 | 35 | 0.680 | 0.000 | 0.000 | 0.680 |
| HEALTH PHYSICS PERSONNEL | 11 | 0 | 17 | 28 | 0.102 | 0.000 | 1.120 | 1.222 |
| SUPERVISORY PERSONNEL | 1 | 0 | 2 | 3 | 0.026 | 0.000 | 0.083 | 0.109 |
| ENGINEERING PERSONNEL | 9 | 0 | 3 | 12 | 0.218 | 0.000 | 0.035 | 0.253 |
| TOTAL | 119 | 0 | 55 | 174 | 1.683 | 0.000 | 6.039 | 7.722 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 173 | 0 | 293 | 466 | 33.794 | 0.000 | 73.641 | 107.435 |
| OPERATIONS PERSONNEL | 62 | 0 | 20 | 82 | 5.410 | 0.000 | 0.109 | 5.519 |
| HEALTH PHYSICS PERSONNEL | 29 | 0 | 57 | 86 | 3.360 | 0.000 | 5.093 | 8.453 |
| SUPERVISORY PERSONNEL | 22 | 0 | 14 | 36 | 1.488 | 0.000 | 0.978 | 2.466 |
| ENGINEERING PERSONNEL | 29 | 0 | 25 | 54 | 3.102 | 0.000 | 1.618 | 4.720 |
| TOTAL | 315 | 0 | 409 | 724 | 47.154 | 0.000 | 81.439 | 128.593 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 107 | 0 | 74 | 181 | 1.722 | 0.000 | 4.493 | 6.215 |
| OPERATIONS PERSONNEL | 67 | 1 | 6 | 74 | 3.757 | 0.000 | 3.631 | 7.388 |
| HEALTH PHYSICS PERSONNEL | 23 | 0 | 50 | 73 | 0.997 | 0.000 | 2.920 | 3.917 |
| SUPERVISORY PERSONNEL | 2 | 0 | 1 | 3 | 0.126 | 0.000 | 0.017 | 0.143 |
| ENGINEERING PERSONNEL | 7 | 0 | 5 | 12 | 0.065 | 0.000 | 0.301 | 0.366 |
| TOTAL | 206 | 1 | 136 | 343 | 6.667 | 0.000 | 11.362 | 18.029 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 866 (366) | 8 (8) | 865 (480) | 1739 (854) | 115.295 | 0.002 | 110.044 | 225.341 |
| OPERATIONS PERSONNEL | 569 (305) | 4 (3) | 139 (112) | 712 (420) | 65.132 | 0.013 | 8.081 | 73.226 |
| HEALTH PHYSICS PERSONNEL | 219 (110) | 0 (0) | 303 (126) | 522 (236) | 20.332 | 0.000 | 31.499 | 51.831 |
| SUPERVISORY PERSONNEL | 173 (133) | 2 (2) | 94 (75) | 269 (210) | 5.776 | 0.002 | 1.840 | 7.618 |
| ENGINEERING PERSONNEL | 237 (167) | 4 (4) | 134 (101) | 375 (272) | 7.900 | 0.002 | 4.567 | 12.469 |
| GRAND TOTALS | 2064 (1081) | 18 (17) | 1535 (894) | 3617(1992) | 214.435 | 0.019 | 156.031 | 370.485 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *PALISADES

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 5 | 3 | 27 | 35 | 2.533 | 0.735 | 8.784 | 12.052 |
| OPERATIONS PERSONNEL | 45 | 0 | 1 | 46 | 15.148 | 0.057 | 2.820 | 18.025 |
| HEALTH PHYSICS PERSONNEL | 21 | 0 | 163 | 184 | 8.084 | 0.000 | 61.539 | 69.623 |
| SUPERVISORY PERSONNEL | 5 | 1 | 3 | 9 | 2.599 | 0.190 | 1.111 | 3.900 |
| ENGINEERING PERSONNEL | 5 | 1 | 3 | 9 | 2.292 | 0.341 | 2.522 | 5.155 |
| TOTAL | 81 | 5 | 197 | 283 | 30.656 | 1.323 | 76.776 | 108.755 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 70 | 0 | 159 | 229 | 52.285 | 0.854 | 81.591 | 134.730 |
| OPERATIONS PERSONNEL | 0 | 0 | 4 | 4 | 0.423 | 0.000 | 1.307 | 1.730 |
| HEALTH PHYSICS PERSONNEL | 5 | 0 | 27 | 32 | 1.516 | 0.000 | 9.760 | 11.276 |
| SUPERVISORY PERSONNEL | 2 | 0 | 2 | 4 | 0.968 | 0.009 | 3.373 | 4.350 |
| ENGINEERING PERSONNEL | 1 | 5 | 11 | 17 | 0.735 | 2.738 | 7.972 | 11.445 |
| TOTAL | 78 | 5 | 203 | 286 | 55.927 | 3.601 | 104.003 | 163.531 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 38 | 38 | 0.256 | 0.000 | 21.987 | 22.243 |
| OPERATIONS PERSONNEL | 0 | 0 | 1 | 1 | 0.000 | 0.000 | 0.341 | 0.341 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 3 | 3 | 0.091 | 0.000 | 0.678 | 0.769 |
| SUPERVISORY PERSONNEL | 0 | 0 | 1 | 1 | 0.020 | 0.003 | 0.182 | 0.205 |
| ENGINEERING PERSONNEL | 0 | 5 | 19 | 24 | 0.117 | 5.192 | 7.254 | 12.563 |
| TOTAL | 0 | 5 | 62 | 67 | 0.484 | 5.195 | 30.442 | 36.121 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 8 | 17 | 425 | 450 | 3.932 | 4.518 | 289.841 | 298.291 |
| OPERATIONS PERSONNEL | 0 | 0 | 16 | 16 | 0.168 | 0.042 | 8.493 | 8.703 |
| HEALTH PHYSICS PERSONNEL | 7 | 0 | 153 | 160 | 1.732 | 0.000 | 45.861 | 47.593 |
| SUPERVISORY PERSONNEL | 1 | 0 | 9 | 10 | 0.384 | 0.037 | 2.844 | 3.265 |
| ENGINEERING PERSONNEL | 0 | 4 | 101 | 105 | 0.289 | 0.900 | 57.753 | 58.942 |
| TOTAL | 16 | 21 | 704 | 741 | 6.505 | 5.497 | 404.792 | 416.794 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.184 | 0.004 | 0.177 | 0.365 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.193 | 0.000 | 0.007 | 0.200 |
| HEALTH PHYSICS PERSONNEL | 10 | 0 | 0 | 10 | 4.931 | 0.000 | 1.081 | 6.012 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.096 | 0.003 | 0.000 | 0.099 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.010 | 0.000 | 0.145 | 0.155 |
| TOTAL | 10 | 0 | 0 | 10 | 5.414 | 0.007 | 1.410 | 6.831 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 5 | 28 | 0 | 33 | 1.657 | 17.788 | 0.147 | 19.592 |
| OPERATIONS PERSONNEL | 5 | 0 | 0 | 5 | 1.870 | 0.000 | 0.093 | 1.963 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 4 | 4 | 0.043 | 0.000 | 1.584 | 1.627 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.301 | 0.040 | 0.018 | 0.359 |
| ENGINEERING PERSONNEL | 1 | 0 | 16 | 17 | 0.420 | 0.000 | 10.369 | 10.789 |
| TOTAL | 11 | 28 | 20 | 59 | 4.291 | 17.828 | 12.211 | 34.330 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 88 | 48 | 649 | 785 | 60.847 | 23.899 | 402.527 | 487.273 |
| OPERATIONS PERSONNEL | 50 | 0 | 22 | 72 | 17.802 | 0.099 | 13.061 | 30.962 |
| HEALTH PHYSICS PERSONNEL | 43 | 0 | 350 | 393 | 16.397 | 0.000 | 120.503 | 136.900 |
| SUPERVISORY PERSONNEL | 8 | 1 | 15 | 24 | 4.368 | 0.282 | 7.528 | 12.178 |
| ENGINEERING PERSONNEL | 7 | 15 | 150 | 172 | 3.863 | 9.171 | 86.015 | 99.049 |
| GRAND TOTALS | 196 | 64 | 1186 | 1446 | 103.277 | 33.451 | 629.634 | 766.362 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *PALO VERDE 1,2,3 TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 1.232 | 0.000 | 2.357 | 3.589 |
| OPERATIONS PERSONNEL | 57 | 0 | 0 | 57 | 17.213 | 0.000 | 1.213 | 18.426 |
| HEALTH PHYSICS PERSONNEL | 45 | 0 | 106 | 151 | 11.489 | 0.000 | 30.052 | 41.541 |
| SUPERVISORY PERSONNEL | 1 | 0 | 0 | 1 | 0.700 | 0.000 | 0.030 | 0.730 |
| ENGINEERING PERSONNEL | 1 | 0 | 6 | 7 | 1.014 | 0.000 | 2.101 | 3.115 |
| TOTAL | 104 | 0 | 112 | 216 | 31.648 | 0.000 | 35.753 | 67.401 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 122 | 0 | 265 | 387 | 45.842 | 0.000 | 117.023 | 162.865 |
| OPERATIONS PERSONNEL | 3 | 0 | 22 | 25 | 2.649 | 0.000 | 5.035 | 7.684 |
| HEALTH PHYSICS PERSONNEL | 48 | 0 | 114 | 162 | 15.635 | 0.000 | 37.486 | 53.121 |
| SUPERVISORY PERSONNEL | 0 | 0 | 2 | 2 | 0.225 | 0.000 | 0.490 | 0.715 |
| ENGINEERING PERSONNEL | 5 | 0 | 16 | 21 | 2.829 | 0.000 | 7.812 | 10.641 |
| TOTAL | 178 | 0 | 419 | 597 | 67.180 | 0.000 | 167.846 | 235.026 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 9 | 0 | 112 | 121 | 3.273 | 0.000 | 60.482 | 63.755 |
| OPERATIONS PERSONNEL | 0 | 0 | 5 | 5 | 0.160 | 0.000 | 1.565 | 1.725 |
| HEALTH PHYSICS PERSONNEL | 7 | 0 | 36 | 43 | 1.738 | 0.000 | 11.553 | 13.291 |
| SUPERVISORY PERSONNEL | 0 | 0 | 2 | 2 | 0.090 | 0.000 | 2.184 | 2.274 |
| ENGINEERING PERSONNEL | 6 | 0 | 28 | 34 | 1.715 | 0.000 | 11.005 | 12.720 |
| TOTAL | 22 | 0 | 183 | 205 | 6.976 | 0.000 | 86.789 | 93.765 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 4 | 0 | 11 | 15 | 1.249 | 0.000 | 3.870 | 5.119 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.010 | 0.000 | 0.010 | 0.020 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 2 | 2 | 0.010 | 0.000 | 0.685 | 0.695 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 1 | 0 | 0 | 1 | 0.350 | 0.000 | 0.000 | 0.350 |
| TOTAL | 5 | 0 | 13 | 18 | 1.619 | 0.000 | 4.565 | 6.184 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 1 | 1 | 0.030 | 0.000 | 0.865 | 0.895 |
| OPERATIONS PERSONNEL | 0 | 0 | 1 | 1 | 0.220 | 0.000 | 0.845 | 1.065 |
| HEALTH PHYSICS PERSONNEL | 17 | 0 | 18 | 35 | 5.507 | 0.000 | 6.189 | 11.696 |
| SUPERVISORY PERSONNEL | 0 | 0 | 1 | 1 | 0.030 | 0.000 | 0.110 | 0.140 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 17 | 0 | 21 | 38 | 5.787 | 0.000 | 8.009 | 13.796 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 19 | 0 | 102 | 121 | 6.829 | 0.000 | 50.508 | 57.337 |
| OPERATIONS PERSONNEL | 2 | 0 | 3 | 5 | 1.500 | 0.000 | 1.288 | 2.788 |
| HEALTH PHYSICS PERSONNEL | 6 | 0 | 61 | 67 | 2.678 | 0.000 | 16.842 | 19.520 |
| SUPERVISORY PERSONNEL | 2 | 0 | 1 | 3 | 0.645 | 0.000 | 0.230 | 0.875 |
| ENGINEERING PERSONNEL | 1 | 0 | 0 | 1 | 0.440 | 0.000 | 0.905 | 1.345 |
| TOTAL | 30 | 0 | 167 | 197 | 12.092 | 0.000 | 69.773 | 81.865 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 154 | 0 | 491 | 645 | 58.455 | 0.000 | 235.105 | 293.560 |
| OPERATIONS PERSONNEL | 62 | 0 | 31 | 93 | 21.752 | 0.000 | 9.956 | 31.708 |
| HEALTH PHYSICS PERSONNEL | 123 | 0 | 337 | 460 | 37.057 | 0.000 | 102.807 | 139.864 |
| SUPERVISORY PERSONNEL | 3 | 0 | 6 | 9 | 1.690 | 0.000 | 3.044 | 4.734 |
| ENGINEERING PERSONNEL | 14 | 0 | 50 | 64 | 6.348 | 0.000 | 21.823 | 28.171 |
| GRAND TOTALS | 356 | 0 | 915 | 1271 | 125.302 | 0.000 | 372.735 | 498.037 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *PEACH BOTTOM 2,3

TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) STATION | UTILITY | CONTRACT | TOTAL | TOTAL PERSON-REM STATION | UTILITY | CONTRACT | TOTAL |
|---|---|---|---|---|---|---|---|---|
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 134 | 197 | 328 | 659 | 4.124 | 3.918 | 8.784 | 16.826 |
| OPERATIONS PERSONNEL | 134 | 29 | 105 | 268 | 20.594 | 1.475 | 9.039 | 31.108 |
| HEALTH PHYSICS PERSONNEL | 104 | 3 | 65 | 172 | 34.276 | 0.632 | 8.228 | 43.136 |
| SUPERVISORY PERSONNEL | 4 | 3 | 13 | 20 | 0.069 | 0.018 | 0.337 | 0.424 |
| ENGINEERING PERSONNEL | 49 | 29 | 32 | 110 | 3.827 | 1.864 | 1.359 | 7.050 |
| TOTAL | 425 | 261 | 543 | 1229 | 62.890 | 7.907 | 27.747 | 98.544 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 122 | 210 | 382 | 714 | 17.799 | 6.035 | 19.840 | 43.674 |
| OPERATIONS PERSONNEL | 44 | 24 | 83 | 151 | 1.991 | 0.681 | 4.220 | 6.892 |
| HEALTH PHYSICS PERSONNEL | 68 | 3 | 48 | 119 | 5.075 | 0.067 | 3.351 | 8.493 |
| SUPERVISORY PERSONNEL | 3 | 2 | 6 | 11 | 0.108 | 0.013 | 0.183 | 0.304 |
| ENGINEERING PERSONNEL | 36 | 26 | 23 | 85 | 1.989 | 0.480 | 0.296 | 2.765 |
| TOTAL | 273 | 265 | 542 | 1080 | 26.962 | 7.276 | 27.890 | 62.128 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 22 | 30 | 77 | 129 | 0.125 | 0.122 | 1.807 | 2.054 |
| OPERATIONS PERSONNEL | 4 | 2 | 7 | 13 | 0.018 | 0.002 | 0.417 | 0.437 |
| HEALTH PHYSICS PERSONNEL | 6 | 1 | 3 | 10 | 0.097 | 0.017 | 0.308 | 0.422 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 5 | 2 | 1 | 8 | 0.137 | 0.029 | 0.007 | 0.173 |
| TOTAL | 37 | 35 | 88 | 160 | 0.377 | 0.170 | 2.539 | 3.086 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 130 | 231 | 482 | 843 | 30.558 | 28.002 | 86.720 | 145.280 |
| OPERATIONS PERSONNEL | 73 | 30 | 139 | 242 | 4.761 | 1.995 | 16.024 | 22.780 |
| HEALTH PHYSICS PERSONNEL | 93 | 3 | 60 | 156 | 13.240 | 0.397 | 5.176 | 18.813 |
| SUPERVISORY PERSONNEL | 4 | 3 | 12 | 19 | 0.238 | 0.183 | 1.270 | 1.691 |
| ENGINEERING PERSONNEL | 44 | 27 | 32 | 103 | 3.270 | 1.775 | 1.994 | 7.039 |
| TOTAL | 344 | 294 | 725 | 1363 | 52.067 | 32.352 | 111.184 | 195.603 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 63 | 84 | 121 | 268 | 2.206 | 1.187 | 3.758 | 7.151 |
| OPERATIONS PERSONNEL | 15 | 10 | 20 | 45 | 0.158 | 0.149 | 1.272 | 1.579 |
| HEALTH PHYSICS PERSONNEL | 52 | 1 | 22 | 75 | 1.716 | 0.002 | 0.994 | 2.712 |
| SUPERVISORY PERSONNEL | 1 | 0 | 3 | 4 | 0.007 | 0.000 | 0.038 | 0.045 |
| ENGINEERING PERSONNEL | 9 | 0 | 4 | 13 | 0.152 | 0.000 | 0.030 | 0.182 |
| TOTAL | 140 | 95 | 170 | 405 | 4.239 | 1.338 | 6.092 | 11.669 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 27 | 97 | 103 | 227 | 0.254 | 1.704 | 2.025 | 3.983 |
| OPERATIONS PERSONNEL | 8 | 7 | 15 | 30 | 0.027 | 0.163 | 0.448 | 0.638 |
| HEALTH PHYSICS PERSONNEL | 19 | 0 | 18 | 37 | 0.200 | 0.000 | 0.688 | 0.888 |
| SUPERVISORY PERSONNEL | 0 | 0 | 1 | 1 | 0.000 | 0.000 | 0.006 | 0.006 |
| ENGINEERING PERSONNEL | 7 | 5 | 3 | 15 | 0.113 | 0.136 | 0.076 | 0.325 |
| TOTAL | 61 | 109 | 140 | 310 | 0.594 | 2.003 | 3.243 | 5.840 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 498 (138) | 849 (233) | 1493 (517) | 2840 (888) | 55.066 | 40.968 | 122.934 | 218.968 |
| OPERATIONS PERSONNEL | 278 (136) | 102 (30) | 369 (164) | 749 (330) | 27.549 | 4.465 | 31.420 | 63.434 |
| HEALTH PHYSICS PERSONNEL | 342 (104) | 11 (3) | 216 (69) | 569 (176) | 54.604 | 1.115 | 18.745 | 74.464 |
| SUPERVISORY PERSONNEL | 12 (4) | 8 (3) | 35 (17) | 55 (24) | 0.422 | 0.214 | 1.834 | 2.470 |
| ENGINEERING PERSONNEL | 150 (51) | 89 (33) | 95 (41) | 334 (125) | 9.488 | 4.284 | 3.762 | 17.534 |
| GRAND TOTALS | 1280 (433) | 1059 (302) | 2208 (808) | 4547(1543) | 147.129 | 51.046 | 178.695 | 376.870 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *PERRY

TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 139 | 4 | 278 | 421 | 1.421 | 0.055 | 11.669 | 13.145 |
| OPERATIONS PERSONNEL | 75 | 2 | 1 | 78 | 13.616 | 0.000 | 0.000 | 13.616 |
| HEALTH PHYSICS PERSONNEL | 50 | 0 | 121 | 171 | 15.369 | 0.000 | 13.436 | 28.805 |
| SUPERVISORY PERSONNEL | 0 | 0 | 2 | 2 | 0.000 | 0.000 | 0.060 | 0.060 |
| ENGINEERING PERSONNEL | 19 | 11 | 18 | 48 | 0.257 | 0.105 | 0.283 | 0.645 |
| TOTAL | 283 | 17 | 420 | 720 | 30.663 | 0.160 | 25.448 | 56.271 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 150 | 5 | 587 | 742 | 7.950 | 0.502 | 125.662 | 134.114 |
| OPERATIONS PERSONNEL | 72 | 2 | 2 | 76 | 3.694 | 0.125 | 0.025 | 3.844 |
| HEALTH PHYSICS PERSONNEL | 46 | 0 | 155 | 201 | 5.683 | 0.000 | 54.402 | 60.085 |
| SUPERVISORY PERSONNEL | 0 | 0 | 2 | 2 | 0.000 | 0.000 | 0.070 | 0.070 |
| ENGINEERING PERSONNEL | 19 | 15 | 35 | 69 | 1.574 | 1.117 | 3.810 | 6.501 |
| TOTAL | 287 | 22 | 781 | 1090 | 18.901 | 1.744 | 183.969 | 204.614 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 9 | 0 | 189 | 198 | 0.020 | 0.000 | 12.318 | 12.338 |
| OPERATIONS PERSONNEL | 8 | 0 | 0 | 8 | 0.061 | 0.000 | 0.000 | 0.061 |
| HEALTH PHYSICS PERSONNEL | 5 | 0 | 30 | 35 | 0.571 | 0.000 | 0.665 | 1.236 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 8 | 8 | 29 | 45 | 0.232 | 0.135 | 0.747 | 1.114 |
| TOTAL | 30 | 8 | 248 | 286 | 0.884 | 0.135 | 13.730 | 14.749 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 151 | 6 | 646 | 803 | 52.790 | 2.930 | 242.085 | 297.805 |
| OPERATIONS PERSONNEL | 81 | 2 | 4 | 87 | 18.424 | 0.085 | 1.115 | 19.624 |
| HEALTH PHYSICS PERSONNEL | 48 | 0 | 152 | 200 | 14.406 | 0.000 | 24.851 | 39.257 |
| SUPERVISORY PERSONNEL | 0 | 0 | 2 | 2 | 0.000 | 0.000 | 0.085 | 0.085 |
| ENGINEERING PERSONNEL | 20 | 16 | 38 | 74 | 3.120 | 1.721 | 8.200 | 13.041 |
| TOTAL | 300 | 24 | 842 | 1166 | 88.740 | 4.736 | 276.336 | 369.812 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 63 | 0 | 162 | 225 | 0.945 | 0.000 | 11.870 | 12.815 |
| OPERATIONS PERSONNEL | 30 | 1 | 1 | 32 | 3.485 | 0.150 | 1.565 | 5.200 |
| HEALTH PHYSICS PERSONNEL | 34 | 0 | 101 | 135 | 4.180 | 0.000 | 6.075 | 10.255 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 2 | 4 | 4 | 10 | 0.000 | 0.020 | 0.000 | 0.020 |
| TOTAL | 129 | 5 | 268 | 402 | 8.610 | 0.170 | 19.510 | 28.290 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 50 | 0 | 156 | 206 | 0.540 | 0.000 | 18.950 | 19.490 |
| OPERATIONS PERSONNEL | 39 | 1 | 1 | 41 | 0.405 | 0.000 | 0.010 | 0.415 |
| HEALTH PHYSICS PERSONNEL | 23 | 0 | 28 | 51 | 1.500 | 0.000 | 2.215 | 3.715 |
| SUPERVISORY PERSONNEL | 0 | 0 | 1 | 1 | 0.000 | 0.000 | 0.050 | 0.050 |
| ENGINEERING PERSONNEL | 7 | 7 | 8 | 22 | 0.035 | 0.305 | 0.480 | 0.820 |
| TOTAL | 119 | 8 | 194 | 321 | 2.480 | 0.305 | 21.705 | 24.490 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 562 | 15 | 2018 | 2595 | 63.666 | 3.487 | 422.554 | 489.707 |
| OPERATIONS PERSONNEL | 305 | 8 | 9 | 322 | 39.685 | 0.360 | 2.715 | 42.760 |
| HEALTH PHYSICS PERSONNEL | 206 | 0 | 587 | 793 | 41.709 | 0.000 | 101.644 | 143.353 |
| SUPERVISORY PERSONNEL | 0 | 0 | 7 | 7 | 0.000 | 0.000 | 0.265 | 0.265 |
| ENGINEERING PERSONNEL | 75 | 61 | 132 | 268 | 5.218 | 3.403 | 13.520 | 22.141 |
| GRAND TOTALS | 1148 | 84 | 2753 | 3985 | 150.278 | 7.250 | 540.698 | 698.226 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *PILGRIM

TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 88 | 3 | 25 | 116 | 21.743 | 0.707 | 6.924 | 29.374 |
| OPERATIONS PERSONNEL | 62 | 1 | 28 | 91 | 26.049 | 0.269 | 10.109 | 36.427 |
| HEALTH PHYSICS PERSONNEL | 32 | 0 | 1 | 33 | 11.808 | 0.000 | 0.558 | 12.366 |
| SUPERVISORY PERSONNEL | 30 | 1 | 9 | 40 | 11.233 | 0.400 | 3.350 | 14.983 |
| ENGINEERING PERSONNEL | 20 | 2 | 5 | 27 | 8.251 | 0.393 | 2.231 | 10.875 |
| TOTAL | 232 | 7 | 68 | 307 | 79.084 | 1.769 | 23.172 | 104.025 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 92 | 3 | 73 | 168 | 32.244 | 0.765 | 26.456 | 59.465 |
| OPERATIONS PERSONNEL | 10 | 1 | 0 | 11 | 3.678 | 0.113 | 0.056 | 3.847 |
| HEALTH PHYSICS PERSONNEL | 29 | 0 | 4 | 33 | 9.882 | 0.000 | 1.691 | 11.573 |
| SUPERVISORY PERSONNEL | 20 | 0 | 11 | 31 | 5.668 | 0.027 | 3.850 | 9.545 |
| ENGINEERING PERSONNEL | 7 | 0 | 3 | 10 | 2.391 | 0.017 | 0.916 | 3.324 |
| TOTAL | 158 | 4 | 91 | 253 | 53.863 | 0.922 | 32.969 | 87.754 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 11 | 11 | 0.049 | 0.000 | 2.262 | 2.311 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.015 | 0.000 | 0.000 | 0.015 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.137 | 0.000 | 0.050 | 0.187 |
| SUPERVISORY PERSONNEL | 0 | 0 | 6 | 6 | 0.000 | 0.000 | 1.660 | 1.660 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.250 | 0.000 | 0.085 | 0.335 |
| TOTAL | 0 | 0 | 17 | 17 | 0.451 | 0.000 | 4.057 | 4.508 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 12 | 12 | 0.277 | 0.000 | 2.710 | 2.987 |
| OPERATIONS PERSONNEL | 1 | 0 | 0 | 1 | 1.002 | 0.003 | 0.000 | 1.005 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.201 | 0.000 | 0.005 | 0.206 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.081 | 0.000 | 0.015 | 0.096 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.241 | 0.000 | 0.013 | 0.254 |
| TOTAL | 1 | 0 | 12 | 13 | 1.802 | 0.003 | 2.743 | 4.548 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.775 | 0.021 | 0.005 | 0.801 |
| OPERATIONS PERSONNEL | 9 | 1 | 0 | 10 | 4.363 | 0.447 | 0.023 | 4.833 |
| HEALTH PHYSICS PERSONNEL | 7 | 0 | 0 | 7 | 2.343 | 0.000 | 0.050 | 2.393 |
| SUPERVISORY PERSONNEL | 2 | 0 | 0 | 2 | 0.915 | 0.000 | 0.008 | 0.923 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.097 | 0.000 | 0.000 | 0.097 |
| TOTAL | 18 | 1 | 0 | 19 | 8.493 | 0.468 | 0.086 | 9.047 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 180 | 6 | 121 | 307 | 55.088 | 1.493 | 38.357 | 94.938 |
| OPERATIONS PERSONNEL | 82 | 3 | 28 | 113 | 35.107 | 0.832 | 10.188 | 46.127 |
| HEALTH PHYSICS PERSONNEL | 68 | 0 | 5 | 73 | 24.371 | 0.000 | 2.354 | 26.725 |
| SUPERVISORY PERSONNEL | 52 | 1 | 26 | 79 | 17.897 | 0.427 | 8.883 | 27.207 |
| ENGINEERING PERSONNEL | 27 | 2 | 8 | 37 | 11.230 | 0.410 | 3.245 | 14.885 |
| GRAND TOTALS | 409 | 12 | 188 | 609 | 143.693 | 3.162 | 63.027 | 209.882 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *POINT BEACH 1,2 TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) STATION | UTILITY | CONTRACT | TOTAL | TOTAL PERSON-REM STATION | UTILITY | CONTRACT | TOTAL |
|---|---|---|---|---|---|---|---|---|
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 1.750 | 0.840 | 2.590 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 14.180 | 0.000 | 0.000 | 14.180 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 30.840 | 0.000 | 0.000 | 30.840 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.500 | 0.000 | 0.000 | 0.500 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.260 | 0.000 | 0.000 | 0.260 |
| TOTAL | 0 | 0 | 0 | 0 | 45.780 | 1.750 | 0.840 | 48.370 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 42.090 | 16.510 | 0.000 | 58.600 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 2.210 | 0.000 | 0.000 | 2.210 |
| TOTAL | 0 | 0 | 0 | 0 | 44.300 | 16.510 | 0.000 | 60.810 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 2.860 | 4.010 | 35.370 | 42.240 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 17.750 | 0.000 | 0.000 | 17.750 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.040 | 0.000 | 0.000 | 0.040 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 4.530 | 0.000 | 0.000 | 4.530 |
| TOTAL | 0 | 0 | 0 | 0 | 25.180 | 4.010 | 35.370 | 64.560 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 8.290 | 3.070 | 109.380 | 120.740 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 0 | 0 | 0 | 0 | 8.290 | 3.070 | 109.380 | 120.740 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 2.890 | 2.890 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.800 | 0.000 | 0.000 | 0.800 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 4.640 | 0.000 | 0.000 | 4.640 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 0 | 0 | 0 | 0 | 5.440 | 0.000 | 2.890 | 8.330 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 28.650 | 11.430 | 0.000 | 40.080 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 3.020 | 0.000 | 0.000 | 3.020 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.280 | 0.000 | 0.000 | 0.280 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 1.980 | 0.000 | 0.000 | 1.980 |
| TOTAL | 0 | 0 | 0 | 0 | 33.930 | 11.430 | 0.000 | 45.360 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 (48) | 0 (34) | 0 (219) | 0 (301) | 81.890 | 36.770 | 148.480 | 267.140 |
| OPERATIONS PERSONNEL | 0 (58) | 0 (0) | 0 (0) | 0 (58) | 35.750 | 0.000 | 0.000 | 35.750 |
| HEALTH PHYSICS PERSONNEL | 0 (40) | 0 (0) | 0 (0) | 0 (40) | 35.480 | 0.000 | 0.000 | 35.480 |
| SUPERVISORY PERSONNEL | 0 (3) | 0 (0) | 0 (0) | 0 (3) | 0.820 | 0.000 | 0.000 | 0.820 |
| ENGINEERING PERSONNEL | 0 (27) | 0 (0) | 0 (0) | 0 (27) | 8.980 | 0.000 | 0.000 | 8.980 |
| GRAND TOTALS | 0 (176) | 0 (34) | 0 (219) | 0 (429) | 162.920 | 36.770 | 148.480 | 348.170 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *PRAIRIE ISLAND 1,2

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 2 | 0 | 0 | 2 | 2.067 | 0.000 | 0.000 | 2.067 |
| OPERATIONS PERSONNEL | 2 | 0 | 0 | 2 | 1.435 | 0.613 | 0.133 | 2.181 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 0 | 1 | 0.383 | 0.127 | 0.265 | 0.775 |
| SUPERVISORY PERSONNEL | 5 | 0 | 1 | 6 | 1.756 | 0.000 | 0.816 | 2.572 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.108 | 0.000 | 0.000 | 0.108 |
| TOTAL | 10 | 0 | 1 | 11 | 5.749 | 0.740 | 1.214 | 7.703 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.033 | 0.000 | 0.000 | 0.033 |
| OPERATIONS PERSONNEL | 19 | 26 | 3 | 48 | 5.878 | 10.090 | 1.414 | 17.382 |
| HEALTH PHYSICS PERSONNEL | 7 | 0 | 10 | 17 | 1.424 | 0.080 | 3.202 | 4.706 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.071 | 0.000 | 0.135 | 0.206 |
| ENGINEERING PERSONNEL | 9 | 1 | 0 | 10 | 1.853 | 0.182 | 0.020 | 2.055 |
| TOTAL | 35 | 27 | 13 | 75 | 9.259 | 10.352 | 4.771 | 24.382 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| OPERATIONS PERSONNEL | 6 | 29 | 39 | 74 | 2.249 | 12.576 | 19.276 | 34.101 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 22 | 23 | 0.530 | 0.055 | 9.159 | 9.744 |
| SUPERVISORY PERSONNEL | 1 | 0 | 16 | 17 | 0.210 | 0.000 | 3.933 | 4.143 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.048 | 0.000 | 0.000 | 0.048 |
| TOTAL | 8 | 29 | 77 | 114 | 3.037 | 12.631 | 32.368 | 48.036 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 10 | 0 | 0 | 10 | 3.256 | 0.000 | 0.000 | 3.256 |
| OPERATIONS PERSONNEL | 33 | 103 | 17 | 153 | 8.913 | 34.860 | 4.112 | 47.885 |
| HEALTH PHYSICS PERSONNEL | 8 | 1 | 46 | 55 | 2.335 | 0.302 | 21.185 | 23.822 |
| SUPERVISORY PERSONNEL | 10 | 0 | 35 | 45 | 2.375 | 0.000 | 9.125 | 11.500 |
| ENGINEERING PERSONNEL | 2 | 0 | 1 | 3 | 0.755 | 0.023 | 0.157 | 0.935 |
| TOTAL | 63 | 104 | 99 | 266 | 17.634 | 35.185 | 34.579 | 87.398 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.118 | 0.000 | 0.000 | 0.118 |
| OPERATIONS PERSONNEL | 2 | 0 | 0 | 2 | 1.011 | 0.327 | 0.002 | 1.340 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.006 | 0.000 | 0.000 | 0.006 |
| SUPERVISORY PERSONNEL | 3 | 0 | 1 | 4 | 1.248 | 0.000 | 0.304 | 1.552 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 5 | 0 | 1 | 6 | 2.383 | 0.327 | 0.306 | 3.016 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.936 | 0.000 | 0.000 | 0.936 |
| OPERATIONS PERSONNEL | 24 | 25 | 0 | 49 | 7.888 | 7.370 | 0.000 | 15.258 |
| HEALTH PHYSICS PERSONNEL | 2 | 0 | 0 | 2 | 0.851 | 0.016 | 0.138 | 1.005 |
| SUPERVISORY PERSONNEL | 0 | 0 | 1 | 1 | 0.049 | 0.000 | 0.266 | 0.315 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.158 | 0.000 | 0.000 | 0.158 |
| TOTAL | 26 | 25 | 1 | 52 | 9.882 | 7.386 | 0.404 | 17.672 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 12 | 0 | 0 | 12 | 6.410 | 0.000 | 0.000 | 6.410 |
| OPERATIONS PERSONNEL | 86 | 183 | 59 | 328 | 27.374 | 65.836 | 24.937 | 118.147 |
| HEALTH PHYSICS PERSONNEL | 19 | 1 | 78 | 98 | 5.529 | 0.580 | 33.949 | 40.058 |
| SUPERVISORY PERSONNEL | 19 | 0 | 54 | 73 | 5.709 | 0.000 | 14.579 | 20.288 |
| ENGINEERING PERSONNEL | 11 | 1 | 1 | 13 | 2.922 | 0.205 | 0.177 | 3.304 |
| GRAND TOTALS | 147 | 185 | 192 | 524 | 47.944 | 66.621 | 73.642 | 188.207 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *QUAD CITIES 1,2 TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 16 | 10 | 110 | 136 | 16.255 | 0.128 | 46.123 | 62.506 |
| OPERATIONS PERSONNEL | 145 | 0 | 223 | 368 | 42.178 | 0.000 | 17.427 | 59.605 |
| HEALTH PHYSICS PERSONNEL | 24 | 0 | 15 | 39 | 20.830 | 0.000 | 6.072 | 26.902 |
| SUPERVISORY PERSONNEL | 96 | 28 | 5 | 129 | 16.574 | 0.395 | 0.957 | 17.926 |
| ENGINEERING PERSONNEL | 43 | 61 | 83 | 187 | 5.306 | 2.075 | 8.003 | 15.384 |
| TOTAL | 324 | 99 | 436 | 859 | 101.143 | 2.598 | 78.582 | 182.323 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 99 | 132 | 563 | 794 | 99.104 | 1.700 | 237.176 | 337.980 |
| OPERATIONS PERSONNEL | 32 | 0 | 2 | 34 | 9.177 | 0.000 | 0.127 | 9.304 |
| HEALTH PHYSICS PERSONNEL | 18 | 0 | 36 | 54 | 15.069 | 0.000 | 13.933 | 29.002 |
| SUPERVISORY PERSONNEL | 96 | 51 | 17 | 164 | 16.692 | 0.727 | 3.394 | 20.813 |
| ENGINEERING PERSONNEL | 32 | 74 | 45 | 151 | 3.956 | 2.539 | 4.268 | 10.763 |
| TOTAL | 277 | 257 | 663 | 1197 | 143.998 | 4.966 | 258.898 | 407.862 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 2 | 0 | 227 | 229 | 1.517 | 0.000 | 95.563 | 97.080 |
| OPERATIONS PERSONNEL | 0 | 0 | 1 | 1 | 0.088 | 0.000 | 0.034 | 0.122 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 1 | 1 | 0.405 | 0.000 | 0.574 | 0.979 |
| SUPERVISORY PERSONNEL | 1 | 1 | 7 | 9 | 0.220 | 0.011 | 1.404 | 1.635 |
| ENGINEERING PERSONNEL | 25 | 52 | 11 | 88 | 3.067 | 1.765 | 1.022 | 5.854 |
| TOTAL | 28 | 53 | 247 | 328 | 5.297 | 1.776 | 98.597 | 105.670 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 6 | 75 | 540 | 621 | 5.647 | 0.971 | 227.217 | 233.835 |
| OPERATIONS PERSONNEL | 2 | 0 | 1 | 3 | 0.534 | 0.000 | 0.108 | 0.642 |
| HEALTH PHYSICS PERSONNEL | 3 | 0 | 19 | 22 | 2.646 | 0.000 | 7.258 | 9.904 |
| SUPERVISORY PERSONNEL | 18 | 3 | 116 | 137 | 3.129 | 0.040 | 23.500 | 26.669 |
| ENGINEERING PERSONNEL | 11 | 55 | 158 | 224 | 1.350 | 1.866 | 15.195 | 18.411 |
| TOTAL | 40 | 133 | 834 | 1007 | 13.306 | 2.877 | 273.278 | 289.461 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.001 | 0.000 | 0.134 | 0.135 |
| OPERATIONS PERSONNEL | 15 | 0 | 25 | 40 | 4.376 | 0.000 | 1.954 | 6.330 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 0 | 1 | 0.801 | 0.000 | 0.025 | 0.826 |
| SUPERVISORY PERSONNEL | 19 | 0 | 0 | 19 | 3.315 | 0.000 | 0.000 | 3.315 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.002 | 0.011 | 0.000 | 0.013 |
| TOTAL | 35 | 0 | 25 | 60 | 8.495 | 0.011 | 2.113 | 10.619 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 19 | 0 | 0 | 19 | 19.399 | 0.000 | 0.192 | 19.591 |
| OPERATIONS PERSONNEL | 17 | 0 | 0 | 17 | 4.869 | 0.000 | 0.005 | 4.874 |
| HEALTH PHYSICS PERSONNEL | 3 | 0 | 0 | 3 | 2.114 | 0.000 | 0.000 | 2.114 |
| SUPERVISORY PERSONNEL | 20 | 0 | 0 | 20 | 3.492 | 0.003 | 0.000 | 3.495 |
| ENGINEERING PERSONNEL | 3 | 3 | 3 | 9 | 0.455 | 0.115 | 0.314 | 0.884 |
| TOTAL | 62 | 3 | 3 | 68 | 30.329 | 0.118 | 0.511 | 30.958 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 142 | 217 | 1440 | 1799 | 141.923 | 2.799 | 606.405 | 751.127 |
| OPERATIONS PERSONNEL | 211 | 0 | 252 | 463 | 61.222 | 0.000 | 19.655 | 80.877 |
| HEALTH PHYSICS PERSONNEL | 49 | 0 | 71 | 120 | 41.865 | 0.000 | 27.862 | 69.727 |
| SUPERVISORY PERSONNEL | 250 | 83 | 145 | 478 | 43.422 | 1.176 | 29.255 | 73.853 |
| ENGINEERING PERSONNEL | 114 | 245 | 300 | 659 | 14.136 | 8.371 | 28.802 | 51.309 |
| GRAND TOTALS | 766 | 545 | 2208 | 3519 | 302.568 | 12.346 | 711.979 | 1026.893 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *RANCHO SECO

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 1 | 0 | 0 | 1 | 0.002 | 0.000 | 0.000 | 0.002 |
| OPERATIONS PERSONNEL | 4 | 0 | 0 | 4 | 0.245 | 0.000 | 0.000 | 0.245 |
| HEALTH PHYSICS PERSONNEL | 13 | 0 | 6 | 19 | 1.814 | 0.000 | 0.698 | 2.512 |
| SUPERVISORY PERSONNEL | 1 | 0 | 0 | 1 | 0.012 | 0.000 | 0.000 | 0.012 |
| ENGINEERING PERSONNEL | 1 | 0 | 0 | 1 | 0.007 | 0.000 | 0.000 | 0.007 |
| TOTAL | 20 | 0 | 6 | 26 | 2.080 | 0.000 | 0.698 | 2.778 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 10 | 0 | 0 | 10 | 0.513 | 0.000 | 0.000 | 0.513 |
| OPERATIONS PERSONNEL | 1 | 0 | 0 | 1 | 0.150 | 0.000 | 0.000 | 0.150 |
| HEALTH PHYSICS PERSONNEL | 9 | 0 | 2 | 11 | 0.158 | 0.000 | 0.016 | 0.174 |
| SUPERVISORY PERSONNEL | 1 | 0 | 0 | 1 | 0.007 | 0.000 | 0.000 | 0.007 |
| ENGINEERING PERSONNEL | 1 | 0 | 0 | 1 | 0.008 | 0.000 | 0.000 | 0.008 |
| TOTAL | 22 | 0 | 2 | 24 | 0.836 | 0.000 | 0.016 | 0.852 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 2 | 0 | 0 | 2 | 0.142 | 0.000 | 0.000 | 0.142 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 4 | 0 | 0 | 4 | 0.025 | 0.000 | 0.000 | 0.025 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 1 | 0 | 0 | 1 | 0.023 | 0.000 | 0.000 | 0.023 |
| TOTAL | 7 | 0 | 0 | 7 | 0.190 | 0.000 | 0.000 | 0.190 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 3 | 0 | 0 | 3 | 0.188 | 0.000 | 0.000 | 0.188 |
| OPERATIONS PERSONNEL | 3 | 0 | 0 | 3 | 0.106 | 0.000 | 0.000 | 0.106 |
| HEALTH PHYSICS PERSONNEL | 12 | 0 | 3 | 15 | 2.635 | 0.000 | 0.844 | 3.479 |
| SUPERVISORY PERSONNEL | 1 | 0 | 0 | 1 | 0.158 | 0.000 | 0.000 | 0.158 |
| ENGINEERING PERSONNEL | 1 | 0 | 0 | 1 | 0.019 | 0.000 | 0.000 | 0.019 |
| TOTAL | 20 | 0 | 3 | 23 | 3.106 | 0.000 | 0.844 | 3.950 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 9 | 0 | 0 | 9 | 1.261 | 0.000 | 0.000 | 1.261 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 6 | 0 | 2 | 8 | 0.120 | 0.000 | 0.010 | 0.130 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 1 | 0 | 0 | 1 | 0.078 | 0.000 | 0.000 | 0.078 |
| TOTAL | 16 | 0 | 2 | 18 | 1.459 | 0.000 | 0.010 | 1.469 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 25 | 0 | 0 | 25 | 2.106 | 0.000 | 0.000 | 2.106 |
| OPERATIONS PERSONNEL | 8 | 0 | 0 | 8 | 0.501 | 0.000 | 0.000 | 0.501 |
| HEALTH PHYSICS PERSONNEL | 44 | 0 | 13 | 57 | 4.752 | 0.000 | 1.568 | 6.320 |
| SUPERVISORY PERSONNEL | 3 | 0 | 0 | 3 | 0.177 | 0.000 | 0.000 | 0.177 |
| ENGINEERING PERSONNEL | 5 | 0 | 0 | 5 | 0.135 | 0.000 | 0.000 | 0.135 |
| GRAND TOTALS | 85 | 0 | 13 | 98 | 7.671 | 0.000 | 1.568 | 9.239 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *RIVER BEND 1 TYPE: BWR

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

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *ROBINSON 2

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 6 | 0 | 2 | 8 | 2.920 | 0.100 | 2.270 | 5.290 |
| OPERATIONS PERSONNEL | 29 | 0 | 0 | 29 | 9.385 | 0.000 | 0.280 | 9.665 |
| HEALTH PHYSICS PERSONNEL | 7 | 0 | 40 | 47 | 2.860 | 0.040 | 16.355 | 19.255 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.210 | 0.065 | 0.050 | 0.325 |
| ENGINEERING PERSONNEL | 3 | 0 | 4 | 7 | 2.400 | 0.300 | 2.320 | 5.020 |
| TOTAL | 45 | 0 | 46 | 91 | 17.775 | 0.505 | 21.275 | 39.555 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 25 | 11 | 52 | 88 | 10.045 | 2.940 | 19.690 | 32.675 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.050 | 0.050 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 5 | 6 | 0.530 | 0.000 | 1.370 | 1.900 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 1 | 0 | 12 | 13 | 0.450 | 0.000 | 3.530 | 3.980 |
| TOTAL | 27 | 11 | 69 | 107 | 11.025 | 2.940 | 24.640 | 38.605 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 4 | 2 | 38 | 44 | 1.610 | 1.220 | 15.400 | 18.230 |
| OPERATIONS PERSONNEL | 3 | 0 | 0 | 3 | 1.620 | 0.000 | 0.000 | 1.620 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 7 | 8 | 0.490 | 0.000 | 1.980 | 2.470 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 6 | 0 | 32 | 38 | 1.880 | 0.140 | 12.400 | 14.420 |
| TOTAL | 14 | 2 | 77 | 93 | 5.600 | 1.360 | 29.780 | 36.740 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 52 | 9 | 383 | 444 | 23.471 | 2.230 | 211.732 | 237.433 |
| OPERATIONS PERSONNEL | 24 | 0 | 41 | 65 | 5.277 | 0.000 | 20.460 | 25.737 |
| HEALTH PHYSICS PERSONNEL | 33 | 0 | 41 | 74 | 11.117 | 0.040 | 13.045 | 24.202 |
| SUPERVISORY PERSONNEL | 0 | 0 | 3 | 3 | 0.090 | 0.040 | 0.870 | 1.000 |
| ENGINEERING PERSONNEL | 14 | 3 | 98 | 115 | 5.982 | 1.070 | 36.422 | 43.474 |
| TOTAL | 123 | 12 | 566 | 701 | 45.937 | 3.380 | 282.529 | 331.846 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 1 | 1 | 55 | 57 | 0.380 | 0.780 | 18.780 | 19.940 |
| OPERATIONS PERSONNEL | 0 | 0 | 1 | 1 | 0.020 | 0.000 | 0.280 | 0.300 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 8 | 9 | 0.625 | 0.080 | 3.400 | 4.105 |
| SUPERVISORY PERSONNEL | 0 | 1 | 0 | 1 | 0.000 | 0.160 | 0.000 | 0.160 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.040 | 0.040 | 0.330 | 0.410 |
| TOTAL | 2 | 2 | 64 | 68 | 1.065 | 1.060 | 22.790 | 24.915 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 15 | 0 | 30 | 45 | 5.465 | 0.040 | 9.180 | 14.685 |
| OPERATIONS PERSONNEL | 1 | 0 | 0 | 1 | 0.540 | 0.000 | 0.040 | 0.580 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 15 | 16 | 0.365 | 0.000 | 4.625 | 4.990 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.020 | 0.020 |
| ENGINEERING PERSONNEL | 3 | 2 | 64 | 69 | 0.810 | 0.385 | 34.760 | 35.955 |
| TOTAL | 20 | 2 | 109 | 131 | 7.180 | 0.425 | 48.625 | 56.230 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 103 | 23 | 560 | 686 | 43.891 | 7.310 | 277.052 | 328.253 |
| OPERATIONS PERSONNEL | 57 | 0 | 42 | 99 | 16.842 | 0.000 | 21.110 | 37.952 |
| HEALTH PHYSICS PERSONNEL | 44 | 0 | 116 | 160 | 15.987 | 0.160 | 40.775 | 56.922 |
| SUPERVISORY PERSONNEL | 0 | 1 | 3 | 4 | 0.300 | 0.265 | 0.940 | 1.505 |
| ENGINEERING PERSONNEL | 27 | 5 | 210 | 242 | 11.562 | 1.935 | 89.762 | 103.259 |
| GRAND TOTALS | 231 | 29 | 931 | 1191 | 88.582 | 9.670 | 429.639 | 527.891 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *SALEM 1,2 TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 1 | 1 | 0.226 | 0.511 | 0.511 | 1.248 |
| OPERATIONS PERSONNEL | 1 | 0 | 0 | 1 | 1.809 | 0.084 | 0.084 | 1.977 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 2 | 3 | 1.069 | 0.799 | 0.799 | 2.667 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.005 | 0.005 | 0.010 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.036 | 0.000 | 0.000 | 0.036 |
| TOTAL | 2 | 0 | 3 | 5 | 3.140 | 1.399 | 1.399 | 5.938 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 6 | 0 | 7 | 13 | 6.430 | 0.099 | 6.265 | 12.794 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 2.943 | 0.000 | 0.158 | 3.101 |
| HEALTH PHYSICS PERSONNEL | 10 | 0 | 2 | 12 | 3.671 | 0.070 | 1.842 | 5.583 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.009 | 0.248 | 0.003 | 0.260 |
| ENGINEERING PERSONNEL | 1 | 0 | 0 | 1 | 0.541 | 0.009 | 0.000 | 0.550 |
| TOTAL | 17 | 0 | 9 | 26 | 13.594 | 0.426 | 8.268 | 22.288 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.079 | 0.000 | 0.257 | 0.336 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.002 | 0.000 | 0.000 | 0.002 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.015 | 0.000 | 0.032 | 0.047 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 0 | 0 | 0 | 0 | 0.096 | 0.000 | 0.289 | 0.385 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 19 | 0 | 33 | 52 | 7.481 | 0.030 | 13.170 | 20.681 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 4.690 | 0.000 | 0.019 | 4.709 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 2 | 3 | 1.264 | 0.004 | 0.872 | 2.140 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.002 | 0.122 | 0.021 | 0.145 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.241 | 0.034 | 0.005 | 0.280 |
| TOTAL | 20 | 0 | 35 | 55 | 13.678 | 0.190 | 14.087 | 27.955 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 1 | 1 | 0.026 | 0.000 | 0.210 | 0.236 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 6 | 0 | 1 | 7 | 1.854 | 0.000 | 0.273 | 2.127 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.070 | 0.000 | 0.070 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 6 | 0 | 2 | 8 | 1.880 | 0.070 | 0.483 | 2.433 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 88 | 1 | 235 | 324 | 36.474 | 0.489 | 145.377 | 182.340 |
| OPERATIONS PERSONNEL | 5 | 0 | 0 | 5 | 3.230 | 0.000 | 0.179 | 3.409 |
| HEALTH PHYSICS PERSONNEL | 25 | 1 | 42 | 68 | 7.973 | 0.277 | 20.415 | 28.665 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.084 | 0.665 | 0.061 | 0.810 |
| ENGINEERING PERSONNEL | 3 | 0 | 0 | 3 | 1.315 | 0.194 | 0.269 | 1.778 |
| TOTAL | 121 | 2 | 277 | 400 | 49.076 | 1.625 | 166.301 | 217.002 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 113 | 1 | 277 | 391 | 50.716 | 1.129 | 165.790 | 217.635 |
| OPERATIONS PERSONNEL | 6 | 0 | 0 | 6 | 12.674 | 0.084 | 0.440 | 13.198 |
| HEALTH PHYSICS PERSONNEL | 43 | 1 | 49 | 93 | 15.846 | 1.150 | 24.233 | 41.229 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.095 | 1.110 | 0.090 | 1.295 |
| ENGINEERING PERSONNEL | 4 | 0 | 0 | 4 | 2.133 | 0.237 | 0.274 | 2.644 |
| GRAND TOTALS | 166 | 2 | 326 | 494 | 81.464 | 3.710 | 190.827 | 276.001 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *SAN ONOFRE 1,2,3

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) STATION | UTILITY | CONTRACT | TOTAL | TOTAL PERSON-REM STATION | UTILITY | CONTRACT | TOTAL |
|---|---|---|---|---|---|---|---|---|
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 72 | 9 | 143 | 224 | 3.730 | 0.100 | 13.121 | 16.951 |
| OPERATIONS PERSONNEL | 44 | 1 | 4 | 49 | 9.824 | 0.088 | 0.528 | 10.440 |
| HEALTH PHYSICS PERSONNEL | 53 | 0 | 122 | 175 | 14.895 | 0.000 | 51.840 | 66.735 |
| SUPERVISORY PERSONNEL | 0 | 0 | 1 | 1 | 0.000 | 0.000 | 0.855 | 0.855 |
| ENGINEERING PERSONNEL | 44 | 4 | 56 | 104 | 3.433 | 0.362 | 6.242 | 10.037 |
| TOTAL | 213 | 14 | 326 | 553 | 31.882 | 0.550 | 72.586 | 105.018 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 137 | 23 | 581 | 741 | 50.648 | 8.371 | 254.686 | 313.705 |
| OPERATIONS PERSONNEL | 36 | 1 | 4 | 41 | 2.120 | 0.021 | 0.271 | 2.412 |
| HEALTH PHYSICS PERSONNEL | 68 | 2 | 206 | 276 | 15.513 | 0.727 | 46.288 | 62.528 |
| SUPERVISORY PERSONNEL | 5 | 1 | 6 | 12 | 1.667 | 0.115 | 1.407 | 3.189 |
| ENGINEERING PERSONNEL | 71 | 8 | 146 | 225 | 16.704 | 1.422 | 33.020 | 51.146 |
| TOTAL | 317 | 35 | 943 | 1295 | 86.652 | 10.656 | 335.672 | 432.980 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 1 | 1 | 38 | 40 | 0.064 | 0.006 | 4.816 | 4.886 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 2 | 2 | 0.000 | 0.000 | 0.053 | 0.053 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 6 | 1 | 8 | 15 | 0.371 | 0.346 | 1.728 | 2.445 |
| TOTAL | 7 | 2 | 48 | 57 | 0.435 | 0.352 | 6.597 | 7.384 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 101 | 19 | 380 | 500 | 19.244 | 3.581 | 131.355 | 154.180 |
| OPERATIONS PERSONNEL | 4 | 1 | 3 | 8 | 0.058 | 0.010 | 0.799 | 0.867 |
| HEALTH PHYSICS PERSONNEL | 36 | 2 | 113 | 151 | 6.661 | 0.556 | 28.317 | 35.534 |
| SUPERVISORY PERSONNEL | 2 | 0 | 3 | 5 | 0.248 | 0.000 | 1.038 | 1.286 |
| ENGINEERING PERSONNEL | 39 | 2 | 102 | 143 | 6.609 | 0.142 | 37.987 | 44.738 |
| TOTAL | 182 | 24 | 601 | 807 | 32.820 | 4.289 | 199.496 | 236.605 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 9 | 4 | 11 | 24 | 0.502 | 0.222 | 1.255 | 1.979 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 22 | 1 | 62 | 85 | 2.753 | 0.004 | 4.680 | 7.437 |
| SUPERVISORY PERSONNEL | 1 | 0 | 0 | 1 | 0.027 | 0.000 | 0.000 | 0.027 |
| ENGINEERING PERSONNEL | 1 | 0 | 12 | 13 | 0.033 | 0.000 | 1.830 | 1.863 |
| TOTAL | 33 | 5 | 85 | 123 | 3.315 | 0.226 | 7.765 | 11.306 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 18 | 1 | 111 | 130 | 5.516 | 0.008 | 36.717 | 42.241 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 9 | 2 | 43 | 54 | 0.527 | 0.087 | 3.333 | 3.947 |
| SUPERVISORY PERSONNEL | 3 | 1 | 0 | 4 | 1.340 | 0.621 | 0.000 | 1.961 |
| ENGINEERING PERSONNEL | 27 | 1 | 23 | 51 | 5.040 | 0.071 | 4.712 | 9.823 |
| TOTAL | 57 | 5 | 177 | 239 | 12.423 | 0.787 | 44.762 | 57.972 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 338 (138) | 57 (23) | 1264 (608) | 1659 (769) | 79.704 | 12.288 | 441.950 | 533.942 |
| OPERATIONS PERSONNEL | 84 (44) | 3 (1) | 11 (5) | 98 (50) | 12.002 | 0.119 | 1.598 | 13.719 |
| HEALTH PHYSICS PERSONNEL | 188 (72) | 7 (2) | 548 (212) | 743 (286) | 40.349 | 1.374 | 134.511 | 176.234 |
| SUPERVISORY PERSONNEL | 11 (5) | 2 (1) | 10 (7) | 23 (13) | 3.282 | 0.736 | 3.300 | 7.318 |
| ENGINEERING PERSONNEL | 188 (74) | 16 (8) | 347 (175) | 551 (257) | 32.190 | 2.343 | 85.519 | 120.052 |
| GRAND TOTALS | 809 (333) | 85 (35) | 2180 (1007) | 3074(1375) | 167.527 | 16.860 | 666.878 | 851.265 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *SEABROOK

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | STATION | | UTILITY | | CONTRACT | | TOTAL | | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | | | | | |
| MAINTENANCE PERSONNEL | 2 | | 0 | | 0 | | 2 | | 0.000 | 0.000 | 0.000 | 0.000 |
| OPERATIONS PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 7 | | 0 | | 0 | | 7 | | 0.380 | 0.000 | 0.000 | 0.380 |
| SUPERVISORY PERSONNEL | 2 | | 0 | | 0 | | 2 | | 0.130 | 0.000 | 0.000 | 0.130 |
| ENGINEERING PERSONNEL | 0 | | 0 | | 1 | | 1 | | 0.000 | 0.000 | 0.025 | 0.025 |
| TOTAL | 11 | | 0 | | 1 | | 12 | | 0.510 | 0.000 | 0.025 | 0.535 |
| ROUTINE MAINTENANCE | | | | | | | | | | | | |
| MAINTENANCE PERSONNEL | 2 | | 0 | | 0 | | 2 | | 0.500 | 0.000 | 0.000 | 0.500 |
| OPERATIONS PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 7 | | 0 | | 0 | | 7 | | 0.345 | 0.000 | 0.000 | 0.345 |
| SUPERVISORY PERSONNEL | 2 | | 0 | | 0 | | 2 | | 0.115 | 0.000 | 0.000 | 0.115 |
| ENGINEERING PERSONNEL | 0 | | 0 | | 1 | | 1 | | 0.000 | 0.000 | 0.185 | 0.185 |
| TOTAL | 11 | | 0 | | 1 | | 12 | | 0.960 | 0.000 | 0.185 | 1.145 |
| IN-SERVICE INSPECTION | | | | | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| OPERATIONS PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 4 | | 0 | | 0 | | 4 | | 0.010 | 0.000 | 0.000 | 0.010 |
| SUPERVISORY PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 4 | | 0 | | 0 | | 4 | | 0.010 | 0.000 | 0.000 | 0.010 |
| SPECIAL MAINTENANCE | | | | | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| OPERATIONS PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| WASTE PROCESSING | | | | | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| OPERATIONS PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 4 | | 0 | | 0 | | 4 | | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 4 | | 0 | | 0 | | 4 | | 0.000 | 0.000 | 0.000 | 0.000 |
| REFUELING | | | | | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| OPERATIONS PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 0 | | 0 | | 0 | | 0 | | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL BY JOB FUNCTION | | | | | | | | | | | | |
| MAINTENANCE PERSONNEL | 4 | (2) | 0 | (0) | 0 | (0) | 4 | (2) | 0.500 | 0.000 | 0.000 | 0.500 |
| OPERATIONS PERSONNEL | 0 | (0) | 0 | (0) | 0 | (0) | 0 | (0) | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 22 | (7) | 0 | (0) | 0 | (0) | 22 | (7) | 0.735 | 0.000 | 0.000 | 0.735 |
| SUPERVISORY PERSONNEL | 4 | (2) | 0 | (0) | 0 | (0) | 4 | (2) | 0.245 | 0.000 | 0.000 | 0.245 |
| ENGINEERING PERSONNEL | 0 | (0) | 0 | (0) | 2 | (1) | 2 | (1) | 0.000 | 0.000 | 0.210 | 0.210 |
| GRAND TOTALS | 30 | (11) | 0 | (0) | 2 | (1) | 32 | (12) | 1.480 | 0.000 | 0.210 | 1.690 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *SEQUOYAH 1,2

