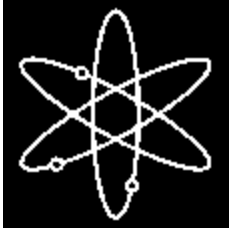
**NUREG-0713**
**Vol. 23**



# Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities 2001

Thirty-Fourth Annual Report

**U.S. Nuclear Regulatory Commission**
**Office of Nuclear Regulatory Research**
**Washington, DC 20555-0001**

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**NUREG-0713**
**Vol. 23**

# Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities 2001

## Thirty-Fourth Annual Report

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**Washington, DC 20555-0001**
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## PREVIOUS REPORTS IN SERIES

| | |
|---|---|
| WASH-1311 | A Compilation of Occupational Radiation Exposure from Light Water Cooled Nuclear Power Plants, 1969-1973, U.S. Atomic Energy Commission, May 1974. |
| NUREG-75/032 | Occupational Radiation Exposure at Light Water Cooled Power Reactors, 1969-1974, U.S. Nuclear Regulatory Commission, June 1975. |
| NUREG-0109 | Occupational Radiation Exposure at Light Water Cooled Power Reactors, 1969-1975, U.S. Nuclear Regulatory Commission, August 1976. |
| NUREG-0323 | Occupational Radiation Exposure at Light Water Cooled Power Reactors, 1969-1976, U.S. Nuclear Regulatory Commission, March 1978. |
| NUREG-0482 | Occupational Radiation Exposure at Light Water Cooled Power Reactors, 1977, U.S. Nuclear Regulatory Commission, May 1979. |
| NUREG-0594 | Occupational Radiation Exposure at Commercial Nuclear Power Reactors, 1978, U.S. Nuclear Regulatory Commission, November 1979. |
| NUREG-0713 | Occupational Radiation Exposure at Commercial Nuclear Power Reactors 1979, Vol. 1, U.S. Nuclear Regulatory Commission, March 1981. |
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| NUREG-0713 | Occupational Radiation Exposure at Commercial Nuclear Power Reactors 1981, Vol. 3, U.S. Nuclear Regulatory Commission, November 1982. |
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| NUREG-0713 | Occupational Radiation Exposure at Commercial Nuclear Power Reactors 1983, Vol. 5, U.S. Nuclear Regulatory Commission, March 1985. |
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| NUREG-0713 | Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities 1991, Vol. 13, U.S. Nuclear Regulatory Commission, July 1993. |
| NUREG-0713 | Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities 1992, Vol. 14, U.S. Nuclear Regulatory Commission, December 1993. |
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| NUREG-0713 | Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities 1997, Vol. 19, U.S. Nuclear Regulatory Commission, November 1998. |
| NUREG-0713 | Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities 1998, Vol. 20, U.S. Nuclear Regulatory Commission, November 1999. |
| NUREG-0713 | Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities 1999, Vol. 21, U.S. Nuclear Regulatory Commission, October 2000. |
| NUREG-0713 | Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities 2000, Vol. 22, U.S. Nuclear Regulatory Commission, September 2001. |

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

| | |
|---|---|
| WASH-1350-R1 through WASH-1350-R6 | First through Sixth Annual Reports of the Operation of the U.S. AEC's Centralized Ionizing Radiation Exposure Records and Reporting System, U.S. Atomic Energy Commission. |
| NUREG-75/108 | Seventh Annual Occupational Radiation Exposure Report for Certain NRC Licensees - 1974, U.S. Nuclear Regulatory Commission, October 1975. |
| NUREG-0119 | Eighth Annual Occupational Radiation Exposure Report for 1975, U.S. Nuclear Regulatory Commission, October 1976. |
| NUREG-0322 | Ninth Annual Occupational Radiation Exposure Report for 1976, U.S. Nuclear Regulatory Commission, October 1977. |
| NUREG-0463 | Tenth Annual Occupational Radiation Exposure Report for 1977, U.S. Nuclear Regulatory Commission, October 1978. |
| NUREG-0593 | Eleventh Annual Occupational Radiation Exposure Report for 1978, U.S. Nuclear Regulatory Commission, January 1981. |
| NUREG-0714 | Twelfth Annual Occupational Radiation Exposure Report for 1979, Vol. 1, U.S. Nuclear Regulatory Commission, August 1982. |
| NUREG-0714 | Occupational Radiation Exposure, Thirteenth and Fourteenth Annual Reports, 1980 and 1981, Vols. 2 and 3, U.S. Nuclear Regulatory Commission, October 1983. |
| NUREG-0714 | Occupational Radiation Exposure, Fifteenth and Sixteenth Annual Reports, 1982 and 1983, Vols. 4 and 5, U.S. Nuclear Regulatory Commission, October 1985. |

# ABSTRACT

This report summarizes the occupational exposure data that are maintained in the U.S. Nuclear Regulatory Commission's (NRC) Radiation Exposure Information and Reporting System (REIRS). The bulk of the information contained in the report was compiled from the 2001 annual reports submitted by six of the seven categories[1] of NRC licensees subject to the reporting requirements of 10 CFR 20.2206. The annual reports submitted by these licensees consist of radiation exposure records for each monitored individual. These records are analyzed for trends and presented in this report in terms of collective dose and the distribution of dose among the monitored individuals. Because there are no geologic repositories for high-level waste currently licensed, only six categories will be considered in this report.

Annual reports for 2001 were received from a total of **272** NRC licensees, of which **104** were operators of nuclear power reactors in commercial operation. Compilations of the reports submitted by the 272 licensees indicated that **118,834** individuals were monitored, **60,750** of whom received a measurable dose (Table 3.1). The collective dose incurred by these individuals was **14,746** person-rem, which represents an **7% decrease** from the 2000 value. The number of workers receiving a measurable dose also decreased, resulting in an average measurable dose of **0.24** rem for 2001. The average measurable dose is defined as the total collective dose (TEDE) divided by the number of workers receiving a measurable dose.[2] These figures have been adjusted to account for transient reactor workers.

In calendar year 2001, the annual collective dose per reactor for light water reactor (LWR) licensees was **107** person-rem. This represents a 12% decrease from the value reported for 2000 (122). The annual collective dose per reactor for boiling water reactors (BWRs) was **138** person-rem and, for pressurized water reactors (PWRs), it was **91** person-rem.

Analyses of transient worker data indicate that **22,301** individuals completed work assignments at two or more licensees during the monitoring year. The dose distributions are adjusted each year to account for the duplicate reporting of transient workers by multiple licensees. In 2001, the average measurable dose per worker for all licensees calculated from reported data was **0.19** rem. The corrected dose distribution resulted in an average measurable dose per worker for all licensees of **0.24** rem.

[1] Commercial nuclear power reactors; industrial radiographers; fuel processors (including uranium enrichment), 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] The number of workers with measurable dose includes any individual with a dose greater than zero rem and does not include doses reported as "not detectable."

# EDITOR'S NOTE

The NRC currently has a 5-year contract with Science Applications International Corporation (SAIC) to assist the NRC Staff in the preparation of the NUREG-0713 series. Mr. Charles Hinson (NRR) assisted in the preparation of this NUREG, serving as the NRC Technical reviewer. SAIC will be suggesting changes in the presentation of certain data in these reports. Readers should be alert to these changes, and the NRC welcomes responses, especially where these changes can be improved upon.

Comments should be directed to:

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Office of Nuclear Regulatory Research
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Washington, DC 20555

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# PREFACE

A number of NRC licensees have inquired as to how the occupational radiation exposure data that are compiled from the individual exposure reports required by § 20.2206 are used by the NRC staff. 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 of trends, both favorable and unfavorable, from the viewpoint of trends, of the effectiveness of the overall NRC/licensee radiation protection and as low as reasonably achievable (ALARA) efforts by certain licensees.

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: U.S./foreign, BWRs/PWRs, civilian/military, facility/facility, nuclear industry/other industries, etc.

3. The data provide for the monitoring of transient workers who may affect dose distribution statistics through multiple counting.

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 the public.

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

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# FOREWORD

NUREG-0713, Volume 23, summarizes the 2001 occupational radiation exposure data maintained in the U.S. Nuclear Regulatory Commission's Radiation Exposure Information Reporting System. Certain classes of licensees are required to annually report individual exposure in accordance with 10 CFR 20.2206.

The occupational radiation exposure data contained in this volume of NUREG-0713 is a compilation of the annual reports received from 272 licensees required to submit annual reports. The collective dose incurred by these individuals was 14,746 person-rem, which represents an 7% decrease from the 2000 value.

Farouk Eltawila, Director
Division of Systems Analysis and Regulatory Effectiveness
Office of Nuclear Regulatory Research

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# Section 1
# INTRODUCTION

## 1.1 BACKGROUND

One of the basic purposes of the Atomic Energy Act and the implementing regulations in Title 10, Code of Federal Regulations (CFR), 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 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 10 CFR 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 and 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 ensures that they are kept indefinitely and facilitates their retrieval and analysis. The data maintained in REIRS have been summarized and published in a report every year since 1969. Annual reports for each of the years 1969 through 1973 presented the data reported by both AEC licensees and contractors and were published in six documents designated as WASH-1350-R1 through WASH-1350-R6.

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

[3] Commercial nuclear power reactors; industrial radiographers; fuel processors (including uranium enrichment as of 1997), fabricators, and reprocessors; manufacturers and distributors of specified quantities of byproduct material.

of Energy (DOE), is collected and published by DOE's Office of Safety and Health, a division of Environment, Safety and Health, in Germantown, Maryland.

In 1982 and 1983, paragraph 20.408(a) of Title 10 of the Code of Federal Regulations was amended to require three additional categories of NRC licensees to submit annual statistical exposure reports and individual termination exposure reports. The categories were (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. This document presents the exposure information that was reported by NRC licensees representing two of these categories. (There are no geologic repositories for high-level waste currently licensed.)

This report and each of the predecessors summarize information reported for both the current year and for previous years. More licensee-specific data for previous years, such as the annual reports submitted by each commercial power reactor pursuant to 10 CFR 20.407 and 20.2206 and their technical specifications, may be found in those documents listed on the inside of the front cover of this report for the specific year desired. 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.

In May of 1991, the revised 10 CFR 20 "Standards for Protection Against Radiation; Final Rule" was published in the Federal Register. The revision redefined the radiation monitoring and reporting requirements of NRC licensees. Instead of summary annual reports (§ 20.407) and termination reports (§ 20.408), licensees are now required to submit an annual report of the dose received by each monitored worker (§ 20.2206). Licensees were required to implement the new requirements no later than January of 1994. This report is the eighth compilation of radiation exposure information collected under the revised 10 CFR 20. Certain sections of the report have been modified to account for the change in the reporting of exposure information. Readers are encouraged to comment on these changes.

Recommendations for further analysis or for different presentation of information are welcome.

## 1.2 RADIATION EXPOSURE INFORMATION ON THE INTERNET

In May of 1995, the NRC began pursuing the dissemination of radiation exposure information via a World Wide Web site on the Internet. This allows interested parties with the appropriate equipment to access the data electronically rather than through the published NUREG-0713 document. A web site was created for radiation exposure and linked into the main NRC web page. The web site contains up-to-date information on radiation exposure, as well as information and guidance on reporting radiation exposure information to the NRC. Interested parties may read the documents online or download information to their systems for further analysis. Software, such as the Radiation Exposure Monitoring and Information Transmittal (REMIT) System, is also available for downloading via the web site. There are also links to other web sites dealing with the topics of radiation and health physics. The NRC intends to continue pursuing the dissemination of radiation exposure information via the Web and will focus more resources on the electronic distribution of information rather than the published hard-copy reports.

The main web URL address for the NRC is:

**http://www.nrc.gov**

The NRC radiation exposure information web URL address is:

**http://www.reirs.com**

Comments on this report or the NRC's web page should be directed to:

**REIRS Project Manager**
**Office of Nuclear Regulatory Research**
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# 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 exposure incident to individuals' work and is used in evaluating the radiation protection program.

Monitoring requirements are specified in 10 CFR § 20.1502, which requires licensees to monitor individuals who receive or are likely to receive a dose in a year in excess of 10% of the applicable limits. For most adults, the annual limit for the whole body is 5 rem, so 0.5 rem per year is the level above which monitoring is required. Separate dose limits have been established for minors and declared pregnant workers. Monitoring is required for any individual entering a high or very high radiation area. Depending on the administrative policy of each licensee, persons such as visitors and clerical workers may also be provided with monitoring devices, although the probability of their being exposed to measurable levels of radiation is extremely small. Licensees must report the dose records of those individuals for whom monitoring is required. Many licensees elect to report the doses for every individual for whom they provided monitoring. This practice tends to 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"[4] 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).

The average dose per individual, as well as the dose distributions shown for groups of licensees, also can be affected by the multiple reporting of individuals who were monitored by two or more licensees during the year. Licensees are only required to report the doses received by individuals at their licensed facility. A dose distribution for a single licensee does not consider that some of the individuals may have received doses at other facilities. When the data are summed to determine the total number of individuals monitored by a group of licensees, individuals may be counted more than once. This can also affect the distribution of doses because individuals may be counted multiple times in the lower dose ranges rather than one time in the higher range corresponding to the actual accumulated dose for the year (the sum of the individual's dose accrued at all facilities). This source of error has the greatest potential impact on the data reported by power reactor facilities since they employ many short-term workers. Section 5 contains an analysis that corrects for individuals being counted more than once.

[4] The number of workers with measurable dose includes any individual with a total effective dose equivalent greater than zero rem. Workers reported with zero dose, or no detectable dose, are included in the number of workers with no measurable exposure.

Another fact that one should keep 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.

One should pay considerable attention 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 distinguish between the doses attributed to the pressurized water reactors (PWRs), and boiling water reactors (BWRs). 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. The apparent discrepancies among the various tables are a necessary side effect of this endeavor.

The data contained in this report are subject to change as licensees may submit corrections or additions to data for previous years. For the 2001 report, data for prior years have been updated to account for these corrections and additions. Users should be alert to these changes.

It should again be pointed out that this report contains information reported by NRC licensees and some Agreement State[5] licensees who also have to report to the NRC. Since the NRC licenses all commercial nuclear power reactors, fuel processors and fabricators, 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 are licensed by the state and are not required to submit occupational exposure reports to the NRC. More than three times as many facilities are regulated by Agreement States than the number licensed by the NRC. In addition, this report does not include non-occupational exposure, such as exposure due to medical x-rays, fluoroscopy, and accelerators when received as a patient.

All dose equivalent values in this report are given in units of rem in accordance with the general provisions for records, 10 CFR 20.2101(a). In order to convert rem into the International System of Units (SI) unit of sieverts (Sv), divide the value in rem by 100. Therefore, 1 rem = 0.01 Sv. In order to convert rem into millisieverts (mSv), multiply the value in rem by 10. Therefore, 1 rem = 10 mSv.

[5] States that have entered into an agreement with the NRC that allows each state to license organizations using radioactive materials for certain purposes. As of August 2002, there are 32 Agreement States.

Section 3

# ANNUAL PERSONNEL MONITORING REPORTS - 10 CFR 20.2206

## 3.1 DEFINITION OF TERMS AND SOURCES OF DATA

### *3.1.1 Statistical Summary Reports*

The total effective dose equivalent (TEDE) is summed per individual and tabulated into the appropriate dose range to generate the dose distribution for each licensee. The total collective dose is more accurate using this method because the licensee reported the dose to each individual, and the total collective dose was calculated from the sum of these doses and not statistically derived from the distribution (see Section 3.1.4). The TEDE includes the dose contribution from the committed effective dose equivalent (CEDE) for those workers who had intakes that required monitoring and reporting of internal dose.

### *3.1.2 Number of Monitored Workers*

The number of monitored workers refers to the total number of workers that the NRC licensees (who are covered by 10 CFR 20.1502) reported as being monitored for exposure to external and internal radiation during the year. This number includes all workers for whom monitoring is required, and may include visitors, service representatives, contract workers, clerical workers, and any other workers for whom the licensee feels that monitoring devices should be provided.

For licensees submitting under the revised 10 CFR 20.2206, the total number of workers was determined from the number of unique personal identification numbers submitted per licensee. Uniqueness is defined by the combination of identification number and identification type. [Ref. 10]

### *3.1.3 Number of Workers with Measurable Dose*

The number of workers with measurable dose includes any individual with a TEDE greater than zero rem. This does not include workers with a TEDE reported as zero, not detectable (ND), or not required to be reported (NR). [Ref. 10]

### *3.1.4 Collective Dose*

The concept of collective dose is used in this report to denote the summation of the TEDE received by all monitored workers and is reported in units of person-rem. The revised 10 CFR 20.2206 requires that the TEDE be reported, so the collective dose is calculated by summing the TEDE for all monitored workers. The phrase “collective dose” is used throughout this report to mean the collective TEDE, unless otherwise specified.

It should be noted that prior to the implementation of the revised dose reporting requirements of 10 CFR 20.2206 in 1994, the collective dose was, in some cases, calculated from the dose distributions by summing the products obtained from multiplying the number of workers reported in each of the dose ranges by the midpoint of the corresponding dose range. This assumes that the midpoint of the range is equal to the arithmetic mean of the individual doses in the range. Experience has shown that the actual

mean dose of workers reported in each dose range is less than the midpoint of the range. For this reason, the resultant calculated collective doses shown in this report for these licensees may be about 10% higher than the sum of the actual individual doses. Care should be taken when comparing the actual collective dose calculated for 1994 to 2001 with the collective dose for years prior to 1994 because of this change in methodology. In addition, prior to 1994, doses only included the external whole body dose. Although the contribution of internal dose to the TEDE is minimal for most licensees, it should be considered when comparing the 2001 collective dose with the collective dose for years prior to 1994. One noted exception is for fuel fabrication licensees where the CEDE in some cases contributes the majority of the TEDE (see Section 3.3.5).

### *3.1.5 Average Individual Dose*

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

### *3.1.6 Average Measurable Dose*

The average measurable dose is obtained by dividing the collective TEDE by the number of workers who 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 deletes those workers receiving zero or no detectable dose, many of whom were monitored for convenience or identification purposes.

### *3.1.7 Number of Licensees Reporting*

The number of licensees refers to the NRC licenses issued to use radioactive material for certain activities that would place the licensees in one of the six categories that are required to report pursuant to 10 CFR 20.2206. The third column in Table 3.1 shows the number of licensees that have filed such reports during the last 10 years. Agreement State licensees do not submit such reports to the NRC and are not included in this report.

### *3.1.8 Collective TEDE Distribution by Dose Range*

The United Nations Scientific Committee on the Effects of Atomic Radiation's (UNSCEAR) 1993 report entitled "Report of the Scientific Committee on the Effects of Atomic Radiation" [Ref. 11] recommends the calculation of a parameter "SR" (previously referred to as CR or MR) to aid in the examination of the distribution of radiation exposure among workers. SR is defined as the ratio of the annual collective dose incurred by workers whose annual doses exceed a certain dose level to the total annual collective dose. UNSCEAR uses a subscript to denote the specific dose level in millisieverts. Therefore, $SR_{15}$ is the notation for the annual collective dose above 1.5 rem divided by the total annual collective dose. The UNSCEAR 1993 report notes that the 1.5 rem dose level may not be useful where doses are consistently lower than this level, and they recommend that research organizations report SR values

# TABLE 3.1
## Average Annual Exposure Data for Certain Categories of NRC Licensees
## 1992 - 2001

| NRC License Category* and Program Code | Calendar Year | Number of Licensees Reporting | Number of Monitored Individuals | Number of Workers With Measurable TEDE | Collective TEDE (person-rem) | Average TEDE (rem) | Average Measurable TEDE per Worker (rem) |
|---|---|---|---|---|---|---|---|
| **Industrial Radiography** | 1992 | 246 | 6,703 | 4,265 | 1,864 | 0.28 | 0.44 |
| | 1993 | 176 | 4,721 | 3,007 | 1,596 | 0.34 | 0.53 |
| | 1994 | 139 | 2,886 | 2,007 | 1,415 | 0.49 | 0.71 |
| **03310** | 1995 | 149 | 3,761 | 2,651 | 1,443 | 0.38 | 0.54 |
| **03320** | 1996 | 148 | 3,766 | 2,639 | 1,449 | 0.38 | 0.55 |
| | 1997 | 148 | 3,570 | 2,574 | 1,356 | 0.38 | 0.53 |
| | 1998 | 142 | 4,952 | 3,446 | 1,863 | 0.38 | 0.54 |
| | 1999 | 132 | 3,837 | 2,827 | 1,551 | 0.40 | 0.55 |
| | 2000 | 129 | 3,368 | 2,542 | 1,528 | 0.45 | 0.60 |
| | 2001 | 123 | 3,778 | 3,161 | 2,111 | 0.56 | 0.67 |
| **Manufacturing and Distribution** | 1992 | 67 | 5,210 | 2,250 | 784 | 0.15 | 0.35 |
| | 1993 | 58 | 4,913 | 2,254 | 680 | 0.14 | 0.30 |
| | 1994 | 44 | 2,941 | 1,251 | 580 | 0.20 | 0.46 |
| | 1995 | 36 | 2,666 | 1,222 | 595 | 0.22 | 0.49 |
| **02500** | 1996 | 38 | 2,631 | 1,241 | 556 | 0.21 | 0.45 |
| **03211** | 1997 | 33 | 1,154 | 665 | 397 | 0.34 | 0.60 |
| **03212** | 1998 | 31 | 1,986 | 654 | 402 | 0.20 | 0.61 |
| **03214** | 1999 | 39 | 2,181 | 836 | 419 | 0.19 | 0.50 |
| | 2000 | 39 | 2,461 | 1,188 | 415 | 0.17 | 0.35 |
| | 2001 | 34 | 1,829 | 1,210 | 351 | 0.19 | 0.29 |
| **Low-Level Waste Disposal**** | 1992 | 2 | 467 | 82 | 37 | 0.08 | 0.45 |
| | 1993 | 2 | 432 | 76 | 21 | 0.05 | 0.27 |
| | 1994 | 2 | 202 | 83 | 22 | 0.11 | 0.27 |
| | 1995 | 2 | 212 | 56 | 8 | 0.04 | 0.15 |
| **03231** | 1996 | 2 | 165 | 67 | 8 | 0.05 | 0.12 |
| | 1997 | 2 | 185 | 50 | 5 | 0.03 | 0.11 |
| | 1998 | 1 | 27 | 13 | 1 | 0.05 | 0.10 |
| **Independent Spent Fuel Storage** | 1992 | 2 | 290 | 85 | 11 | 0.04 | 0.13 |
| | 1993 | 2 | 135 | 52 | 14 | 0.10 | 0.26 |
| | 1994 | 1 | 158 | 89 | 42 | 0.27 | 0.47 |
| | 1995 | 1 | 104 | 49 | 51 | 0.49 | 1.04 |
| **23100** | 1996 | 1 | 97 | 53 | 54 | 0.56 | 1.02 |
| **23200** | 1997 | 1 | 55 | 24 | 6 | 0.11 | 0.24 |
| | 1998 | 1 | 53 | 21 | 3 | 0.05 | 0.12 |
| | 1999 | 2 | 86 | 33 | 5 | 0.06 | 0.16 |
| | 2000 | 2 | 146 | 83 | 6 | 0.04 | 0.07 |
| | 2001 | 2 | 154 | 107 | 13 | 0.08 | 0.12 |
| **Fuel Cycle Licenses - Fabrication Processing and Uranium Enrich.** | 1992 | 11 | 8,439 | 5,061 | 545 | 0.06 | 0.11 |
| | 1993 | 8 | 9,649 | 2,611 | 339 | 0.04 | 0.13 |
| | 1994 | 8 | 3,596 | 2,847 | 1,147 | 0.32 | 0.40 |
| | 1995 | 8 | 4,106 | 2,959 | 1,217 | 0.30 | 0.41 |
| | 1996 | 8 | 4,369 | 3,061 | 878 | 0.20 | 0.29 |
| | 1997 | 10 | 11,214 | 3,910 | 1,006 | 0.09 | 0.26 |
| | 1998 | 10 | 10,684 | 3,613 | 950 | 0.09 | 0.26 |
| **21200** | 1999 | 9 | 9,693 | 3,927 | 1,020 | 0.11 | 0.26 |
| **21210** | 2000 | 9 | 9,336 | 4,649 | 1,339 | 0.14 | 0.29 |
| | 2001 | 9 | 8,145 | 3,980 | 1,162 | 0.14 | 0.29 |
| **Commercial Light Water Reactors***** | 1992 | 110 | 181,889 | 94,172 | 29,297 | 0.16 | 0.31 |
| | 1993 | 108 | 169,259 | 86,193 | 26,364 | 0.16 | 0.31 |
| | 1994 | 109 | 139,390 | 71,613 | 21,704 | 0.16 | 0.30 |
| | 1995 | 109 | 132,266 | 70,821 | 21,688 | 0.16 | 0.31 |
| **41111** | 1996 | 109 | 126,402 | 68,305 | 18,883 | 0.15 | 0.28 |
| | 1997 | 109 | 126,781 | 68,372 | 17,149 | 0.14 | 0.25 |
| | 1998 | 105 | 114,367 | 57,466 | 13,187 | 0.12 | 0.23 |
| | 1999 | 104 | 114,154 | 59,216 | 13,666 | 0.12 | 0.23 |
| | 2000 | 104 | 110,557 | 57,233 | 12,652 | 0.11 | 0.22 |
| | 2001 | 104 | 104,928 | 52,292 | 11,109 | 0.11 | 0.21 |
| **Grand Totals and Averages** | 1992 | 438 | 202,998 | 105,915 | 32,537 | 0.16 | 0.31 |
| | 1993 | 354 | 189,109 | 94,193 | 29,013 | 0.15 | 0.31 |
| | 1994 | 303 | 149,173 | 77,890 | 24,910 | 0.17 | 0.32 |
| | 1995 | 305 | 143,115 | 77,758 | 25,003 | 0.17 | 0.32 |
| | 1996 | 306 | 137,430 | 75,366 | 21,828 | 0.16 | 0.29 |
| | 1997 | 303 | 142,959 | 75,595 | 19,919 | 0.14 | 0.26 |
| | 1998 | 290 | 132,069 | 65,213 | 16,406 | 0.12 | 0.25 |
| | 1999 | 286 | 129,951 | 66,839 | 16,661 | 0.13 | 0.25 |
| | 2000 | 283 | 125,868 | 65,695 | 15,940 | 0.13 | 0.24 |
| | 2001 | 272 | 118,834 | 60,750 | 14,746 | 0.12 | 0.24 |

* These categories consist only of NRC licensees. Agreement State licensed organizations do not report occupational exposure data to the NRC.
** As of 1999, there are no longer any NRC licensees involved in this activity. All low-level waste disposal facilities are now located in Agreement States and no longer report to the NRC.
*** Includes all LWRs in commercial operation for a full year for each of the years indicated. Reactor data have been corrected to account for the multiple counting of transient reactor workers (see Section 5).

lower than 1.5 rem where appropriate. For this reason, the NRC has adopted the policy of calculating and tracking the collective TEDE distribution by dose range at dose levels of 0.100 rem, 0.250 rem, 0.500 rem, 1.0 rem, and 2.0 rem. The collective TEDE distribution by dose range values in this report was calculated by summing the TEDE to each individual who received a TEDE greater than or equal to the specified dose range divided by the total collective TEDE. In addition, the distribution is presented as a percentage rather than a decimal fraction.

Figures 3.2, 3.3, 3.5, 3.6, 3.8, 3.10, 3.12, and 3.13 show the collective TEDE distribution by dose range calculated in terms of percentages of the collective dose delivered above the specified dose levels for each of the categories of NRC licensee. Two properties of these graphs help to further reveal the nature of the distribution of dose and dose trends at NRC licensees. The first is that the percentage of dose in the higher dose ranges (above 0.500 rem) should be relatively small. This would indicate that fewer workers are exposed at these higher levels of individual risk. The second property is the ability to track the shift in dose over time. For a given dose level, a reduction in the percentage from one year to the next indicates that less dose is being received by workers above this level. Therefore, these graphs can be useful in qualifying the dose received in a given year and the trend in doses from year to year.

## 3.2 ANNUAL TEDE DOSE DISTRIBUTIONS

Table 3.2 provides a statistical compilation of the exposure reports submitted by six categories of licensees (see Section 3.3 for a description of each licensee category). The dose distributions are generated by summing the TEDE for each individual and counting the number of individuals in each dose range. In nearly every category, a large number of workers receive doses that are less than measurable, and very few doses exceed 4 or 5 rem. Eighty-nine percent of the reported workers with measurable doses were monitored by nuclear power facilities in 2001, where they received 75% of the total collective dose.

Under the regulatory limits of the revised 10 CFR 20.1201, annual TEDE in excess of 5 rem for occupationally exposed adults is, by definition, an exposure in excess of regulatory limits (see Section 6).

Table 3.3 gives a summary of the annual exposures reported to the Commission by certain categories of NRC licensees as required by 10 CFR 20.2206. Table 3.3 shows that approximately 95% of the exposures consistently remained <2 rem between 1968 and 1984. For the past 11 years, the percentage of workers with <2 rem has been ≥99%. The number of workers receiving an annual exposure in excess of 5 rem has been <0.01% since 1985. One individual received a dose above the 5 rem annual TEDE limit in 2001 (see Section 6).

## TABLE 3.2
### Distribution of Annual Collective TEDE by License Category
### 2001

| License Category (Number of sites reporting) | *Number of Individuals with TEDE in the Ranges (rem) | | | | | | | | | | | | | Total Number Monitored | Number with Meas. Dose | Total Collective Dose (TEDE) (person-rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No Meas. | Meas. <0.1 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.00-5.00 | 5.00-6.00 | 6.00-12.00 | >12 | | | |
| **INDUSTRIAL RADIOGRAPHY** | | | | | | | | | | | | | | | | |
| Single Location (19) | 177 | 68 | 2 | 6 | 1 | 1 | 1 | | | | | | | 256 | 79 | 5.913 |
| Multiple Location (104) | 440 | 858 | 506 | 450 | 299 | 238 | 472 | 148 | 71 | 40 | | | | 3,522 | 3,082 | 2,105.033 |
| Total (123) | 617 | 926 | 508 | 456 | 300 | 239 | 473 | 148 | 71 | 40 | | | | 3,778 | 3,161 | 2,110.946 |
| **MANUFACTURING AND DISTRIBUTION** | | | | | | | | | | | | | | | | |
| "A" - Broad (4) | 265 | 115 | 49 | 51 | 21 | 26 | 53 | 36 | | | | | | 616 | 351 | 232.367 |
| Limited (30) | 354 | 630 | 134 | 50 | 21 | 9 | 3 | 5 | 4 | 3 | | | | 1,213 | 859 | 118.698 |
| Total (34) | 619 | 745 | 183 | 101 | 42 | 35 | 56 | 41 | 4 | 3 | | | | 1,829 | 1,210 | 351.065 |
| **LOW-LEVEL WASTE DISPOSAL** | | | | | | | | | | | | | | | | |
| Total (0)** | | | | | | | | | | | | | | | | |
| **INDEPENDENT SPENT FUEL STORAGE** | | | | | | | | | | | | | | | | |
| Total (2) | 47 | 64 | 23 | 19 | 1 | | | | | | | | | 154 | 107 | 13.088 |
| **FUEL CYCLE LICENSES*** ** | | | | | | | | | | | | | | | | |
| Total (9) | 4,165 | 2,177 | 832 | 451 | 151 | 84 | 140 | 83 | 55 | 7 | | | | 8,145 | 3,980 | 1,162.262 |
| **COMMERCIAL POWER REACTORS**** ** | | | | | | | | | | | | | | | | |
| Boiling Water (35) | 25,462 | 15,544 | 6,686 | 4,362 | 1,462 | 477 | 262 | 4 | | | | | | 54,259 | 28,797 | 4,835.397 |
| Pressurized Water (69) | 47,744 | 21,917 | 9,392 | 4,869 | 1,468 | 583 | 485 | 59 | | | | | | 86,517 | 38,773 | 6,273.155 |
| Total (104) | 73,206 | 37,461 | 16,078 | 9,231 | 2,930 | 1,060 | 747 | 63 | | | | | | 140,776 | 67,570 | 11,108.552 |
| **GRAND TOTALS** | **78,654** | **41,373** | **17,624** | **10,258** | **3,424** | **1,418** | **1,416** | **335** | **130** | **50** | | | | **154,682** | **76,028** | **14,745.913** |

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

** There are no NRC licensees currently involved in this activity. All facilities are now located in Agreement States.

*** Includes fabrication, processing and uranium enrichment plants (see Section 3.3.5).

**** Includes all reactors in commercial operation for a full year during 2001. These values have not been adjusted for the multiple counting of transient reactor workers (see Section 5).

## TABLE 3.3

**Summary of Annual Dose Distributions for Certain* NRC Licensees**
**1968 - 2001**

| Year | Total Number of Monitored Persons | | Percent of Individuals With Doses < 2 rem** | Percent of Individuals With Doses < 5 rem** | Number of Individuals With Doses >12 rem** |
|---|---|---|---|---|---|
| | Reported Number | Corrected Number | | | |
| 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 | 97.6% (4,734) | >99.99% (15) | 2 |
| 1986 | 225,582 | 213,017 | 98.0% (4,076) | >99.99% (8) | 0 |
| 1987 | 243,562 | 227,997 | 98.8% (2,738) | >99.99% (4) | 1 |
| 1988 | 231,234 | 215,662 | 98.6% (2,980) | >99.99% (8) | 0 |
| 1989 | 229,353 | 212,474 | 99.1% (2,018) | >99.99% (7) | 1 |
| 1990 | 227,777 | 208,513 | 98.9% (2,150) | >99.99% (3) | 0 |
| 1991 | 218,519 | 202,731 | 99.4% (1,174) | >99.99% (2) | 0 |
| 1992 | 220,717 | 202,998 | 99.6% (897) | >99.99% (1) | 0 |
| 1993 | 208,784 | 189,109 | 99.5% (719) | >99.99% (2) | 0 |
| 1994 | 178,987 | 149,173 | 99.5% (818) | >99.99% (1) | 0 |
| 1995 | 179,406 | 143,115 | 99.3% (1,049) | >99.99% (1) | 0 |
| 1996 | 173,674 | 137,430 | 99.5% (730) | >99.99% (1) | 0 |
| 1997 | 180,814 | 142,959 | 99.5% (666) | 100% (0) | 0 |
| 1998 | 166,127 | 132,069 | 99.6% (489) | >99.99% (6) | 1 |
| 1999 | 166,084 | 129,117 | 99.6% (534) | >99.99% (1) | 0 |
| 2000 | 163,073 | 125,026 | 99.5% (573) | >99.99% (3) | 0 |
| 2001 | 154,682 | 118,115 | 99.4% (734) | >99.99% (1) | 0 |

* Licensees required to submit radiation exposure reports to the NRC under 10 CFR 20.2206.

** Data for 1985-2001 are based on the distribution of individual doses after adjusting for the multiple counting of transient reactor workers (see Section 5). The numbers of people exceeding both 2 and 5 rem are shown in parentheses from 1985-2001.

## 3.3 SUMMARY OF OCCUPATIONAL EXPOSURE DATA BY LICENSE CATEGORY

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

Industrial Radiography licenses are issued to allow the use of sealed radioactive materials, usually in exposure devices or "cameras," that primarily emit gamma rays for nondestructive testing of pipeline weld joints, steel structures, boilers, aircraft 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 designed and shielded for radiography; 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 123 radiography licensees in 2001. Table 3.4 summarizes the reported data for the two types of radiography licenses for 2001 and for the previous 2 years for comparison purposes.

The average measurable dose for workers performing radiography at a single location ranged from 10 to 25% of the average measurable dose of workers at multiple location facilities over the past 3 years. This is because it is more difficult for workers to avoid exposure to radiation in the field, where conditions are not optimal and may change daily. To view the contribution that each radiography licensee made to the total collective dose, see Appendix A, which presents a summary of the information reported by each of these licensees in 2001.

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

**TABLE 3.4**
Annual Exposure Information for Industrial Radiographers
1999 - 2001

| Year | Type of License | Number of Licensees | Number of Monitored Individuals | Workers With Measurable Dose | Collective Dose (person-rem) | Average Measurable Dose (rem) |
|---|---|---|---|---|---|---|
| **1999** | Single Location | 21 | 266 | 50 | 7 | 0.14 |
| | Multiple Locations | 111 | 3,571 | 2,777 | 1,544 | 0.56 |
| | **Total** | **132** | **3,837** | **2,827** | **1,551** | **0.55** |
| **2000** | Single Location | 21 | 257 | 78 | 8 | 0.10 |
| | Multiple Locations | 108 | 3,111 | 2,464 | 1,520 | 0.62 |
| | **Total** | **129** | **3,368** | **2,542** | **1,528** | **0.60** |
| **2001** | Single Location | 19 | 256 | 79 | 6 | 0.07 |
| | Multiple Locations | 104 | 3,522 | 3,082 | 2,105 | 0.68 |
| | **Total** | **123** | **3,778** | **3,161** | **2,111** | **0.67** |

Figure 3.1 shows the number of workers with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose per worker for both types of Industrial Radiography facilities from 1973 through 2001. The collective TEDE, the number of workers with measurable TEDE, and the average measurable TEDE increased from 2000 to 2001. The average measurable TEDE increased by 12% from 0.60 rem in 2000 to 0.67 rem in 2001. Figures 3.2 and 3.3 show the collective dose distribution by dose range (see Section 3.1.8) for single location and multiple location radiography licensees. These graphs demonstrate that multiple location licensees consistently have individuals receiving dose in the higher dose ranges and routinely have 20% to 40% of the collective dose delivered to individuals above 2 rem. Since 1999, there have been increases in the percentage of dose for each dose range above 0.500 rem.