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 636 | 9 | 38 | 683 | 20.317 | 0.314 | 0.707 | 21.338 |
| OPERATIONS PERSONNEL | 63 | 10 | 0 | 73 | 14.415 | 5.954 | 0.000 | 20.369 |
| HEALTH PHYSICS PERSONNEL | 41 | 32 | 97 | 170 | 13.945 | 5.845 | 22.545 | 42.335 |
| SUPERVISORY PERSONNEL | 102 | 4 | 39 | 145 | 10.730 | 0.042 | 2.883 | 13.655 |
| ENGINEERING PERSONNEL | 126 | 53 | 39 | 218 | 7.836 | 3.637 | 0.854 | 12.327 |
| TOTAL | 968 | 108 | 213 | 1289 | 67.243 | 15.792 | 26.989 | 110.024 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 1105 | 14 | 55 | 1174 | 310.375 | 0.626 | 7.026 | 318.027 |
| OPERATIONS PERSONNEL | 60 | 10 | 0 | 70 | 1.170 | 0.812 | 0.000 | 1.982 |
| HEALTH PHYSICS PERSONNEL | 38 | 27 | 85 | 150 | 8.290 | 1.935 | 5.539 | 15.764 |
| SUPERVISORY PERSONNEL | 99 | 15 | 50 | 164 | 7.789 | 1.014 | 2.297 | 11.100 |
| ENGINEERING PERSONNEL | 203 | 60 | 102 | 365 | 10.954 | 6.087 | 45.710 | 62.751 |
| TOTAL | 1505 | 126 | 292 | 1923 | 338.578 | 10.474 | 60.572 | 409.624 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 281 | 3 | 20 | 304 | 42.935 | 0.048 | 0.782 | 43.765 |
| OPERATIONS PERSONNEL | 3 | 0 | 1 | 4 | 0.005 | 0.000 | 0.441 | 0.446 |
| HEALTH PHYSICS PERSONNEL | 30 | 17 | 50 | 97 | 9.920 | 2.667 | 18.757 | 31.344 |
| SUPERVISORY PERSONNEL | 33 | 6 | 19 | 58 | 6.500 | 1.750 | 2.417 | 10.667 |
| ENGINEERING PERSONNEL | 40 | 80 | 116 | 236 | 2.826 | 60.499 | 105.636 | 168.961 |
| TOTAL | 387 | 106 | 206 | 699 | 62.186 | 64.964 | 128.033 | 255.183 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 1208 | 8 | 49 | 1265 | 508.144 | 1.653 | 13.418 | 523.215 |
| OPERATIONS PERSONNEL | 19 | 6 | 1 | 26 | 1.351 | 0.542 | 0.003 | 1.896 |
| HEALTH PHYSICS PERSONNEL | 41 | 34 | 88 | 163 | 8.001 | 7.418 | 17.909 | 33.328 |
| SUPERVISORY PERSONNEL | 94 | 11 | 55 | 160 | 16.808 | 0.253 | 15.615 | 32.676 |
| ENGINEERING PERSONNEL | 315 | 37 | 135 | 487 | 91.904 | 7.277 | 74.267 | 173.448 |
| TOTAL | 1677 | 96 | 328 | 2101 | 626.208 | 17.143 | 121.212 | 764.563 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 215 | 0 | 16 | 231 | 24.321 | 0.000 | 2.384 | 26.705 |
| OPERATIONS PERSONNEL | 4 | 0 | 2 | 6 | 0.062 | 0.000 | 3.487 | 3.549 |
| HEALTH PHYSICS PERSONNEL | 31 | 15 | 38 | 84 | 3.713 | 0.835 | 4.034 | 8.582 |
| SUPERVISORY PERSONNEL | 9 | 0 | 1 | 10 | 0.345 | 0.000 | 0.029 | 0.374 |
| ENGINEERING PERSONNEL | 7 | 4 | 0 | 11 | 0.010 | 0.042 | 0.000 | 0.052 |
| TOTAL | 266 | 19 | 57 | 342 | 28.451 | 0.877 | 9.934 | 39.262 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 786 | 3 | 27 | 816 | 158.412 | 0.545 | 6.238 | 165.195 |
| OPERATIONS PERSONNEL | 51 | 9 | 1 | 61 | 0.845 | 0.268 | 0.290 | 1.403 |
| HEALTH PHYSICS PERSONNEL | 26 | 19 | 40 | 85 | 8.842 | 5.892 | 10.130 | 24.864 |
| SUPERVISORY PERSONNEL | 53 | 2 | 29 | 84 | 5.215 | 0.985 | 4.158 | 10.358 |
| ENGINEERING PERSONNEL | 80 | 49 | 52 | 181 | 3.588 | 8.668 | 11.152 | 23.408 |
| TOTAL | 996 | 82 | 149 | 1227 | 176.902 | 16.358 | 31.968 | 225.228 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 4231 | 37 | 205 | 4473 | 1064.504 | 3.186 | 30.555 | 1098.245 |
| OPERATIONS PERSONNEL | 200 | 35 | 5 | 240 | 17.848 | 7.576 | 4.221 | 29.645 |
| HEALTH PHYSICS PERSONNEL | 207 | 144 | 398 | 749 | 52.711 | 24.592 | 78.914 | 156.217 |
| SUPERVISORY PERSONNEL | 390 | 38 | 193 | 621 | 47.387 | 4.044 | 27.399 | 78.830 |
| ENGINEERING PERSONNEL | 771 | 283 | 444 | 1498 | 117.118 | 86.210 | 237.619 | 440.947 |
| GRAND TOTALS | 5799 | 537 | 1245 | 7581 | 1299.568 | 125.608 | 378.708 | 1803.884 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *SOUTH TEXAS 1,2 TYPE: PWR

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

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *ST. LUCIE 1,2

TYPE: PWR

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

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *SUMMER 1 TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) STATION | UTILITY | CONTRACT | TOTAL | TOTAL PERSON-REM STATION | UTILITY | CONTRACT | TOTAL |
|---|---|---|---|---|---|---|---|---|
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 7 | 0 | 3 | 10 | 2.150 | 0.000 | 2.440 | 4.590 |
| OPERATIONS PERSONNEL | 35 | 0 | 1 | 36 | 9.695 | 0.010 | 1.005 | 10.710 |
| HEALTH PHYSICS PERSONNEL | 8 | 0 | 35 | 43 | 2.485 | 0.000 | 10.965 | 13.450 |
| SUPERVISORY PERSONNEL | 0 | 0 | 1 | 1 | 0.810 | 0.000 | 0.190 | 1.000 |
| ENGINEERING PERSONNEL | 1 | 0 | 4 | 5 | 0.370 | 0.000 | 1.285 | 1.655 |
| TOTAL | 51 | 0 | 44 | 95 | 15.510 | 0.010 | 15.885 | 31.405 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 17 | 0 | 43 | 60 | 5.780 | 0.000 | 15.430 | 21.210 |
| OPERATIONS PERSONNEL | 1 | 2 | 9 | 12 | 1.087 | 0.415 | 2.910 | 4.412 |
| HEALTH PHYSICS PERSONNEL | 2 | 0 | 40 | 42 | 0.555 | 0.000 | 14.670 | 15.225 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.405 | 0.000 | 0.040 | 0.445 |
| ENGINEERING PERSONNEL | 0 | 0 | 1 | 1 | 0.290 | 0.000 | 0.850 | 1.140 |
| TOTAL | 20 | 2 | 93 | 115 | 8.117 | 0.415 | 33.900 | 42.432 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 4 | 0 | 45 | 49 | 1.520 | 0.000 | 11.675 | 13.195 |
| OPERATIONS PERSONNEL | 7 | 0 | 4 | 11 | 2.365 | 0.000 | 1.505 | 3.870 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 5 | 5 | 0.175 | 0.000 | 2.360 | 2.535 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.015 | 0.000 | 0.100 | 0.115 |
| ENGINEERING PERSONNEL | 0 | 0 | 2 | 2 | 0.000 | 0.000 | 0.685 | 0.685 |
| TOTAL | 11 | 0 | 56 | 67 | 4.075 | 0.000 | 16.325 | 20.400 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 39 | 0 | 234 | 273 | 14.300 | 0.000 | 134.170 | 148.470 |
| OPERATIONS PERSONNEL | 15 | 1 | 18 | 34 | 4.625 | 0.500 | 4.550 | 9.675 |
| HEALTH PHYSICS PERSONNEL | 5 | 0 | 102 | 107 | 1.745 | 0.000 | 40.915 | 42.660 |
| SUPERVISORY PERSONNEL | 2 | 0 | 0 | 2 | 1.485 | 0.000 | 4.000 | 5.485 |
| ENGINEERING PERSONNEL | 5 | 0 | 110 | 115 | 1.385 | 0.000 | 63.140 | 64.525 |
| TOTAL | 66 | 1 | 464 | 531 | 23.540 | 0.500 | 246.775 | 270.815 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 39 | 0 | 1 | 40 | 0.140 | 0.000 | 0.425 | 0.565 |
| OPERATIONS PERSONNEL | 15 | 0 | 0 | 15 | 0.030 | 0.025 | 0.465 | 0.520 |
| HEALTH PHYSICS PERSONNEL | 5 | 0 | 1 | 6 | 0.755 | 0.000 | 1.025 | 1.780 |
| SUPERVISORY PERSONNEL | 2 | 0 | 0 | 2 | 0.055 | 0.000 | 0.000 | 0.055 |
| ENGINEERING PERSONNEL | 5 | 0 | 0 | 5 | 0.010 | 0.000 | 0.000 | 0.010 |
| TOTAL | 66 | 0 | 2 | 68 | 0.990 | 0.025 | 1.915 | 2.930 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 29 | 29 | 3.060 | 0.000 | 10.050 | 13.110 |
| OPERATIONS PERSONNEL | 0 | 0 | 2 | 2 | 1.045 | 0.030 | 1.170 | 2.245 |
| HEALTH PHYSICS PERSONNEL | 3 | 0 | 28 | 31 | 0.960 | 0.000 | 8.985 | 9.945 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.200 | 0.000 | 0.000 | 0.200 |
| ENGINEERING PERSONNEL | 0 | 0 | 16 | 16 | 0.085 | 0.000 | 16.880 | 16.965 |
| TOTAL | 3 | 0 | 75 | 78 | 5.350 | 0.030 | 37.085 | 42.465 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 106 (76) | 0 (0) | 355 (355) | 461 (431) | 26.950 | 0.000 | 174.190 | 201.140 |
| OPERATIONS PERSONNEL | 73 (60) | 3 (3) | 34 (34) | 110 (97) | 18.847 | 0.980 | 11.605 | 31.432 |
| HEALTH PHYSICS PERSONNEL | 23 (21) | 0 (0) | 211 (211) | 234 (232) | 6.675 | 0.000 | 78.920 | 85.595 |
| SUPERVISORY PERSONNEL | 4 (2) | 0 (0) | 1 (1) | 5 (3) | 2.970 | 0.000 | 4.330 | 7.300 |
| ENGINEERING PERSONNEL | 11 (6) | 0 (0) | 133 (133) | 144 (139) | 2.140 | 0.000 | 82.840 | 84.980 |
| GRAND TOTALS | 217 (165) | 3 (3) | 734 (734) | 954 (902) | 57.582 | 0.980 | 351.885 | 410.447 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *SURRY 1,2

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 177 | 2 | 588 | 767 | 3.202 | 0.000 | 1.165 | 4.367 |
| OPERATIONS PERSONNEL | 351 | 42 | 127 | 520 | 17.338 | 0.061 | 0.639 | 18.038 |
| HEALTH PHYSICS PERSONNEL | 84 | 11 | 128 | 223 | 16.075 | 0.074 | 5.415 | 21.564 |
| SUPERVISORY PERSONNEL | 149 | 8 | 65 | 222 | 2.823 | 0.003 | 1.018 | 3.844 |
| ENGINEERING PERSONNEL | 88 | 33 | 97 | 218 | 1.022 | 0.026 | 0.463 | 1.511 |
| TOTAL | 849 | 96 | 1005 | 1950 | 40.460 | 0.164 | 8.700 | 49.324 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 165 | 0 | 740 | 905 | 54.109 | 0.000 | 140.604 | 194.713 |
| OPERATIONS PERSONNEL | 185 | 10 | 111 | 306 | 20.976 | 0.077 | 8.130 | 29.183 |
| HEALTH PHYSICS PERSONNEL | 77 | 1 | 188 | 266 | 23.317 | 0.021 | 53.305 | 76.643 |
| SUPERVISORY PERSONNEL | 97 | 2 | 56 | 155 | 6.417 | 0.010 | 8.946 | 15.373 |
| ENGINEERING PERSONNEL | 75 | 33 | 70 | 178 | 3.412 | 0.248 | 1.599 | 5.259 |
| TOTAL | 599 | 46 | 1165 | 1810 | 108.231 | 0.356 | 212.584 | 321.171 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 1 | 0 | 132 | 133 | 0.015 | 0.000 | 16.242 | 16.257 |
| OPERATIONS PERSONNEL | 32 | 4 | 28 | 64 | 0.352 | 0.021 | 1.688 | 2.061 |
| HEALTH PHYSICS PERSONNEL | 21 | 0 | 16 | 37 | 0.463 | 0.000 | 1.387 | 1.850 |
| SUPERVISORY PERSONNEL | 6 | 0 | 6 | 12 | 0.007 | 0.000 | 0.975 | 0.982 |
| ENGINEERING PERSONNEL | 5 | 4 | 51 | 60 | 1.093 | 0.107 | 11.500 | 12.700 |
| TOTAL | 65 | 8 | 233 | 306 | 1.930 | 0.128 | 31.792 | 33.850 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 63 | 0 | 628 | 691 | 1.325 | 0.000 | 70.435 | 71.760 |
| OPERATIONS PERSONNEL | 37 | 0 | 50 | 87 | 0.956 | 0.000 | 2.605 | 3.561 |
| HEALTH PHYSICS PERSONNEL | 45 | 0 | 89 | 134 | 6.722 | 0.000 | 7.839 | 14.561 |
| SUPERVISORY PERSONNEL | 23 | 0 | 52 | 75 | 0.774 | 0.000 | 5.532 | 6.306 |
| ENGINEERING PERSONNEL | 22 | 3 | 57 | 82 | 0.444 | 0.000 | 1.143 | 1.587 |
| TOTAL | 190 | 3 | 876 | 1069 | 10.221 | 0.000 | 87.554 | 97.775 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 15 | 0 | 21 | 36 | 0.019 | 0.000 | 0.110 | 0.129 |
| OPERATIONS PERSONNEL | 22 | 0 | 1 | 23 | 3.083 | 0.000 | 0.003 | 3.086 |
| HEALTH PHYSICS PERSONNEL | 42 | 1 | 8 | 51 | 1.553 | 0.000 | 0.381 | 1.934 |
| SUPERVISORY PERSONNEL | 12 | 0 | 8 | 20 | 2.165 | 0.000 | 0.320 | 2.485 |
| ENGINEERING PERSONNEL | 0 | 0 | 1 | 1 | 0.000 | 0.000 | 0.164 | 0.164 |
| TOTAL | 91 | 1 | 39 | 131 | 6.820 | 0.000 | 0.978 | 7.798 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 40 | 0 | 109 | 149 | 1.993 | 0.000 | 18.091 | 20.084 |
| OPERATIONS PERSONNEL | 23 | 6 | 13 | 42 | 0.954 | 0.096 | 0.394 | 1.444 |
| HEALTH PHYSICS PERSONNEL | 28 | 0 | 49 | 77 | 1.408 | 0.000 | 1.358 | 2.766 |
| SUPERVISORY PERSONNEL | 14 | 0 | 10 | 24 | 0.643 | 0.000 | 0.970 | 1.613 |
| ENGINEERING PERSONNEL | 3 | 2 | 8 | 13 | 0.008 | 0.094 | 0.195 | 0.297 |
| TOTAL | 108 | 8 | 189 | 305 | 5.006 | 0.190 | 21.008 | 26.204 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 461 | 2 | 2218 | 2681 | 60.663 | 0.000 | 246.647 | 307.310 |
| OPERATIONS PERSONNEL | 650 | 62 | 330 | 1042 | 43.659 | 0.255 | 13.459 | 57.373 |
| HEALTH PHYSICS PERSONNEL | 297 | 13 | 478 | 788 | 49.538 | 0.095 | 69.685 | 119.318 |
| SUPERVISORY PERSONNEL | 301 | 10 | 197 | 508 | 12.829 | 0.013 | 17.761 | 30.603 |
| ENGINEERING PERSONNEL | 193 | 75 | 284 | 552 | 5.979 | 0.475 | 15.064 | 21.518 |
| GRAND TOTALS | 1902 | 162 | 3507 | 5571 | 172.668 | 0.838 | 362.616 | 536.122 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *SUSQUEHANNA 1,2

TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| OPERATIONS PERSONNEL | 69 | 0 | 4 | 73 | 24.376 | 0.000 | 1.037 | 25.413 |
| HEALTH PHYSICS PERSONNEL | 8 | 0 | 5 | 13 | 3.532 | 0.000 | 0.960 | 4.492 |
| SUPERVISORY PERSONNEL | 0 | 1 | 0 | 1 | 0.000 | 0.201 | 0.000 | 0.201 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 77 | 1 | 9 | 87 | 27.908 | 0.201 | 1.997 | 30.106 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 83 | 221 | 160 | 464 | 44.364 | 90.243 | 66.064 | 200.671 |
| OPERATIONS PERSONNEL | 40 | 1 | 10 | 51 | 13.328 | 0.130 | 4.951 | 18.409 |
| HEALTH PHYSICS PERSONNEL | 23 | 1 | 133 | 157 | 17.991 | 0.595 | 63.239 | 81.825 |
| SUPERVISORY PERSONNEL | 11 | 0 | 0 | 11 | 2.560 | 0.000 | 0.000 | 2.560 |
| ENGINEERING PERSONNEL | 7 | 2 | 6 | 15 | 1.217 | 0.222 | 1.983 | 3.422 |
| TOTAL | 164 | 225 | 309 | 698 | 79.460 | 91.190 | 136.237 | 306.887 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 36 | 55 | 91 | 0.000 | 32.637 | 22.153 | 54.790 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 1 | 0 | 0 | 1 | 0.565 | 0.000 | 0.000 | 0.565 |
| ENGINEERING PERSONNEL | 0 | 3 | 0 | 3 | 0.000 | 0.371 | 0.000 | 0.371 |
| TOTAL | 1 | 39 | 55 | 95 | 0.565 | 33.008 | 22.153 | 55.726 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 3 | 52 | 20 | 75 | 0.955 | 27.704 | 9.117 | 37.776 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 1 | 1 | 5 | 7 | 0.822 | 0.505 | 1.613 | 2.940 |
| SUPERVISORY PERSONNEL | 2 | 1 | 0 | 3 | 0.295 | 0.210 | 0.000 | 0.505 |
| ENGINEERING PERSONNEL | 4 | 0 | 14 | 18 | 0.768 | 0.000 | 5.819 | 6.587 |
| TOTAL | 10 | 54 | 39 | 103 | 2.840 | 28.419 | 16.549 | 47.808 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 1 | 1 | 1 | 3 | 0.110 | 0.405 | 0.125 | 0.640 |
| OPERATIONS PERSONNEL | 0 | 0 | 2 | 2 | 0.000 | 0.000 | 1.400 | 1.400 |
| HEALTH PHYSICS PERSONNEL | 3 | 0 | 9 | 12 | 1.225 | 0.000 | 3.479 | 4.704 |
| SUPERVISORY PERSONNEL | 1 | 0 | 1 | 2 | 0.220 | 0.000 | 0.620 | 0.840 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 5 | 1 | 13 | 19 | 1.555 | 0.405 | 5.624 | 7.584 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| OPERATIONS PERSONNEL | 3 | 0 | 0 | 3 | 0.423 | 0.000 | 0.000 | 0.423 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 3 | 0 | 0 | 3 | 0.423 | 0.000 | 0.000 | 0.423 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 87 | 310 | 236 | 633 | 45.429 | 150.989 | 97.459 | 293.877 |
| OPERATIONS PERSONNEL | 112 | 1 | 16 | 129 | 38.127 | 0.130 | 7.388 | 45.645 |
| HEALTH PHYSICS PERSONNEL | 35 | 2 | 152 | 189 | 23.570 | 1.100 | 69.291 | 93.961 |
| SUPERVISORY PERSONNEL | 15 | 2 | 1 | 18 | 3.640 | 0.411 | 0.620 | 4.671 |
| ENGINEERING PERSONNEL | 11 | 5 | 20 | 36 | 1.985 | 0.593 | 7.802 | 10.380 |
| GRAND TOTALS | 260 | 320 | 425 | 1005 | 112.751 | 153.223 | 182.560 | 448.534 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *THREE MILE ISLAND 1

TYPE: PWR

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

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *THREE MILE ISLAND 2 TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) STATION | UTILITY | CONTRACT | TOTAL | TOTAL PERSON-REM STATION | UTILITY | CONTRACT | TOTAL |
|---|---|---|---|---|---|---|---|---|
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 33 | 0 | 54 | 87 | 1.376 | 0.000 | 8.426 | 9.802 |
| OPERATIONS PERSONNEL | 52 | 0 | 1 | 53 | 9.761 | 0.000 | 0.020 | 9.781 |
| HEALTH PHYSICS PERSONNEL | 66 | 3 | 22 | 91 | 3.519 | 0.000 | 3.097 | 6.616 |
| SUPERVISORY PERSONNEL | 46 | 16 | 21 | 83 | 1.324 | 0.411 | 0.952 | 2.687 |
| ENGINEERING PERSONNEL | 14 | 1 | 4 | 19 | 0.100 | 0.022 | 0.094 | 0.216 |
| TOTAL | 211 | 20 | 102 | 333 | 16.080 | 0.433 | 12.589 | 29.102 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 57 | 1 | 31 | 89 | 1.493 | 0.002 | 0.943 | 2.438 |
| OPERATIONS PERSONNEL | 70 | 0 | 4 | 74 | 3.638 | 0.000 | 0.080 | 3.718 |
| HEALTH PHYSICS PERSONNEL | 60 | 5 | 4 | 69 | 1.501 | 0.002 | 0.070 | 1.573 |
| SUPERVISORY PERSONNEL | 83 | 20 | 15 | 118 | 0.684 | 0.011 | 0.287 | 0.982 |
| ENGINEERING PERSONNEL | 29 | 7 | 15 | 51 | 0.113 | 0.002 | 0.012 | 0.127 |
| TOTAL | 299 | 33 | 69 | 401 | 7.429 | 0.017 | 1.392 | 8.838 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 2 | 3 | 1 | 6 | 0.000 | 0.000 | 0.020 | 0.020 |
| OPERATIONS PERSONNEL | 3 | 4 | 1 | 8 | 0.047 | 0.000 | 0.030 | 0.077 |
| HEALTH PHYSICS PERSONNEL | 21 | 0 | 6 | 27 | 0.406 | 0.000 | 0.224 | 0.630 |
| SUPERVISORY PERSONNEL | 98 | 19 | 10 | 127 | 1.346 | 0.580 | 0.471 | 2.397 |
| ENGINEERING PERSONNEL | 10 | 1 | 5 | 16 | 0.361 | 0.027 | 0.145 | 0.533 |
| TOTAL | 134 | 27 | 23 | 184 | 2.160 | 0.607 | 0.890 | 3.657 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 36 | 1 | 92 | 129 | 30.971 | 0.005 | 29.252 | 60.228 |
| OPERATIONS PERSONNEL | 49 | 1 | 8 | 58 | 18.716 | 0.000 | 0.298 | 19.014 |
| HEALTH PHYSICS PERSONNEL | 27 | 0 | 18 | 45 | 10.191 | 0.000 | 5.712 | 15.903 |
| SUPERVISORY PERSONNEL | 16 | 1 | 23 | 40 | 2.748 | 0.048 | 4.234 | 7.030 |
| ENGINEERING PERSONNEL | 9 | 0 | 17 | 26 | 1.770 | 0.000 | 2.663 | 4.433 |
| TOTAL | 137 | 3 | 158 | 298 | 64.396 | 0.053 | 42.159 | 106.608 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 26 | 0 | 6 | 32 | 2.033 | 0.000 | 0.004 | 2.037 |
| OPERATIONS PERSONNEL | 54 | 1 | 7 | 62 | 2.910 | 0.002 | 0.020 | 2.932 |
| HEALTH PHYSICS PERSONNEL | 39 | 0 | 10 | 49 | 2.466 | 0.000 | 0.352 | 2.818 |
| SUPERVISORY PERSONNEL | 23 | 5 | 8 | 36 | 0.429 | 0.003 | 0.051 | 0.483 |
| ENGINEERING PERSONNEL | 9 | 0 | 3 | 12 | 0.064 | 0.000 | 0.006 | 0.070 |
| TOTAL | 151 | 6 | 34 | 191 | 7.902 | 0.005 | 0.433 | 8.340 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 154 (58) | 5 (4) | 184 (107) | 343 (169) | 35.873 | 0.007 | 38.645 | 74.525 |
| OPERATIONS PERSONNEL | 228 (73) | 6 (5) | 21 (10) | 255 (88) | 35.072 | 0.002 | 0.448 | 35.522 |
| HEALTH PHYSICS PERSONNEL | 213 (71) | 8 (8) | 60 (22) | 281 (101) | 18.083 | 0.002 | 9.455 | 27.540 |
| SUPERVISORY PERSONNEL | 266 (167) | 61 (44) | 77 (37) | 404 (248) | 6.531 | 1.053 | 5.995 | 13.579 |
| ENGINEERING PERSONNEL | 71 (34) | 9 (8) | 44 (30) | 124 (72) | 2.408 | 0.051 | 2.920 | 5.379 |
| GRAND TOTALS | 932 (403) | 89 (69) | 386 (206) | 1407 (678) | 97.967 | 1.115 | 57.463 | 156.545 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *TROJAN

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) STATION | UTILITY | CONTRACT | TOTAL | TOTAL PERSON-REM STATION | UTILITY | CONTRACT | TOTAL |
|---|---|---|---|---|---|---|---|---|
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 1 | 0 | 0 | 1 | 0.770 | 0.010 | 0.680 | 1.460 |
| OPERATIONS PERSONNEL | 5 | 0 | 0 | 5 | 1.940 | 0.000 | 0.000 | 1.940 |
| HEALTH PHYSICS PERSONNEL | 15 | 0 | 5 | 20 | 3.200 | 0.000 | 2.240 | 5.440 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.700 | 0.000 | 0.980 | 1.680 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.600 | 0.000 | 0.150 | 0.750 |
| TOTAL | 21 | 0 | 5 | 26 | 7.210 | 0.010 | 4.050 | 11.270 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 131 | 3 | 134 | 268 | 39.040 | 0.920 | 63.510 | 103.470 |
| OPERATIONS PERSONNEL | 10 | 0 | 0 | 10 | 3.050 | 0.000 | 0.000 | 3.050 |
| HEALTH PHYSICS PERSONNEL | 61 | 1 | 59 | 121 | 19.090 | 0.470 | 37.310 | 56.870 |
| SUPERVISORY PERSONNEL | 9 | 0 | 25 | 34 | 3.440 | 0.100 | 7.040 | 10.580 |
| ENGINEERING PERSONNEL | 11 | 0 | 81 | 92 | 3.340 | 0.000 | 62.310 | 65.650 |
| TOTAL | 222 | 4 | 299 | 525 | 67.960 | 1.490 | 170.170 | 239.620 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 2 | 0 | 32 | 34 | 0.430 | 0.070 | 13.000 | 13.500 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.010 | 0.000 | 0.000 | 0.010 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 1 | 1 | 0.250 | 0.050 | 0.910 | 1.210 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.110 | 0.000 | 0.200 | 0.310 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.110 | 0.000 | 0.140 | 0.250 |
| TOTAL | 2 | 0 | 33 | 35 | 0.910 | 0.120 | 14.250 | 15.280 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.090 | 0.000 | 0.280 | 0.370 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.420 | 0.000 | 0.000 | 0.420 |
| HEALTH PHYSICS PERSONNEL | 10 | 0 | 2 | 12 | 3.110 | 0.060 | 0.420 | 3.590 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.040 | 0.000 | 0.010 | 0.050 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.000 | 0.000 |
| TOTAL | 10 | 0 | 2 | 12 | 3.660 | 0.060 | 0.710 | 4.430 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 14 | 1 | 42 | 57 | 4.070 | 0.260 | 32.070 | 36.400 |
| OPERATIONS PERSONNEL | 3 | 0 | 0 | 3 | 0.930 | 0.000 | 0.000 | 0.930 |
| HEALTH PHYSICS PERSONNEL | 9 | 0 | 15 | 24 | 2.180 | 0.000 | 6.070 | 8.250 |
| SUPERVISORY PERSONNEL | 0 | 0 | 1 | 1 | 0.610 | 0.000 | 0.360 | 0.970 |
| ENGINEERING PERSONNEL | 2 | 0 | 5 | 7 | 0.600 | 0.010 | 1.190 | 1.800 |
| TOTAL | 28 | 1 | 63 | 92 | 8.390 | 0.270 | 39.690 | 48.350 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 148 (121) | 4 (3) | 208 (176) | 360 (300) | 44.400 | 1.260 | 109.540 | 155.200 |
| OPERATIONS PERSONNEL | 18 (13) | 0 (0) | 0 (0) | 18 (13) | 6.350 | 0.000 | 0.000 | 6.350 |
| HEALTH PHYSICS PERSONNEL | 95 (67) | 1 (1) | 82 (80) | 178 (148) | 27.830 | 0.580 | 46.950 | 75.360 |
| SUPERVISORY PERSONNEL | 9 (12) | 0 (0) | 26 (22) | 35 (34) | 4.900 | 0.100 | 8.590 | 13.590 |
| ENGINEERING PERSONNEL | 13 (4) | 0 (0) | 86 (85) | 99 (89) | 4.650 | 0.010 | 63.790 | 68.450 |
| GRAND TOTALS | 283 (217) | 5 (4) | 402 (363) | 690 (584) | 88.130 | 1.950 | 228.870 | 318.950 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *TURKEY POINT 3,4 TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) STATION | UTILITY | CONTRACT | TOTAL | TOTAL PERSON-REM STATION | UTILITY | CONTRACT | TOTAL |
|---|---|---|---|---|---|---|---|---|
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 98 | 1 | 107 | 206 | 30.970 | 0.340 | 38.025 | 69.335 |
| OPERATIONS PERSONNEL | 62 | 0 | 0 | 62 | 24.780 | 0.000 | 0.010 | 24.790 |
| HEALTH PHYSICS PERSONNEL | 60 | 0 | 59 | 119 | 32.515 | 0.030 | 18.050 | 50.595 |
| SUPERVISORY PERSONNEL | 21 | 0 | 11 | 32 | 6.295 | 0.150 | 3.545 | 9.990 |
| ENGINEERING PERSONNEL | 13 | 2 | 19 | 34 | 4.170 | 0.605 | 9.305 | 14.080 |
| TOTAL | 254 | 3 | 196 | 453 | 98.730 | 1.125 | 68.935 | 168.790 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 171 | 2 | 295 | 468 | 71.660 | 1.090 | 116.395 | 189.145 |
| OPERATIONS PERSONNEL | 14 | 0 | 0 | 14 | 4.430 | 0.000 | 0.000 | 4.430 |
| HEALTH PHYSICS PERSONNEL | 37 | 0 | 39 | 76 | 11.825 | 0.000 | 11.835 | 23.660 |
| SUPERVISORY PERSONNEL | 11 | 0 | 15 | 26 | 3.615 | 0.030 | 3.890 | 7.535 |
| ENGINEERING PERSONNEL | 6 | 0 | 7 | 13 | 2.340 | 0.065 | 4.685 | 7.090 |
| TOTAL | 239 | 2 | 356 | 597 | 93.870 | 1.185 | 136.805 | 231.860 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 199 | 199 | 0.530 | 0.000 | 86.955 | 87.485 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.170 | 0.000 | 0.000 | 0.170 |
| HEALTH PHYSICS PERSONNEL | 14 | 0 | 7 | 21 | 2.930 | 0.000 | 2.285 | 5.215 |
| SUPERVISORY PERSONNEL | 2 | 1 | 11 | 14 | 0.525 | 0.655 | 2.945 | 4.125 |
| ENGINEERING PERSONNEL | 0 | 2 | 4 | 6 | 0.095 | 0.970 | 1.310 | 2.375 |
| TOTAL | 16 | 3 | 221 | 240 | 4.250 | 1.625 | 93.495 | 99.370 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 85 | 2 | 336 | 423 | 29.425 | 0.765 | 141.580 | 171.770 |
| OPERATIONS PERSONNEL | 6 | 0 | 0 | 6 | 2.370 | 0.000 | 0.000 | 2.370 |
| HEALTH PHYSICS PERSONNEL | 19 | 0 | 14 | 33 | 5.265 | 0.000 | 4.215 | 9.480 |
| SUPERVISORY PERSONNEL | 18 | 1 | 35 | 54 | 8.635 | 0.285 | 14.080 | 23.000 |
| ENGINEERING PERSONNEL | 4 | 2 | 41 | 47 | 2.030 | 0.495 | 15.340 | 17.865 |
| TOTAL | 132 | 5 | 426 | 563 | 47.725 | 1.545 | 175.215 | 224.485 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 18 | 0 | 4 | 22 | 5.220 | 0.000 | 2.610 | 7.830 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.100 | 0.000 | 0.000 | 0.100 |
| HEALTH PHYSICS PERSONNEL | 10 | 0 | 3 | 13 | 5.045 | 0.000 | 1.005 | 6.050 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.105 | 0.000 | 0.020 | 0.125 |
| ENGINEERING PERSONNEL | 1 | 0 | 0 | 1 | 0.150 | 0.000 | 0.095 | 0.245 |
| TOTAL | 29 | 0 | 7 | 36 | 10.620 | 0.000 | 3.730 | 14.350 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 77 | 3 | 141 | 221 | 32.780 | 1.295 | 73.565 | 107.640 |
| OPERATIONS PERSONNEL | 15 | 0 | 0 | 15 | 4.925 | 0.000 | 0.000 | 4.925 |
| HEALTH PHYSICS PERSONNEL | 15 | 0 | 15 | 30 | 3.680 | 0.000 | 4.530 | 8.210 |
| SUPERVISORY PERSONNEL | 5 | 1 | 16 | 22 | 1.815 | 0.115 | 4.805 | 6.735 |
| ENGINEERING PERSONNEL | 2 | 1 | 18 | 21 | 1.585 | 0.390 | 12.840 | 14.815 |
| TOTAL | 114 | 5 | 190 | 309 | 44.785 | 1.800 | 95.740 | 142.325 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 449 (229) | 8 (4) | 1082 (671) | 1539 (904) | 170.585 | 3.490 | 459.130 | 633.205 |
| OPERATIONS PERSONNEL | 97 (81) | 0 (0) | 0 (0) | 97 (81) | 36.775 | 0.000 | 0.010 | 36.785 |
| HEALTH PHYSICS PERSONNEL | 155 (66) | 0 (0) | 137 (101) | 292 (167) | 61.260 | 0.030 | 41.920 | 103.210 |
| SUPERVISORY PERSONNEL | 57 (31) | 3 (2) | 88 (59) | 148 (92) | 20.990 | 1.235 | 29.285 | 51.510 |
| ENGINEERING PERSONNEL | 26 (17) | 7 (5) | 89 (57) | 122 (79) | 10.370 | 2.525 | 43.575 | 56.470 |
| GRAND TOTALS | 784 (424) | 18 (11) | 1396 (888) | 2198(1323) | 299.980 | 7.280 | 573.920 | 881.180 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *VERMONT YANKEE

TYPE: BWR

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

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *VOGTLE 1,2

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 58 | 0 | 74 | 132 | 24.024 | 0.016 | 34.283 | 58.323 |
| OPERATIONS PERSONNEL | 6 | 1 | 1 | 8 | 2.544 | 0.266 | 0.663 | 3.473 |
| HEALTH PHYSICS PERSONNEL | 3 | 0 | 42 | 45 | 1.154 | 0.000 | 17.773 | 18.927 |
| SUPERVISORY PERSONNEL | 4 | 0 | 10 | 14 | 0.809 | 0.000 | 4.028 | 4.837 |
| ENGINEERING PERSONNEL | 3 | 0 | 4 | 7 | 0.792 | 0.002 | 2.420 | 3.214 |
| TOTAL | 74 | 1 | 131 | 206 | 29.323 | 0.284 | 59.167 | 88.774 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 13 | 0 | 31 | 44 | 5.212 | 0.016 | 12.415 | 17.643 |
| OPERATIONS PERSONNEL | 21 | 0 | 1 | 22 | 5.386 | 0.053 | 0.135 | 5.574 |
| HEALTH PHYSICS PERSONNEL | 15 | 1 | 46 | 62 | 4.646 | 0.173 | 16.166 | 20.985 |
| SUPERVISORY PERSONNEL | 4 | 0 | 9 | 13 | 2.239 | 0.100 | 2.479 | 4.818 |
| ENGINEERING PERSONNEL | 0 | 0 | 4 | 4 | 0.138 | 0.002 | 1.136 | 1.276 |
| TOTAL | 53 | 1 | 91 | 145 | 17.621 | 0.344 | 32.331 | 50.296 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 16 | 0 | 58 | 74 | 7.238 | 0.016 | 27.602 | 34.856 |
| OPERATIONS PERSONNEL | 7 | 0 | 1 | 8 | 2.580 | 0.000 | 0.186 | 2.766 |
| HEALTH PHYSICS PERSONNEL | 5 | 0 | 17 | 22 | 1.183 | 0.000 | 6.580 | 7.763 |
| SUPERVISORY PERSONNEL | 2 | 1 | 3 | 6 | 0.432 | 0.423 | 1.320 | 2.175 |
| ENGINEERING PERSONNEL | 5 | 0 | 1 | 6 | 1.281 | 0.002 | 0.595 | 1.878 |
| TOTAL | 35 | 1 | 80 | 116 | 12.714 | 0.441 | 36.283 | 49.438 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 81 | 0 | 188 | 269 | 24.640 | 0.016 | 81.116 | 105.772 |
| OPERATIONS PERSONNEL | 18 | 0 | 0 | 18 | 4.584 | 0.053 | 0.021 | 4.658 |
| HEALTH PHYSICS PERSONNEL | 22 | 0 | 46 | 68 | 9.550 | 0.049 | 20.007 | 29.606 |
| SUPERVISORY PERSONNEL | 0 | 0 | 14 | 14 | 0.250 | 0.012 | 5.917 | 6.179 |
| ENGINEERING PERSONNEL | 5 | 0 | 19 | 24 | 1.856 | 0.002 | 8.495 | 10.353 |
| TOTAL | 126 | 0 | 267 | 393 | 40.880 | 0.132 | 115.556 | 156.568 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 9 | 0 | 17 | 26 | 3.495 | 0.016 | 6.562 | 10.073 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.668 | 0.000 | 0.128 | 0.796 |
| HEALTH PHYSICS PERSONNEL | 6 | 0 | 21 | 27 | 1.859 | 0.000 | 6.444 | 8.303 |
| SUPERVISORY PERSONNEL | 0 | 0 | 1 | 1 | 0.042 | 0.000 | 0.514 | 0.556 |
| ENGINEERING PERSONNEL | 0 | 0 | 1 | 1 | 0.151 | 0.002 | 0.463 | 0.616 |
| TOTAL | 15 | 0 | 40 | 55 | 6.215 | 0.018 | 14.111 | 20.344 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 35 | 0 | 56 | 91 | 18.795 | 0.016 | 22.339 | 41.150 |
| OPERATIONS PERSONNEL | 17 | 0 | 0 | 17 | 5.671 | 0.000 | 0.091 | 5.762 |
| HEALTH PHYSICS PERSONNEL | 15 | 0 | 69 | 84 | 8.199 | 0.000 | 36.794 | 44.993 |
| SUPERVISORY PERSONNEL | 4 | 0 | 7 | 11 | 1.170 | 0.000 | 2.523 | 3.693 |
| ENGINEERING PERSONNEL | 1 | 0 | 8 | 9 | 0.422 | 0.002 | 3.402 | 3.826 |
| TOTAL | 72 | 0 | 140 | 212 | 34.257 | 0.018 | 65.149 | 99.424 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 212 | 0 | 424 | 636 | 83.404 | 0.096 | 184.317 | 267.817 |
| OPERATIONS PERSONNEL | 69 | 1 | 3 | 73 | 21.433 | 0.372 | 1.224 | 23.029 |
| HEALTH PHYSICS PERSONNEL | 66 | 1 | 241 | 308 | 26.591 | 0.222 | 103.764 | 130.577 |
| SUPERVISORY PERSONNEL | 14 | 1 | 44 | 59 | 4.942 | 0.535 | 16.781 | 22.258 |
| ENGINEERING PERSONNEL | 14 | 0 | 37 | 51 | 4.640 | 0.012 | 16.511 | 21.163 |
| GRAND TOTALS | 375 | 3 | 749 | 1127 | 141.010 | 1.237 | 322.597 | 464.844 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *WASHINGTON NUCLEAR 2

TYPE: BWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 43 | 1 | 13 | 57 | 28.336 | 0.374 | 9.008 | 37.718 |
| OPERATIONS PERSONNEL | 48 | 1 | 0 | 49 | 42.304 | 0.163 | 0.000 | 42.467 |
| HEALTH PHYSICS PERSONNEL | 30 | 0 | 15 | 45 | 20.230 | 0.000 | 5.793 | 26.023 |
| SUPERVISORY PERSONNEL | 12 | 1 | 0 | 13 | 4.370 | 0.231 | 0.000 | 4.601 |
| ENGINEERING PERSONNEL | 5 | 9 | 2 | 16 | 1.104 | 3.142 | 0.525 | 4.771 |
| TOTAL | 138 | 12 | 30 | 180 | 96.344 | 3.910 | 15.326 | 115.580 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 174 | 0 | 187 | 361 | 141.120 | 0.060 | 106.110 | 247.290 |
| OPERATIONS PERSONNEL | 3 | 0 | 0 | 3 | 2.795 | 0.014 | 0.000 | 2.809 |
| HEALTH PHYSICS PERSONNEL | 9 | 0 | 42 | 51 | 10.130 | 0.000 | 30.539 | 40.669 |
| SUPERVISORY PERSONNEL | 13 | 2 | 2 | 17 | 6.147 | 0.536 | 0.498 | 7.181 |
| ENGINEERING PERSONNEL | 21 | 18 | 27 | 66 | 7.671 | 6.607 | 8.894 | 23.172 |
| TOTAL | 220 | 20 | 258 | 498 | 167.863 | 7.217 | 146.041 | 321.121 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 1 | 0 | 3 | 4 | 0.638 | 0.000 | 2.164 | 2.802 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.009 | 0.000 | 0.000 | 0.009 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.409 | 0.000 | 0.363 | 0.772 |
| SUPERVISORY PERSONNEL | 0 | 1 | 0 | 1 | 0.023 | 0.163 | 0.061 | 0.247 |
| ENGINEERING PERSONNEL | 2 | 1 | 9 | 12 | 0.479 | 0.553 | 2.133 | 3.165 |
| TOTAL | 3 | 2 | 12 | 17 | 1.558 | 0.716 | 4.721 | 6.995 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 15 | 0 | 65 | 80 | 16.121 | 0.005 | 24.446 | 40.572 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.053 | 0.000 | 0.000 | 0.053 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 3 | 4 | 1.106 | 0.000 | 2.253 | 3.359 |
| SUPERVISORY PERSONNEL | 1 | 1 | 1 | 3 | 0.314 | 0.191 | 0.149 | 0.654 |
| ENGINEERING PERSONNEL | 1 | 4 | 6 | 11 | 0.367 | 1.147 | 1.323 | 2.837 |
| TOTAL | 18 | 5 | 75 | 98 | 17.961 | 1.343 | 28.171 | 47.475 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 9 | 0 | 4 | 13 | 5.905 | 0.000 | 1.562 | 7.467 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.164 | 0.000 | 0.000 | 0.164 |
| HEALTH PHYSICS PERSONNEL | 3 | 0 | 2 | 5 | 2.799 | 0.000 | 3.131 | 5.930 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.037 | 0.000 | 0.000 | 0.037 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.037 | 0.046 | 0.033 | 0.116 |
| TOTAL | 12 | 0 | 6 | 18 | 8.942 | 0.046 | 4.726 | 13.714 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 2 | 0 | 0 | 2 | 1.634 | 0.000 | 0.009 | 1.643 |
| OPERATIONS PERSONNEL | 3 | 0 | 0 | 3 | 3.317 | 0.000 | 0.000 | 3.317 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 0 | 1 | 1.431 | 0.000 | 0.015 | 1.446 |
| SUPERVISORY PERSONNEL | 1 | 0 | 0 | 1 | 0.270 | 0.000 | 0.000 | 0.270 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.019 | 0.076 | 0.095 |
| TOTAL | 7 | 0 | 0 | 7 | 6.652 | 0.019 | 0.100 | 6.771 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 244 | 1 | 272 | 517 | 193.754 | 0.439 | 143.299 | 337.492 |
| OPERATIONS PERSONNEL | 54 | 1 | 0 | 55 | 48.642 | 0.177 | 0.000 | 48.819 |
| HEALTH PHYSICS PERSONNEL | 44 | 0 | 62 | 106 | 36.105 | 0.000 | 42.094 | 78.199 |
| SUPERVISORY PERSONNEL | 27 | 5 | 3 | 35 | 11.161 | 1.121 | 0.708 | 12.990 |
| ENGINEERING PERSONNEL | 29 | 32 | 44 | 105 | 9.658 | 11.514 | 12.984 | 34.156 |
| GRAND TOTALS | 398 | 39 | 381 | 818 | 299.320 | 13.251 | 199.085 | 511.656 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *WATERFORD 3 TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 0 | 0 | 0.028 | 0.000 | 0.128 | 0.156 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.061 | 0.061 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.000 | 0.055 | 0.055 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.002 | 0.000 | 0.000 | 0.002 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.006 | 0.000 | 0.000 | 0.006 |
| TOTAL | 0 | 0 | 0 | 0 | 0.036 | 0.000 | 0.244 | 0.280 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 1 | 1 | 0.002 | 0.000 | 0.183 | 0.185 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.632 | 0.000 | 0.120 | 0.752 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 0 | 1 | 0.298 | 0.000 | 0.150 | 0.448 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.009 | 0.000 | 0.012 | 0.021 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.139 | 0.000 | 0.002 | 0.141 |
| TOTAL | 1 | 0 | 1 | 2 | 1.080 | 0.000 | 0.467 | 1.547 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 7 | 7 | 1.219 | 0.000 | 3.970 | 5.189 |
| OPERATIONS PERSONNEL | 2 | 0 | 0 | 2 | 2.103 | 0.000 | 0.471 | 2.574 |
| HEALTH PHYSICS PERSONNEL | 5 | 0 | 4 | 9 | 1.654 | 0.000 | 1.663 | 3.317 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.036 | 0.000 | 0.014 | 0.050 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.231 | 0.000 | 0.039 | 0.270 |
| TOTAL | 7 | 0 | 11 | 18 | 5.243 | 0.000 | 6.157 | 11.400 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 7 | 7 | 1.265 | 0.000 | 3.407 | 4.672 |
| OPERATIONS PERSONNEL | 1 | 0 | 0 | 1 | 1.725 | 0.000 | 0.376 | 2.101 |
| HEALTH PHYSICS PERSONNEL | 7 | 0 | 2 | 9 | 2.045 | 0.000 | 0.721 | 2.766 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.036 | 0.000 | 0.037 | 0.073 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.236 | 0.000 | 0.023 | 0.259 |
| TOTAL | 8 | 0 | 9 | 17 | 5.307 | 0.000 | 4.564 | 9.871 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 6 | 6 | 0.878 | 0.000 | 3.554 | 4.432 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.638 | 0.000 | 0.162 | 0.800 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 0 | 1 | 0.305 | 0.000 | 0.353 | 0.658 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.036 | 0.000 | 0.037 | 0.073 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.236 | 0.000 | 0.039 | 0.275 |
| TOTAL | 1 | 0 | 6 | 7 | 2.093 | 0.000 | 4.145 | 6.238 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 6 | 6 | 1.201 | 0.000 | 3.594 | 4.795 |
| OPERATIONS PERSONNEL | 1 | 0 | 0 | 1 | 1.707 | 0.000 | 0.370 | 2.077 |
| HEALTH PHYSICS PERSONNEL | 6 | 0 | 2 | 8 | 2.191 | 0.000 | 0.701 | 2.892 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.036 | 0.000 | 0.033 | 0.069 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.192 | 0.000 | 0.039 | 0.231 |
| TOTAL | 7 | 0 | 8 | 15 | 5.327 | 0.000 | 4.737 | 10.064 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 27 | 27 | 4.593 | 0.000 | 14.836 | 19.429 |
| OPERATIONS PERSONNEL | 4 | 0 | 0 | 4 | 6.805 | 0.000 | 1.560 | 8.365 |
| HEALTH PHYSICS PERSONNEL | 20 | 0 | 8 | 28 | 6.493 | 0.000 | 3.643 | 10.136 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.155 | 0.000 | 0.133 | 0.288 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 1.040 | 0.000 | 0.142 | 1.182 |
| GRAND TOTALS | 24 | 0 | 35 | 59 | 19.086 | 0.000 | 20.314 | 39.400 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *WOLF CREEK 1

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) STATION | UTILITY | CONTRACT | TOTAL | TOTAL PERSON-REM STATION | UTILITY | CONTRACT | TOTAL |
|---|---|---|---|---|---|---|---|---|
| **REACTOR OPS & SURV** | | | | | | | | |
| MAINTENANCE PERSONNEL | 9 | 0 | 20 | 29 | 3.514 | 0.015 | 7.883 | 11.412 |
| OPERATIONS PERSONNEL | 9 | 0 | 0 | 9 | 2.588 | 0.129 | 0.714 | 3.431 |
| HEALTH PHYSICS PERSONNEL | 11 | 0 | 11 | 22 | 3.333 | 0.100 | 4.536 | 7.969 |
| SUPERVISORY PERSONNEL | 4 | 1 | 1 | 6 | 1.630 | 0.147 | 0.497 | 2.274 |
| ENGINEERING PERSONNEL | 1 | 0 | 3 | 4 | 0.849 | 0.053 | 1.085 | 1.987 |
| TOTAL | 34 | 1 | 35 | 70 | 11.914 | 0.444 | 14.715 | 27.073 |
| **ROUTINE MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 28 | 0 | 76 | 104 | 8.204 | 0.079 | 19.774 | 28.057 |
| OPERATIONS PERSONNEL | 1 | 0 | 1 | 2 | 1.518 | 0.062 | 0.927 | 2.507 |
| HEALTH PHYSICS PERSONNEL | 8 | 0 | 31 | 39 | 2.328 | 0.026 | 7.603 | 9.957 |
| SUPERVISORY PERSONNEL | 7 | 0 | 2 | 9 | 2.720 | 0.012 | 0.674 | 3.406 |
| ENGINEERING PERSONNEL | 2 | 0 | 18 | 20 | 0.924 | 0.151 | 4.300 | 5.375 |
| TOTAL | 46 | 0 | 128 | 174 | 15.694 | 0.330 | 33.278 | 49.302 |
| **IN-SERVICE INSPECTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 5 | 0 | 44 | 49 | 2.470 | 0.067 | 15.911 | 18.448 |
| OPERATIONS PERSONNEL | 0 | 0 | 1 | 1 | 0.328 | 0.028 | 0.715 | 1.071 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 7 | 7 | 0.407 | 0.014 | 3.183 | 3.604 |
| SUPERVISORY PERSONNEL | 1 | 0 | 0 | 1 | 0.712 | 0.000 | 0.274 | 0.986 |
| ENGINEERING PERSONNEL | 0 | 0 | 15 | 15 | 0.336 | 0.021 | 3.901 | 4.258 |
| TOTAL | 6 | 0 | 67 | 73 | 4.253 | 0.130 | 23.984 | 28.367 |
| **SPECIAL MAINTENANCE** | | | | | | | | |
| MAINTENANCE PERSONNEL | 22 | 1 | 43 | 66 | 6.688 | 0.175 | 13.539 | 20.402 |
| OPERATIONS PERSONNEL | 0 | 0 | 1 | 1 | 0.502 | 0.051 | 0.848 | 1.401 |
| HEALTH PHYSICS PERSONNEL | 5 | 0 | 10 | 15 | 1.533 | 0.010 | 4.165 | 5.708 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 1.325 | 0.069 | 0.407 | 1.801 |
| ENGINEERING PERSONNEL | 0 | 0 | 9 | 9 | 0.464 | 0.026 | 3.215 | 3.705 |
| TOTAL | 27 | 1 | 63 | 91 | 10.512 | 0.331 | 22.174 | 33.017 |
| **WASTE PROCESSING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 8 | 0 | 32 | 40 | 3.620 | 0.021 | 11.486 | 15.127 |
| OPERATIONS PERSONNEL | 0 | 0 | 2 | 2 | 0.764 | 0.049 | 0.753 | 1.566 |
| HEALTH PHYSICS PERSONNEL | 9 | 0 | 7 | 16 | 3.218 | 0.033 | 4.063 | 7.314 |
| SUPERVISORY PERSONNEL | 3 | 0 | 2 | 5 | 0.982 | 0.028 | 0.370 | 1.380 |
| ENGINEERING PERSONNEL | 0 | 0 | 10 | 10 | 0.325 | 0.127 | 2.452 | 2.904 |
| TOTAL | 20 | 0 | 53 | 73 | 8.909 | 0.258 | 19.124 | 28.291 |
| **REFUELING** | | | | | | | | |
| MAINTENANCE PERSONNEL | 26 | 0 | 17 | 43 | 6.277 | 0.000 | 5.891 | 12.168 |
| OPERATIONS PERSONNEL | 0 | 0 | 0 | 0 | 0.647 | 0.000 | 0.090 | 0.737 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 2 | 3 | 0.379 | 0.001 | 0.886 | 1.266 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.500 | 0.000 | 0.058 | 0.558 |
| ENGINEERING PERSONNEL | 0 | 1 | 1 | 2 | 0.198 | 0.239 | 0.435 | 0.872 |
| TOTAL | 27 | 1 | 20 | 48 | 8.001 | 0.240 | 7.360 | 15.601 |
| **TOTAL BY JOB FUNCTION** | | | | | | | | |
| MAINTENANCE PERSONNEL | 98 (68) | 1 (2) | 232 (163) | 331 (233) | 30.773 | 0.357 | 74.484 | 105.614 |
| OPERATIONS PERSONNEL | 10 (25) | 0 (1) | 5 (13) | 15 (39) | 6.347 | 0.319 | 4.047 | 10.713 |
| HEALTH PHYSICS PERSONNEL | 34 (23) | 0 (1) | 68 (83) | 102 (107) | 11.198 | 0.184 | 24.436 | 35.818 |
| SUPERVISORY PERSONNEL | 15 (27) | 1 (1) | 5 (6) | 21 (34) | 7.869 | 0.256 | 2.280 | 10.405 |
| ENGINEERING PERSONNEL | 3 (12) | 1 (1) | 56 (46) | 60 (59) | 3.096 | 0.617 | 15.388 | 19.101 |
| GRAND TOTALS | 160 (155) | 3 (6) | 366 (311) | 529 (472) | 59.283 | 1.733 | 120.635 | 181.651 |

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

# APPENDIX D (Continued)

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

## 1990

PLANT: *YANKEE-ROWE

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) | | | | TOTAL PERSON-REM | | | |
|---|---|---|---|---|---|---|---|---|
| | STATION | UTILITY | CONTRACT | TOTAL | STATION | UTILITY | CONTRACT | TOTAL |
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 3 | 0 | 5 | 8 | 1.881 | 0.066 | 4.797 | 6.744 |
| OPERATIONS PERSONNEL | 43 | 0 | 0 | 43 | 12.966 | 0.025 | 1.217 | 14.208 |
| HEALTH PHYSICS PERSONNEL | 10 | 0 | 5 | 15 | 3.095 | 0.000 | 3.142 | 6.237 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.597 | 0.000 | 0.000 | 0.597 |
| ENGINEERING PERSONNEL | 3 | 4 | 1 | 8 | 1.479 | 1.775 | 0.678 | 3.932 |
| TOTAL | 59 | 4 | 11 | 74 | 20.018 | 1.866 | 9.834 | 31.718 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 30 | 0 | 96 | 126 | 17.686 | 0.096 | 45.029 | 62.811 |
| OPERATIONS PERSONNEL | 6 | 0 | 3 | 9 | 3.053 | 0.000 | 0.547 | 3.600 |
| HEALTH PHYSICS PERSONNEL | 9 | 0 | 46 | 55 | 3.233 | 0.000 | 26.656 | 29.889 |
| SUPERVISORY PERSONNEL | 3 | 0 | 0 | 3 | 1.088 | 0.000 | 0.000 | 1.088 |
| ENGINEERING PERSONNEL | 8 | 3 | 2 | 13 | 4.116 | 1.452 | 0.724 | 6.292 |
| TOTAL | 56 | 3 | 147 | 206 | 29.176 | 1.548 | 72.956 | 103.680 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 1 | 43 | 44 | 0.516 | 0.889 | 21.063 | 22.468 |
| OPERATIONS PERSONNEL | 1 | 0 | 0 | 1 | 0.840 | 0.000 | 0.000 | 0.840 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 0 | 0 | 0.013 | 0.000 | 0.327 | 0.340 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.027 | 0.000 | 0.000 | 0.027 |
| ENGINEERING PERSONNEL | 2 | 5 | 3 | 10 | 0.982 | 1.517 | 1.781 | 4.280 |
| TOTAL | 3 | 6 | 46 | 55 | 2.378 | 2.406 | 23.171 | 27.955 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 1 | 0 | 77 | 78 | 0.140 | 0.018 | 33.980 | 34.138 |
| OPERATIONS PERSONNEL | 1 | 0 | 0 | 1 | 0.128 | 0.000 | 0.016 | 0.144 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 1 | 1 | 0.000 | 0.000 | 1.009 | 1.009 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.027 | 0.000 | 0.000 | 0.027 |
| ENGINEERING PERSONNEL | 0 | 1 | 2 | 3 | 0.116 | 0.702 | 0.383 | 1.201 |
| TOTAL | 2 | 1 | 80 | 83 | 0.411 | 0.720 | 35.388 | 36.519 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 1 | 0 | 0 | 1 | 0.442 | 0.000 | 0.329 | 0.771 |
| OPERATIONS PERSONNEL | 4 | 0 | 0 | 4 | 1.298 | 0.000 | 0.000 | 1.298 |
| HEALTH PHYSICS PERSONNEL | 4 | 0 | 30 | 34 | 3.641 | 0.000 | 11.382 | 15.023 |
| SUPERVISORY PERSONNEL | 0 | 0 | 0 | 0 | 0.004 | 0.000 | 0.000 | 0.004 |
| ENGINEERING PERSONNEL | 1 | 0 | 0 | 1 | 0.569 | 0.080 | 0.080 | 0.729 |
| TOTAL | 10 | 0 | 30 | 40 | 5.954 | 0.080 | 11.791 | 17.825 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 20 | 0 | 40 | 60 | 5.670 | 0.035 | 10.873 | 16.578 |
| OPERATIONS PERSONNEL | 11 | 0 | 6 | 17 | 2.895 | 0.000 | 1.423 | 4.318 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 19 | 20 | 0.346 | 0.000 | 4.491 | 4.837 |
| SUPERVISORY PERSONNEL | 2 | 0 | 0 | 2 | 1.114 | 0.000 | 0.000 | 1.114 |
| ENGINEERING PERSONNEL | 3 | 0 | 0 | 3 | 1.109 | 0.089 | 0.000 | 1.198 |
| TOTAL | 37 | 0 | 65 | 102 | 11.134 | 0.124 | 16.787 | 28.045 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 55 | 1 | 261 | 317 | 26.335 | 1.104 | 116.071 | 143.510 |
| OPERATIONS PERSONNEL | 66 | 0 | 9 | 75 | 21.180 | 0.025 | 3.203 | 24.408 |
| HEALTH PHYSICS PERSONNEL | 24 | 0 | 101 | 125 | 10.328 | 0.000 | 47.007 | 57.335 |
| SUPERVISORY PERSONNEL | 5 | 0 | 0 | 5 | 2.857 | 0.000 | 0.000 | 2.857 |
| ENGINEERING PERSONNEL | 17 | 13 | 8 | 38 | 8.371 | 5.615 | 3.646 | 17.632 |
| GRAND TOTALS | 167 | 14 | 379 | 560 | 69.071 | 6.744 | 169.927 | 245.742 |

*Workers may be counted in more than one category.

# APPENDIX D (Continued)

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

## 1990

PLANT: *ZION 1,2

TYPE: PWR

| WORK AND JOB FUNCTION | NUMBER OF PERSONNEL (>100 mREM) STATION | UTILITY | CONTRACT | TOTAL | TOTAL PERSON-REM STATION | UTILITY | CONTRACT | TOTAL |
|---|---|---|---|---|---|---|---|---|
| REACTOR OPS & SURV | | | | | | | | |
| MAINTENANCE PERSONNEL | 1 | 0 | 1 | 2 | 0.772 | 0.000 | 0.488 | 1.260 |
| OPERATIONS PERSONNEL | 118 | 0 | 197 | 315 | 8.352 | 0.000 | 0.331 | 8.683 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 6 | 7 | 0.686 | 0.000 | 1.829 | 2.515 |
| SUPERVISORY PERSONNEL | 42 | 16 | 1 | 59 | 5.800 | 0.018 | 0.054 | 5.872 |
| ENGINEERING PERSONNEL | 12 | 1 | 2 | 15 | 0.767 | 0.024 | 0.002 | 0.793 |
| TOTAL | 174 | 17 | 207 | 398 | 16.377 | 0.042 | 2.704 | 19.123 |
| ROUTINE MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 115 | 2 | 680 | 797 | 62.518 | 0.000 | 279.437 | 341.955 |
| OPERATIONS PERSONNEL | 63 | 0 | 41 | 104 | 4.458 | 0.000 | 0.070 | 4.528 |
| HEALTH PHYSICS PERSONNEL | 29 | 0 | 215 | 244 | 25.820 | 0.000 | 69.427 | 95.247 |
| SUPERVISORY PERSONNEL | 166 | 87 | 413 | 666 | 23.170 | 0.098 | 28.394 | 51.662 |
| ENGINEERING PERSONNEL | 83 | 250 | 44 | 377 | 5.203 | 8.649 | 0.042 | 13.894 |
| TOTAL | 456 | 339 | 1393 | 2188 | 121.169 | 8.747 | 377.370 | 507.286 |
| IN-SERVICE INSPECTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 5 | 0 | 174 | 179 | 2.605 | 0.000 | 71.527 | 74.132 |
| OPERATIONS PERSONNEL | 3 | 0 | 0 | 3 | 0.238 | 0.000 | 0.000 | 0.238 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 1 | 1 | 0.334 | 0.000 | 0.190 | 0.524 |
| SUPERVISORY PERSONNEL | 5 | 9 | 109 | 123 | 0.666 | 0.010 | 7.521 | 8.197 |
| ENGINEERING PERSONNEL | 13 | 9 | 1 | 23 | 0.849 | 0.318 | 0.001 | 1.168 |
| TOTAL | 26 | 18 | 285 | 329 | 4.692 | 0.328 | 79.239 | 84.259 |
| SPECIAL MAINTENANCE | | | | | | | | |
| MAINTENANCE PERSONNEL | 4 | 0 | 55 | 59 | 2.368 | 0.000 | 22.751 | 25.119 |
| OPERATIONS PERSONNEL | 5 | 0 | 0 | 5 | 0.345 | 0.000 | 0.001 | 0.346 |
| HEALTH PHYSICS PERSONNEL | 0 | 0 | 6 | 6 | 0.282 | 0.000 | 1.940 | 2.222 |
| SUPERVISORY PERSONNEL | 7 | 0 | 7 | 14 | 0.996 | 0.000 | 0.492 | 1.488 |
| ENGINEERING PERSONNEL | 2 | 7 | 0 | 9 | 0.104 | 0.229 | 0.000 | 0.333 |
| TOTAL | 18 | 7 | 68 | 93 | 4.095 | 0.229 | 25.184 | 29.508 |
| WASTE PROCESSING | | | | | | | | |
| MAINTENANCE PERSONNEL | 0 | 0 | 5 | 5 | 0.040 | 0.000 | 2.240 | 2.280 |
| OPERATIONS PERSONNEL | 18 | 0 | 0 | 18 | 1.241 | 0.000 | 0.000 | 1.241 |
| HEALTH PHYSICS PERSONNEL | 1 | 0 | 6 | 7 | 0.545 | 0.000 | 2.039 | 2.584 |
| SUPERVISORY PERSONNEL | 3 | 0 | 1 | 4 | 0.368 | 0.000 | 0.078 | 0.446 |
| ENGINEERING PERSONNEL | 0 | 0 | 0 | 0 | 0.000 | 0.004 | 0.000 | 0.004 |
| TOTAL | 22 | 0 | 12 | 34 | 2.194 | 0.004 | 4.357 | 6.555 |
| REFUELING | | | | | | | | |
| MAINTENANCE PERSONNEL | 51 | 2 | 3 | 56 | 27.720 | 0.000 | 1.376 | 29.096 |
| OPERATIONS PERSONNEL | 65 | 0 | 0 | 65 | 4.585 | 0.000 | 0.000 | 4.585 |
| HEALTH PHYSICS PERSONNEL | 3 | 0 | 1 | 4 | 2.417 | 0.000 | 0.417 | 2.834 |
| SUPERVISORY PERSONNEL | 57 | 0 | 16 | 73 | 7.995 | 0.000 | 1.084 | 9.079 |
| ENGINEERING PERSONNEL | 4 | 73 | 0 | 77 | 0.274 | 2.516 | 0.000 | 2.790 |
| TOTAL | 180 | 75 | 20 | 275 | 42.991 | 2.516 | 2.877 | 48.384 |
| TOTAL BY JOB FUNCTION | | | | | | | | |
| MAINTENANCE PERSONNEL | 176 (177) | 4 (4) | 918 (920) | 1098(1101) | 96.023 | 0.000 | 377.819 | 473.842 |
| OPERATIONS PERSONNEL | 272 (272) | 0 (0) | 238 (239) | 510 (511) | 19.219 | 0.000 | 0.402 | 19.621 |
| HEALTH PHYSICS PERSONNEL | 34 (34) | 0 (0) | 235 (234) | 269 (268) | 30.084 | 0.000 | 75.842 | 105.926 |
| SUPERVISORY PERSONNEL | 280 (280) | 112 (112) | 547 (547) | 939 (939) | 38.995 | 0.126 | 37.623 | 76.744 |
| ENGINEERING PERSONNEL | 114 (114) | 340 (340) | 47 (47) | 501 (501) | 7.197 | 11.740 | 0.045 | 18.982 |
| GRAND TOTALS | 876 (877) | 456 (456) | 1985 (1987) | 3317(3320) | 191.518 | 11.866 | 491.731 | 695.115 |