### *3.3.2 Manufacturing and Distribution Licenses, Type "A" Broad and Limited*

Manufacturing and Distribution 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 that may use many different radionuclides in many different ways and that have a comprehensive radiation protection program. Some Type "A" Broad license 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, diagnoses, and therapy. The Limited licenses are usually issued to smaller firms requiring a more restrictive license. Limited firms are suppliers of industrial radionuclides and are involved in the processing, encapsulation, packaging, and distribution of the radionuclides that they have purchased in bulk quantities from production reactors and cyclotrons. Major products include gamma radiography sources, cobalt irradiation sources, well logging sources, sealed sources for gauges and smoke detectors, and radio-chemicals for

**TABLE 3.5**
Annual Exposure Information for Manufacturers and Distributors
1999 - 2001

| Year | Type of License | Number of Licensees | Number of Monitored Individuals | Workers With Measurable Dose | Collective Dose (person-rem) | Average Measurable Dose (rem) |
|---|---|---|---|---|---|---|
| **1999** | M & D - "A" - Broad | 5 | 1,261 | 352 | 347 | 0.99 |
| | M & D - Limited | 34 | 920 | 484 | 72 | 0.15 |
| | **Total** | **39** | **2,181** | **836** | **419** | **0.50** |
| **2000** | M & D - "A" - Broad | 4 | 1,351 | 419 | 298 | 0.71 |
| | M & D - Limited | 35 | 1,110 | 769 | 118 | 0.15 |
| | **Total** | **39** | **2,461** | **1,188** | **415** | **0.35** |
| **2001** | M & D - "A" - Broad | 4 | 616 | 351 | 232 | 0.66 |
| | M & D - Limited | 30 | 1,213 | 859 | 119 | 0.14 |
| | **Total** | **34** | **1,829** | **1,210** | **351** | **0.29** |

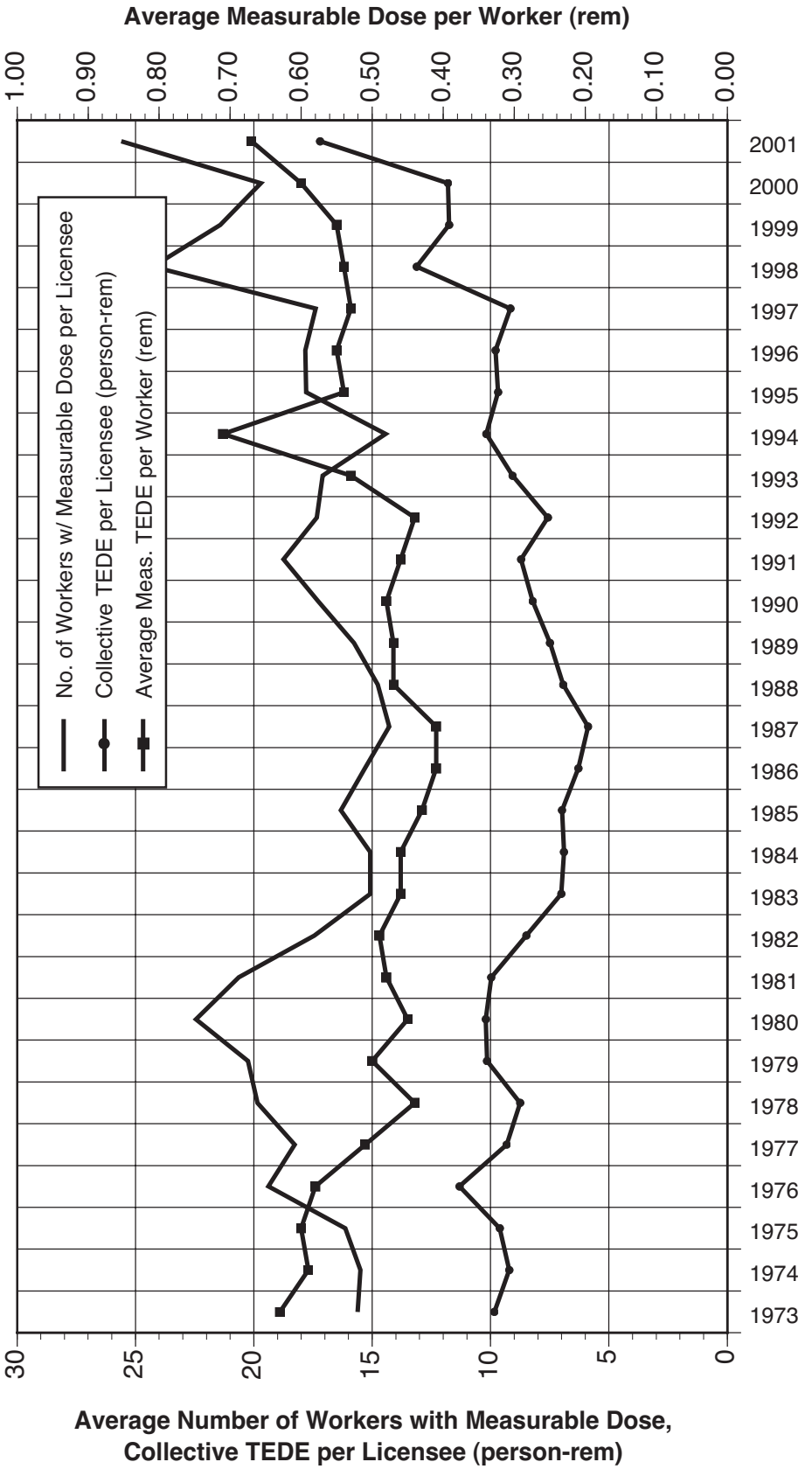



***FIGURE 3.1.*** Average Annual Values at Industrial Radiography Facilities 1973 - 2001

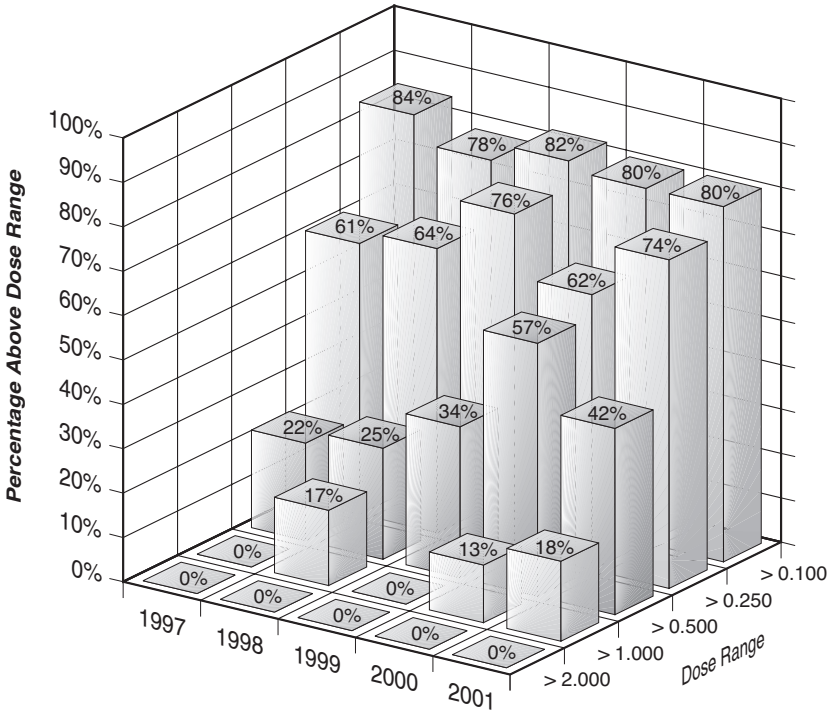



**FIGURE 3.2.** Collective TEDE Distribution by Dose Range
Industrial Radiographer – Single Location Licensees
1997 - 2001

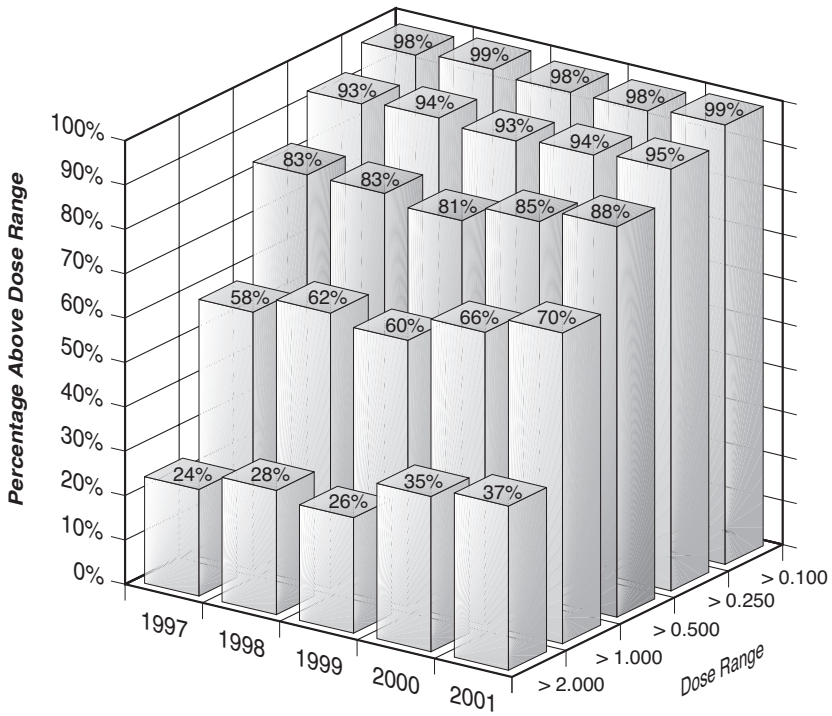



**FIGURE 3.3.** Collective TEDE Distribution by Dose Range
Industrial Radiographer – Multiple Location Licensees
1997 - 2001

nonmedical research. However, only those NRC licensees that possess or use at any one time specified quantities of the nuclides listed in paragraph 10 CFR 20.2206(a)(7) are required to submit reports to the NRC.

Table 3.5 presents the annual data that were reported by the two types of licensees for 2001 and the previous 2 years. 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, it should be noted that the types and quantities of radionuclides may fluctuate from year to year, and even during the year. For this reason, 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. Because the number of reporting licensees is quite small, these fluctuations may have a significant impact on the values of the parameters.

Figure 3.4 shows the number of workers with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose per worker for both Type "A" Broad and Limited Manufacturing and Distribution facilities. The figures for Type "A" Broad licensees are primarily attributed to Mallinckrodt Medical, Inc., which accounted for over 93% of the collective dose for this category of licensee in 2001. Several of the Type "A" Broad licensees that have reported significant dose in prior years have been transferred to Agreement State licensees. Figures 3.5 and 3.6 show the collective dose distribution by dose range (see Section 3.1.8) for Type "A" Broad and Limited Manufacturing and Distribution licensees. These graphs clearly show that the Type "A" Broad licensees consistently have individuals receiving dose in the higher dose ranges. For 1997 through 2000, over 55% of the collective dose was received by individuals above 2 rem. In 2001, this percentage decreased for the second consecutive year to 40%. Limited licensees exhibit a distribution of the collective dose where individuals below 0.500 rem receive most of the collective dose. However, the percentage of the collective dose above 1 rem has increased for the past 2 years.

Appendix A lists the contribution that each of these licensees made toward the total values of the number of workers monitored, number of workers, and collective dose for 2001.

### *3.3.3 Low-Level Waste Disposal Licenses*

Low-Level Waste Disposal licenses are issued to allow the receipt, possession, and disposal of low-level radioactive wastes at a land disposal facility. The licensee has the appropriate facilities to receive wastes from such places as hospitals and laboratories, store them for a short time, and dispose of them in a properly prepared burial ground. The licensees in this category are located in and licensed by Agreement States which have primary regulatory authority over the licensees' activity. Since 1999, no licensees have conducted these activities that are not in Agreement States; therefore, there are no licensees reporting radiation exposure data to REIRS. Figure 3.7 shows the number of workers with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose per worker for Low-Level Waste Disposal facilities from 1982 through 1998. Figure 3.8 shows the collective dose distribution by dose range (see Section 3.1.8) for Low-Level Waste Disposal licensees for the past 5 years.

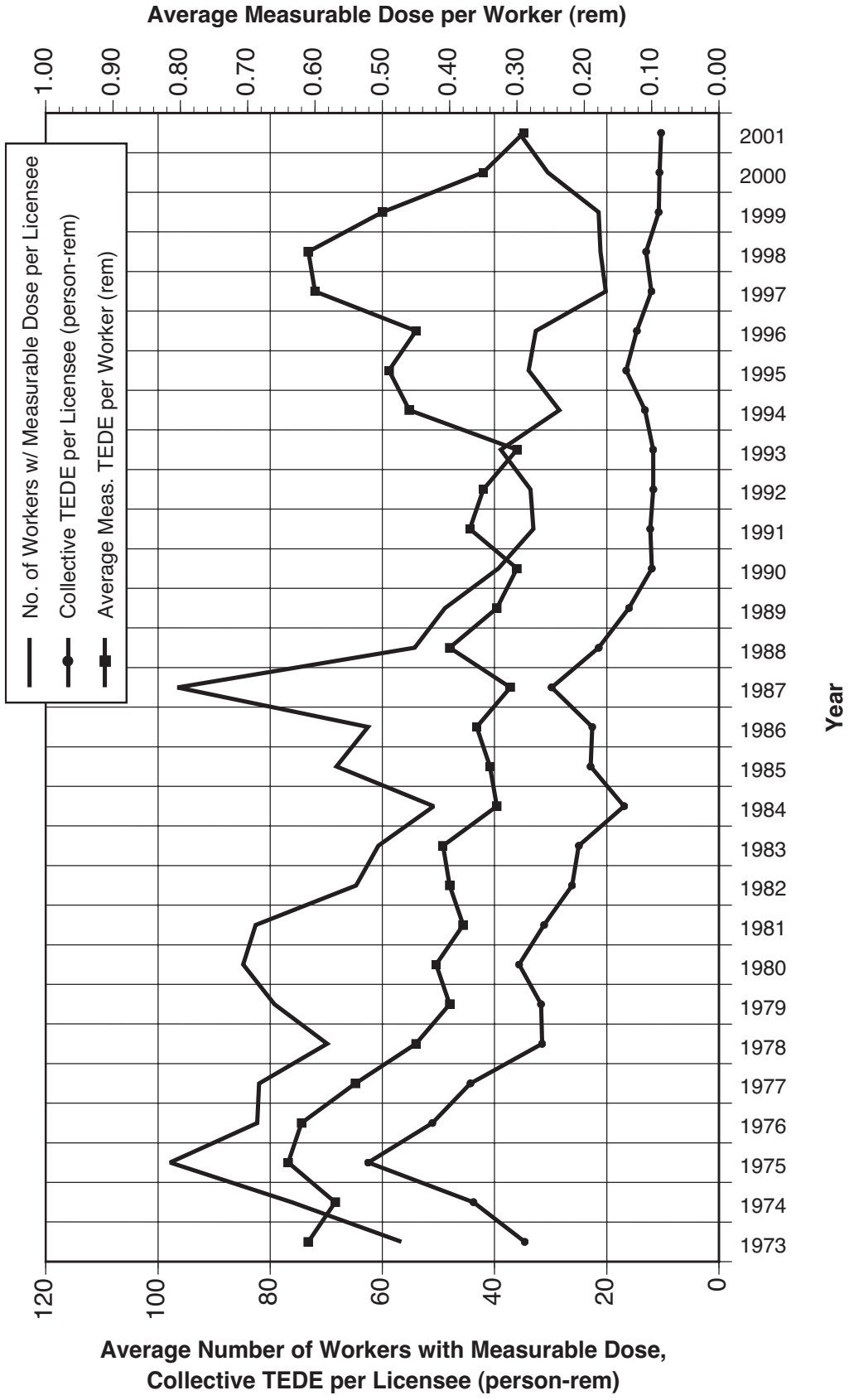



**FIGURE 3.4.** Average Annual Values at Manufacturing and Distribution Facilities 1973 - 2001

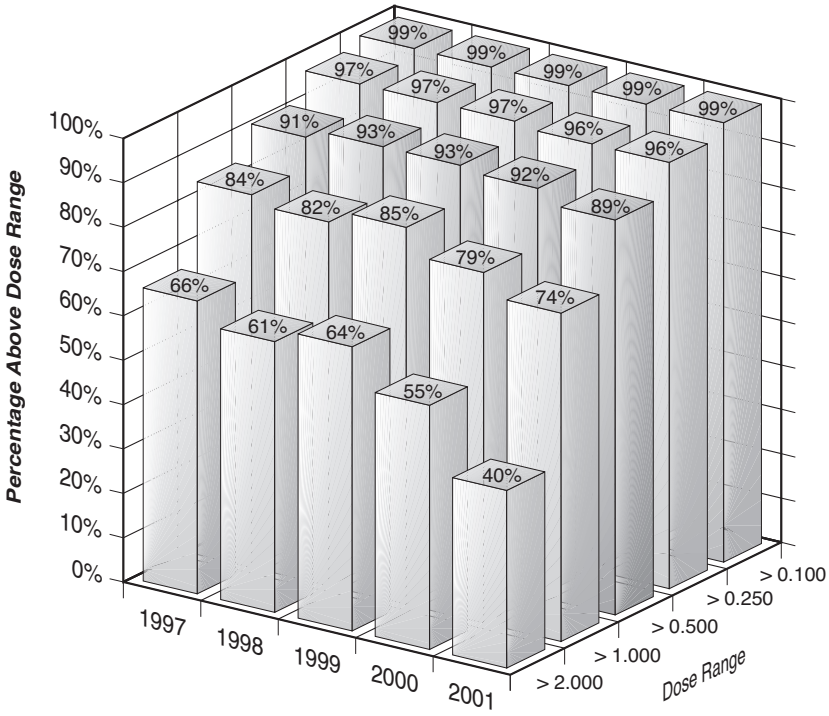



**FIGURE 3.5.** Collective TEDE Distribution by Dose Range
Type "A" Broad Manufacturing and Distribution Licensees
1997 - 2001

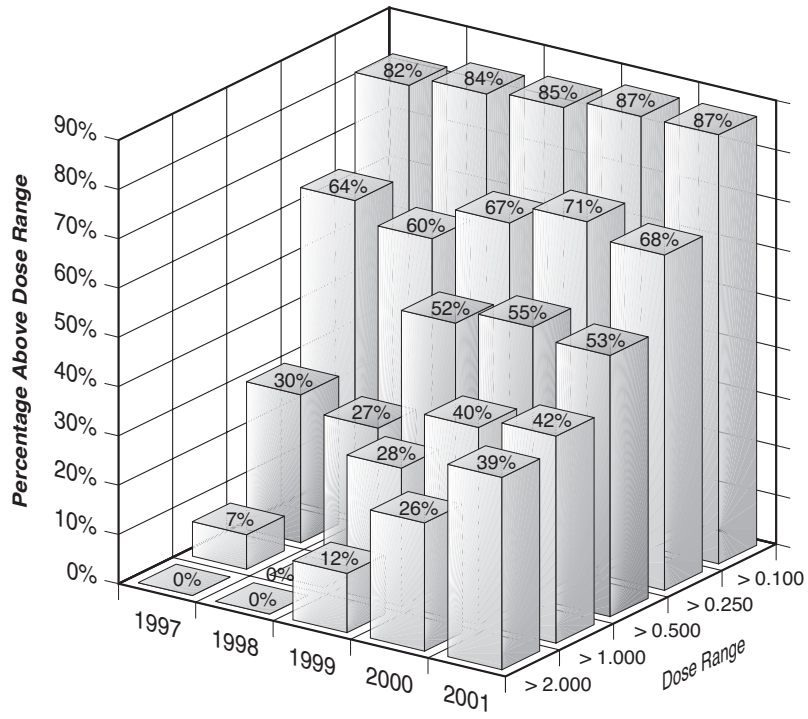



**FIGURE 3.6.** Collective TEDE Distribution by Dose Range
Limited Manufacturing and Distribution Licensees
1997 - 2001

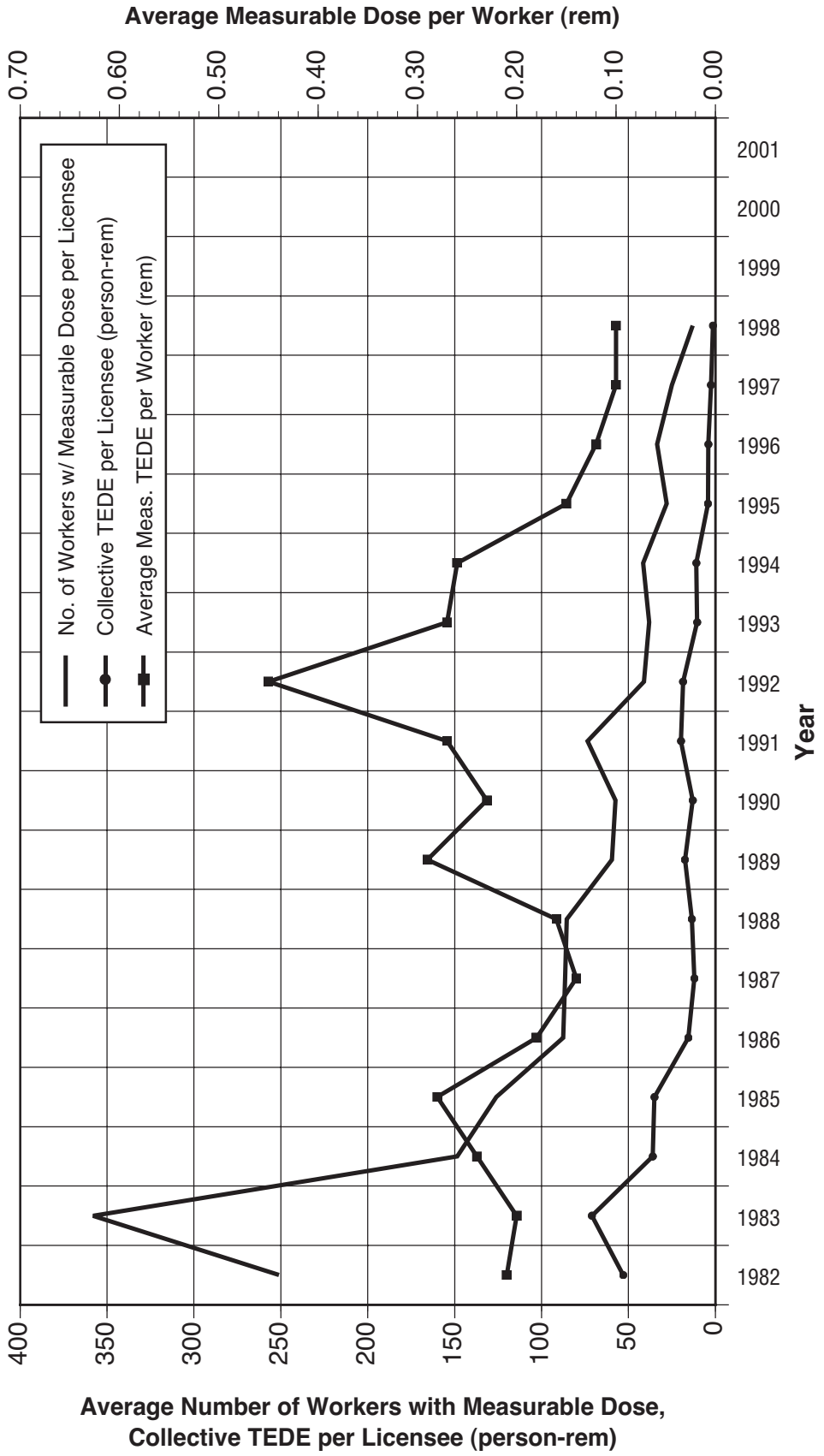



**FIGURE 3.7.** Average Annual Values at Low-Level Waste Disposal Facilities
1982 - 1998

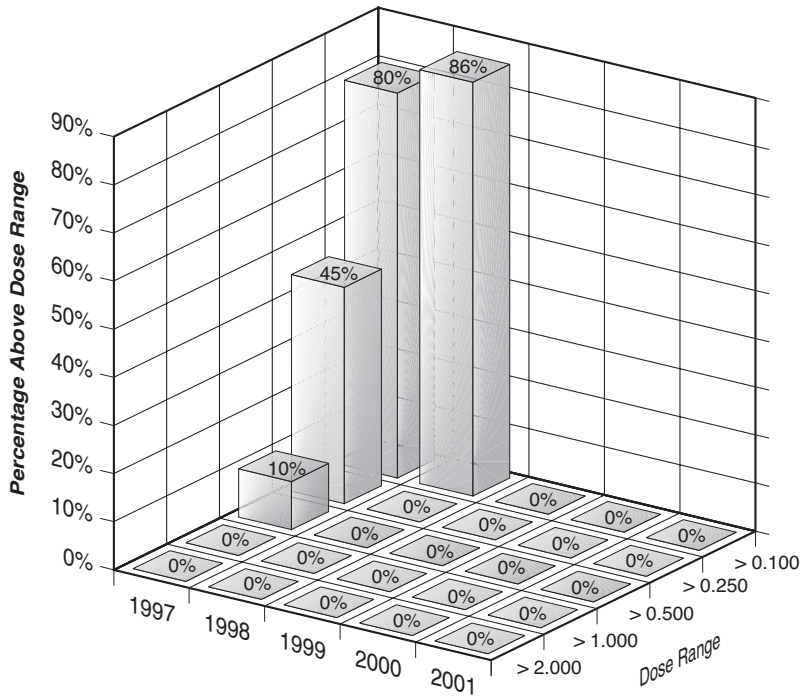
Note: As of 1999, there are no longer any NRC licensees involved in this activity. All low-level waste disposal facilities are now located in Agreement States and no longer report to the NRC.

### *3.3.4 Independent Spent Fuel Storage Installation Licenses*

Independent Spent Fuel Storage Installation (ISFSI) 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 ISFSI. Here, the spent fuel, which has undergone at least 1 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.

Forty-one licenses were authorized to conduct these activities during 2001. Eighteen of these licenses are for activities involving cask design and storage systems. Twenty-one are located at nuclear power plants allowing on-site temporary storage of fuel. These licensees report the dose from fuel storage activities along with the dose from reactor operations at these sites. The two remaining licenses are located at facilities that are independent of a reactor site. One is the GE Morris facility located in Illinois. The second site was included for the first time in 1999, and is a site in Idaho operated by DOE for the storage of fuel from Three Mile Island Unit 2. Appendix A summarizes the exposure information reported by these two installations.

Figure 3.9 shows the number of workers with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose per worker for ISFSI facilities. The large increase in the collective dose per licensee and number of workers per licensee in 1994 was mainly because only one licensee reported separately for 1994




Note: As of 1999, there are no longer any NRC licensees involved in this activity. All low-level waste disposal facilities are now located in Agreement States and no longer report to the NRC.

**FIGURE 3.8.** Collective TEDE Distribution by Dose Range
Low-Level Waste Disposal Licensees
1997 - 2001

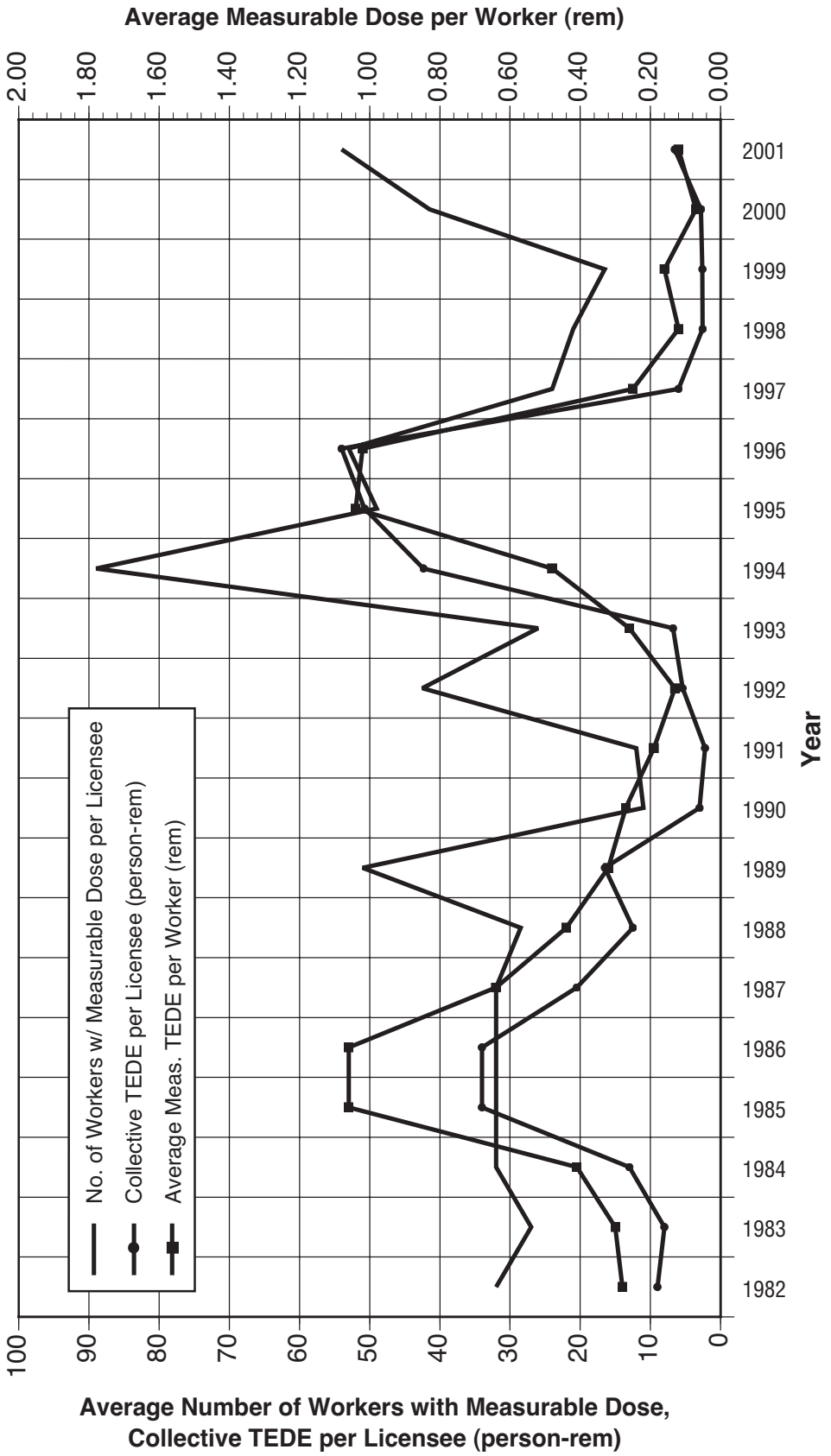



***FIGURE 3.9.*** Average Annual Values at Independent Spent Fuel Storage Facilities 1982 - 2001

through 1998, rather than the two licensees that reported in prior years. All parameters decreased significantly from 1996 to 2000, but have increased from 2000 to 2001. This is due to increases in the number of workers with measurable dose and the collective dose reported by DOE from the storage of the TMI-2 fuel. Figure 3.10 shows the collective dose distribution by dose range (see Section 3.1.8) for ISFSI licensees from 1997 to 2001. The percentages for each dose range have decreased significantly since 1997.

### *3.3.5 Fuel Cycle Licenses*

Fuel cycle licenses are issued to allow the processing, enrichment, and fabrication of reactor fuels. In most uranium facilities where light water reactor (LWR) fuels are fabricated, enriched uranium hexafluoride is converted to solid uranium dioxide pellets and inserted into zirconium alloy tubes. The tubes are fabricated into fuel assemblies that are shipped to nuclear power plants. Some facilities also perform chemical operations to recover the

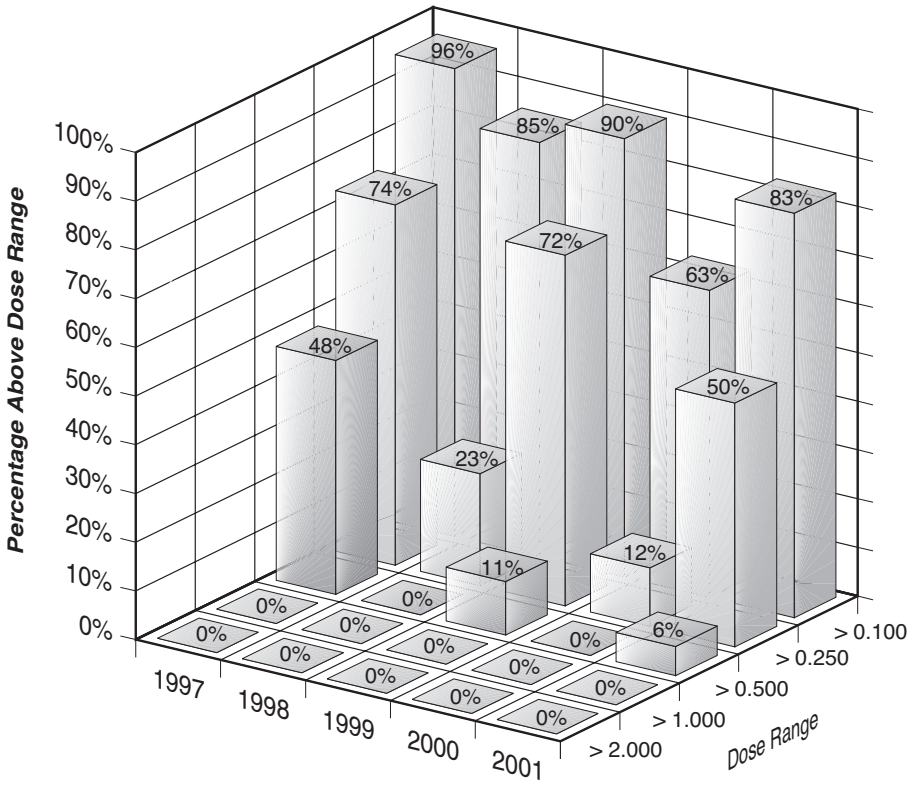



**FIGURE 3.10.** Collective TEDE Distribution by Dose Range
Independent Spent Fuel Storage Licensees
1997 - 2001

uranium from scrap and other off-specification materials prior to disposal of these materials. For 1997 to 2001, this category also includes the two uranium enrichment facilities at Portsmouth, Ohio, and Paducah, Kentucky. The regulatory oversight for these facilities was transferred from DOE to the NRC in 1997.

Figure 3.11 shows the number of workers with measurable dose per licensee, the total collective dose per licensee, and the average measurable dose per worker for Fuel Cycle licensees. In addition to the TEDE collective and average measurable dose, the Deep Dose Equivalent (DDE) collective dose and DDE average measurable dose are shown. Both doses are shown since the CEDE is a significant contribution to the TEDE for Fuel Fabrication facilities. Figure 3.12 shows the collective dose distribution by dose range (see Section 3.1.8) for Fuel Cycle licensees from 1997 to 2001. The distribution of collective dose has been fairly constant with a decreasing trend in the percentage in almost every dose range until 2000. In 2000, there was a three-fold increase in the number of individuals over 2 rem at Westinghouse Commercial Nuclear Fuel Division in South Carolina, which resulted in an increased percentage of the dose in each dose range for 2000 and 2001. Appendix A lists each of the licensees reporting in 2001, with the number of workers monitored, the number of workers receiving measurable external doses, and the collective dose for each licensee. Table 3.6 shows that there were 9 licensed Fuel Cycle (Fabrication and Enrichment) facilities reporting in 2001.

### *3.3.6 Light-Water-Cooled Power Reactor Licenses*

LWR licenses are issued to utilities to allow them to use special nuclear material in a reactor that produces heat to generate electricity to be sold to consumers. There are two major types of commercial LWRs in the United States – PWRs and BWRs, each of which uses water as the primary coolant.