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

# APPENDIX E

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

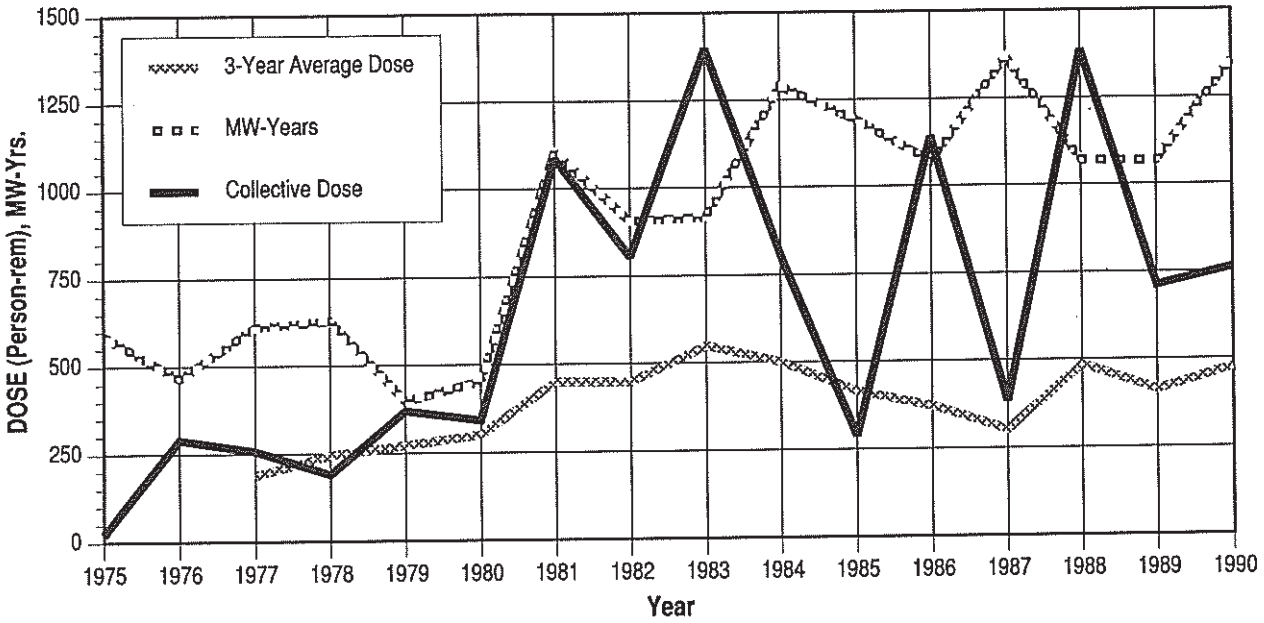
1973-1990

# APPENDIX E

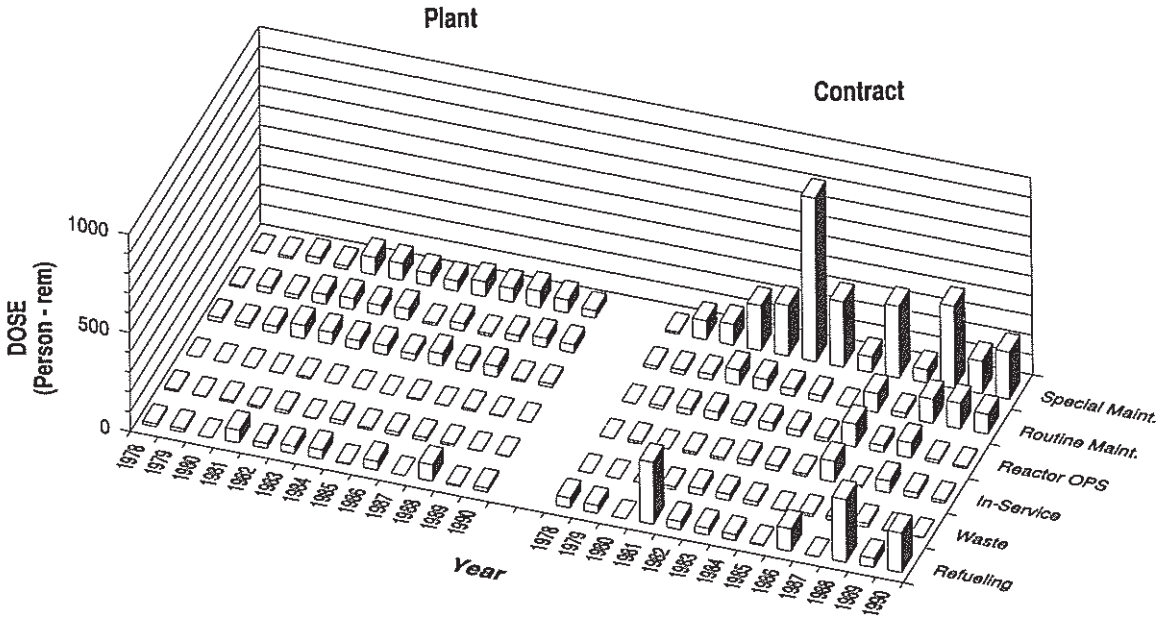
## ARKANSAS 1, 2

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

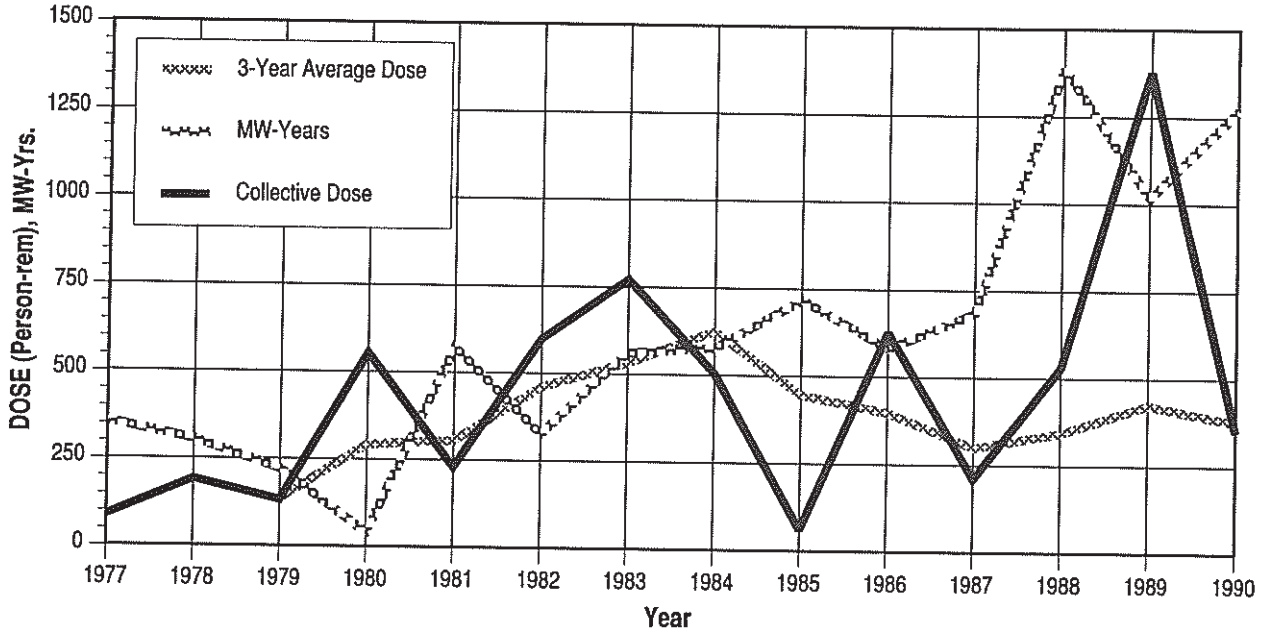


## APPENDIX E (continued)

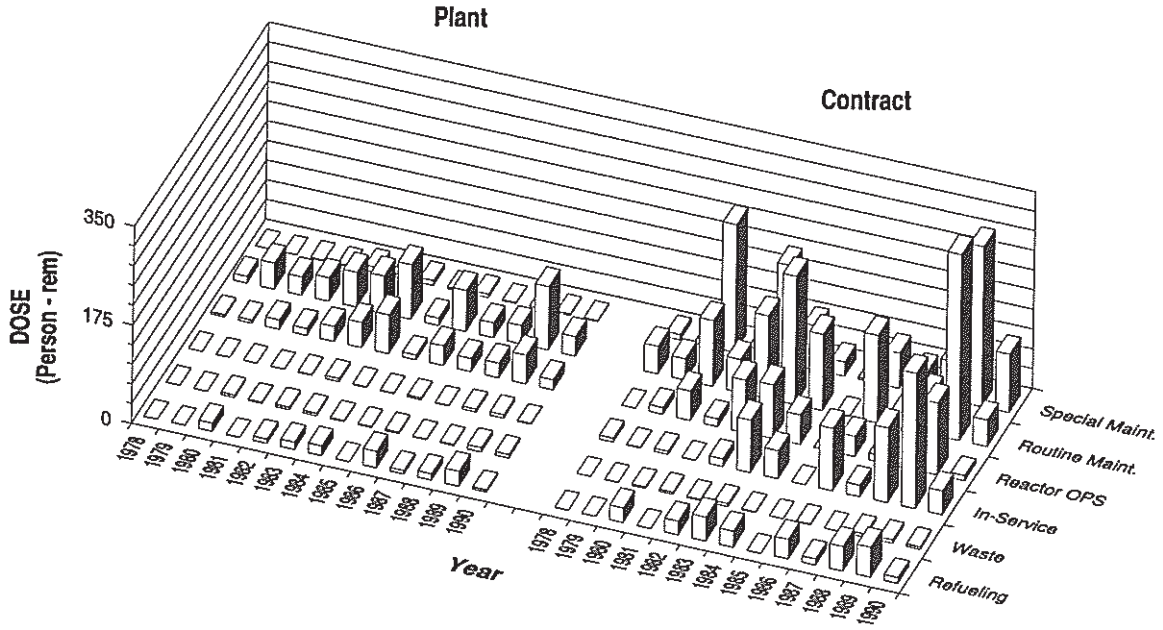
### BEAVER VALLEY 1, 2

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

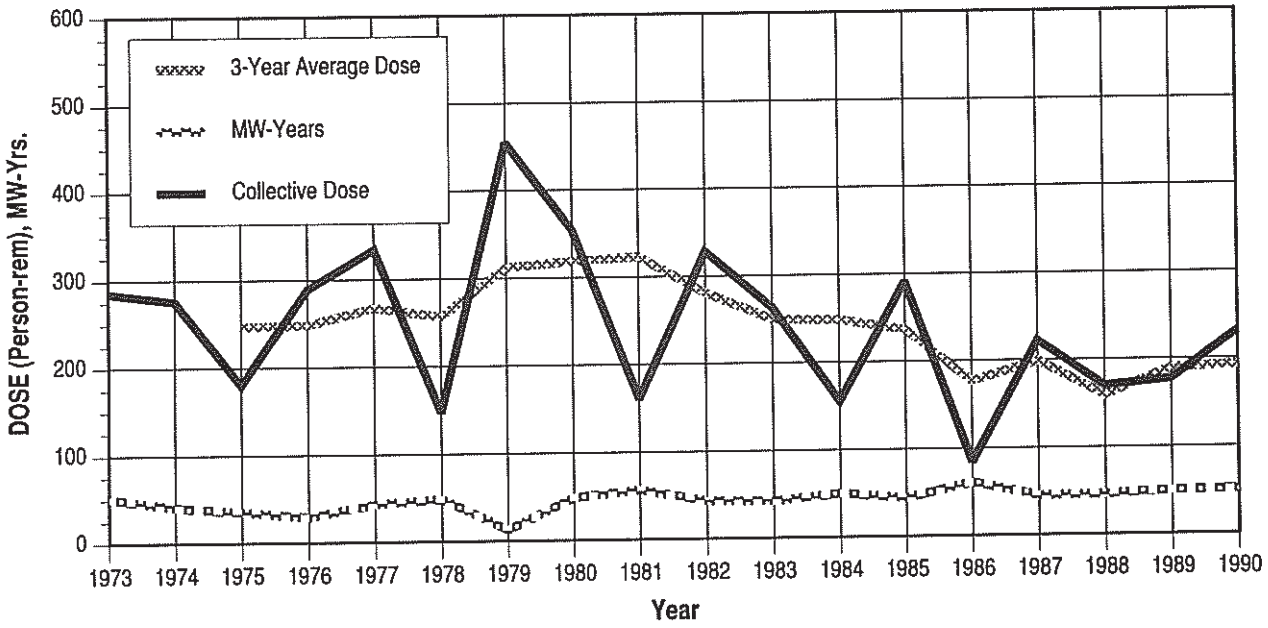


## APPENDIX E (continued)

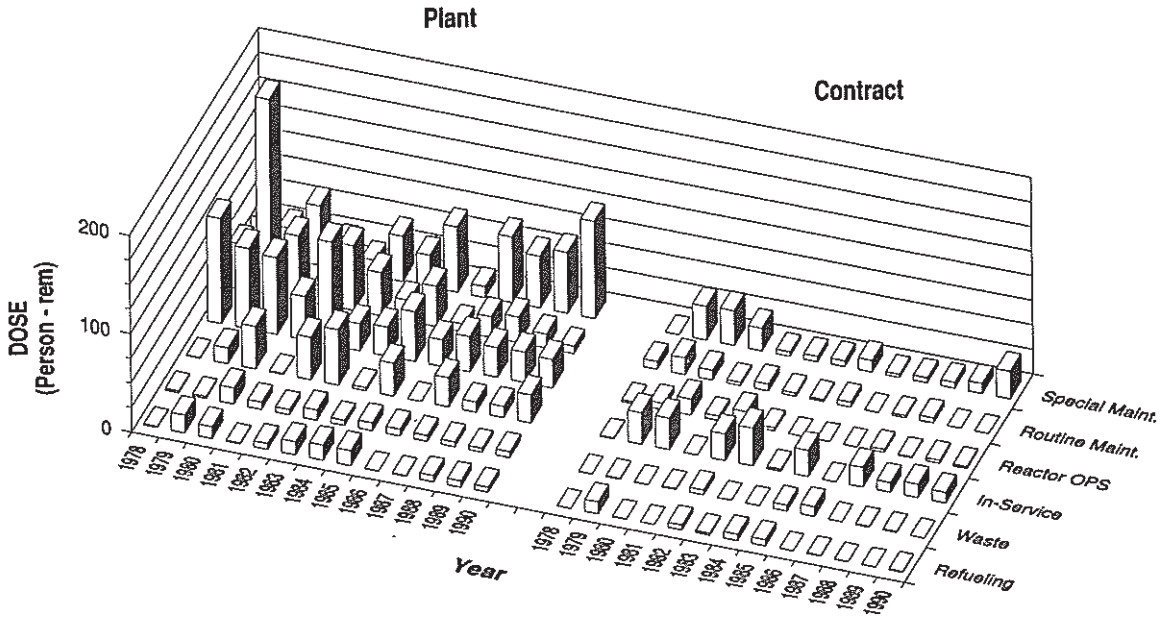
### BIG ROCK POINT

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

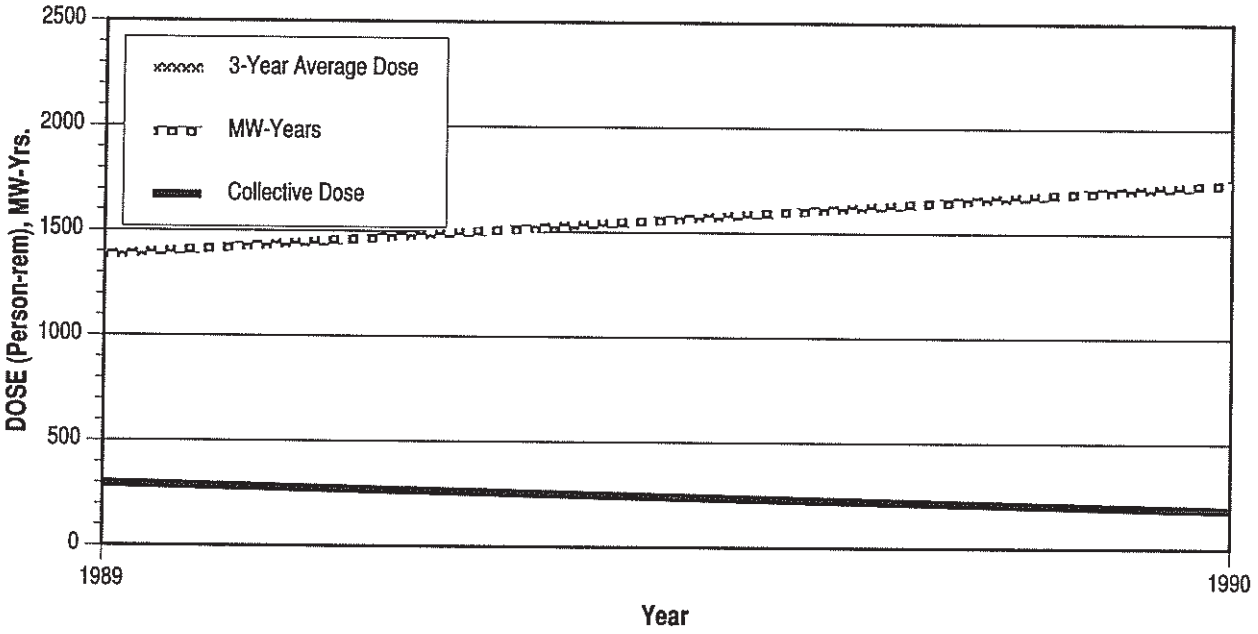


## APPENDIX E (continued)

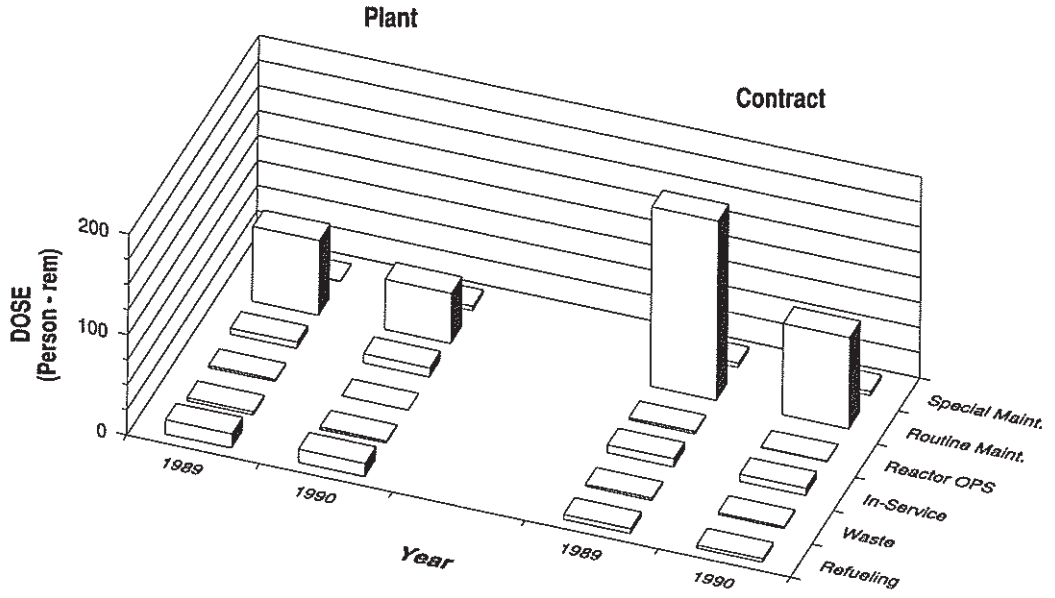
## BRAIDWOOD 1, 2

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

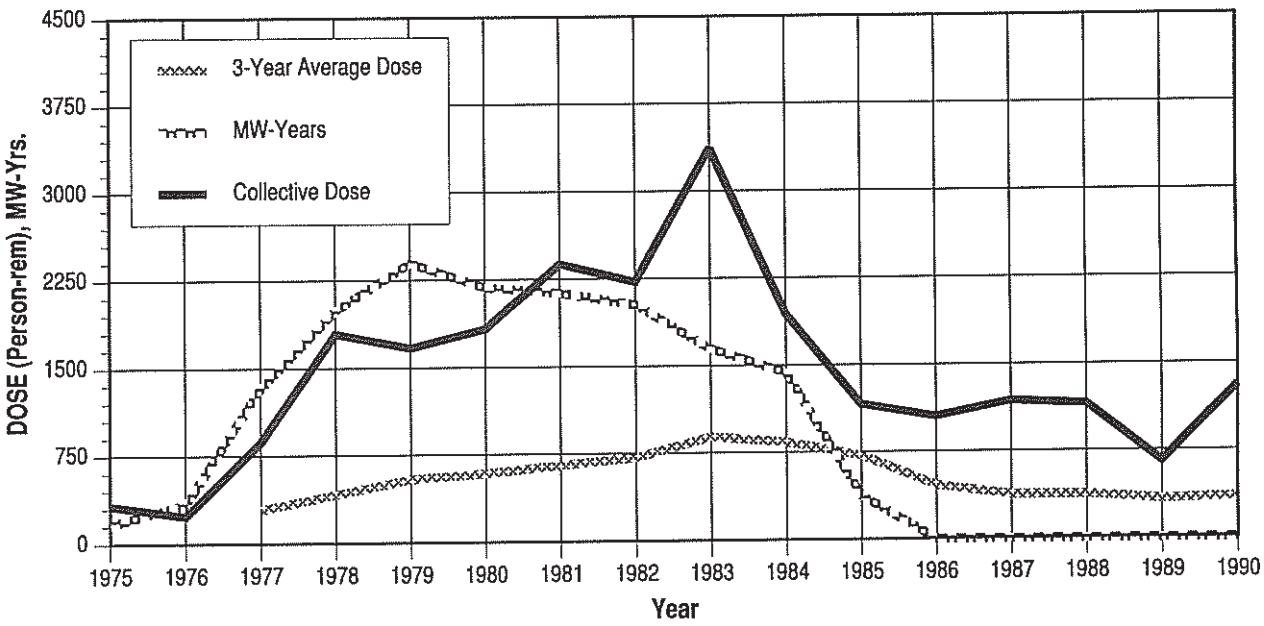


## APPENDIX E (continued)

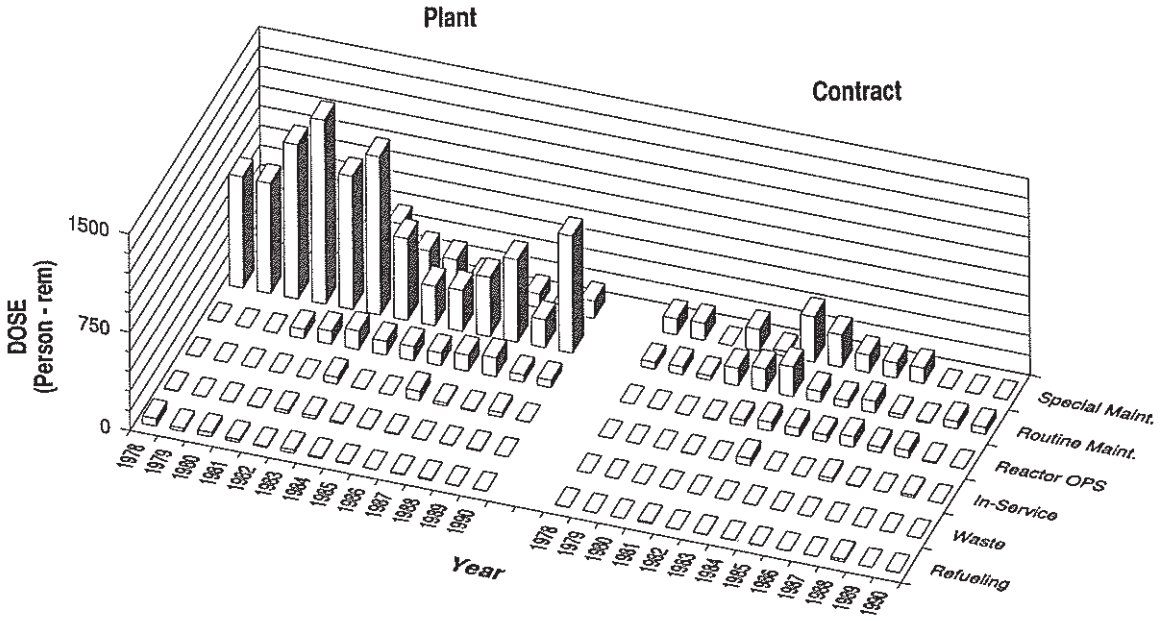
### BROWNS FERRY 1, 2, 3

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

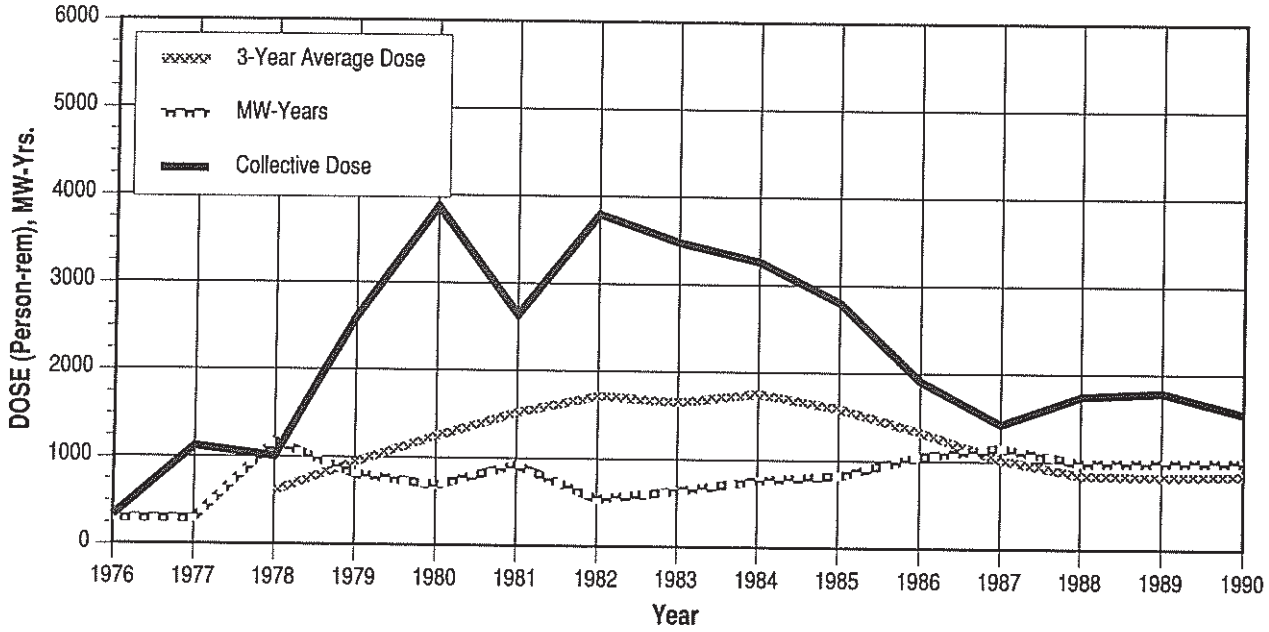


## APPENDIX E (continued)

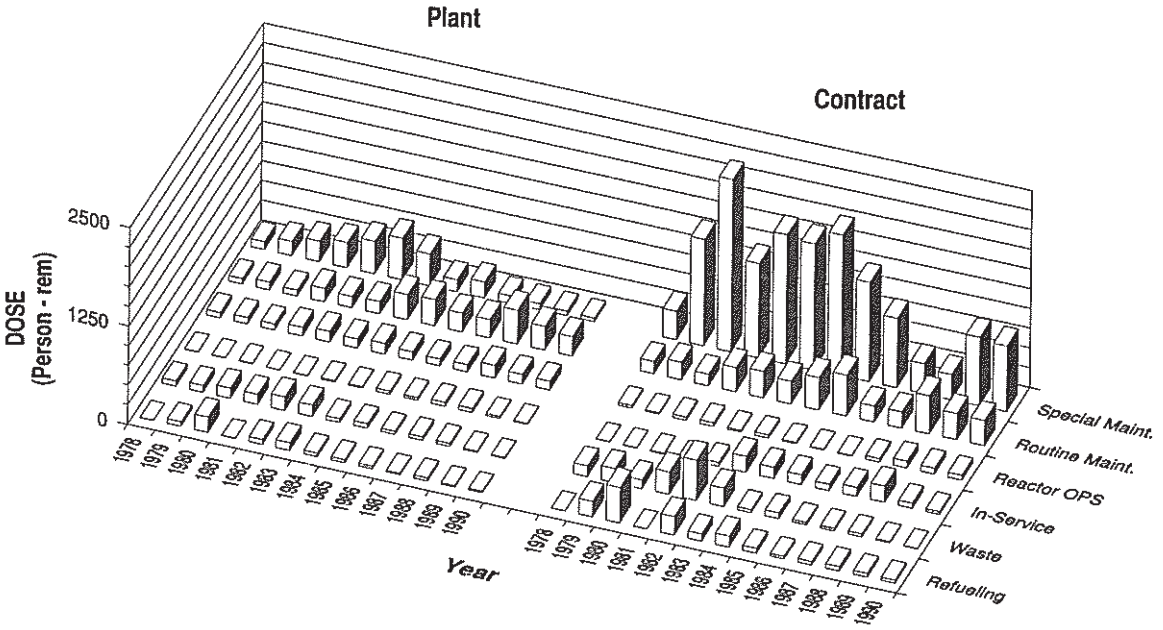
### BRUNSWICK 1, 2

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

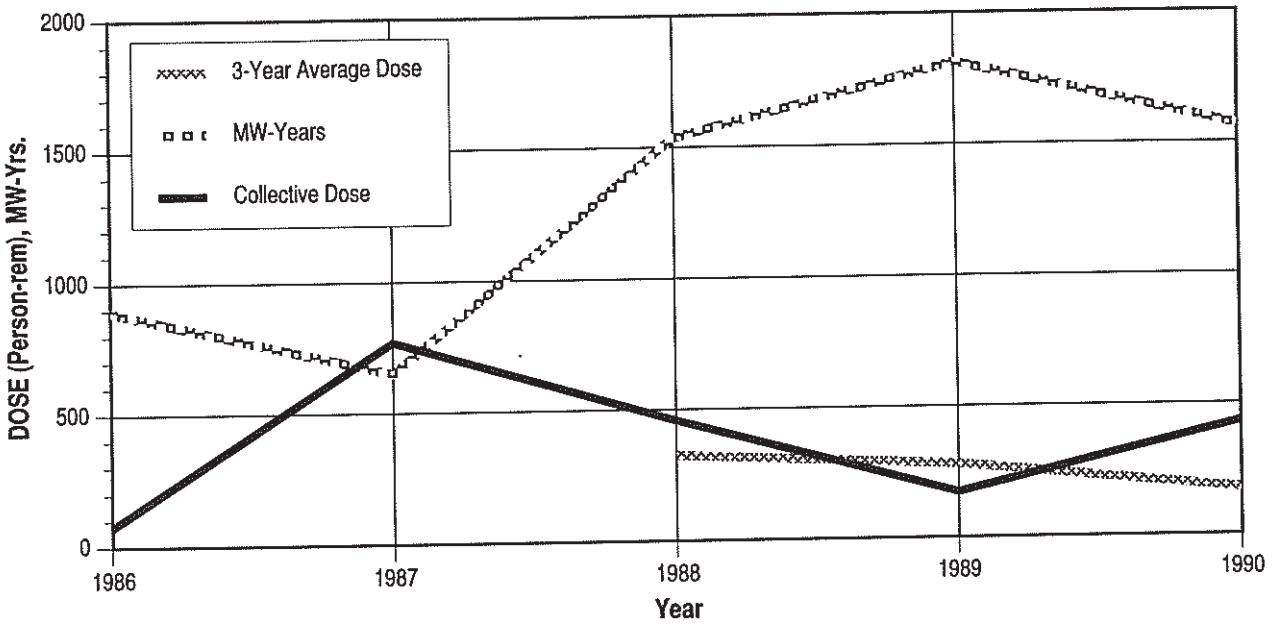


## APPENDIX E (continued)

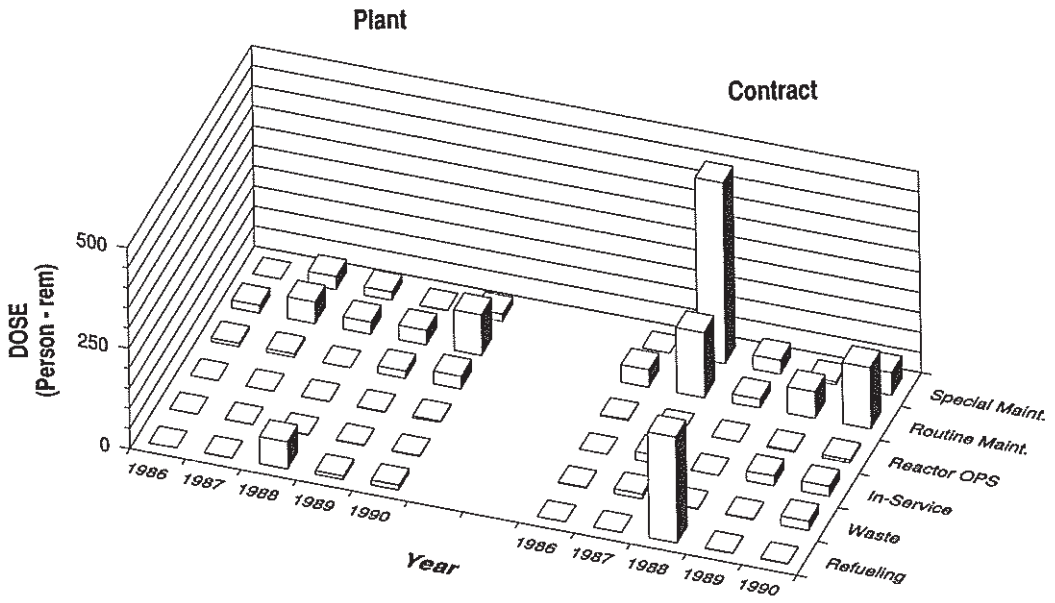
### BYRON 1, 2

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

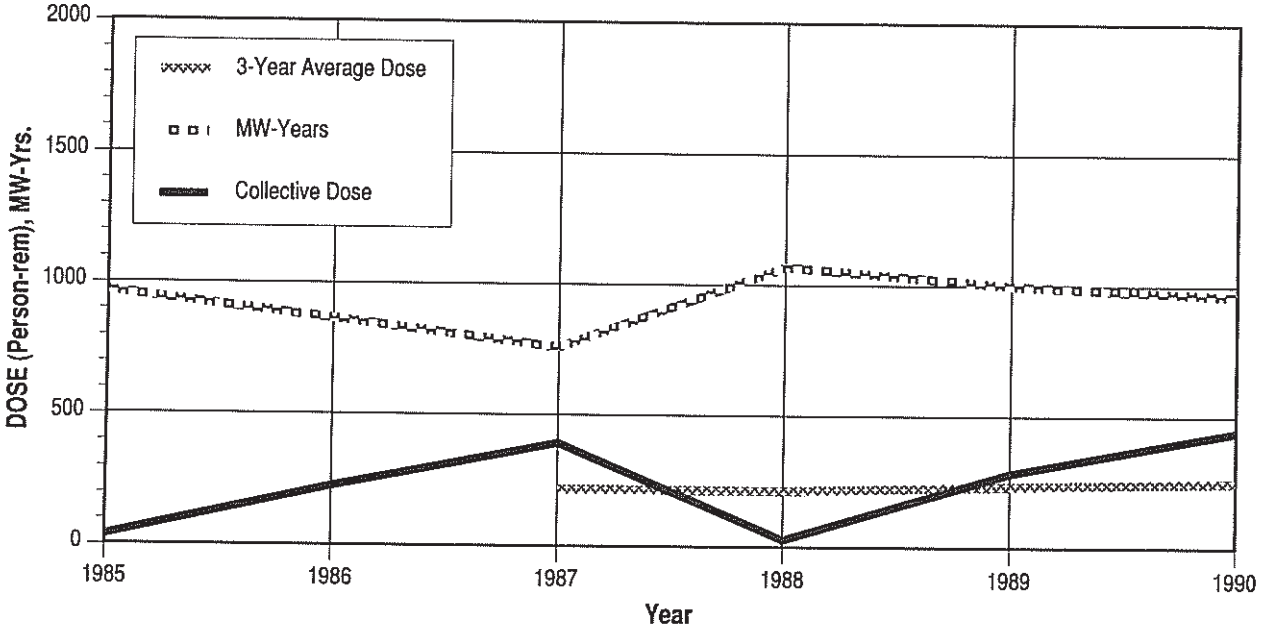


## APPENDIX E (continued)

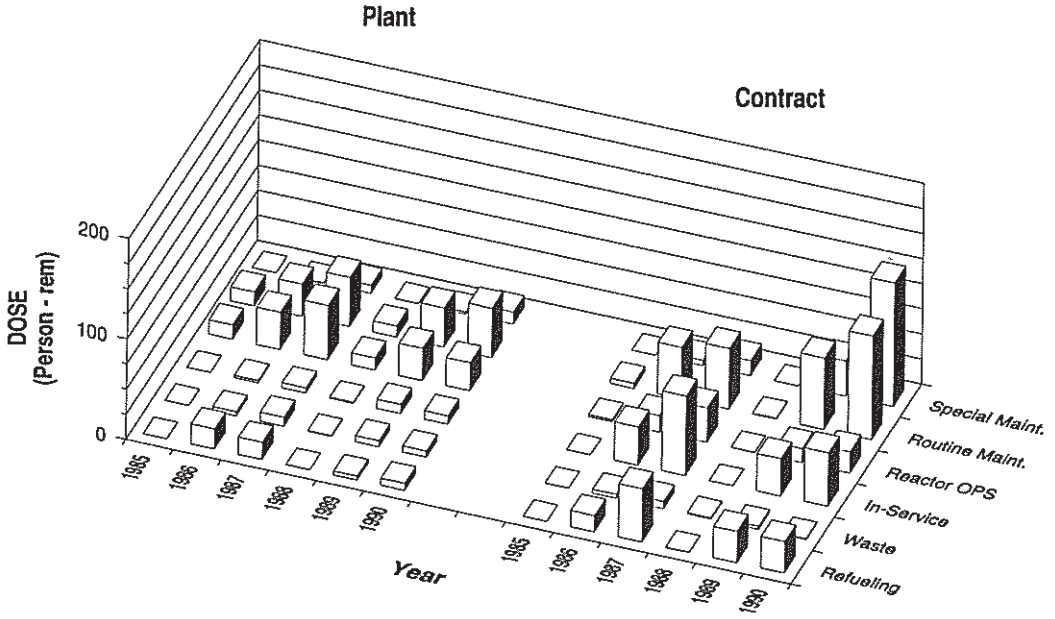
### CALLAWAY 1

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

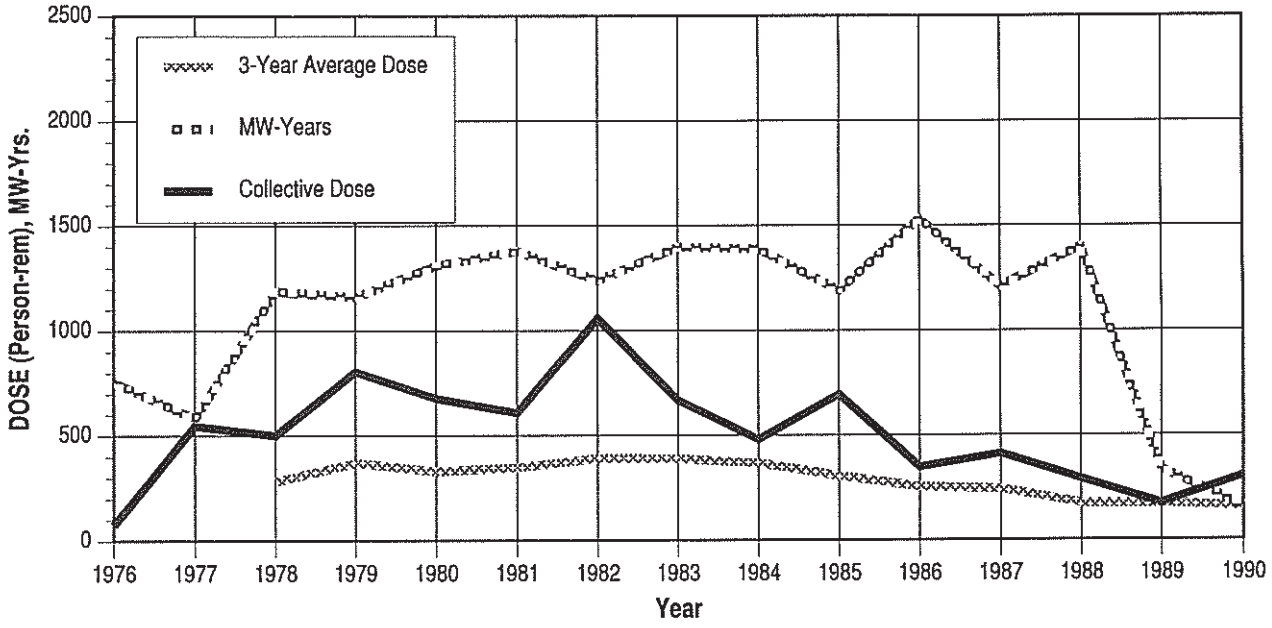


## APPENDIX E (continued)

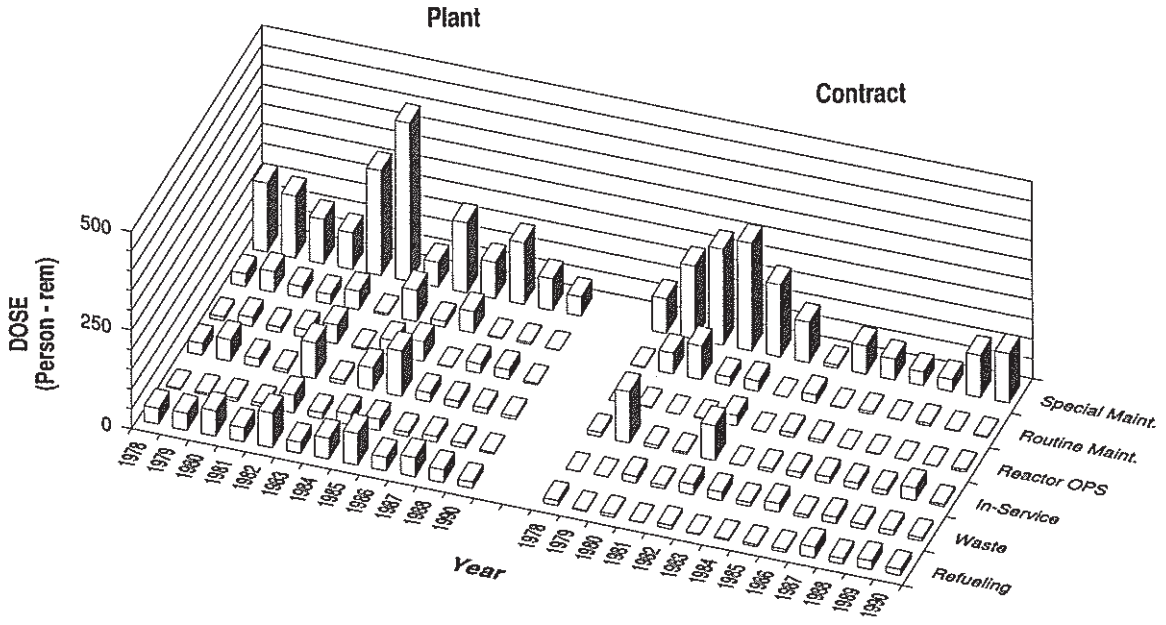
### CALVERT CLIFFS 1, 2

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

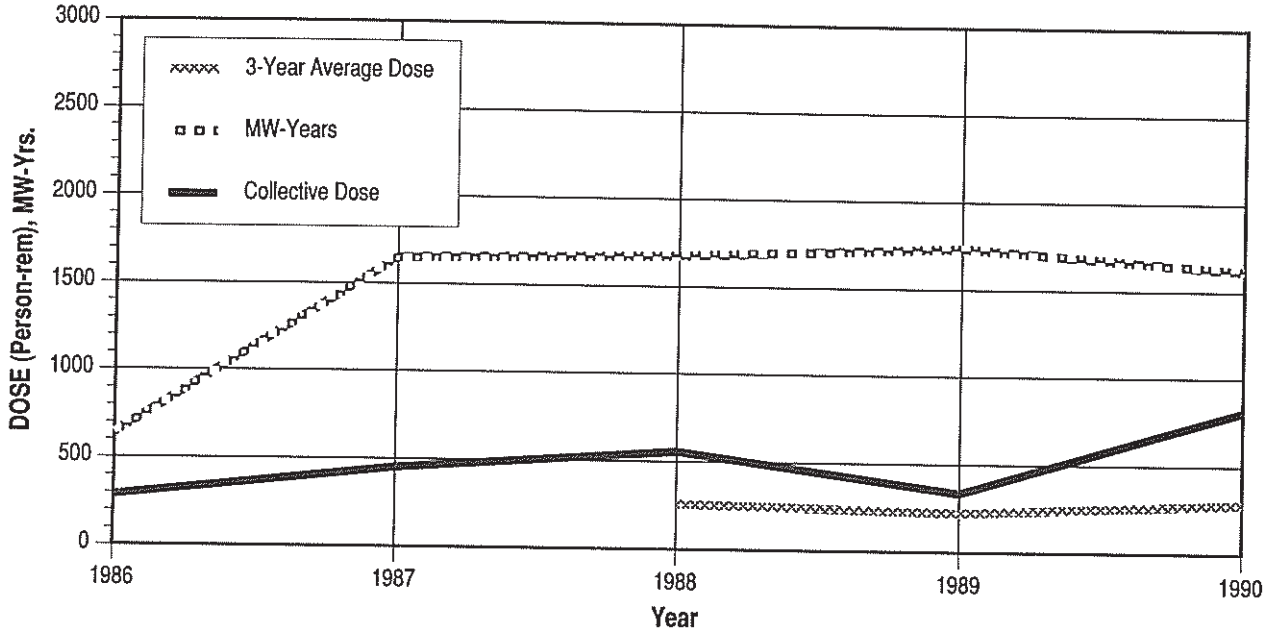


## APPENDIX E (continued)

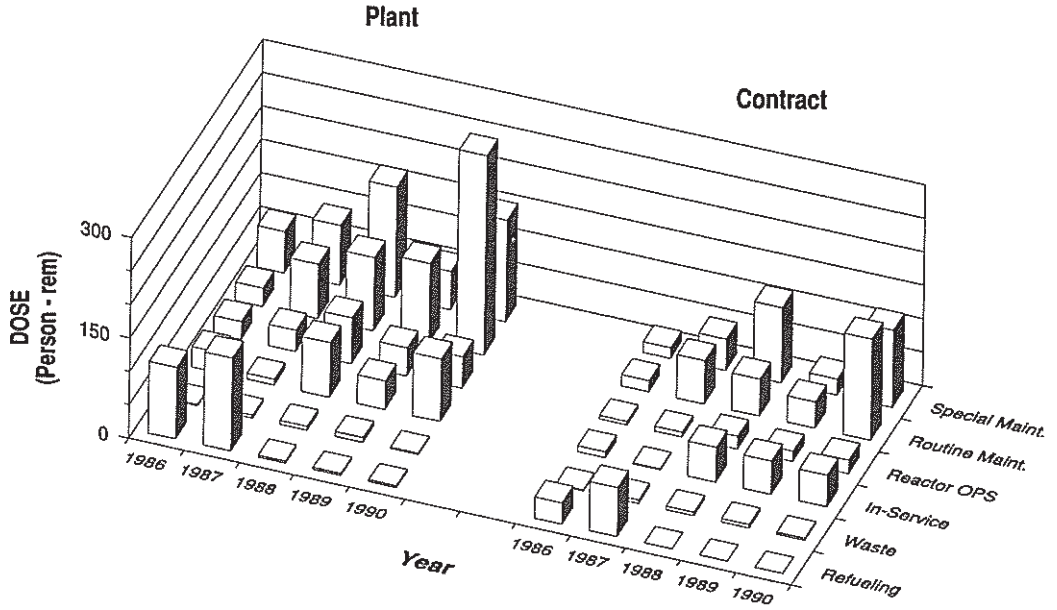
### CATAWBA 1, 2

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

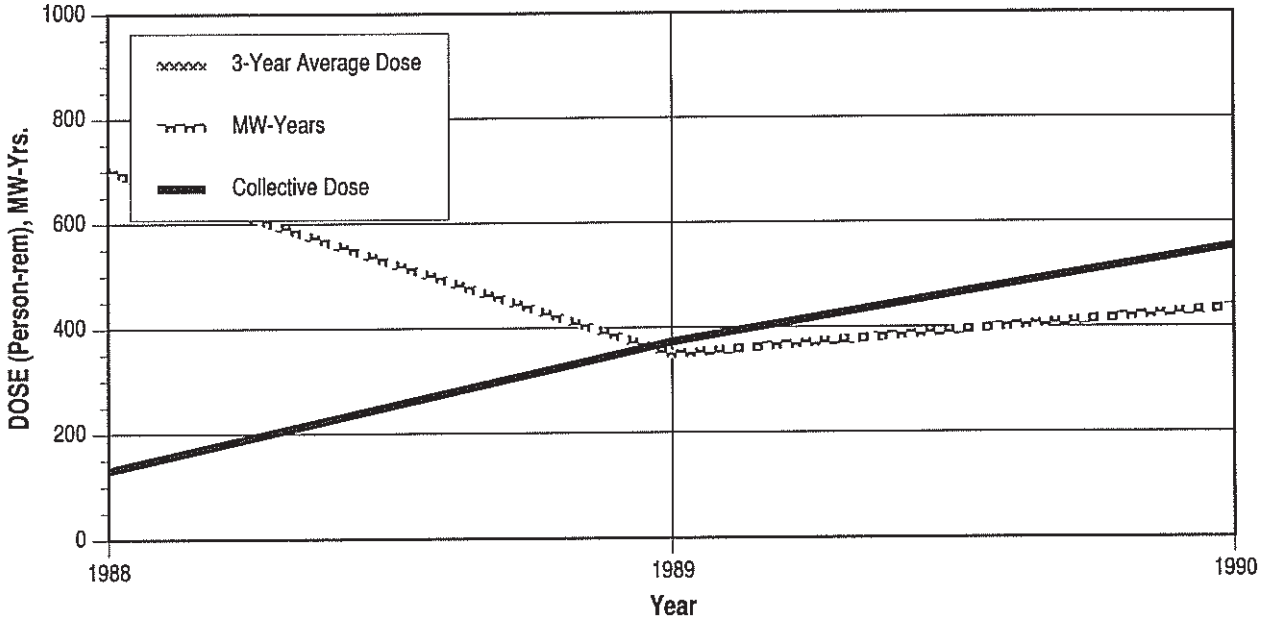


## APPENDIX E (continued)

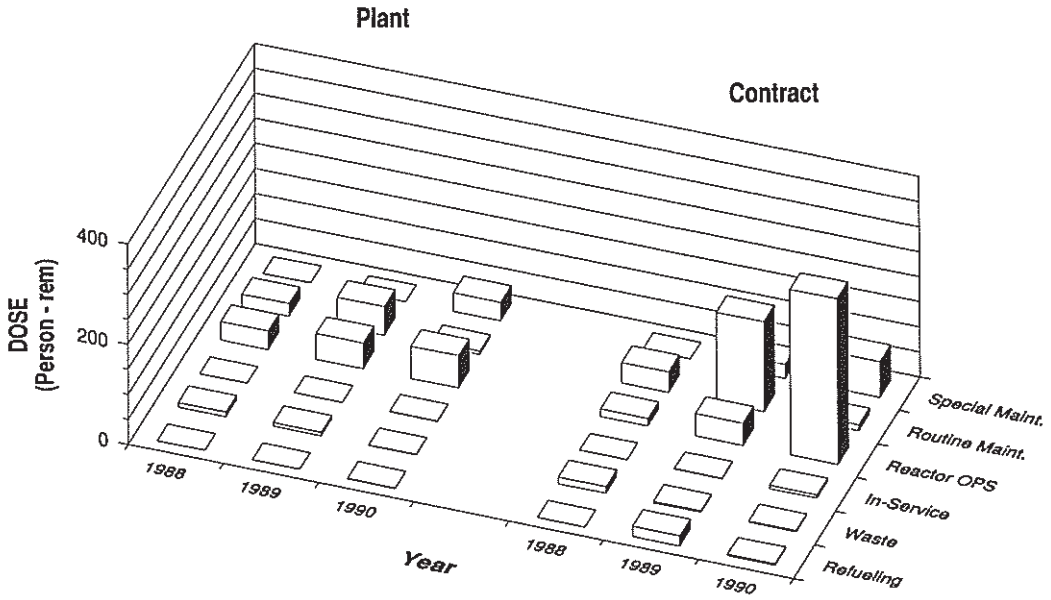
### CLINTON

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

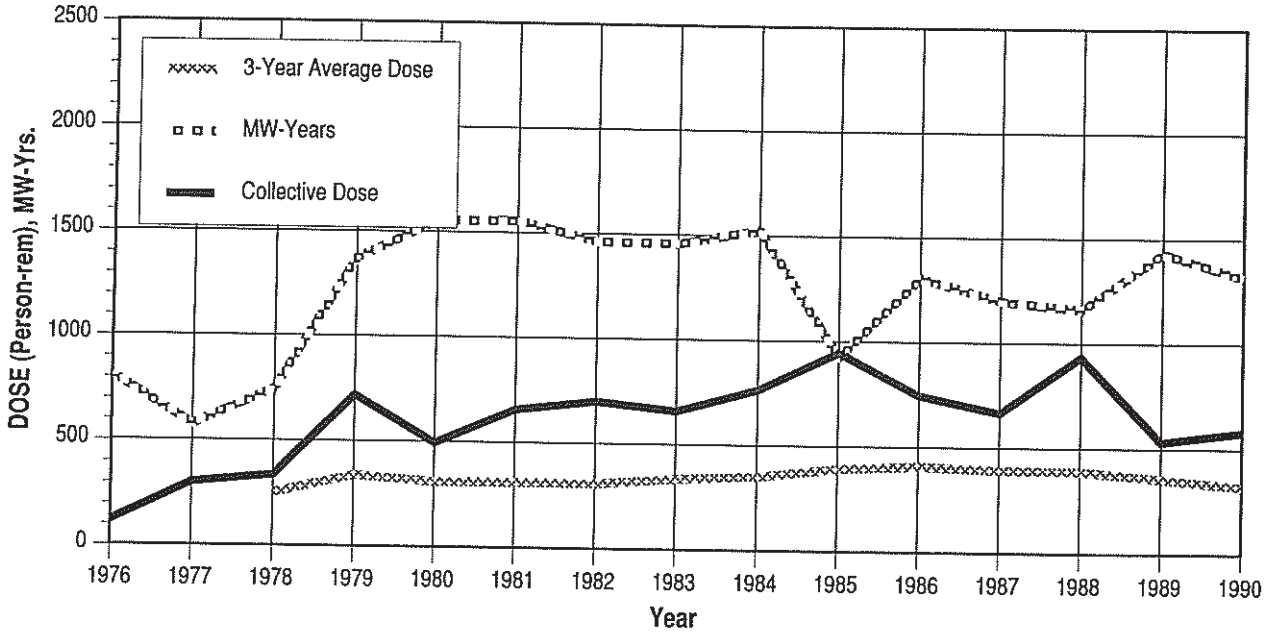


## APPENDIX E (continued)

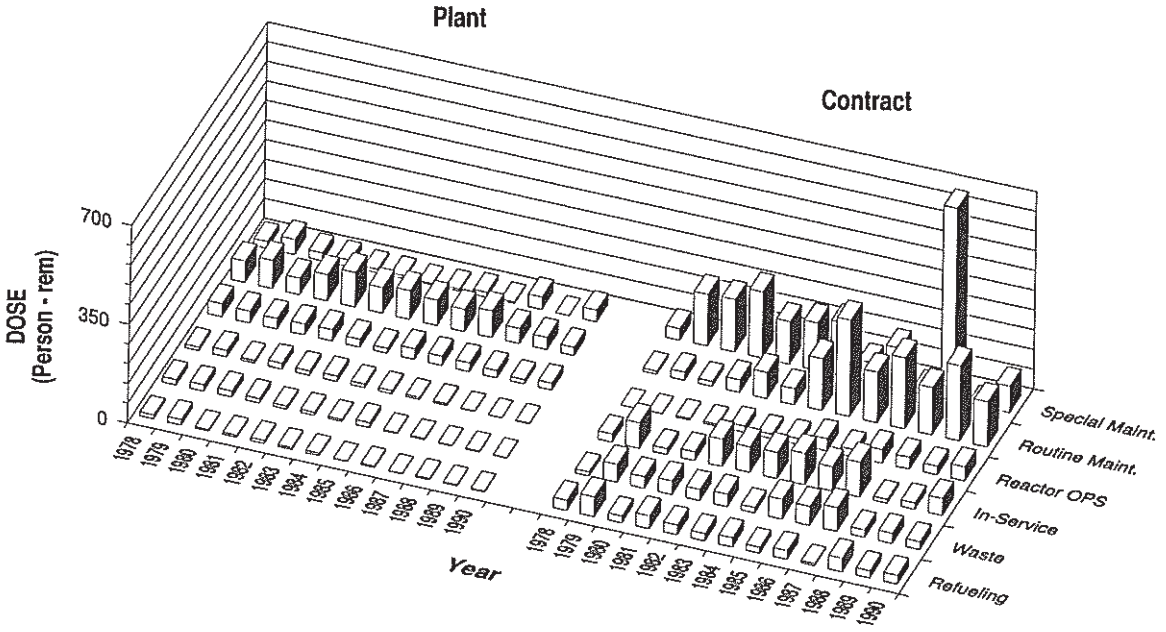
### COOK 1, 2

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

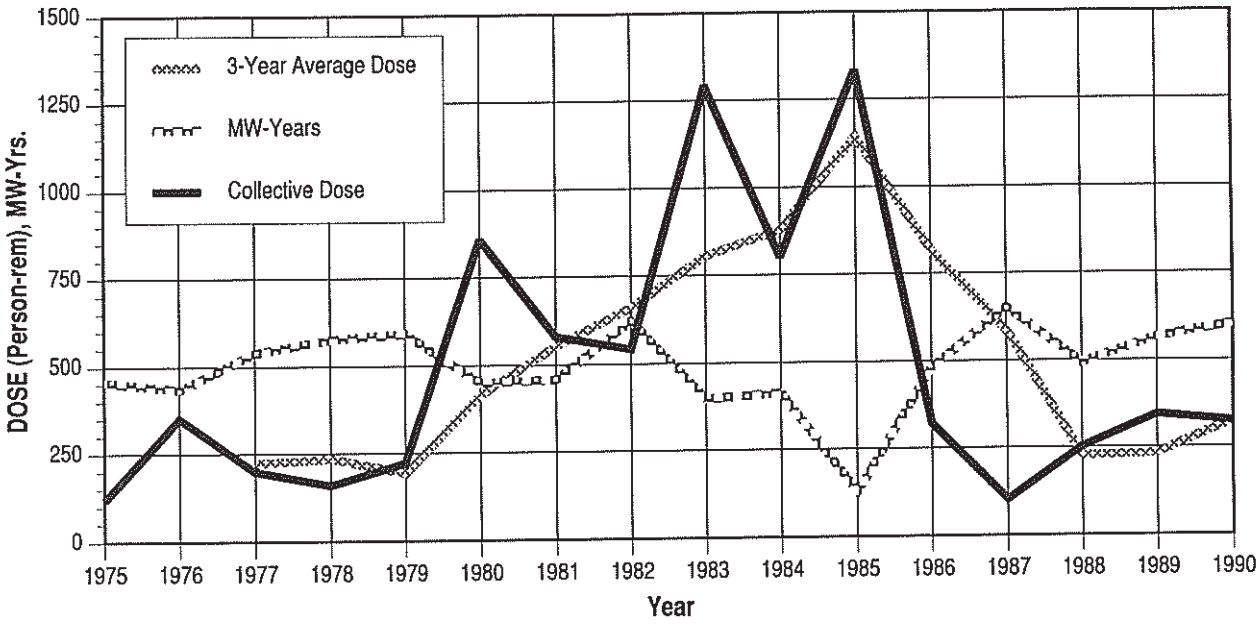


## APPENDIX E (continued)

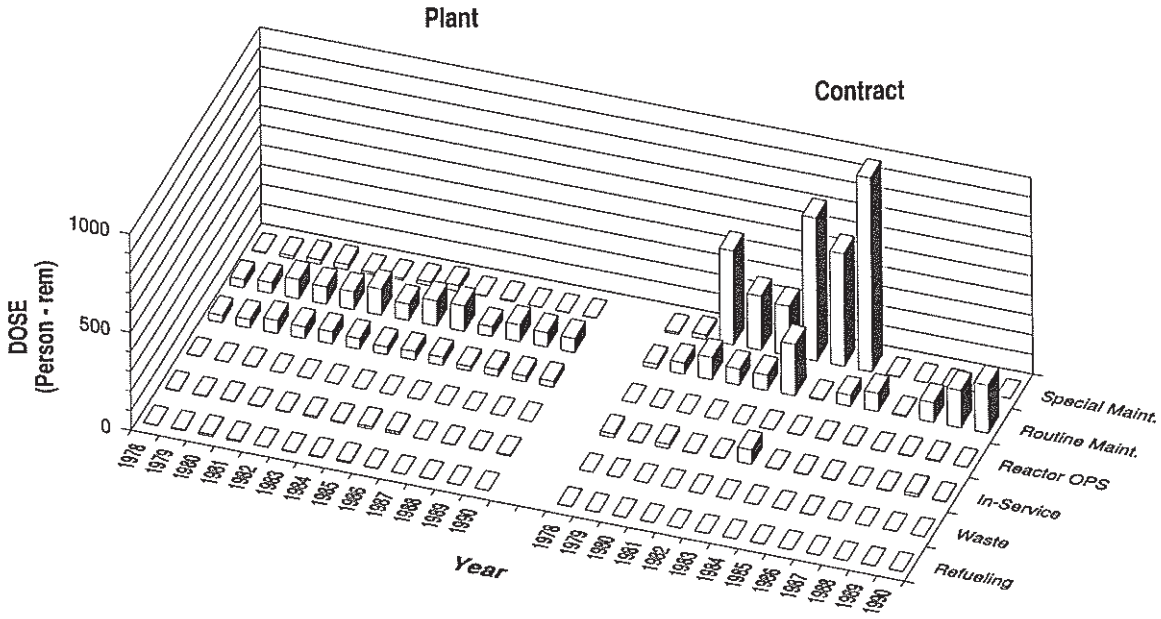
### COOPER STATION

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

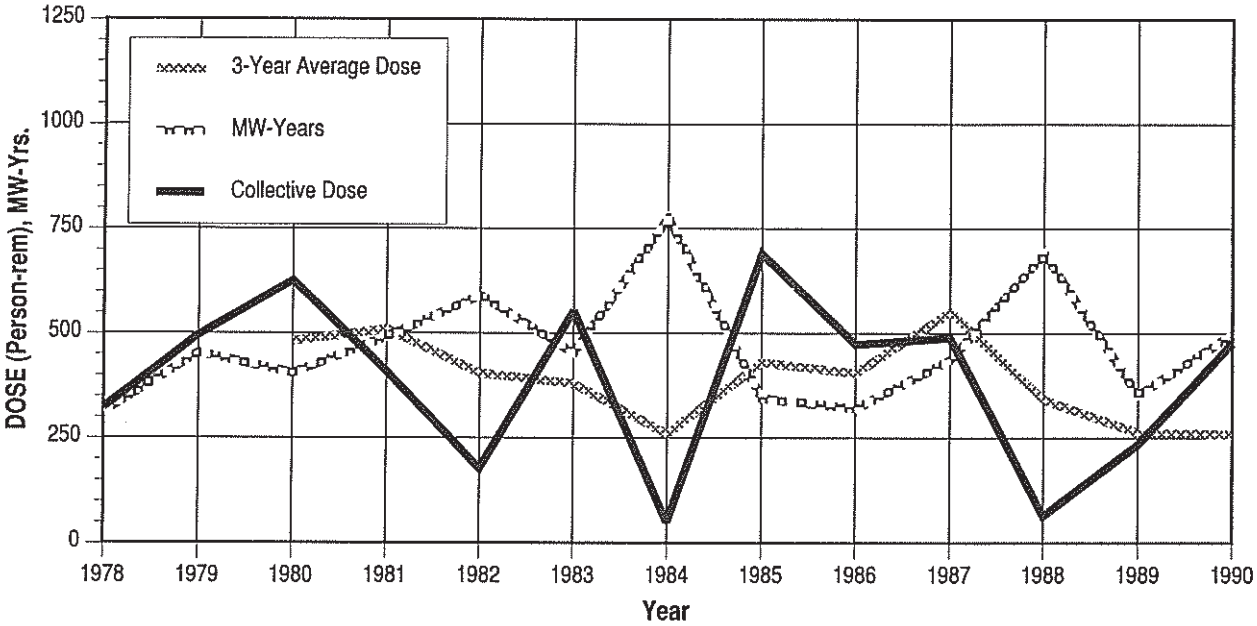


## APPENDIX E (continued)

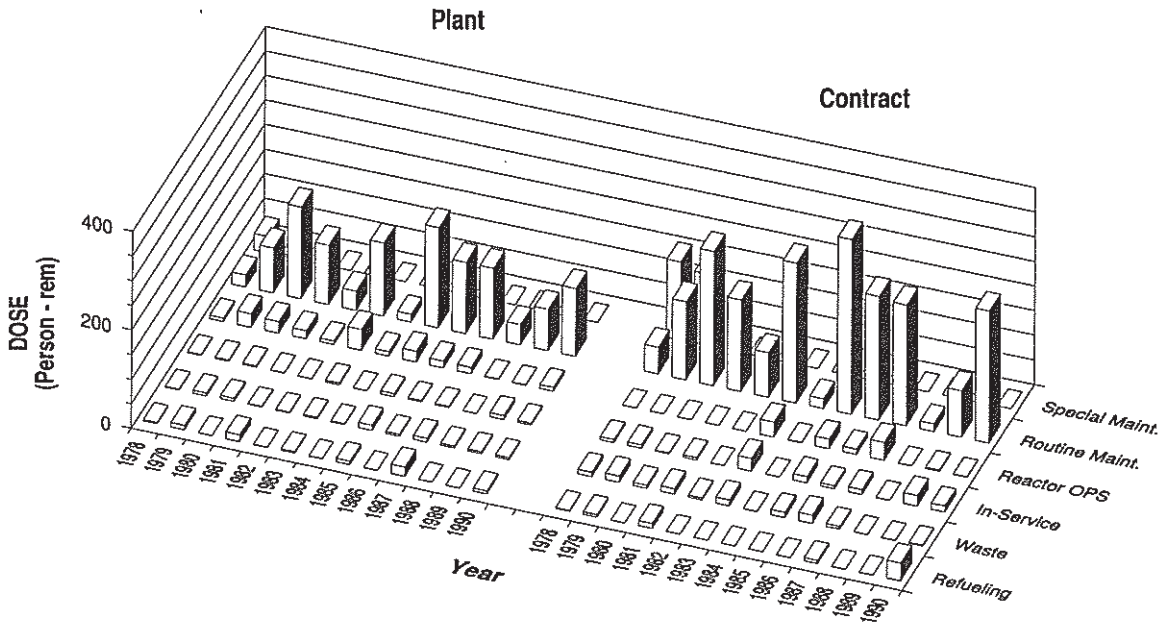
### CRYSTAL RIVER 3

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

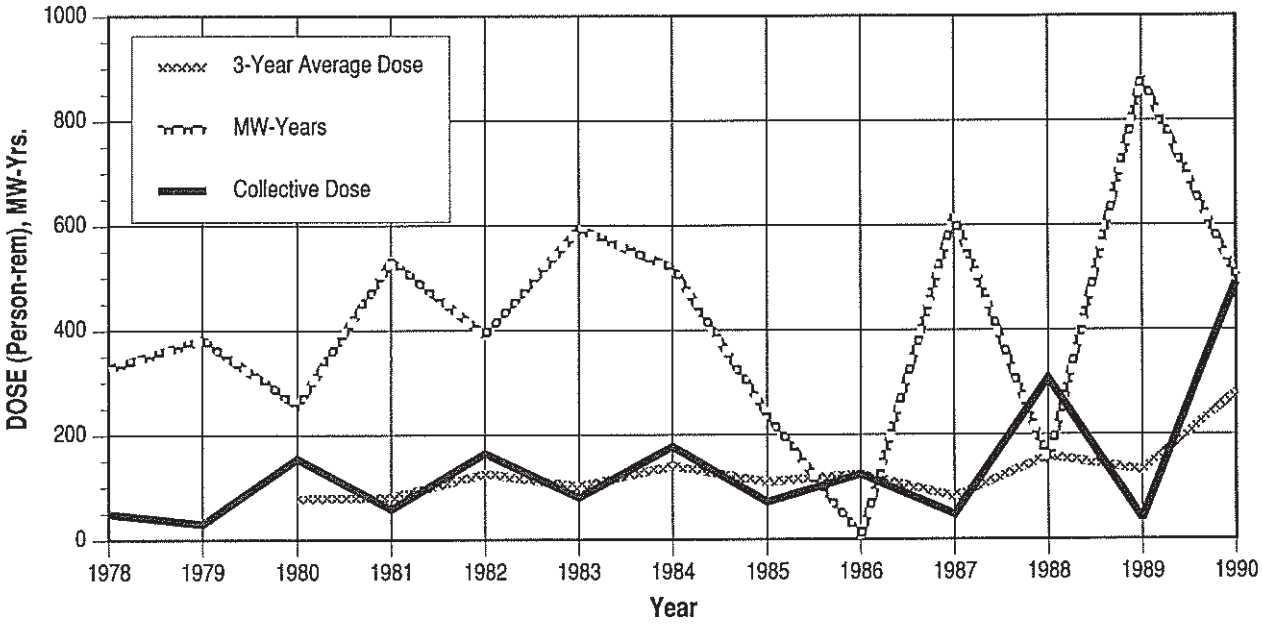


## APPENDIX E (continued)

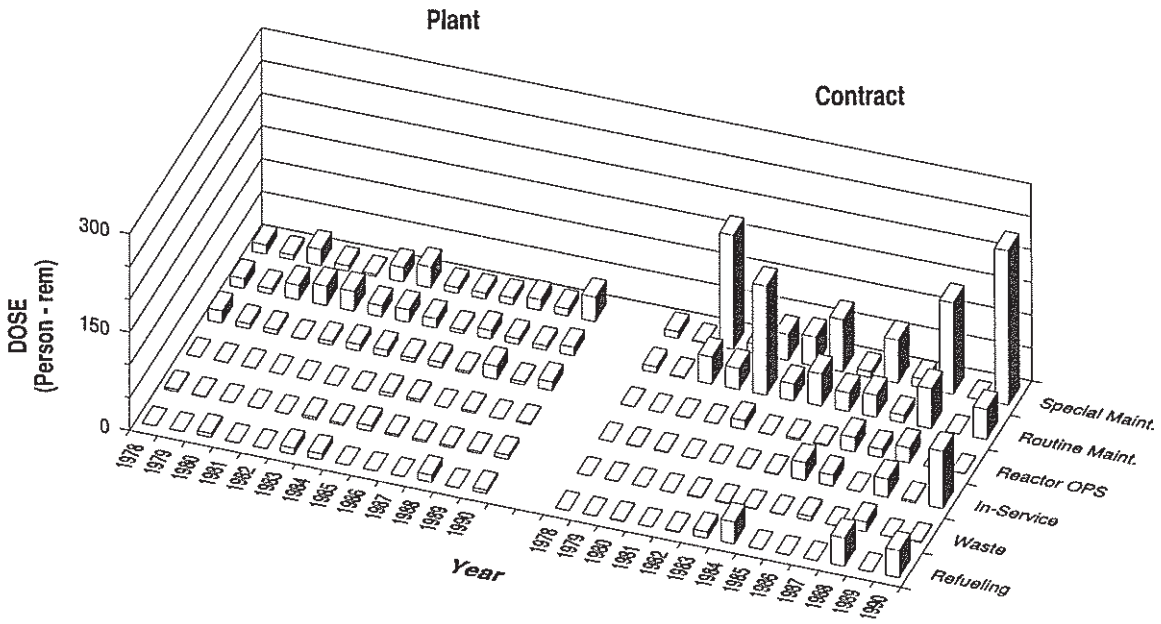
### DAVIS-BESSE

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