Table 3.1 shows the number of licensees, total number of monitored workers, the number of workers with measurable dose, the total collective dose, and average dose per

**TABLE 3.6**
**Annual Exposure Information for Fuel Cycle Licenses**
**1999 - 2001**

| Year | Type of License | Number of Licensees | Number of Monitored Individuals | Workers With Meas. TEDE | Collective TEDE (person-rem) | Average Meas. TEDE (rem) | Workers With Meas. DDE | Collective DDE (person-rem) | Average Meas. DDE (rem) | Workers With Meas. CEDE | Collective CEDE (person-rem) | Average Meas. CEDE (rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1999 | Fuel Cycle | 9 | 9,693 | 3,927 | 1,020 | 0.26 | 3,207 | 247 | 0.08 | 2,462 | 773 | 0.31 |
| 2000 | Fuel Cycle | 9 | 9,336 | 4,649 | 1,339 | 0.29 | 3,582 | 406 | 0.11 | 2,784 | 934 | 0.34 |
| 2001 | Fuel Cycle | 9 | 8,145 | 3,980 | 1,162 | 0.29 | 3,295 | 362 | 0.11 | 2,577 | 800 | 0.31 |

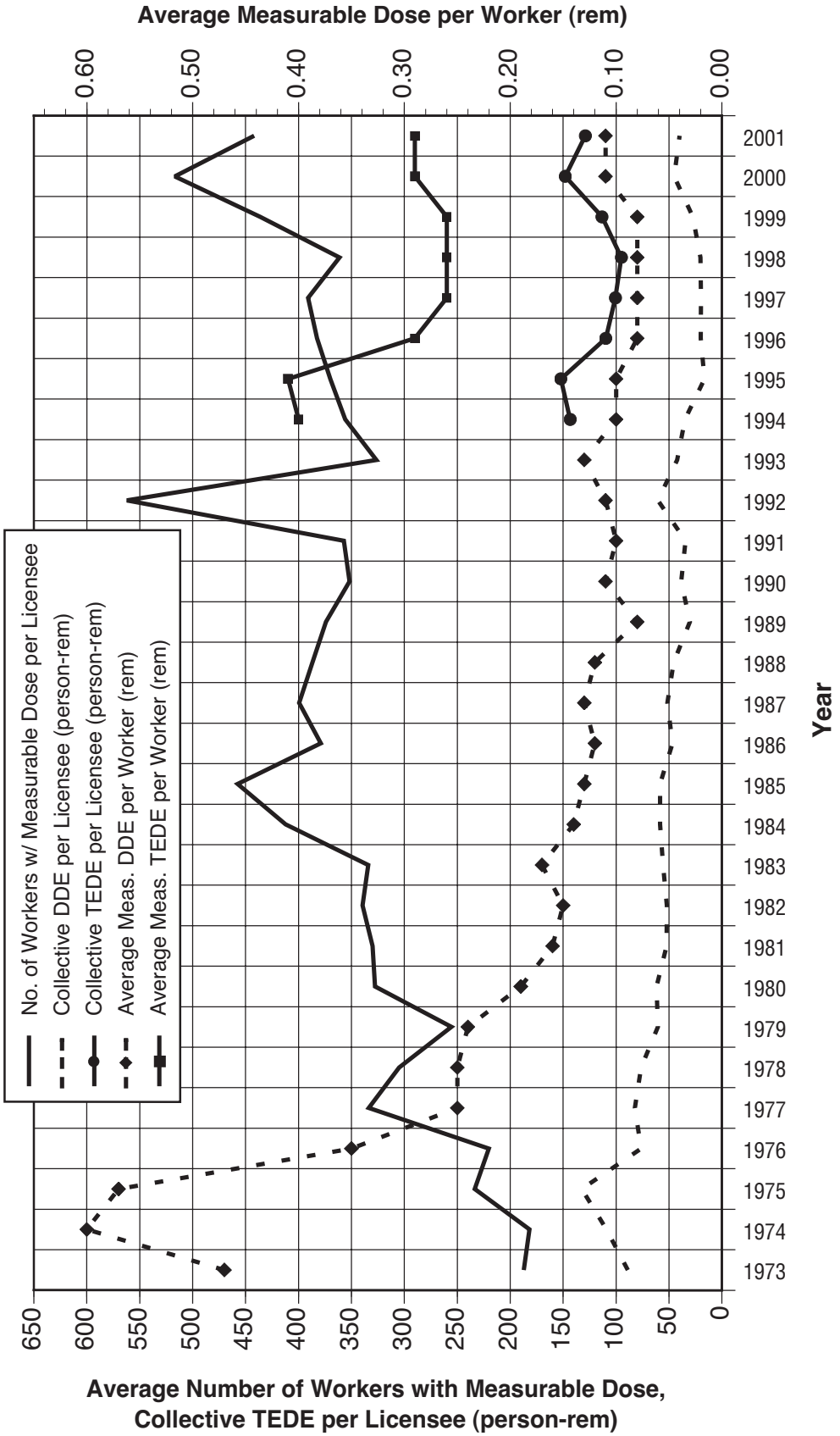



**FIGURE 3.11.** Average Annual Values at Fuel Cycle Licensees 1973 - 2001

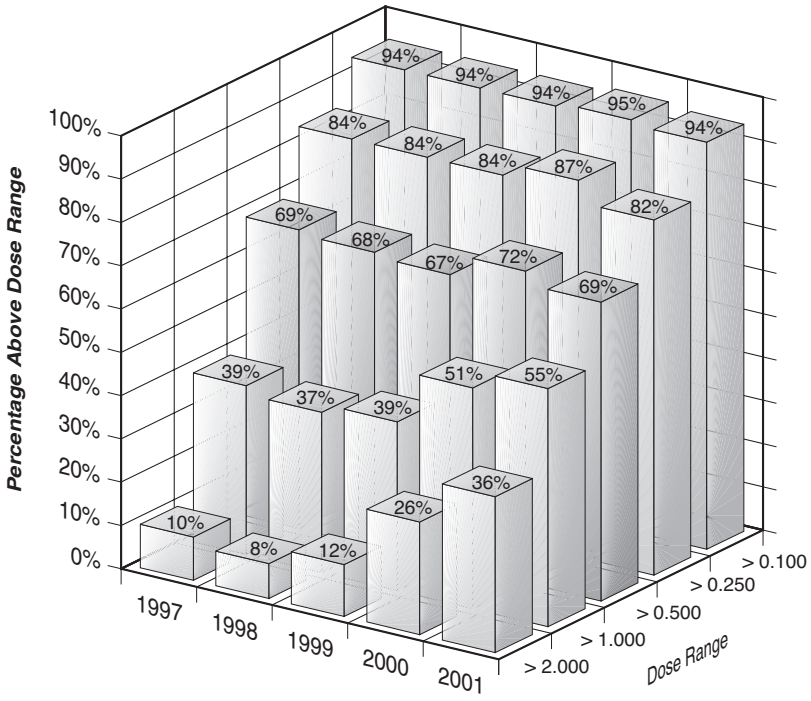



**FIGURE 3.12.** Collective TEDE Distribution by Dose Range
Fuel Cycle Licensees
1997 - 2001

worker for reactor facilities that were in commercial operation for a full year for each of the years 1992 through 2001. The values do not include reactors that have been shut down or were not yet in commercial operation. These figures have been adjusted for the multiple counting of transient workers (see Section 5). The reported dose distribution of workers monitored at each plant site for the year 2001 is presented in alphabetical order by site name in Appendix B.

Figure 3.13 shows the collective dose distribution by dose range (see Section 3.1.8) for Reactor licensees from 1997 to 2001. The distribution of collective dose has been fairly constant with a decreasing trend in the percentage in every dose range over the past 5 years.

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

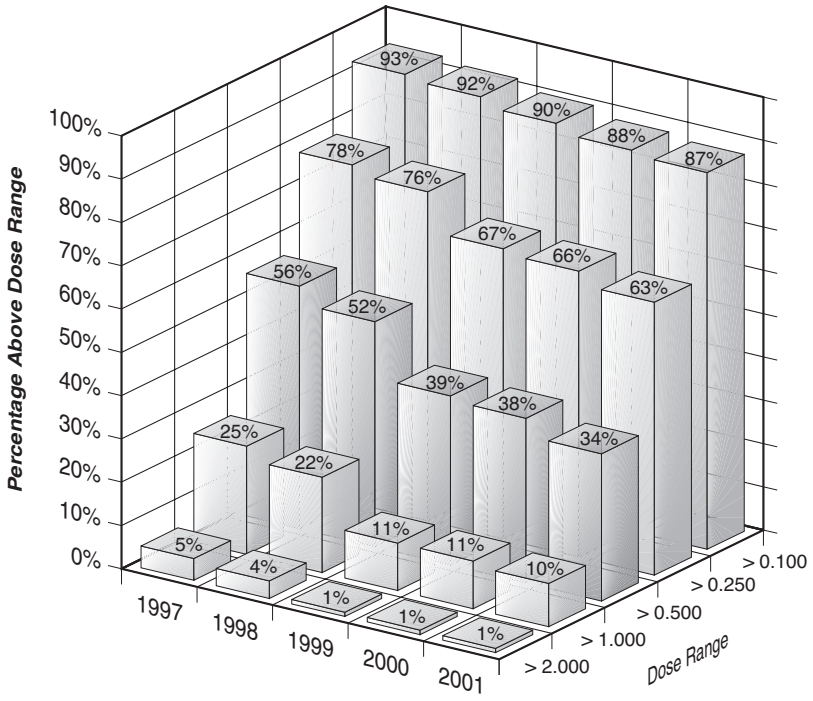



**FIGURE 3.13.** Collective TEDE Distribution by Dose Range
Reactor Licensees
1997 - 2001

## 3.4 SUMMARY OF INTAKE DATA BY LICENSE CATEGORY

With the revision of 10 CFR 20 in 1994, licensees were required to report additional data to the NRC concerning intakes of radioactive material. Licensees were required to list for each intake the radionuclide that was taken into the body, the pulmonary clearance class, intake mode, and amount of the intake in microcuries. An NRC Form 5 report containing this information is required to be completed and submitted to the NRC under 10 CFR 20.2206.

Tables 3.7 and 3.8 summarize the intake data reported to the NRC during 2001. The data are categorized by licensee type and are listed in order of radionuclide and pulmonary clearance class. Table 3.7 lists the intakes where the mode of intake into the body was recorded as ingestion. Table 3.8 lists the intakes where the mode of intake was inhalation from ambient airborne radioactive material in the workplace. The pulmonary clearance class is recorded as D, W, or Y corresponding to its clearance half-time in the order of **d**ays, **w**eeks, or **y**ears from the pulmonary region of the lung into the blood and gastrointestinal tract. The amount of material taken into the body is given in microcuries, a unit of measure of the quantity of radioactive material. For each category of licensee, the maximum number of intake records and the maximum intake is highlighted in the table in bold for ease of reference.

Table 3.9 lists the number of individuals with measurable CEDE, the collective CEDE, and the average measurable CEDE per individual for each licensee category. Fuel fabrication facilities have the majority of internal dose (99%) in 2001 and the highest average CEDE per individual. This is due to the worker's exposure to uranium during the processing and fabrication of the uranium fuel.

Table 3.10 shows the distribution of internal dose (CEDE) from 1994 to 2001 for licensees required to report under 10 CFR 20.2206. For the purposes of this table, the definition of a "measurable CEDE" is any reported value greater than zero. As noted above, the vast majority of the internal doses is received by individuals working at fuel fabrication facilities.

In 2001, the highest CEDE was 4.011 rem, received by an individual at Westinghouse Electric Company, a fuel fabrication facility. The individual received an intake of U-234, U-235, and U-238 from inhalation. The highest CDE was 34.887 rem to this same individual.

## TABLE 3.7

**Intake by Licensee Type and Radionuclide Mode of Intake – *Ingestion and Other***
**2001**

| Mode | Licensee Type | Program Code | Radionuclide | Number of Intake Records* | Collective Intake in Microcuries** | Collective Intake in Microcuries (sci. notation) |
|---|---|---|---|---|---|---|
| Ingestion | Power Reactors | 41111 | AG-110M | 1 | 0.055 | 5.50E-02 |
| | | 41111 | AM-241 | 27 | 0.003 | 2.84E-03 |
| | | 41111 | CE-144 | 2 | 0.001 | 1.43E-03 |
| | | 41111 | CM-242 | 25 | 0.000 | 2.14E-05 |
| | | 41111 | CM-243 | 26 | 0.001 | 9.85E-04 |
| | | 41111 | CM-244 | 1 | 0.000 | 1.56E-06 |
| | | 41111 | CO-58 | 13 | 0.102 | 1.02E-01 |
| | | 41111 | CO-60 | **43** | **0.452** | **4.52E-01** |
| | | 41111 | CS-134 | 1 | 0.259 | 2.59E-01 |
| | | 41111 | CS-137 | 2 | 0.315 | 3.15E-01 |
| | | 41111 | I-131 | 1 | 0.112 | 1.12E-01 |
| | | 41111 | MN-54 | 14 | 0.129 | 1.29E-01 |
| | | 41111 | NB-95 | 3 | 0.354 | 3.54E-01 |
| | | 41111 | PU-238 | 27 | 0.002 | 2.01E-03 |
| | | 41111 | PU-239 | 25 | 0.001 | 6.98E-04 |
| | | 41111 | PU-241 | 25 | 0.041 | 4.06E-02 |
| | | 41111 | RU-106 | 1 | 0.304 | 3.04E-01 |
| | | 41111 | SR-90 | 2 | 0.001 | 7.45E-04 |
| | | 41111 | ZR-95 | 2 | 0.266 | 2.66E-01 |

* An intake event may involve multiple nuclides, and individuals may incur multiple intakes during the year. The number of intake records given here indicates the number of separate intake reports that were submitted on NRC Form 5 reports under 10 CFR 20.2206.

** A microcurie is one millionth of a Curie.

## TABLE 3.8
Intake by Licensee Type and Radionuclide Mode of Intake – *Inhalation*
2001

| Licensee Type | Program Code | Radionuclide | Pulmonary Clearance Class | Number of Intake Records* | Collective Intake in Microcuries** | Collective Intake in Microcuries (sci. notation) |
|---|---|---|---|---|---|---|
| Nuclear Pharmacies | 02500 | I-123 | D | 4 | 2.800 | 2.80E+00 |
| | 02500 | I-131 | D | **39** | 0.402 | 4.02E-01 |
| | 02500 | I-131 | W | 38 | 0.520 | 5.20E-01 |
| | 02500 | TC-99M | D | 5 | **5,755.000** | **5.76E+03** |
| Manufacturing and Distribution | 03211 | I-131 | D | **1** | **0.641** | **6.41E-01** |
| Uranium Enrichment | 21200 | TC-99 | D | 10 | **8.331** | **8.33E+00** |
| | 21200 | TC-99 | W | 1 | 0.759 | 7.59E-01 |
| | 21200 | TH-230 | W | 2 | 0.000 | 2.27E-05 |
| | 21200 | U-234 | D | **85** | 0.033 | 3.31E-02 |
| Fuel Fabrication | 21210 | AM-241 | W | 172 | 0.001 | 1.34E-03 |
| | 21210 | PU-239 | W | 255 | 0.006 | 6.32E-03 |
| | 21210 | PU-239 | Y | 18 | 0.000 | 8.88E-05 |
| | 21210 | TC-99 | W | 1 | 0.000 | 1.10E-05 |
| | 21210 | TH-228 | W | 25 | 0.000 | 1.98E-04 |
| | 21210 | TH-228 | Y | 17 | 0.000 | 1.14E-06 |
| | 21210 | TH-230 | W | 23 | 0.000 | 7.68E-05 |
| | 21210 | TH-230 | Y | 17 | 0.000 | 5.24E-07 |
| | 21210 | TH-232 | Y | 258 | 0.002 | 2.23E-03 |
| | 21210 | U-234 | D | 721 | 0.364 | 3.64E-01 |
| | 21210 | U-234 | F | 1 | 0.004 | 3.60E-03 |
| | 21210 | U-234 | S | 311 | 1.678 | 1.68E+00 |
| | 21210 | U-234 | W | 484 | 0.042 | 4.18E-02 |
| | 21210 | U-234 | Y | **2,379** | **6.571** | **6.57E+00** |
| | 21210 | U-235 | D | 234 | 0.004 | 3.56E-03 |
| | 21210 | U-235 | S | 311 | 0.045 | 4.45E-02 |
| | 21210 | U-235 | Y | 1,063 | 0.165 | 1.65E-01 |
| | 21210 | U-236 | D | 233 | 0.000 | 1.40E-04 |
| | 21210 | U-236 | S | 204 | 0.003 | 2.92E-03 |
| | 21210 | U-236 | Y | 389 | 0.001 | 8.07E-04 |
| | 21210 | U-238 | D | 308 | 0.022 | 2.16E-02 |
| | 21210 | U-238 | S | 204 | 0.038 | 3.81E-02 |
| | 21210 | U-238 | W | 21 | 0.000 | 2.72E-04 |
| | 21210 | U-238 | Y | 2,000 | 3.022 | 3.02E+00 |
| Power Reactors | 41111 | AG-110M | Y | 5 | 0.681 | 6.81E-01 |
| | 41111 | AM-241 | W | 94 | 0.004 | 3.99E-03 |
| | 41111 | AM-241 | Y | 1 | 0.001 | 1.00E-03 |
| | 41111 | C-14 | D | 1 | 0.000 | 3.60E-06 |
| | 41111 | C-14 | Y | 4 | 0.002 | 1.99E-03 |
| | 41111 | CE-141 | W | 1 | 0.027 | 2.71E-02 |
| | 41111 | CE-141 | Y | 1 | 0.109 | 1.09E-01 |
| | 41111 | CE-144 | W | 3 | 0.017 | 1.70E-02 |
| | 41111 | CE-144 | Y | 1 | 0.072 | 7.20E-02 |
| | 41111 | CM-242 | W | 80 | 0.002 | 1.67E-03 |

* An intake event may involve multiple nuclides, and individuals may incur multiple intakes during the year. The number of intake records given here indicates the number of separate intake reports that were submitted on NRC Form 5 reports under 10 CFR 20.2206.

** A microcurie is one millionth of a Curie.

**TABLE 3.8** (continued)
**Intake by Licensee Type and Radionuclide Mode of Intake – *Inhalation***
**2001**

| Licensee Type | Program Code | Radionuclide | Pulmonary Clearance Class | Number of Intake Records* | Collective Intake in Microcuries** | Collective Intake in Microcuries (sci. notation) |
|---|---|---|---|---|---|---|
| Power Reactors (continued) | 41111 | CM-243 | W | 78 | 0.001 | 1.13E-03 |
| | 41111 | CM-244 | W | 2 | 0.000 | 2.60E-05 |
| | 41111 | CO-57 | Y | 6 | 0.039 | 3.90E-02 |
| | 41111 | CO-58 | D | 1 | 0.216 | 2.16E-01 |
| | 41111 | CO-58 | Y | 97 | **342.283** | **3.42E+02** |
| | 41111 | CO-60 | Y | **232** | 295.453 | 2.95E+02 |
| | 41111 | CR-51 | Y | 8 | 1.984 | 1.98E+00 |
| | 41111 | CS-134 | D | 7 | 0.658 | 6.58E-01 |
| | 41111 | CS-137 | D | 19 | 2.917 | 2.92E+00 |
| | 41111 | CS-137 | Y | 13 | 0.157 | 1.57E-01 |
| | 41111 | CU-64 | Y | 1 | 11.950 | 1.20E+01 |
| | 41111 | FE-55 | D | 1 | 0.000 | 1.40E-04 |
| | 41111 | FE-55 | W | 11 | 3.273 | 3.27E+00 |
| | 41111 | FE-59 | W | 14 | 1.619 | 1.62E+00 |
| | 41111 | FE-59 | Y | 1 | 0.100 | 1.00E-01 |
| | 41111 | H-3 | Y | 9 | 189.600 | 1.90E+02 |
| | 41111 | I-131 | D | 6 | 0.838 | 8.38E-01 |
| | 41111 | I-131 | Y | 2 | 0.059 | 5.86E-02 |
| | 41111 | MN-54 | W | 46 | 3.349 | 3.35E+00 |
| | 41111 | MN-54 | Y | 2 | 0.260 | 2.60E-01 |
| | 41111 | NB-95 | W | 6 | 1.121 | 1.12E+00 |
| | 41111 | NB-95 | Y | 9 | 0.337 | 3.37E-01 |
| | 41111 | NB-97 | W | 2 | 0.075 | 7.53E-02 |
| | 41111 | NI-63 | D | 1 | 0.006 | 5.50E-03 |
| | 41111 | NI-63 | W | 11 | 0.632 | 6.32E-01 |
| | 41111 | NP-237 | W | 10 | 0.000 | 1.30E-07 |
| | 41111 | PU-238 | W | 27 | 0.000 | 1.60E-04 |
| | 41111 | PU-238 | Y | 53 | 0.001 | 1.24E-03 |
| | 41111 | PU-239 | W | 27 | 0.000 | 6.09E-05 |
| | 41111 | PU-239 | Y | 42 | 0.000 | 4.51E-04 |
| | 41111 | PU-240 | Y | 10 | 0.000 | 2.74E-05 |
| | 41111 | PU-241 | W | 27 | 0.005 | 5.15E-03 |
| | 41111 | PU-241 | Y | 24 | 0.019 | 1.94E-02 |
| | 41111 | SB-124 | W | 2 | 0.010 | 1.02E-02 |
| | 41111 | SB-125 | W | 2 | 0.063 | 6.34E-02 |
| | 41111 | SN-113 | W | 6 | 0.037 | 3.66E-02 |
| | 41111 | SR-90 | Y | 1 | 0.000 | 3.40E-04 |
| | 41111 | TC-99 | W | 1 | 0.000 | 5.60E-09 |
| | 41111 | ZN-65 | Y | 13 | 1.676 | 1.68E+00 |
| | 41111 | ZR-95 | D | 2 | 0.034 | 3.40E-02 |
| | 41111 | ZR-95 | W | 6 | 1.761 | 1.76E+00 |
| | 41111 | ZR-95 | Y | 2 | 0.248 | 2.48E-01 |
| | 41111 | ZRNB-95 | Y | 1 | 0.146 | 1.46E-01 |

* An intake event may involve multiple nuclides, and individuals may incur multiple intakes during the year. The number of intake records given here indicates the number of separate intake reports that were submitted on NRC Form 5 reports under 10 CFR 20.2206.
** A microcurie is one millionth of a Curie.

## TABLE 3.9
### Collective and Average CEDE by Licensee
### 2001

| Licensee Type | Licensee Name | License Number | Number with Meas. CEDE | Collective CEDE (person-rem) | Average Meas. CEDE (rem) |
|---|---|---|---|---|---|
| Nuclear Pharmacies | EASTERN ISOTOPES, INC. | 45-25221-01MD | **11** | 0.022 | 0.002 |
| 02500 | SYNCOR INTERNATIONAL CORP. | 04-26507-01MD | 8 | **0.153** | **0.019** |
| | | **Total** | **19** | **0.175** | **0.009** |
| Manufactuing and Distribution | MALLINCKRODT INC. | 24-04206-01 | **1** | **0.021** | **0.021** |
| 03211 | | **Total** | **1** | **0.021** | **0.021** |
| Uranium Enrichment | U. S. ENRICHMENT CORP. - PADUCAH | GDP-1 | **51** | **0.088** | 0.002 |
| 21200 | U. S. ENRICHMENT CORP. - PORTSMOUTH | GDP-2 | 2 | 0.020 | **0.010** |
| | | **Total** | **53** | **0.108** | **0.002** |
| Fuel Fabrication | BWX TECHNOLOGIES, INC. | SNM-0042 | 319 | 46.579 | 0.146 |
| 21210 | WESTINGHOUSE ELECTRIC COMPANY, LLC | SNM-0033 | 164 | 43.801 | 0.267 |
| | FRAMATOME ANP, INC. | SNM-1168 | 31 | 2.438 | 0.079 |
| | FRAMATOME ANP, INC. | SNM-1227 | 329 | 62.123 | 0.189 |
| | GLOBAL NUCLEAR FUEL - AMERICAS, LLC | SNM-1097 | 609 | 55.638 | 0.091 |
| | NUCLEAR FUEL SERVICES, INC. | SNM-124 | **620** | 78.697 | 0.127 |
| | WESTINGHOUSE ELECTRIC COMPANY | SNM-1107 | 452 | **510.940** | **1.130** |
| | | **Total** | **2,524** | **800.216** | **0.317** |
| Power Reactors | ARKANSAS | DPR-51 | 4 | 0.087 | 0.022 |
| 41111 | BEAVER VALLEY | DPR-66 | 2 | 0.037 | 0.019 |
| | BROWNS FERRY | DPR-33 | 61 | 0.781 | 0.013 |
| | BRUNSWICK | DPR-62 | 8 | 0.174 | 0.022 |
| | CALLAWAY | NPF-30 | 16 | 0.220 | 0.014 |
| | CALVERT CLIFFS | DPR-53 | 11 | 0.240 | 0.022 |
| | CATAWBA | NPF-35 | 1 | 0.012 | 0.012 |
| | COLUMBIA GENERATING | NPF-21 | 4 | 0.090 | 0.023 |
| | COOK | DPR-58 | 157 | 0.437 | 0.003 |
| | COOPER STATION | DPR-46 | 9 | 0.060 | 0.007 |
| | DAVIS-BESSE | NPF-03 | 10 | 0.053 | 0.005 |
| | DRESDEN | DPR-19 | 1 | 0.015 | 0.015 |
| | FARLEY | NPF-02 | 2 | 0.046 | 0.023 |
| | FERMI | NPF-43 | 2 | 0.027 | 0.014 |
| | GRAND GULF | NPF-29 | 3 | 0.070 | 0.023 |
| | HADDAM NECK | DPR-61 | 25 | 0.234 | 0.009 |
| | INDIAN POINT 3 | DPR-64 | 1 | 0.018 | 0.018 |
| | LIMERICK | NPF-39 | 12 | 0.083 | 0.007 |
| | MAINE YANKEE | DPR-36 | 59 | 0.365 | 0.006 |
| | MILLSTONE POINT 1 | DPR-21 | 1 | 0.030 | 0.030 |
| | MONTICELLO | DPR-22 | 13 | 0.088 | 0.007 |
| | NINE MILE POINT | DPR-63 | 3 | 0.052 | 0.017 |
| | NORTH ANNA | NPF-04 | 3 | 0.085 | 0.028 |
| | OCONEE | DPR-38 | 32 | 0.940 | 0.029 |
| | OYSTER CREEK | DPR-16 | 2 | 0.037 | 0.019 |
| | PALISADES | DPR-20 | 41 | 1.231 | 0.030 |
| | PEACH BOTTOM | DPR-44 | 15 | 0.191 | 0.013 |
| | PILGRIM | DPR-35 | 22 | 0.175 | 0.008 |
| | PRAIRIE ISLAND | DPR-42 | 1 | 0.012 | 0.012 |
| | QUAD CITIES | DPR-29 | 2 | 0.080 | **0.040** |
| | RANCHO SECO | DPR-54 | 1 | 0.008 | 0.008 |
| | RIVER BEND | NPF-47 | 19 | 0.643 | 0.034 |
| | SAN ONOFRE | DPR-13 | 10 | 0.237 | 0.024 |
| | SEQUOYAH | DPR-77 | **360** | **1.495** | 0.004 |
| | ST. LUCIE | DPR-67 | 12 | 0.114 | 0.010 |
| | SURRY | DPR-32 | 1 | 0.003 | 0.003 |
| | SUSQUEHANNA | NPF-14 | 67 | 0.125 | 0.002 |
| | THREE MILE ISLAND 1 | DPR-50 | 15 | 0.089 | 0.006 |
| | TURKEY POINT | DPR-31 | 24 | 0.053 | 0.002 |
| | VERMONT YANKEE | DPR-28 | 47 | 0.505 | 0.011 |
| | VOGTLE | NPF-68 | 3 | 0.037 | 0.012 |
| | WATTS BAR | NPF-90 | 107 | 0.329 | 0.003 |
| | | **Total** | **1,189** | **9.608** | **0.008** |
| **Grand Totals** | | | **3,786** | **810.128** | **0.214** |

## TABLE 3.10
Internal Dose (CEDE) Distribution
1994 - 2001

| Year | Number of Individuals with CEDE in the Ranges (rem) | | | | | | | | | | Total with Meas. CEDE | Collective CEDE (person-rem) | Average Meas. CEDE (rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Meas. 0.020 | 0.020-0.100 | 0.100-0.250 | 0.250-0.500 | 0.500-0.750 | 0.750-1.000 | 1-2 | 2-3 | 3-4 | 4-5 | | | |
| 1994 | 3,425 | 577 | 287 | 351 | 196 | 138 | 293 | 69 | 2 | - | 5,338 | 1,033.688 | 0.194 |
| 1995 | 2,868 | 691 | 338 | 362 | 216 | 145 | 288 | 49 | 2 | - | 4,959 | 1,019.045 | 0.205 |
| 1996 | 3,096 | 598 | 305 | 317 | 190 | 121 | 185 | 22 | 2 | 2 | 4,838 | 741.373 | 0.153 |
| 1997 | 3,835 | 869 | 381 | 366 | 242 | 148 | 169 | 30 | - | - | 6,040 | 826.280 | 0.137 |
| 1998 | 3,310 | 932 | 426 | 355 | 230 | 140 | 153 | 21 | 2 | - | 5,569 | 779.148 | 0.140 |
| 1999 | 3,399 | 630 | 402 | 425 | 206 | 117 | 173 | 29 | - | - | 5,381 | 792.586 | 0.147 |
| 2000 | 3,248 | 891 | 514 | 373 | 214 | 98 | 224 | 58 | 7 | 1 | 5,628 | 969.792 | 0.172 |
| 2001 | 1,767 | 766 | 572 | 277 | 109 | 51 | 146 | 82 | 15 | 1 | 3,786 | 810.128 | 0.214 |

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Section 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, amount of electricity generated, and age of the reactor. Exposure data are 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 1 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 reactors that have been in commercial operation for less than 12 months during the first year and reactors that have been permanently defueled. This yields conservative values for many of the averages shown in the tables. The date that each reactor was declared to be in commercial operation was taken from Ref. 12.

Three Mile Island (TMI) 2 had been included in the compilation of data for commercially operating reactors through 1988 even though the reactor was shut down following the 1979 accident and has been in the process of defueling and decommissioning since that time. TMI 2 has not been included in the data analysis since 1988. Data for this reactor, however, will be listed in Appendix B for reference purposes. The dose data presented in Appendix D for TMI includes the dose data for Unit 2 prior to 1986.

There were no changes to the count of operating reactors in 2001. The number of operating BWRs remains the same as in 2000 at 35 and the number of operating PWRs remains the same at 69. The dose information for these reactors and others that are no longer in commercial operation are listed at the end of Appendix B.

### *4.2.2 Electric Energy Generated*

The electric energy generated in megawatt years (MW yr) each year by each reactor is graphically represented in Appendix D. This number was obtained by dividing the 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. For the years 1973 to 1996, the electricity generated is the gross electricity output of the reactor. For 1997 to 2001, the number

## TABLE 4.1
### Summary of Information Reported by Commercial Boiling Water Reactors
### 1973 - 2001

| Year | Number of Reactors Included* | Annual Collective Dose (person-rem) | No. of Workers With Measurable Dose** | Electricity Generated*** (MW-yrs) | Average Measurable Dose Per Worker (rem)** | Average Collective Dose Per Reactor (person-rem) | 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) | Percent of Maximum Dependable Capacity Achieved |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1973 | 12 | 4,564 | 5,340 | 3,393.9 | 0.85 | 380 | 445 | 1.34 | 283 | 438 | 65% |
| 1974 | 14 | 7,095 | 8,769 | 4,060.2 | 0.81 | 507 | 626 | 1.75 | 290 | 485 | 60% |
| 1975 | 18 | 12,633 | 17,350 | 5,786.4 | 0.73 | 702 | 964 | 2.18 | 321 | 595 | 54% |
| 1976 | 22 | 12,298 | 16,927 | 8,137.9 | 0.73 | 559 | 769 | 1.51 | 370 | 630 | 59% |
| 1977 | 23 | 19,054 | 21,515 | 9,102.5 | 0.89 | 828 | 935 | 2.09 | 396 | 637 | 62% |
| 1978 | 25 | 15,257 | 20,381 | 11,856.0 | 0.75 | 610 | 815 | 1.29 | 474 | 660 | 72% |
| 1979 | 25 | 18,251 | 25,425 | 11,671.0 | 0.72 | 730 | 1,017 | 1.56 | 467 | 660 | 71% |
| 1980 | 26 | 29,472 | 34,220 | 10,868.2 | 0.86 | 1,134 | 1,316 | 2.71 | 418 | 663 | 63% |
| 1981 | 26 | 25,490 | 34,873 | 10,899.2 | 0.73 | 980 | 1,341 | 2.34 | 419 | 663 | 63% |
| 1982 | 26 | 24,447 | 32,318 | 10,614.6 | 0.76 | 940 | 1,243 | 2.30 | 408 | 663 | 62% |
| 1983 | 26 | 27,467 | 33,581 | 9,730.1 | 0.82 | 1,056 | 1,292 | 2.82 | 374 | 663 | 56% |
| 1984 | 27 | 27,111 | 41,315 | 10,019.2 | 0.66 | 1,004 | 1,530 | 2.71 | 371 | 754 | 49% |
| 1985 | 29 | 20,578 | 38,336 | 12,284.0 | 0.54 | 710 | 1,322 | 1.68 | 424 | 775 | 55% |
| 1986 | 30 | 19,353 | 37,999 | 12,102.1 | 0.51 | 645 | 1,267 | 1.60 | 403 | 786 | 51% |
| 1987 | 32 | 16,722 | 41,806 | 15,109.0 | 0.40 | 523 | 1,306 | 1.11 | 472 | 832 | 57% |
| 1988 | 34 | 17,986 | 40,371 | 16,665.4 | 0.45 | 529 | 1,187 | 1.08 | 490 | 845 | 58% |
| 1989 | 36 | 15,550 | 44,384 | 17,543.5 | 0.35 | 432 | 1,233 | 0.89 | 487 | 857 | 57% |
| 1990 | 37 | 15,781 | 41,585 | 21,336.1 | 0.38 | 427 | 1,124 | 0.74 | 577 | 862 | 67% |
| 1991 | 37 | 12,007 | 38,508 | 21,505.8 | 0.31 | 325 | 1,041 | 0.56 | 581 | 860 | 68% |
| 1992 | 37 | 13,312 | 42,107 | 20,592.2 | 0.32 | 360 | 1,138 | 0.65 | 557 | 859 | 65% |
| 1993 | 37 | 12,221 | 39,352 | 21,995.6 | 0.31 | 330 | 1,064 | 0.56 | 594 | 798 | 74% |
| 1994 | 37 | 12,098 | 39,171 | 22,139.0 | 0.31 | 327 | 1,059 | 0.55 | 598 | 801 | 75% |
| 1995 | 37 | 9,471 | 35,686 | 24,737.0 | 0.27 | 256 | 964 | 0.38 | 669 | 835 | 80% |
| 1996 | 37 | 9,466 | 37,792 | 24,322.2 | 0.25 | 256 | 1,021 | 0.39 | 657 | 838 | 78% |
| 1997 | 37 | 7,603 | 34,021 | 22,866.1 | 0.22 | 205 | 919 | 0.33 | 618 | 845 | 73% |
| 1998 | 36 | 6,829 | 32,899 | 23,781.2 | 0.21 | 190 | 914 | 0.29 | 661 | 874 | 76% |
| 1999 | 35 | 6,434 | 31,482 | 26,962.6 | 0.20 | 184 | 899 | 0.24 | 770 | 885 | 87% |
| 2000 | 35 | 6,090 | 31,186 | 28,476.9 | 0.20 | 174 | 891 | 0.21 | 814 | 893 | 91% |
| 2001 | 35 | 4,835 | 28,797 | 28,730.4 | 0.17 | 138 | 823 | 0.17 | 821 | 895 | 92% |

* 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.
** Figures are not adjusted for the multiple reporting of transient individuals. See Section 5.
*** Electricity Generated reflects the gross electricity generated for the years 1973 - 1996. Beginning in 1997, it reflects the net electricity generated.

## TABLE 4.2
### Summary of Information Reported by Commercial Pressurized Water Reactors
### 1973 - 2001

| Year | Number of Reactors Included* | Annual Collective Dose (person-rem) | No. of Workers With Measurable Dose** | Electricity Generated*** (MW-yrs) | Average Measurable Dose Per Worker (rem)** | Average Collective Dose Per Reactor (person-rem) | 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) | Percent of Maximum Dependable Capacity Achieved |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1973 | 12 | 9,398 | 9,440 | 3,770.2 | 1.00 | 783 | 787 | 2.49 | 314 | 544 | 58% |
| 1974 | 19 | 6,555 | 9,370 | 6,530.7 | 0.70 | 345 | 493 | 1.00 | 344 | 591 | 58% |
| 1975 | 26 | 8,268 | 10,884 | 11,982.5 | 0.76 | 318 | 419 | 0.69 | 461 | 647 | 71% |
| 1976 | 30 | 13,807 | 17,588 | 13,325.0 | 0.79 | 460 | 586 | 1.04 | 444 | 701 | 63% |
| 1977 | 34 | 13,467 | 20,878 | 17,345.8 | 0.65 | 396 | 614 | 0.78 | 510 | 688 | 74% |
| 1978 | 39 | 16,528 | 25,700 | 19,840.5 | 0.64 | 424 | 659 | 0.83 | 509 | 706 | 72% |
| 1979 | 42 | 21,657 | 38,828 | 18,255.0 | 0.56 | 516 | 924 | 1.19 | 435 | 746 | 58% |
| 1980 | 42 | 24,267 | 46,237 | 18,289.3 | 0.52 | 578 | 1,101 | 1.33 | 435 | 746 | 58% |
| 1981 | 44 | 28,673 | 47,351 | 20,553.7 | 0.61 | 652 | 1,076 | 1.40 | 467 | 752 | 62% |
| 1982 | 48 | 27,754 | 52,149 | 22,140.6 | 0.53 | 578 | 1,086 | 1.25 | 461 | 777 | 59% |
| 1983 | 49 | 29,017 | 52,170 | 23,195.5 | 0.56 | 592 | 1,065 | 1.25 | 473 | 785 | 60% |
| 1984 | 51 | 28,140 | 56,994 | 26,478.4 | 0.49 | 552 | 1,118 | 1.06 | 519 | 809 | 64% |
| 1985 | 53 | 22,470 | 54,632 | 29,470.7 | 0.41 | 424 | 1,031 | 0.76 | 556 | 820 | 68% |
| 1986 | 60 | 23,033 | 62,998 | 33,593.0 | 0.37 | 384 | 1,050 | 0.69 | 560 | 878 | 64% |
| 1987 | 64 | 23,684 | 62,597 | 37,007.3 | 0.38 | 370 | 978 | 0.64 | 578 | 900 | 64% |
| 1988 | 68 | 22,786 | 62,923 | 42,929.7 | 0.36 | 335 | 925 | 0.53 | 631 | 885 | 71% |
| 1989 | 71 | 20,381 | 63,894 | 44,679.5 | 0.32 | 287 | 900 | 0.46 | 629 | 897 | 70% |
| 1990 | 73 | 20,821 | 67,082 | 46,955.6 | 0.31 | 285 | 919 | 0.44 | 643 | 907 | 71% |
| 1991 | 74 | 16,512 | 60,274 | 51,942.6 | 0.27 | 223 | 815 | 0.32 | 702 | 913 | 77% |
| 1992 | 73 | 15,985 | 61,048 | 53,419.8 | 0.26 | 219 | 836 | 0.30 | 732 | 923 | 79% |
| 1993 | 71 | 14,143 | 56,590 | 50,480.6 | 0.25 | 199 | 797 | 0.28 | 711 | 945 | 75% |
| 1994 | 72 | 9,606 | 44,811 | 54,618.3 | 0.21 | 133 | 622 | 0.18 | 759 | 932 | 81% |
| 1995 | 72 | 12,217 | 51,899 | 55,825.1 | 0.24 | 170 | 721 | 0.22 | 775 | 933 | 83% |
| 1996 | 72 | 9,417 | 46,852 | 55,337.8 | 0.20 | 131 | 651 | 0.17 | 769 | 935 | 82% |
| 1997 | 72 | 9,546 | 50,690 | 48,985.3 | 0.19 | 133 | 704 | 0.19 | 680 | 943 | 72% |
| 1998 | 69 | 6,358 | 38,586 | 53,288.7 | 0.16 | 92 | 559 | 0.12 | 772 | 942 | 82% |
| 1999 | 69 | 7,231 | 43,938 | 56,235.0 | 0.16 | 105 | 637 | 0.13 | 815 | 942 | 86% |
| 2000 | 69 | 6,562 | 42,922 | 57,529.9 | 0.15 | 95 | 622 | 0.11 | 834 | 943 | 88% |
| 2001 | 69 | 6,273 | 38,773 | 58,822.4 | 0.16 | 91 | 562 | 0.11 | 852 | 946 | 90% |

* 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.
** Figures are not adjusted for the multiple reporting of transient individuals. See Section 5.
*** Electricity Generated reflects the gross electricity generated for the years 1973 - 1996. Beginning in 1997, it reflects the net electricity generated.

## TABLE 4.3
### Summary of Information Reported by Commercial Light Water Reactors
### 1973 - 2001

| Year | Number of Reactors Included* | Annual Collective Dose (person-rem) | No. of Workers With Measurable Dose** | Electricity Generated*** (MW-yrs) | Average Measurable Dose Per Worker (rem)** | Average Collective Dose Per Reactor (person-rem) | 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) | Percent of Maximum Dependable Capacity Achieved |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1973 | 24 | 13,962 | 14,780 | 7,164.1 | 0.94 | 582 | 616 | 1.95 | 299 | 491 | 61% |
| 1974 | 33 | 13,650 | 18,139 | 10,590.9 | 0.75 | 414 | 550 | 1.29 | 321 | 546 | 59% |
| 1975 | 44 | 20,901 | 28,234 | 17,768.9 | 0.74 | 475 | 642 | 1.18 | 404 | 626 | 65% |
| 1976 | 52 | 26,105 | 34,515 | 21,462.9 | 0.76 | 502 | 664 | 1.22 | 413 | 671 | 62% |
| 1977 | 57 | 32,521 | 42,393 | 26,448.3 | 0.77 | 571 | 744 | 1.23 | 464 | 667 | 70% |
| 1978 | 64 | 31,785 | 46,081 | 31,696.5 | 0.69 | 497 | 720 | 1.00 | 495 | 688 | 72% |
| 1979 | 67 | 39,908 | 64,253 | 29,926.0 | 0.62 | 596 | 959 | 1.33 | 447 | 714 | 63% |
| 1980 | 68 | 53,739 | 80,457 | 29,157.5 | 0.67 | 790 | 1,183 | 1.84 | 429 | 714 | 60% |
| 1981 | 70 | 54,163 | 82,224 | 31,452.9 | 0.66 | 774 | 1,175 | 1.72 | 449 | 719 | 63% |
| 1982 | 74 | 52,201 | 84,467 | 32,755.2 | 0.62 | 705 | 1,141 | 1.59 | 443 | 737 | 60% |
| 1983 | 75 | 56,484 | 85,751 | 32,925.6 | 0.66 | 753 | 1,143 | 1.72 | 439 | 743 | 59% |
| 1984 | 78 | 55,251 | 98,309 | 36,497.6 | 0.56 | 708 | 1,260 | 1.51 | 468 | 790 | 59% |
| 1985 | 82 | 43,048 | 92,968 | 41,754.7 | 0.46 | 525 | 1,134 | 1.03 | 509 | 804 | 63% |
| 1986 | 90 | 42,386 | 100,997 | 45,695.1 | 0.42 | 471 | 1,122 | 0.93 | 508 | 847 | 60% |
| 1987 | 96 | 40,406 | 104,403 | 52,116.3 | 0.39 | 421 | 1,088 | 0.78 | 543 | 877 | 62% |
| 1988 | 102 | 40,772 | 103,294 | 59,595.1 | 0.39 | 400 | 1,013 | 0.68 | 584 | 871 | 67% |
| 1989 | 107 | 35,931 | 108,278 | 62,223.0 | 0.33 | 336 | 1,012 | 0.58 | 582 | 883 | 66% |
| 1990 | 110 | 36,602 | 108,667 | 68,291.7 | 0.34 | 333 | 988 | 0.54 | 621 | 892 | 70% |
| 1991 | 111 | 28,519 | 98,782 | 73,448.4 | 0.29 | 257 | 890 | 0.39 | 662 | 895 | 74% |
| 1992 | 110 | 29,297 | 103,155 | 74,012.0 | 0.28 | 266 | 938 | 0.40 | 673 | 901 | 75% |
| 1993 | 108 | 26,364 | 95,942 | 72,476.2 | 0.27 | 244 | 888 | 0.36 | 671 | 895 | 75% |
| 1994 | 109 | 21,704 | 83,982 | 76,757.3 | 0.26 | 199 | 770 | 0.28 | 704 | 888 | 79% |
| 1995 | 109 | 21,688 | 87,585 | 80,562.1 | 0.25 | 199 | 804 | 0.27 | 739 | 900 | 82% |
| 1996 | 109 | 18,883 | 84,644 | 79,660.0 | 0.22 | 173 | 777 | 0.24 | 731 | 902 | 81% |
| 1997 | 109 | 17,149 | 84,711 | 71,851.4 | 0.20 | 157 | 777 | 0.24 | 659 | 910 | 72% |
| 1998 | 105 | 13,188 | 71,485 | 77,069.9 | 0.18 | 126 | 681 | 0.17 | 734 | 918 | 80% |
| 1999 | 104 | 13,666 | 75,420 | 83,197.6 | 0.18 | 131 | 725 | 0.16 | 800 | 923 | 87% |
| 2000 | 104 | 12,652 | 74,108 | 86,006.8 | 0.17 | 122 | 713 | 0.15 | 827 | 926 | 89% |
| 2001 | 104 | 11,109 | 67,570 | 87,552.8 | 0.16 | 107 | 650 | 0.13 | 842 | 929 | 91% |

* 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.
** Figures are not adjusted for the multiple reporting of transient individuals. See Section 5.
*** Electricity Generated reflects the gross electricity generated for the years 1973 - 1996. Beginning in 1997, it reflects the net electricity generated.

reflects the net electricity produced, which is the gross electricity minus the amount the plant uses for operations. This change is the result of a change in NRC power generation reporting requirements. The electricity generated (in MW-yrs) that is presented in Tables 4.1, 4.2, and 4.3 is the summation of electricity generated by the number of reactors included in each year. These sums are divided by the number of operating reactors included in each year to yield the average amount of electric energy generated per reactor, which is also shown in Tables 4.1, 4.2, and 4.3. The number of megawatt hours of electricity produced each year was obtained from Ref. 12.

As shown in Table 4.3, there was a 2% increase in the net electricity generated at LWRs in 2001. Contributors to the increase include Cook and Indian Point 2, which resumed power near capacity, and Oyster Creek and Arkansas, which increased power generation by 34% and 27%, respectively. BWRs increased net electricity generated by less than 1%. PWRs increased net electric output by 2%.

### *4.2.3 Collective Dose per Megawatt-Year*

The number of MW-yrs of electricity generated was used in determining the ratio of the average value of the annual collective dose (TEDE) to the number of MW-yrs of electricity generated. The ratio was calculated by dividing the total collective dose in person-rem by the electric energy generated in MW-yrs and is a measure of the dose incurred by workers at power plants in relation to the electric energy produced. For the years 1973 to 1996, the electricity generated is the gross electricity output of the reactor. For 1997 to 2001, the number reflects the net electricity produced. This ratio, calculated by year for BWRs, PWRs, and LWRs, is presented in Tables 4.1, 4.2, and 4.3. This ratio was also calculated for each reactor site (see Appendix C). The average collective dose per MW-yr for LWRs decreased from 0.15 in 2000 to a value of 0.13 in 2001.

### *4.2.4 Average Maximum Dependable Capacity*

*Average maximum dependable capacity* as 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 Ref. 12.

### *4.2.5 Percent of Maximum Dependable Capacity Achieved*

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

From 1973 to 1978 this indicator exhibited an increasing trend as a number of new reactors began producing power at higher efficiencies. Following the accident at TMI, reactor operations personnel concentrated on improving safety systems and complying with the new regulations for these systems. During this time period, from 1979 to 1987, the percent of maximum dependable capacity remained around 61%. Following the completion of most of these mandated repairs, reactors have increased the percent of maximum dependable capacity from 62% in 1987 to 81% in 1996, a gain of nearly 20% in 10 years. The decrease in maximum dependable capacity from 1996 to 1997 was due to the change from measuring the gross electricity generated to the net electricity generated. The percent of maximum dependable capacity achieved has increased by 2% from 2000 to 2001.

## 4.3 ANNUAL TEDE DISTRIBUTIONS

Table 4.4 summarizes the distribution of the annual TEDE doses received by workers at all commercial LWRs during each of the years 1977 through 2001. This distribution is the sum of the annual dose distributions reported by each licensed LWR each year. As previously noted, the distribution reported by each LWR site for 2001 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). Table 4.4 includes only those reactors in operation for a full year for each year presented in the table. The total collective dose decreased by 12% to a value of 11,109 person-rem in 2001.

# TABLE 4.4
## Summary Distribution of Annual Whole Body Doses at Commercial Light Water Reactors*
## 1977 - 2001

| Year | No Measurable Exposure | Measurable <0.10 | Number of Individuals with Whole Body Doses in the Ranges (rem) | | | | | | | | | | | | | | | Total Number Monitored | Number with Measurable Exposure | Collective Dose** (person-rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 0.10-0.25 | 0.25-0.5 | 0.50-0.75 | 0.75-1.0 | 1.0-2.0 | 2.0-3.0 | 3.0-4.0 | 4.0-5.0 | 5.0-6.0 | 6.0-7.0 | 7.0-8.0 | 8.0-9.0 | 9.0-10.0 | 10.0-12.0 | >12 | | | |
| 1977 | 22,688 | 12,436 | 6,056 | 4,538 | 2,905 | 2,230 | 5,660 | 2,858 | 1,290 | 661 | 186 | 89 | 47 | 23 | 6 | - | - | 61,673 | 38,985 | 32,521 |
| 1978 | 26,360 | 15,165 | 6,349 | 5,010 | 3,094 | 2,255 | 5,984 | 3,050 | 1,194 | 517 | 110 | 37 | 9 | - | 1 | - | 2 | 69,137 | 42,777 | 31,785 |
| 1979 | 40,535 | 22,642 | 9,012 | 7,485 | 4,795 | 3,262 | 7,574 | 3,401 | 1,403 | 545 | 117 | 42 | 17 | 3 | 1 | - | - | 100,834 | 60,299 | 39,908 |
| 1980 | 44,716 | 26,990 | 10,697 | 8,913 | 5,573 | 4,139 | 10,672 | 4,607 | 1,816 | 831 | 235 | 119 | 29 | 7 | 1 | - | - | 119,345 | 74,629 | 53,739 |
| 1981 | 39,258 | 26,916 | 11,241 | 9,338 | 6,051 | 4,501 | 11,174 | 4,809 | 1,999 | 533 | 103 | 93 | 9 | 3 | 1 | - | 1 | 116,030 | 76,772 | 54,163 |
| 1982 | 41,704 | 29,278 | 11,734 | 9,907 | 6,235 | 4,422 | 10,220 | 4,716 | 2,066 | 596 | 97 | 31 | 5 | - | 1 | 1 | - | 121,013 | 79,309 | 52,201 |
| 1983 | 47,027 | 29,200 | 11,200 | 9,345 | 5,854 | 4,279 | 11,342 | 5,334 | 2,270 | 716 | 121 | 38 | 8 | 2 | - | - | - | 126,736 | 79,709 | 56,484 |
| 1984 | 54,637 | 36,488 | 13,438 | 10,277 | 6,338 | 4,804 | 11,284 | 5,208 | 2,122 | 487 | 52 | 22 | - | - | - | - | - | 145,157 | 90,520 | 55,251 |
| 1985 | 59,625 | 36,920 | 13,015 | 11,044 | 6,626 | 4,545 | 10,042 | 3,574 | 1,002 | 157 | 1 | - | - | - | - | - | - | 146,551 | 86,926 | 43,048 |
| 1986 | 67,677 | 41,536 | 14,574 | 11,842 | 7,017 | 4,693 | 10,241 | 3,062 | 868 | 146 | - | - | - | - | - | - | - | 161,656 | 93,979 | 42,386 |
| 1987 | 85,170 | 41,283 | 15,842 | 12,838 | 7,586 | 5,333 | 10,611 | 2,192 | 477 | 69 | - | - | - | - | - | - | - | 181,401 | 96,231 | 40,406 |
| 1988 | 87,281 | 40,290 | 15,915 | 13,152 | 7,905 | 5,461 | 10,310 | 2,442 | 511 | 26 | - | 1 | - | - | - | - | - | 183,294 | 96,013 | 40,772 |
| 1989 | 83,954 | 45,302 | 17,270 | 13,778 | 7,944 | 5,138 | 8,633 | 1,615 | 370 | 34 | - | - | - | - | - | - | - | 184,038 | 100,084 | 35,931 |
| 1990 | 83,875 | 42,612 | 17,526 | 14,199 | 8,226 | 5,261 | 8,594 | 1,791 | 337 | 21 | - | - | - | - | - | - | - | 182,442 | 98,567 | 36,602 |
| 1991 | 87,247 | 42,603 | 16,770 | 13,182 | 7,188 | 4,192 | 5,977 | 938 | 219 | 17 | - | - | - | - | - | - | - | 178,333 | 91,086 | 28,519 |
| 1992 | 87,717 | 41,943 | 17,821 | 14,779 | 8,135 | 4,521 | 6,076 | 808 | 85 | 4 | - | - | - | - | - | - | - | 181,889 | 94,172 | 29,297 |
| 1993 | 83,066 | 37,332 | 17,235 | 13,734 | 7,562 | 4,289 | 5,322 | 638 | 76 | 5 | - | - | - | - | - | - | - | 169,259 | 86,193 | 26,364 |
| 1994 | 67,777 | 30,185 | 15,010 | 11,823 | 6,185 | 3,620 | 4,242 | 508 | 40 | - | - | - | - | - | - | - | - | 139,390 | 71,613 | 21,704 |
| 1995 | 61,445 | 29,631 | 15,096 | 12,023 | 6,125 | 3,304 | 3,912 | 595 | 133 | 2 | - | - | - | - | - | - | - | 132,266 | 70,821 | 21,688 |
| 1996 | 58,097 | 30,204 | 14,831 | 11,343 | 5,423 | 2,833 | 3,196 | 408 | 67 | - | - | - | - | - | - | - | - | 126,402 | 68,305 | 18,883 |
| 1997 | 58,409 | 31,955 | 14,890 | 10,913 | 5,233 | 2,455 | 2,599 | 286 | 41 | - | - | - | - | - | - | - | - | 126,781 | 68,372 | 17,149 |
| 1998 | 56,901 | 27,998 | 12,849 | 8,816 | 3,940 | 1,841 | 1,827 | 179 | 15 | 1 | - | - | - | - | - | - | - | 114,367 | 57,466 | 13,187 |
| 1999 | 54,885 | 29,048 | 13,184 | 8,949 | 3,793 | 1,900 | 1,894 | 245 | 18 | - | - | - | - | - | - | - | - | 113,916 | 59,031 | 13,599 |
| 2000 | 53,324 | 28,480 | 12,921 | 8,679 | 3,571 | 1,644 | 1,734 | 186 | 18 | - | - | - | - | - | - | - | - | 110,557 | 57,233 | 12,652 |
| 2001 | 52,636 | 27,246 | 11,491 | 7,659 | 2,907 | 1,323 | 1,392 | 221 | 53 | - | - | - | - | - | - | - | - | 104,928 | 52,292 | 11,109 |

* Summary of reports submitted in accordance with 10 CFR 20.407 or 20.2206 (since 1994) by only those plants that had been in commercial operation for at least 1 full year as of December 31 of each of the indicated years. Figures shown have been adjusted for the multiple reporting of transient individuals (see Section 5).

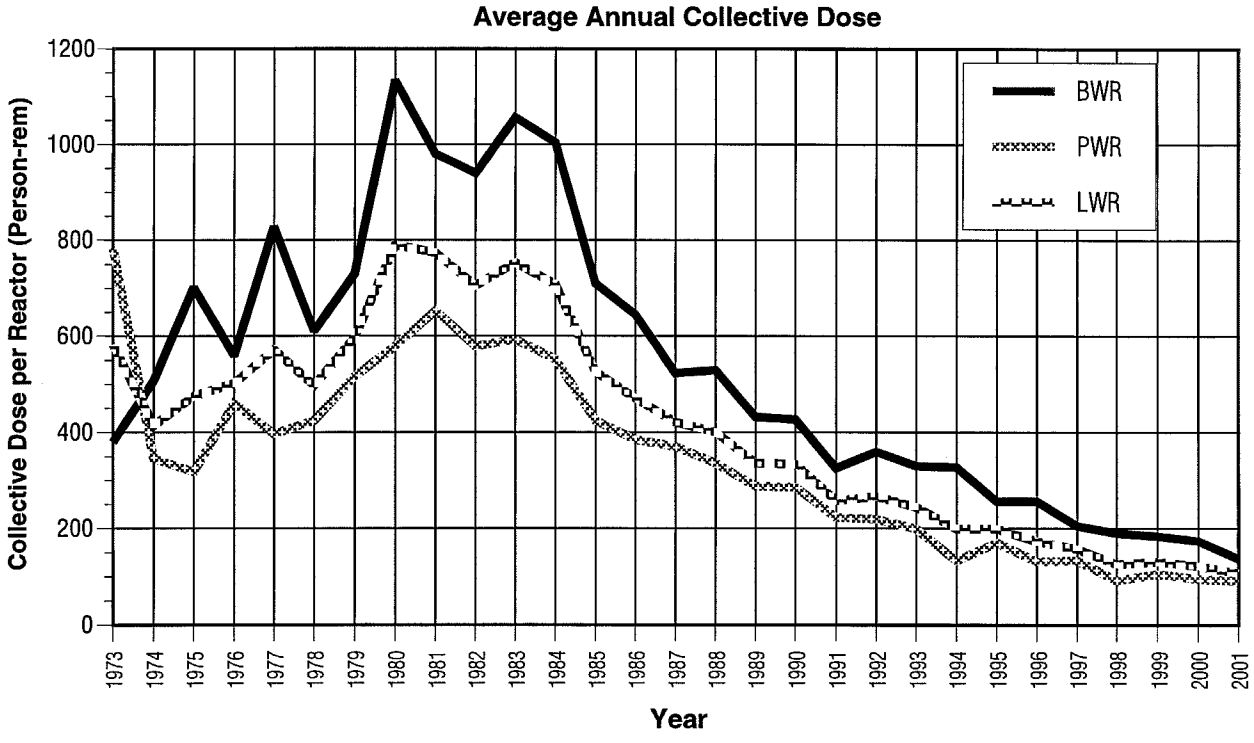
** The collective dose, when not reported by the licensee, was calculated by the NRC staff using methods described in Section 3.1.4.

## 4.4 AVERAGE ANNUAL TEDE 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 2001, the average collective dose per LWR dropped by 86%. Between 2000 and 2001, the collective dose per reactor for PWRs decreased by 4% to 91 person-rem. The collective dose per reactor for BWRs decreased by 21% to 138 person-rem from 2000 to 2001. The overall collective dose per reactor for LWRs decreased by 12% to 107 person-rem in 2001. The number of workers with measurable dose per reactor decreased to 823 for BWRs and decreased to 562 for PWRs in 2001. The overall decreasing trend in average reactor collective doses since 1983 indicates that licensees are continuing to successfully implement ALARA dose reduction features at their facilities.

Figures 4.2 and 4.3 are plots of most of the other information that is given in Tables 4.1, 4.2, and 4.3. The value for the total collective dose for all LWRs decreased by 12% from a value of 12,652 person-rem in 2000 to 11,109 person-rem in 2001. Together with the decrease in the number of workers with measurable dose, this resulted in the average measurable dose per worker decreasing from 0.17 rem in 2000 to 0.16 rem in 2001 (when not adjusted for transient workers). Figure 4.2 shows that in 2001 the net electricity generated increased to an all-time high of 87,552.8 MW-yr.

The fluctuations in the parameters for the years following the accident at the TMI 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 TMI accident, and they are increasing efforts to avoid and reduce exposure. The importance of exposure control and the concept of keeping exposures to ALARA levels is continually being stressed, and most utilities have established programs to collect and share information relative to tasks, techniques, and exposures.



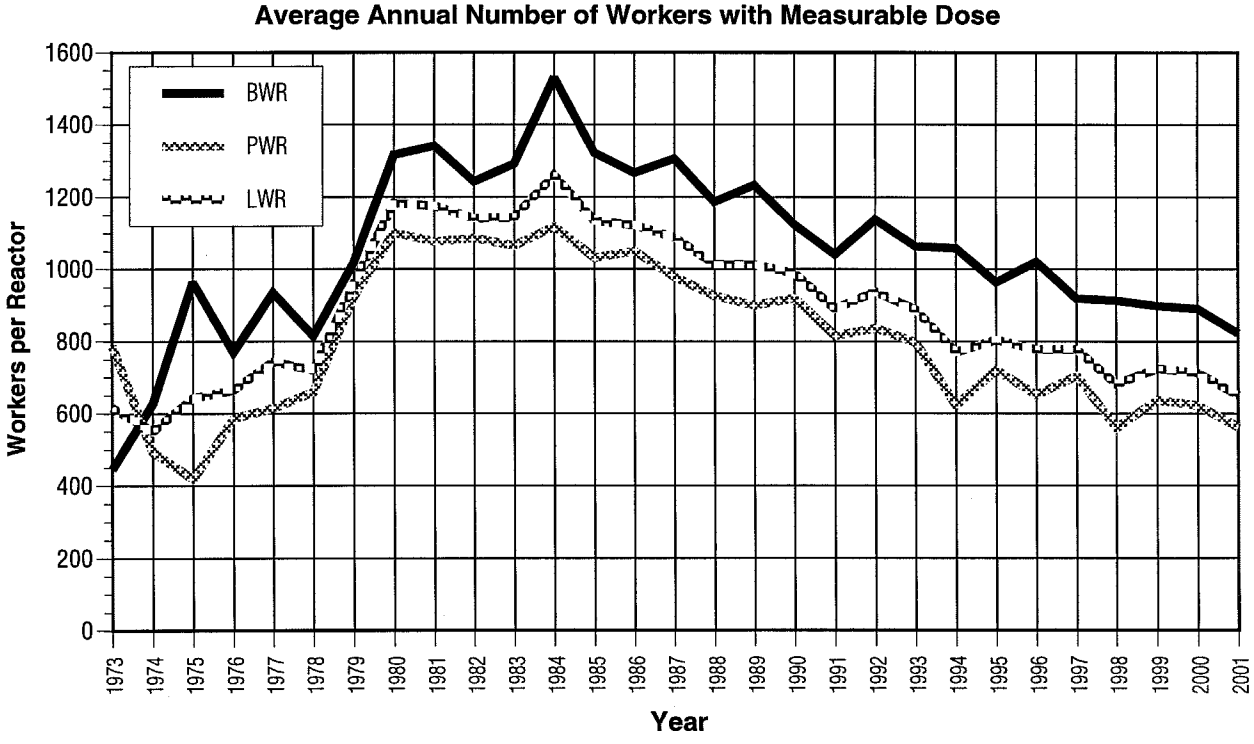




***FIGURE 4.1.*** Average Collective Dose and Number of Workers with Measurable Dose per Reactor 1973 - 2001

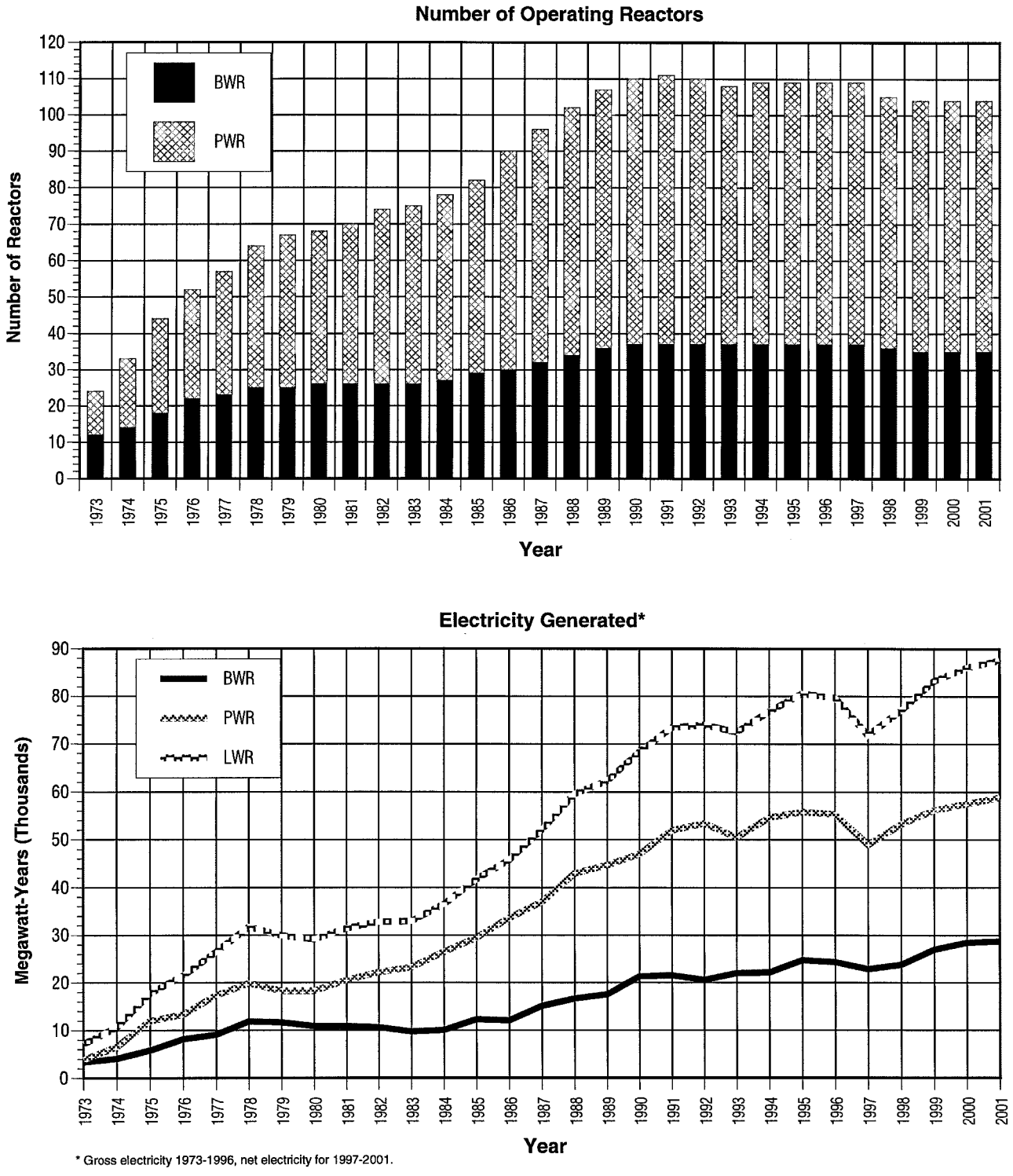
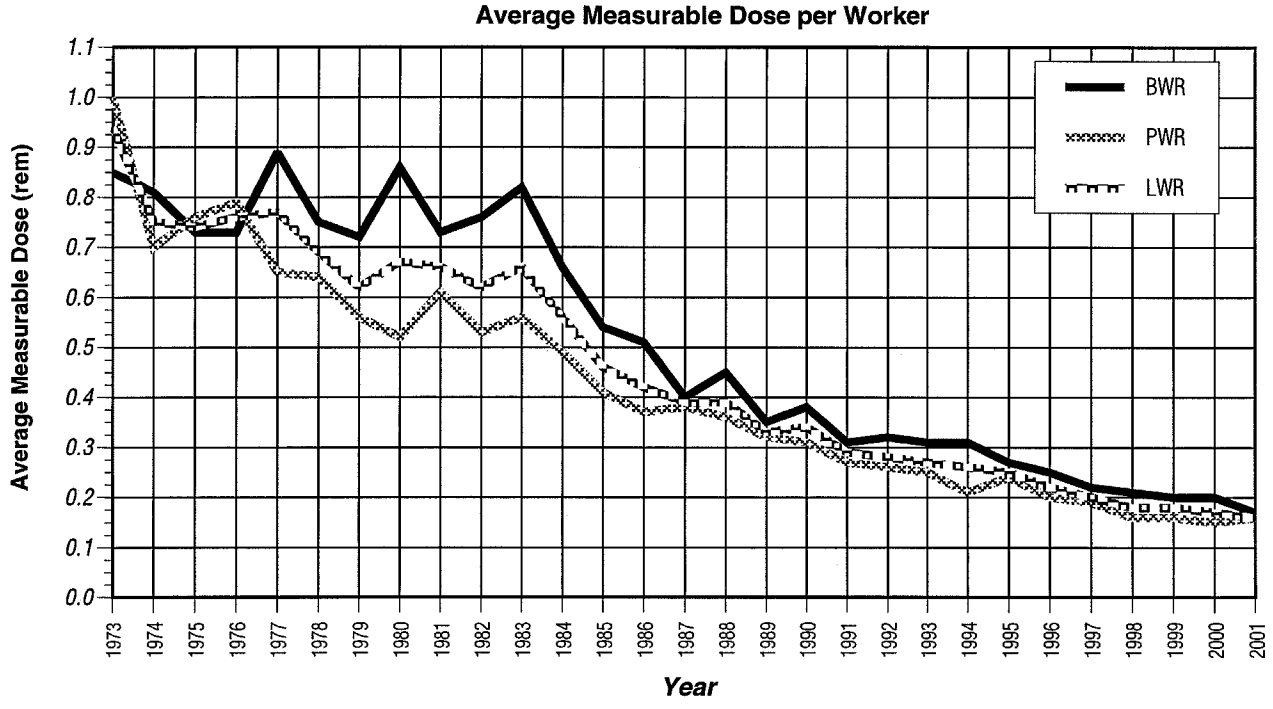



***FIGURE 4.2.*** Number of Operating Reactors and Gross Electricity Generated 1973 - 2001



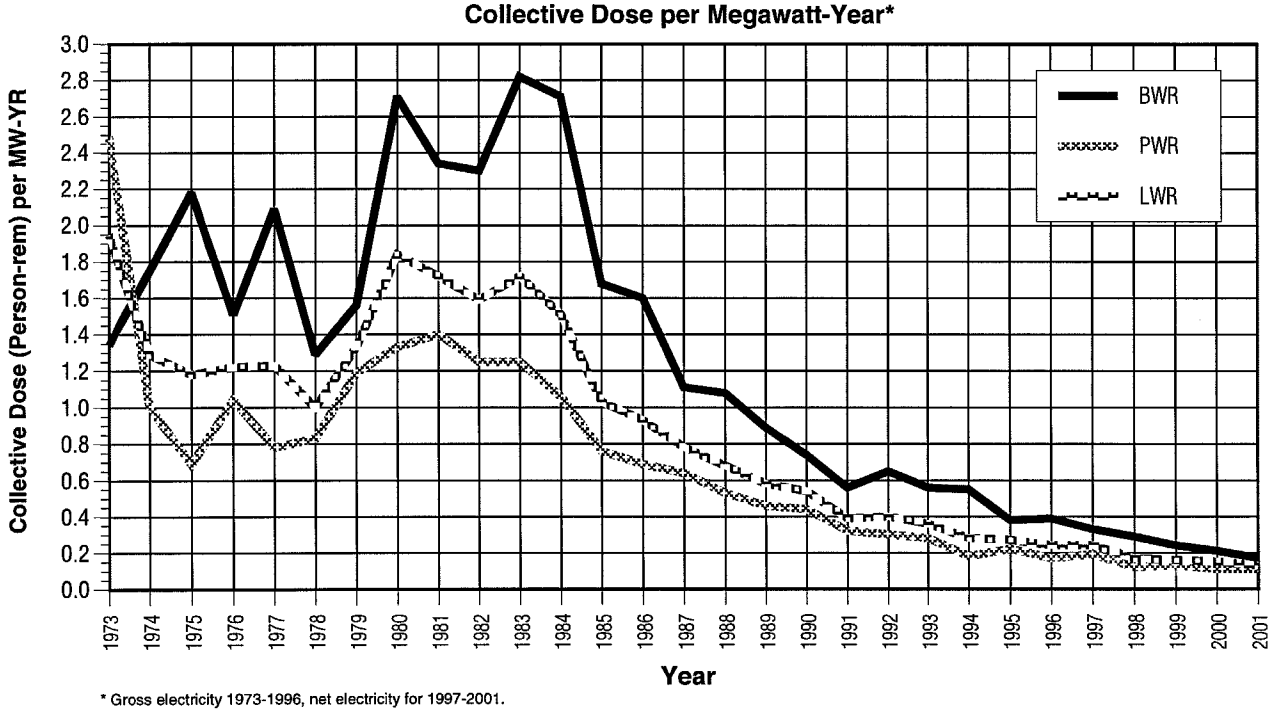




***FIGURE 4.3.*** Average Measurable Dose per Worker and Collective Dose per Megawatt-Year 1973 - 2001

To further assist in the identification of any trends that might exist, Figures 4.4 and 4.5 together display the average and median[6] values of the collective dose per reactor for BWRs and for PWRs for the years 1973 through 2001. 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 25th through the 75th percentiles. Since the median values usually are not as greatly affected by the extreme values of the collective doses, they do not normally fluctuate as much from year to year as do the average values. The median collective dose for PWRs experienced a decrease from 91 person-rem in 2000 to 68 person-rem in 2001. At BWRs, the median fluctuates more from year to year, and in 2001 the median collective dose decreased to 144 person-rem. Figure 4.5 also shows that, in 2001, 50% of the PWRs reported collective doses between 57 and 119 person-rem, while 50% of the BWRs reported collective doses between 98 and 172 person-rem. Nearly every year, the median collective dose is less than the average, which indicates that the collective dose for most plants is less than the average collective dose per reactor (the value that is widely quoted).

## 4.5 THREE-YEAR AVERAGE COLLECTIVE TEDE PER REACTOR

The 3-year average collective dose per reactor is one of the metrics that the NRC uses in the Revised Reactor Oversight Program to evaluate the effectiveness of the licensee's ALARA program. Tables 4.5 and 4.6 list the sites that had been in commercial operation for at least 3 years as of December 31, 2001, and show the values of several parameters for each of the sites. They also give averages for the two types of reactors. Based on the 105 reactor-years of operation accumulated by the 35 BWRs listed, the average 3-year collective TEDE per reactor was found to be 165 person-rem, the average measurable TEDE per worker was 0.19 rem, and the average collective TEDE per MW-yr was 0.21 person-rem per MW-yr. All of these values decreased from the previous 3-year period.

Based on the 207 reactor-years of operation at the 69 PWRs listed, the average annual collective TEDE per reactor, average measurable TEDE per worker, and average collective TEDE per MW-yr were found to be 97 person-rem, 0.16 rem, and 0.12 person-rem per MW-yr, respectively. Each of these values is the same as for the previous 3-year period.

[6] The value at which 50% of the reactors reported greater collective doses, and the other 50% reported smaller collective doses.