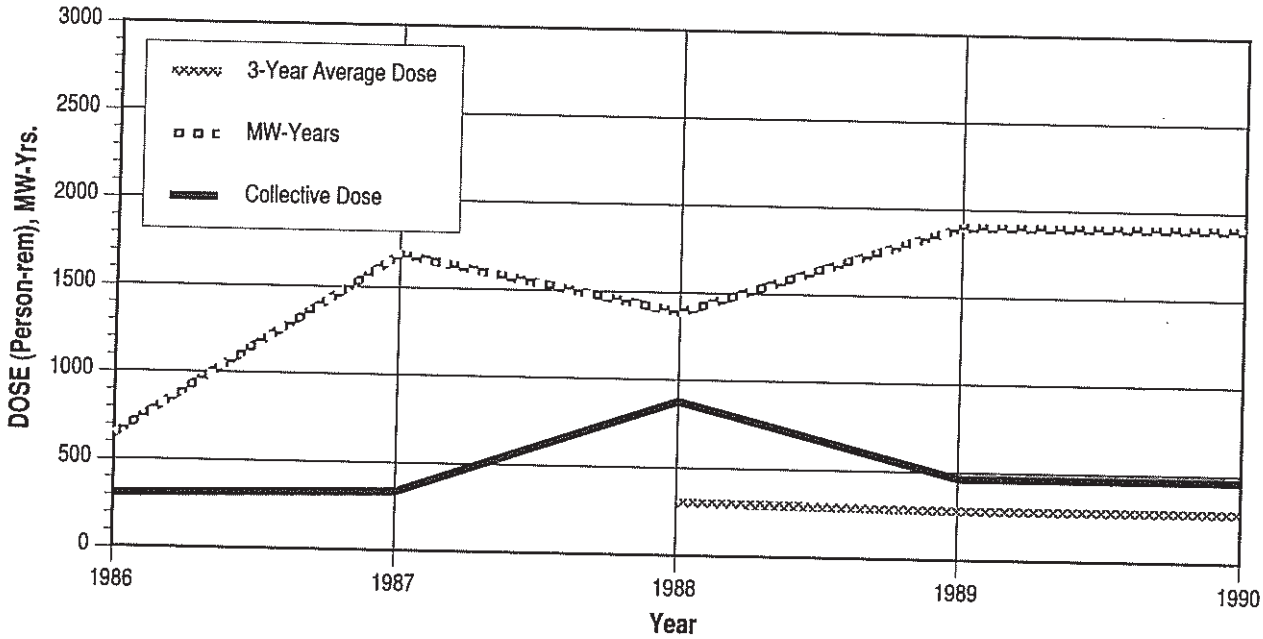


## APPENDIX E (continued)

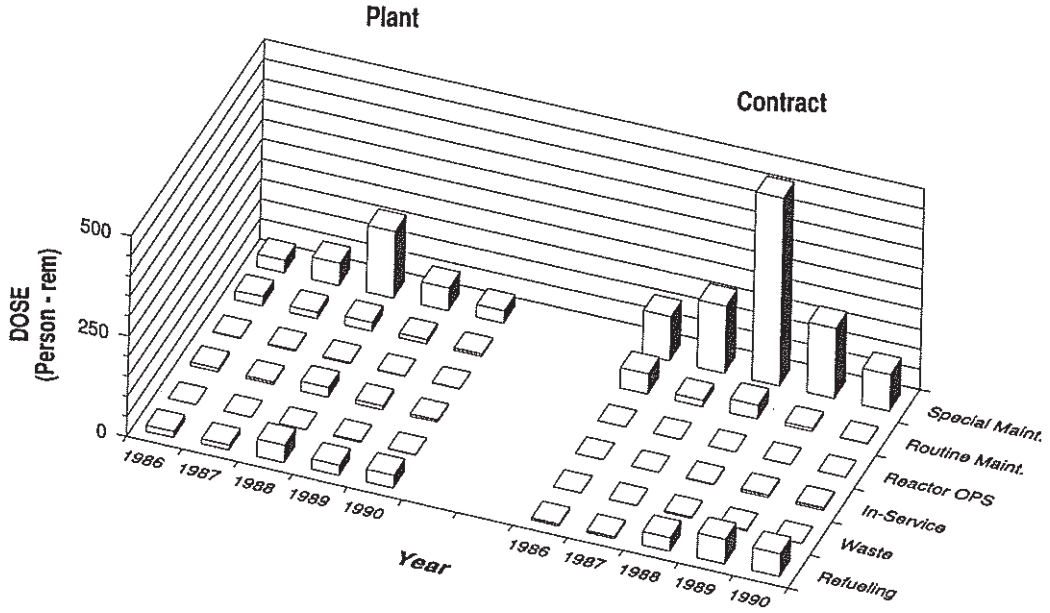
### DIABLO CANYON 1, 2

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

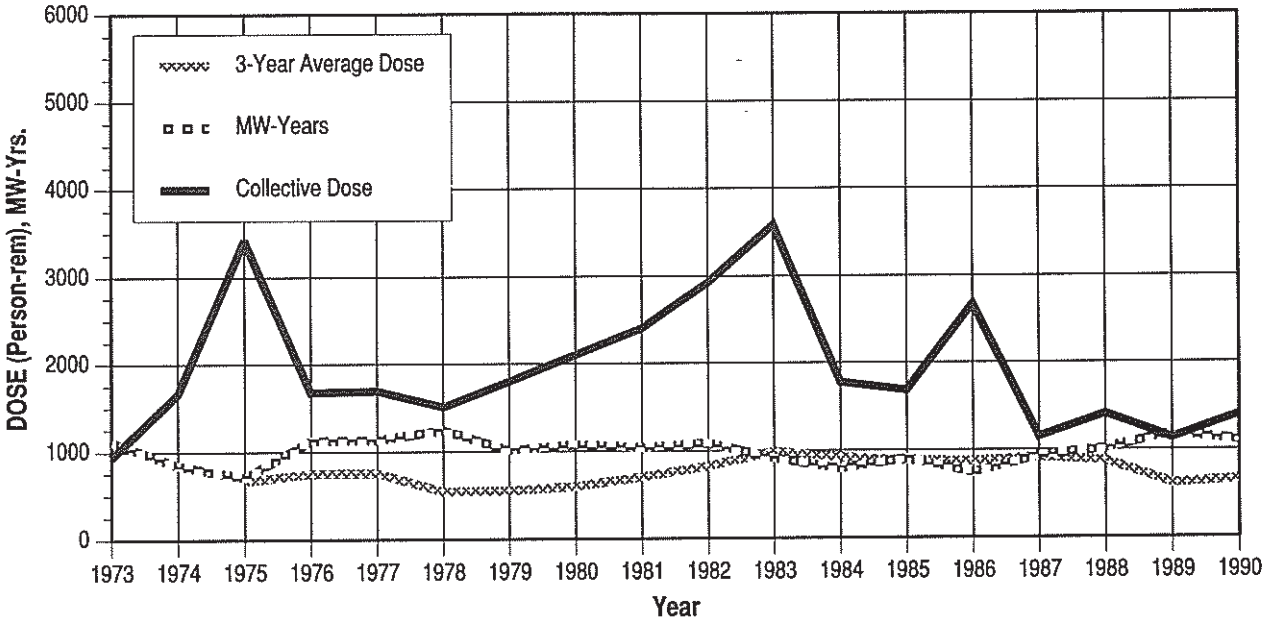


## APPENDIX E (continued)

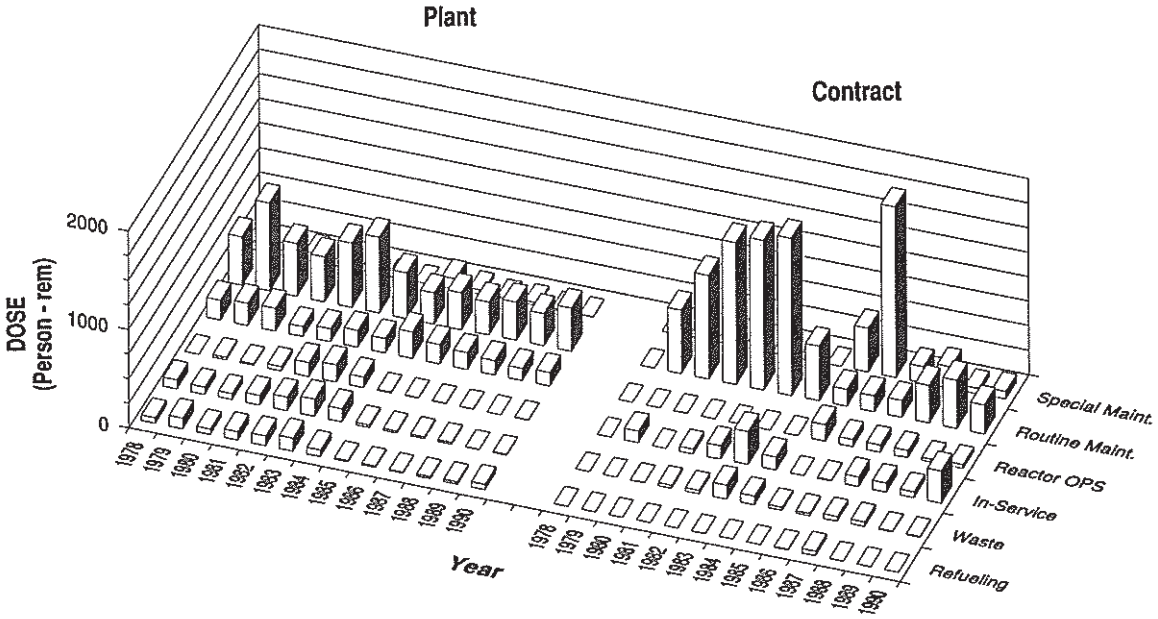
### DRESDEN 2, 3

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

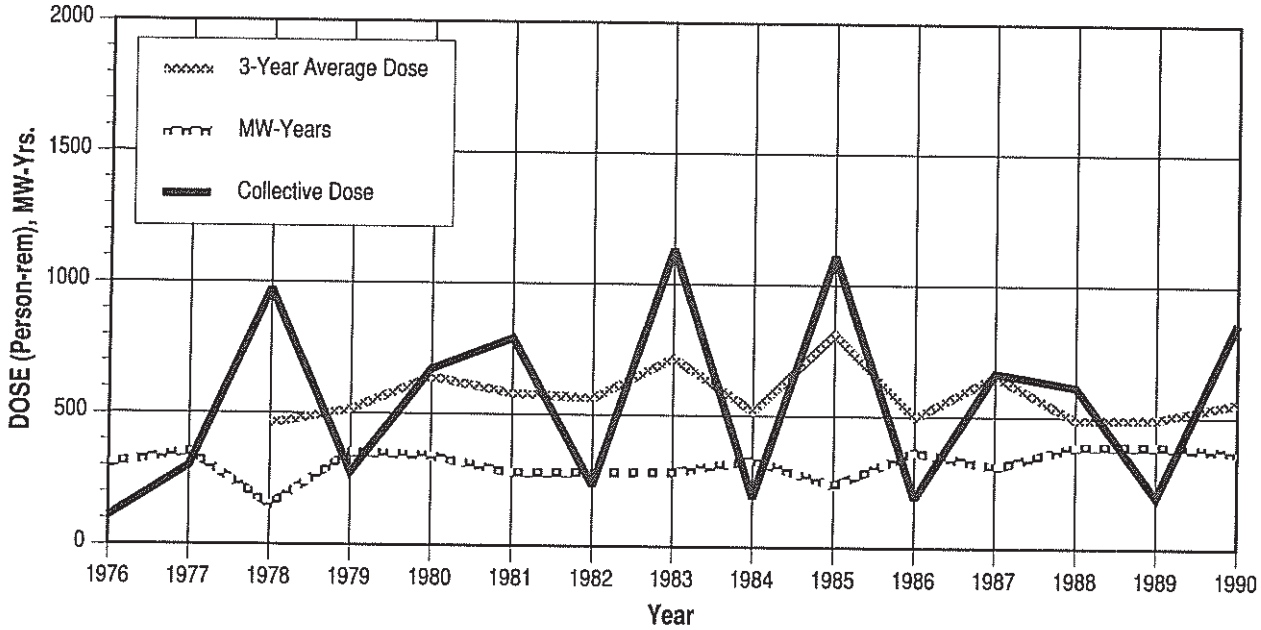


## APPENDIX E (continued)

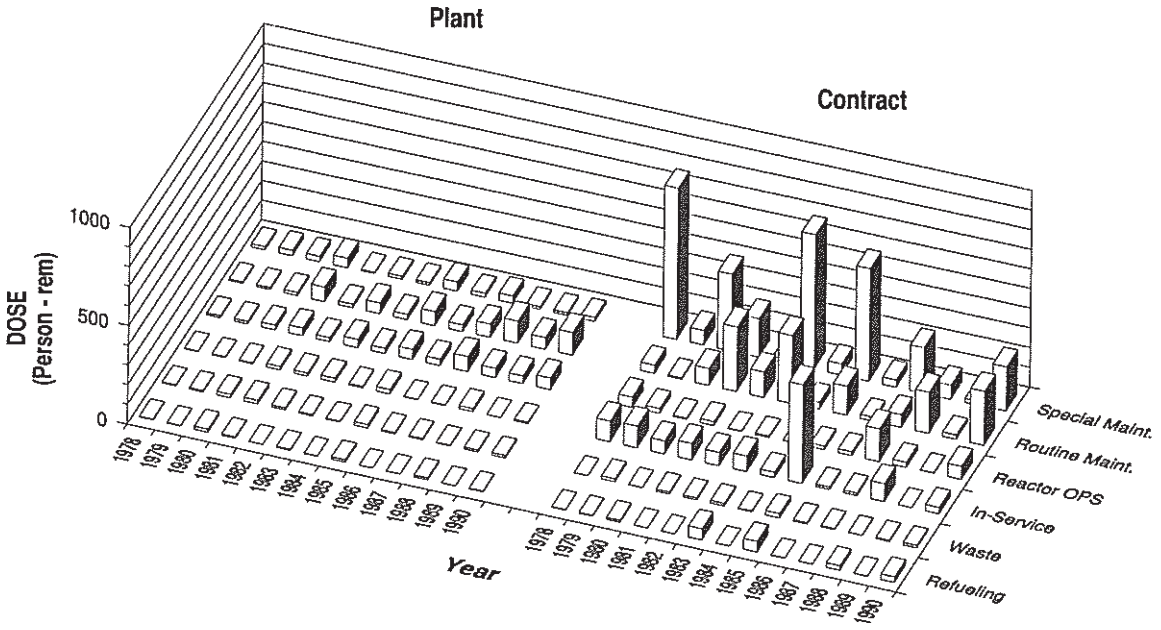
## DUANE ARNOLD

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

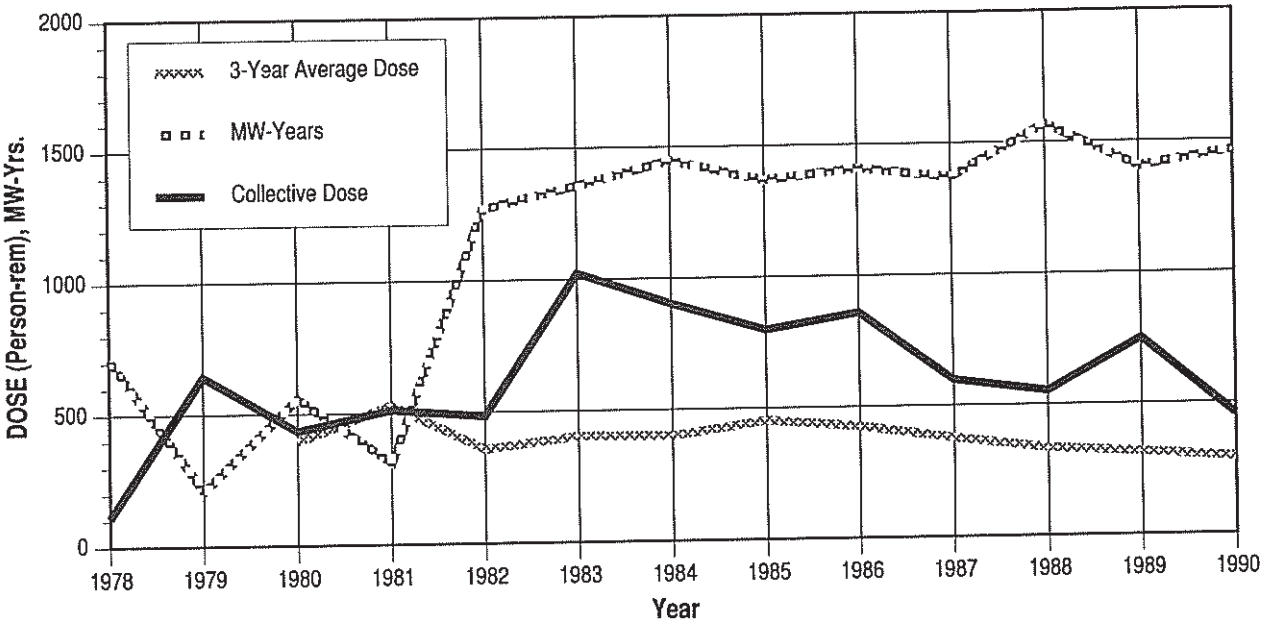


## APPENDIX E (continued)

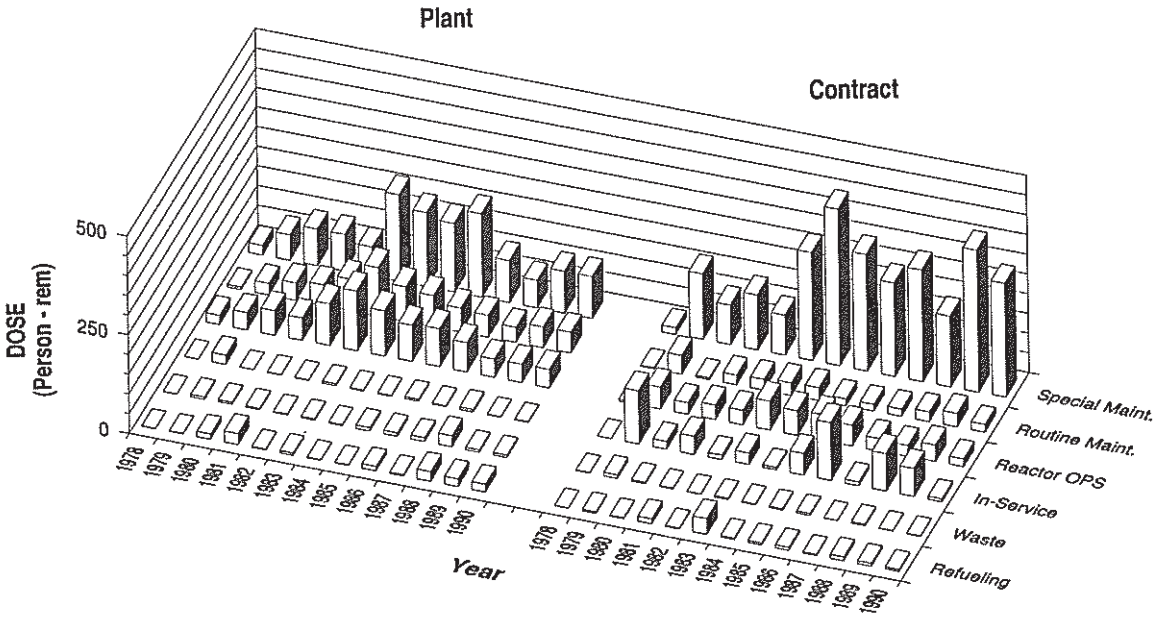
### FARLEY 1, 2

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

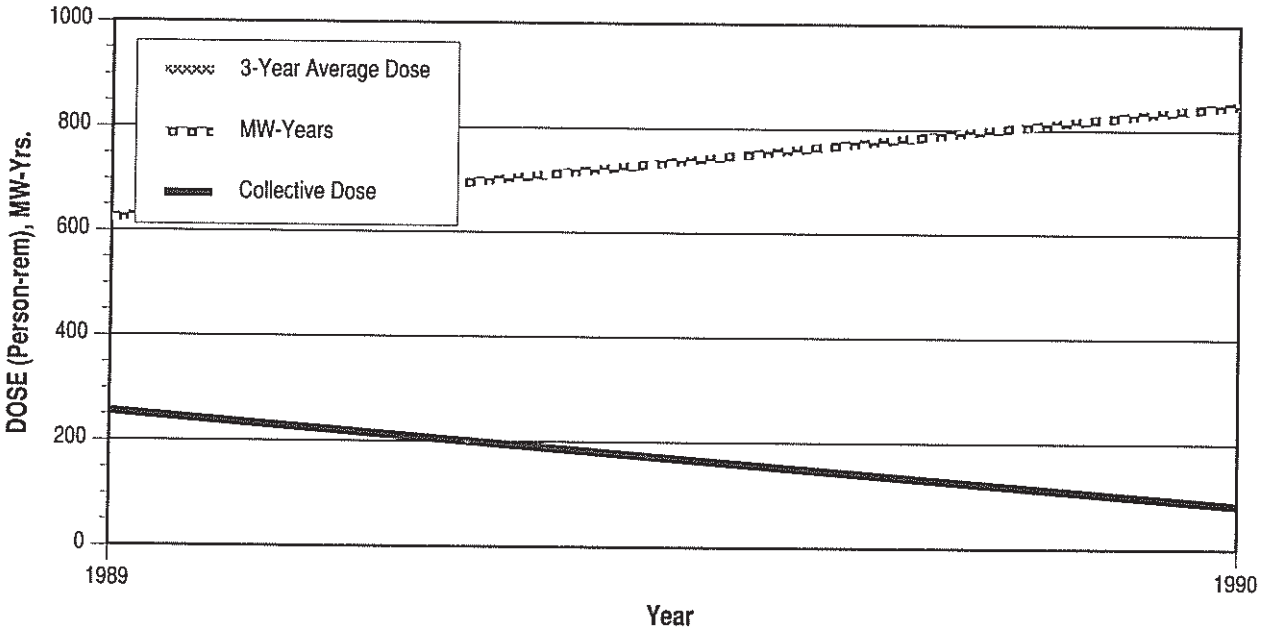


## APPENDIX E (continued)

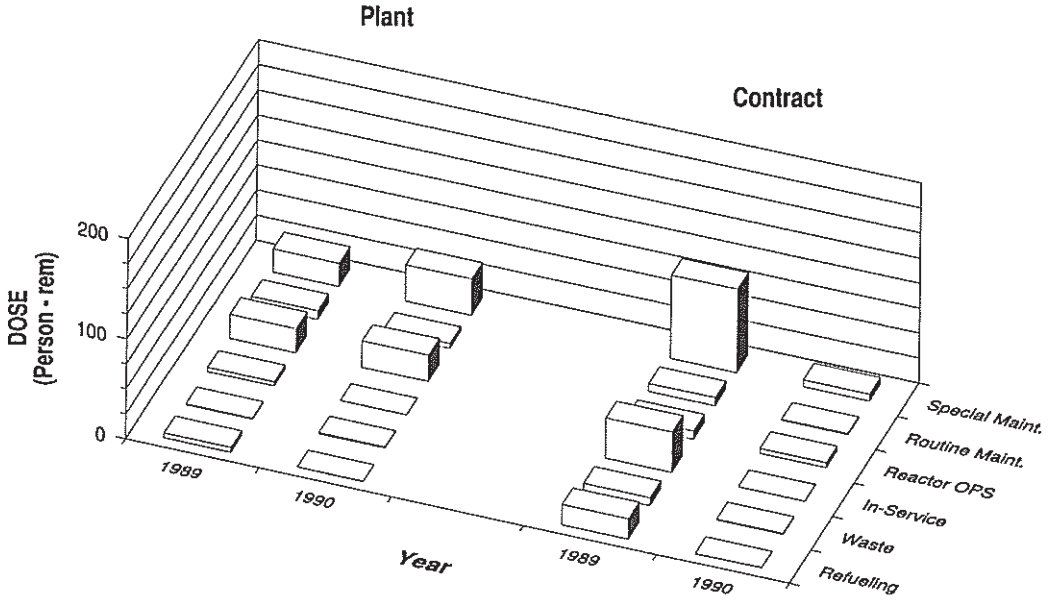
### FERMI 2

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

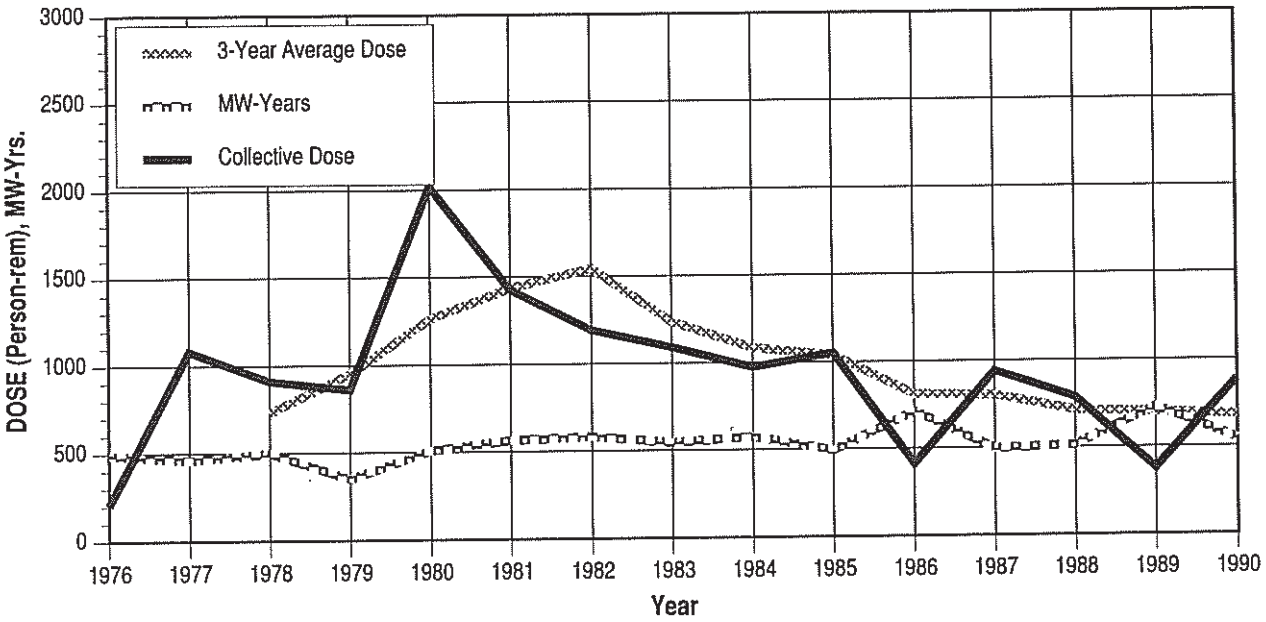


## APPENDIX E (continued)

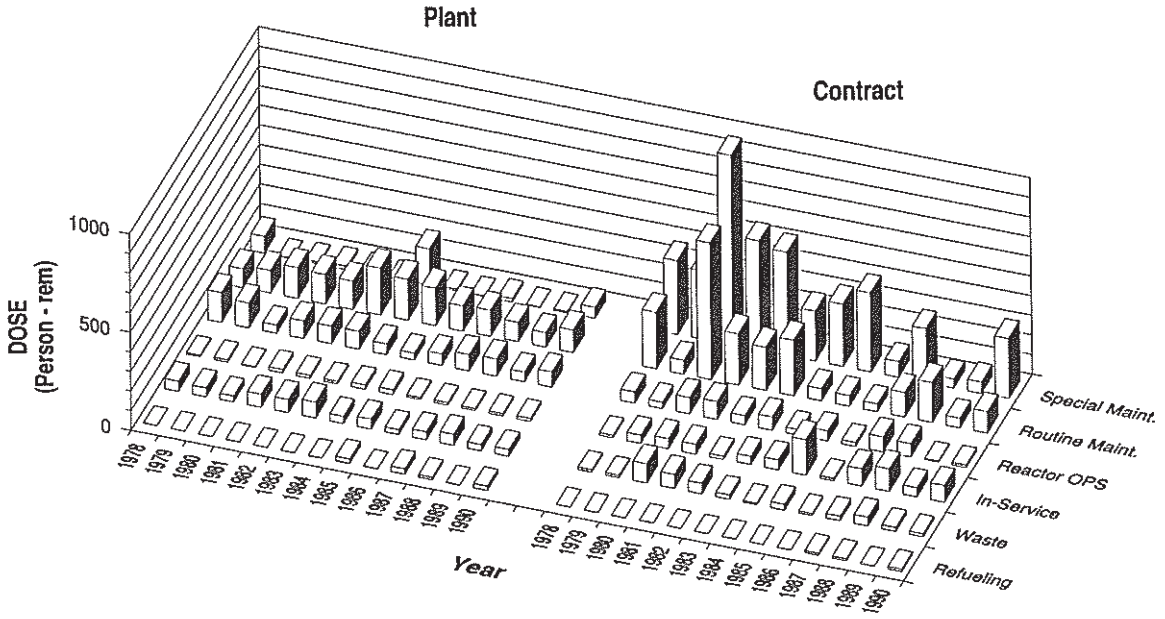
### FITZPATRICK

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

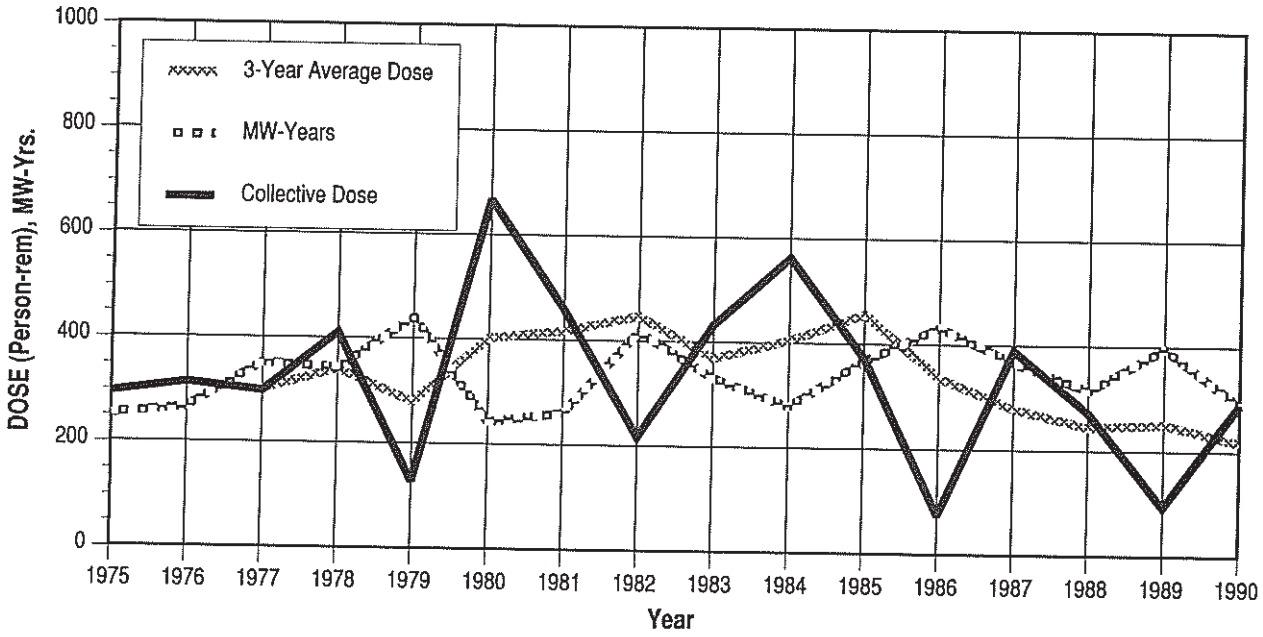


## APPENDIX E (continued)

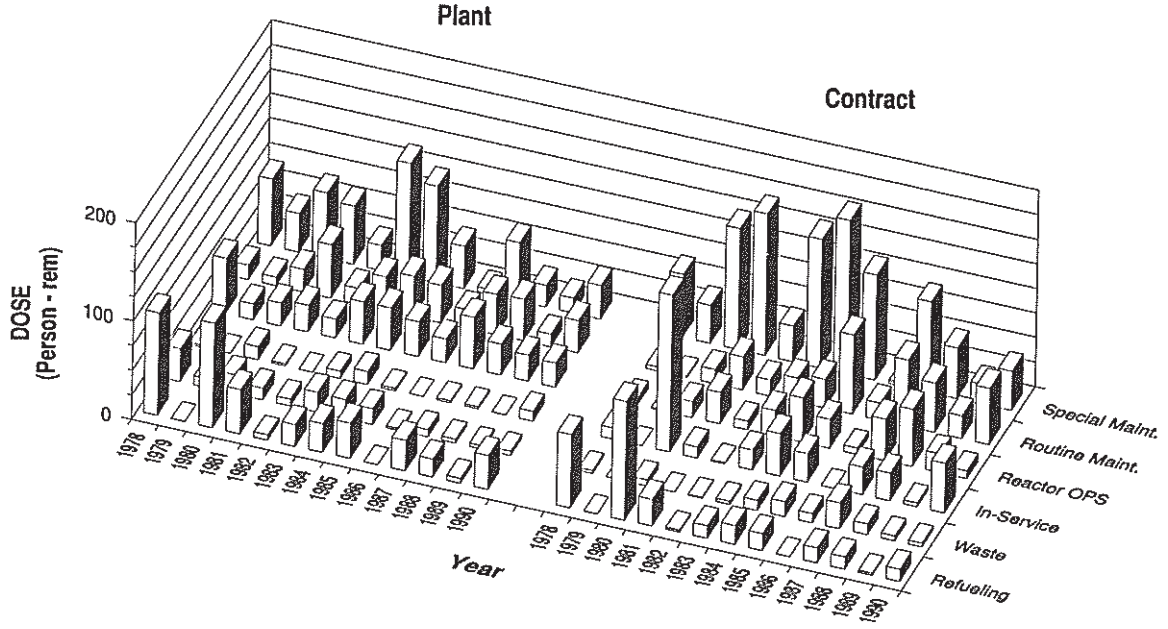
## FORT CALHOUN

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

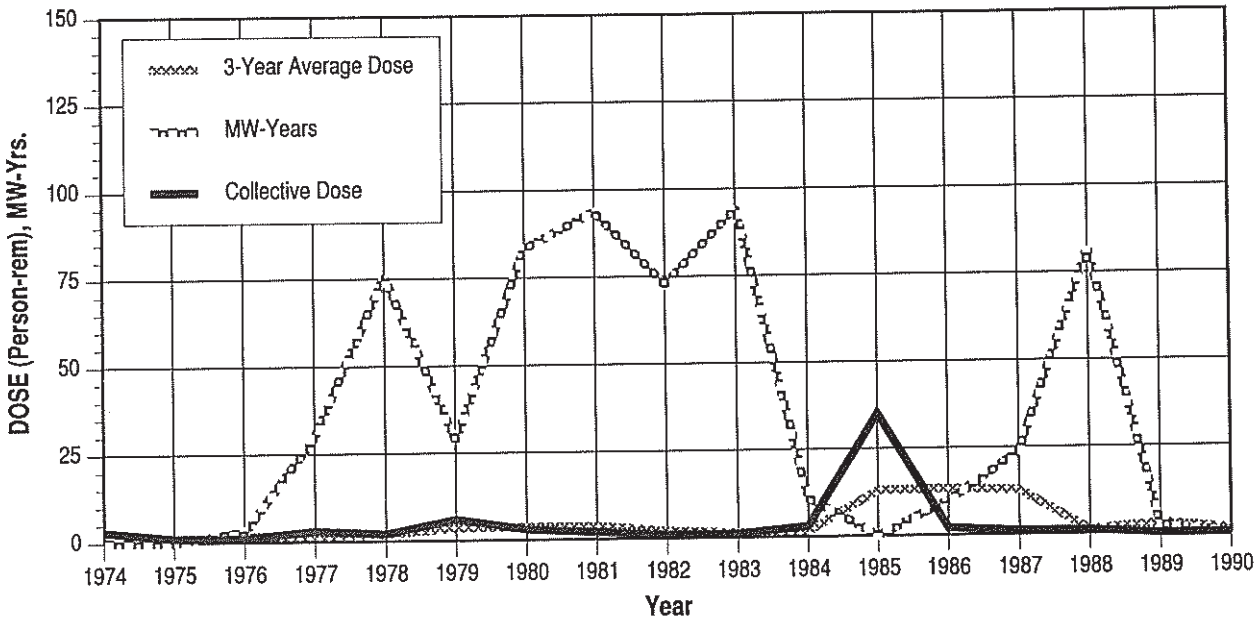


## APPENDIX E (continued)

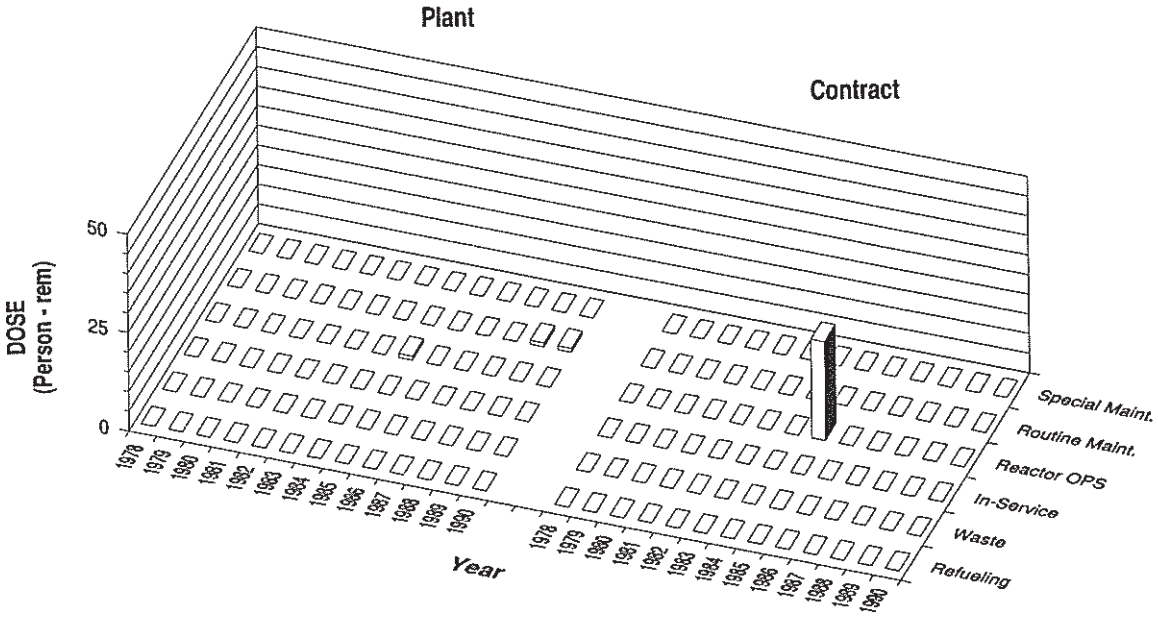
### FORT ST. VRAIN

Dose-Performance Indicators

**HTGR**




Breakdown by Job Function

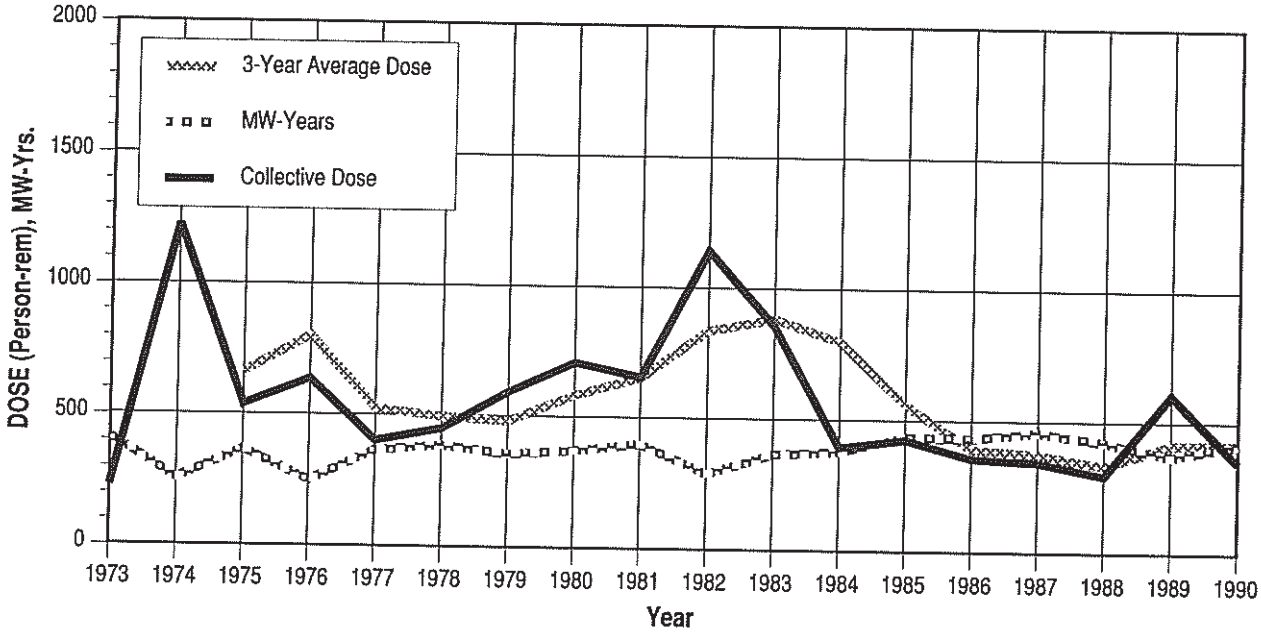


## APPENDIX E (continued)

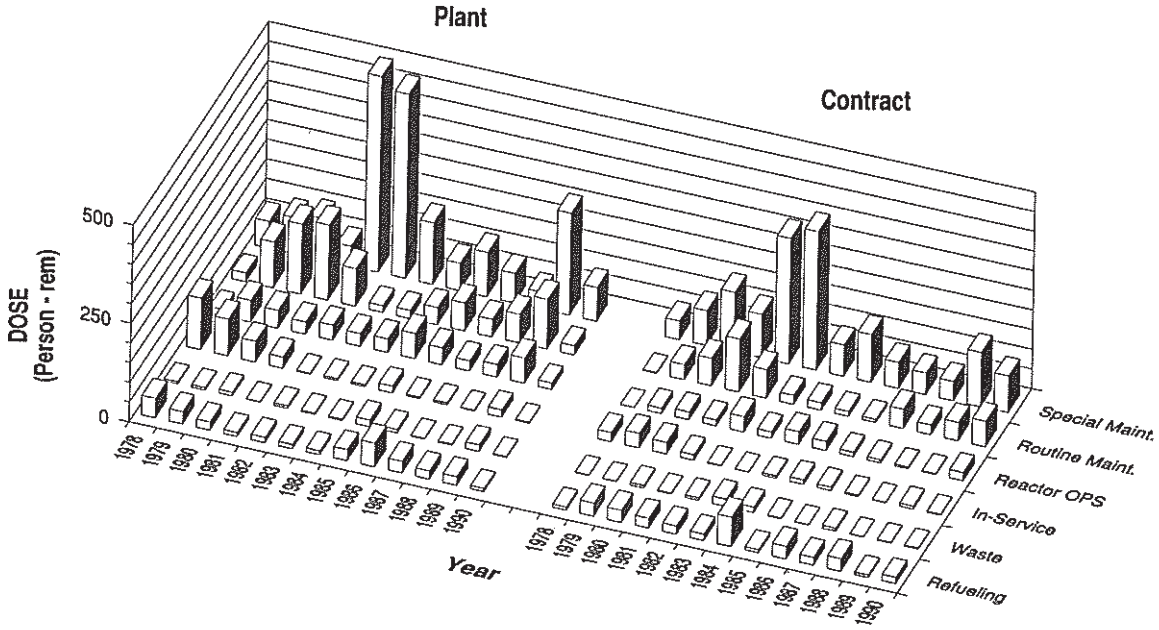
### GINNA

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

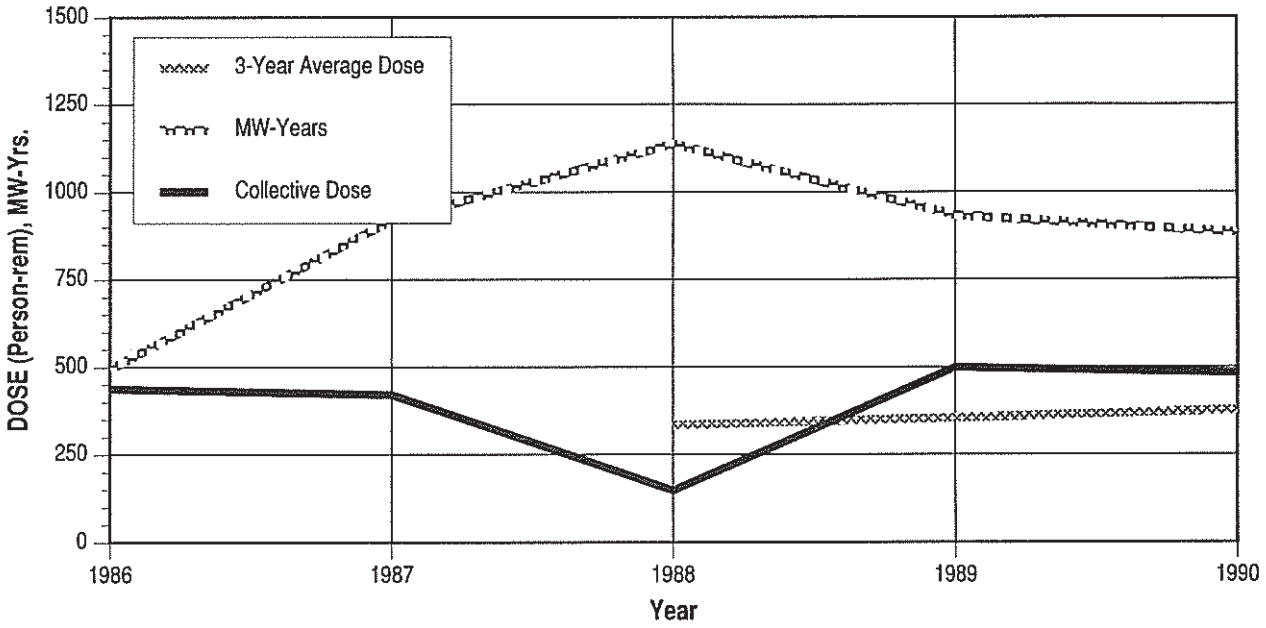


## APPENDIX E (continued)

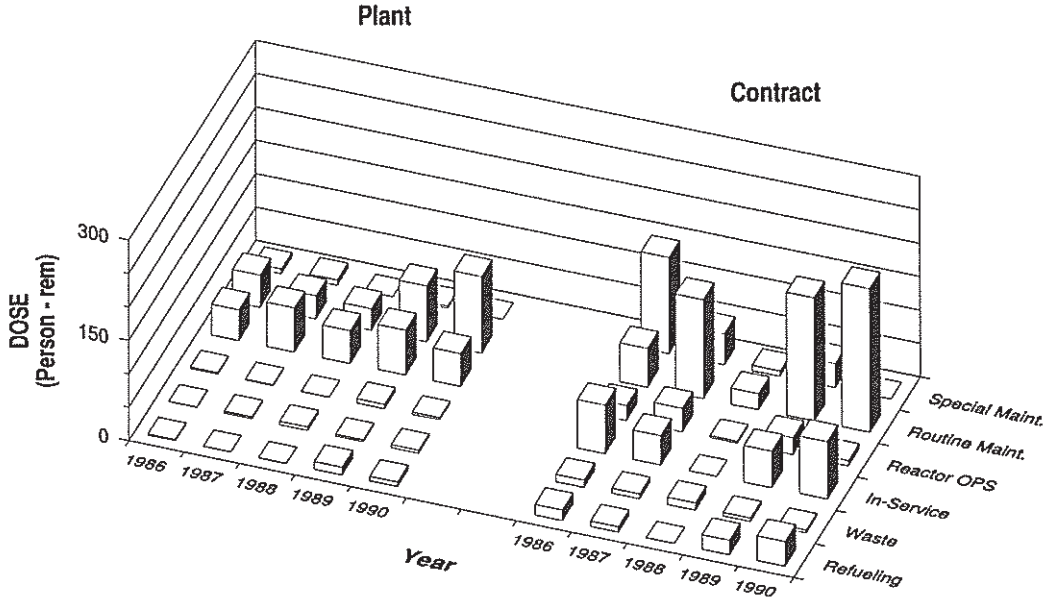
### GRAND GULF

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

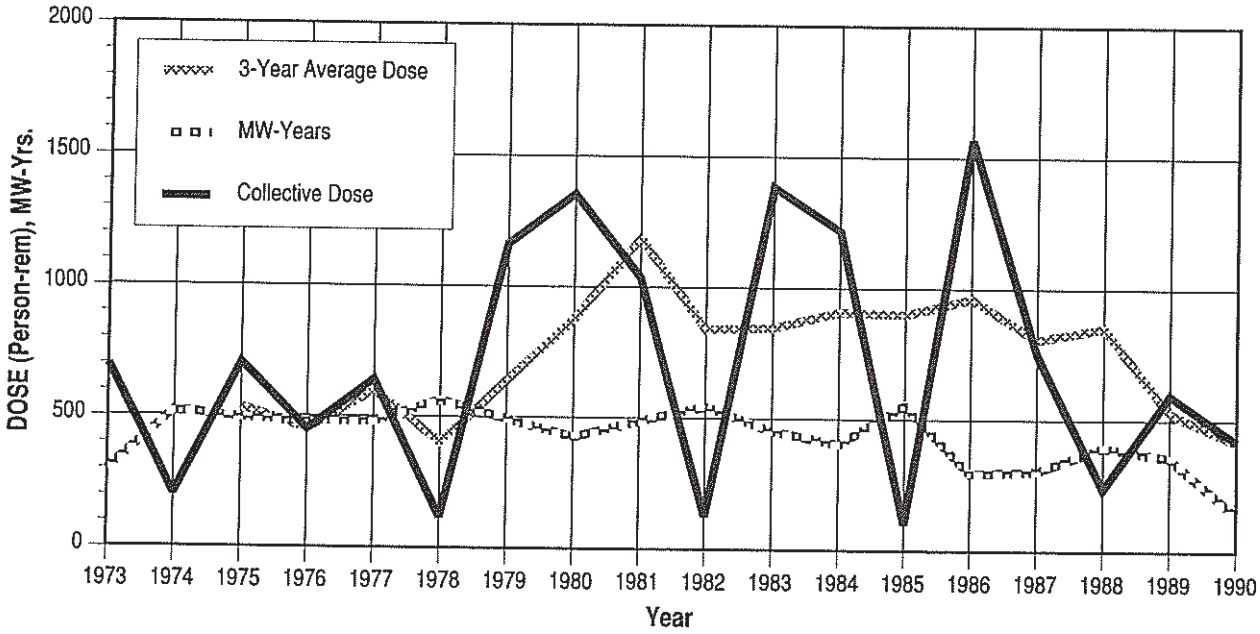


## APPENDIX E (continued)

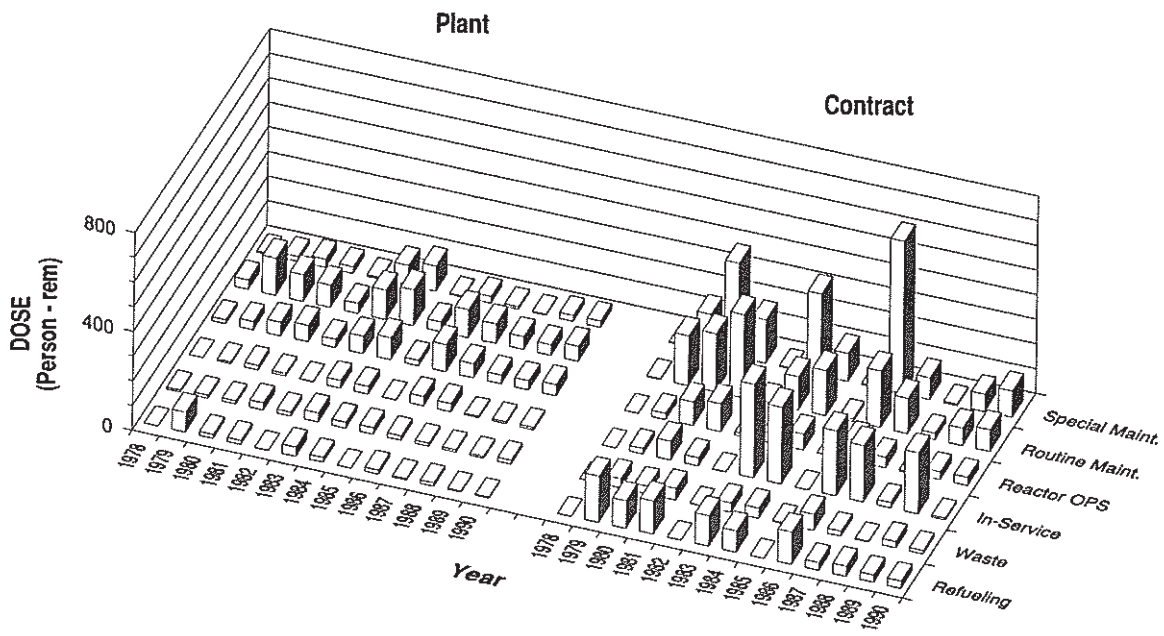
### HADDAM NECK

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

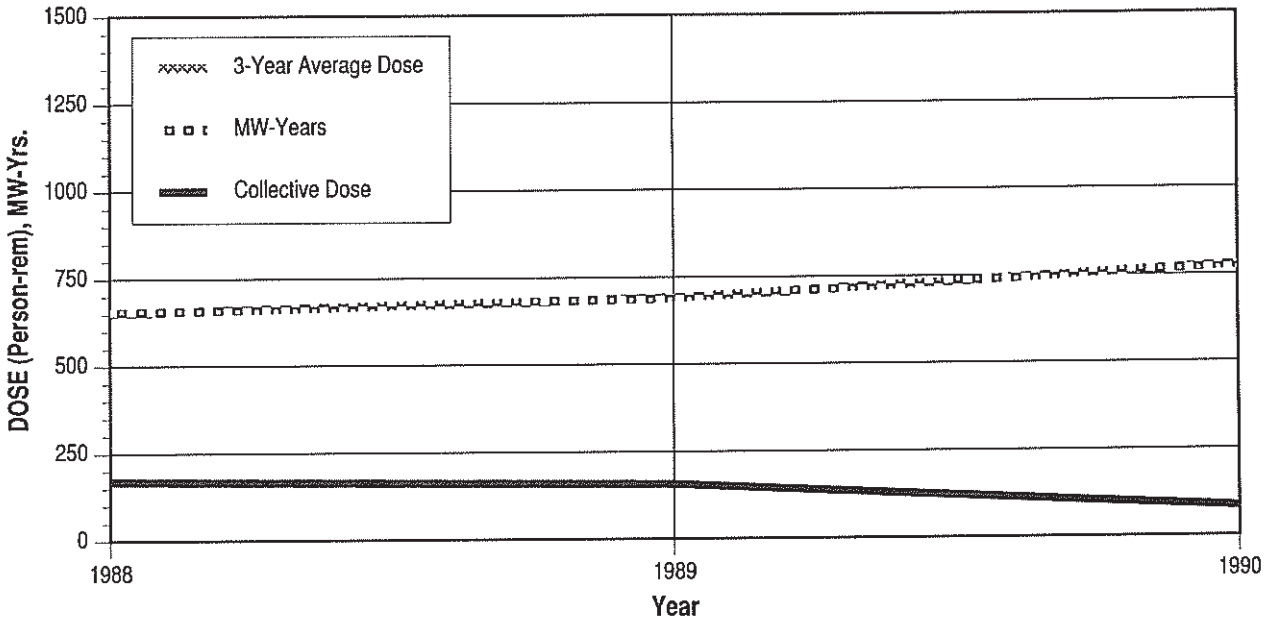


## APPENDIX E (continued)

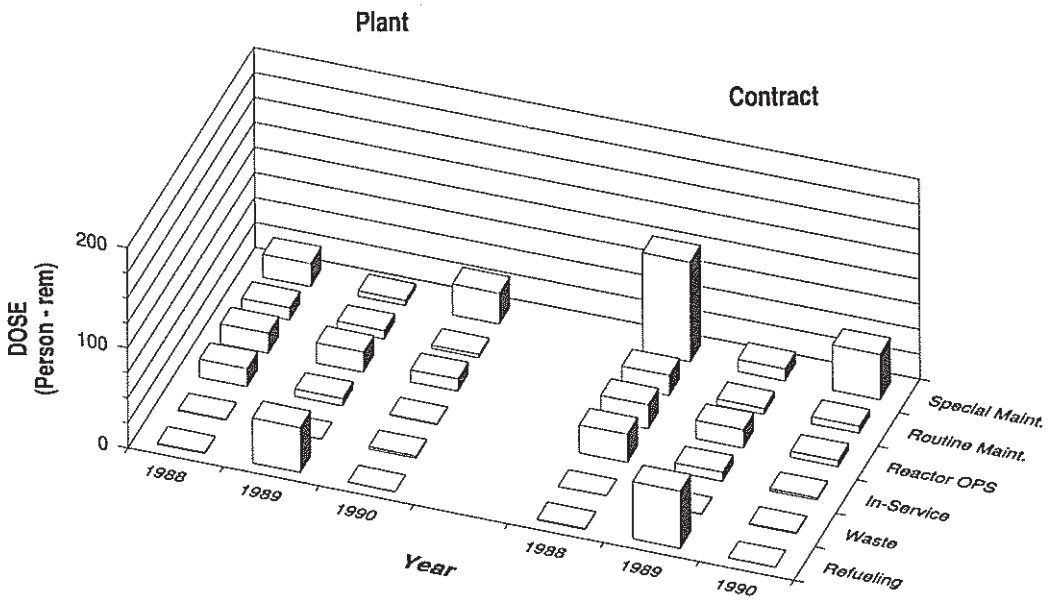
### HARRIS

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

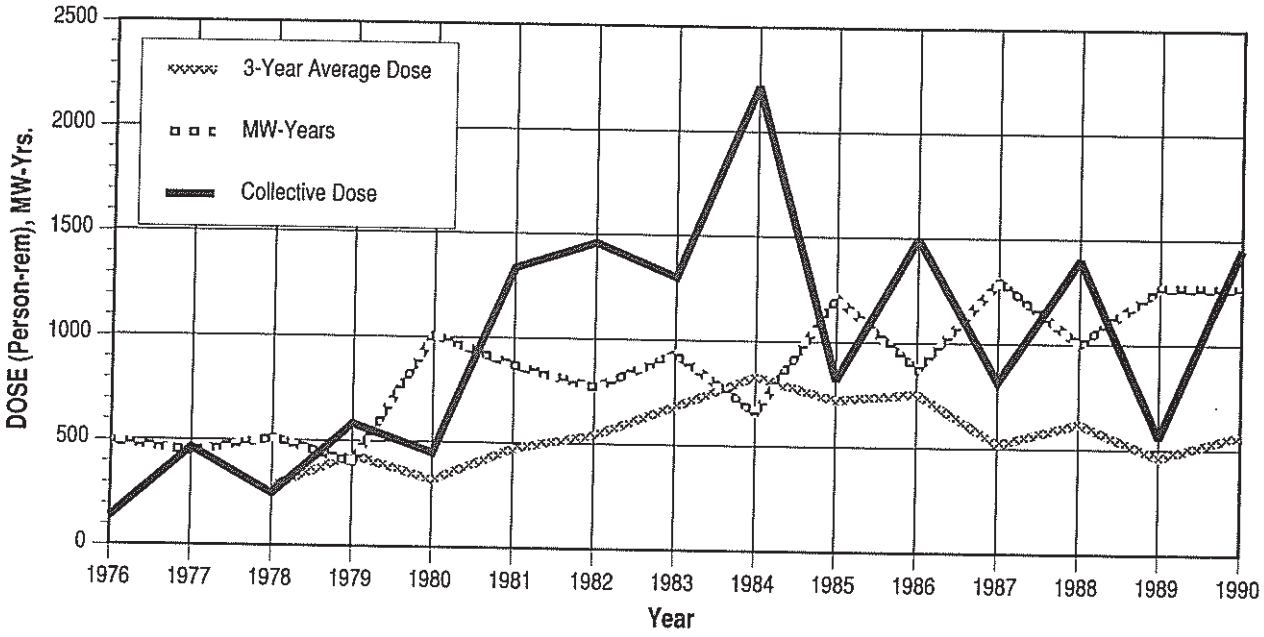


## APPENDIX E (continued)

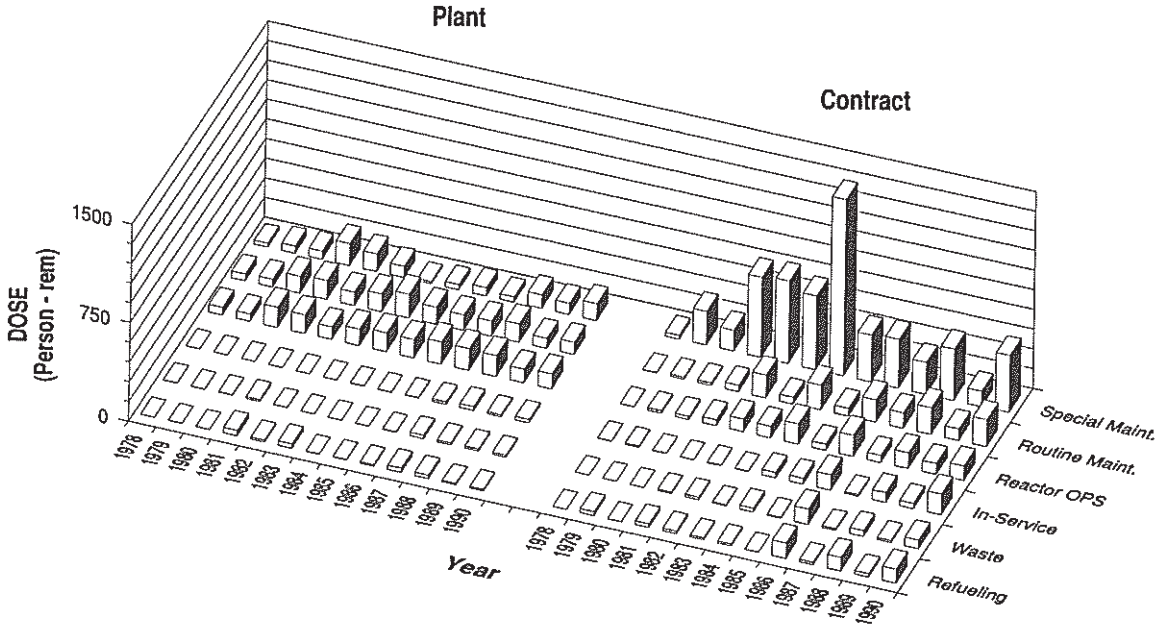
### HATCH 1, 2

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

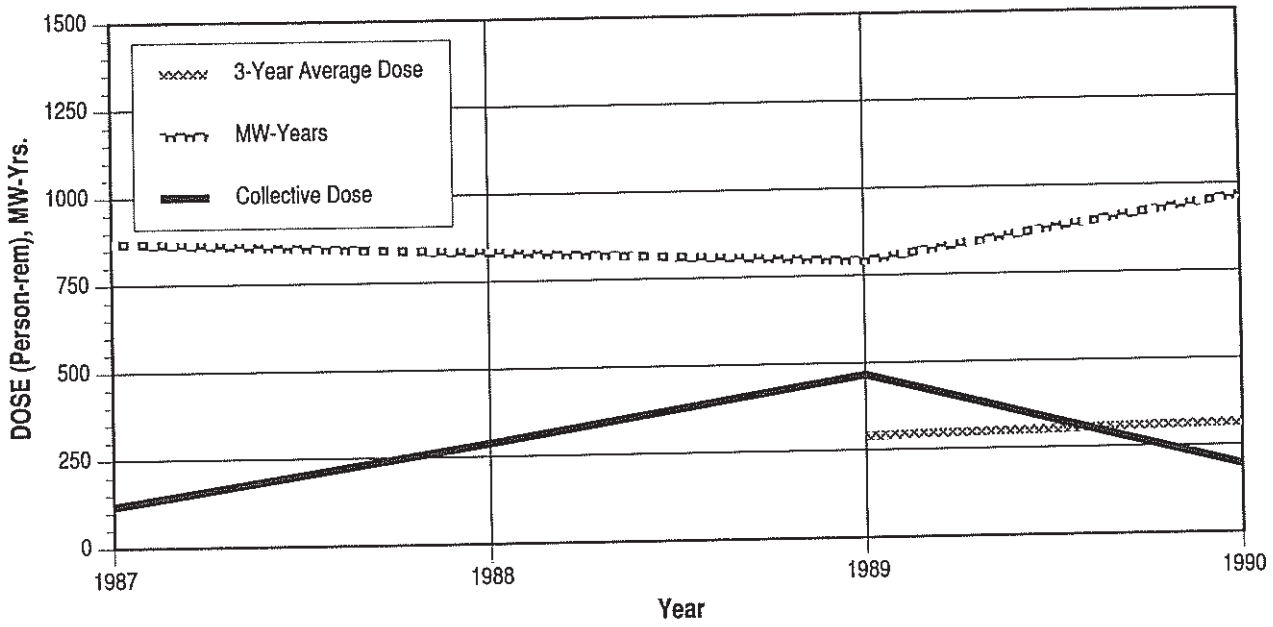


## APPENDIX E (continued)

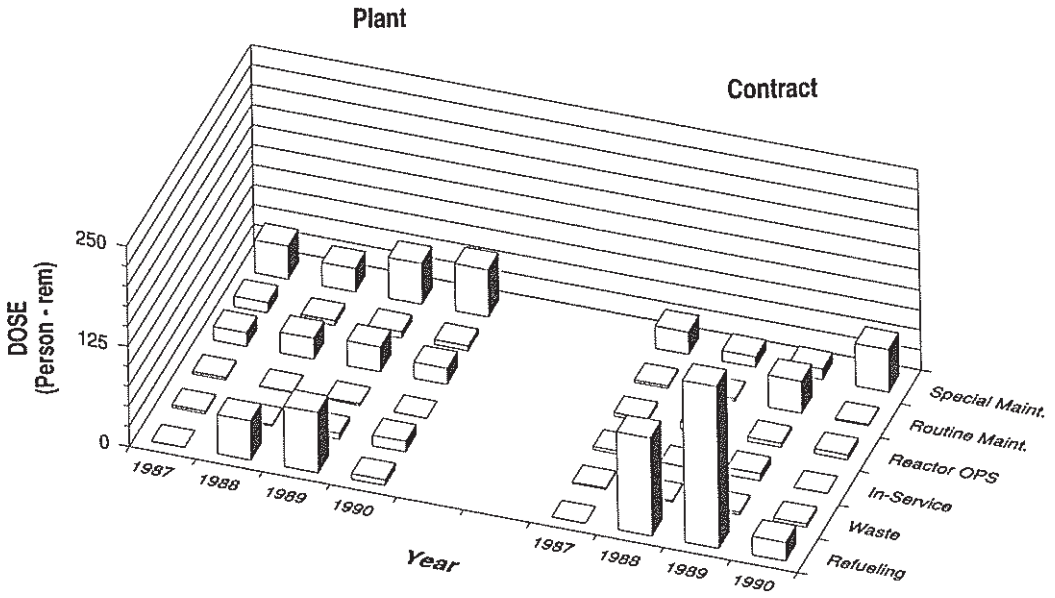
### HOPE CREEK 1

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

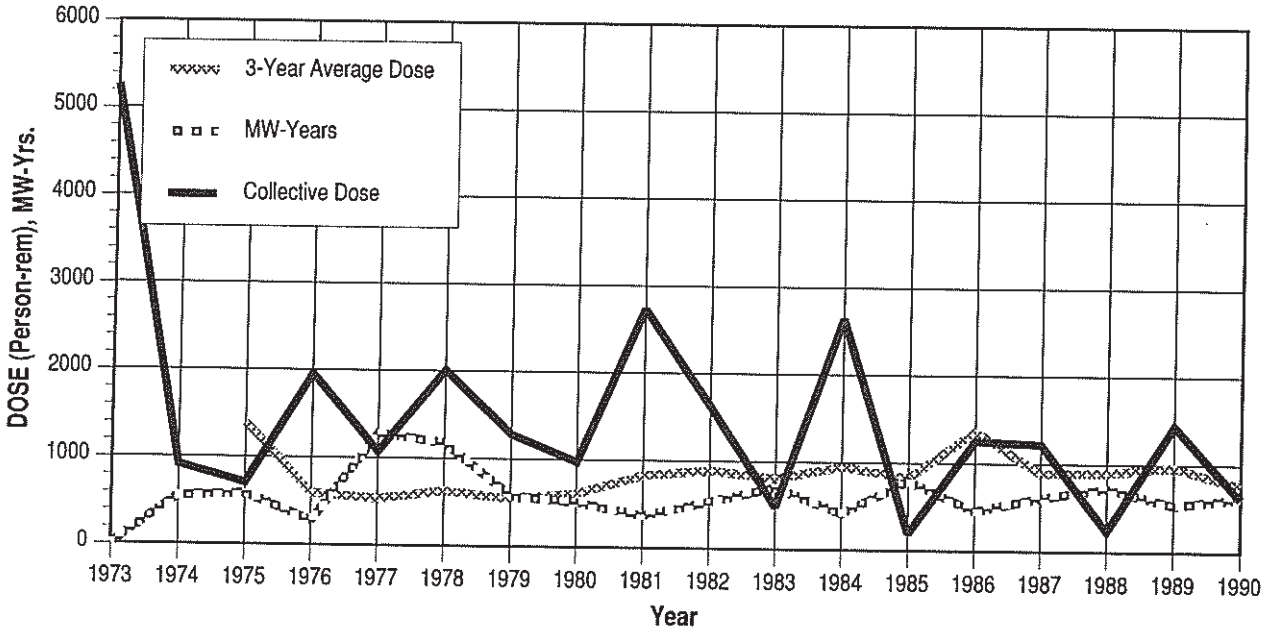


## APPENDIX E (continued)

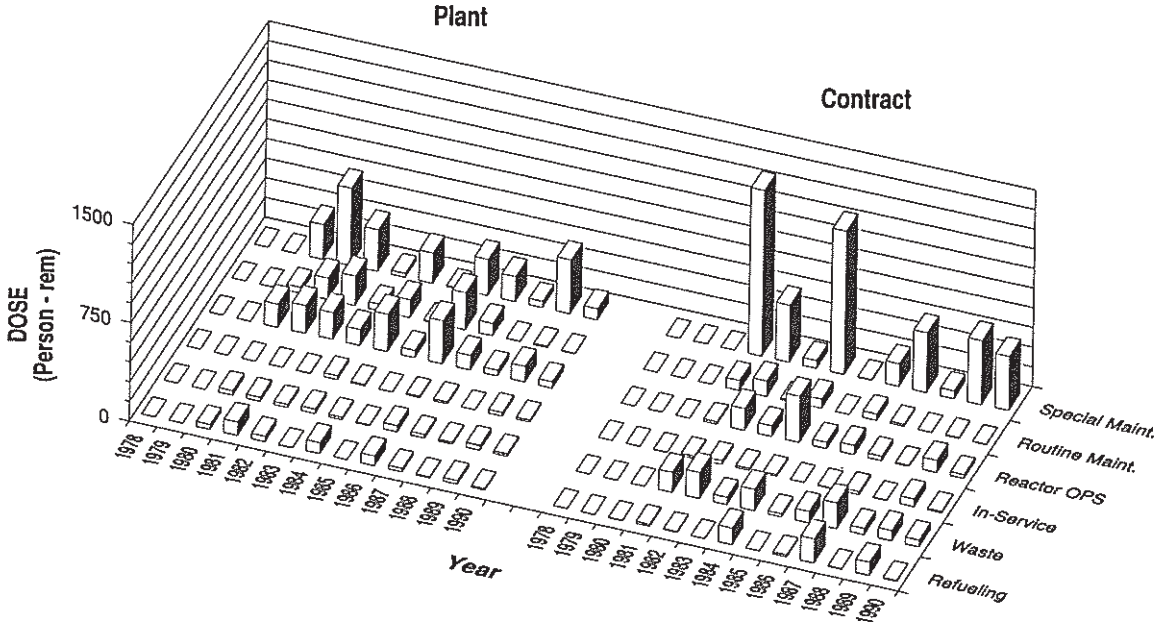
### INDIAN POINT 2

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

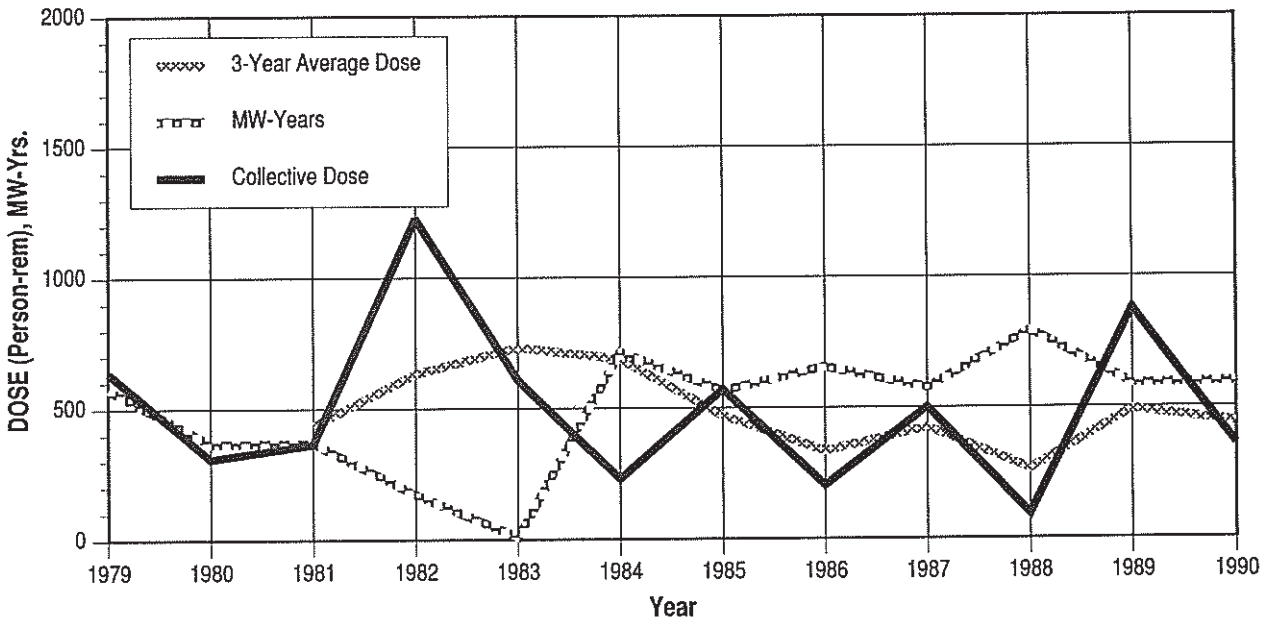


## APPENDIX E (continued)

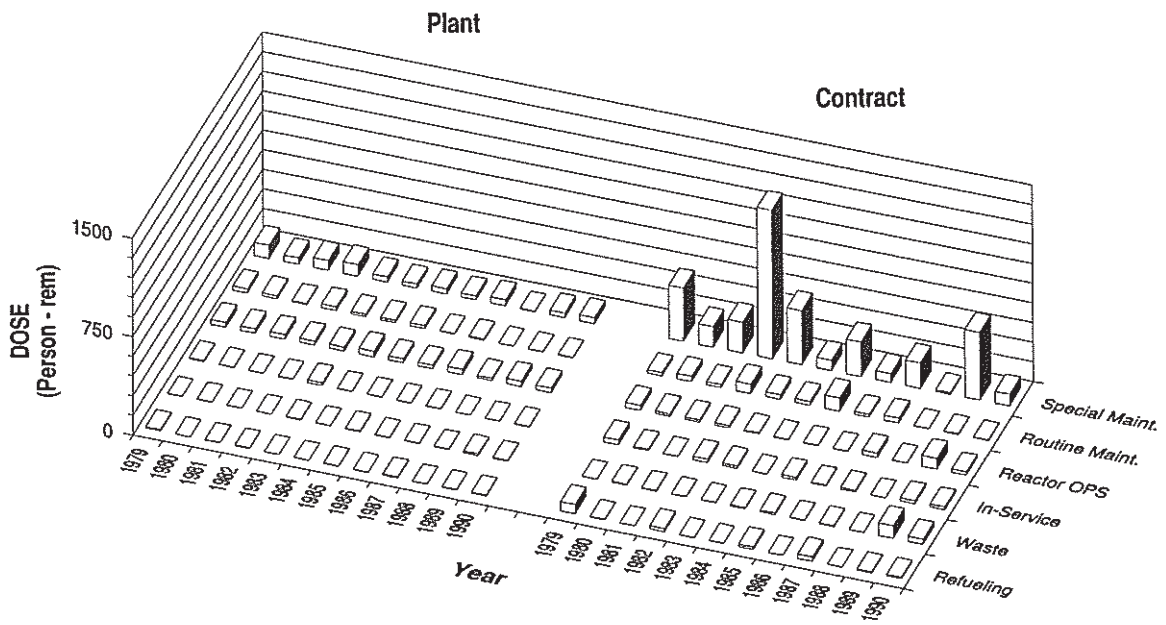