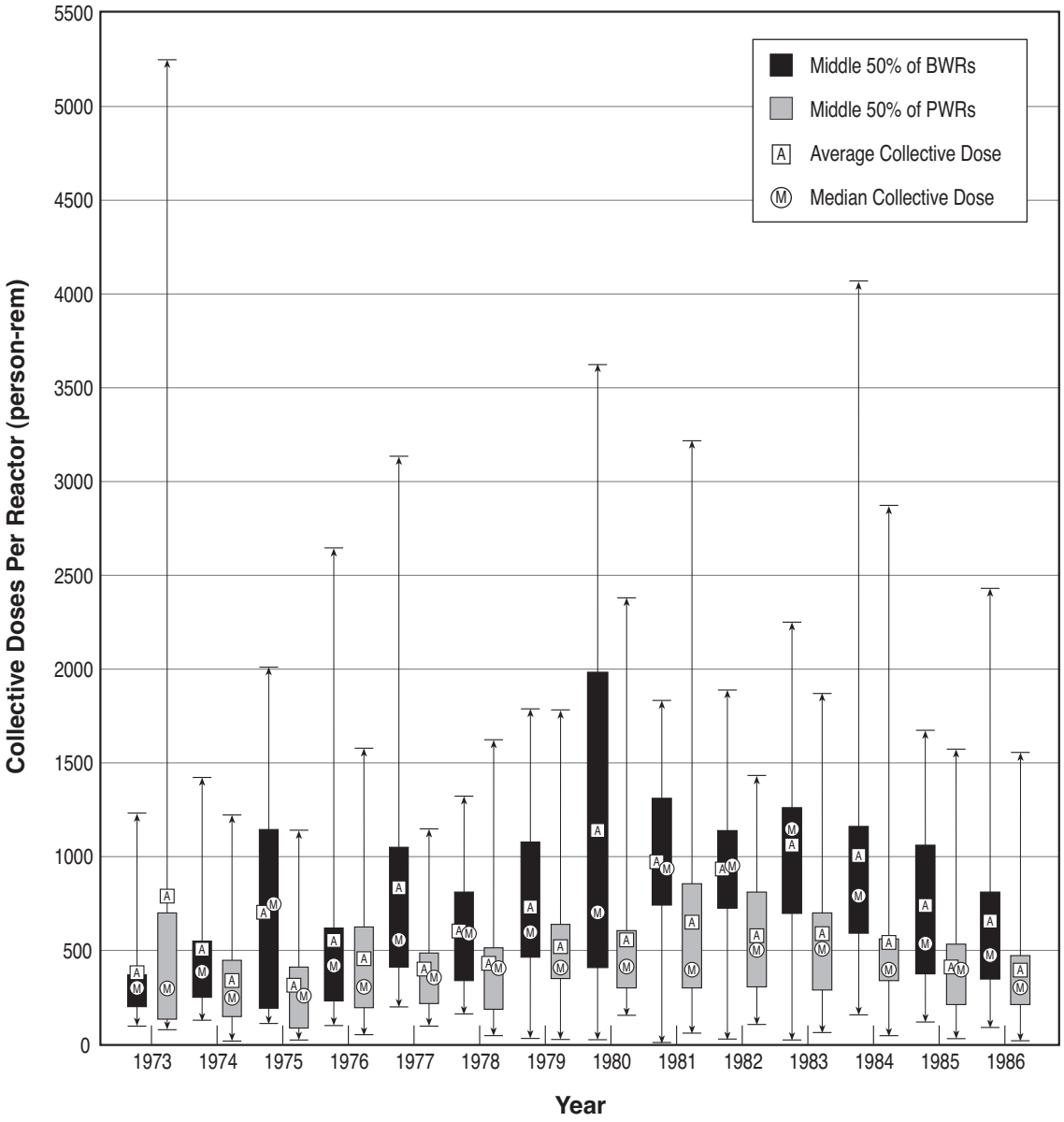



**FIGURE 4.4.** Average, Median, and Extreme Values of the Collective Dose per Reactor 1973 - 1986

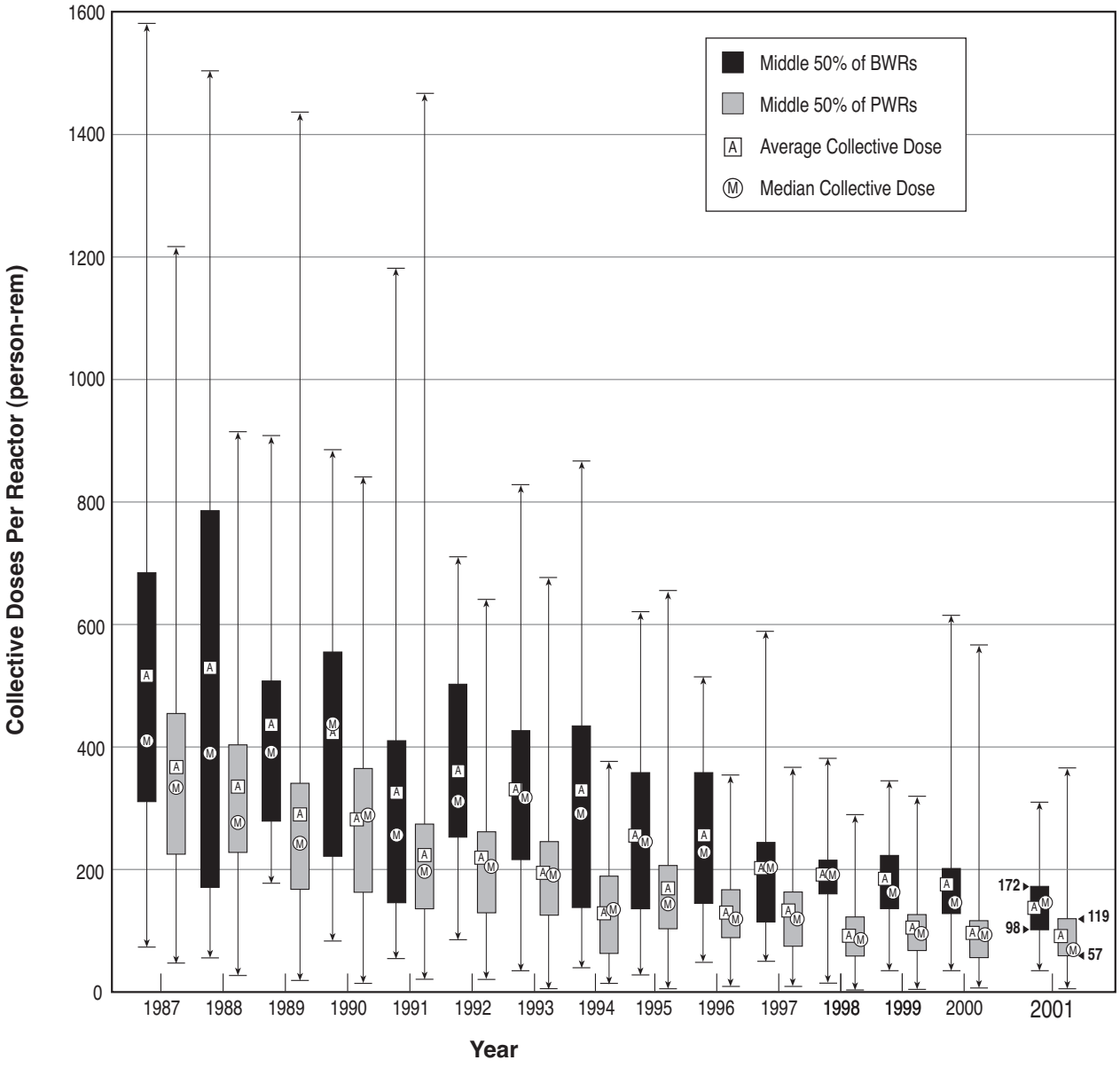



**FIGURE 4.5.** Average, Median, and Extreme Values of the Collective Dose per Reactor 1987 - 2001

## TABLE 4.5

Three-Year Totals and Averages Listed in Ascending Order of Collective TEDE per BWR
1999- 2001

| Site Name* | Reactor Years | Collective TEDE per Reactor | Collective TEDE per Site | Number of Workers with Measurable TEDE | Average TEDE per Worker | Total MW-Years | Average TEDE per MW-Year |
|---|---|---|---|---|---|---|---|
| FERMI 2 | 3 | 117 | 351 | 2,929 | 0.12 | 2,997.3 | 0.12 |
| VERMONT YANKEE | 3 | 119 | 357 | 1,915 | 0.19 | 1,456.1 | 0.24 |
| BROWNS FERRY 1,2,3** | 9 | 119 | 1,074 | 4,923 | 0.22 | 6,308.8 | 0.17 |
| LIMERICK 1,2 | 6 | 124 | 742 | 4,206 | 0.18 | 6,450.4 | 0.12 |
| CLINTON | 3 | 125 | 375 | 2,214 | 0.17 | 2,218.0 | 0.17 |
| DUANE ARNOLD | 3 | 128 | 383 | 2,049 | 0.19 | 1,363.4 | 0.28 |
| COOPER STATION | 3 | 139 | 416 | 2,590 | 0.16 | 1,875.1 | 0.22 |
| FITZPATRICK | 3 | 144 | 433 | 2,490 | 0.17 | 2,242.8 | 0.19 |
| COLUMBIA GENERATING | 3 | 145 | 435 | 3,243 | 0.13 | 2,613.6 | 0.17 |
| GRAND GULF | 3 | 149 | 446 | 2,578 | 0.17 | 3,309.4 | 0.13 |
| LASALLE 1,2 | 6 | 153 | 919 | 5,055 | 0.18 | 6,034.3 | 0.15 |
| HATCH 1,2 | 6 | 160 | 961 | 5,186 | 0.19 | 4,605.4 | 0.21 |
| PEACH BOTTOM 2,3 | 6 | 166 | 995 | 4,804 | 0.21 | 6,152.6 | 0.16 |
| MONTICELLO | 3 | 169 | 507 | 2,077 | 0.24 | 1,455.2 | 0.35 |
| BRUNSWICK 1,2 | 6 | 174 | 1,043 | 5,089 | 0.20 | 4,641.9 | 0.22 |
| SUSQUEHANNA 1,2 | 6 | 175 | 1,051 | 5,406 | 0.19 | 5,918.2 | 0.18 |
| NINE MILE POINT 1,2 | 6 | 179 | 1,073 | 4,863 | 0.22 | 4,360.3 | 0.25 |
| PILGRIM | 3 | 192 | 575 | 2,757 | 0.21 | 1,723.8 | 0.33 |
| QUAD CITIES 1,2 | 6 | 206 | 1,238 | 4,576 | 0.27 | 4,365.1 | 0.28 |
| HOPE CREEK 1 | 3 | 208 | 624 | 3,879 | 0.16 | 2,625.1 | 0.24 |
| DRESDEN 2,3 | 6 | 209 | 1,254 | 8,353 | 0.15 | 4,344.7 | 0.29 |
| PERRY | 3 | 213 | 640 | 3,651 | 0.18 | 3,075.8 | 0.21 |
| OYSTER CREEK | 3 | 234 | 702 | 2,952 | 0.24 | 1,655.0 | 0.42 |
| RIVER BEND 1 | 3 | 256 | 768 | 3,680 | 0.21 | 2,377.6 | 0.32 |
| **Grand Totals and Averages** | **105** | | **17,360** | **91,465** | **0.19** | **84,169.9** | **0.21** |
| **Averages Per Reactor-Year** | | | **165** | **871** | | **801.6** | |

* Sites where not all reactors had completed 3 full years of commercial operation as of 12/31/01 are not included.
** Browns Ferry 1 remains in the count of operating reactors, but was placed on Administrative Hold in June of 1985.

## TABLE 4.6
Three-Year Totals and Averages Listed in Ascending Order of Collective TEDE per PWR
1999 - 2001

| Site Name* | Reactor Years | Collective TEDE per Reactor | Collective TEDE per Site | Number of Workers with Measurable TEDE | Average TEDE per Worker | Total MW-Years | Average TEDE per MW-Year |
|---|---|---|---|---|---|---|---|
| PRAIRIE ISLAND 1,2 | 6 | 51 | 303 | 1,865 | 0.16 | 2,882.3 | 0.11 |
| PALO VERDE 1,2,3 | 9 | 54 | 486 | 3,915 | 0.12 | 10,210.0 | 0.05 |
| SEABROOK | 3 | 61 | 184 | 2,920 | 0.06 | 2,882.9 | 0.06 |
| DAVIS-BESSE | 3 | 67 | 202 | 1,625 | 0.12 | 2,487.7 | 0.08 |
| CATAWBA 1,2 | 6 | 70 | 421 | 3,169 | 0.13 | 6,196.9 | 0.07 |
| BRAIDWOOD 1,2 | 6 | 73 | 441 | 3,596 | 0.12 | 6,490.8 | 0.07 |
| COMANCHE PEAK 1,2 | 6 | 74 | 444 | 2,928 | 0.15 | 6,172.1 | 0.07 |
| TURKEY POINT 3,4 | 6 | 75 | 449 | 3,038 | 0.15 | 3,960.3 | 0.11 |
| WATTS BAR 1 | 3 | 76 | 227 | 2,225 | 0.10 | 3,072.3 | 0.07 |
| NORTH ANNA 1,2 | 6 | 78 | 469 | 2,688 | 0.17 | 4,972.8 | 0.09 |
| POINT BEACH 1,2 | 6 | 78 | 465 | 2,467 | 0.19 | 2,593.9 | 0.18 |
| VOGTLE 1,2 | 6 | 80 | 480 | 3,128 | 0.15 | 6,561.4 | 0.07 |
| INDIAN POINT 3 | 3 | 81 | 244 | 2,050 | 0.12 | 2,693.7 | 0.09 |
| BYRON 1,2 | 6 | 82 | 492 | 3,156 | 0.16 | 6,562.6 | 0.08 |
| CALVERT CLIFFS 1,2 | 6 | 82 | 493 | 2,941 | 0.17 | 4,651.8 | 0.11 |
| ST. LUCIE 1,2 | 6 | 84 | 504 | 3,472 | 0.15 | 4,726.6 | 0.11 |
| ROBINSON 2 | 3 | 86 | 257 | 1,772 | 0.15 | 1,986.8 | 0.13 |
| WATERFORD 3 | 3 | 87 | 260 | 1,749 | 0.15 | 2,900.6 | 0.09 |
| GINNA | 3 | 87 | 262 | 1,210 | 0.22 | 1,325.6 | 0.20 |
| MCGUIRE 1,2 | 6 | 88 | 526 | 3,177 | 0.17 | 6,175.1 | 0.09 |
| ARKANSAS 1,2 | 6 | 89 | 532 | 4,522 | 0.12 | 4,490.5 | 0.12 |
| COOK 1,2 | 6 | 89 | 536 | 4,591 | 0.12 | 2,354.4 | 0.23 |
| MILLSTONE 2,3 | 6 | 95 | 569 | 4,400 | 0.13 | 5,071.4 | 0.11 |
| WOLF CREEK 1 | 3 | 99 | 296 | 1,778 | 0.17 | 3,255.9 | 0.09 |
| SAN ONOFRE 2,3 | 6 | 100 | 601 | 3,633 | 0.17 | 5,695.8 | 0.11 |
| KEWAUNEE | 3 | 102 | 305 | 1,607 | 0.19 | 1,331.8 | 0.23 |
| BEAVER VALLEY 1,2 | 6 | 104 | 622 | 3,773 | 0.16 | 4,233.2 | 0.15 |
| SURRY 1,2 | 6 | 110 | 660 | 3,435 | 0.19 | 4,414.5 | 0.15 |
| SEQUOYAH 1,2 | 6 | 111 | 667 | 4,677 | 0.14 | 6,233.4 | 0.11 |
| SALEM 1,2 | 6 | 111 | 669 | 3,665 | 0.18 | 5,756.4 | 0.12 |
| OCONEE 1,2,3 | 9 | 117 | 1,054 | 5,256 | 0.20 | 6,753.1 | 0.16 |
| SUMMER 1 | 3 | 119 | 356 | 2,246 | 0.16 | 2,335.2 | 0.15 |
| THREE MILE ISLAND 1 | 3 | 120 | 360 | 2,550 | 0.14 | 2,152.5 | 0.17 |
| SOUTH TEXAS 1,2 | 6 | 122 | 729 | 4,025 | 0.18 | 6,662.4 | 0.11 |
| HARRIS | 3 | 123 | 369 | 2,721 | 0.14 | 2,221.2 | 0.17 |
| DIABLO CANYON 1,2 | 6 | 125 | 747 | 3,697 | 0.20 | 5,910.6 | 0.13 |
| CRYSTAL RIVER 3 | 3 | 138 | 414 | 2,483 | 0.17 | 2,288.5 | 0.18 |
| FORT CALHOUN | 3 | 140 | 420 | 1,695 | 0.25 | 1,254.2 | 0.33 |
| FARLEY 1,2 | 6 | 145 | 871 | 4,595 | 0.19 | 4,250.4 | 0.20 |
| CALLAWAY 1 | 3 | 148 | 443 | 2,215 | 0.20 | 3,073.3 | 0.14 |
| PALISADES | 3 | 202 | 607 | 2,226 | 0.27 | 1,508.0 | 0.40 |
| INDIAN POINT 2 | 3 | 210 | 630 | 2,752 | 0.23 | 1,834.4 | 0.34 |
| **Grand Totals and Averages** | **207** | | **20,066** | **125,633** | **0.16** | **172,587.3** | **0.12** |
| **Averages Per Reactor-Year** | | | **97** | **607** | | **833.8** | |

* Sites where not all reactors had completed 3 full years of commercial operation as of 12/31/01 are not included.

The average 3-year collective TEDE per BWR for 1999 - 2001 is 10% less than the average for 1998 - 2000. The average 3-year collective TEDE per PWR for 1999 - 2001 is the same as the average for 1999 - 2000. The average MW-yr per reactor for BWRs and PWRs was greater than the previous 3-year average.

## 4.6 GRAPHICAL REPRESENTATION OF DOSE TRENDS IN APPENDIX D

Each page of Appendix D presents a graph of selected dose performance indicators from 1973 through 2001. The dose and performance indicators illustrate the history of the collective dose per reactor for the site, the rolling 3-year average collective dose per reactor, and the electricity generated at the site. These data are plotted, beginning with the plant's first full year of commercial operation, and continuing through 2001. Data for years when the plant was not in commercial operation have been included when available. However, any data reported prior to 1973 are not included. The 3-year average collective dose per reactor data are included because they provide an overall indication of the plant's general trend in collective dose. The 3-year average collective dose per reactor is also one of the metrics used by the NRC in the Revised Reactor Oversight Program to evaluate a plant's ALARA program. This average is determined by summing the collective dose for the current year and the previous 2 years and then dividing this sum by the number of reactors reporting during those years. Depicting dose trends using a 3-year average reduces the sporadic effects on annual doses of refueling operations (usually a 2- to 3-year cycle) and occasional high dose maintenance activities, and gives a better idea of collective dose trends over the life of the plant. The annual average collective dose per reactor for all reactors of the same type is also shown on the graph.

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Section 5

# TRANSIENT WORKERS AND CAREER DOSES AT NRC-LICENSED FACILITIES

## 5.1 TERMINATION REPORTS

Under the revised 10 CFR 20, licensees are required to submit NRC Form 5s to the Commission for each individual who is required to be monitored at the end of the monitoring year or upon the individual's termination of employment at the facility. The "termination reports" submitted in accordance with the old § 20.408, listing the individual's complete dose history during employment at the facility, are no longer required.

However, the Form 5s submitted to the NRC upon an individual's termination of employment serve the same function as the previous requirements with regard to the analysis of transient workers at NRC-licensed facilities. The following analysis examines the workers who had more than one Form 5 dose record at more than one NRC-licensed facility during the monitoring year. These workers are defined as "transient" because they worked at more than one facility during the monitoring year.

The term "monitoring year" is used here in accordance with the definition of a year given in § 20.1003, which defines a year as "the period of time beginning in January used to determine compliance with the provisions of this part. The licensee may change the start date of the monitoring year used to determine compliance provided that the change is made at the beginning of the monitoring/calendar year and that no day is omitted or duplicated in consecutive years."

## 5.2 TRANSIENT WORKERS AT NRC FACILITIES

Examination of the data reported for workers who began and terminated two or more periods of employment with two or more different facilities within one monitoring year is useful in many ways. For example, the number of and individual dose received by these "annual transients" can be determined from examining these data.

Additionally, the distribution of the doses received by transient workers can be useful in determining the impact that the inclusion of these individuals in each of two or more licensees' annual reports has on the annual summary (as reported in Appendix B) for all nuclear power facilities, and all NRC licensees combined (one of the problems mentioned in Section 2). Table 5.1 shows the "actual distribution" of transient worker doses as determined from the NRC Form 5 termination reports and compares it with the "reported distribution" of the doses of these workers as they would have appeared in a summation of the annual reports submitted by each of the licensees.

In 2001, over 99% of the transient individuals were reported by nuclear power facilities. For this reason, these data are shown separately in Table 5.1.

## TABLE 5.1
Effects of Transient Workers on Annual Statistical Compilations
2001

| License Category | Number of Individuals with TEDE in the Ranges (rem) | | | | | | | | | | | | Total Number Monitored | Number with Measurable Exposure | Collective TEDE (person-rem) | Average Meas. TEDE (rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No Measurable Exposure | Measurable <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 | | | | |
| **POWER REACTORS** | | | | | | | | | | | | | | | | |
| 1) Form 5 Summation | 73,206 | 37,461 | 16,078 | 9,231 | 2,930 | 1,060 | 747 | 63 | | | | | 140,776 | 67,570 | 11,109 | 0.16 |
| 2) Transients - As Reported | 26,731 | 15,746 | 8,061 | 4,728 | 1,582 | 622 | 473 | 45 | | | | | 57,988 | 31,257 | 5,832 | 0.19 |
| 3) Transients - Actual | 6,161 | 5,531 | 3,474 | 3,156 | 1,559 | 885 | 1,118 | 203 | 53 | | | | 22,140 | 15,979 | 5,832 | 0.36 |
| **Corrected Distribution (1-(2-3))** | **52,636** | **27,246** | **11,491** | **7,659** | **2,907** | **1,323** | **1,392** | **221** | **53** | | | | **104,928** | **52,292** | **11,109** | **0.21** |
| **ALL LICENSEES** | | | | | | | | | | | | | | | | |
| 1) Form 5 Summation | 78,654 | 41,373 | 17,624 | 10,258 | 3,424 | 1,418 | 1,416 | 335 | 130 | 50 | | | 154,682 | 76,028 | 14,746 | 0.19 |
| 2) Transients - As Reported | 27,082 | 16,017 | 8,149 | 4,793 | 1,612 | 644 | 519 | 50 | 1 | 1 | | | 58,868 | 31,786 | 5,996 | 0.19 |
| 3) Transients - Actual | 6,146 | 5,554 | 3,487 | 3,185 | 1,585 | 899 | 1,174 | 214 | 56 | | 1 | | 22,301 | 16,155 | 5,996 | 0.37 |
| **Corrected Distribution (1-(2-3))** | **57,718** | **30,910** | **12,962** | **8,650** | **3,397** | **1,673** | **2,071** | **499** | **185** | **49** | **1** | | **118,115** | **60,397** | **14,746** | **0.24** |

Table 5.1 illustrates the impact that the multiple reporting of these transient individuals had on the summation of the exposure reports for 2001. Because each licensee reports the doses received by workers while monitored by the particular licensee 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 2001, Table 5.1 shows that the summation of annual reports for reactor licensees indicated that 63 individuals received doses greater than 2 rem. After accounting for those individuals who were reported more than once, the corrected distribution indicated that there were really 274 workers who received doses greater than 2 rem. Correcting for the multiple counting of individuals also has a significant effect on the average measurable dose for these workers. The corrected average measurable dose for transient workers is nearly twice as high as the value calculated by the summation of licensee records. The transient workers represent 27% of the workforce that receives measurable dose. The correction for the transient workers increases the average measurable dose by a factor of 2 from 0.19 rem to 0.37 rem for the transient workforce. It should be noted that this analysis of transient workers does not include workers who may have been exposed at facilities that are not required to report to the NRC REIRS database (see Section 1), such as Agreement State licensees, or DOE facilities.

One purpose of the REIRS database, which tracks occupational radiation exposures at NRC-licensed facilities, is to identify individuals who may have exceeded the occupational radiation exposure limits because of multiple exposures at different facilities throughout the year. The REIRS database stores the radiation exposure information for an individual by their unique identification number and identification type [Ref. 10, Section 1.5] and sums the exposure for all facilities during the monitoring year. An individual exceeding the TEDE 5 rem per year regulatory limit would be identified in Table 5.1 in one of the dose ranges >5 rem. In 2001, one individual was discovered to have exceeded the 5 rem annual TEDE limit as a result of doses received at more than one radiography licensee during the year. This is the first instance since 1985 that a transient individual has been identified as having exceeded a regulatory dose limit that would not have been otherwise detected by the NRC.

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Section 6

# EXPOSURES TO PERSONNEL IN EXCESS OF REGULATORY LIMITS

## 6.1 CONTROL LEVELS

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, or may not, be the case.

The implementation date for the revised 10 CFR 20 was January 1, 1994. The revised 10 CFR 20 includes requirements for summing internal and external dose equivalents to yield TEDE and to implement a similar limitation system for organs and tissues (such as the gonads, red bone marrow, bone surfaces, lung, thyroid, and breast). The revised 10 CFR 20.1201 limits the TEDE of workers to ionizing radiation from licensed material and other sources of radiation within the licensee's control. The revised 10 CFR 20 no longer contains quarterly exposure limits but has reporting requirements for planned special exposures (PSEs)[7]. The annual TEDE limit for adult workers is 5 rem.

The revised 10 CFR 20.2202 and 10 CFR 20.2203 require that all licensees 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 20.2202(a)(1) - a TEDE to any individual of 25 rem or more; an eye dose equivalent of 75 rem or more; or a shallow-dose equivalent to the skin or extremities of 250 rad or more. The Commission must be notified immediately of these events.

(2) Category B
10 CFR 20.2202(b)(1) - a TEDE to any individual of 5 rem or more; an eye dose equivalent of 15 rem or more; or a shallow-dose equivalent to the skin or extremities of 50 rem or more in a 24-hour period. The Commission must be notified within 24 hours of these events.

[7] See 10 CFR 20.1206, 20.2204, and Regulatory Guide 8.35 for more information on PSEs and their reporting requirements.

(3) Category C
10 CFR 20.2203 - In addition to the notification required by § 20.2202 (category A and B occurrences), each licensee must submit a written report within 30 days after learning of any of the following occurrences:

(1) Any incident for which notification is required by § 20.2202; or

(2) Doses that exceed the limits in § 20.1201, § 20.1207, § 20.1208, § 20.1301 (for adults, minors, the embryo/fetus of a declared pregnant worker, and the public, respectively), or any applicable limit in the license; or

(3) Levels of radiation or concentrations of radioactive material that exceed any applicable license limit for restricted areas or that, for unrestricted areas, are in excess of 10 times any applicable limit set forth in this part or in the license (whether or not involving exposure of any individual in excess of the limits in § 20.1301); or

(4) For licensees subject to the provisions of the Environmental Protection Agency's generally applicable environmental radiation standards in 40 CFR 190, levels of radiation or releases of radioactive material in excess of those standards, or of license conditions related to those standards.

## 6.2 LIMITATIONS OF THE DATA

It is important to note that this summary of events includes **only**:

- Occupational radiation exposures in excess of regulatory limits
- Events at NRC-licensed facilities
- Final dose of record assigned to an individual

It **does not** include:

- Medical misadministrations to medical patients
- Exposures in excess of regulatory limits to the general public
- Agreement State-licensed activities or DOE facilities
- Other radiation-related violations, such as high dose rate areas or effluent limits
- Exposures to dosimeters that, upon evaluation, have been determined to be high dosimeter readings only and are not assigned to an individual as the dose of record by the NRC

Care should be taken when comparing the summary information presented here with other reports and analyses published by the NRC or other agencies. Various reports may include other types of "overexposure" events; therefore, the distinctions should be noted.

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

For these reasons, an attempt is made to keep the exposure events summary presented here current. An event that has been reassessed and determined not to be an exposure in excess of the limits is not included in this report. In addition, events that occurred in prior years are added to the summary in the appropriate year of occurrence. The reader should note that the summary presented here represents a "snapshot" of the status of events as of the publication date of this report. Previous or future reports may not correlate in the exact number of events because of the review cycle and reassessment of the events.

## 6.3 SUMMARY OF EXPOSURES IN EXCESS OF REGULATORY LIMITS

Table 6.1 summarizes the occupational exposures in excess of regulatory limits as reported by Commission licensees pursuant to 10 CFR 20.2202 and 10 CFR 20.2203 from 1994 to 2001. Table 6.2 shows the data reported under 10 CFR 20.403 and 10 CFR 20.405 for the period 1985-1993. Note that the categorization criteria changed effective with the revised 10 CFR 20 in 1994. The dose reporting thresholds have been revised – the skin of the whole body and the extremities now have the same dose limits, and a new set of dose limits has been added for the lens of the eye.

For the period 1990-1993, Table 6.2 shows the number of individuals who exceeded various limits while employed by one of several types of licensees. For the period 1985-1989, only the exposures in excess of regulatory limits reported by licensed industrial radiography firms are shown separately. Most of the occurrences included in the "All Other" category come from research facilities, universities, and measuring and well logging activities.

In 2001, there were three "Category A" occurrences, no "Category B" occurrences, and three "Category C" occurrences. All but one of the events resulted in extremity exposures in excess of the 50 rem annual extremity limit. One event was discovered during the transient analysis (see Section 5) in preparation for this report where an individual was found to have exceeded the 5 rem TEDE annual limit from doses received at

# TABLE 6.1
## Occupational Exposures in Excess of Regulatory Limits
## 1994 - 2001

| Year | License Category | Persons and Doses (rem) | Types Of Exposures And Doses | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | TEDE (rem) | | Lens of the Eye (rem) | | Skin/Extremity (rem) | |
| | | | 5 - 25 | >25 | 15 - 75 | >75 | 50 - 250 | >250 rad |
| 2001 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS<br>SUM OF DOSES | 1<br>5.606 | | | | 1<br>80 | |
| | POWER REACTORS | NO. OF PERSONS<br>SUM OF DOSES | | | | | | |
| | MEDICAL FACILITIES | NO. OF PERSONS<br>SUM OF DOSES | | | | | | |
| | MARKETING & MANUFACT. | NO. OF PERSONS<br>SUM OF DOSES | | | | | 1<br>127 | 3<br>1260 |
| | OTHER | NO. OF PERSONS<br>SUM OF DOSES | | | | | | |
| 2000 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS<br>SUM OF DOSES | 2<br>11.373 | | | | | |
| | POWER REACTORS | NO. OF PERSONS<br>SUM OF DOSES | | | | | | |
| | MEDICAL FACILITIES | NO. OF PERSONS<br>SUM OF DOSES | 2<br>10.636 | | | | | |
| | MARKETING & MANUFACT. | NO. OF PERSONS<br>SUM OF DOSES | | | | | | 2<br>2,562 |
| | OTHER | NO. OF PERSONS<br>SUM OF DOSES | | | | | | 1<br>115 |
| 1999 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS<br>SUM OF DOSES | 1<br>5.67 | | | | | |
| | POWER REACTORS | NO. OF PERSONS<br>SUM OF DOSES | | | | | | |
| | MEDICAL FACILITIES | NO. OF PERSONS<br>SUM OF DOSES | | | | | 1<br>143 | |
| | MARKETING & MANUFACT. | NO. OF PERSONS<br>SUM OF DOSES | | | | | 4[f]<br>423 | 2[f]<br>1,080 |
| | OTHER | NO. OF PERSONS<br>SUM OF DOSES | | | | | | |
| 1998 | INDUSTRIAL RADIOGRAPHY | NO.OF PERSONS<br>SUM OF DOSES | 4[a]<br>34.8 | | | | 1<br>50-200 | |
| | POWER REACTORS | NO.OF PERSONS<br>SUM OF DOSES | | | | | | |
| | MEDICAL FACILITIES | NO. OF PERSONS<br>SUM OF DOSES | | | | | | |
| | MARKETING & MANUFACT. | NO.OF PERSONS<br>SUM OF DOSES | | | | | 5[f]<br>675 | 3[f]<br>1,115 |
| | OTHER | NO.OF PERSONS<br>SUM OF DOSES | | | | | | |
| 1997 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS<br>SUM OF DOSES | | | | | | |
| | POWER REACTORS | NO. OF PERSONS<br>SUM OF DOSES | | | | | 1[b]<br>51.1 | |
| | MEDICAL FACILITIES | NO. OF PERSONS<br>SUM OF DOSES | | | | | | |
| | MARKETING & MANUFACT. | NO.OFPERSONS<br>SUM OF DOSES | | | | | 5[f]<br>431 | 3[f]<br>1,199 |
| | OTHER | NO. OF PERSONS<br>SUM OF DOSES | | | | | | |
| 1996 | INDUSTRIAL RADIOGRAPHY | NO.OF PERSONS<br>SUM OF DOSES | 1<br>8.3 | | | | | |
| | OTHER | NO. OF PERSONS<br>SUM OF DOSES | | | | | 7[c, f]<br>810.6 | |
| 1995 | INDUSTRIAL RADIOGRAPHY | NO.OF PERSONS<br>SUM OF DOSES | 1<br>5.1 | | | | | |
| | OTHER | NO. OF PERSONS<br>SUM OF DOSES | | | | | 4[d, f]<br>782 | 1[f]<br>255 |
| 1994 | INDUSTRIAL RADIOGRAPHY | NO.OF PERSONS<br>SUM OF DOSES | 2<br>12.2 | | | | | |
| | OTHER | NO. OF PERSONS<br>SUM OF DOSES | | | | | 1[e]<br>180 | |

[a] One of these individuals also received the extremity exposure as shown.

[b] This exposure was from a hot particle to a localized area of the skin.

[c] This exposure was from a hot particle to a localized area of the skin.

[d] These two exposures (230 rem and 342 rem) were the result of hot particles.

[e] This exposure was from a hot particle to a localized area of the skin.

[f] These exposures have been added due to a reassessment of extremity dose from the direct handling of vials containing Indium at a radiopharmaceutical manufacturing licensee.

# TABLE 6.2

## Occupational Exposures in Excess of Regulatory Limits
## 1985 - 1993

| Year | License Category | Persons and Doses (rem) | Types Of Exposures And Doses | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Whole Body (rem) | | | Skin (rem) | | | Extremity (rem) | | |
| | | | <5 | 5 - 25 | >25 | <7.5<30 | 30 - 50 | >150 | >18.75>75 | 75 - 375 | >375 |
| 1993 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS | | 1 | | | | | | | |
| | | SUM OF DOSES | | 6 | | | | | | | |
| | POWER REACTORS | NO. OF PERSONS | | | | | | | | | |
| | | SUM OF DOSES | | | | | | | | | |
| | MEDICAL FACILITIES | NO. OF PERSONS | 1 | | | | | | | 3[f] | |
| | | SUM OF DOSES | 1.3 | | | | | | | 187.3 | |
| | MARKETING & MANUFACT. | NO. OF PERSONS | 5 | | | | | | | | |
| | | SUM OF DOSES | 10.6 | | | | | | | | |
| | OTHER | NO. OF PERSONS | 2[a] | 1[a] | | | | | | 1 | |
| | | SUM OF DOSES | 4.0 | 5.4 | | | | | | 275 | |
| 1992 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS | | | | | | | | | 1 |
| | | SUM OF DOSES | | | | | | | | | 300-1000 |
| | POWER REACTORS | NO. OF PERSONS | 1 | | | 4 | | | | | |
| | | SUM OF DOSES | 1.9 | | | 57.7 | | | | | |
| | MEDICAL FACILITIES | NO. OF PERSONS | | | | | | | 4 | 1 | |
| | | SUM OF DOSES | | | | | | | 143.6 | 272 | |
| | MARKETING & MANUFACT. | NO. OF PERSONS | | | | | | | | | |
| | | SUM OF DOSES | | | | | | | | | |
| | OTHER | NO. OF PERSONS | 1[b] | | | 1 | | | 1 | | |
| | | SUM OF DOSES | 1.9 | | | 24.1 | | | 40.5 | | |
| 1991 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS | 2 | | | | | | | | |
| | | SUM OF DOSES | 5.6 | | | | | | | | |
| | POWER REACTORS | NO. OF PERSONS | | | | | | | | | |
| | | SUM OF DOSES | | | | | | | | | |
| | MEDICAL FACILITIES | NO. OF PERSONS | 2 | | | | | | | | |
| | | SUM OF DOSES | 3.8 | | | | | | | | |
| | MARKETING & MANUFACT. | NO. OF PERSONS | | | | | | | 1 | | |
| | | SUM OF DOSES | | | | | | | 22.3 | | |
| | OTHER | NO. OF PERSONS | 1 | | | | | | | | |
| | | SUM OF DOSES | 2.4 | | | | | | | | |
| 1990 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS | 3 | 3[c, d] | | | | 1[c] | | 1 | 2[d] |
| | | SUM OF DOSES | 7.2 | 49.9 | | | | 6000 | | 111 | 3962 |
| | POWER REACTORS | NO. OF PERSONS | | | | | | | 1 | | |
| | | SUM OF DOSES | | | | | | | 48.8 | | |
| | MEDICAL FACILITIES | NO. OF PERSONS | 3[e] | | | | | | | | |
| | | SUM OF DOSES | 8.9 | | | | | | | | |
| | MARKETING & MANUFACT. | NO. OF PERSONS | | | | | | | | | |
| | | SUM OF DOSES | | | | | | | | | |
| | OTHER | NO. OF PERSONS | 1 | | | | | | | | |
| | | SUM OF DOSES | 2.3 | | | | | | | | |
| 1989 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS | 3 | | 1 | | | | 1 | | |
| | | SUM OF DOSES | 8.1 | | 93 | | | | 72 | | |
| | ALL OTHER | NO. OF PERSONS | 4 | | | 1 | | | 2 | 1 | |
| | | SUM OF DOSES | 6.6 | | | 9.2 | | | 105 | 178 | |
| 1988 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS | 3 | 1 | | | | | | 1 | |
| | | SUM OF DOSES | 8.1 | 6.1 | | | | | | 118 | |
| | ALL OTHER | NO. OF PERSONS | 7 | | | 4 | 1 | 1 | 1 | 1 | |
| | | SUM OF DOSES | 19.34 | | | 66.8 | 61 | 278 | 58 | 127 | |
| 1987 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS | 1 | | | | | | | 1 | |
| | | SUM OF DOSES | 3.1 | | | | | | | 180 | |
| | ALL OTHER | NO. OF PERSONS | 2 | 1 | | 5 | | | 3 | | 1 |
| | | SUM OF DOSES | 2.8 | 7.5 | | 128.4 | | | 72.0 | | 650 |
| 1986 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS | 2 | | | | | | | | |
| | | SUM OF DOSES | 4.4 | | | | | | | | |
| | ALL OTHER | NO. OF PERSONS | 3 | | | | | | 1 | 1 | 2 |
| | | SUM OF DOSES | 9.6 | | | | | | 41.2 | 115 | 930 |
| 1985 | INDUSTRIAL RADIOGRAPHY | NO. OF PERSONS | 6 | 3 | 1 | | | | | 1 | |
| | | SUM OF DOSES | 16.7 | 32.6 | 27.0 | | | | | 288 | |
| | ALL OTHER | NO. OF PERSONS | 7 | | | | | | 3 | 1 | |
| | | SUM OF DOSES | 11.8 | | | | | | 60.2 | 93 | |

[a] Same individual exceeded 1.25 rem/qtr limit twice during 1993.

[b] This 1992 exposure was reported in 1994.

[c] This individual received a whole-body dose of 24 rem in addition to a 6000 rem skin dose.

[d] One of these individuals received a 9 rem whole-body dose in addition to a 1070 rem extremity dose.

[e] One of these individuals exceeded the quarterly whole-body dose limits three times in one calendar year.

[f] An additional 1993 exposure was reported in 1994.

two different radiography licensees. A summary of the events follows.

One of the purposes of the NRC's REIRS database is to examine the dose records from all NRC licensees in order to identify transient individuals who may have exceeded regulatory limits from doses received at more than one facility during a year. In 2001, during the analysis of dose records for transient workers for Section 5 of this report, an individual was found to have exceeded the 5 rem annual TEDE limit. The individual worked at two radiography licensees during the year and received 1.348 rem at one facility during the first quarter of the year, and then received 4.258 rem at a second facility during the remainder of the year, resulting in annual TEDE of 5.606 rem. The doses were confirmed by the licensee and the NRC was notified. The NRC is currently in the process of reviewing and investigating this occurrence.

In September of 2001, a licensee reported a Category C extremity exposure to a nuclear pharmacist. On 10/19/2001, the dosimetry vendor notified the licensee that the pharmacist's extremity dosimeter results were 56.35 rem and 34.69 rem for the right and left finger rings, respectively. Through August 2001, the pharmacist had an annual extremity dose of 15.57 rem. The pharmacist routinely handled radiopharmaceuticals such as Tc-99m and I-131; however, during the month of September 2001, she prepared a significant number of F-18 doses using an automatic dose-drawing robot. The pharmacist was assigned non-radiological duties during an investigation into the event. The investigation determined that the pharmacist did not use the robotic dose-handling machine as designed. Instead of using the remote handling tools provided, the pharmacist handled the sample container and the syringe by hand during the F-18 dose splitting process. The licensee determined that the pharmacist's total occupational extremity dose for 2001 was 127.38 rem and 86.31 rem for the right and left index fingers, respectively. The root cause of this event was the licensee's failure to have adequate procedures in place for handling F-18 doses. A contributing factor was the licensee's failure to adequately train the pharmacist in the F-18 dose handling process. To prevent recurrence, the licensee updated and posted the procedure for the safe handling of materials for the F-18 dose splitting process.

In April of 2002, a licensee reported possible Category A extremity exposures in excess of the annual limit to two radiopharmacists involved in dispensing doses of Tc-99m. Ring dosimeter readings of 30 to 40 rem were recorded for the individuals in the year of 2001. During follow-up investigation, a certified health physicist determined that the individuals were receiving fingertip doses 3 to 7 times higher than those recorded on the ring dosimeters. Therefore, the two radiopharmacists could have received doses up to 280 rem to the fingertips. The two individuals are shown in Table 6.1 as having received these maximum doses.

In December of 2001, an individual was observed by an NRC inspector dispensing 3.7 GBq (100 mCi) bulk doses of Tc-99m using a vial shield without a shielded top. The individual's dispensing technique resulted in exceeding 10 CFR 20 extremity exposure limits. The individual's left-hand index fingertip exposure was estimated at

700 R/year. The assumptions for the exposure estimate were based on a calculation from an article "Fingertip and Whole Body Exposure to Nuclear Medicine Personnel." The individual was estimated at 40 draws/day x 6 seconds/draw x 6 days/ week x 50 weeks/year = 20 hours/year. This equates to 1.6 hours/year of exposure to the finger = 56 R. Therefore, 56 R/1.6 hours x 20 hours = 700 R. During the inspection, the licensee took action to ensure that the vial shields would be appropriately used. Although the individual wore an extremity monitor on his right ring finger, it appeared that the dosimetry results may not reflect the highest exposure received by the individual. Following a discussion with the inspector, the licensee committed to perform a calculation to determine the dose to the individual's index finger. A consultant also concluded that the radiopharmacist received an extremity exposure to his left index finger of 700 rem, which is a Category A event.

In January of 2001, during an inspection, the NRC inspector learned of an event that resulted in an assistant radiographer receiving a Category C exposure to his hand. The individual's hand was within 6 inches of a 1.48 TBq (40 Ci) Ir-192 radiography source. The assistant radiographer received the overexposure while disconnecting the guide tube from the radiography camera. After completing a radiography exposure, the radiographer retracted the source, but the source was not in the fully shielded position when the assistant radiographer began to disconnect the guide tube from the camera. The assistant radiographer immediately released the guide tube when he saw that the drive cable and source pigtail cable were extended outside of the camera. The radiographer and assistant radiographer failed to survey the guide tube and camera before the assistant radiographer removed the guide tube. Because the radiographers were in a high noise work environment, they were unable to hear their alarming ratemeters or the "Posi-Lock" locking mechanism on the camera engage the source. Their pocket dosimeters were off scale. The radiographer's film badge indicated a whole body exposure of approximately 445 mrem and the assistant radiographer's film badge indicated a whole body exposure of 1.002 rem. Based on a re-enactment of the event, the inspector estimated that the extremity exposure received by the assistant radiographer was 60 rem. A consultant provided revised dose estimates for the assistant radiographer of 1.2 rem to the whole body and 1.33 rem to the hand. After reviewing the information from the consultant and considering the unresolved uncertainties in the calculations, the licensee stated that a reasonable estimate of the assistant radiographer's dose was 1.2 rem whole body and 80 rem to the hand. Corrective actions include briefing all radiography personnel of the incident, implementing a weekly audit program of the radiation protection program, and instituting measures to respond to the inability of staff to hear alarming ratemeters in high noise environments.

Of the six occurences summarized above, two of the occurences took place at licensees that were required to report exposure records to the NRC REIRS database in 2001 and are included in the tables and figures in other sections of this report. All six occurences are included in Table 6.1.

## 6.4 MAXIMUM EXPOSURES BELOW THE NRC LIMITS

Because few exposures exceed the NRC occupational exposure limits, certain researchers have expressed an interest in a listing of the maximum exposures received at NRC licensees that do not exceed the limits. This would allow an examination of exposures that approach, but do not exceed the limits. Table 6.3 shows the maximum exposures for each dose category required to be reported to the NRC. In addition, the number of exposures in certain dose ranges is shown to reflect the number of exposures that approach the NRC limits.

As shown in Table 6.3, few exposures exceed half of the NRC occupational annual limits. In 2001, four individuals exceeded 95% of the TEDE limit. One individual exceeded the 5 rem TEDE limit and one individual exceeded the 50 rem extremity limit. No individuals were reported to have exceeded the skin, eye, or organ dose limits.

**TABLE 6.3**
**Maximum Occupational Exposures for Each Exposure Category ***
**2001**

| Exposure Category** | Annual Dose Limit 10CFR20*** | Maximum Exposure Reported (rem) | Max Dose Percent of the Limit | Number of Individuals with Measurable Dose | Number of Individuals ≥ 25% of the Limit | Number of Individuals ≥ 50% of the Limit | Number of Individuals ≥ 75% of the Limit | Number of Individuals ≥ 95% of the Limit |
|---|---|---|---|---|---|---|---|---|
| SDE-ME | 50 rem | 127.380 | > limit | 50,145 | 77 | 31 | 4 | 2 (1 > limit) |
| SDE-WB | 50 rem | 34.040 | 68% | 61,733 | 1 | 1 | 0 | 0 |
| LDE | 15 rem | 5.606 | 37% | 59,315 | 60 | 0 | 0 | 0 |
| CEDE | | 4.011 | | 3,786 | | | | |
| CDE | | 34.887 | | 2,981 | | | | |
| DDE | | 5.606 | | 61,191 | | | | |
| TEDE | 5 rem | 5.606 | > limit | 62,003 | 1920 | 448 | 73 | 4 (1> limit) |
| TODE | 50 rem | 35.394 | 71% | 54,119 | 184 | 24 | 0 | 0 |

* Only records reported by licensees required to report under 10 CFR 20.2206 are included. Numbers have been adjusted for the multiple reporting of transient individuals.

** SDE-ME = shallow dose equivalent – maximally exposed extremity
SDE-WB = shallow dose equivalent – whole body
LDE = eye dose equivalent to the lens of the eye
CEDE = committed effective dose equivalent
CDE = committed dose equivalent
DDE = deep dose equivalent
TEDE = total effective dose equivalent
TODE = total organ dose equivalent

*** Shaded boxes represent dose categories that do not have specific dose limits defined in 10 CFR 20.

# Section 7
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11. United Nations, *Report of the Scientific Committee on the Effects of Atomic Radiation*, General Assembly of Official Records, United Nations, New York, 1993.

12. *Licensed Operating Reactors, Status Summary Report,* compiled from reactor monthly operating reports submitted to the NRC. Data provided electronically from the Idaho National Engineering and Environmental Laboratory (INEEL) Risk, Reliability and Regulatory Support Department under contract to the NRC in support of the NRC's Performance Indicator Project.


* Report is available for purchase from the National Technical Information Service, Springfield, Virginia, 22161, and/or the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20402-9328.

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Appendix A

# ANNUAL TEDE FOR NON-REACTOR NRC LICENSEES

# 2001

# APPENDIX A
## Annual TEDE for Non-Reactor NRC Licensees
## CY 2001

| PROGRAM CODE - LICENSEE NAME | LICENSE# | Number of Individuals with Whole Body Doses in the Ranges (rems) | | | | | | | | | | | | | Total Number Monitored | Number With Meas. Dose | Total Collective TEDE (Person-Rem) | Average Meas. TEDE (Rems) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | 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 | 6.00-12.00 | >12.0 | | | | |
| ***NUCLEAR PHARMACIES - 02500*** | | | | | | | | | | | | | | | | | | |
| CAPITAL PHARMACY INC. | 21-26597-01MD | 9 | 11 | 4 | | | | | | | | - | - | - | 24 | 15 | 0.858 | 0.057 |
| EASTERN ISOTOPES, INC. | 45-25221-01MD | 16 | 53 | 7 | 4 | 2 | 2 | 1 | 5 | 4 | 3 | - | - | - | 97 | 81 | **48.182** | **0.595** |
| MALLINCKRODT, INC. | 24-04206-00MD | 9 | 11 | 4 | 2 | | | | | | | | | | 26 | 17 | 1.710 | 0.101 |
| MALLINCKRODT, INC. | 24-04206-08MD | 1 | 14 | 5 | 1 | | | | | | | - | - | - | 21 | 20 | 1.753 | 0.088 |
| MALLINCKRODT, INC. | 24-04206-22MD | 3 | 5 | 1 | | | | | | | | | | | 9 | 6 | 0.284 | 0.047 |
| MALLINCKRODT MEDICAL, INC. | 24-04206-01MD | 47 | 9 | 6 | 1 | 1 | | | | | | - | - | - | 64 | 17 | 2.464 | 0.145 |
| MALLINCKRODT MEDICAL, INC. | 24-04206-14MD | 2 | 8 | 13 | | 1 | | | | | | - | - | - | 24 | 22 | 2.906 | 0.132 |
| MALLINCKRODT MEDICAL, INC. | 24-04206-19MD | 9 | 10 | 6 | 7 | | 1 | | | | | - | - | - | 33 | 24 | 4.177 | 0.174 |
| MID-AMERICA ISOTOPES, INC. | 24-26241-01MD | 5 | 21 | 3 | | 2 | | | | | | - | - | - | 31 | 26 | 2.113 | 0.081 |
| NUCLEAR DIAGNOSTIC PRODUCTS | 29-30500-01MD | 4 | 15 | 5 | | | | | | | | - | - | - | 24 | 20 | 1.218 | 0.061 |
| OKLAHOMA, UNIVERSITY OF | 35-03176-04MD | 5 | 16 | 4 | 1 | | | | | | | - | - | - | 26 | 21 | 1.433 | 0.068 |
| PHARMALOGIC OF PENN LTD | 37-30219-01MD | 1 | 7 | 6 | | | | | | | | | | | 14 | 13 | 1.126 | 0.087 |
| PSI, INC. | 11-27705-01MD | - | - | 4 | 2 | 1 | | | | | | | | | 7 | 7 | 1.845 | 0.264 |
| RADIOPHARMACY, INC. | 13-26246-01MD | - | 18 | 3 | 3 | | | | | | | - | - | - | 24 | 24 | 2.262 | 0.094 |
| SPECTRUM PHARMACY INC. | 13-26367-01MD | 2 | 25 | 9 | 5 | 2 | | 2 | | | | - | - | - | 45 | 43 | 7.709 | 0.179 |
| SPECTRUM PHARMACY, INC. | 13-32053-01MD | 14 | 12 | 1 | | | | | | | | - | - | - | 27 | 13 | 0.569 | 0.044 |
| SYNCOR CARIBE | 52-16345-02MD | 1 | 9 | 3 | 2 | 1 | | | | | | - | - | - | 16 | 15 | 2.057 | 0.137 |
| SYNCOR INTERNATIONAL CORP. | 04-26507-01MD | 87 | 206 | 37 | 9 | 3 | | | | | | - | - | - | **342** | **255** | 15.595 | 0.061 |
| **Total** | **18** | **215** | **450** | **121** | **37** | **13** | **3** | **3** | **5** | **4** | **3** | **-** | **-** | **-** | **854** | **639** | **98.261** | **0.154** |

NOTE: The data values shown bolded and in boxes represent the highest value in each category.

# APPENDIX A
## Annual TEDE for Non-Reactor NRC Licensees
## CY 2001 (continued)

| PROGRAM CODE - LICENSEE NAME | LICENSE# | Number of Individuals with Whole Body Doses in the Ranges (rems) | | | | | | | | | | | | | Total Number Monitored | Number With Meas. Dose | Total Collective TEDE (Person-Rem) | Average Meas. TEDE (Rems) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | 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 | 6.00-12.00 | >12.0 | | | | |
| ***MANUFACTURING AND DISTRIBUTION - TYPE A BROAD - 03211*** | | | | | | | | | | | | | | | | | | |
| CANBERRA DOVER, INC. | 29-04236-01 | 19 | 11 | - | - | - | - | - | - | - | - | - | - | - | 30 | 11 | 0.062 | 0.006 |
| E. R. SQUIBB & SONS | 29-00139-02 | 130 | 7 | 12 | 4 | 2 | 2 | - | - | - | - | - | - | - | 157 | 27 | 6.327 | 0.234 |
| INTERNATIONAL ISOTOPES IDAHO, INC. | 11-27680-01 | 2 | 1 | 2 | 1 | 2 | 2 | 3 | 1 | - | - | - | - | - | 14 | 12 | 9.897 | **0.825** |
| MALLINCKRODT, INC. | 24-04206-01 | 114 | 96 | 35 | 46 | 17 | 22 | 50 | 35 | - | - | - | - | - | **415** | **301** | **216.081** | 0.718 |
| **Total** | **4** | **265** | **115** | **49** | **51** | **21** | **26** | **53** | **36** | **-** | **-** | **-** | **-** | **-** | **616** | **351** | **232.367** | **0.662** |
| ***MANUFACTURING AND DISTRIBUTION - TYPE B BROAD - 03212*** | | | | | | | | | | | | | | | | | | |
| BEST INDUSTRIES | 45-19757-01 | 57 | 78 | 7 | 5 | 5 | 6 | | | | | | | | **158** | **101** | **12.962** | **0.128** |
| OHMART/VEGA CORP. | 34-00639-04 | 27 | 26 | 3 | 4 | 2 | | | | - | - | - | - | - | 62 | 35 | 3.656 | 0.104 |
| **Total** | **2** | **84** | **104** | **10** | **9** | **7** | **6** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **220** | **136** | **16.618** | **0.122** |
| ***MANUFACTURING AND DISTRIBUTION - OTHER - 03214*** | | | | | | | | | | | | | | | | | | |
| ADVANZ MEASUREMENT & CONTROL | 34-26683-03 | - | 10 | - | - | - | - | - | - | - | - | - | - | - | 10 | 10 | 0.538 | 0.054 |
| BERTHOLD SYSTEMS, INC. | 37-21226-01 | - | 3 | - | - | 1 | - | - | - | - | - | - | - | - | 4 | 4 | 0.652 | 0.163 |
| BRISTOL-MYERS SQUIBB MEDICAL | 20-00320-19 | - | - | - | 1 | - | - | - | - | - | - | - | - | - | 1 | 1 | 0.310 | 0.310 |
| CANBERRA INDUSTRIES, INC. | 37-02401-01 | 10 | 26 | 2 | - | - | - | - | - | - | - | - | - | - | 38 | **28** | 0.652 | 0.023 |
| CIS-US, INC. | 20-20973-04 | - | - | - | 3 | - | - | - | - | - | - | - | - | - | 3 | 3 | **1.019** | **0.340** |
| FAIRCHILD SEMICONDUCTOR | 37-24841-02 | 10 | - | - | - | - | - | - | - | - | - | - | - | - | 10 | - | - | - |
| FISCHER TECHNOLOGY | 06-19165-01 | 9 | - | - | - | - | - | - | - | - | - | - | - | - | 9 | - | - | - |
| NORDION INTERNATIONAL, INC. | 54-28275-01 | 1 | 10 | 1 | - | - | - | - | - | - | - | - | - | - | 12 | 11 | 0.374 | 0.034 |
| PHARMASAN LABS, INC. | 48-26355-01 | - | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 | 0.016 | 0.005 |
| PRINCETON GAMMA-TECH, INC. | 29-12783-01 | 25 | 24 | - | - | - | - | - | - | - | - | - | - | - | **49** | 24 | 0.258 | 0.011 |
| **Total** | **10** | **55** | **76** | **3** | **4** | **1** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **139** | **84** | **3.819** | **0.045** |

NOTE: The data values shown bolded and in boxes represent the highest value in each category.

# APPENDIX A
## Annual TEDE for Non-Reactor NRC Licensees
## CY 2001 (continued)

| PROGRAM CODE - LICENSEE NAME | LICENSE# | Number of Individuals with Whole Body Doses in the Ranges (rems) | | | | | | | | | | | | | Total Number Monitored | Number With Meas. Dose | Total Collective TEDE (Person-Rem) | Average Meas. TEDE (Rems) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | 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 | 6.00-12.00 | >12.0 | | | | |
| ***INDUSTRIAL RADIOGRAPHY - SINGLE LOCATION - 03310*** | | | | | | | | | | | | | | | | | | |
| ARMY, DEPARTMENT OF THE | 13-18235-01 | 37 | - | - | - | - | - | - | - | - | - | - | - | - | 37 | - | - | - |
| ARMY, DEPARTMENT OF THE | 29-00047-06 | 2 | - | - | - | - | - | - | - | - | - | - | - | - | 2 | - | - | - |
| ARROW TANK & ENGINEERING CO. | 22-13253-01 | 1 | 1 | - | 2 | 1 | - | - | - | - | - | - | - | - | 5 | 4 | 1.301 | 0.325 |
| BUCKEYE STEEL CASTINGS | 34-06627-01 | - | 2 | - | - | - | - | - | - | - | - | - | - | - | 2 | 2 | 0.020 | 0.010 |
| CARONDELET FOUNDRY COMPANY | 24-26136-01 | 3 | 5 | - | - | - | - | - | - | - | - | - | - | - | 8 | 5 | 0.341 | 0.068 |
| CHART INDUSTRIES, INC. | 22-24393-01 | - | 5 | - | - | - | - | - | - | - | - | - | - | - | 5 | 5 | 0.137 | 0.027 |
| CITY METAL COMPANY | 24-15152-01 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | 4 | - | - | - |
| DURALOY TECHNOLOGIES | 37-02279-02 | - | 2 | 2 | - | - | - | - | - | - | - | - | - | - | 4 | 4 | 0.438 | 0.110 |
| GREDE -PRYOR, INC. | 35-18099-01 | 1 | 2 | - | - | - | - | - | - | - | - | - | - | - | 3 | 2 | 0.003 | 0.002 |
| HARRISON STEEL CASTINGS CO. | 13-02141-01 | 3 | 2 | - | - | - | - | - | - | - | - | - | - | - | 5 | 2 | 0.062 | 0.031 |
| HUTCHINSON TECHNICAL COLLEGE | 22-15554-01 | 29 | 19 | - | - | - | - | - | - | - | - | - | - | - | 48 | **19** | 0.168 | 0.009 |
| INTERMET - ARCHER CREEK | 45-17464-01 | 5 | 2 | - | - | - | - | - | - | - | - | - | - | - | 7 | 2 | 0.046 | 0.023 |
| LAFAYETTE TESTING SERVICES, INC. | 48-32158-01 | - | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 | 0.111 | 0.037 |
| NILES STEEL TANK CO. | 21-04741-01 | 2 | 1 | - | - | - | - | - | - | - | - | - | - | - | 3 | 1 | 0.005 | 0.005 |
| THE FLOWSERVE CORPORATION | 34-06398-01 | - | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 | 0.078 | 0.026 |
| THE SHAW GROUP, INC. | 45-25521-01 | 2 | 1 | - | - | - | - | - | - | - | - | - | - | - | 3 | 1 | 0.014 | 0.014 |
| TRANS WORLD AIRLINES, INC. | 24-05151-05 | 81 | 18 | - | - | - | - | - | - | - | - | - | - | - | **99** | 18 | 0.075 | 0.004 |
| WAUKESHA FOUNDRY DIVISION | 48-13776-01 | 4 | 1 | - | - | - | - | - | - | - | - | - | - | - | 5 | 1 | 0.025 | 0.025 |
| WISCONSIN CENTRIFUGAL, INC. | 48-11641-01 | 3 | 1 | - | 4 | - | 1 | 1 | - | - | - | - | - | - | 10 | 7 | **3.089** | **0.441** |
| **Total** | **19** | **177** | **68** | **2** | **6** | **1** | **1** | **1** | **-** | **-** | **-** | **-** | **-** | **-** | **256** | **79** | **5.913** | **0.075** |

NOTE: The data values shown bolded and in boxes represent the highest value in each category.

# APPENDIX A
## Annual TEDE for Non-Reactor NRC Licensees
## CY 2001 (continued)

| PROGRAM CODE - LICENSEE NAME | LICENSE# | Number of Individuals with Whole Body Doses in the Ranges (rems) | | | | | | | | | | | | | Total Number Monitored | Number With Meas. Dose | Total Collective TEDE (Person-Rem) | Average Meas. TEDE (Rems) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | 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 | 6.00-12.00 | >12.0 | | | | |
| ***INDUSTRIAL RADIOGRAPHY - MULTIPLE LOCATION - 03320*** | | | | | | | | | | | | | | | | | | |
| ALASKA INDUSTRIAL X-RAY | 50-16084-01 | - | 2 | 5 | 1 | 1 | 2 | 2 | 1 | 1 | - | - | - | - | 15 | 15 | 13.205 | 0.880 |
| ALLEGHENY LABORATORIES | 37-20734-01 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 1 | - | - | - |
| ALLIED INSPECTION SERVICES, INC. | 21-18428-01 | - | 1 | 1 | - | - | 1 | 3 | - | - | - | - | - | - | 6 | 6 | 4.568 | 0.761 |
| ALONSO & CARUS IRON WORKS, INC. | 52-21350-01 | - | 1 | 2 | 2 | - | - | - | - | - | - | - | - | - | 5 | 5 | 0.960 | 0.192 |
| AMERICAN AIRLINES, INC. | 35-13964-01 | 12 | 20 | - | - | - | - | - | - | - | - | - | - | - | 32 | 20 | 0.257 | 0.013 |
| AMERICAN ENGINEERING TESTING | 22-20271-02 | 1 | 8 | 3 | 3 | - | - | 2 | 2 | - | - | - | - | - | 19 | 18 | 9.731 | 0.541 |
| ANVIL CORPORATION | 46-23236-03 | 7 | 21 | 16 | 9 | 11 | 4 | 11 | 2 | - | - | - | - | - | 81 | 74 | 35.850 | 0.484 |
| APPLIED TECHNICAL SERVICES, INC. | 45-25477-01 | - | 5 | 1 | 1 | - | - | - | - | - | - | - | - | - | 7 | 7 | 0.674 | 0.096 |
| ARCTIC SLOPE INSPECTION SVCS, INC. | 50-29015-01 | 28 | 61 | 36 | 18 | 13 | 2 | 6 | 1 | - | - | - | - | - | 165 | 137 | 35.230 | 0.257 |
| ASTROTECH, INC. | 37-09928-01 | 11 | 10 | 4 | 1 | 2 | - | - | - | - | - | - | - | - | 28 | 17 | 2.580 | 0.152 |
| BARNETT INDUSTRIAL X-RAY | 35-26953-01 | 3 | - | 3 | 2 | 2 | 4 | 4 | 2 | - | - | - | - | - | 20 | 17 | 16.400 | 0.965 |
| BIG STATE X-RAY, INC. | 35-21144-01 | - | 1 | 7 | 3 | 1 | 3 | 13 | 1 | - | - | - | - | - | 29 | 29 | 25.200 | 0.869 |
| BILL MILLER, INC. | 35-19048-01 | 2 | 2 | 6 | 11 | 6 | 5 | 3 | - | - | - | - | - | - | 35 | 33 | 16.241 | 0.492 |
| BRANCH RADIOGRAPHIC LABS., INC. | 29-03405-02 | 9 | 6 | 5 | 6 | 1 | 2 | 2 | - | - | - | - | - | - | 31 | 22 | 8.864 | 0.403 |
| BRAUN INTERTEC CORPORATION | 22-16537-02 | 9 | 3 | 4 | 3 | 5 | 1 | 2 | - | - | - | - | - | - | 27 | 18 | 8.890 | 0.494 |
| CALIBER INSPECTION | 46-03414-03 | 6 | 11 | 3 | 2 | 1 | - | 3 | - | - | - | - | - | - | 26 | 20 | 7.529 | 0.376 |
| CALUMET TESTING SERVICES, INC. | 13-16347-01 | 1 | 3 | 1 | 2 | | 2 | 3 | 1 | 1 | 5 | - | - | - | 19 | 18 | 34.506 | **1.917** |
| CAPITAL X-RAY SERVICES, INC. | 35-11114-01 | - | 7 | 5 | 3 | 2 | 2 | 5 | 3 | 3 | 1 | - | - | - | 31 | 31 | 34.812 | 1.123 |
| CBI SERVICES, INC. | 12-32299-01 | 9 | 20 | 1 | 1 | 2 | - | - | - | - | - | - | - | - | 33 | 24 | 2.126 | 0.089 |
| CENTURY INSPECTION, INC. | 42-08456-02 | 9 | 19 | 18 | 8 | 12 | 9 | 10 | 3 | - | - | - | - | - | 88 | 79 | 41.189 | 0.521 |
| CERTIFIED TESTING LABS, INC. | 29-14150-01 | 3 | 2 | 9 | 1 | - | - | 2 | - | 1 | - | - | - | - | 18 | 15 | 8.360 | 0.557 |
| COLBY & THIELMEIER TESTING CO. | 24-13737-01 | - | - | 1 | 4 | 4 | 1 | 3 | - | - | - | - | - | - | 13 | 13 | 8.705 | 0.670 |
| COMO TECH INSPECTION | 15-26978-01 | - | - | 1 | - | 3 | - | 2 | - | - | - | - | - | - | 6 | 6 | 5.255 | 0.876 |
| CONAM INSPECTION | 12-16559-02 | 13 | 9 | 9 | 7 | 4 | 4 | 7 | - | - | - | - | - | - | 53 | 40 | 19.809 | 0.495 |
| CONNELL LIMITED PARTNERSHIP | 35-13735-01 | - | 2 | 1 | - | | - | - | - | - | - | - | - | - | 3 | 3 | 0.183 | 0.061 |
| CONSUMERS ENERGY - NON-DEST. | 21-08606-03 | 6 | 12 | 1 | 4 | 1 | - | - | - | - | - | | - | - | 24 | 18 | 2.781 | 0.155 |
| COOPERHEAT - MQS | 42-32219-01 | 47 | 152 | 77 | 64 | 50 | 32 | 72 | 6 | 3 | 1 | - | - | - | **504** | **457** | 230.337 | 0.504 |

NOTE: The data values shown bolded and in boxes represent the highest value in each category.

# APPENDIX A
## Annual TEDE for Non-Reactor NRC Licensees
## CY 2001 (continued)

| PROGRAM CODE - LICENSEE NAME | LICENSE# | Number of Individuals with Whole Body Doses in the Ranges (rems) | | | | | | | | | | | | | Total Number Monitored | Number With Meas. Dose | Total Collective TEDE (Person-Rem) | Average Meas. TEDE (Rems) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | 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 | 6.00-12.00 | >12.0 | | | | |
| ***INDUSTRIAL RADIOGRAPHY - MULTIPLE LOCATION - 03320 Continued*** | | | | | | | | | | | | | | | | | | |
| CTI CORE DRILLING SERVICES, INC. | 45-25383-01 | - | 1 | 2 | - | 1 | 3 | - | - | - | - | - | - | - | 7 | 7 | 3.614 | 0.516 |
| DAYTON X-RAY CO. DBA/U.S. INSPEC. | 34-06943-02 | 2 | 19 | 6 | 15 | 7 | 5 | 10 | 1 | 1 | - | - | - | - | 66 | 64 | 34.779 | 0.543 |
| DIAMOND H TESTING COMPANY | 11-27316-01 | 2 | 5 | 1 | 3 | 1 | 3 | 3 | - | 2 | - | - | - | - | 20 | 18 | 16.428 | 0.913 |
| EASTERN TESTING & INSPECTION, INC. | 29-09814-01 | 2 | 2 | 3 | 1 | - | 2 | - | - | - | - | - | - | - | 10 | 8 | 2.649 | 0.331 |
| EDWARDS PIPELINE SERVICES, INC. | 35-23193-01 | 9 | 13 | 24 | 31 | 9 | 11 | 14 | 1 | - | - | - | - | - | 112 | 103 | 51.206 | 0.497 |
| ELECTRIC BOAT CORPORATION | 06-01781-08 | 1 | 11 | 3 | - | - | - | - | - | - | - | - | - | - | 15 | 14 | 0.805 | 0.058 |
| ELITE INSPECTION, INC. | 13-26712-01 | 2 | 4 | 4 | 2 | 3 | 4 | 3 | 2 | 1 | - | - | - | - | 25 | 23 | 18.853 | 0.820 |
| FROEHLING & ROBERTSON, INC. | 45-08890-01 | 7 | 1 | 5 | - | - | - | - | - | - | - | - | - | - | 13 | 6 | 0.865 | 0.144 |
| GENERAL TESTING & INSPECTION CO. | 47-32191-01 | - | 1 | - | 3 | 1 | 1 | - | - | - | - | - | - | - | 6 | 6 | 2.465 | 0.411 |
| GLITSCH FIELD SERVICES/NDE,INC. | 34-14071-01 | 4 | 19 | 7 | 2 | 5 | - | 1 | - | - | - | - | - | - | 38 | 34 | 6.603 | 0.194 |
| GLOBE X-RAY SERVICES, INC. | 35-15194-01 | 2 | 7 | 6 | 3 | 2 | 2 | 7 | 7 | 2 | - | - | - | - | 38 | 36 | 40.141 | 1.115 |
| GREAT LAKES TESTING, INC. | 48-26484-01 | 1 | 2 | - | 5 | 1 | - | 5 | 1 | 2 | - | - | - | - | 17 | 16 | 18.210 | 1.138 |
| H & G INSPECTION CO., INC. | 42-26838-01 | - | - | 1 | - | - | - | 5 | 2 | - | - | - | - | - | 8 | 8 | 13.895 | 1.737 |
| H & H X-RAY SERVICES, INC. | 17-19236-01 | 3 | 12 | 13 | 20 | 22 | 24 | 58 | 23 | 10 | 12 | - | - | - | 197 | 194 | **272.428** | 1.404 |
| HIGH MOUNTAIN INSPECTION SVCS. | 49-26808-02 | - | 5 | 6 | 9 | 4 | 9 | 20 | 12 | 9 | 9 | - | - | - | 83 | 83 | 141.609 | 1.706 |
| HUNTINGTON TESTING & TECHNOLOGY | 47-23076-01 | 5 | 4 | 12 | 10 | 3 | 3 | 4 | 1 | 1 | - | - | - | - | 43 | 38 | 22.727 | 0.598 |
| IESCO GROUP 2 | 04-32290-01 | 3 | - | 1 | 1 | - | 2 | | - | - | - | - | - | - | 7 | 4 | 2.105 | 0.526 |
| INDUSTRIAL NDT CO., INC. | 39-24888-01 | 1 | 2 | 5 | - | 1 | 3 | 1 | - | - | - | - | - | - | 13 | 12 | 5.099 | 0.425 |
| INTEGRATED TECHNOLOGIES, INC. | 06-30317-01 | 1 | 4 | 2 | 1 | 1 | 1 | 2 | - | - | - | - | - | - | 12 | 11 | 4.141 | 0.376 |
| INTERNATIONAL RADIOGRAPHY & INSP. | 35-30246-02 | - | 5 | 5 | 6 | 4 | 3 | 15 | 11 | 11 | 3 | - | - | - | 63 | 63 | 107.201 | 1.702 |
| INTERNATIONAL SCIENTIFIC RESEARCH | 11-27661-01 | 2 | 7 | 1 | - | - | - | - | - | - | - | - | - | - | 10 | 8 | 0.508 | 0.064 |
| JACOBS PAN-AMERICAN CORP. | 55-25502-01 | 1 | 6 | 1 | 1 | 2 | 1 | 7 | 3 | - | 3 | - | - | - | 25 | 24 | 32.743 | 1.364 |
| JAN X-RAY SERVICES, INC. | 21-16560-01 | 7 | 26 | 29 | 43 | 29 | 16 | 22 | 2 | - | - | - | - | - | 174 | 167 | 85.447 | 0.512 |
| KAKIVIK ASSET MANAGEMENT | 50-27667-01 | 15 | 19 | 11 | 9 | 3 | 3 | 2 | - | - | - | - | - | - | 62 | 47 | 12.895 | 0.274 |
| LAWGIBB GROUP | 34-25898-02 | 1 | 3 | - | 3 | - | 4 | 1 | 1 | - | - | - | - | - | 13 | 12 | 8.894 | 0.741 |
| LEHIGH TESTING LABS, INC. | 07-01173-03 | - | 1 | - | - | 3 | - | - | - | - | - | - | - | - | 4 | 4 | 1.976 | 0.494 |

NOTE: The data values shown bolded and in boxes represent the highest value in each category.