### INDIAN POINT 3

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

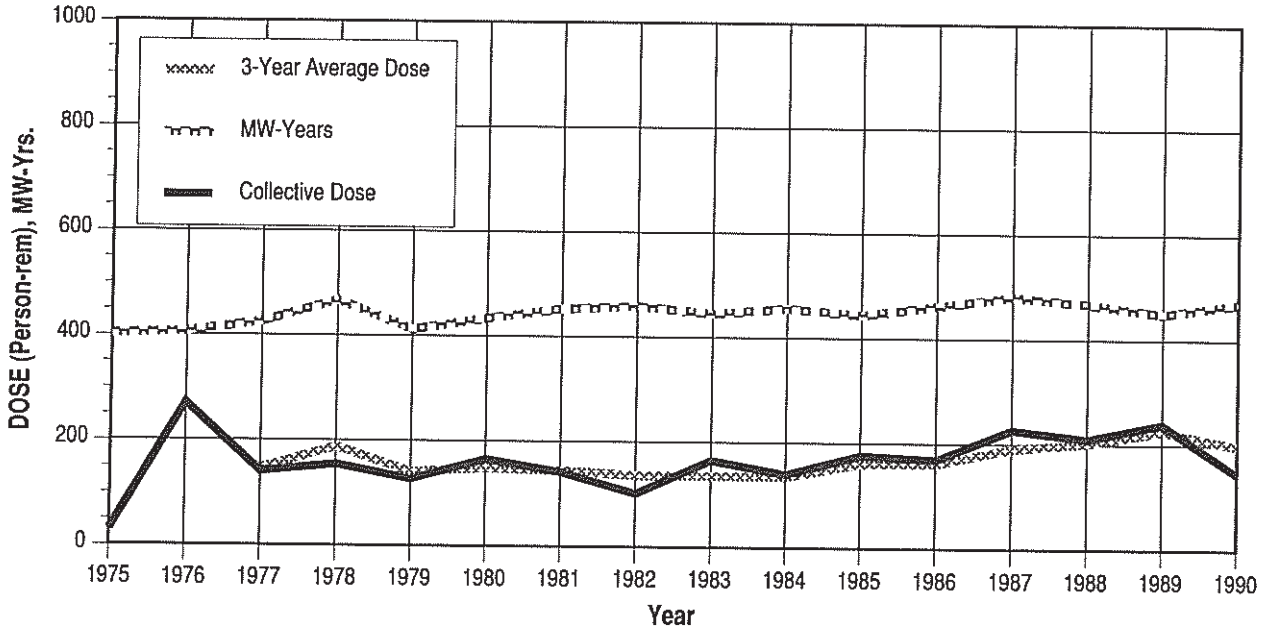


## APPENDIX E (continued)

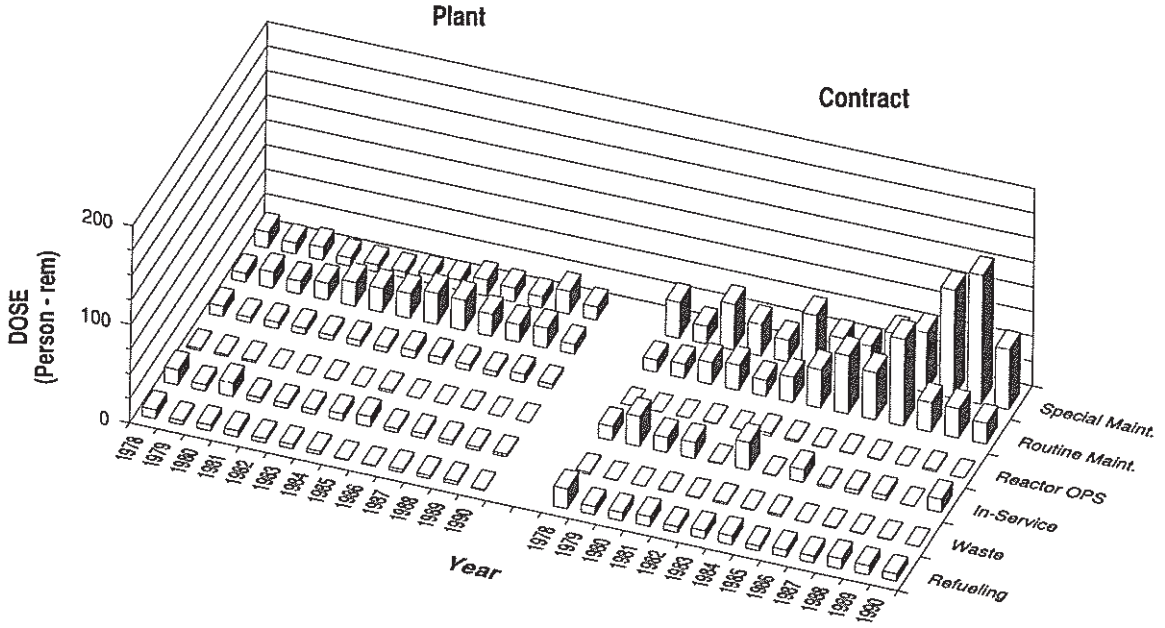
### KEWAUNEE

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

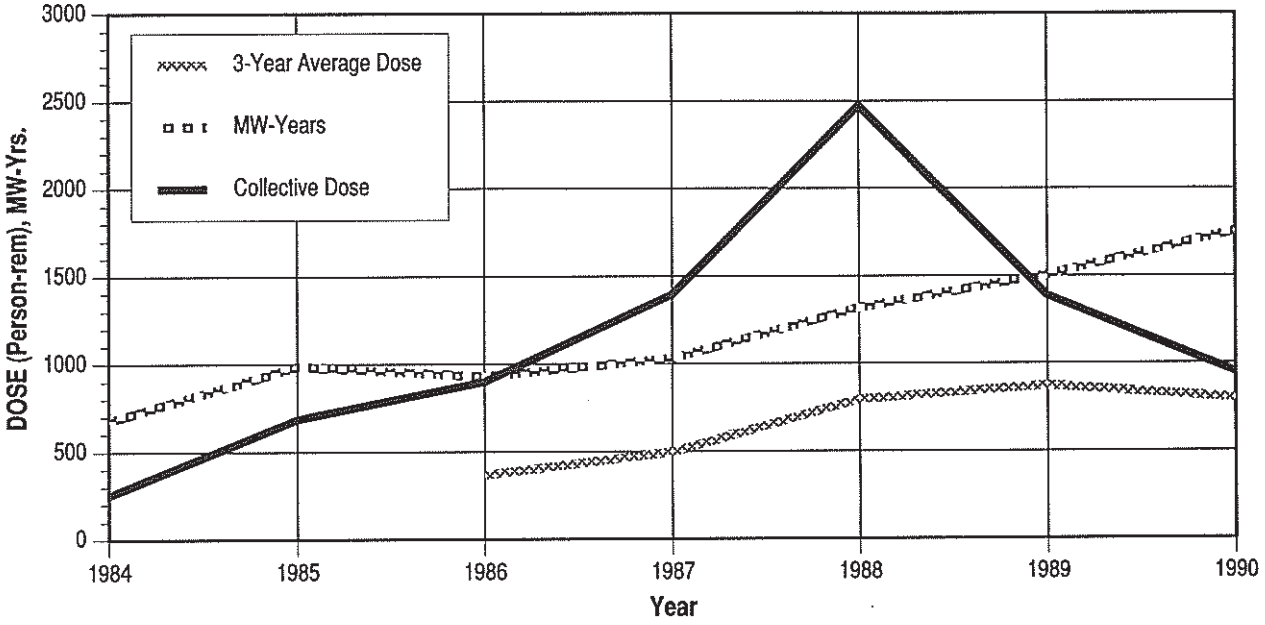


## APPENDIX E (continued)

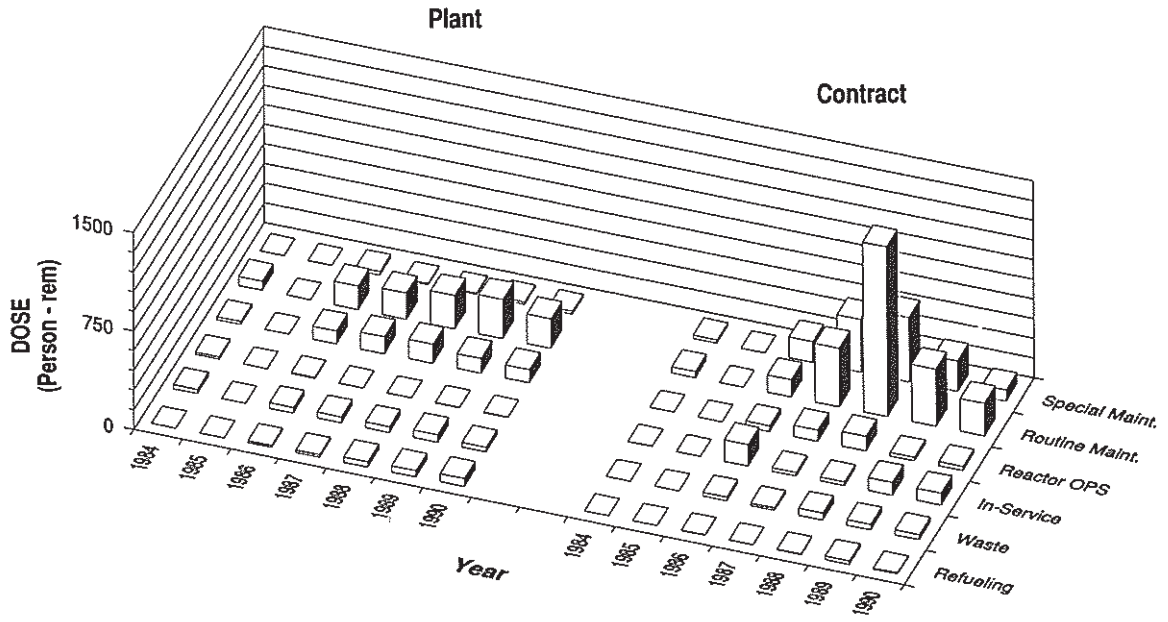
### LASALLE 1, 2

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

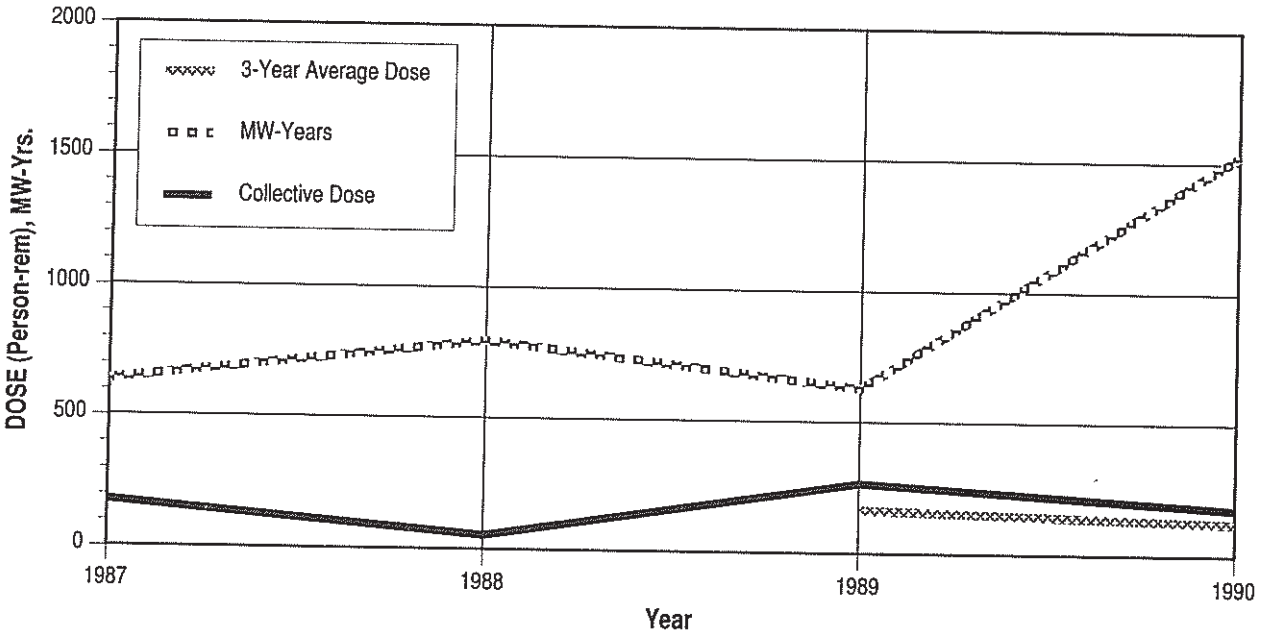


## APPENDIX E (continued)

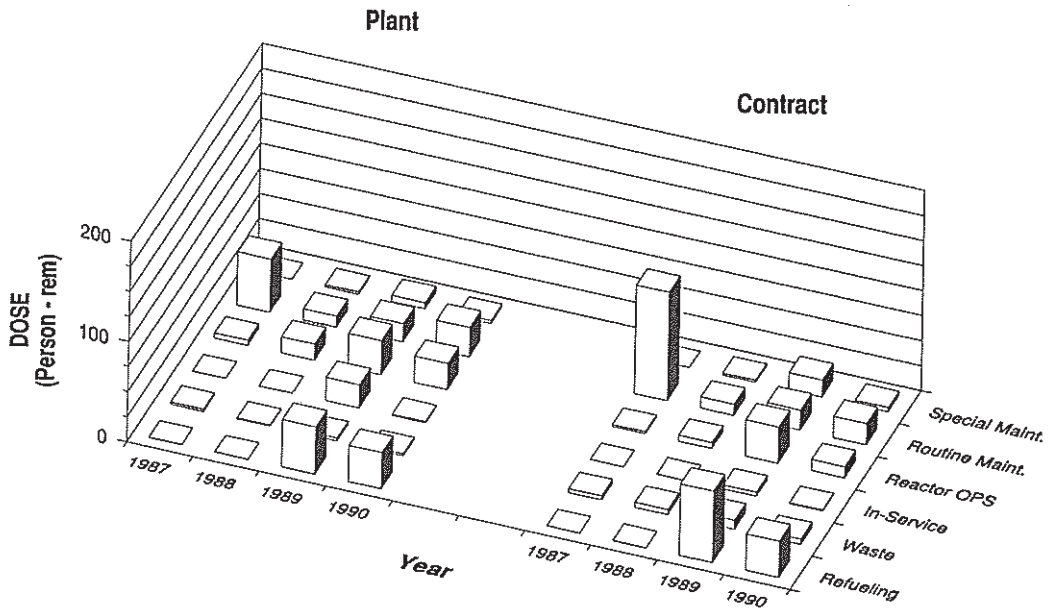
### LIMERICK 1, 2

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

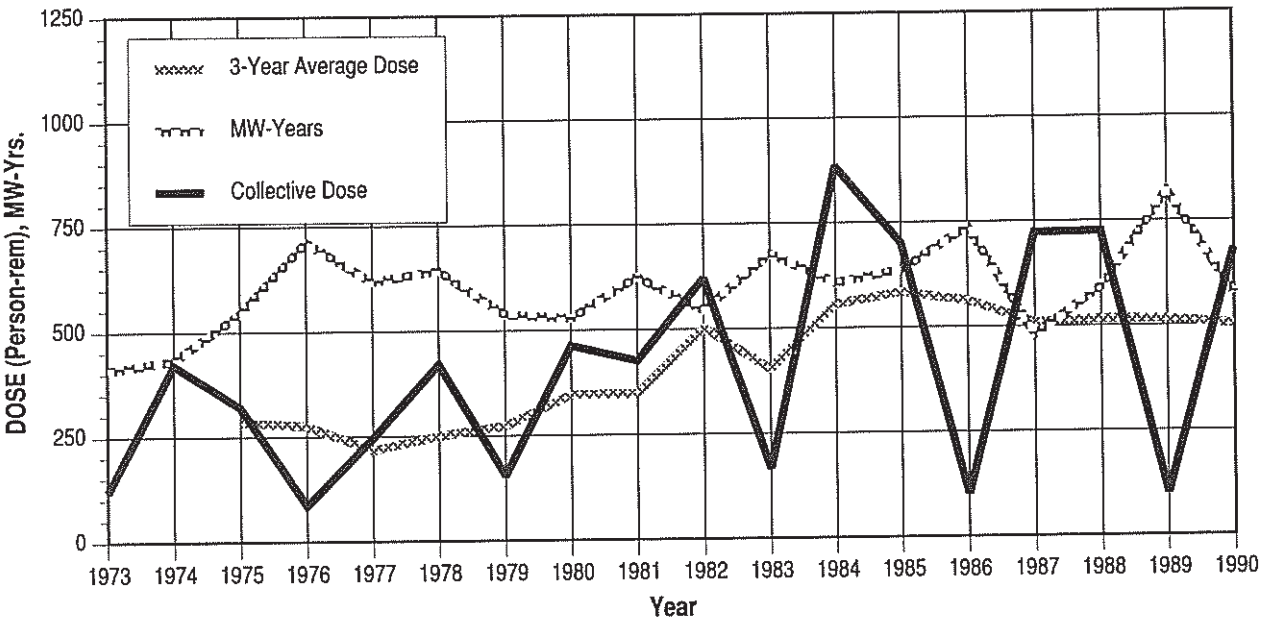


## APPENDIX E (continued)

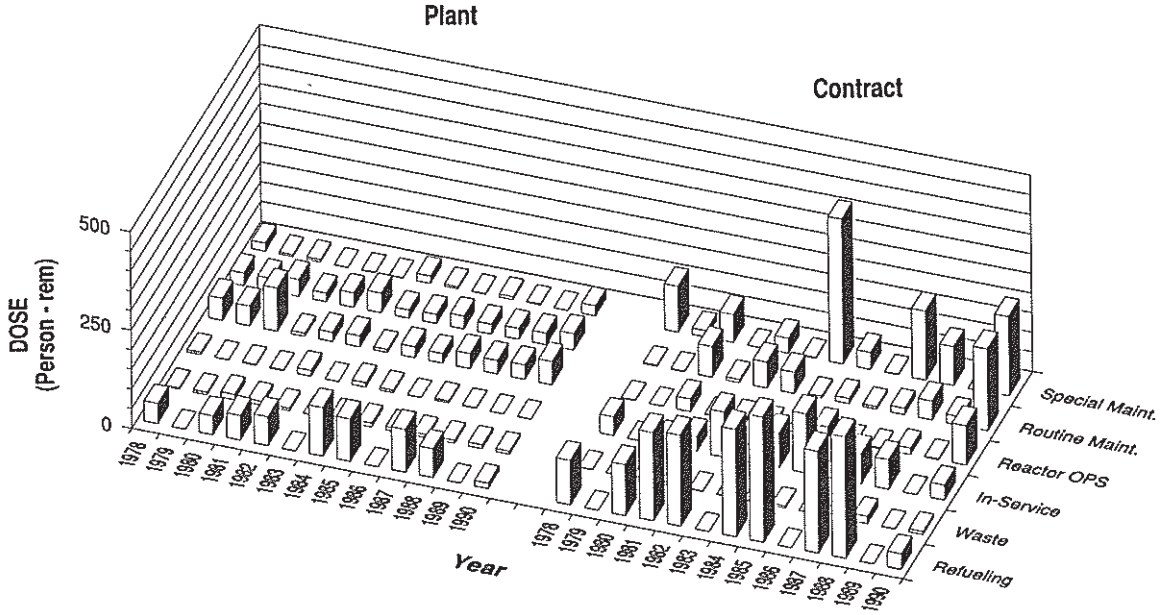
### MAINE YANKEE

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

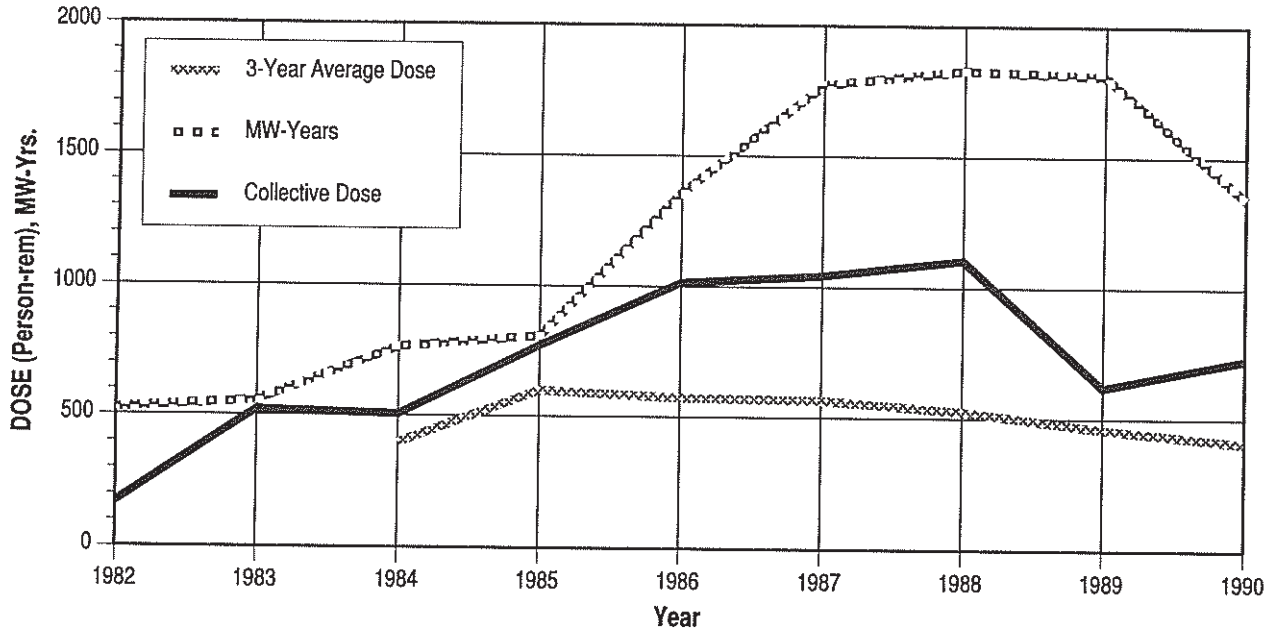


## APPENDIX E (continued)

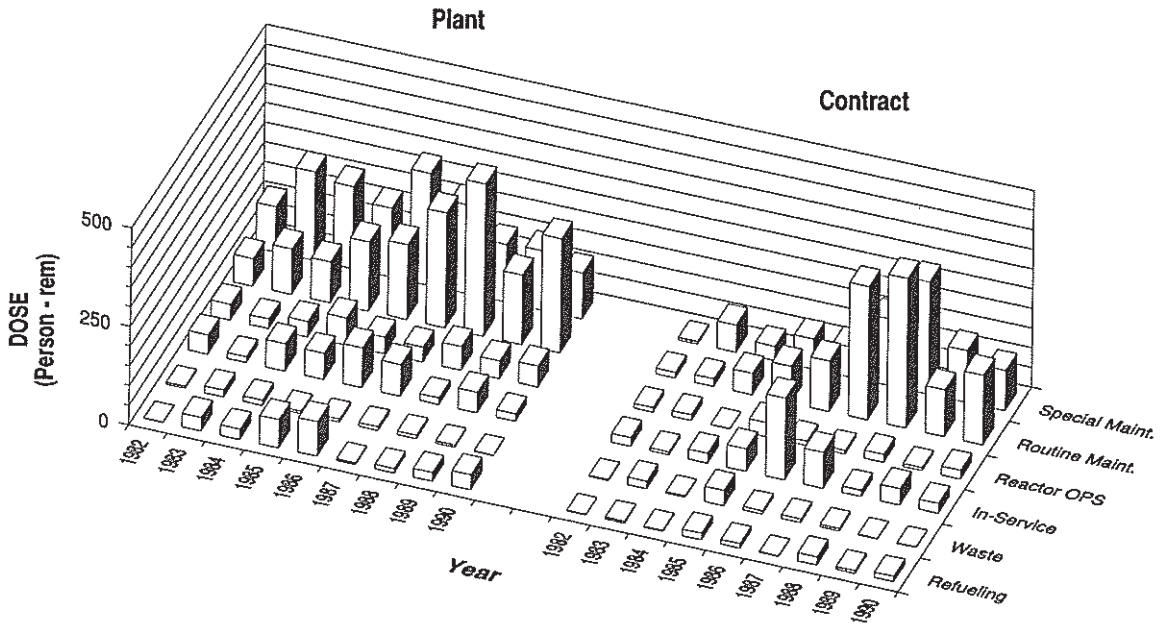
### MCGUIRE 1, 2

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

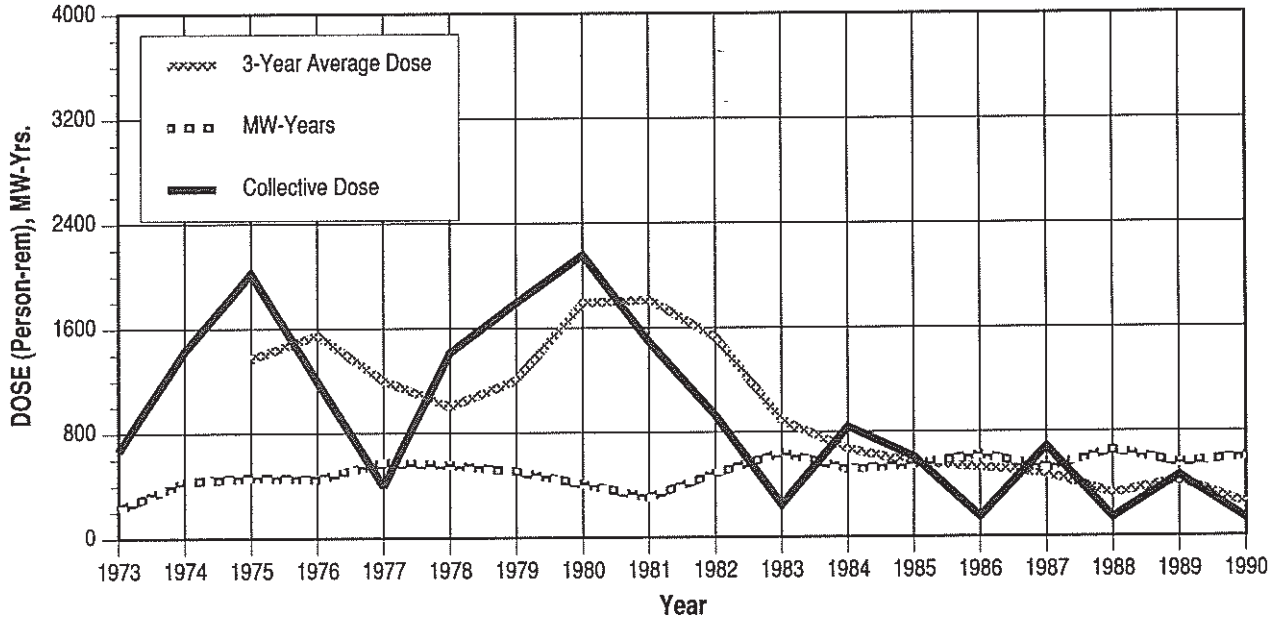


## APPENDIX E (continued)

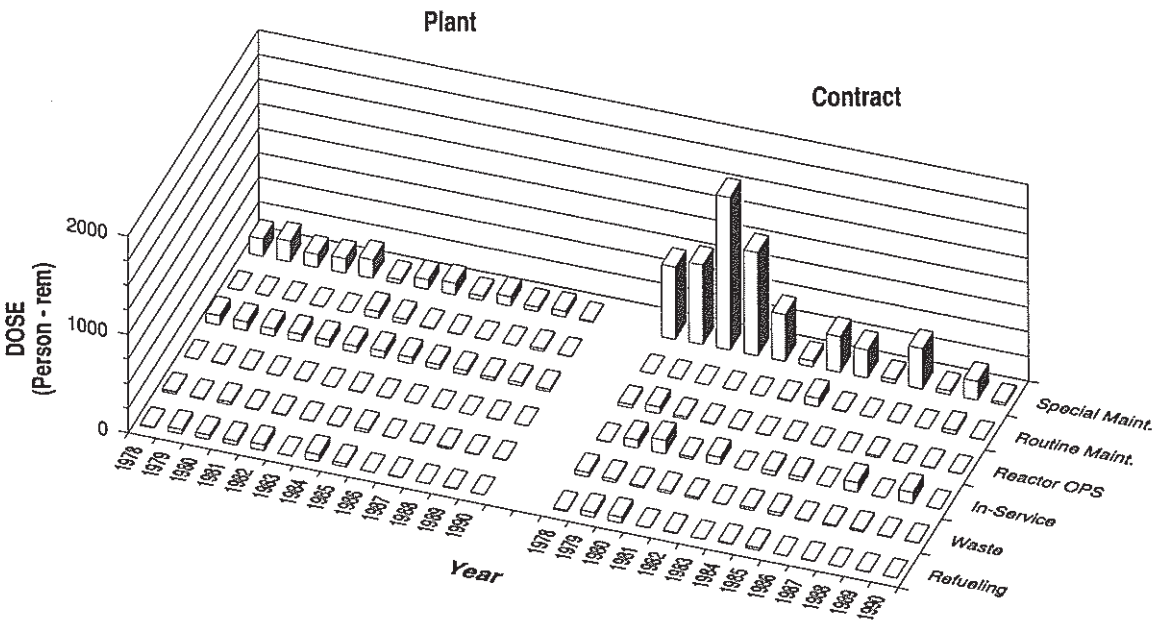
### MILLSTONE POINT 1

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

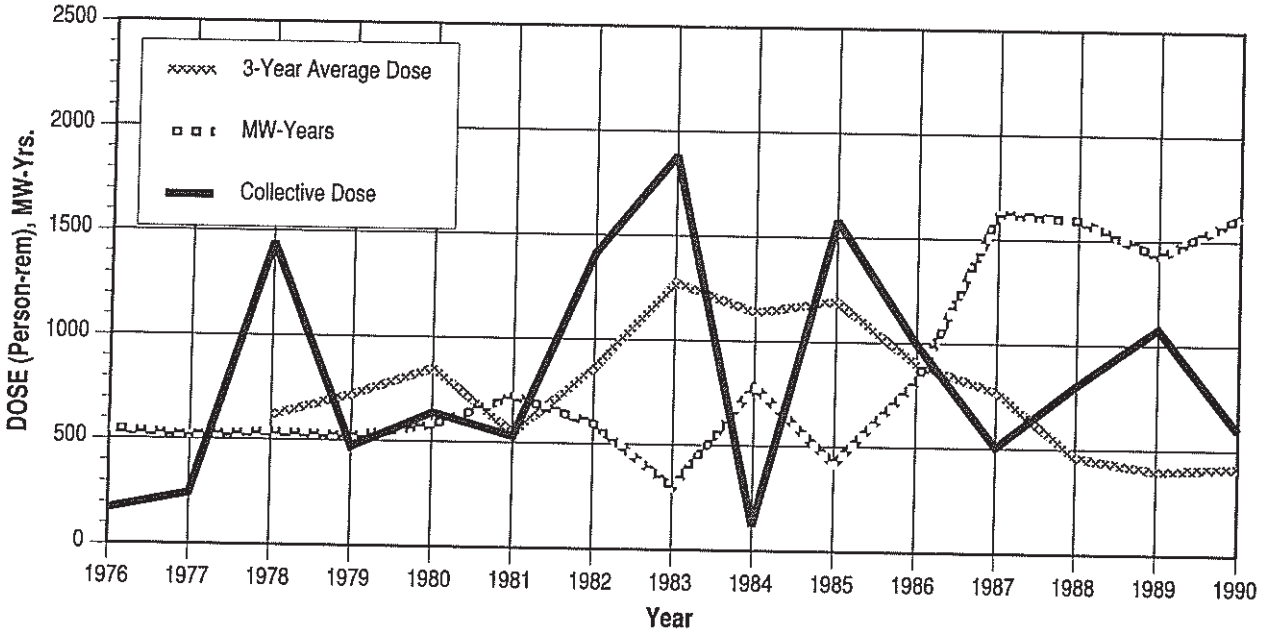


## APPENDIX E (continued)

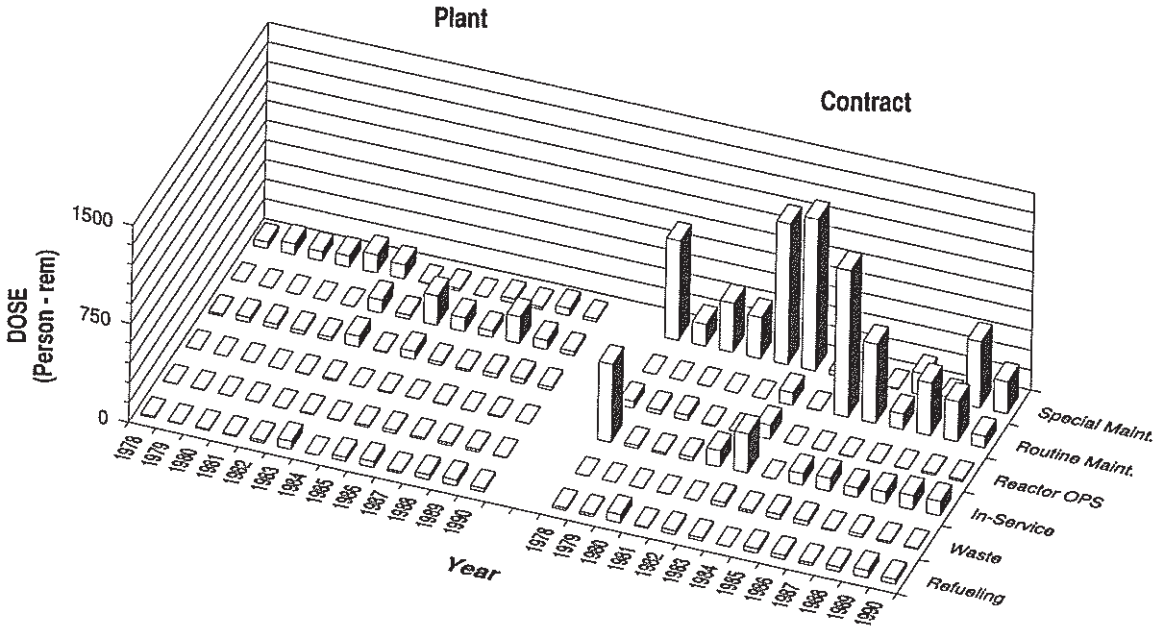
### MILLSTONE POINT 2, 3

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

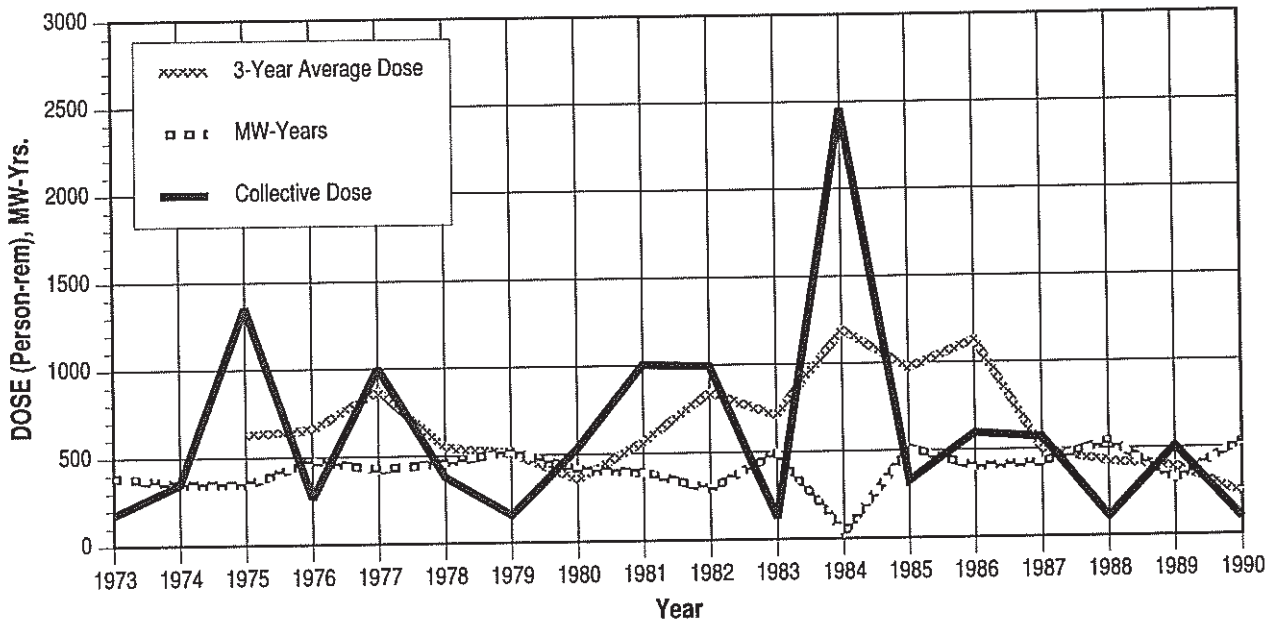


## APPENDIX E (continued)

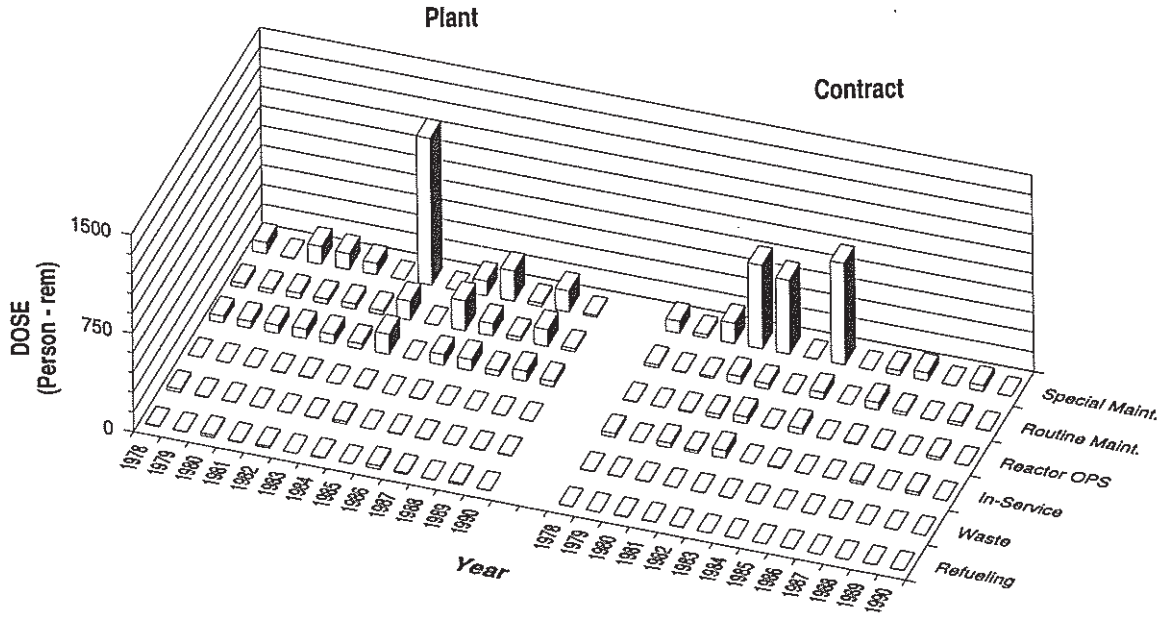
### MONTICELLO

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

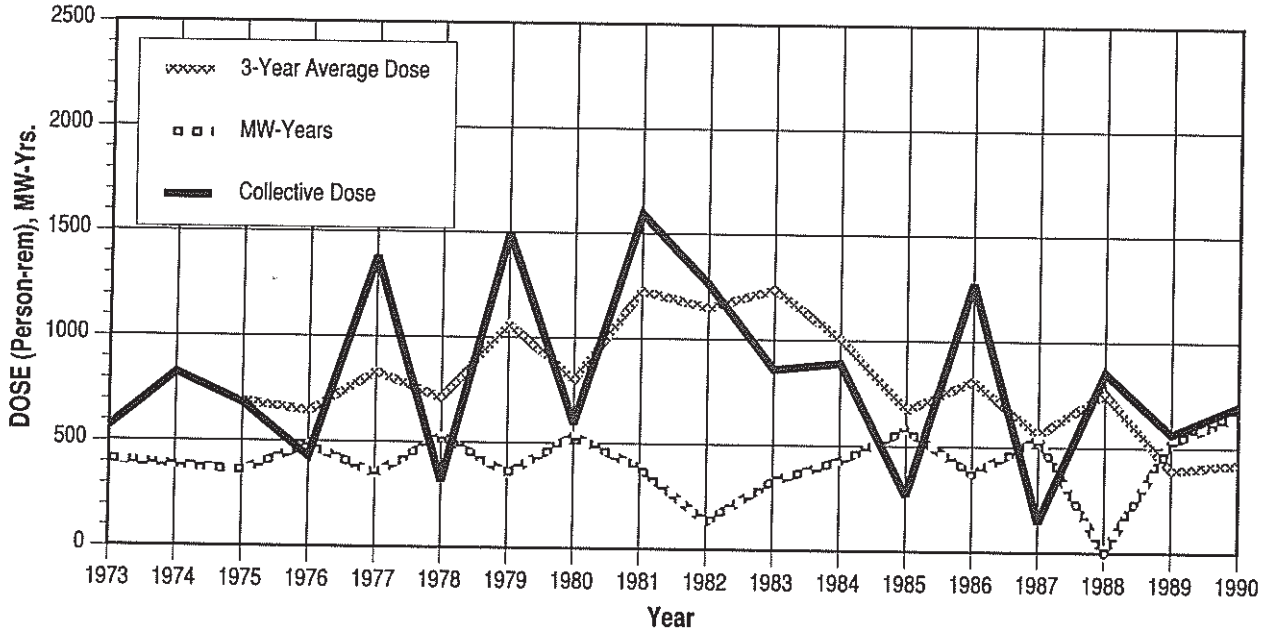


## APPENDIX E (continued)

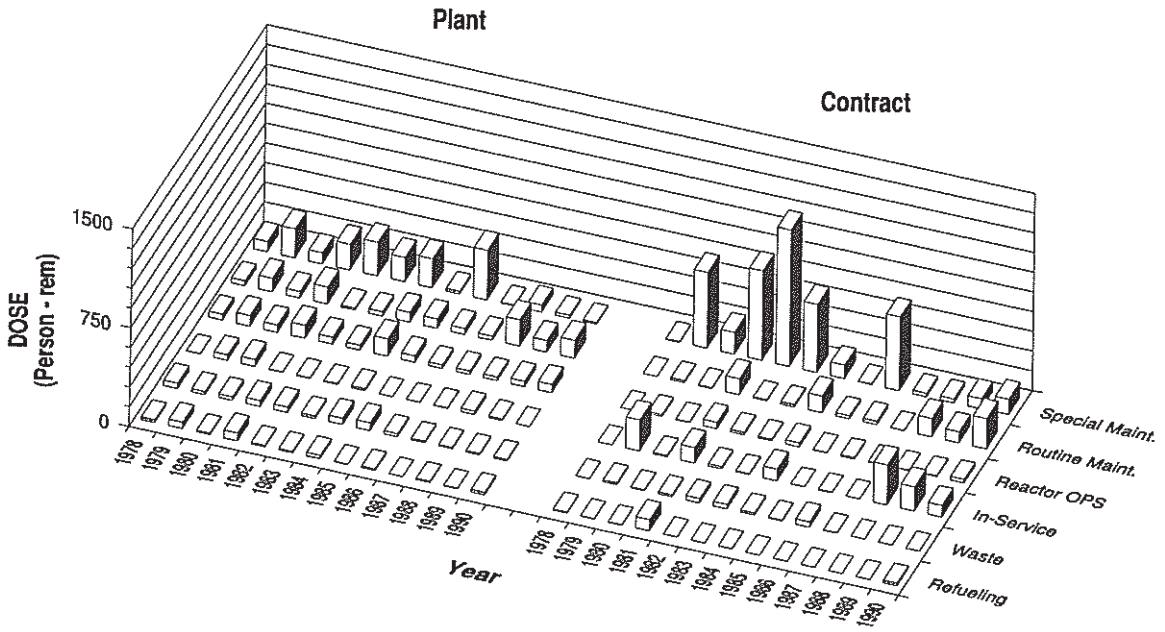
### NINE MILE POINT 1, 2

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

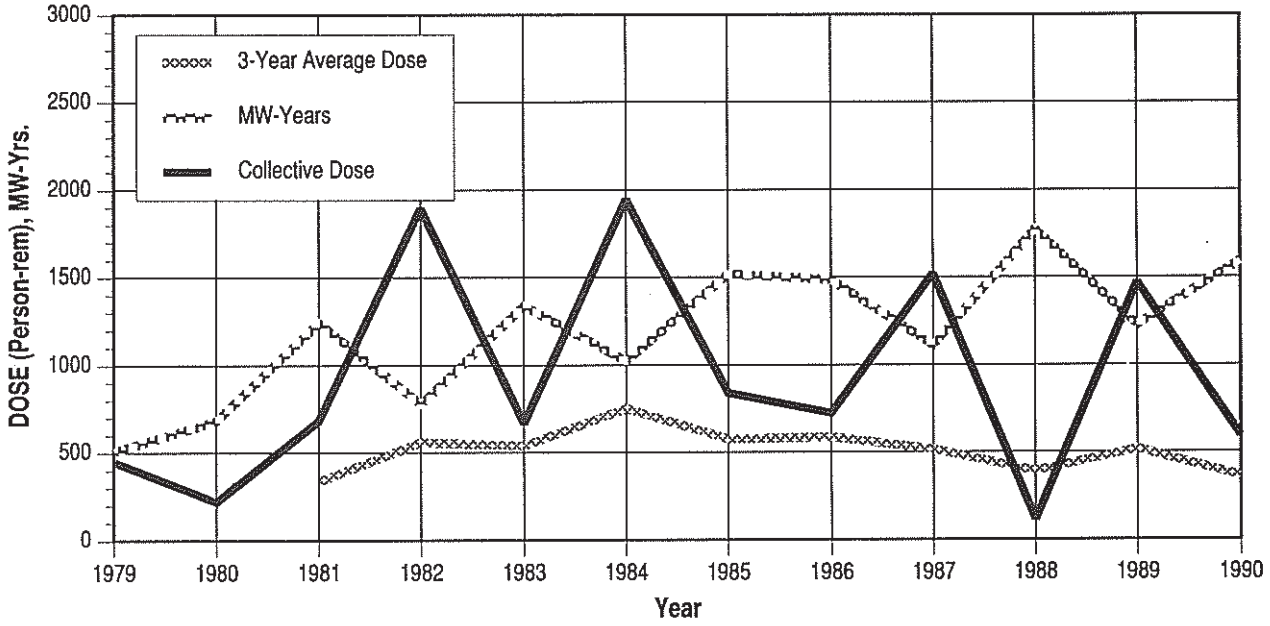


## APPENDIX E (continued)

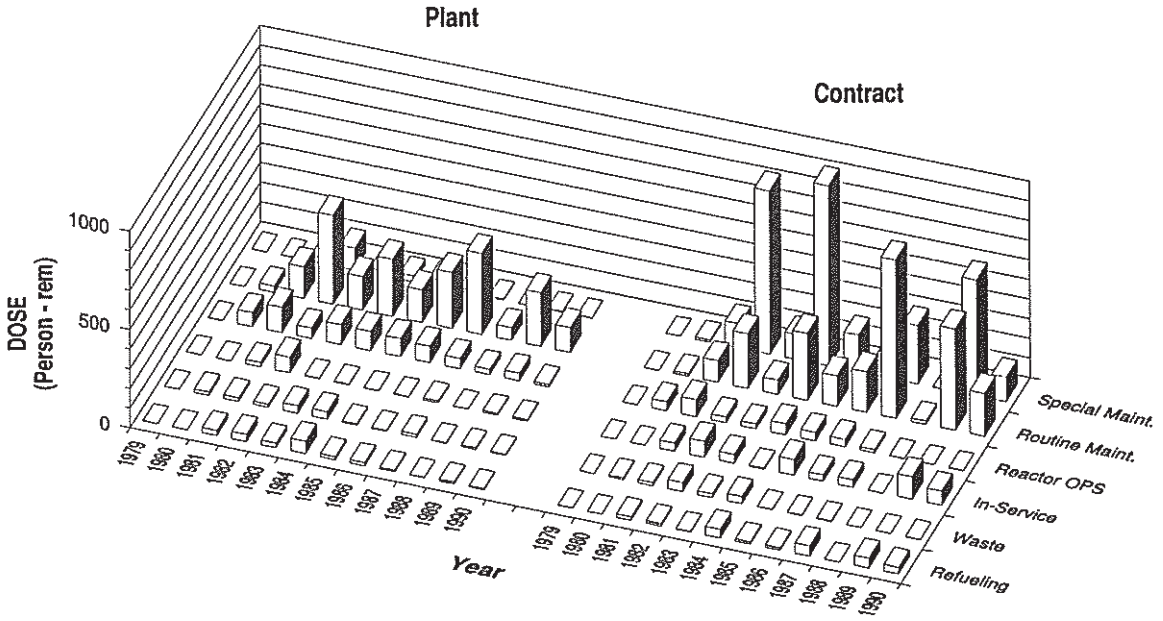
## NORTH ANNA 1, 2

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

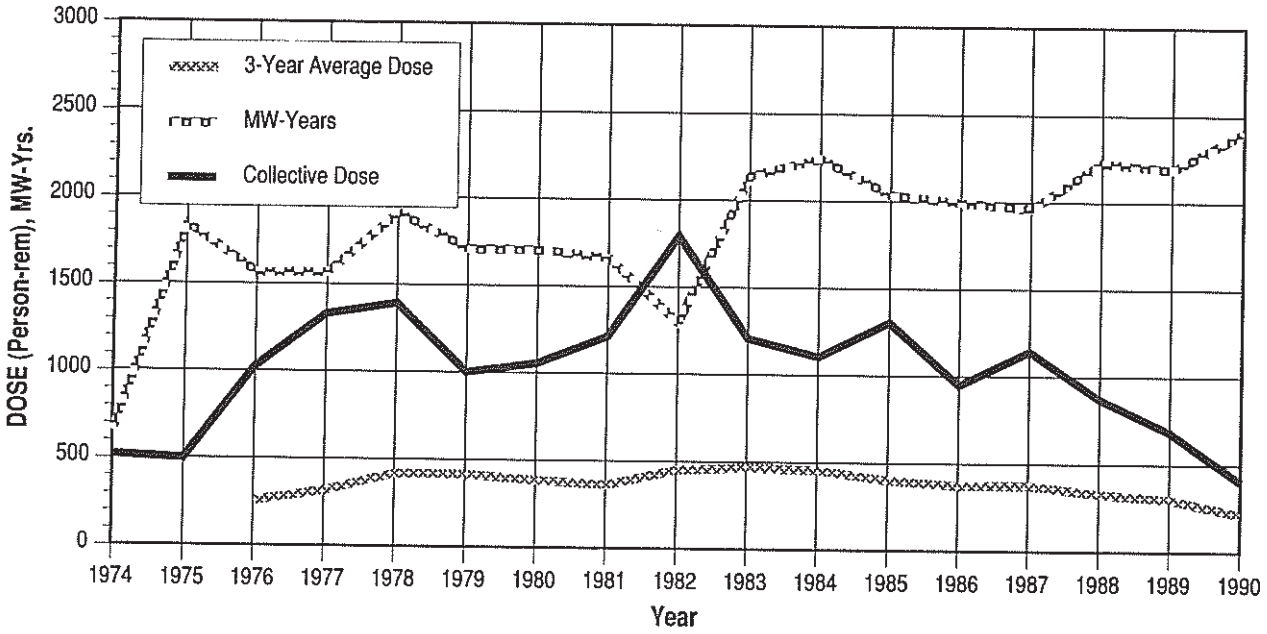


## APPENDIX E (continued)

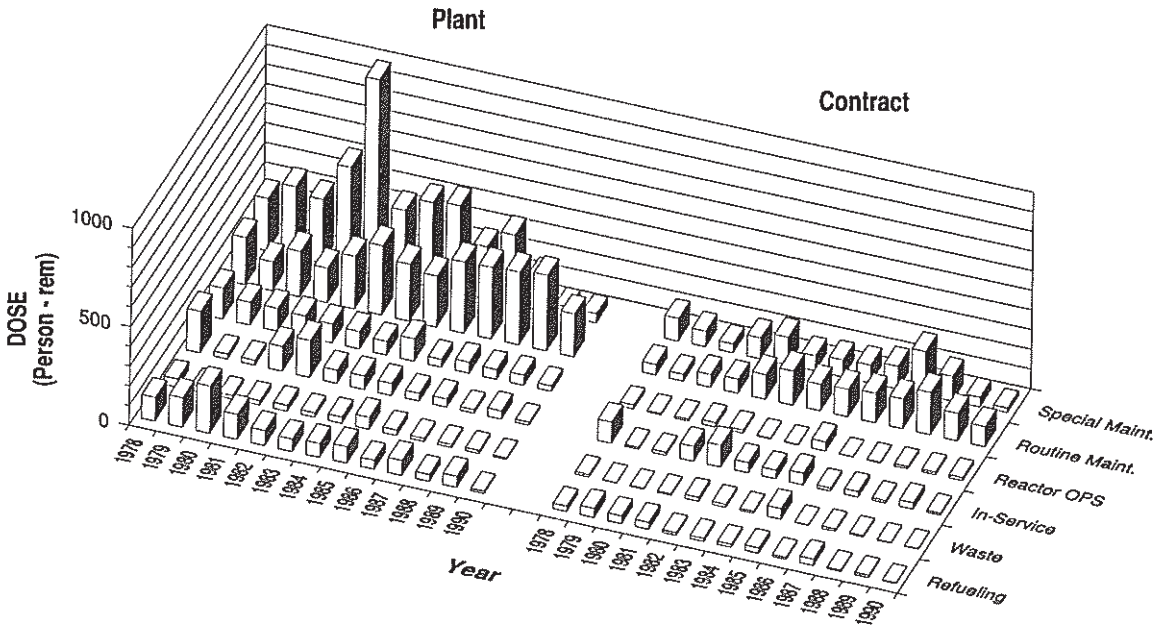
### OCONEE 1, 2, 3

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

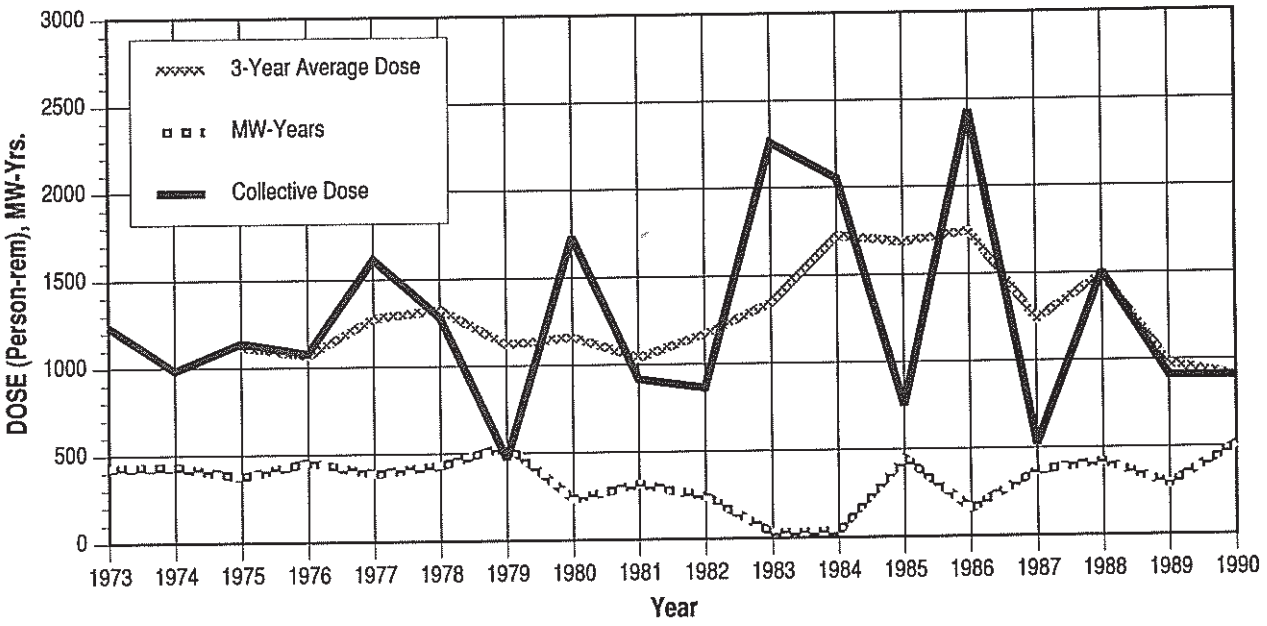


## APPENDIX E (continued)

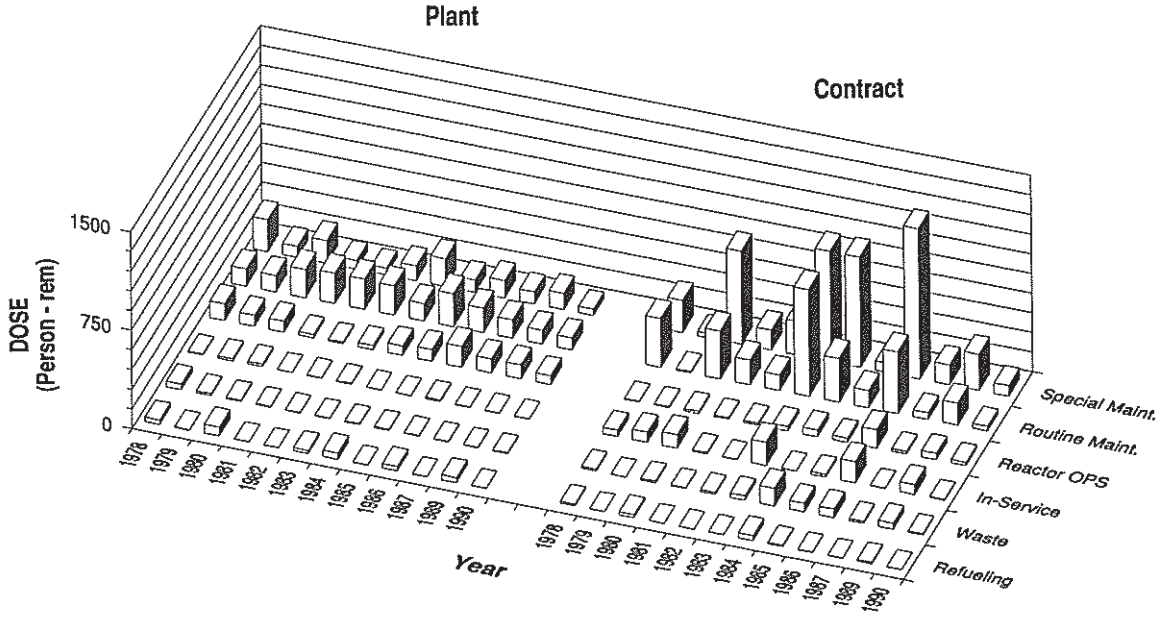
### OYSTER CREEK

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

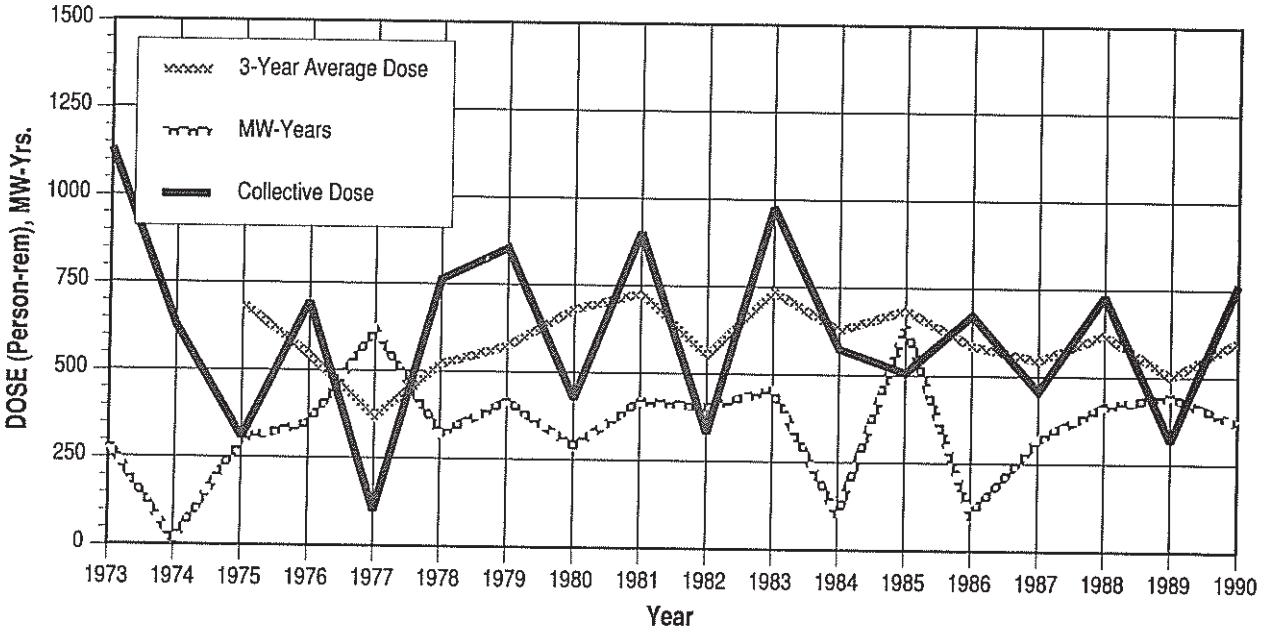


## APPENDIX E (continued)

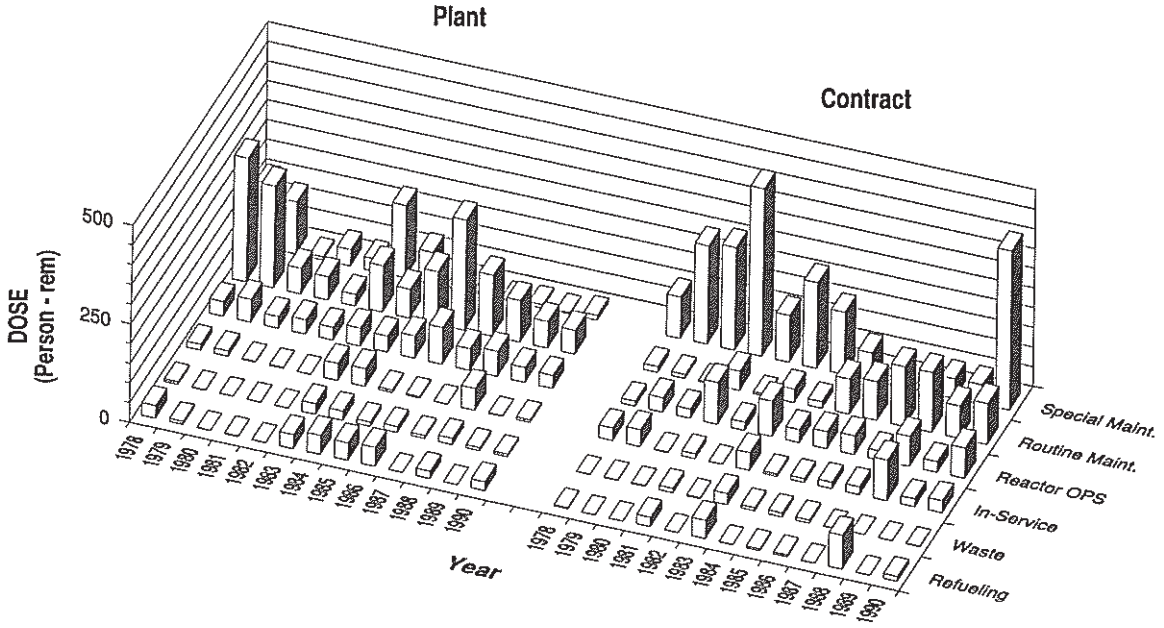
## PALISADES

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

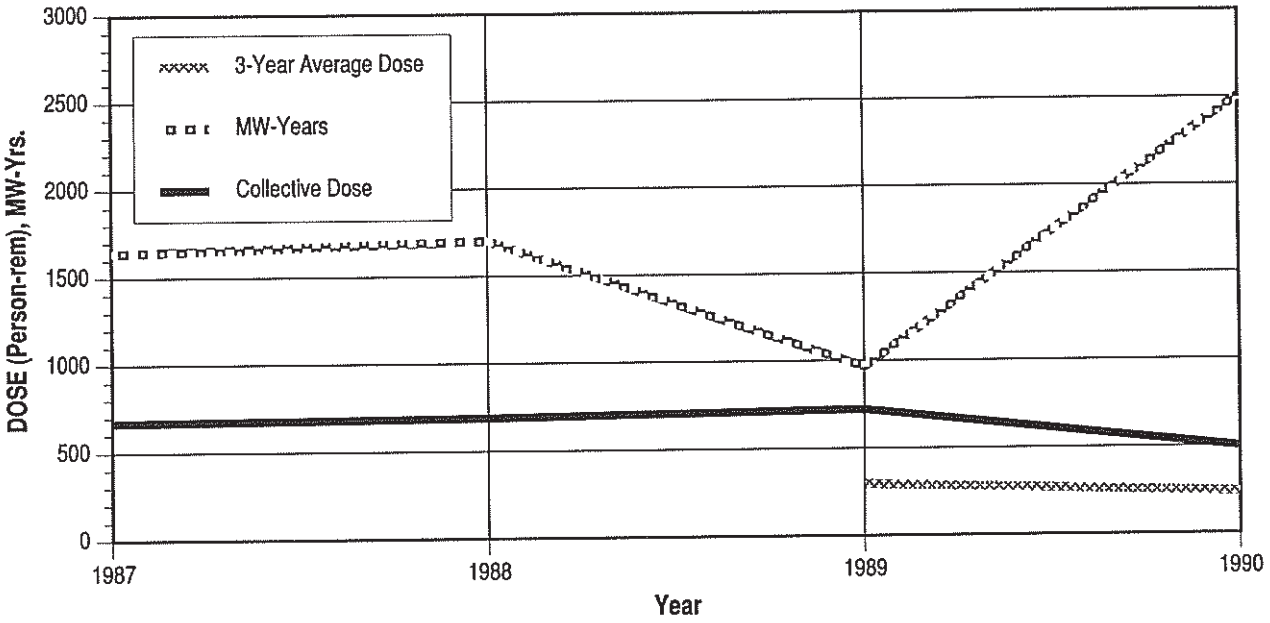


## APPENDIX E (continued)

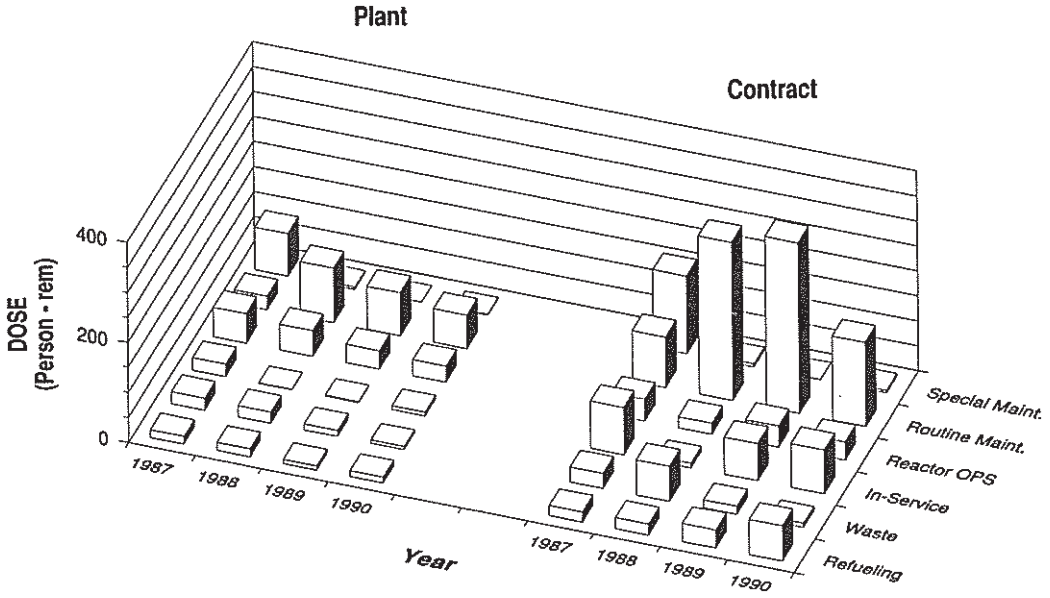
### PALO VERDE 1, 2, 3

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

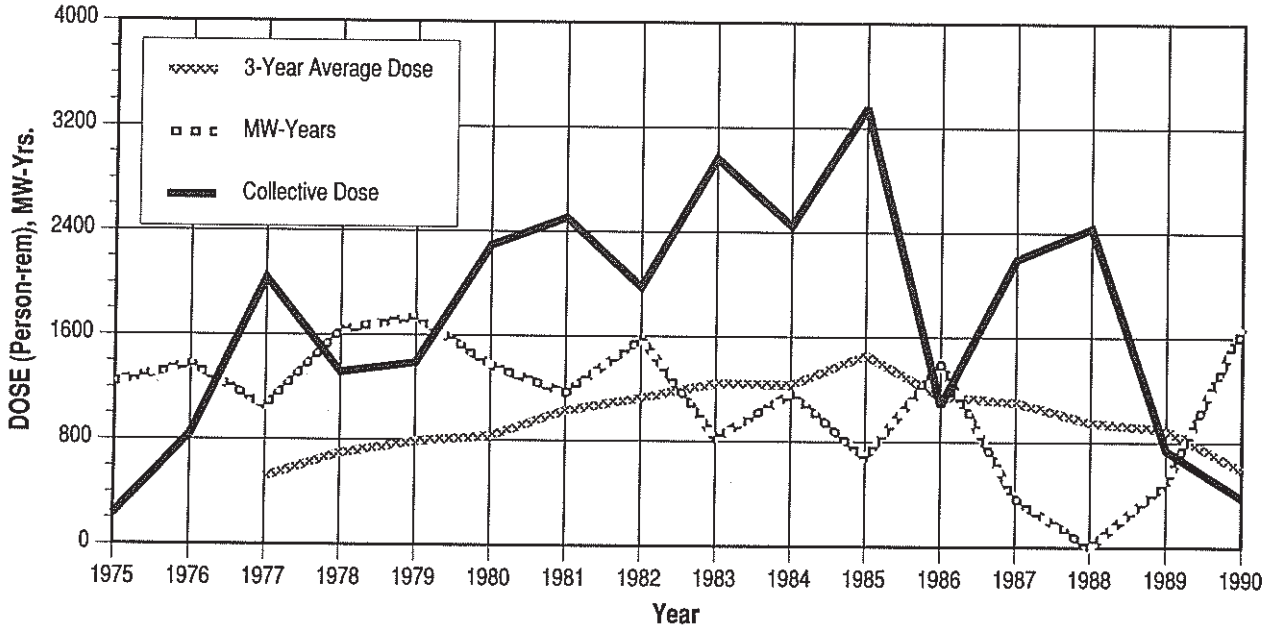


## APPENDIX E (continued)

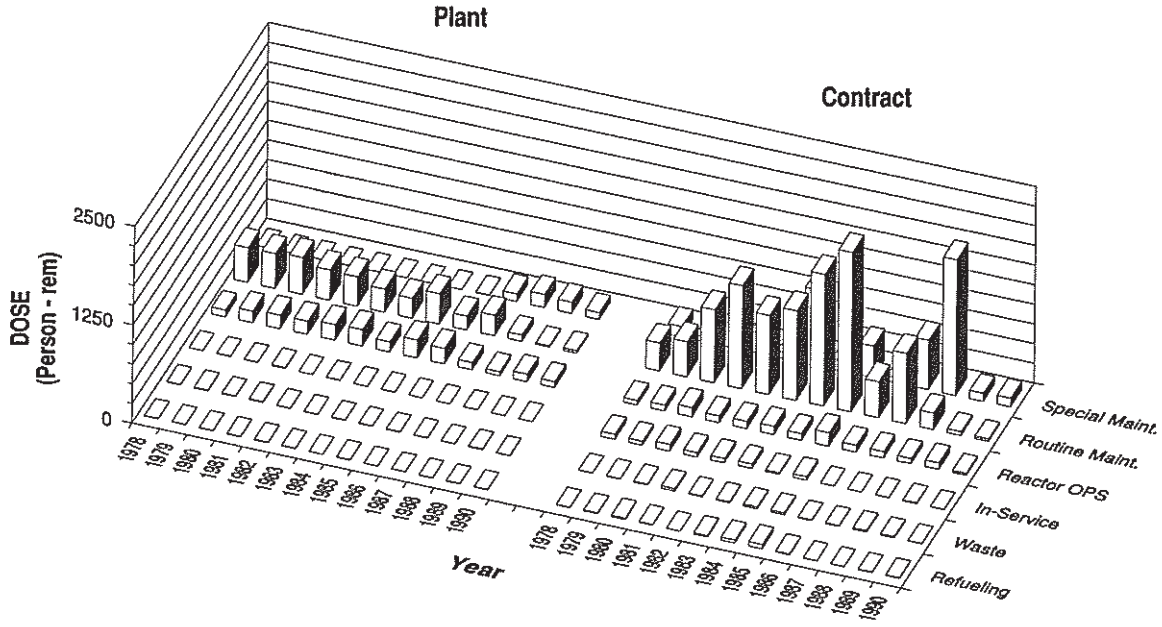
## PEACH BOTTOM 2, 3

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

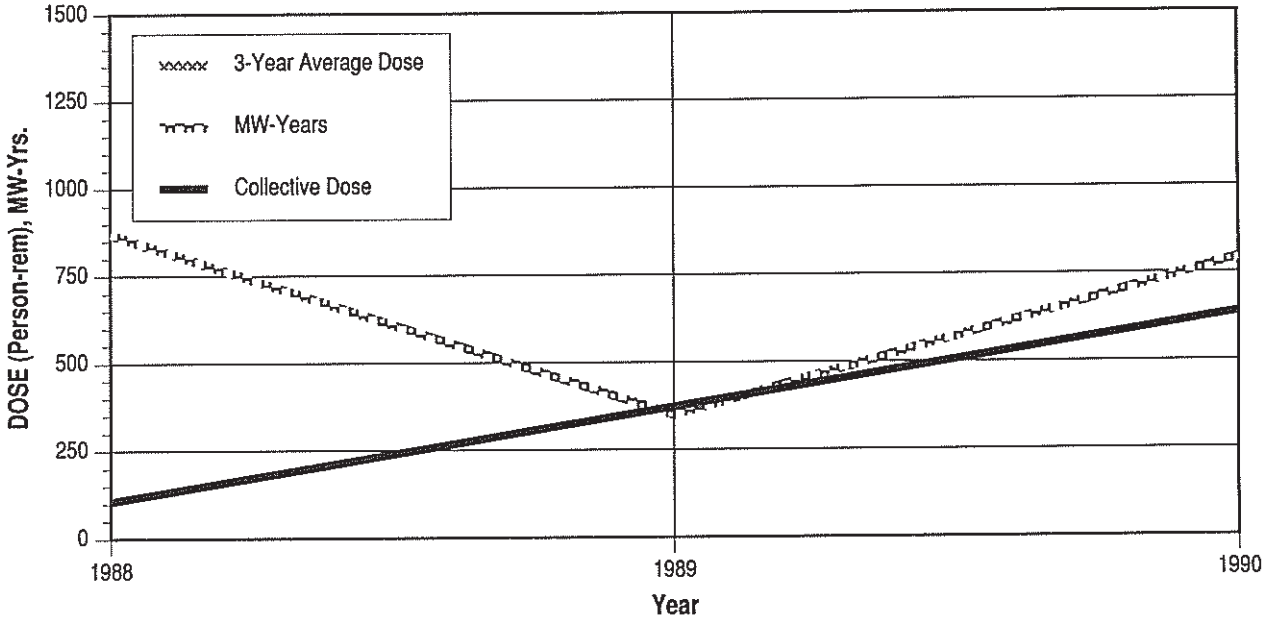


## APPENDIX E (continued)

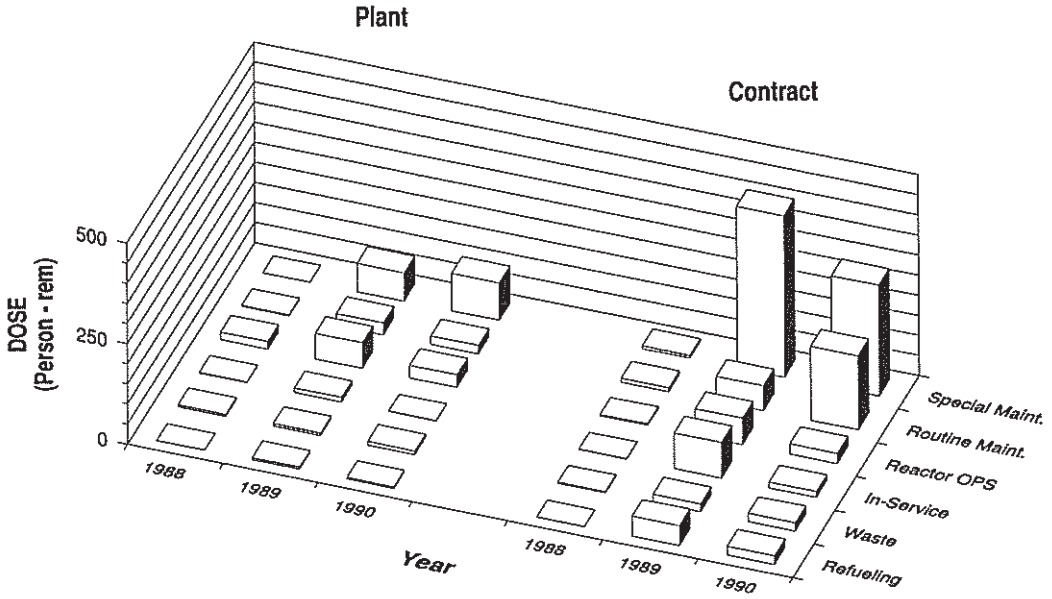
### PERRY

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

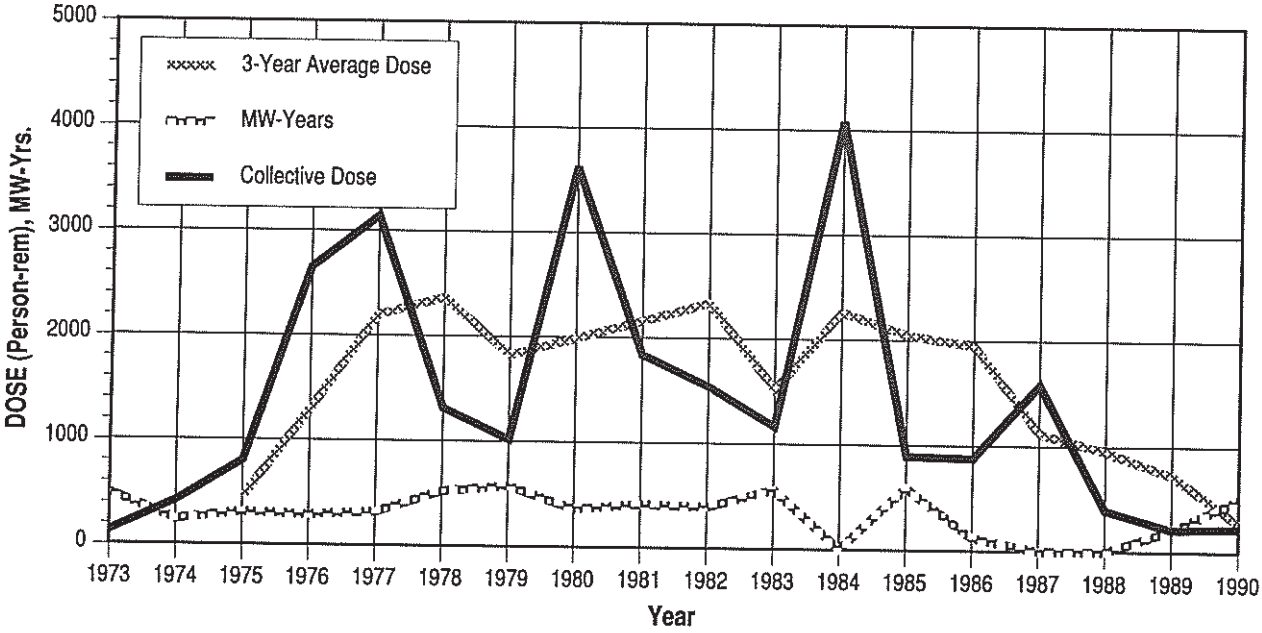


## APPENDIX E (continued)

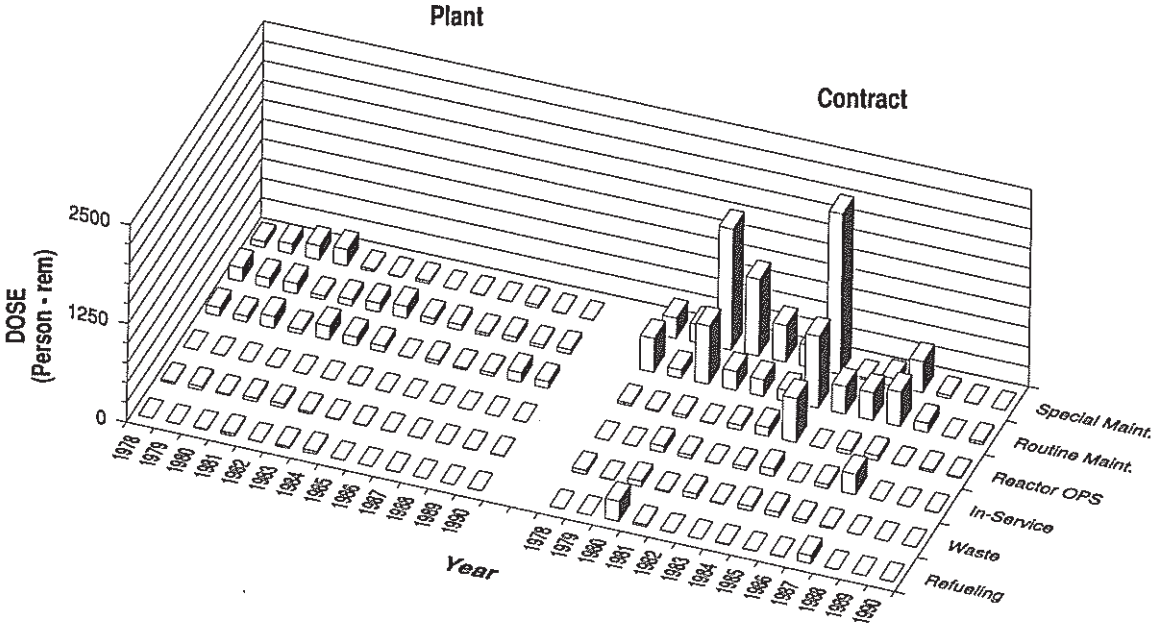
### PILGRIM

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

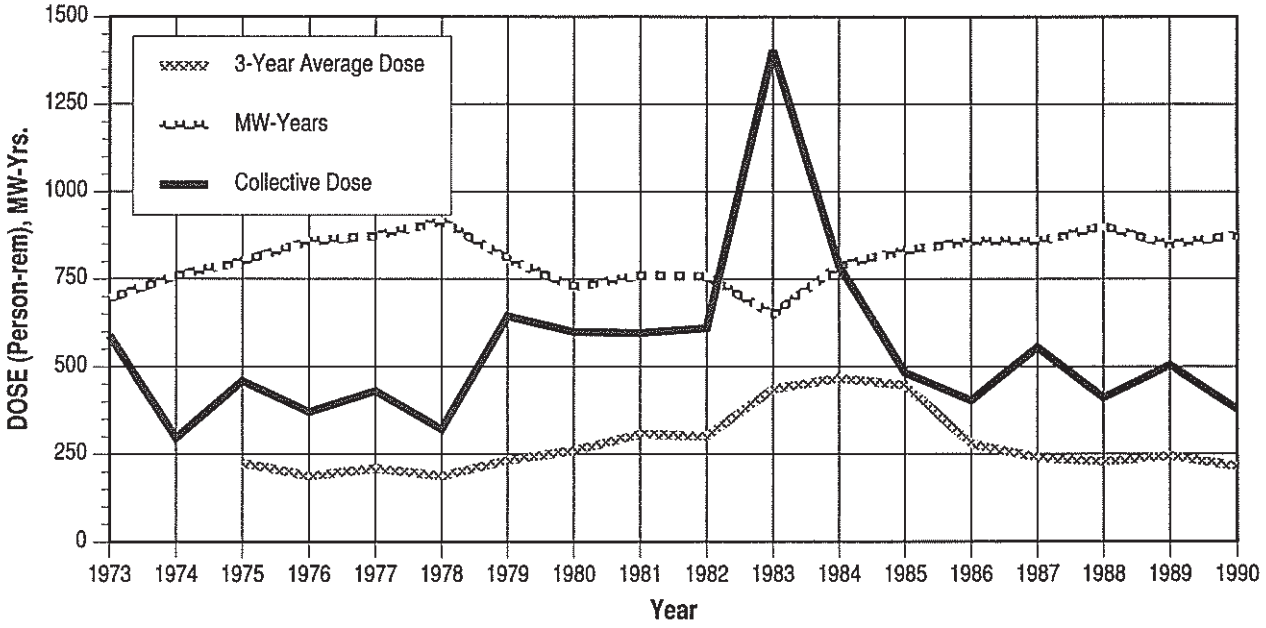


## APPENDIX E (continued)

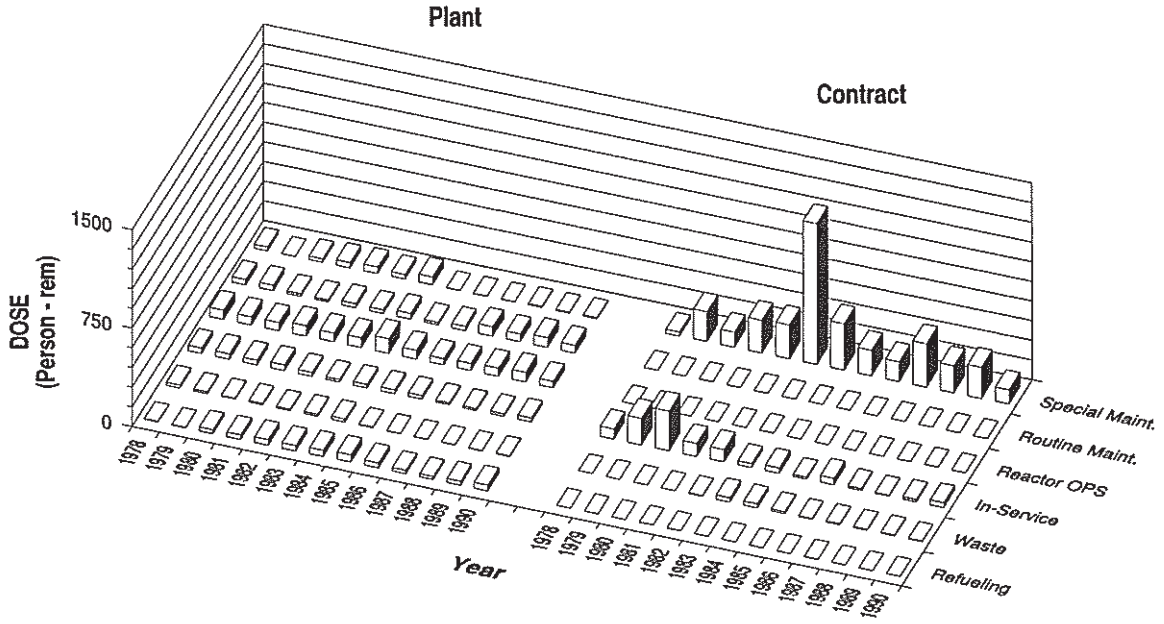
### POINT BEACH 1, 2

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

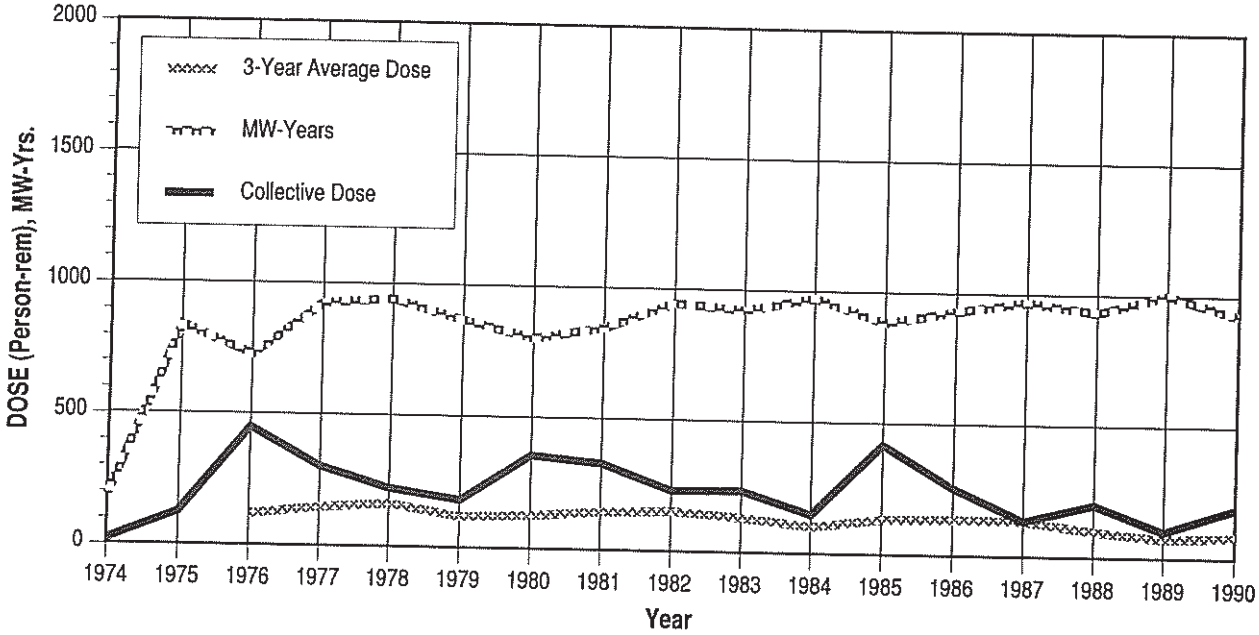


## APPENDIX E (continued)

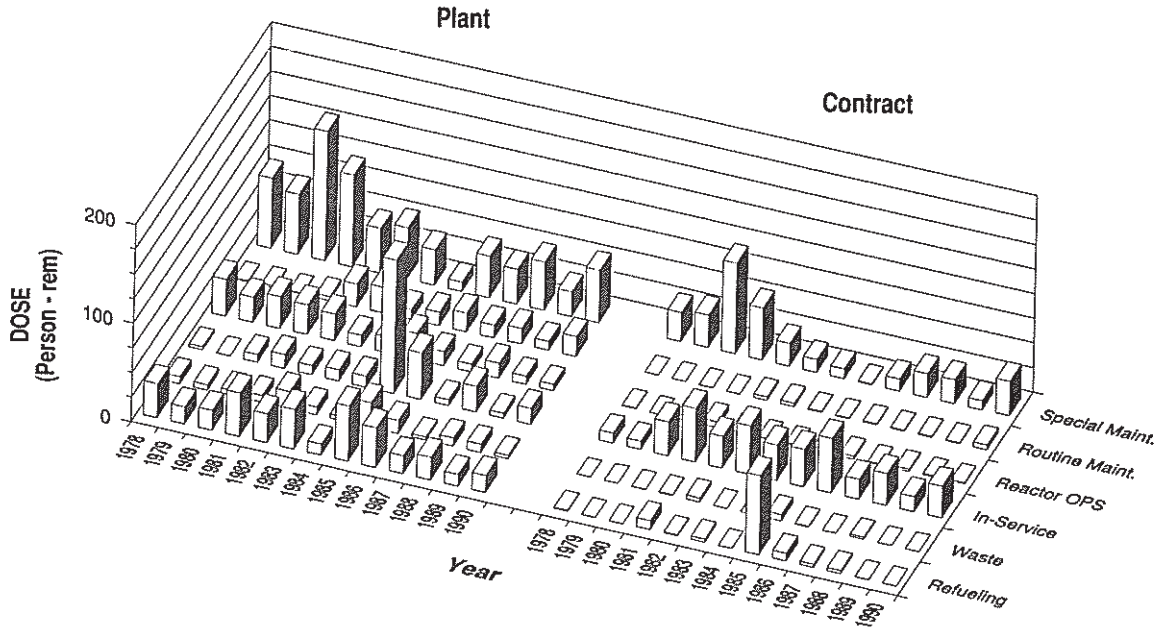
### PRAIRIE ISLAND 1, 2

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

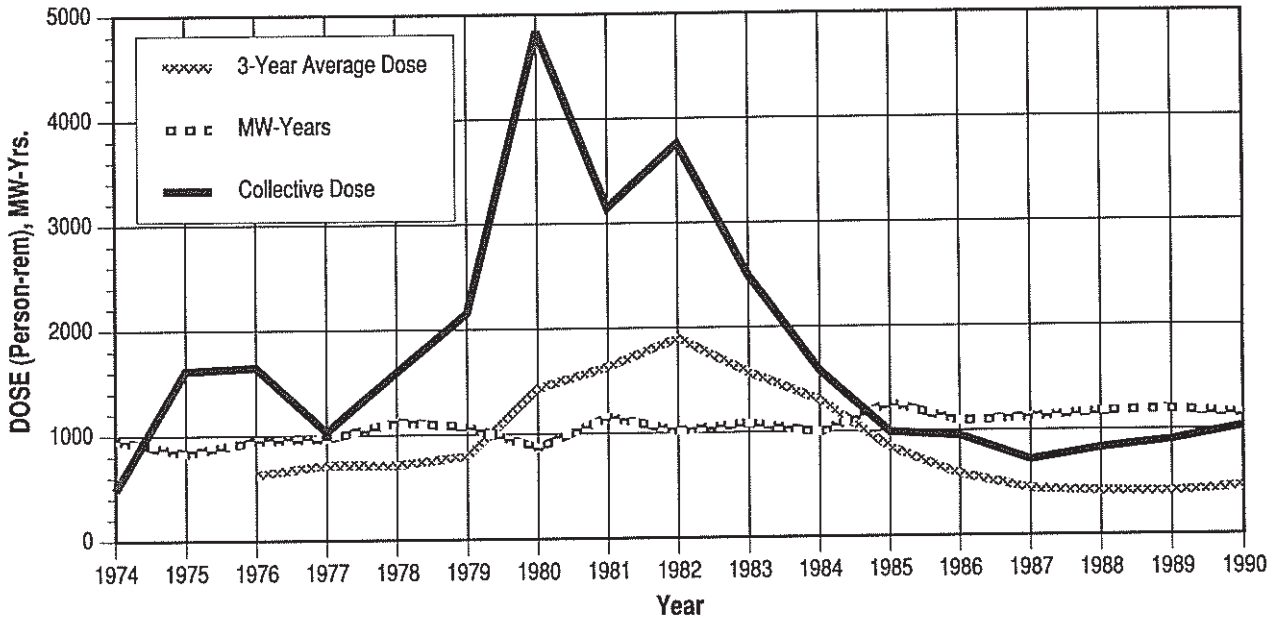


## APPENDIX E (continued)

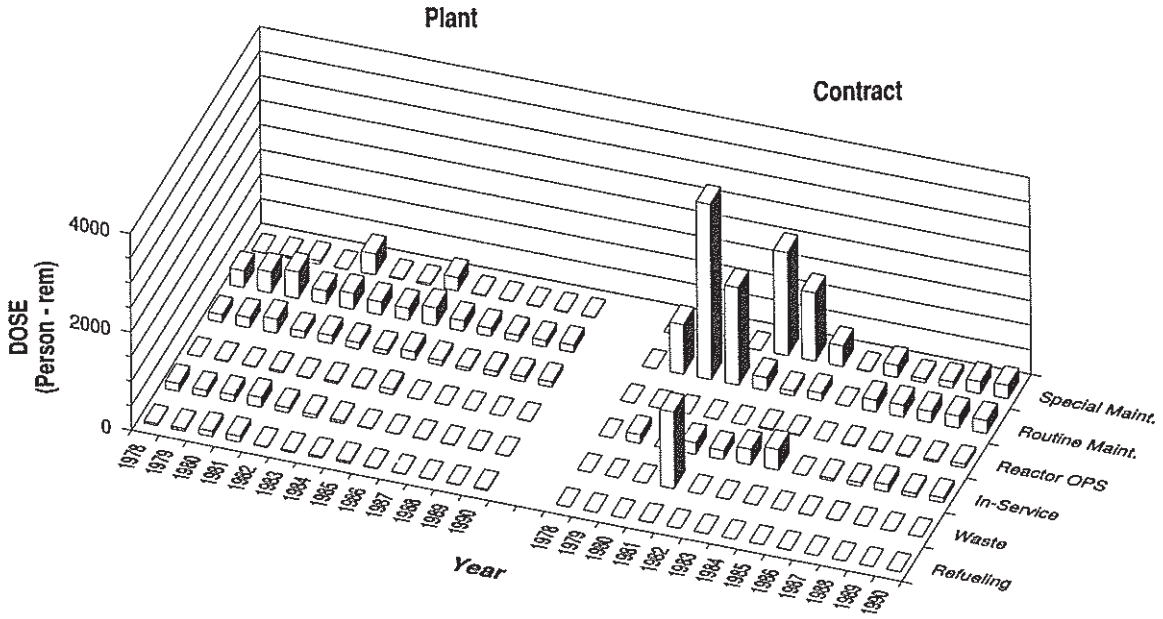
## QUAD CITIES 1, 2

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

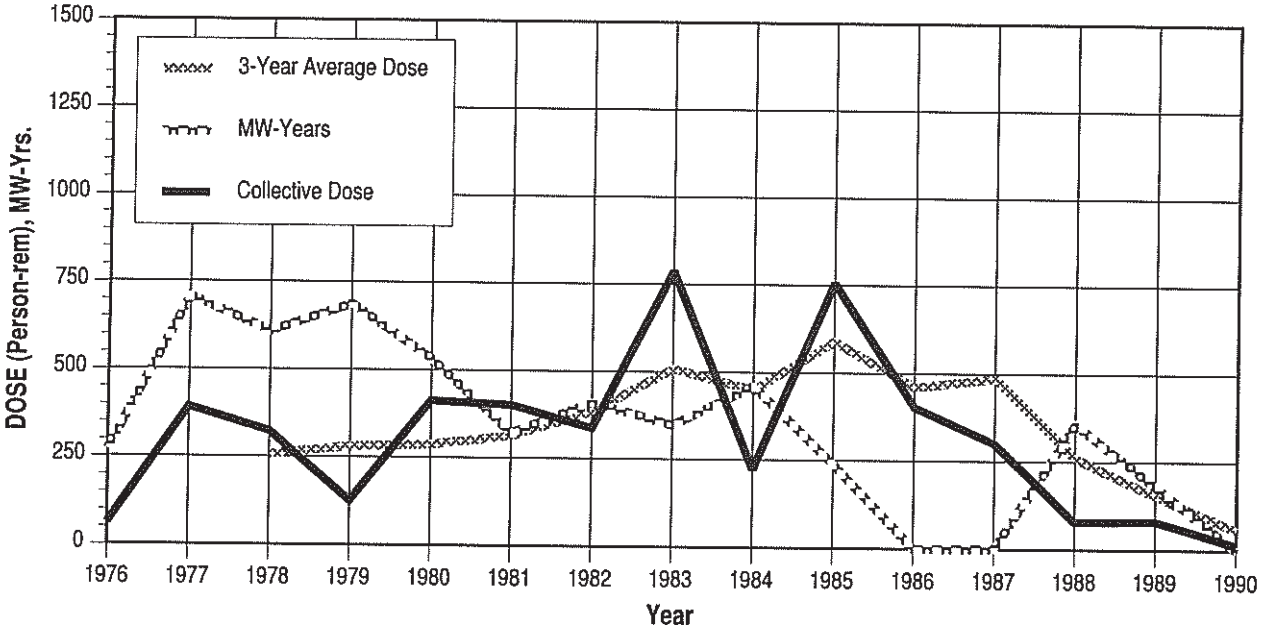


## APPENDIX E (continued)

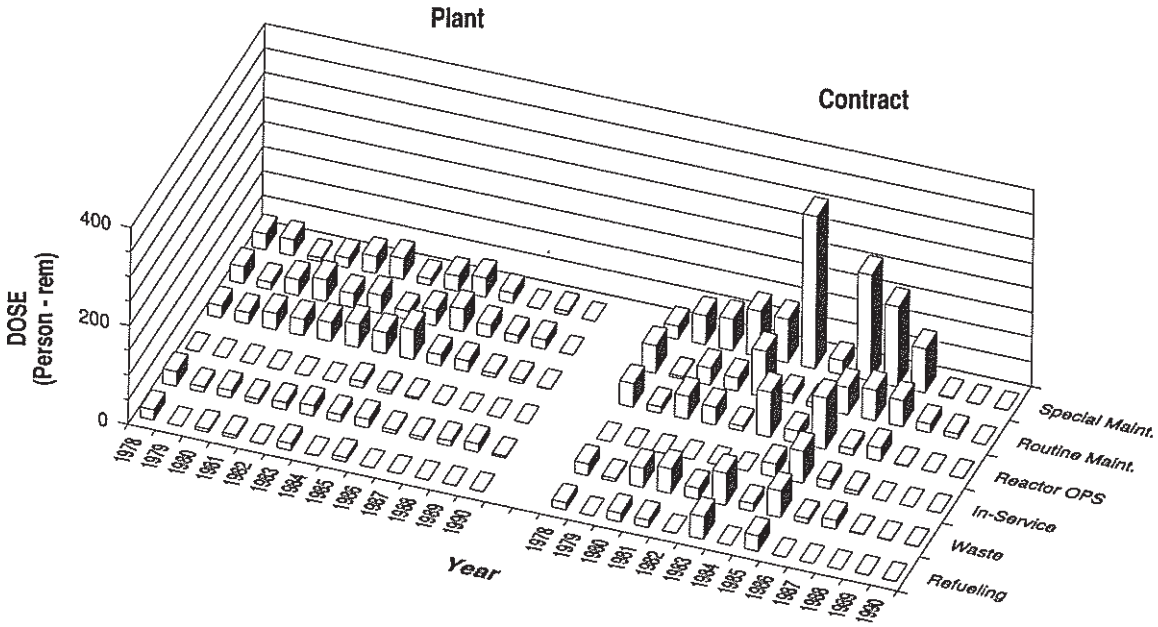
### RANCHO SECO

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

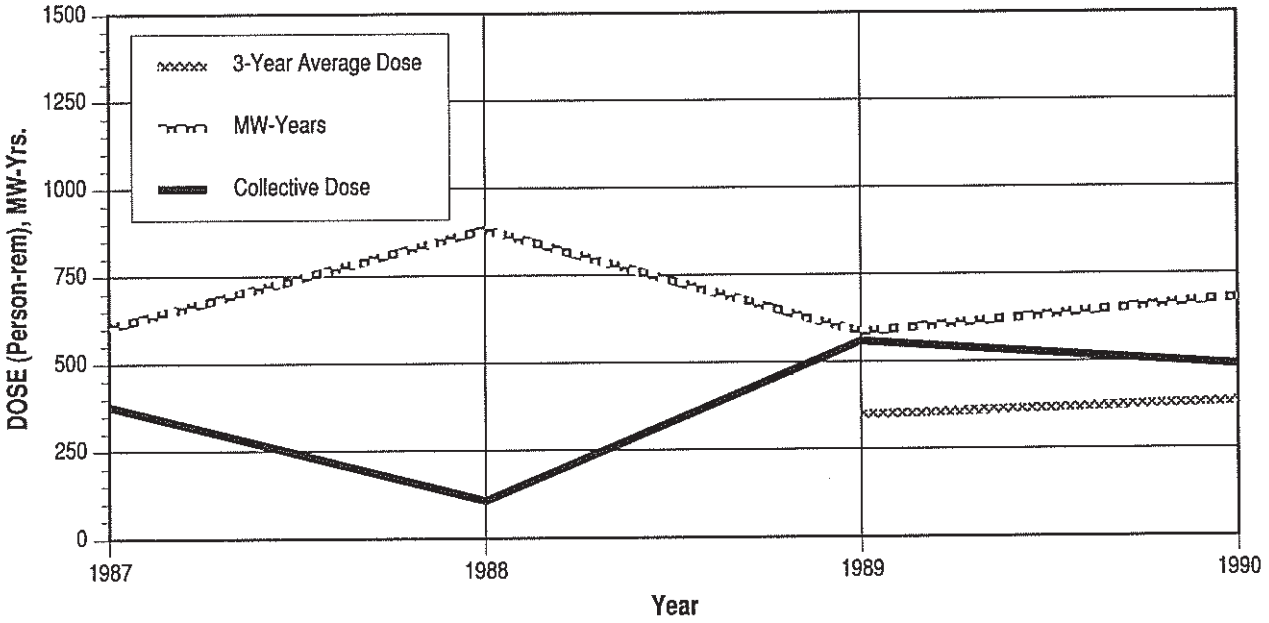


## APPENDIX E (continued)

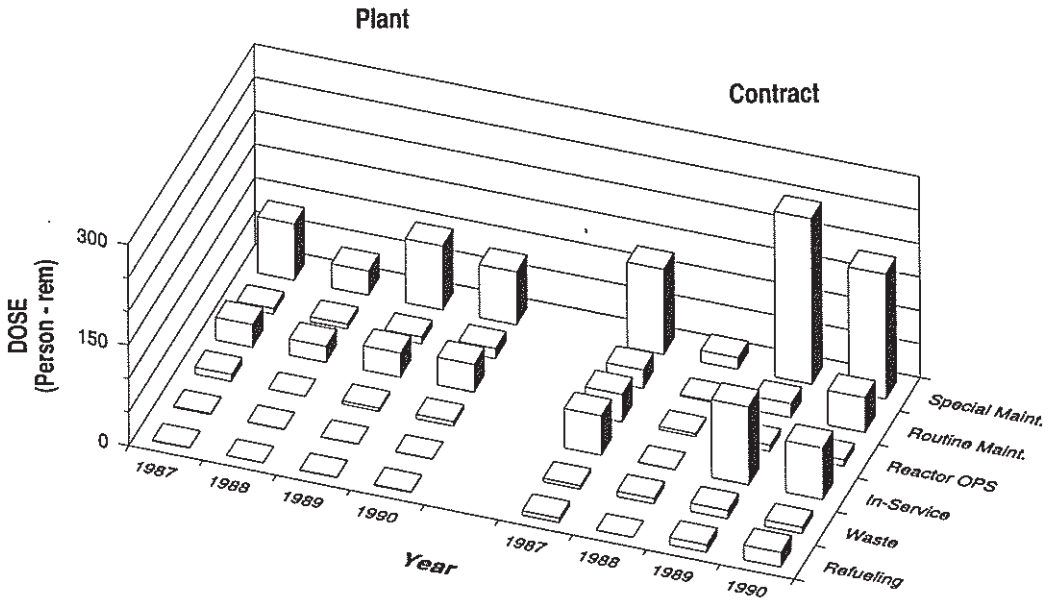
### RIVER BEND 1

Dose-Performance Indicators

**BWR**




Breakdown by Job Function

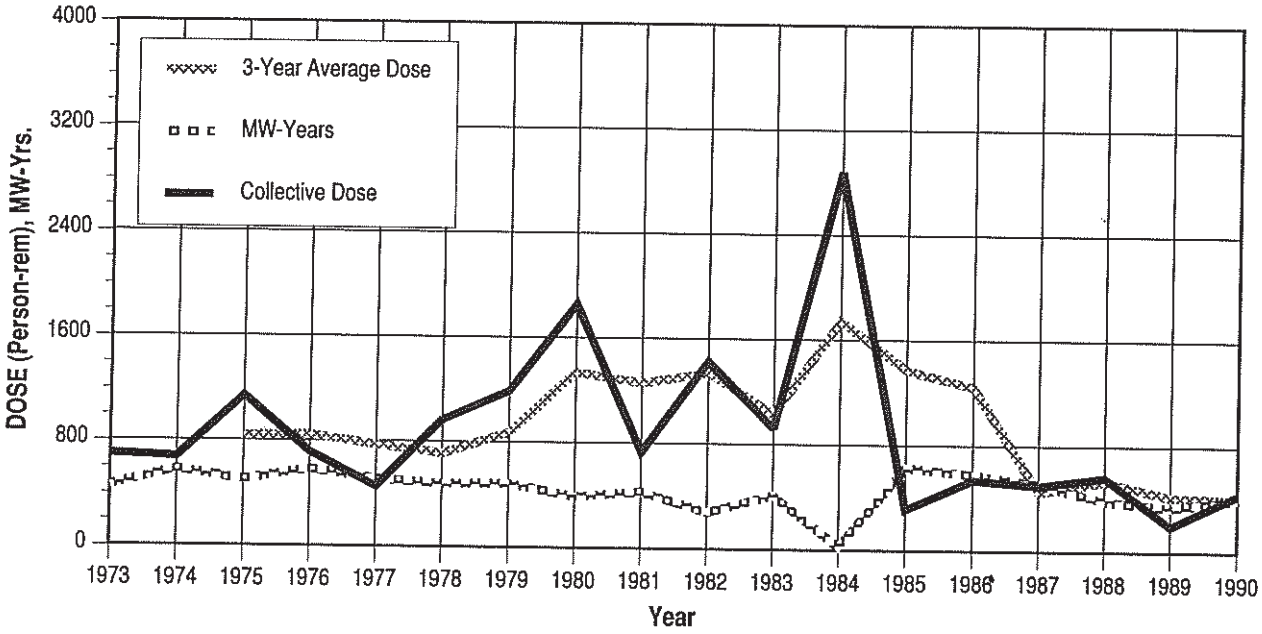


## APPENDIX E (continued)

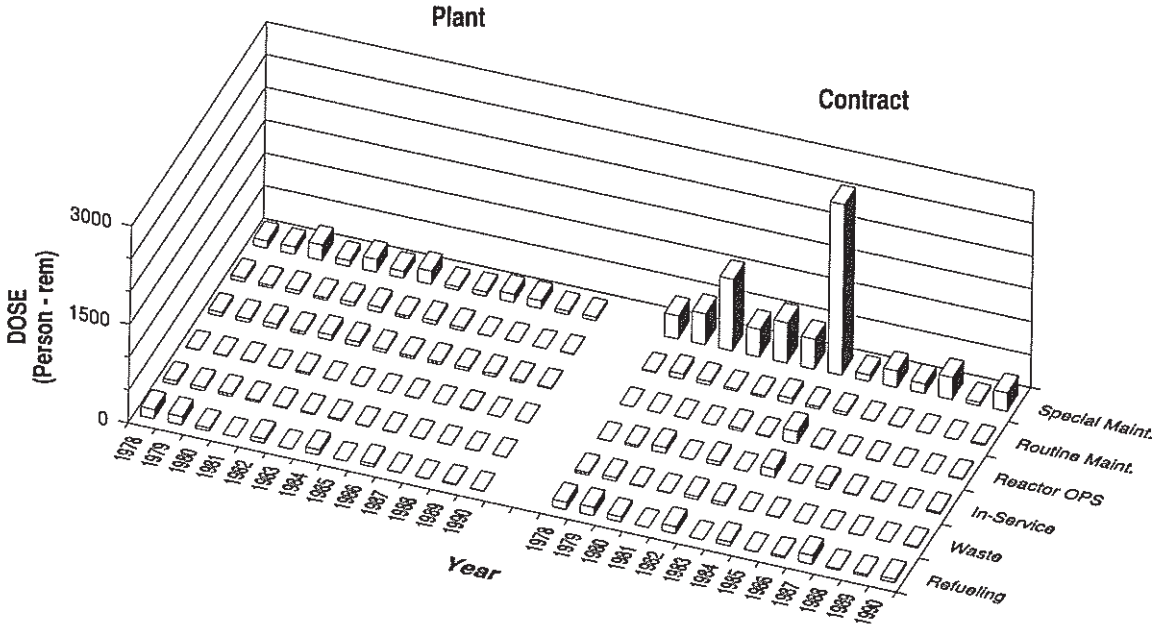
### ROBINSON 2

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

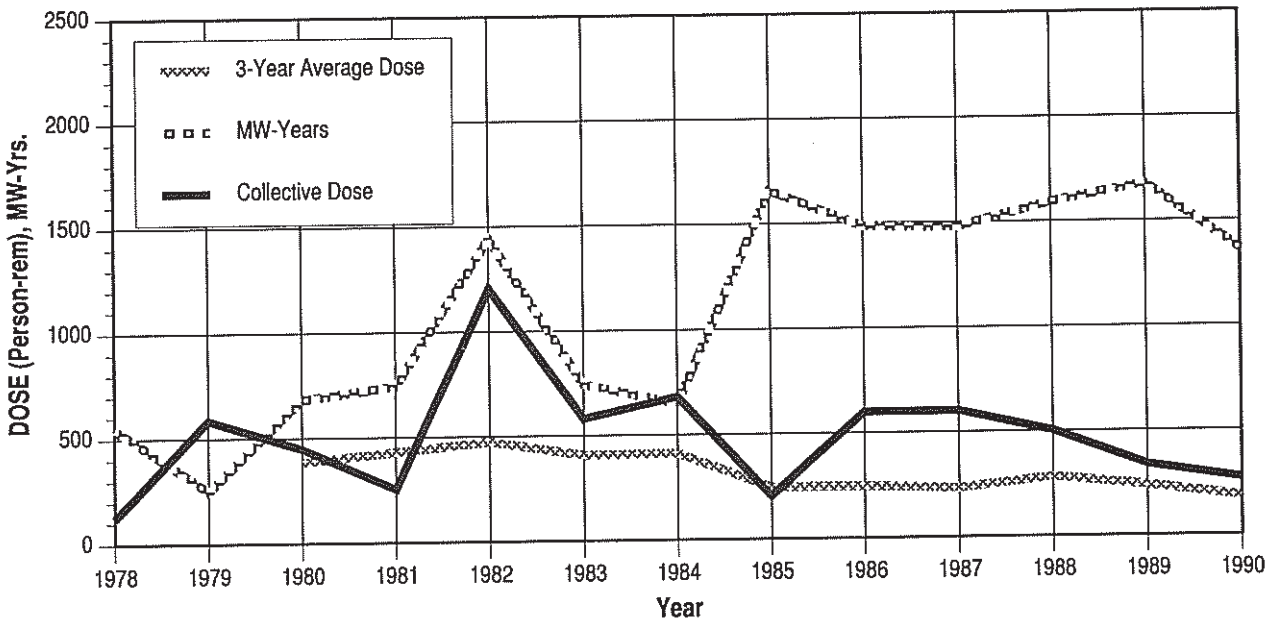


## APPENDIX E (continued)

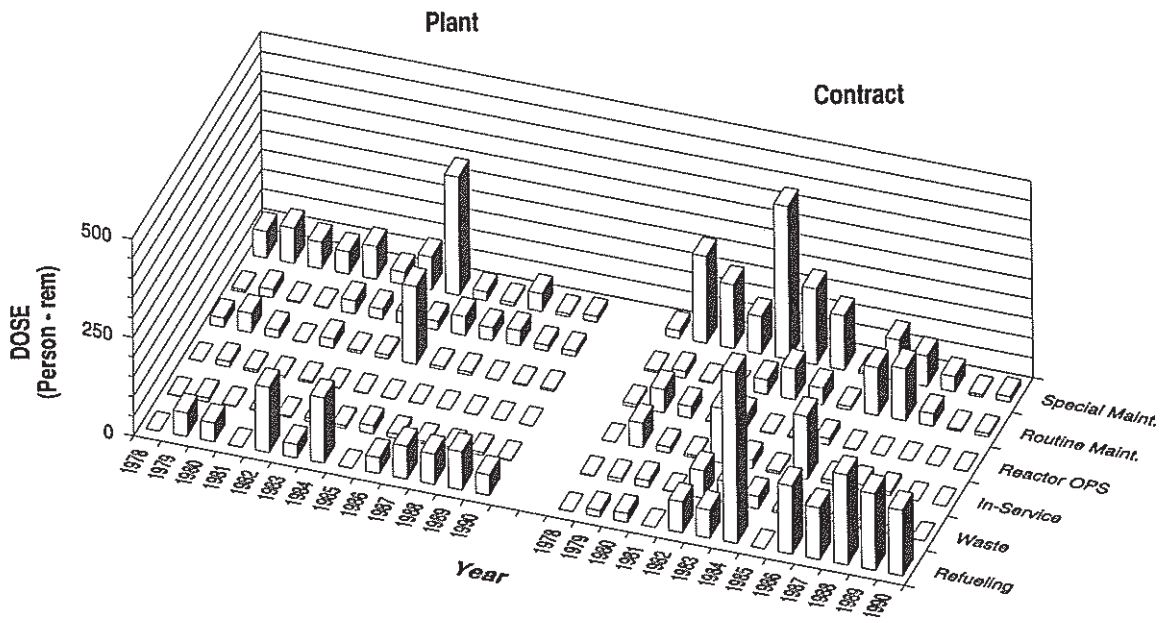
### SALEM 1, 2

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

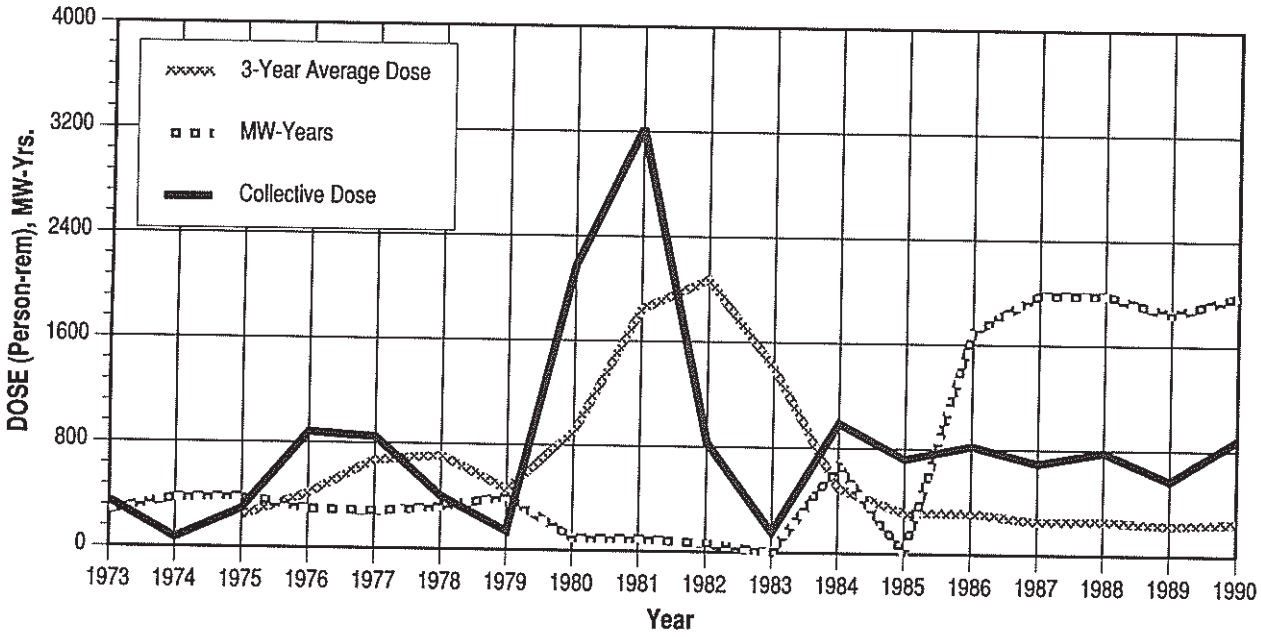


## APPENDIX E (continued)

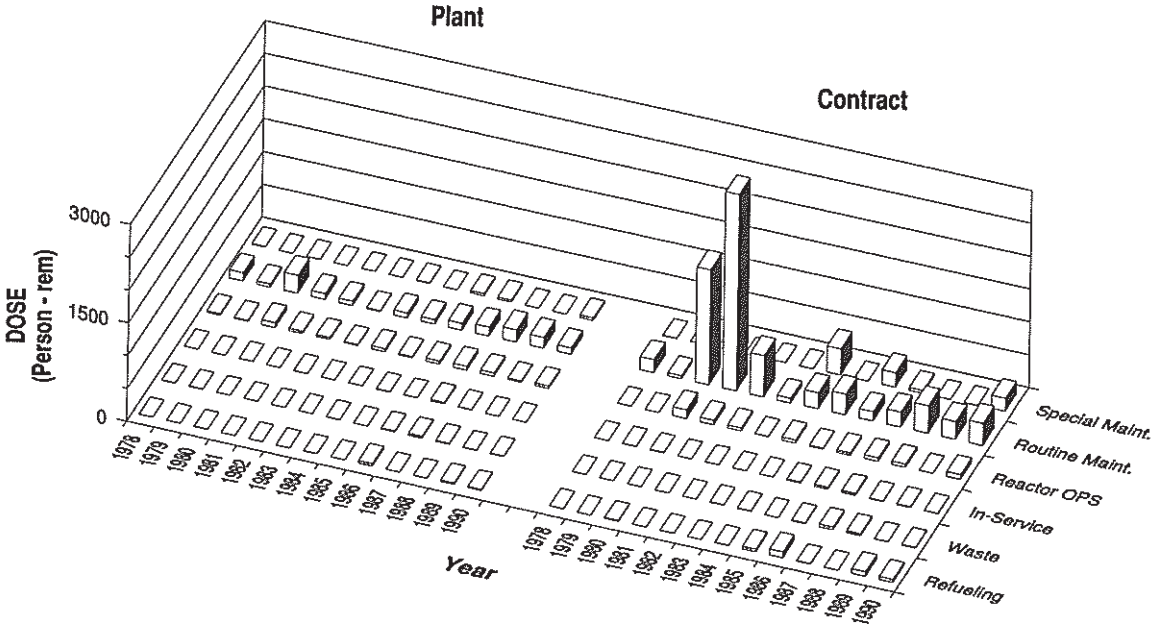
### SAN ONOFRE 1, 2, 3

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

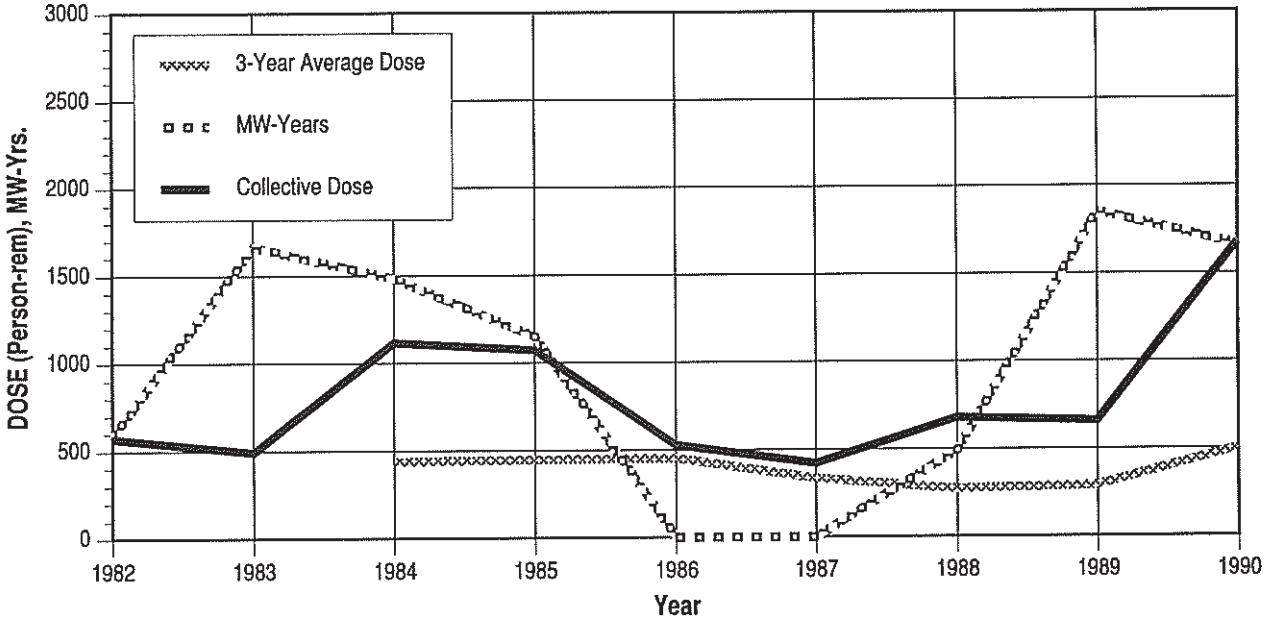


## APPENDIX E (continued)

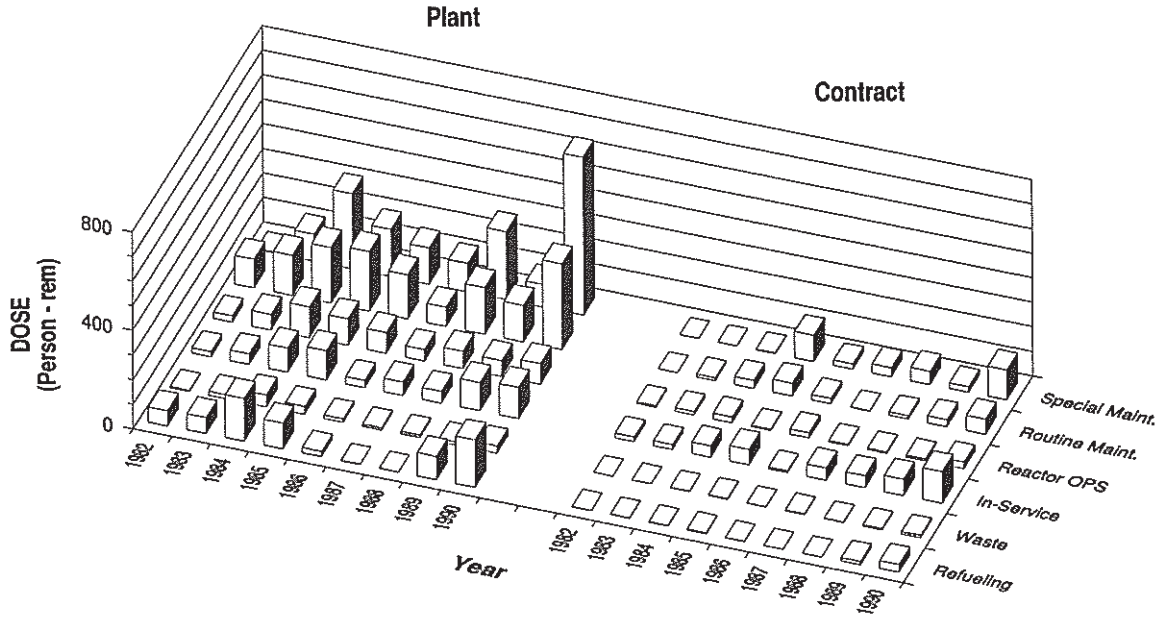
### SEQUOYAH 1, 2

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

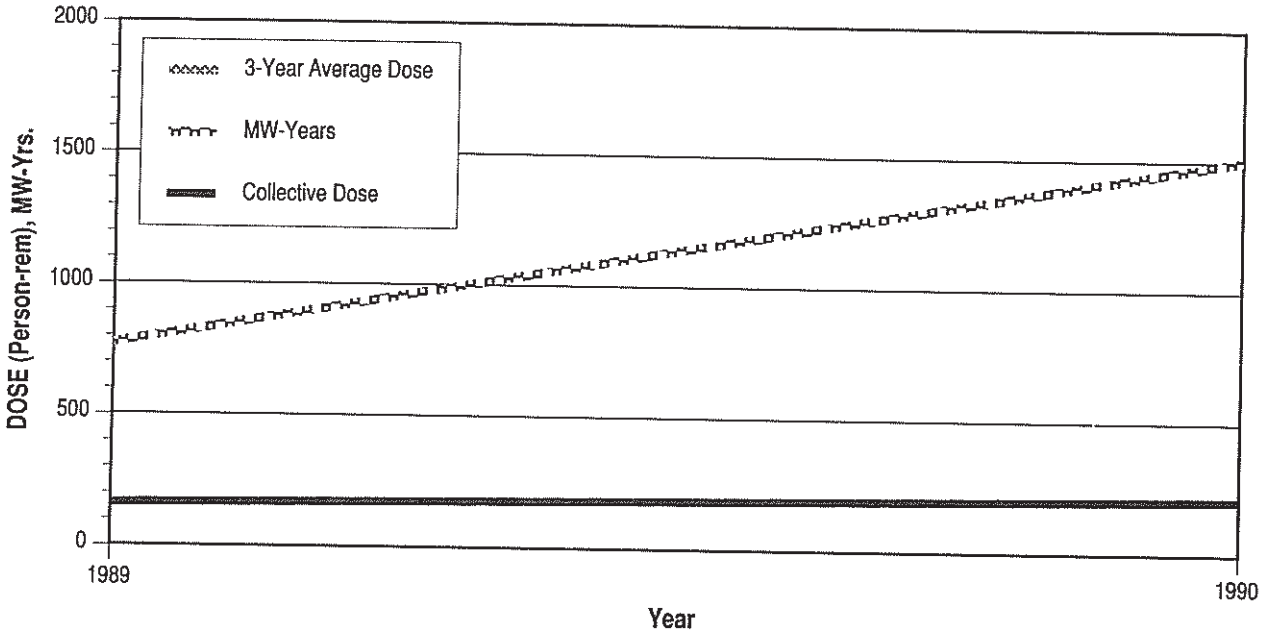


## APPENDIX E (continued)

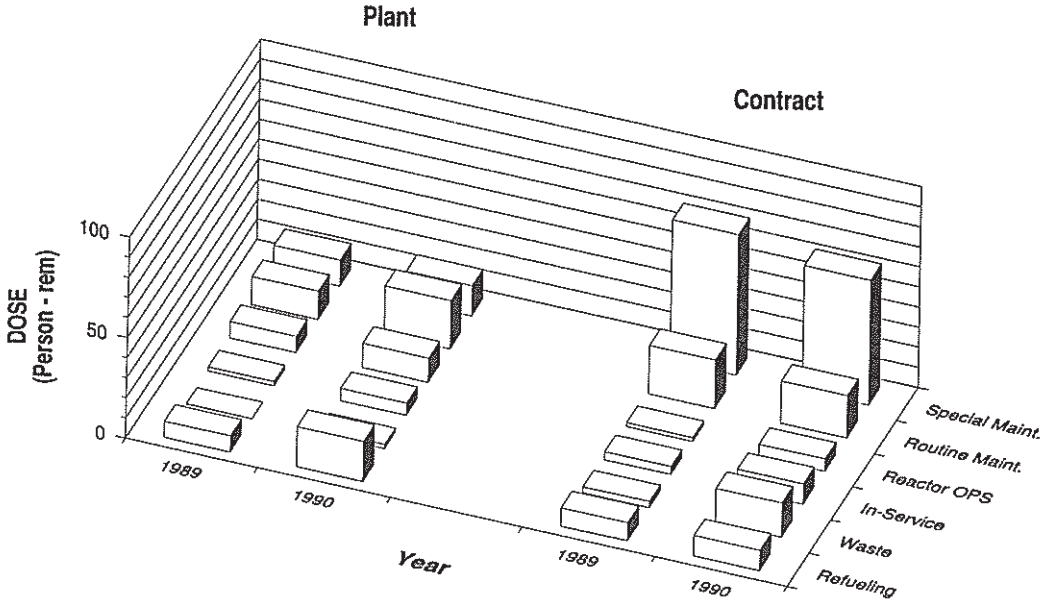
### SOUTH TEXAS 1, 2

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

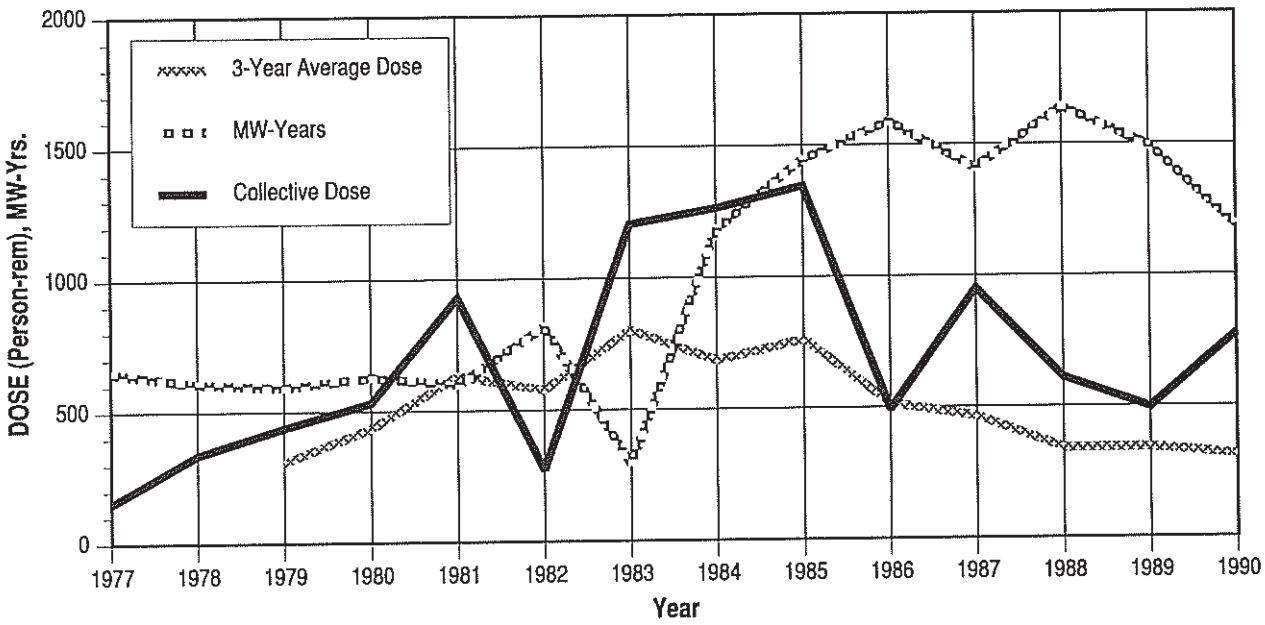


## APPENDIX E (continued)

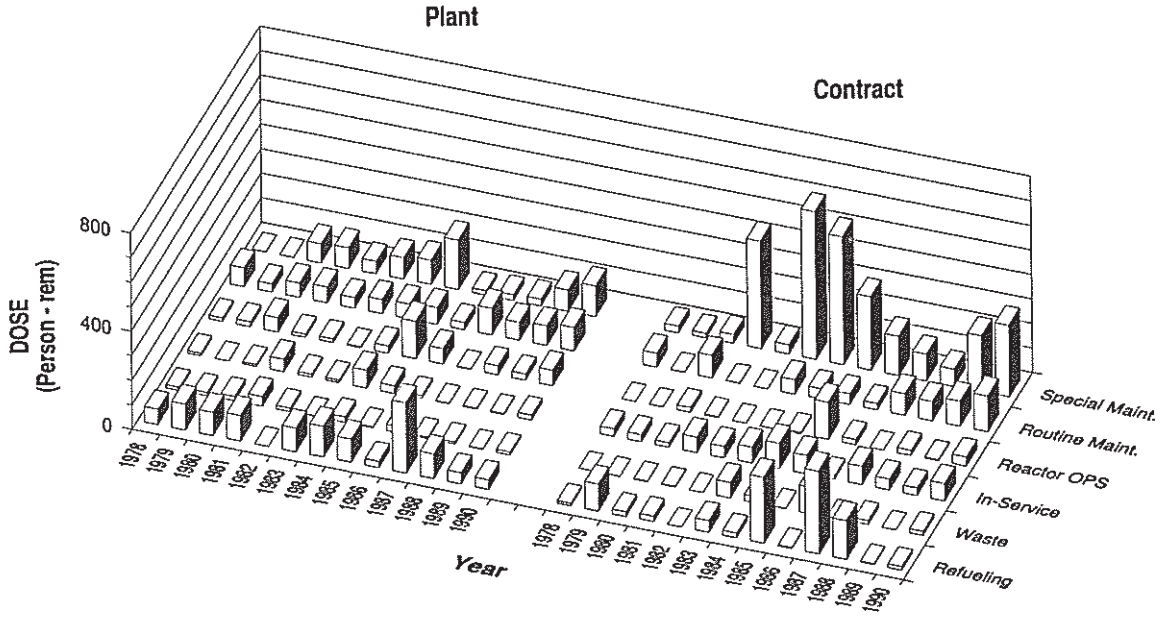
### ST. LUCIE 1, 2

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

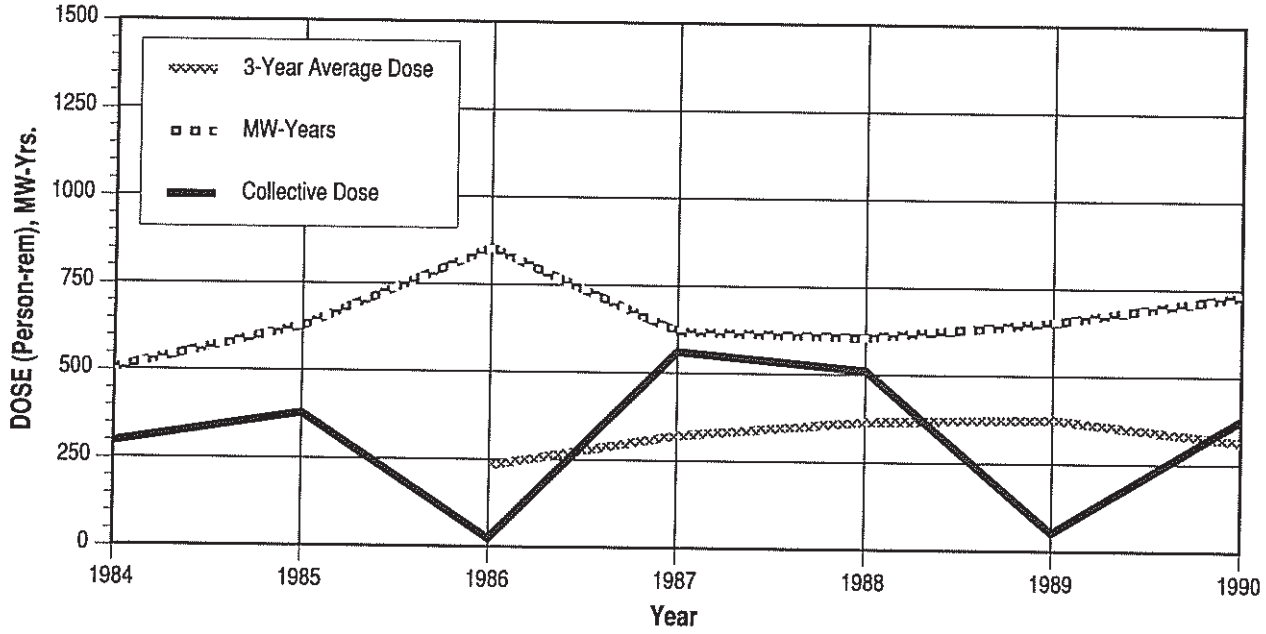


## APPENDIX E (continued)

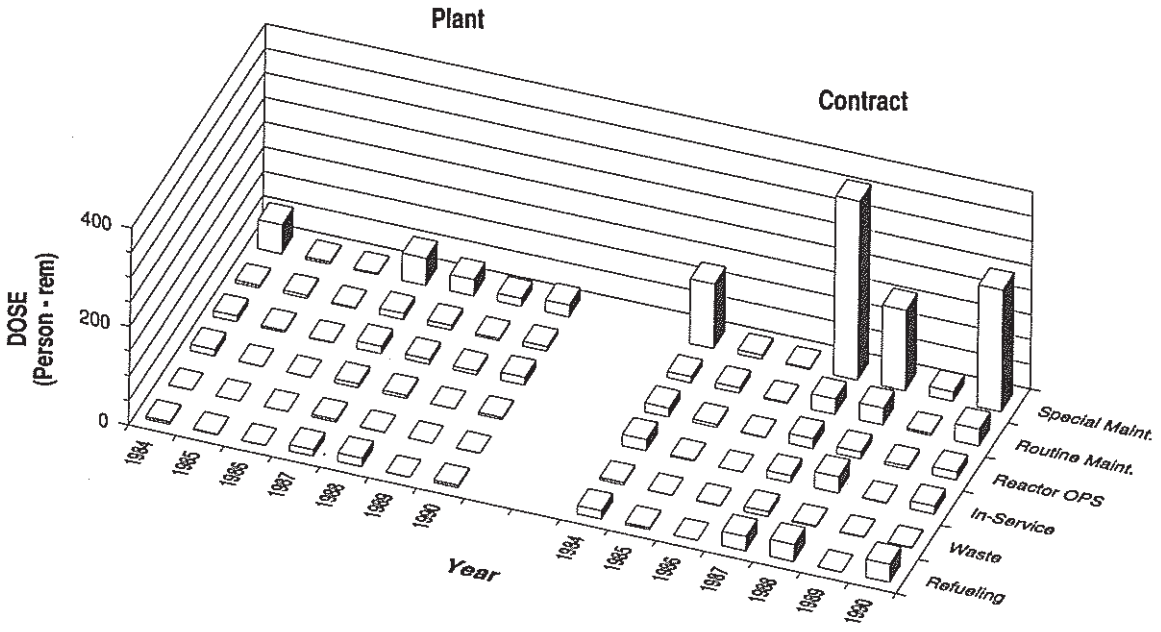
### SUMMER 1

Dose-Performance Indicators

**PWR**




Breakdown by Job Function

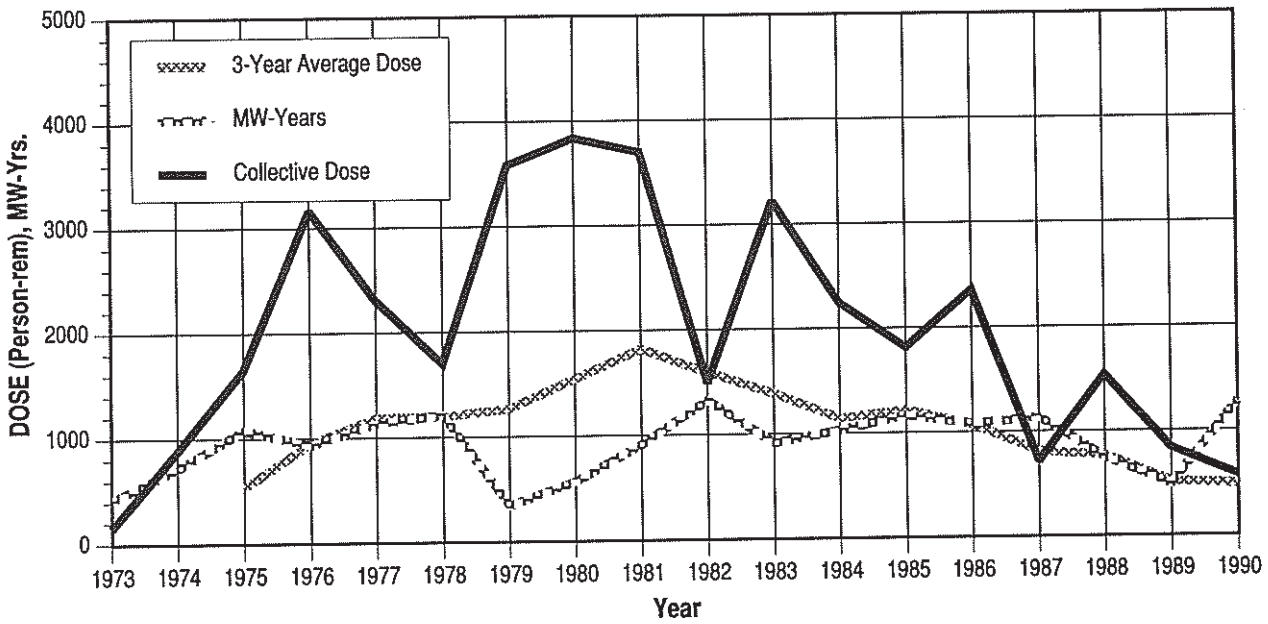


## APPENDIX E (continued)

### SURRY 1, 2

Dose-Performance Indicators

**PWR**

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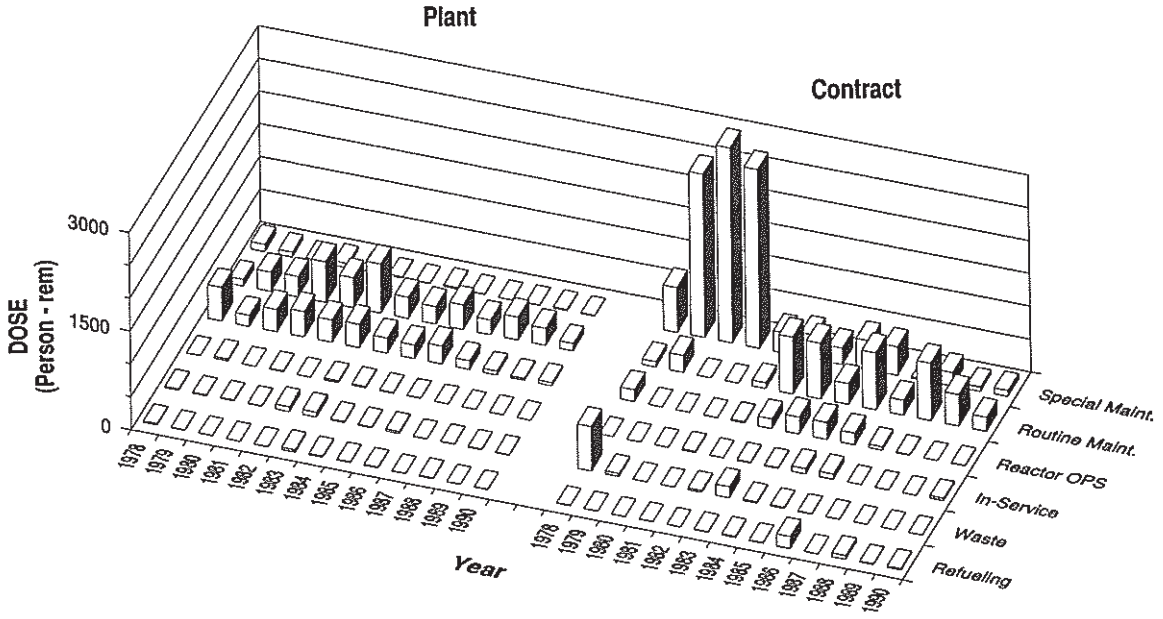
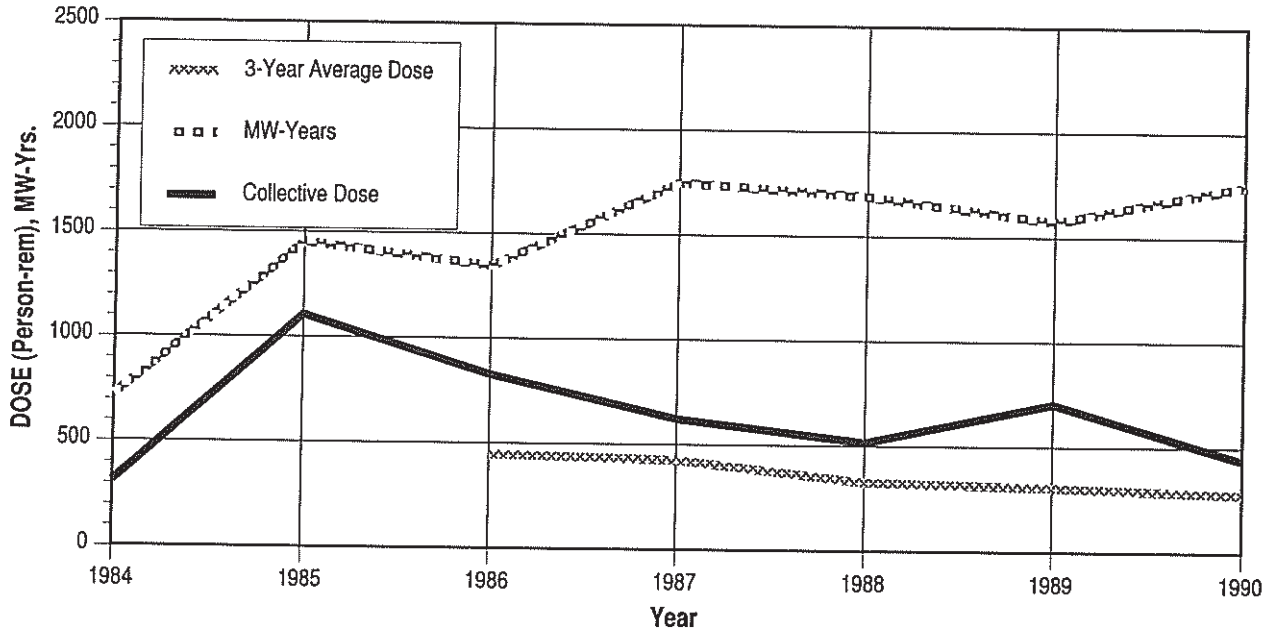