# APPENDIX A
## Annual TEDE for Non-Reactor NRC Licensees
## CY 2001 (continued)

| PROGRAM CODE - LICENSEE NAME | LICENSE# | Number of Individuals with Whole Body Doses in the Ranges (rems) | | | | | | | | | | | | | Total Number Monitored | Number With Meas. Dose | Total Collective TEDE (Person-Rem) | Average Meas. TEDE (Rems) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | 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 | 6.00-12.00 | >12.0 | | | | |
| ***INDUSTRIAL RADIOGRAPHY - MULTIPLE LOCATION - 03320 Continued*** | | | | | | | | | | | | | | | | | | |
| LONGVIEW INSPECTION, INC. | 42-27593-01 | 11 | 9 | 8 | 15 | 11 | 9 | 22 | 10 | 1 | - | - | - | - | 96 | 85 | 80.689 | 0.949 |
| LONGVIEW INSPECTION, INC. (WIT) | 48-17480-01 | - | 1 | 2 | - | - | 1 | 1 | - | - | - | - | - | - | 5 | 5 | 2.861 | 0.572 |
| LUCIUS PITKIN | 29-27816-01 | 1 | 1 | 1 | 3 | - | - | - | - | - | - | - | - | - | 6 | 5 | 1.326 | 0.265 |
| MAGNA CHEK, INC. | 21-19111-02 | 2 | 2 | - | - | - | - | - | - | - | - | - | - | - | 4 | 2 | 0.012 | 0.006 |
| MARTIN INDUSTRIAL TESTING, INC. | 45-25452-01 | - | 1 | - | 1 | - | 1 | - | - | - | - | - | - | - | 3 | 3 | 1.183 | 0.394 |
| MARYLAND Q.C. LABORATORIES, INC. | 19-28683-01 | 3 | 12 | 3 | 2 | 1 | 1 | - | - | - | 1 | - | - | - | 23 | 20 | 7.522 | 0.376 |
| MATTINGLY TESTING SERVICES, INC. | 25-21479-01 | 2 | 2 | - | 2 | 1 | 3 | 2 | - | - | - | - | - | - | 12 | 10 | 6.699 | 0.670 |
| MET-CHEM TESTING LABS OF UTAH, INC. | 43-27362-01 | - | 9 | 2 | 1 | 1 | 1 | 4 | - | - | - | - | - | - | 18 | 18 | 7.522 | 0.418 |
| MID AMERICAN INSPECTION SERV, INC. | 21-26060-01 | 5 | - | - | 2 | 4 | 1 | 4 | 4 | - | - | - | - | - | 20 | 15 | 20.272 | 1.351 |
| MIDWEST INDUSTRIAL X-RAY, INC. | 33-27427-01 | 1 | 1 | 1 | 2 | 2 | 1 | 1 | 4 | 4 | - | - | - | - | 17 | 16 | 29.871 | 1.867 |
| NAVY, DEPARTMENT OF THE* | 45-23645-01NA | 99 | 107 | 10 | 4 | - | - | - | - | - | - | - | - | - | 220 | 121 | 4.733 | 0.039 |
| NDT SPECIALISTS, INC. | 48-25917-01 | 1 | - | 2 | 2 | - | 1 | 2 | - | 1 | - | - | - | - | 9 | 8 | 7.670 | 0.959 |
| NEWPORT NEWS SHIPBLDG. & DRY DOCK | 45-09428-02 | - | 17 | 15 | 1 | - | - | - | - | - | - | - | - | - | 33 | 33 | 3.542 | 0.107 |
| NON-DESTRUCTIVE TESTING GROUP | 21-32340-01 | - | 2 | 5 | 6 | 1 | - | 6 | 3 | - | - | - | - | - | 23 | 23 | 18.423 | 0.801 |
| NOVA DATA TESTING LABS, INC. | 45-24872-01 | - | 4 | 1 | - | - | 1 | - | - | - | - | - | - | - | 6 | 6 | 1.073 | 0.179 |
| PACIFIC TESTING, INC. | 53-29118-01 | - | 1 | - | 2 | - | - | - | - | - | - | - | - | - | 3 | 3 | 0.748 | 0.249 |
| PRECISION CALIBRATION & TESTING CO. | 37-30546-01 | 3 | 6 | 3 | - | - | - | - | - | - | - | - | - | - | 12 | 9 | 0.650 | 0.072 |
| PRECISION COMPONENTS CORP. | 37-16280-01 | 7 | 11 | - | - | - | - | - | - | - | - | - | - | - | 18 | 11 | 0.048 | 0.004 |
| PRIME NDT SERVICES, INC. | 37-23370-01 | - | 2 | 4 | 1 | 2 | 3 | 7 | 4 | 1 | 1 | - | - | - | 25 | 25 | 32.824 | 1.313 |
| PROFESSIONAL NDE & WELDING SVCS. | 52-25538-01 | - | 3 | 3 | - | - | - | - | - | - | - | - | - | - | 6 | 6 | 0.661 | 0.110 |
| PROFESSIONAL SERVICE INDUSTRIES | 12-16941-03 | 1 | 5 | 3 | 5 | 2 | 6 | 2 | 1 | - | - | - | - | - | 25 | 24 | 13.409 | 0.559 |
| PROFESSIONAL WELDING ASSOC. INC. | 48-25806-01 | 1 | 1 | - | 1 | 1 | - | - | - | - | - | - | - | - | 4 | 3 | 0.883 | 0.294 |
| PROGRESS SERVICES, INC. | 34-19592-02 | 3 | 2 | 1 | - | - | - | - | - | - | - | - | - | - | 6 | 3 | 0.188 | 0.063 |
| Q. C. LABORATORIES, INC. | 09-11579-03 | 1 | 4 | 5 | 3 | 3 | - | - | - | - | - | - | - | - | 16 | 15 | 3.947 | 0.263 |
| QSL INSPECTION, INC. | 37-28085-01 | 2 | 8 | 4 | 4 | 2 | 4 | 5 | 4 | 9 | 2 | - | - | - | 44 | 42 | 63.964 | 1.523 |
| QUALITY INSPECTION SERVICES, INC. | 31-30187-01 | 1 | 2 | - | - | 1 | - | 1 | 1 | - | - | - | - | - | 6 | 5 | 4.302 | 0.860 |

* Reported under program code 03613 as a multi-site, multi-regional R&D broad scope licensee.

NOTE: The data values shown bolded and in boxes represent the highest value in each category.

# APPENDIX A
## Annual TEDE for Non-Reactor NRC Licensees
## CY 2001 (continued)

| PROGRAM CODE - LICENSEE NAME | LICENSE# | Number of Individuals with Whole Body Doses in the Ranges (rems) | | | | | | | | | | | | | Total Number Monitored | Number With Meas. Dose | Total Collective TEDE (Person-Rem) | Average Meas. TEDE (Rems) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | 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 | 6.00-12.00 | >12.0 | | | | |
| ***INDUSTRIAL RADIOGRAPHY - MULTIPLE LOCATION - 03320 Continued*** | | | | | | | | | | | | | | | | | | |
| QUALITY TESTING SERVICE, INC. | 24-32292-01 | 2 | 3 | 2 | - | - | - | - | - | - | - | - | - | - | 7 | 5 | 0.338 | 0.068 |
| RIVEST TESTING USA, INC. | 35-27438-01 | - | - | 2 | 2 | 4 | 1 | 1 | - | - | - | - | - | - | 10 | 10 | 5.560 | 0.556 |
| SCIENTIFIC TECHNICAL, INC. | 45-24882-01 | - | 3 | 1 | 5 | - | - | - | - | - | - | - | - | - | 9 | 9 | 2.138 | 0.238 |
| S. K. MCBRYDE, INC. | 32-25137-01 | - | 3 | 3 | 1 | - | - | 1 | - | - | - | - | - | - | 8 | 8 | 2.364 | 0.296 |
| SOUTHWEST X-RAY CORPORATION | 49-27434-01 | - | 1 | 1 | - | 2 | - | 2 | - | - | - | - | - | - | 6 | 6 | 4.656 | 0.776 |
| ST. LOUIS TESTING LABS., INC. | 24-00188-02 | 2 | 4 | 8 | 2 | 1 | - | - | 2 | - | - | - | - | - | 19 | 17 | 7.979 | 0.469 |
| T & K INSPECTION, INC. | 33-27678-01 | - | - | 1 | 1 | | 1 | 3 | 2 | 2 | - | - | - | - | 10 | 10 | 17.478 | 1.748 |
| TEI ANALYTICAL SERVICES, INC. | 37-28004-01 | 3 | 10 | 6 | 3 | 3 | 3 | 8 | - | - | - | - | - | - | 36 | 33 | 18.037 | 0.547 |
| TESTING INSTITUTE OF ALASKA, INC. | 50-17446-01 | - | 3 | 2 | 2 | 1 | 1 | 1 | - | - | - | - | - | - | 10 | 10 | 3.795 | 0.380 |
| TESTING TECHNOLOGIES, INC. | 45-25007-01 | 1 | 7 | 8 | 6 | 5 | 2 | - | - | - | - | - | - | - | 29 | 28 | 8.973 | 0.320 |
| TESTMASTER INSPECTION CO., INC. | 34-24872-01 | - | - | - | 1 | - | 1 | 4 | 1 | - | 1 | - | - | - | 8 | 8 | 14.149 | 1.769 |
| THERMAL ENGINEERING INT'L | 24-19500-01 | 3 | 3 | - | - | - | - | - | - | - | - | - | - | - | 6 | 3 | 0.030 | 0.010 |
| THREE RIVERS GAMMA SERVICES | 37-28367-01 | - | - | - | - | - | - | 2 | - | - | - | - | - | - | 2 | 2 | 2.395 | 1.198 |
| TMP WORLDWIDE | 37-27891-01 | 2 | 9 | 1 | 4 | 1 | 1 | 5 | 2 | - | - | - | - | - | 25 | 23 | 14.674 | 0.638 |
| TULSA GAMMA RAY, INC. | 35-17178-01 | 11 | 10 | 10 | 16 | 11 | 4 | 21 | 10 | 4 | 1 | - | - | - | 98 | 87 | 92.288 | 1.061 |
| TVA INSPECTION SERVICES ORG. | 41-06832-06 | 11 | 5 | 2 | 2 | 1 | - | - | - | - | - | - | - | - | 21 | 10 | 1.934 | 0.193 |
| TWIN CITY TESTING CORPORATION | 22-01376-02 | - | 3 | 1 | 2 | 2 | 5 | 4 | - | - | - | - | - | - | 17 | 17 | 12.476 | 0.734 |
| TWIN PORTS TESTING, INC. | 48-23476-01 | 5 | 3 | 1 | 1 | 2 | 1 | 1 | - | - | - | - | - | - | 14 | 9 | 3.940 | 0.438 |
| UNITED EVALUATION SERVICES, INC. | 29-28358-02 | 1 | 3 | 1 | 1 | 1 | 1 | 4 | 3 | 1 | - | - | - | - | 16 | 15 | 17.377 | 1.158 |
| VALLEY INDUSTRIAL X-RAY | 04-29076-01 | 7 | 9 | 9 | 8 | 5 | 7 | 12 | 2 | - | - | - | - | - | 59 | 52 | 36.934 | 0.710 |
| VALLEY INSPECTION SERVICE, INC. | 37-28385-01 | - | - | 1 | 2 | - | - | 2 | 2 | - | - | - | - | - | 7 | 7 | 8.819 | 1.260 |
| VERMONT RADIOLOGISTS | 44-28802-01 | - | 1 | - | 1 | - | - | - | - | - | - | - | - | - | 2 | 2 | 0.352 | 0.176 |
| WESTERN X-RAY COMPANY | 35-19993-01 | - | 3 | 5 | 7 | 5 | 3 | 8 | 4 | - | - | - | - | - | 35 | 35 | 29.035 | 0.830 |
| WESTINGHOUSE GVT SVC CO, LLC | 37-05809-02 | - | 3 | - | - | - | - | - | - | - | - | - | - | - | 3 | 3 | 0.020 | 0.007 |
| WOS TESTING COMPANY, INC. | 48-26385-01 | - | 2 | | 2 | - | - | 1 | - | - | - | - | - | - | 5 | 5 | 1.742 | 0.348 |
| **Total** | **104** | **440** | **858** | **506** | **450** | **299** | **238** | **472** | **148** | **71** | **40** | **-** | **-** | **-** | **3,522** | **3,082** | **2,105.033** | **0.683** |

NOTE: The data values shown bolded and in boxes represent the highest value in each category.

# APPENDIX A
## Annual TEDE for Non-Reactor NRC Licensees
## CY 2001 (continued)

| PROGRAM CODE - LICENSEE NAME | LICENSE# | Number of Individuals with Whole Body Doses in the Ranges (rems) | | | | | | | | | | | | | Total Number Monitored | Number With Meas. Dose | Total Collective TEDE (Person-Rem) | Average Meas. TEDE (Rems) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | 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 | 6.00-12.00 | >12.0 | | | | |
| ***URANIUM ENRICHMENT PLANTS - 21200*** | | | | | | | | | | | | | | | | | | |
| USEC - PADUCAH | GDP-1 | 1864 | 200 | 11 | - | - | - | - | - | - | - | - | - | - | **2,075** | **211** | **6.125** | 0.029 |
| USEC - PORTSMOUTH | GDP-2 | 1806 | 123 | 11 | - | - | - | - | - | - | - | - | - | - | 1,940 | 134 | 4.200 | **0.031** |
| **Total** | **2** | **3,670** | **323** | **22** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **4,015** | **345** | **10.325** | **0.030** |
| ***FUEL FABRICATION FACILITIES - 21210*** | | | | | | | | | | | | | | | | | | |
| BWX TECHNOLOGIES, INC. (NNFD) | SNM-0042 | 4 | 134 | 174 | 47 | 11 | 2 | 6 | - | - | - | - | - | - | 378 | 374 | 67.695 | 0.181 |
| FRAMATOME ANP, INC. | SNM-1227 | 88 | 278 | 116 | 75 | 34 | 16 | 9 | 1 | - | - | - | - | - | 617 | 529 | 105.224 | 0.199 |
| FRAMATOME ANP, INC. | SNM-1168 | 127 | 215 | 29 | 6 | 1 | 2 | - | - | - | - | - | - | - | 380 | 253 | 13.125 | 0.052 |
| GLOBAL NUCLEAR FUEL-AMERICAS, LLC | SNM-1097 | 179 | 455 | 181 | 117 | 4 | 1 | - | - | - | - | - | - | - | **937** | 758 | 86.000 | 0.113 |
| NUCLEAR FUEL SERVICES, INC. | SNM-0124 | 70 | 498 | 104 | 64 | 21 | 10 | 12 | 2 | - | - | - | - | - | 781 | 711 | 95.599 | 0.134 |
| WESTINGHOUSE ELECTRIC CO. | SNM-1107 | 13 | 180 | 161 | 102 | 59 | 39 | 105 | 80 | 55 | 7 | - | - | - | 801 | **788** | **725.177** | **0.920** |
| WESTINGHOUSE ELECTRIC CO. LLC | SNM-0033 | 14 | 94 | 45 | 40 | 21 | 14 | 8 | - | - | - | - | - | - | 236 | 222 | 59.117 | 0.266 |
| **Total** | **7** | **495** | **1,854** | **810** | **451** | **151** | **84** | **140** | **83** | **55** | **7** | **-** | **-** | **-** | **4,130** | **3,635** | **1,151.937** | **0.317** |
| ***INDEPENDENT SPENT FUEL STORAGE INSTALLATION - 23200*** | | | | | | | | | | | | | | | | | | |
| DEPARTMENT OF ENERGY (TMI) | SNM-2508 | 31 | 37 | 21 | 13 | 1 | - | - | - | - | - | - | - | - | **103** | **72** | **10.040** | **0.139** |
| GENERAL ELECTRIC COMPANY | SNM-2500 | 16 | 27 | 2 | 6 | - | - | - | - | - | - | - | - | - | 51 | 35 | 3.048 | 0.087 |
| **Total** | **2** | **47** | **64** | **23** | **19** | **1** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **154** | **107** | **13.088** | **0.122** |

NOTE: The data values shown bolded and in boxes represent the highest value in each category.

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Appendix B

# ANNUAL WHOLE BODY DOSES AT LICENSED NUCLEAR POWER FACILITIES

# 2001

# APPENDIX B
## Annual Whole Body Doses at Licensed Nuclear Power Facilities
## CY 2001

| PLANT NAME | TYPE | Number of Individuals with Whole Body Doses in the Ranges (rems) | | | | | | | | | | | | | | Total Number Monitored | Number With Meas. Dose | Total Collective TEDE (Person-Rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | 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 | 1,221 | 740 | 244 | 86 | 8 | 3 | 1 | - | - | - | - | - | - | - | 2,303 | 1,082 | 106.040 |
| BEAVER VALLEY 1, 2 | PWR | 1,383 | 620 | 344 | 185 | 29 | 16 | 8 | - | - | - | - | - | - | - | 2,585 | 1,202 | 184.361 |
| BRAIDWOOD 1, 2 | PWR | 1,303 | 571 | 200 | 90 | 15 | 4 | 1 | - | - | - | - | - | - | - | 2,184 | 881 | 100.570 |
| BROWNS FERRY 1, 2, 3 | BWR | 1,244 | 695 | 386 | 315 | 93 | 25 | 11 | - | - | - | - | - | - | - | 2,769 | 1,525 | 293.879 |
| BRUNSWICK 1, 2 | BWR | 1,368 | 868 | 352 | 242 | 89 | 47 | 25 | - | - | - | - | - | - | - | 2,991 | 1,623 | 302.812 |
| BYRON 1, 2 | PWR | 1,382 | 499 | 187 | 32 | 1 | - | - | - | - | - | - | - | - | - | 2,101 | 719 | 59.451 |
| CALLAWAY 1 | PWR | 1,039 | 579 | 171 | 87 | 24 | 4 | 8 | - | - | - | - | - | - | - | 1,912 | 873 | 106.782 |
| CALVERT CLIFFS 1, 2 | PWR | 1,363 | 448 | 223 | 140 | 50 | 16 | 18 | - | - | - | - | - | - | - | 2,258 | 895 | 166.864 |
| CATAWBA 1, 2 | PWR | 1,688 | 572 | 291 | 59 | 28 | 8 | 2 | - | - | - | - | - | - | - | 2,648 | 960 | 116.241 |
| CLINTON | BWR | 1,185 | 199 | 104 | 25 | 1 | - | - | - | - | - | - | - | - | - | 1,514 | 329 | 33.770 |
| COLUMBIA GENERATING 2 | BWR | 820 | 876 | 302 | 248 | 68 | 19 | 2 | - | - | - | - | - | - | - | 2,335 | 1,515 | 226.675 |
| COMANCHE PEAK 1, 2 | PWR | 1,311 | 470 | 247 | 106 | 24 | 5 | 1 | - | - | - | - | - | - | - | 2,164 | 853 | 114.968 |
| COOK 1, 2 | PWR | 1,861 | 339 | 69 | 10 | 4 | 1 | - | - | - | - | - | - | - | - | 2,284 | 423 | 27.290 |
| COOPER STATION | BWR | 540 | 836 | 261 | 144 | 49 | 17 | 2 | - | - | - | - | - | - | - | 1,849 | 1,309 | 168.665 |
| CRYSTAL RIVER 3 | PWR | 857 | 474 | 232 | 131 | 45 | 15 | 5 | - | - | - | - | - | - | - | 1,759 | 902 | 147.946 |
| DAVIS-BESSE | PWR | 837 | 108 | 11 | - | - | - | - | - | - | - | - | - | - | - | 956 | 119 | 5.505 |
| DIABLO CANYON 1, 2 | PWR | 1,111 | 690 | 266 | 89 | 25 | 4 | - | - | - | - | - | - | - | - | 2,185 | 1,074 | 117.804 |
| DRESDEN 2, 3 | BWR | 1,307 | 1,674 | 616 | 313 | 112 | 25 | 29 | - | - | - | - | - | - | - | 4,076 | 2,769 | 400.702 |
| DUANE ARNOLD | BWR | 843 | 502 | 212 | 127 | 44 | 9 | 4 | - | - | - | - | - | - | - | 1,741 | 898 | 137.564 |
| FARLEY 1, 2 | PWR | 1,195 | 825 | 552 | 307 | 89 | 30 | 7 | - | - | - | - | - | - | - | 3,005 | 1,810 | 320.509 |
| FERMI 2 | BWR | 1,089 | 685 | 294 | 162 | 50 | 11 | - | - | - | - | - | - | - | - | 2,291 | 1,202 | 168.689 |
| FITZPATRICK | BWR | 632 | 497 | 82 | 66 | 18 | 1 | 1 | - | - | - | - | - | - | - | 1,297 | 665 | 63.229 |
| FORT CALHOUN | PWR | 456 | 271 | 161 | 164 | 108 | 48 | 18 | - | - | - | - | - | - | - | 1,226 | 770 | 225.891 |
| GINNA | PWR | 588 | 115 | 19 | 5 | 1 | - | - | - | - | - | - | - | - | - | 728 | 140 | 10.156 |
| GRAND GULF | BWR | 994 | 601 | 273 | 156 | 43 | 26 | 10 | - | - | - | - | - | - | - | 2,103 | 1,109 | 185.214 |
| HARRIS | PWR | 974 | 818 | 423 | 258 | 74 | 12 | 1 | - | - | - | - | - | - | - | 2,560 | 1,586 | 252.241 |
| HATCH 1, 2 | BWR | 1,157 | 653 | 418 | 273 | 56 | 6 | 1 | - | - | - | - | - | - | - | 2,564 | 1,407 | 230.242 |
| HOPE CREEK 1 | BWR | 625 | 1,064 | 241 | 154 | 49 | 20 | 4 | - | - | - | - | - | - | - | 2,157 | 1,532 | 156.180 |
| INDIAN POINT 2 | PWR | 1,253 | 336 | 57 | 4 | 2 | - | - | - | - | - | - | - | - | - | 1,652 | 399 | 22.067 |
| INDIAN POINT 3 | PWR | 877 | 612 | 262 | 128 | 12 | - | - | - | - | - | - | - | - | - | 1,891 | 1,014 | 118.115 |
| KEWAUNEE | PWR | 665 | 470 | 359 | 227 | 41 | 11 | 2 | - | - | - | - | - | - | - | 1,775 | 1,110 | 200.245 |
| LASALLE 1, 2 | BWR | 1,804 | 222 | 206 | 96 | 6 | 3 | 2 | - | - | - | - | - | - | - | 2,339 | 535 | 82.721 |
| LIMERICK 1, 2 | BWR | 1,622 | 581 | 295 | 135 | 65 | 31 | 20 | - | - | - | - | - | - | - | 2,749 | 1,127 | 210.336 |
| MCGUIRE 1, 2 | PWR | 1,499 | 486 | 313 | 133 | 22 | 9 | - | - | - | - | - | - | - | - | 2,462 | 963 | 136.581 |
| MILLSTONE 2, 3 | PWR | 1,079 | 929 | 232 | 116 | 35 | 12 | 3 | - | - | - | - | - | - | - | 2,406 | 1,327 | 174.238 |
| MONTICELLO | BWR | 514 | 357 | 176 | 147 | 85 | 40 | 29 | - | - | - | - | - | - | - | 1,348 | 834 | 220.683 |
| NINE MILE POINT 1, 2 | BWR | 1,532 | 593 | 308 | 249 | 123 | 50 | 46 | 2 | - | - | - | - | - | - | 2,903 | 1,371 | 343.197 |
| NORTH ANNA 1, 2 | PWR | 2,076 | 607 | 286 | 178 | 64 | 30 | 48 | 18 | - | - | - | - | - | - | 3,307 | 1,231 | 308.907 |

# APPENDIX B
## Annual Whole Body Doses at Licensed Nuclear Power Facilities
## CY 2001

| PLANT NAME | TYPE | Number of Individuals with Whole Body Doses in the Ranges (rems) | | | | | | | | | | | | | | Total Number Monitored | Number With Meas. Dose | Total Collective TEDE (Person-Rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | 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 | | | |
| OCONEE 1, 2, 3 | PWR | 1,859 | 836 | 524 | 296 | 111 | 95 | 126 | 14 | - | - | - | - | - | - | 3,861 | 2,002 | 579.209 |
| OYSTER CREEK | BWR | 1,101 | 282 | 110 | 45 | 5 | - | - | - | - | - | - | - | - | - | 1,543 | 442 | 45.817 |
| PALISADES | PWR | 677 | 356 | 247 | 202 | 88 | 53 | 67 | 19 | - | - | - | - | - | - | 1,709 | 1,032 | 362.723 |
| PALO VERDE 1, 2, 3 | PWR | 1,307 | 869 | 247 | 164 | 56 | 21 | 4 | - | - | - | - | - | - | - | 2,668 | 1,361 | 182.043 |
| PEACH BOTTOM 2, 3 | BWR | 1,415 | 684 | 292 | 257 | 121 | 44 | 45 | 2 | - | - | - | - | - | - | 2,860 | 1,445 | 344.283 |
| PERRY | BWR | 1,052 | 638 | 375 | 274 | 87 | 17 | 1 | - | - | - | - | - | - | - | 2,444 | 1,392 | 258.268 |
| PILGRIM | BWR | 555 | 609 | 258 | 177 | 49 | 11 | 9 | - | - | - | - | - | - | - | 1,668 | 1,113 | 179.585 |
| POINT BEACH 1, 2 | PWR | 738 | 365 | 172 | 146 | 50 | 7 | - | - | - | - | - | - | - | - | 1,478 | 740 | 131.667 |
| PRAIRIE ISLAND 1, 2 | PWR | 623 | 316 | 197 | 122 | 46 | 9 | 1 | - | - | - | - | - | - | - | 1,314 | 691 | 124.708 |
| QUAD CITIES 1, 2 | BWR | 1,057 | 388 | 119 | 145 | 61 | 17 | 6 | - | - | - | - | - | - | - | 1,793 | 736 | 143.849 |
| RIVER BEND 1 | BWR | 809 | 594 | 368 | 213 | 59 | 11 | 4 | - | - | - | - | - | - | - | 2,058 | 1,249 | 207.614 |
| ROBINSON 2 | PWR | 791 | 401 | 250 | 145 | 31 | - | - | - | - | - | - | - | - | - | 1,618 | 827 | 124.750 |
| SALEM 1, 2 | PWR | 520 | 885 | 200 | 128 | 41 | 16 | 4 | - | - | - | - | - | - | - | 1,794 | 1,274 | 153.088 |
| SAN ONOFRE 2, 3 | PWR | 1,590 | 669 | 270 | 111 | 27 | 5 | 1 | - | - | - | - | - | - | - | 2,673 | 1,083 | 131.384 |
| SEABROOK | PWR | 844 | 404 | 19 | - | - | - | - | - | - | - | - | - | - | - | 1,267 | 423 | 8.672 |
| SEQUOYAH 1, 2 | PWR | 1,220 | 827 | 292 | 155 | 16 | 1 | 1 | - | - | - | - | - | - | - | 2,512 | 1,292 | 145.066 |
| SOUTH TEXAS 1, 2 | PWR | 1,105 | 692 | 326 | 185 | 68 | 41 | 13 | - | - | - | - | - | - | - | 2,430 | 1,325 | 237.645 |
| ST. LUCIE 1, 2 | PWR | 972 | 723 | 385 | 172 | 61 | 16 | 18 | - | - | - | - | - | - | - | 2,347 | 1,375 | 228.071 |
| SUMMER 1 | PWR | 753 | 324 | 87 | 34 | 25 | 9 | 7 | - | - | - | - | - | - | - | 1,239 | 486 | 69.398 |
| SURRY 1, 2 | PWR | 2,101 | 616 | 287 | 159 | 52 | 37 | 84 | 8 | - | - | - | - | - | - | 3,344 | 1,243 | 328.650 |
| SUSQUEHANNA 1, 2 | BWR | 1,422 | 993 | 427 | 261 | 81 | 38 | 7 | - | - | - | - | - | - | - | 3,229 | 1,807 | 288.413 |
| THREE MILE ISLAND 1 | PWR | 1,544 | 730 | 257 | 101 | 47 | 30 | 31 | - | - | - | - | - | - | - | 2,740 | 1,196 | 196.699 |
| TURKEY POINT 3, 4 | PWR | 989 | 517 | 201 | 79 | 23 | 4 | 3 | - | - | - | - | - | - | - | 1,816 | 827 | 101.575 |
| VERMONT YANKEE | BWR | 775 | 453 | 211 | 138 | 48 | 9 | 4 | - | - | - | - | - | - | - | 1,638 | 863 | 143.010 |
| VOGTLE 1, 2 | PWR | 1,047 | 449 | 253 | 130 | 25 | 11 | 2 | - | - | - | - | - | - | - | 1,917 | 870 | 129.270 |
| WATERFORD 3 | PWR | 1,009 | 79 | 12 | - | - | - | - | - | - | - | - | - | - | - | 1,100 | 91 | 4.677 |
| WATTS BAR 1 | PWR | 1,129 | 185 | 12 | - | - | - | - | - | - | - | - | - | - | - | 1,326 | 197 | 5.912 |
| WOLF CREEK 1 | PWR | 908 | 95 | 5 | 5 | - | - | - | - | - | - | - | - | - | - | 1,013 | 105 | 5.176 |
| **TOTALS: 35 BWRs** | | **25,462** | **15,544** | **6,686** | **4,362** | **1,462** | **477** | **262** | **4** | **-** | **-** | **-** | **-** | **-** | **-** | **54,259** | **28,797** | **4,835.397** |
| **TOTALS: 69 PWRs** | | **47,744** | **21,917** | **9,392** | **4,869** | **1,468** | **583** | **485** | **59** | **-** | **-** | **-** | **-** | **-** | **-** | **86,517** | **38,773** | **6,273.155** |
| **TOTALS: 104 LWRs** | | **73,206** | **37,461** | **16,078** | **9,231** | **2,930** | **1,060** | **747** | **63** | **-** | **-** | **-** | **-** | **-** | **-** | **140,776** | **67,570** | **11,108.552** |

# APPENDIX B
## Annual Whole Body Doses at Licensed Nuclear Power Facilities
## CY 2001

| PLANT NAME | TYPE | Number of Individuals with Whole Body Doses in the Ranges (rems) | | | | | | | | | | | | | | Total Number Monitored | Number With Meas. Dose | Total Collective TEDE (Person-Rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | 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 | | | |
| **REACTORS NOT YET IN COMMERCIAL OPERATION** | | | | | | | | | | | | | | | | | | |
| WATTS BAR 2 | PWR | Reported with Watts Bar 1 | | | | | | | | | | | | | | | | |
| **REACTORS NO LONGER IN COMMERCIAL OPERATION** | | | | | | | | | | | | | | | | | | |
| BIG ROCK POINT | BWR | 185 | 76 | 31 | 13 | 32 | 8 | 7 | - | - | - | - | - | - | - | 352 | 167 | 47.556 |
| HADDAM NECK | PWR | 612 | 158 | 78 | 63 | 25 | 16 | 21 | - | - | - | - | - | - | - | 973 | 361 | 95.348 |
| HUMBOLDT BAY | BWR | 157 | 9 | 1 | - | - | - | - | - | - | - | - | - | - | - | 167 | 10 | 0.360 |
| LACROSSE | BWR | 19 | 35 | 6 | 4 | - | - | - | - | - | - | - | - | - | - | 64 | 45 | 2.782 |
| MAINE YANKEE | PWR | 376 | 234 | 82 | 61 | 24 | 7 | 4 | - | - | - | - | - | - | - | 788 | 412 | 68.121 |
| MILLSTONE 1 | BWR | 337 | 290 | 72 | 36 | 11 | 4 | 1 | - | - | - | - | - | - | - | 751 | 414 | 14.946 |
| RANCHO SECO | PWR | 119 | 156 | 26 | 23 | 5 | - | - | - | - | - | - | - | - | - | 329 | 210 | 18.432 |
| SAN ONOFRE 1 | PWR | 1,153 | 174 | 84 | 51 | 21 | 8 | - | - | - | - | - | - | - | - | 1,491 | 338 | 57.785 |
| TROJAN | PWR | 289 | 11 | 2 | 1 | - | - | - | - | - | - | - | - | - | - | 303 | 14 | 1.091 |
| YANKEE-ROWE | PWR | 438 | 36 | 9 | 2 | 1 | - | - | - | - | - | - | - | - | - | 486 | 48 | 3.969 |
| ZION 1, 2 | PWR | 93 | 5 | 1 | - | - | - | - | - | - | - | - | - | - | - | 99 | 6 | 0.274 |
| **REACTORS NO LONGER IN COMMERCIAL OPERATION, REPORTED WITH OTHER UNITS** | | | | | | | | | | | | | | | | | | |
| BROWNS FERRY 1 | BWR | Reported with Browns Ferry 2, 3 and still included in the count of operating reactors, although Unit 1 has been on Administrative Hold since June, 1985. | | | | | | | | | | | | | | | | |
| DRESDEN 1 | BWR | Reported with Dresden 2, 3. An estimated 12 person-rem was attributed to Unit 1. | | | | | | | | | | | | | | | | |
| INDIAN POINT 1 | PWR | Reported with Indian Point 2 | | | | | | | | | | | | | | | | |
| THREE MILE ISLAND 2 | PWR | Reported with Three Mile Island 1 | | | | | | | | | | | | | | | | |
| **TOTAL REPORTING:** | **12** | **3,778** | **1,184** | **392** | **254** | **119** | **43** | **33** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **5,803** | **2,025** | **310.664** |

# Appendix C*

# PERSONNEL, DOSE, AND POWER GENERATION SUMMARY

# 1969 - 2001

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

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **ARKANSAS 1, 2** | 1975 | 588.0 | 76.5 | 147 | 21 | 0.14 | 0.04 |
| Docket 50-313, 50-368; | 1976 | 464.6 | 56.6 | 476 | 289 | 0.61 | 0.62 |
| DPR-51; NPF-6 | 1977 | 610.3 | 76.8 | 601 | 256 | 0.43 | 0.42 |
| 1st commercial operation | 1978 | 627.2 | 77.5 | 722 | 189 | 0.26 | 0.30 |
| 12/74, 3/80 | 1979 | 397.0 | 55.3 | 1,321 | 369 | 0.28 | 0.93 |
| Type - PWRs | 1980 | 452.8 | 63.7 | 1,233 | 342 | 0.28 | 0.76 |
| Capacity - 836, 858 MWe | 1981 | 1,104.7 | 68.3 | 2,225 | 1,102 | 0.50 | 1.00 |
| | 1982 | 905.4 | 58.6 | 1,608 | 803 | 0.50 | 0.89 |
| | 1983 | 915.0 | 54.7 | 2,109 | 1,397 | 0.66 | 1.53 |
| | 1984 | 1,289.1 | 77.4 | 1,742 | 806 | 0.46 | 0.63 |
| | 1985 | 1,192.3 | 73.6 | 1,262 | 286 | 0.23 | 0.24 |
| | 1986 | 1,070.3 | 66.9 | 2,135 | 1,141 | 0.53 | 1.07 |
| | 1987 | 1,366.1 | 88.9 | 1,123 | 382 | 0.34 | 0.28 |
| | 1988 | 1,070.3 | 69.4 | 2,421 | 1,387 | 0.57 | 1.30 |
| | 1989 | 1,066.3 | 72.0 | 2,063 | 711 | 0.34 | 0.67 |
| | 1990 | 1,351.9 | 84.2 | 2,493 | 762 | 0.31 | 0.56 |
| | 1991 | 1,515.8 | 88.4 | 2,064 | 351 | 0.17 | 0.23 |
| | 1992 | 1,352.1 | 77.4 | 3,114 | 876 | 0.28 | 0.65 |
| | 1993 | 1,606.0 | 91.3 | 1,981 | 268 | 0.14 | 0.17 |
| | 1994 | 1,662.8 | 93.6 | 1,361 | 172 | 0.13 | 0.10 |
| | 1995 | 1,397.0 | 82.7 | 2,259 | 386 | 0.17 | 0.28 |
| | 1996 | 1,596.0 | 89.5 | 1,441 | 203 | 0.14 | 0.13 |
| | 1997 | 1,621.9 | 95.9 | 1,195 | 119 | 0.10 | 0.07 |
| | 1998 | 1,494.6 | 88.1 | 1,249 | 167 | 0.13 | 0.11 |
| | 1999 | 1,477.3 | 86.9 | 1,463 | 184 | 0.13 | 0.12 |
| | 2000 | 1,329.2 | 79.5 | 1,977 | 242 | 0.12 | 0.18 |
| | 2001 | 1,684.0 | 95.8 | 1,082 | 106 | 0.10 | 0.06 |
| **BEAVER VALLEY 1, 2** | 1977 | 355.6 | 57.0 | 331 | 878 | 0.26 | 2.47 |
| Docket 50-334, 50-412; | 1978 | 304.2 | 40.8 | 646 | 190 | 0.29 | 0.62 |
| DPR-66, NPF-73 | 1979 | 221.0 | 40.0 | 704 | 132 | 0.19 | 0.60 |
| 1st commercial operation | 1980 | 39.8 | 6.8 | 1,817 | 553 | 0.30 | 13.89 |
| 10/76, 11/87 | 1981 | 573.4 | 73.6 | 1,237 | 229 | 0.19 | 0.40 |
| Type - PWRs | 1982 | 326.7 | 41.6 | 1,755 | 599 | 0.34 | 1.83 |
| Capacity - 821, 831 MWe | 1983 | 561.2 | 68.2 | 1,485 | 772 | 0.52 | 1.38 |
| | 1984 | 576.7 | 71.8 | 1,393 | 504 | 0.36 | 0.87 |
| | 1985 | 717.7 | 91.9 | 619 | 60 | 0.10 | 0.08 |
| | 1986 | 581.3 | 70.7 | 1,575 | 627 | 0.40 | 1.08 |
| | 1987 | 684.1 | 83.8 | 1,282 | 210 | 0.16 | 0.31 |
| | 1988 | 1,386.1 | 87.4 | 1,764 | 530 | 0.30 | 0.38 |
| | 1989 | 1,017.4 | 69.6 | 2,349 | 1,378 | 0.59 | 1.35 |
| | 1990 | 1,271.0 | 85.3 | 1,675 | 348 | 0.21 | 0.27 |
| | 1991 | 1,267.5 | 78.6 | 1,689 | 495 | 0.29 | 0.39 |
| | 1992 | 1,441.9 | 89.1 | 1,414 | 289 | 0.20 | 0.20 |
| | 1993 | 1,157.9 | 73.1 | 2,087 | 621 | 0.30 | 0.54 |
| | 1994 | 1,514.6 | 88.6 | 487 | 44 | 0.09 | 0.03 |
| | 1995 | 1,389.2 | 83.1 | 1,536 | 453 | 0.29 | 0.33 |
| | 1996 | 1,269.0 | 76.5 | 1,688 | 449 | 0.27 | 0.35 |
| | 1997 | 1,159.3 | 72.1 | 1,391 | 306 | 0.22 | 0.26 |
| | 1998 | 523.1 | 33.5 | 700 | 59 | 0.08 | 0.11 |
| | 1999 | 1,353.7 | 85.9 | 841 | 99 | 0.12 | 0.07 |
| | 2000 | 1,378.7 | 87.3 | 1,730 | 338 | 0.20 | 0.24 |
| | 2001 | 1,500.8 | 92.3 | 1,202 | 184 | 0.15 | 0.12 |