## APPENDIX E (continued)

### SUSQUEHANNA 1, 2

Dose-Performance Indicators

**BWR**

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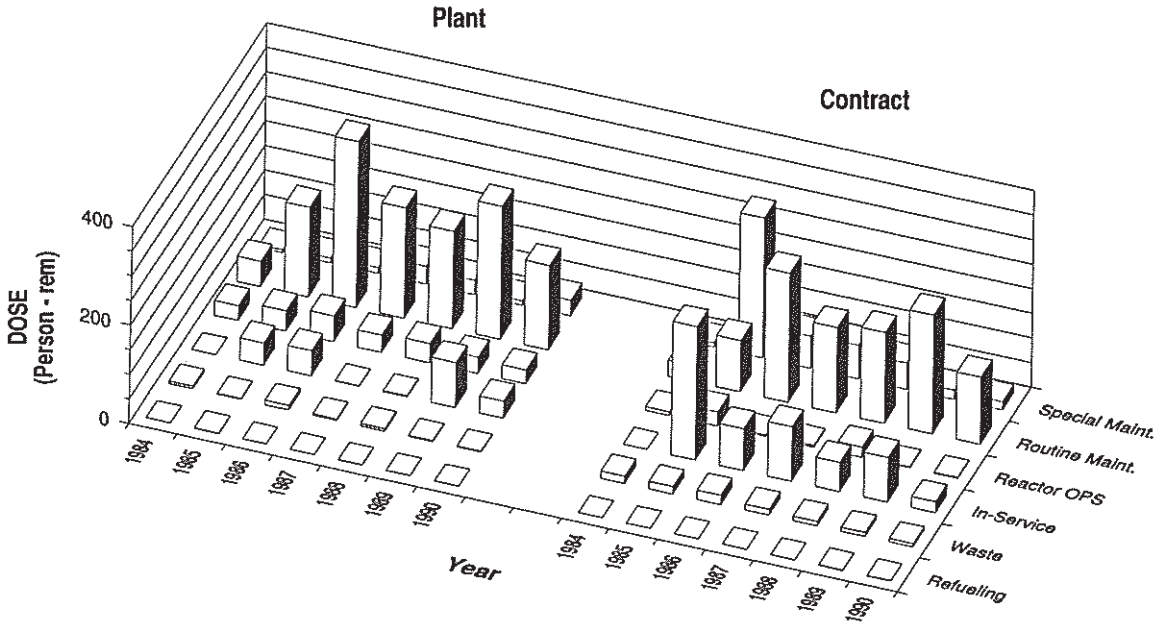
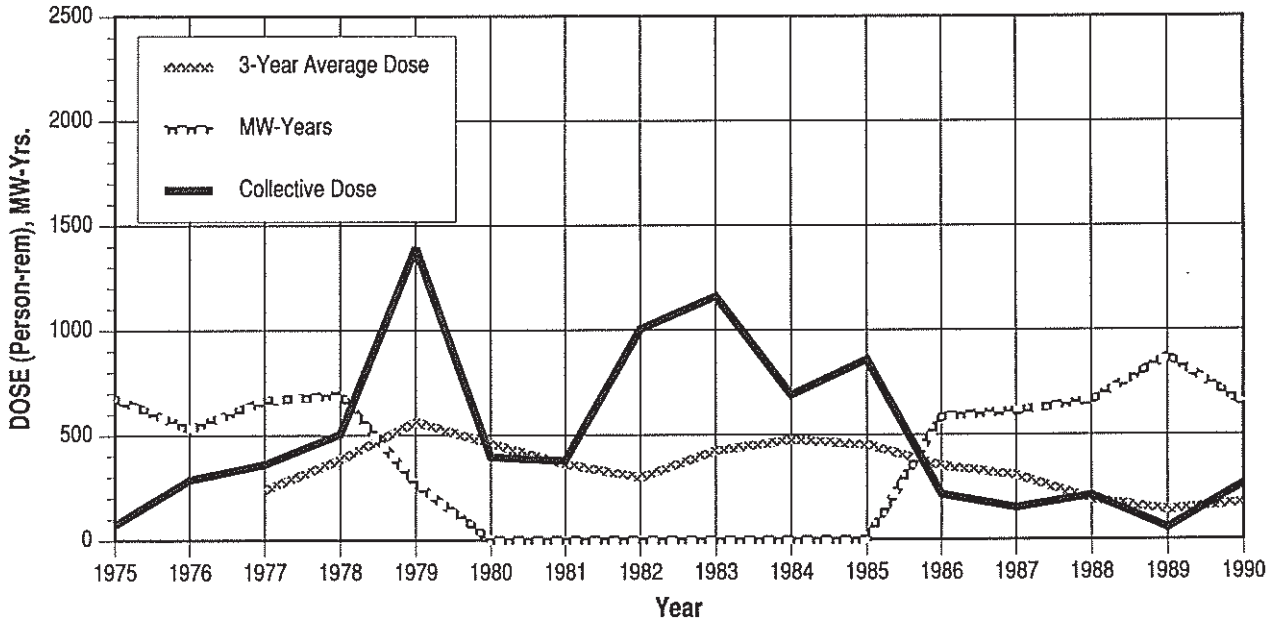


## APPENDIX E (continued)

### THREE MILE ISLAND 1

Dose-Performance Indicators

**PWR**

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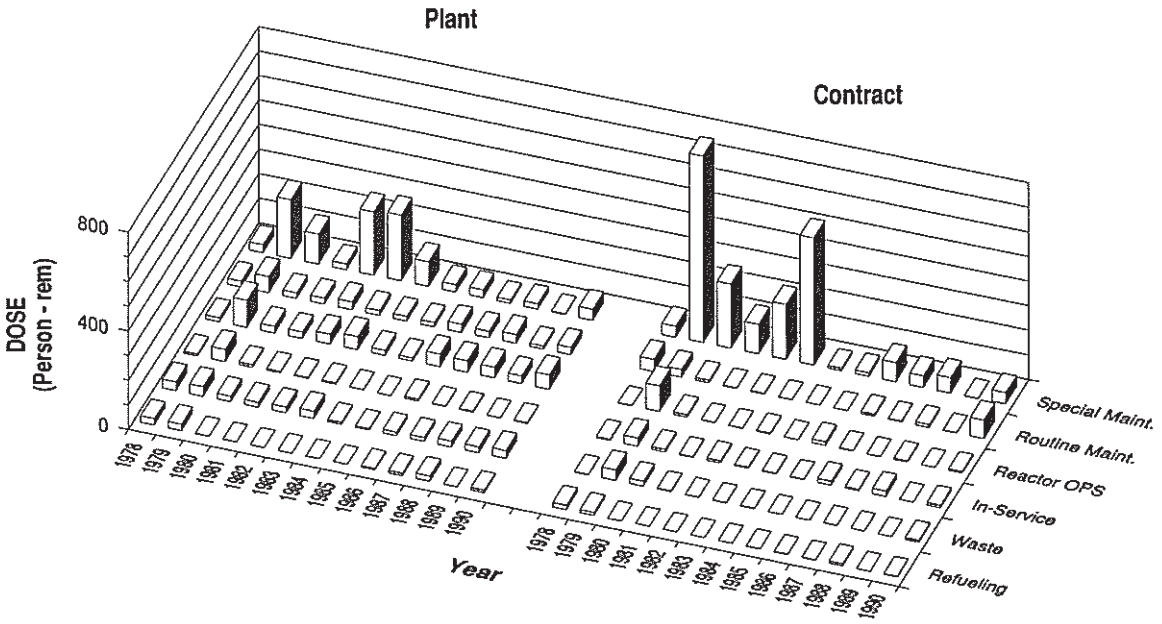
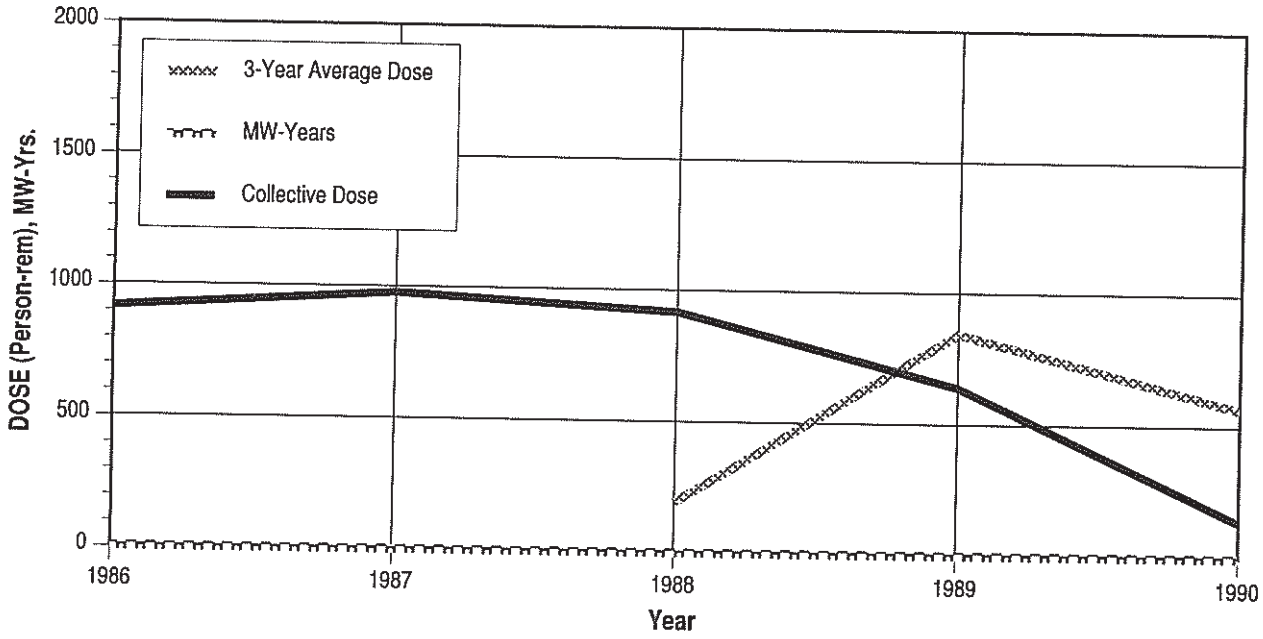


## APPENDIX E (continued)

### THREE MILE ISLAND 2

Dose-Performance Indicators

**PWR**

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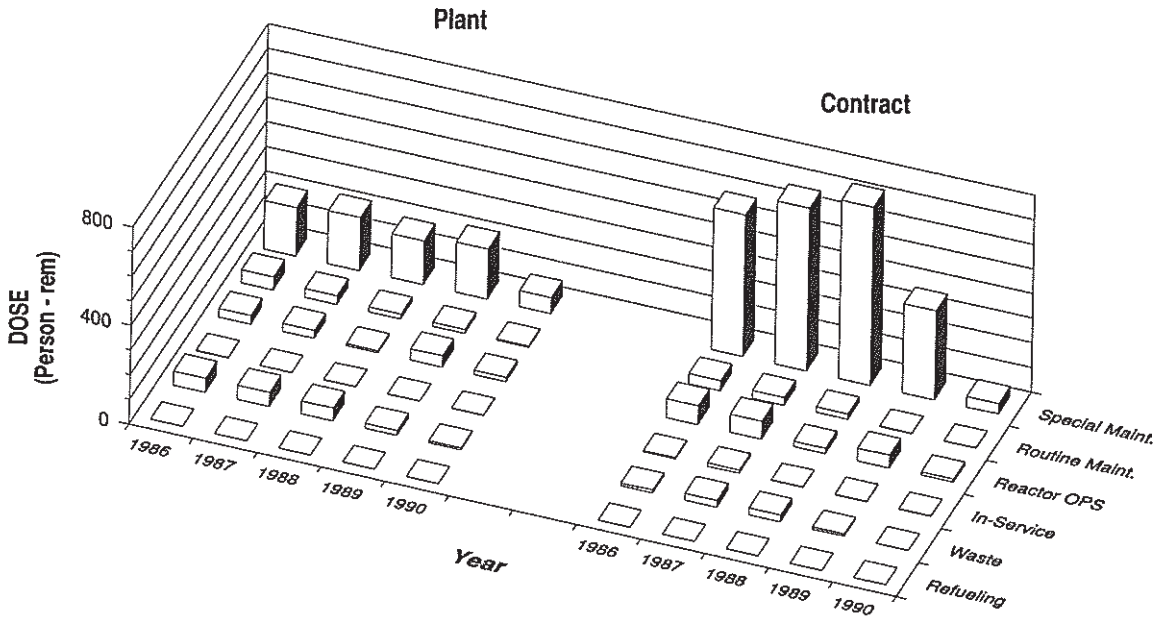
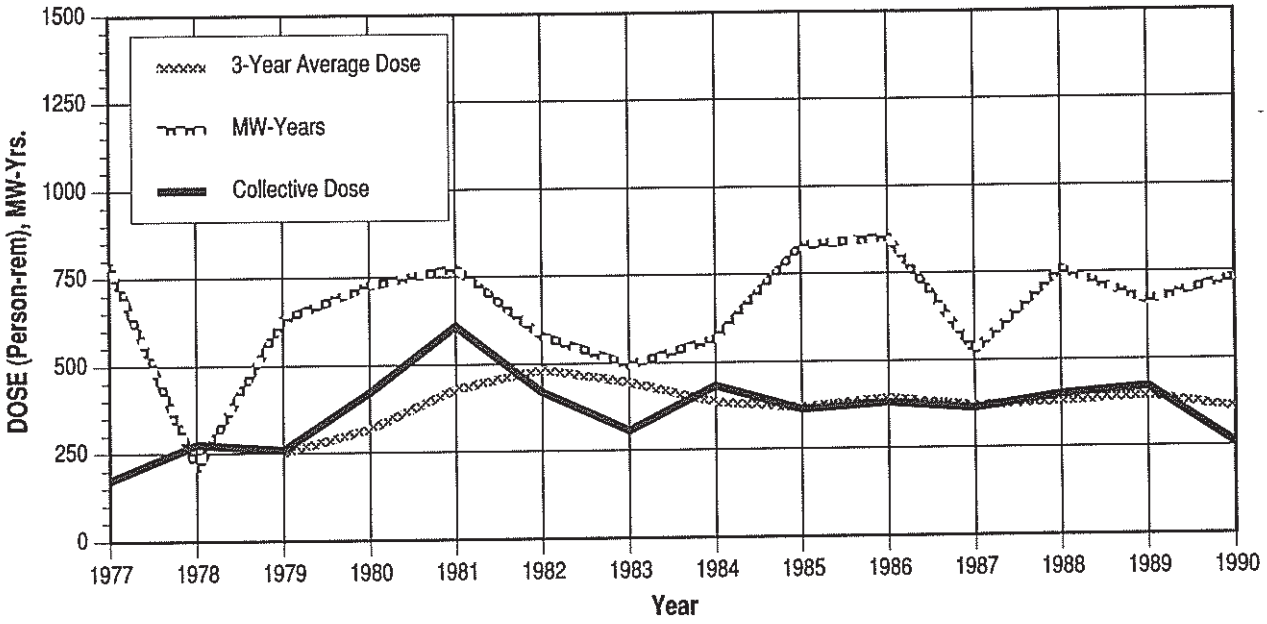


## APPENDIX E (continued)

### TROJAN

Dose-Performance Indicators

**PWR**

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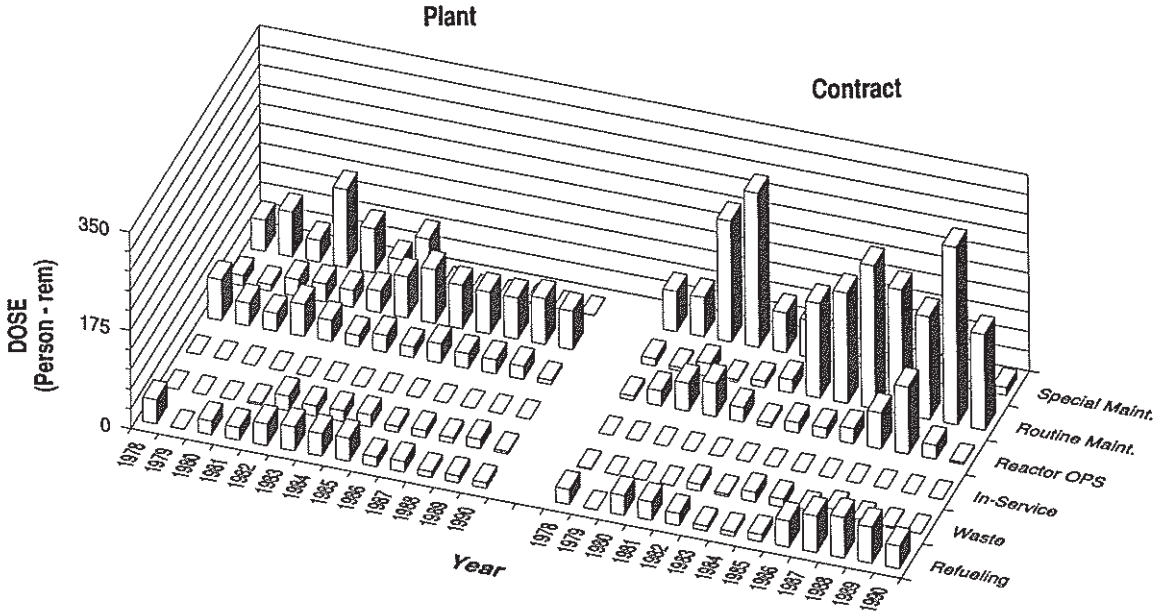
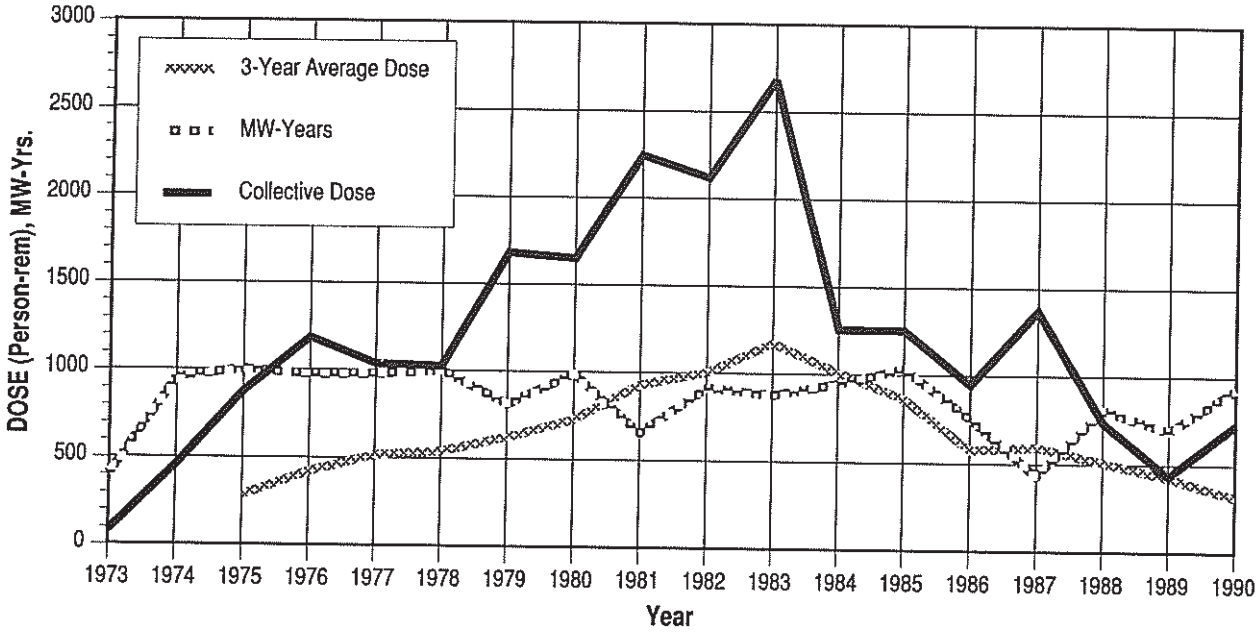


## APPENDIX E (continued)

### TURKEY POINT 3, 4

Dose-Performance Indicators

**PWR**

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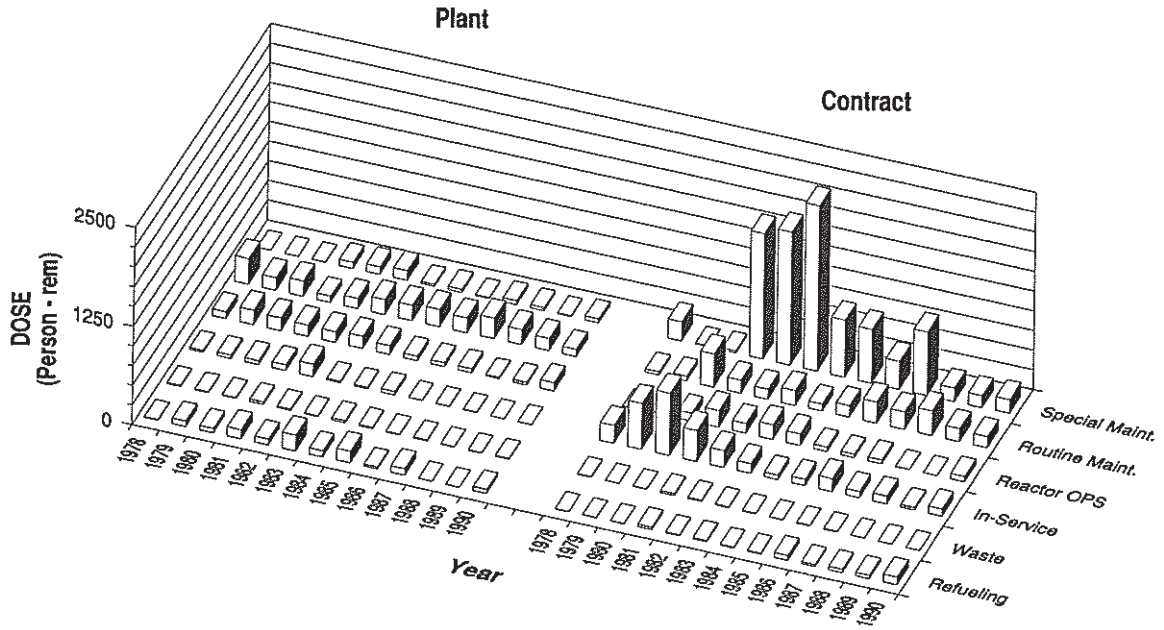
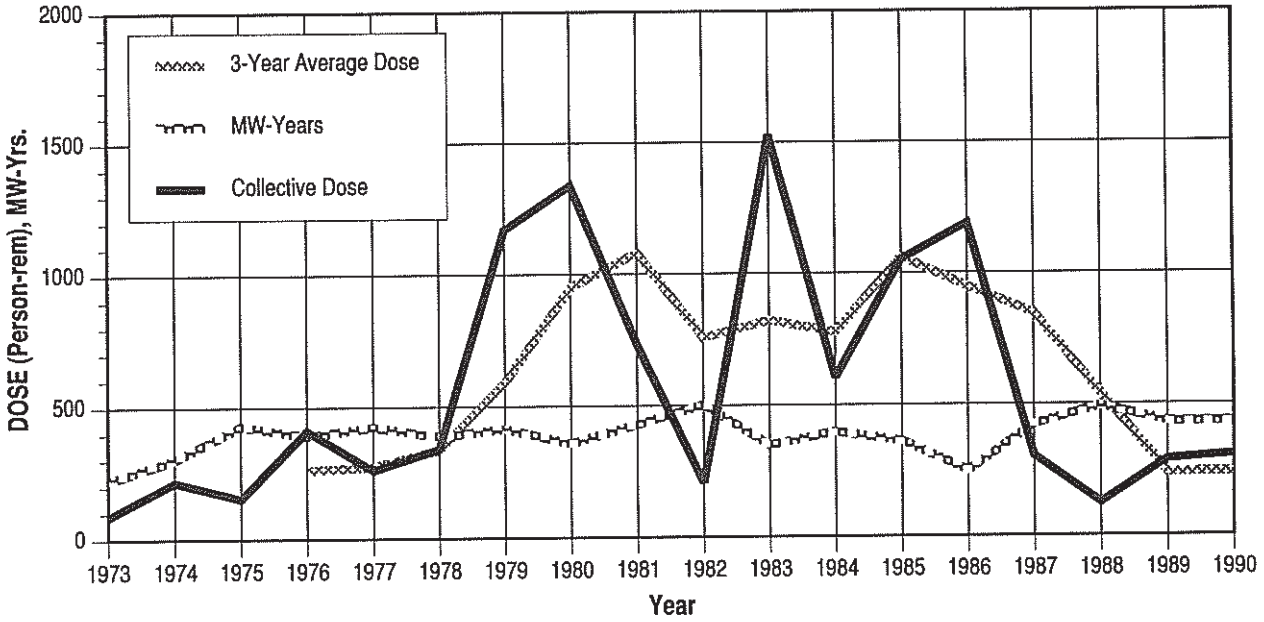


## APPENDIX E (continued)

### VERMONT YANKEE

Dose-Performance Indicators

**BWR**

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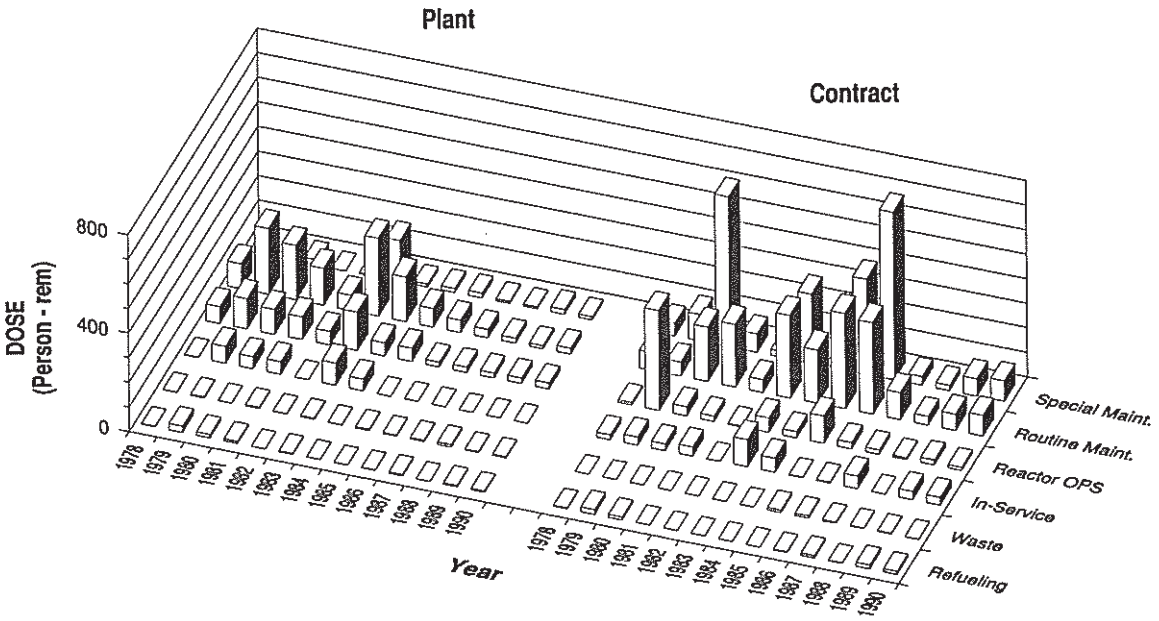
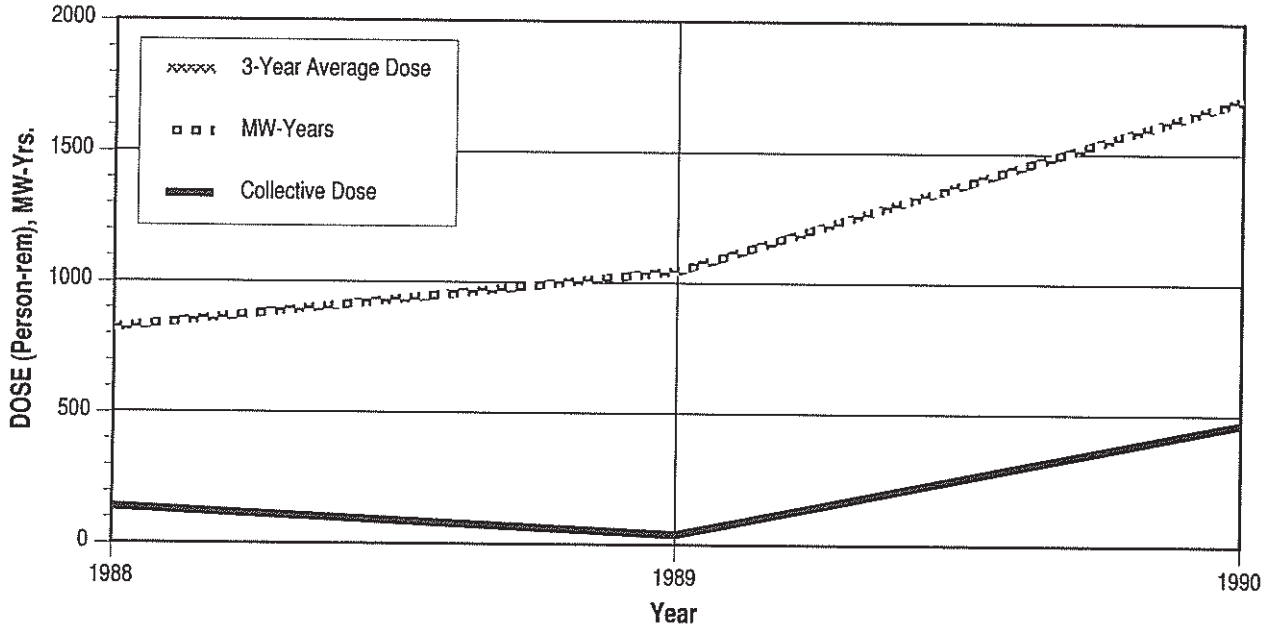


## APPENDIX E (continued)

### VOGTLE 1, 2

Dose-Performance Indicators

**PWR**

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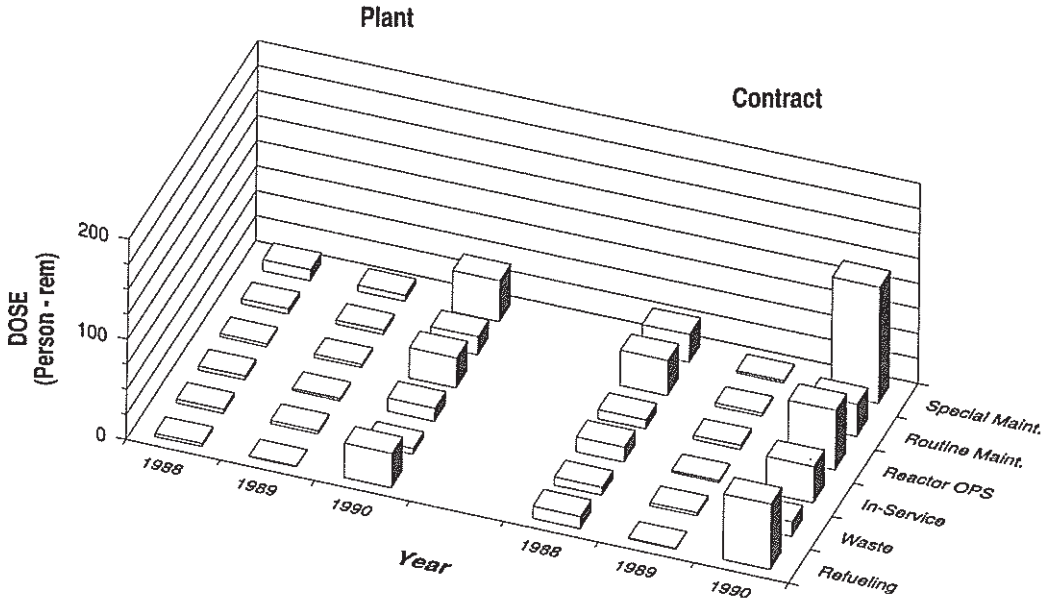
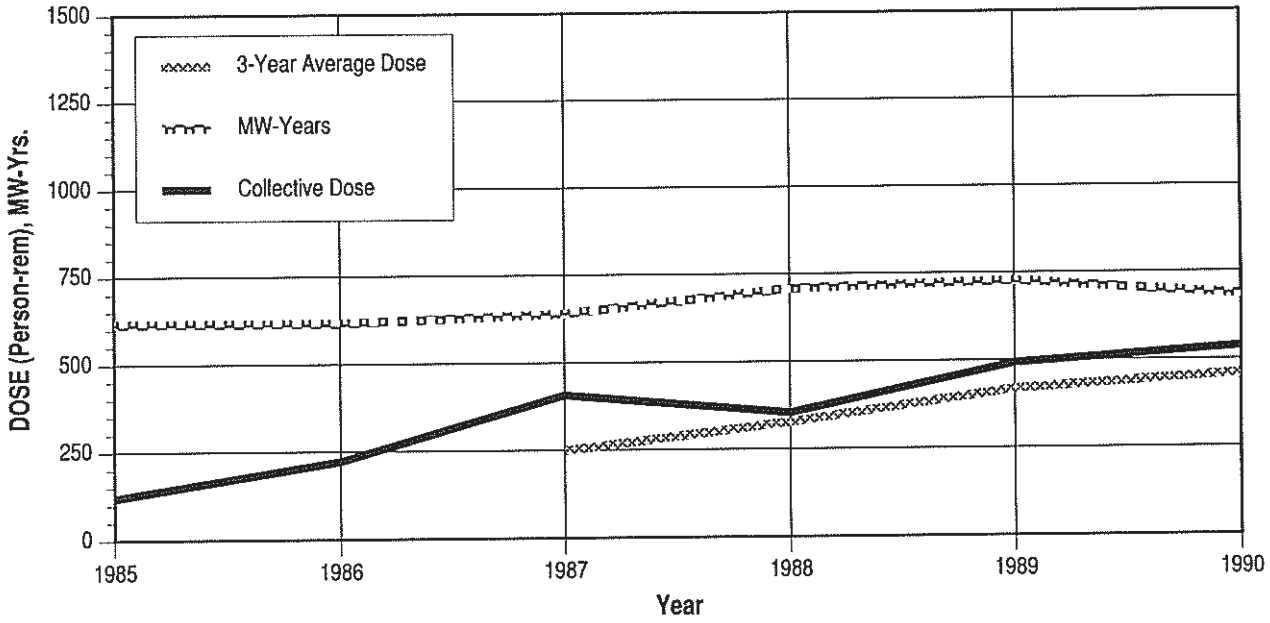


## APPENDIX E (continued)

### WASHINGTON NUCLEAR 2

Dose-Performance Indicators

**BWR**

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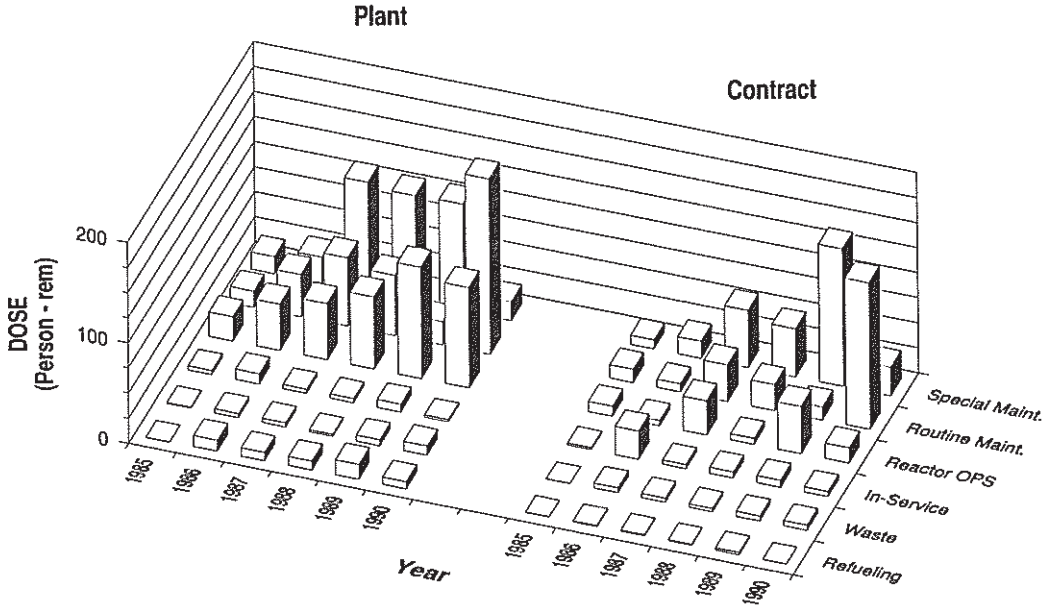
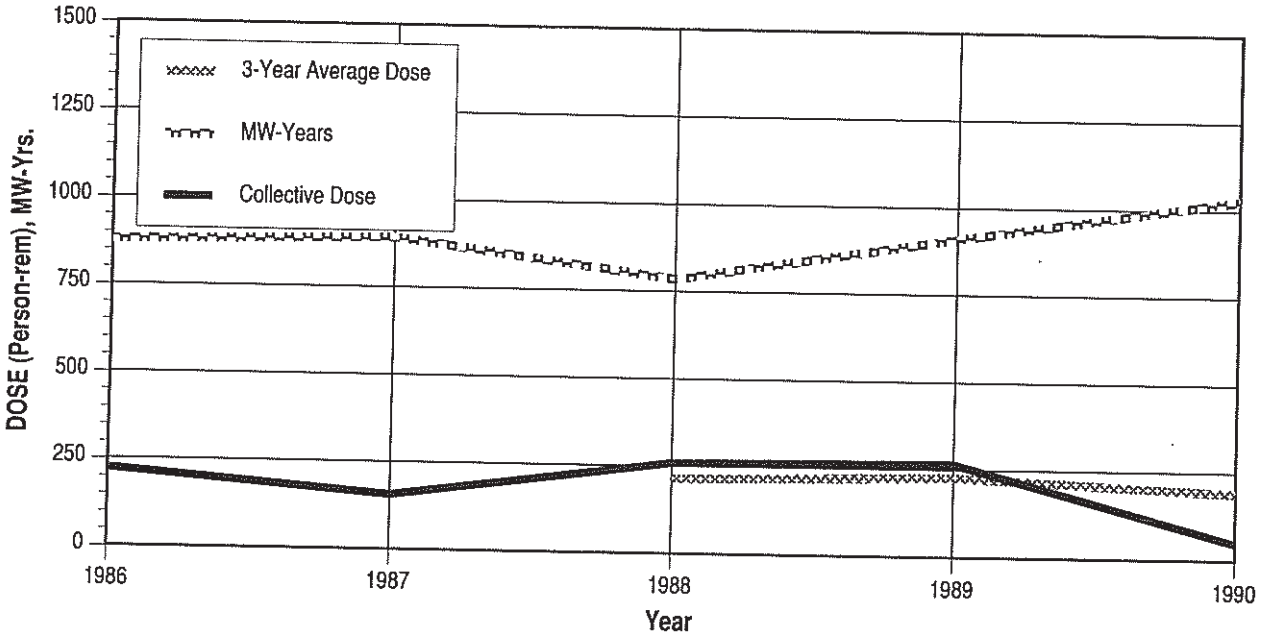


## APPENDIX E (continued)

### WATERFORD 3

Dose-Performance Indicators

**PWR**

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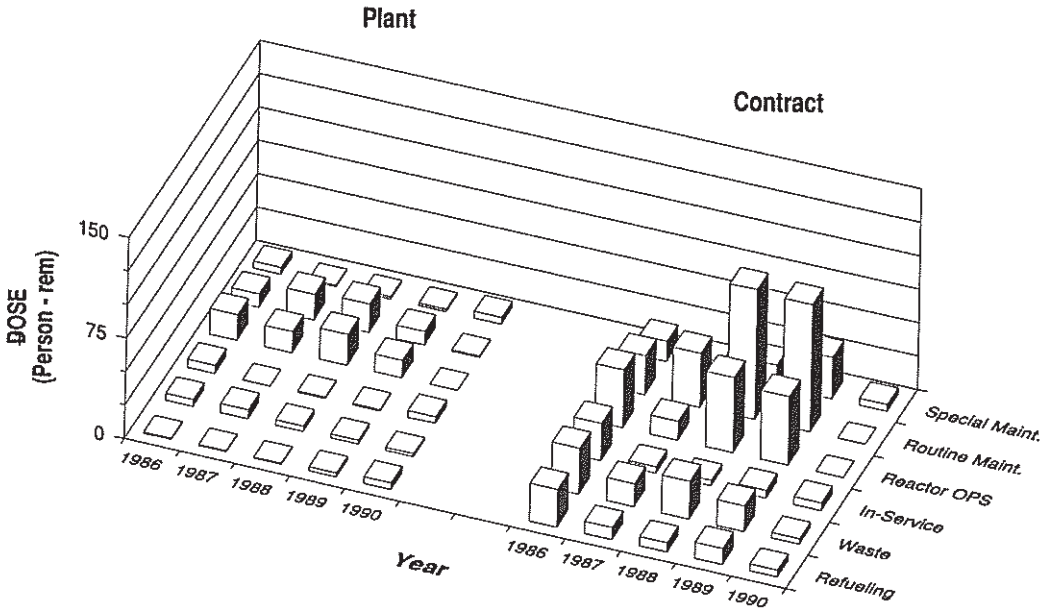
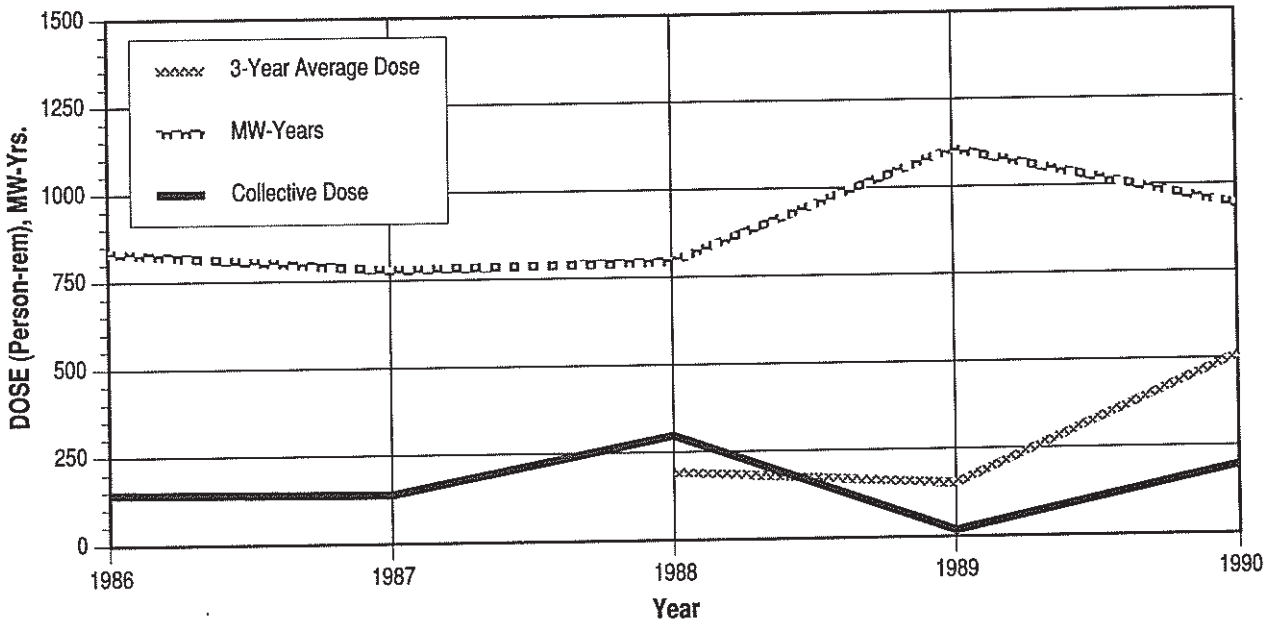


## APPENDIX E (continued)

### WOLF CREEK 1

Dose-Performance Indicators

**PWR**

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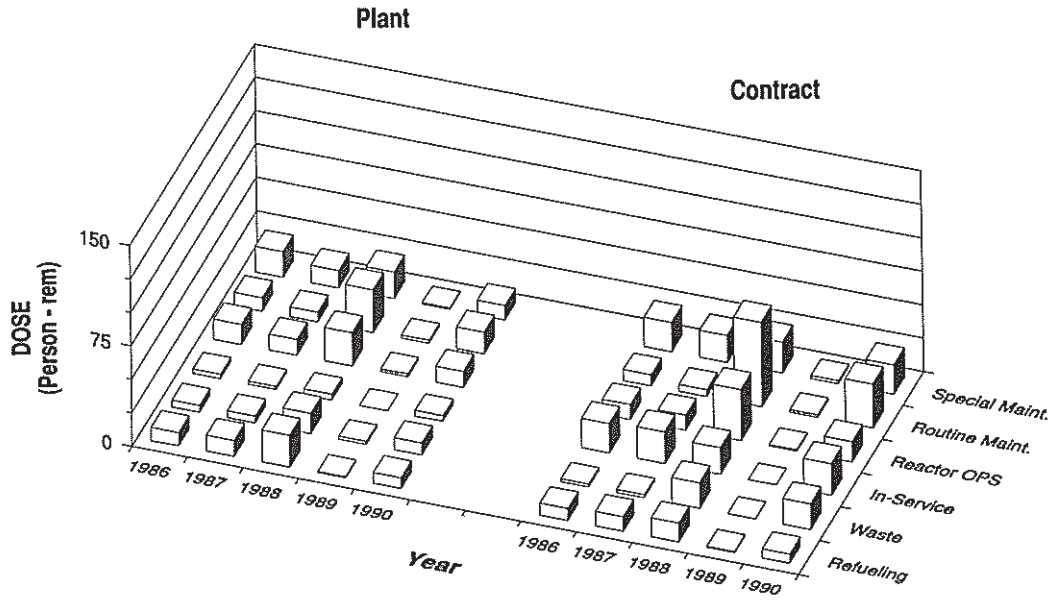
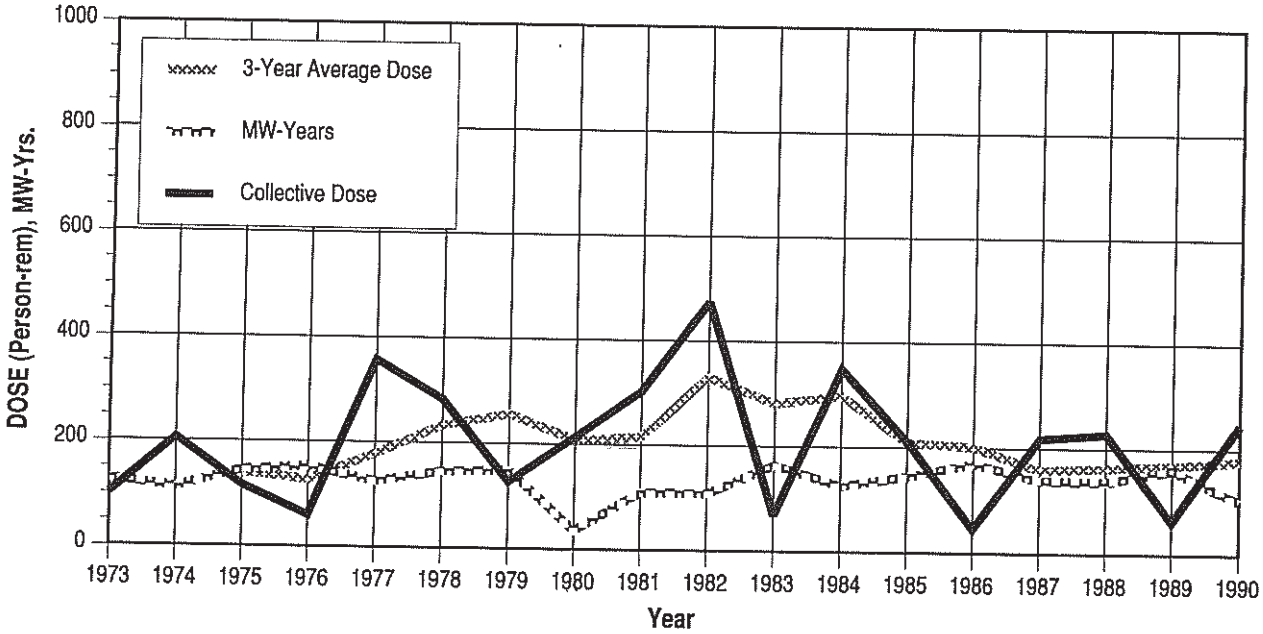


## APPENDIX E (continued)

### YANKEE-ROWE

Dose-Performance Indicators

**PWR**

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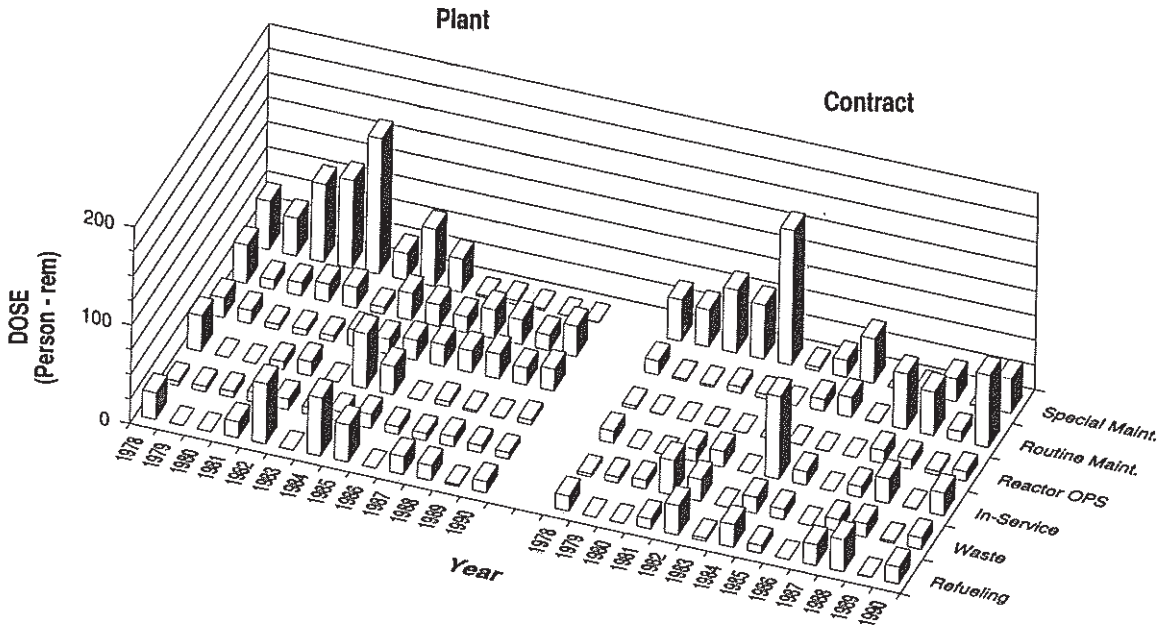
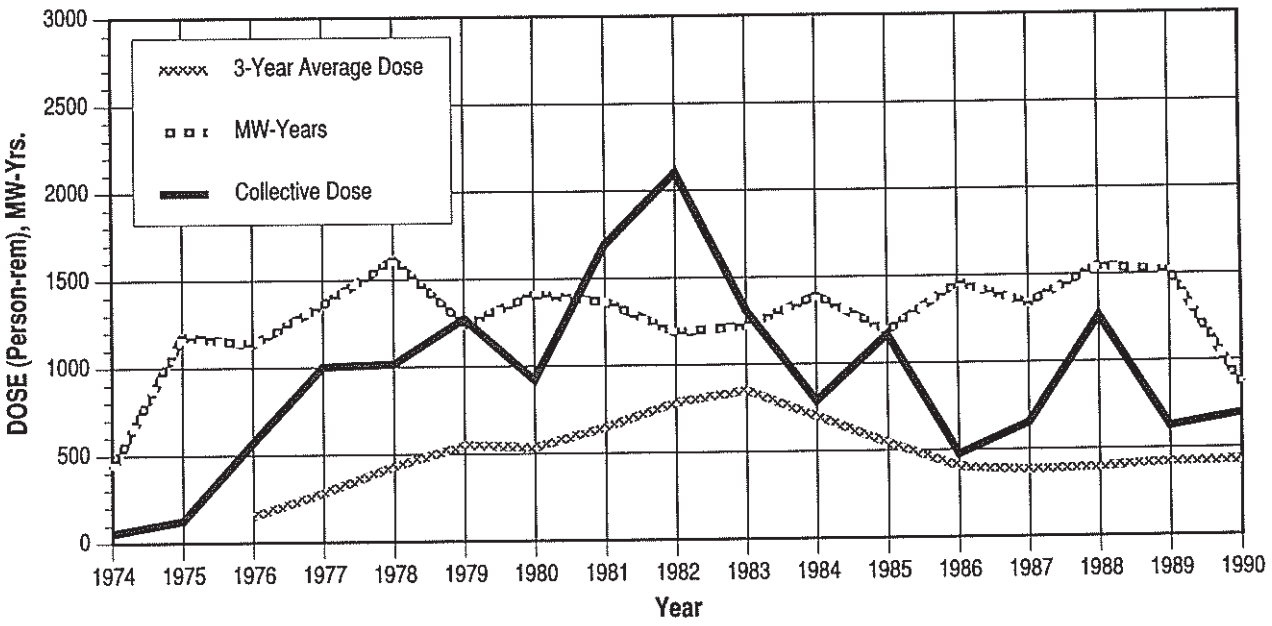


## APPENDIX E (continued)

### ZION 1, 2

Dose-Performance Indicators

**PWR**

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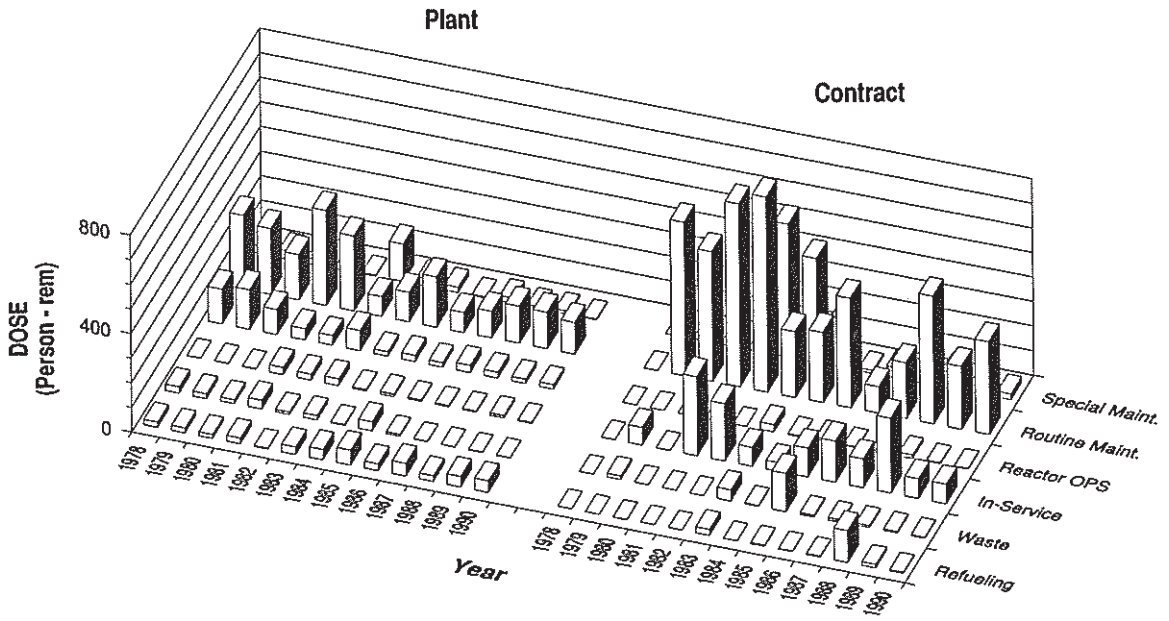

# APPENDIX F

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

1984-1990

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

| YEAR AND REACTOR TYPE | Number of Individuals with Whole Body Doses in the Ranges (rems or cSv) | | | | | | | | | | | | | | | | | TOTAL NUMBER MONI-TORED | NUMBER WITH MEAS. EXPOSURE | TOTAL COLLEC-TIVE DOSE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No Mea-surable | Meas. <0.10 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.0-5.0 | 5-6.0 | 6-7.0 | 7-8.0 | 8-9.0 | 9-10 | 10-12 | >12 | | | |
| 1990 - PWRs | 54,572 | 29,791 | 13,030 | 10,747 | 5,759 | 3,384 | 4,712 | 607 | 43 | | | | | | | | | 122,645 | 68,073 | 20,812 |
| 1990 - BWRs | 39,102 | 17,210 | 7,336 | 5,992 | 3,717 | 2,493 | 4,162 | 625 | 41 | 1 | | | | | | | | 80,679 | 41,577 | 15,780 |
| 1990 - LWRs | 93,674 | 47,001 | 20,366 | 16,739 | 9,476 | 5,877 | 8,874 | 1,232 | 84 | 1 | | | | | | | | 203,324 | 109,650 | 36,592 |
| 1989 - PWRs | 51,701 | 29,419 | 11,591 | 9,336 | 5,061 | 2,997 | 4,739 | 674 | 66 | 11 | | | | | | | | 115,595 | 63,894 | 20,381 |
| 1989 - BWRs | 40,951 | 19,343 | 7,887 | 6,323 | 3,753 | 2,544 | 3,962 | 515 | 33 | | | | | | | | | 85,311 | 44,360 | 15,558 |
| 1989 - LWRs | 92,652 | 48,762 | 19,478 | 15,659 | 8,814 | 5,541 | 8,701 | 1,189 | 99 | 11 | | | | | | | | 200,906 | 108,254 | 35,939 |
| 1988 - PWRs | 47,866 | 27,177 | 11,014 | 9,260 | 5,563 | 3,541 | 5,405 | 829 | 127 | 4 | | 1 | | | | | | 110,787 | 62,921 | 22,786 |
| 1988 - BWRs | 47,679 | 16,044 | 6,736 | 5,609 | 3,311 | 2,397 | 4,859 | 1,129 | 215 | 5 | | | | | | | | 87,984 | 40,305 | 18,092 |
| 1988 - LWRs | 95,545 | 43,221 | 17,750 | 14,869 | 8,874 | 5,938 | 10,264 | 1,958 | 342 | 9 | | 1 | | | | | | 198,771 | 103,226 | 40,878 |
| 1987 - PWRs | 48,870 | 27,070 | 10,796 | 8,828 | 5,152 | 3,442 | 6,187 | 988 | 124 | 10 | | | | | | | | 111,467 | 62,597 | 23,684 |
| 1987 - BWRs | 43,688 | 17,711 | 7,027 | 5,739 | 3,447 | 2,383 | 4,578 | 723 | 117 | 12 | | | | | | | | 85,425 | 41,737 | 16,717 |
| 1987 - LWRs | 92,558 | 44,781 | 17,823 | 14,567 | 8,599 | 5,825 | 10,765 | 1,711 | 241 | 22 | | | | | | | | 196,892 | 104,334 | 40,401 |
| 1986 - PWRs | 44,016 | 29,758 | 10,128 | 8,159 | 4,784 | 3,059 | 5,594 | 1,244 | 239 | 30 | | | | | | | | 107,011 | 62,995 | 23,032 |
| 1986 - BWRs | 29,232 | 15,075 | 5,865 | 4,962 | 2,996 | 2,121 | 5,084 | 1,426 | 354 | 45 | | | | | | | | 67,160 | 37,928 | 19,349 |
| 1986 - LWRs | 73,248 | 44,833 | 15,993 | 13,121 | 7,780 | 5,180 | 10,678 | 2,670 | 593 | 75 | | | | | | | | 174,171 | 100,923 | 42,381 |
| 1985 - PWRs | 42,409 | 25,545 | 8,158 | 6,761 | 4,107 | 2,602 | 5,584 | 1,586 | 248 | 42 | | | | | | | | 97,042 | 54,633 | 22,469 |
| 1985 - BWRs | 22,061 | 14,446 | 5,957 | 5,218 | 3,107 | 2,295 | 4,973 | 1,731 | 468 | 42 | | | | | | | | 60,298 | 38,237 | 20,573 |
| 1985 - LWRs | 64,470 | 39,991 | 14,115 | 11,979 | 7,214 | 4,897 | 10,557 | 3,317 | 716 | 84 | | | | | | | | 157,340 | 92,870 | 43,042 |
| 1984 - PWRs | 37,875 | 24,887 | 8,599 | 6,585 | 4,133 | 2,998 | 6,781 | 2,253 | 681 | 77 | | | | | | | | 94,869 | 56,994 | 28,138 |
| 1984 - BWRs | 21,741 | 14,997 | 6,165 | 4,907 | 3,033 | 2,398 | 5,679 | 2,714 | 994 | 218 | | | | | | | | 62,846 | 41,105 | 27,097 |
| 1984 - LWRs | 59,616 | 39,884 | 14,764 | 11,492 | 7,166 | 5,396 | 12,460 | 4,967 | 1,675 | 295 | | | | | | | | 157,715 | 98,099 | 55,235 |

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Twenty-Third Annual Report

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Washington, DC 20555

10. SUPPLEMENTARY NOTES

11. ABSTRACT (200 words or less)

This report summarizes the occupational radiation exposure information that has been reported to the NRC's Radiation Exposure Information Reporting System (REIRS) by nuclear power facilities and certain other categories of NRC licensees during the years 1969 through 1990. The bulk of the data presented in the report was obtained from annual radiation exposure reports submitted in accordance with the requirements of 10 CFR 20.407 and the technical specifications of nuclear power plants. Data on workers terminating their employment at certain NRC licensed facilities were obtained from reports submitted pursuant to 10 CFR 20.408. The 1990 annual reports submitted by about 443 licensees indicated that approximately 214,568 individuals were monitored, 110,204 of whom were monitored by nuclear power facilities. They incurred an average individual dose of 0.19 rem (cSv) and an average measurable dose of about 0.36 (cSv). Termination radiation exposure reports were analyzed to reveal that about 113,361 individuals completed their employment with one or more of the 443 covered licensees during 1990. Some 77,633 of these individuals terminated from power reactor facilities, and about 11,083 of them were considered to be transient workers who received an average dose of 0.67 rem (cSv).

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

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average dose
transient workers
fuel fabricators

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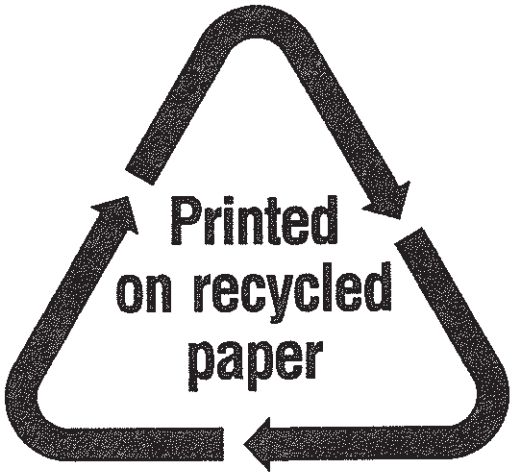


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