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **BIG ROCK POINT**[1] | 1969 | 48.1 | | 165 | 136 | 0.82 | 2.83 |
| Docket 50-155; DPR-6 | 1970 | 43.5 | | 290 | 194 | 0.67 | 4.46 |
| 1st commercial operation 3/63 | 1971 | 44.4 | | 260 | 184 | 0.71 | 4.14 |
| Type - BWR | 1972 | 43.5 | | 195 | 181 | 0.93 | 4.16 |
| Capacity - (67) MWe | 1973 | 50.9 | | 241 | 285 | 1.18 | 5.60 |
| | 1974 | 40.7 | 70.3 | 281 | 276 | 0.98 | 6.78 |
| | 1975 | 35.1 | 59.8 | 300 | 180 | 0.60 | 5.13 |
| | 1976 | 29.5 | 50.1 | 488 | 289 | 0.59 | 9.80 |
| | 1977 | 43.6 | 73.4 | 465 | 334 | 0.72 | 7.66 |
| | 1978 | 48.5 | 77.9 | 285 | 175 | 0.61 | 3.61 |
| | 1979 | 13.0 | 23.5 | 623 | 455 | 0.73 | 35.00 |
| | 1980 | 48.9 | 79.0 | 599 | 354 | 0.59 | 7.24 |
| | 1981 | 56.9 | 90.6 | 479 | 160 | 0.33 | 2.81 |
| | 1982 | 43.6 | 70.8 | 521 | 328 | 0.63 | 7.52 |
| | 1983 | 42.3 | 71.0 | 493 | 263 | 0.53 | 6.22 |
| | 1984 | 50.3 | 78.6 | 297 | 155 | 0.52 | 3.08 |
| | 1985 | 43.8 | 73.5 | 435 | 291 | 0.67 | 6.64 |
| | 1986 | 61.0 | 95.5 | 202 | 84 | 0.42 | 1.38 |
| | 1987 | 45.3 | 71.0 | 251 | 222 | 0.88 | 4.90 |
| | 1988 | 46.1 | 72.8 | 303 | 170 | 0.56 | 3.69 |
| | 1989 | 50.2 | 79.0 | 418 | 177 | 0.42 | 3.53 |
| | 1990 | 51.3 | 77.2 | 351 | 232 | 0.66 | 4.52 |
| | 1991 | 59.1 | 85.2 | 435 | 226 | 0.52 | 3.82 |
| | 1992 | 32.7 | 54.5 | 496 | 277 | 0.56 | 8.47 |
| | 1993 | 51.2 | 79.4 | 419 | 152 | 0.36 | 2.97 |
| | 1994 | 49.5 | 75.3 | 310 | 119 | 0.38 | 2.40 |
| | 1995 | 62.2 | 95.0 | 205 | 54 | 0.26 | 0.87 |
| | 1997 | 22.4 | 54.1 | 258 | 55 | 0.21 | 2.46 |
| | 1998 | 0.0 | 0.0 | 432 | 104 | 0.24 | --- |
| | 1999 | 0.0 | 0.0 | 285 | 87 | 0.31 | --- |
| | 2000 | 0.0 | 0.0 | 226 | 89 | 0.40 | --- |
| | 2001 | 0.0 | 0.0 | 167 | 48 | 0.28 | --- |
| **BRAIDWOOD 1, 2** | 1989 | 1,381.8 | 75.4 | 1,460 | 296 | 0.20 | 0.21 |
| Docket 50-456, 50-457; | 1990 | 1,740.2 | 84.1 | 1,081 | 186 | 0.17 | 0.11 |
| NPF-72, NPF-77 | 1991 | 1,377.2 | 68.9 | 1,641 | 550 | 0.34 | 0.40 |
| 1st commercial operation | 1992 | 1,885.9 | 89.0 | 1,059 | 228 | 0.22 | 0.12 |
| 7/88, 10/88 | 1993 | 1,899.3 | 86.9 | 1,043 | 273 | 0.26 | 0.14 |
| Type - PWRs | 1994 | 1,666.1 | 77.2 | 1,237 | 298 | 0.24 | 0.18 |
| Capacity - 1168, 1122 MWe | 1995 | 1,914.7 | 85.4 | 1,134 | 236 | 0.21 | 0.12 |
| | 1996 | 1,854.9 | 82.1 | 1,356 | 334 | 0.25 | 0.18 |
| | 1997 | 1,863.3 | 85.4 | 1,693 | 321 | 0.19 | 0.17 |
| | 1998 | 1,979.1 | 88.9 | 1,869 | 259 | 0.14 | 0.13 |
| | 1999 | 2,161.6 | 95.8 | 1,153 | 146 | 0.13 | 0.07 |
| | 2000 | 2,142.8 | 94.9 | 1,562 | 194 | 0.12 | 0.09 |
| | 2001 | 2,186.4 | 95.8 | 881 | 101 | 0.11 | 0.05 |
| **BROWNS FERRY 1**[2]**, 2, 3** | 1975 | 161.7 | 17.8 | 2,743 | 347 | 0.13 | 2.15 |
| Docket 50-259, 50-260, | 1976 | 337.6 | 26.9 | 2,530 | 232 | 0.09 | 0.69 |
| 50-296 | 1977 | 1,327.5 | 73.7 | 1,985 | 876 | 0.44 | 0.66 |
| DPR - 33, - 52, - 68 | 1978 | 1,992.1 | 73.5 | 2,479 | 1,776 | 0.72 | 0.89 |
| 1st commercial operation | 1979 | 2,393.0 | 79.1 | 2,869 | 1,593 | 0.56 | 0.67 |
| 8/74, 3/75, 3/77 | 1980 | 2,182.1 | 73.6 | 2,838 | 1,768 | 0.62 | 0.81 |
| Type - BWRs | 1981 | 2,132.9 | 69.5 | 3,497 | 2,398 | 0.69 | 1.12 |
| Capacity - (1065), 1118, | 1982 | 2,025.4 | 67.6 | 3,360 | 2,230 | 0.66 | 1.10 |
| 1118 MWe | 1983 | 1,641.0 | 54.3 | 3,410 | 3,375 | 0.99 | 2.06 |
| | 1984 | 1,431.9 | 54.2 | 3,172 | 1,954 | 0.62 | 1.36 |

[1] Big Rock Point was shut down in 9/97 and is no longer included in the count of operating reactors. Parentheses indicate plant capacity when plant was operational.

[2] Browns Ferry 1 remains in the count of operating reactors, but was placed on Administrative Hold in June of 1985. Parentheses indicate plant capacity when plant was operational.

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **BROWNS FERRY 1[2], 2, 3** | 1985 | 368.2 | 11.9 | 2,854 | 1,164 | 0.41 | 3.16 |
| (continued) | 1986 | 0.0 | 0.0 | 3,074 | 1,054 | 0.34 | --- |
| | 1987 | 0.0 | 0.0 | 3,184 | 1,186 | 0.37 | --- |
| | 1988 | 0.0 | 0.0 | 3,390 | 1,158 | 0.34 | --- |
| | 1989 | 0.0 | 0.0 | 2,707 | 657 | 0.24 | --- |
| | 1990 | 0.0 | 0.0 | 2,725 | 1,311 | 0.48 | --- |
| | 1991 | 445.0 | 17.7 | 1,831 | 356 | 0.19 | 0.80 |
| | 1992 | 979.9 | 32.2 | 2,670 | 519 | 0.19 | 0.53 |
| | 1993 | 675.1 | 66.8 | 3,594 | 870 | 0.24 | 1.29 |
| | 1994 | 860.2 | 83.4 | 3,362 | 861 | 0.26 | 1.00 |
| | 1995 | 1,165.8 | 98.6 | 2,567 | 413 | 0.16 | 0.35 |
| | 1996 | 1,972.8 | 93.0 | 1,904 | 389 | 0.20 | 0.20 |
| | 1997 | 1,928.8 | 90.2 | 2,268 | 522 | 0.23 | 0.27 |
| | 1998 | 1,961.9 | 87.7 | 1,612 | 368 | 0.23 | 0.19 |
| | 1999 | 2,091.0 | 85.1 | 1,741 | 447 | 0.26 | 0.21 |
| | 2000 | 2,143.8 | 97.1 | 1,657 | 333 | 0.20 | 0.16 |
| | 2001 | 2,074.0 | 90.7 | 1,525 | 294 | 0.19 | 0.14 |
| **BRUNSWICK 1, 2** | 1976 | 297.2 | 56.0 | 1,265 | 326 | 0.26 | 1.10 |
| Docket 50-324, 50-325; | 1977 | 291.1 | 55.7 | 1,512 | 1,120 | 0.74 | 3.85 |
| DPR-62, -71 | 1978 | 1,173.1 | 83.7 | 1,458 | 1,004 | 0.69 | 0.86 |
| 1st commercial operation | 1979 | 810.0 | 60.1 | 2,891 | 2,602 | 0.90 | 3.21 |
| 3/77, 11/75 | 1980 | 687.2 | 52.2 | 3,788 | 3,870 | 1.02 | 5.63 |
| Type - BWRs | 1981 | 925.2 | 56.9 | 3,854 | 2,638 | 0.68 | 2.85 |
| Capacity - 820, 811 MWe | 1982 | 540.3 | 50.3 | 4,957 | 3,792 | 0.76 | 7.02 |
| | 1983 | 636.7 | 44.3 | 5,602 | 3,475 | 0.62 | 5.46 |
| | 1984 | 761.3 | 51.5 | 5,046 | 3,260 | 0.65 | 4.28 |
| | 1985 | 822.2 | 58.4 | 4,057 | 2,804 | 0.69 | 3.41 |
| | 1986 | 1,051.3 | 69.1 | 3,370 | 1,909 | 0.57 | 1.82 |
| | 1987 | 1,152.4 | 80.6 | 3,052 | 1,419 | 0.46 | 1.23 |
| | 1988 | 990.8 | 70.1 | 2,648 | 1,747 | 0.66 | 1.76 |
| | 1989 | 990.9 | 65.8 | 3,844 | 1,786 | 0.46 | 1.80 |
| | 1990 | 991.6 | 67.8 | 3,182 | 1,548 | 0.49 | 1.56 |
| | 1991 | 952.8 | 64.5 | 2,586 | 778 | 0.30 | 0.82 |
| | 1992 | 375.9 | 27.9 | 2,690 | 623 | 0.23 | 1.66 |
| | 1993 | 470.0 | 33.8 | 2,921 | 872 | 0.30 | 1.86 |
| | 1994 | 1,268.4 | 83.0 | 3,049 | 999 | 0.70 | 0.79 |
| | 1995 | 1,411.7 | 92.9 | 2,657 | 683 | 0.26 | 0.48 |
| | 1996 | 1,261.1 | 85.9 | 2,784 | 716 | 0.26 | 0.57 |
| | 1997 | 1,474.0 | 94.1 | 2,212 | 411 | 0.19 | 0.28 |
| | 1998 | 1,521.0 | 94.3 | 2,005 | 396 | 0.20 | 0.26 |
| | 1999 | 1,494.7 | 92.8 | 1,818 | 418 | 0.23 | 0.28 |
| | 2000 | 1,571.2 | 95.6 | 1,648 | 322 | 0.20 | 0.20 |
| | 2001 | 1,576.0 | 95.8 | 1,623 | 303 | 0.19 | 0.19 |
| **BYRON 1, 2** | 1986 | 894.5 | 88.6 | 1,081 | 76 | 0.07 | 0.08 |
| Docket 50-454, 50-455; | 1987 | 650.9 | 70.9 | 1,826 | 769 | 0.42 | 1.18 |
| NPF-37, NPF-66 | 1988 | 1,534.7 | 86.3 | 1,222 | 459 | 0.38 | 0.30 |
| 1st commercial operation | 1989 | 1,812.6 | 90.2 | 1,109 | 172 | 0.16 | 0.09 |
| 9/85, 8/87 | 1990 | 1,567.3 | 78.8 | 1,396 | 434 | 0.31 | 0.28 |
| Type - PWRS | 1991 | 1,816.3 | 89.9 | 1,077 | 268 | 0.25 | 0.15 |
| Capacity - 1163, 1131 MWe | 1992 | 1,888.4 | 90.1 | 1,021 | 199 | 0.19 | 0.11 |
| | 1993 | 1,785.6 | 83.5 | 1,370 | 432 | 0.32 | 0.24 |
| | 1994 | 1,953.3 | 90.7 | 962 | 280 | 0.29 | 0.14 |
| | 1995 | 1,900.6 | 85.5 | 1,107 | 306 | 0.28 | 0.16 |
| | 1996 | 1,758.4 | 79.3 | 1,610 | 455 | 0.28 | 0.26 |

[2] Browns Ferry 1 remains in the count of operating reactors, but was placed on Administrative Hold in June of 1985. Parentheses indicate plant capacity when plant was operational.

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **BYRON 1, 2** | 1997 | 1,856.7 | 86.6 | 1,546 | 241 | 0.16 | 0.13 |
| (continued) | 1998 | 1,869.8 | 85.9 | 1,809 | 275 | 0.15 | 0.15 |
| | 1999 | 2,064.2 | 92.3 | 1,478 | 239 | 0.16 | 0.12 |
| | 2000 | 2,196.9 | 97.4 | 959 | 194 | 0.20 | 0.09 |
| | 2001 | 2,301.5 | 97.8 | 719 | 59 | 0.08 | 0.03 |
| **CALLAWAY 1** | 1985 | 967.4 | 90.0 | 964 | 36 | 0.04 | 0.04 |
| Docket 50-483; NPF-30 | 1986 | 865.2 | 81.3 | 1,052 | 225 | 0.21 | 0.26 |
| 1st commercial operation 12/84 | 1987 | 759.0 | 71.1 | 1,082 | 393 | 0.36 | 0.52 |
| Type - PWR | 1988 | 1,069.2 | 93.4 | 353 | 27 | 0.08 | 0.03 |
| Capacity - 1125 MWe | 1989 | 1,000.3 | 85.4 | 1,055 | 283 | 0.27 | 0.28 |
| | 1990 | 960.7 | 84.1 | 1,134 | 442 | 0.39 | 0.46 |
| | 1991 | 1,193.1 | 99.7 | 280 | 21 | 0.07 | 0.02 |
| | 1992 | 967.5 | 83.0 | 1,133 | 336 | 0.30 | 0.35 |
| | 1993 | 1,002.9 | 86.4 | 1,126 | 225 | 0.20 | 0.22 |
| | 1994 | 1,196.4 | 100.0 | 191 | 14 | 0.07 | 0.01 |
| | 1995 | 989.6 | 84.7 | 1,062 | 187 | 0.18 | 0.19 |
| | 1996 | 1,066.0 | 90.5 | 980 | 248 | 0.25 | 0.23 |
| | 1997 | 1,022.2 | 100.0 | 248 | 12 | 0.05 | 0.01 |
| | 1998 | 972.2 | 91.3 | 929 | 201 | 0.22 | 0.21 |
| | 1999 | 981.3 | 88.7 | 1,098 | 321 | 0.29 | 0.33 |
| | 2000 | 1,137.5 | 99.8 | 244 | 16 | 0.07 | 0.01 |
| | 2001 | 954.5 | 86.7 | 873 | 107 | 0.12 | 0.11 |
| **CALVERT CLIFFS 1, 2** | 1976 | 753.4 | 95.2 | 507 | 74 | 0.15 | 0.10 |
| Docket 50-317, 50-318; | 1977 | 583.0 | 72.1 | 2,265 | 547 | 0.24 | 0.94 |
| DPR-53, -69 | 1978 | 1,188.5 | 75.8 | 1,391 | 500 | 0.36 | 0.42 |
| 1st commercial operation | 1979 | 1,161.0 | 74.0 | 1,428 | 805 | 0.56 | 0.69 |
| 5/75, 4/77 | 1980 | 1,309.9 | 84.1 | 1,496 | 677 | 0.45 | 0.52 |
| Type - PWRs | 1981 | 1,379.7 | 83.1 | 1,555 | 607 | 0.39 | 0.44 |
| Capacity - 825, 835MWe | 1982 | 1,238.3 | 73.7 | 1,805 | 1,057 | 0.59 | 0.85 |
| | 1983 | 1,397.2 | 81.6 | 1,915 | 668 | 0.35 | 0.48 |
| | 1984 | 1,389.4 | 79.3 | 1,369 | 479 | 0.35 | 0.34 |
| | 1985 | 1,189.8 | 68.4 | 1,598 | 694 | 0.43 | 0.58 |
| | 1986 | 1,530.0 | 87.2 | 1,296 | 347 | 0.27 | 0.23 |
| | 1987 | 1,207.3 | 71.8 | 1,384 | 412 | 0.30 | 0.34 |
| | 1988 | 1,397.7 | 81.0 | 1,296 | 291 | 0.22 | 0.21 |
| | 1989 | 333.6 | 20.1 | 1,786 | 346 | 0.19 | 1.04 |
| | 1990 | 161.1 | 11.0 | 2,019 | 304 | 0.15 | 1.89 |
| | 1991 | 1,085.0 | 64.7 | 1,974 | 132 | 0.07 | 0.12 |
| | 1992 | 1,271.2 | 73.9 | 1,979 | 330 | 0.17 | 0.26 |
| | 1993 | 1,462.1 | 83.9 | 1,462 | 405 | 0.28 | 0.28 |
| | 1994 | 1,342.1 | 79.4 | 1,482 | 454 | 0.31 | 0.34 |
| | 1995 | 1,542.8 | 89.9 | 1,203 | 235 | 0.20 | 0.15 |
| | 1996 | 1,438.5 | 82.4 | 1,167 | 239 | 0.20 | 0.17 |
| | 1997 | 1,499.6 | 89.1 | 1,091 | 229 | 0.21 | 0.15 |
| | 1998 | 1,523.1 | 89.3 | 1,042 | 187 | 0.18 | 0.12 |
| | 1999 | 1,521.4 | 90.1 | 1,134 | 192 | 0.17 | 0.13 |
| | 2000 | 1,575.7 | 92.7 | 912 | 135 | 0.15 | 0.09 |
| | 2001 | 1,554.7 | 91.7 | 895 | 167 | 0.19 | 0.11 |
| **CATAWBA 1, 2** | 1986 | 638.9 | 49.9 | 1,724 | 286 | 0.17 | 0.45 |
| Docket 50-413, 50-414; | 1987 | 1,651.2 | 75.9 | 1,865 | 449 | 0.24 | 0.27 |
| NPF-35, NPF-52 | 1988 | 1,675.2 | 77.2 | 2,009 | 556 | 0.28 | 0.33 |
| 1st commercial operation | 1989 | 1,733.6 | 79.5 | 1,660 | 334 | 0.20 | 0.19 |
| 6/85, 8/86 | 1990 | 1,616.3 | 70.8 | 2,174 | 809 | 0.37 | 0.50 |
| Type - PWRs | 1991 | 1,691.5 | 74.6 | 1,871 | 462 | 0.25 | 0.27 |
| Capacity - 1129, 1129 MWe | 1992 | 1,962.8 | 83.9 | 1,515 | 414 | 0.27 | 0.21 |
| | 1993 | 1,896.1 | 81.5 | 1,564 | 396 | 0.25 | 0.21 |
| | 1994 | 2,105.2 | 90.2 | 1,268 | 207 | 0.16 | 0.10 |
| | 1995 | 2,011.9 | 85.3 | 1,892 | 462 | 0.24 | 0.23 |
| | 1996 | 1,879.1 | 80.5 | 1,588 | 302 | 0.19 | 0.16 |

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **CATAWBA 1, 2** | 1997 | 2,028.2 | 89.3 | 1,561 | 266 | 0.17 | 0.13 |
| (continued) | 1998 | 2,006.4 | 89.6 | 1,123 | 162 | 0.14 | 0.08 |
| | 1999 | 2,046.7 | 90.2 | 1,024 | 119 | 0.12 | 0.06 |
| | 2000 | 2,038.3 | 90.3 | 1,185 | 187 | 0.16 | 0.09 |
| | 2001 | 2,119.9 | 92.9 | 960 | 116 | 0.12 | 0.06 |
| **CLINTON** | 1988 | 701.3 | 84.2 | 769 | 130 | 0.17 | 0.19 |
| Docket 50-461; NPF-62 | 1989 | 348.3 | 48.5 | 1,196 | 372 | 0.31 | 1.07 |
| 1st commercial operation 11/87 | 1990 | 435.8 | 55.1 | 1,390 | 553 | 0.40 | 1.27 |
| Type - BWR | 1991 | 722.7 | 80.8 | 1,010 | 233 | 0.23 | 0.32 |
| Capacity - 930 MWe | 1992 | 589.7 | 68.6 | 1,195 | 431 | 0.36 | 0.73 |
| | 1993 | 701.5 | 79.6 | 1,253 | 498 | 0.40 | 0.71 |
| | 1994 | 883.3 | 94.8 | 409 | 63 | 0.15 | 0.07 |
| | 1995 | 731.1 | 83.0 | 1,182 | 316 | 0.27 | 0.43 |
| | 1996 | 634.7 | 66.7 | 1,154 | 350 | 0.30 | 0.55 |
| | 1997 | 0.0 | 0.0 | 738 | 172 | 0.23 | --- |
| | 1998 | 0.0 | 0.0 | 866 | 177 | 0.17 | --- |
| | 1999 | 537.0 | 63.5 | 637 | 87 | 0.14 | 0.16 |
| | 2000 | 784.2 | 87.8 | 1,248 | 253 | 0.20 | 0.32 |
| | 2001 | 896.8 | 98.5 | 329 | 34 | 0.10 | 0.04 |
| **COLUMBIA GENERATING**[3] | 1985 | 616.0 | 87.6 | 755 | 119 | 0.16 | 0.19 |
| Docket 50-397; NPF-21 | 1986 | 616.0 | 74.4 | 1,013 | 222 | 0.22 | 0.36 |
| 1st commercial operation 12/84 | 1987 | 639.0 | 70.8 | 1,201 | 406 | 0.34 | 0.64 |
| Type - BWR | 1988 | 707.7 | 71.8 | 1,050 | 353 | 0.34 | 0.50 |
| Capacity - 1107 MWe | 1989 | 727.2 | 78.3 | 1,299 | 492 | 0.38 | 0.68 |
| | 1990 | 684.7 | 67.5 | 1,348 | 536 | 0.40 | 0.78 |
| | 1991 | 508.5 | 50.3 | 1,088 | 387 | 0.36 | 0.76 |
| | 1992 | 682.3 | 65.6 | 1,489 | 612 | 0.41 | 0.90 |
| | 1993 | 849.6 | 79.5 | 1,385 | 469 | 0.34 | 0.55 |
| | 1994 | 803.8 | 75.2 | 1,870 | 866 | 0.46 | 1.08 |
| | 1995 | 824.7 | 83.8 | 1,694 | 456 | 0.27 | 0.55 |
| | 1996 | 662.9 | 82.2 | 1,453 | 373 | 0.26 | 0.56 |
| | 1997 | 697.0 | 72.7 | 1,218 | 251 | 0.21 | 0.36 |
| | 1998 | 789.5 | 75.3 | 1,220 | 286 | 0.23 | 0.36 |
| | 1999 | 694.7 | 70.0 | 1,022 | 155 | 0.15 | 0.22 |
| | 2000 | 979.6 | 96.3 | 706 | 53 | 0.08 | 0.05 |
| | 2001 | 939.3 | 88.1 | 1,515 | 227 | 0.15 | 0.24 |
| **COMANCHE PEAK 1, 2** | 1991 | 644.4 | 82.2 | 985 | 148 | 0.15 | 0.23 |
| Docket 50-445, 50-446; | 1992 | 830.8 | 84.0 | 1,128 | 188 | 0.17 | 0.23 |
| NPF-87, 89 | 1993 | 853.8 | 81.2 | 945 | 109 | 0.12 | 0.13 |
| 1st commercial operation | 1994 | 1,750.0 | 93.7 | 970 | 90 | 0.09 | 0.05 |
| 8/90, 8/93 | 1995 | 2,022.6 | 92.5 | 951 | 179 | 0.19 | 0.09 |
| Type - PWR | 1996 | 1,804.8 | 81.4 | 1,462 | 288 | 0.20 | 0.16 |
| Capacity - 1150, 1150 MWe | 1997 | 2,002.4 | 93.4 | 870 | 146 | 0.17 | 0.07 |
| | 1998 | 2,037.8 | 94.9 | 967 | 232 | 0.24 | 0.11 |
| | 1999 | 1,981.5 | 90.9 | 1,316 | 251 | 0.19 | 0.13 |
| | 2000 | 2,104.7 | 95.3 | 759 | 78 | 0.10 | 0.04 |
| | 2001 | 2,085.9 | 94.7 | 853 | 115 | 0.13 | 0.06 |

[3] Energy Northwest has changed the name of Washington Nuclear 2 to Columbia Generating Station.

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **COOK 1, 2** | 1976 | 807.4 | 83.1 | 395 | 116 | 0.29 | 0.14 |
| Docket 50-315; DPR-58, -74 | 1977 | 573.0 | 76.1 | 802 | 300 | 0.37 | 0.52 |
| 1st commercial operation | 1978 | 744.8 | 73.6 | 778 | 336 | 0.43 | 0.45 |
| 8/75, 7/78 | 1979 | 1,373.0 | 65.3 | 1,445 | 718 | 0.50 | 0.52 |
| Type - PWRs | 1980 | 1,552.4 | 74.1 | 1,345 | 493 | 0.37 | 0.32 |
| Capacity - 1000, 1060 MWe | 1981 | 1,557.3 | 73.4 | 1,341 | 656 | 0.49 | 0.42 |
| | 1982 | 1,461.6 | 69.8 | 1,527 | 699 | 0.46 | 0.48 |
| | 1983 | 1,456.5 | 71.2 | 1,418 | 658 | 0.46 | 0.45 |
| | 1984 | 1,526.0 | 75.3 | 1,559 | 762 | 0.49 | 0.50 |
| | 1985 | 925.4 | 47.6 | 1,984 | 945 | 0.48 | 1.02 |
| | 1986 | 1,307.1 | 73.4 | 1,774 | 745 | 0.42 | 0.57 |
| | 1987 | 1,199.5 | 70.2 | 1,696 | 666 | 0.39 | 0.56 |
| | 1988 | 1,160.4 | 63.5 | 2,266 | 867 | 0.38 | 0.75 |
| | 1989 | 1,433.1 | 72.8 | 1,575 | 493 | 0.31 | 0.34 |
| | 1990 | 1,318.5 | 67.9 | 1,851 | 580 | 0.31 | 0.44 |
| | 1991 | 1,837.4 | 90.2 | 815 | 69 | 0.08 | 0.04 |
| | 1992 | 760.9 | 50.8 | 1,954 | 492 | 0.25 | 0.65 |
| | 1993 | 1,927.7 | 98.5 | 587 | 44 | 0.07 | 0.02 |
| | 1994 | 1,105.2 | 65.2 | 1,748 | 479 | 0.27 | 0.43 |
| | 1995 | 1,656.0 | 82.1 | 1,310 | 203 | 0.15 | 0.12 |
| | 1996 | 1,938.9 | 92.7 | 1,114 | 214 | 0.19 | 0.11 |
| | 1997 | 1,189.7 | 59.7 | 1,864 | 550 | 0.30 | 0.46 |
| | 1998 | 0.0 | 0.0 | 1,155 | 105 | 0.09 | --- |
| | 1999 | 0.0 | 0.0 | 1,662 | 171 | 0.10 | --- |
| | 2000 | 560.1 | 28.1 | 2,506 | 338 | 0.14 | 0.60 |
| | 2001 | 1,794.3 | 89.2 | 423 | 27 | 0.06 | 0.02 |
| **COOPER STATION** | 1975 | 456.4 | 83.6 | 579 | 117 | 0.20 | 0.26 |
| Docket 50-298; DPR-46 | 1976 | 433.3 | 75.5 | 763 | 350 | 0.46 | 0.81 |
| 1st commercial operation 7/74 | 1977 | 538.2 | 86.2 | 315 | 198 | 0.63 | 0.37 |
| Type - BWR | 1978 | 576.0 | 91.0 | 297 | 158 | 0.53 | 0.27 |
| Capacity - 764 MWe | 1979 | 591.0 | 87.6 | 426 | 221 | 0.52 | 0.37 |
| | 1980 | 448.3 | 71.2 | 785 | 859 | 1.09 | 1.92 |
| | 1981 | 457.1 | 71.2 | 935 | 579 | 0.62 | 1.27 |
| | 1982 | 622.3 | 84.6 | 743 | 542 | 0.73 | 0.87 |
| | 1983 | 396.6 | 63.3 | 1,383 | 1,293 | 0.93 | 3.26 |
| | 1984 | 411.9 | 67.2 | 1,598 | 799 | 0.50 | 1.94 |
| | 1985 | 127.3 | 21.5 | 1,980 | 1,333 | 0.67 | 10.47 |
| | 1986 | 480.0 | 74.7 | 895 | 320 | 0.36 | 0.67 |
| | 1987 | 652.3 | 96.2 | 549 | 103 | 0.19 | 0.16 |
| | 1988 | 493.4 | 67.9 | 942 | 251 | 0.27 | 0.51 |
| | 1989 | 564.3 | 76.2 | 1,202 | 343 | 0.29 | 0.61 |
| | 1990 | 602.0 | 79.4 | 1,174 | 379 | 0.32 | 0.63 |
| | 1991 | 566.3 | 78.8 | 1,099 | 405 | 0.37 | 0.72 |
| | 1992 | 731.0 | 96.4 | 463 | 84 | 0.18 | 0.11 |
| | 1993 | 436.1 | 58.8 | 1,130 | 391 | 0.35 | 0.90 |
| | 1994 | 262.2 | 35.1 | 333 | 79 | 0.24 | 0.30 |
| | 1995 | 486.5 | 66.8 | 1,095 | 228 | 0.21 | 0.47 |
| | 1996 | 742.1 | 97.9 | 468 | 48 | 0.10 | 0.06 |
| | 1997 | 622.8 | 84.4 | 1,125 | 174 | 0.16 | 0.28 |
| | 1998 | 555.9 | 75.9 | 977 | 182 | 0.19 | 0.33 |
| | 1999 | 743.2 | 98.1 | 318 | 48 | 0.15 | 0.06 |
| | 2000 | 539.2 | 74.2 | 963 | 200 | 0.21 | 0.37 |
| | 2001 | 592.7 | 80.9 | 1,309 | 169 | 0.13 | 0.28 |

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **CRYSTAL RIVER 3** | 1978 | 311.5 | 41.4 | 643 | 321 | 0.50 | 1.03 |
| Docket 50-302; DPR-72 | 1979 | 453.0 | 58.9 | 1,150 | 495 | 0.43 | 1.09 |
| 1st commercial operation 3/77 | 1980 | 404.1 | 53.2 | 1,053 | 625 | 0.59 | 1.55 |
| Type - PWR | 1981 | 490.4 | 62.2 | 1,120 | 408 | 0.36 | 0.83 |
| Capacity - 834 MWe | 1982 | 589.8 | 76.0 | 780 | 177 | 0.23 | 0.30 |
| | 1983 | 452.1 | 58.8 | 1,720 | 552 | 0.32 | 1.22 |
| | 1984 | 774.2 | 94.5 | 549 | 49 | 0.09 | 0.06 |
| | 1985 | 344.2 | 47.6 | 1,976 | 689 | 0.35 | 2.00 |
| | 1986 | 319.5 | 41.8 | 1,057 | 472 | 0.45 | 1.48 |
| | 1987 | 436.0 | 60.9 | 1,384 | 488 | 0.35 | 1.12 |
| | 1988 | 690.2 | 84.0 | 569 | 64 | 0.11 | 0.09 |
| | 1989 | 352.8 | 48.8 | 880 | 234 | 0.27 | 0.66 |
| | 1990 | 497.8 | 63.8 | 1,441 | 476 | 0.33 | 0.96 |
| | 1991 | 654.6 | 82.0 | 821 | 116 | 0.14 | 0.18 |
| | 1992 | 632.1 | 76.1 | 1,403 | 424 | 0.30 | 0.67 |
| | 1993 | 722.4 | 85.0 | 683 | 60 | 0.09 | 0.08 |
| | 1994 | 711.9 | 84.3 | 1,079 | 228 | 0.21 | 0.32 |
| | 1995 | 866.3 | 100.0 | 209 | 8 | 0.04 | 0.01 |
| | 1996 | 290.8 | 37.7 | 1,192 | 353 | 0.30 | 1.21 |
| | 1997 | 0.0 | 0.0 | 973 | 179 | 0.18 | --- |
| | 1998 | 739.9 | 90.3 | 313 | 19 | 0.06 | 0.03 |
| | 1999 | 727.5 | 87.8 | 1,324 | 251 | 0.19 | 0.35 |
| | 2000 | 819.4 | 97.6 | 257 | 15 | 0.06 | 0.02 |
| | 2001 | 741.6 | 89.2 | 902 | 148 | 0.16 | 0.20 |
| **DAVIS-BESSE 1** | 1978 | 326.4 | 48.7 | 421 | 48 | 0.11 | 0.15 |
| Docket 50-346; NPF-3 | 1979 | 381.0 | 67.0 | 304 | 30 | 0.10 | 0.08 |
| 1st commercial operation 7/78 | 1980 | 256.4 | 36.2 | 1,283 | 154 | 0.12 | 0.60 |
| Type - PWR | 1981 | 531.4 | 67.4 | 578 | 58 | 0.10 | 0.11 |
| Capacity - 882 MWe | 1982 | 390.8 | 51.5 | 1,350 | 164 | 0.12 | 0.42 |
| | 1983 | 592.1 | 73.0 | 718 | 80 | 0.11 | 0.14 |
| | 1984 | 518.5 | 62.5 | 1,088 | 177 | 0.16 | 0.34 |
| | 1985 | 238.3 | 31.2 | 718 | 71 | 0.10 | 0.30 |
| | 1986 | 3.3 | 1.3 | 981 | 124 | 0.13 | 37.58 |
| | 1987 | 618.0 | 89.6 | 625 | 47 | 0.08 | 0.08 |
| | 1988 | 144.1 | 27.1 | 1,183 | 307 | 0.26 | 2.13 |
| | 1989 | 880.0 | 98.6 | 404 | 38 | 0.09 | 0.04 |
| | 1990 | 500.0 | 56.7 | 1,377 | 489 | 0.36 | 0.98 |
| | 1991 | 703.6 | 81.8 | 1,000 | 216 | 0.22 | 0.31 |
| | 1992 | 915.2 | 100.0 | 287 | 19 | 0.07 | 0.02 |
| | 1993 | 729.5 | 83.4 | 1,244 | 348 | 0.28 | 0.48 |
| | 1994 | 768.4 | 88.0 | 861 | 144 | 0.17 | 0.19 |
| | 1995 | 920.4 | 100.0 | 256 | 7 | 0.03 | 0.01 |
| | 1996 | 775.8 | 85.3 | 949 | 167 | 0.18 | 0.22 |
| | 1997 | 820.0 | 94.0 | 213 | 10 | 0.05 | 0.01 |
| | 1998 | 699.8 | 83.2 | 980 | 155 | 0.16 | 0.22 |
| | 1999 | 841.3 | 95.6 | 397 | 28 | 0.07 | 0.03 |
| | 2000 | 770.8 | 87.3 | 1,109 | 168 | 0.15 | 0.22 |
| | 2001 | 875.6 | 100.0 | 119 | 6 | 0.05 | 0.01 |
| **DIABLO CANYON 1, 2** | 1986 | 641.5 | 80.6 | 1,260 | 304 | 0.24 | 0.47 |
| Docket 50-275, 50-323; | 1987 | 1,688.6 | 83.0 | 1,170 | 336 | 0.29 | 0.20 |
| DPR-80, DPR-82 | 1988 | 1,386.1 | 67.6 | 1,826 | 877 | 0.48 | 0.63 |
| 1st commercial operation | 1989 | 1,899.0 | 87.5 | 1,646 | 465 | 0.28 | 0.24 |
| 5/85, 3/86 | 1990 | 1,952.6 | 91.0 | 1,441 | 323 | 0.22 | 0.17 |
| Type - PWRs | 1991 | 1,809.6 | 83.8 | 2,040 | 546 | 0.27 | 0.30 |
| Capacity - 1087, 1087 MWe | 1992 | 1,995.7 | 90.9 | 1,850 | 459 | 0.25 | 0.23 |
| | 1993 | 2,008.6 | 91.4 | 1,508 | 281 | 0.19 | 0.14 |
| | 1994 | 1,832.6 | 83.3 | 2,317 | 590 | 0.26 | 0.32 |
| | 1995 | 1,950.3 | 90.0 | 1,615 | 286 | 0.18 | 0.15 |
| | 1996 | 2,003.6 | 90.7 | 1,462 | 176 | 0.12 | 0.09 |

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **DIABLO CANYON 1, 2** | 1997 | 1,948.7 | 92.7 | 1,331 | 219 | 0.17 | 0.11 |
| (continued) | 1998 | 1,955.1 | 92.8 | 1,313 | 173 | 0.13 | 0.09 |
| | 1999 | 1,902.8 | 90.1 | 1,566 | 449 | 0.29 | 0.24 |
| | 2000 | 1,940.1 | 92.0 | 1,057 | 181 | 0.17 | 0.09 |
| | 2001 | 2,067.7 | 96.4 | 1,074 | 118 | 0.11 | 0.06 |
| **DRESDEN 1[4] , 2, 3** | 1969 | 99.7 | | | 286 | | 2.87 |
| Docket 50-010, 50-237, 50-249; | 1970 | 163.1 | | | 143 | | 0.88 |
| DPR-2, -19, -25 | 1971 | 394.5 | | | 715 | | 1.81 |
| 1st commercial operation 7/60, | 1972 | 1,243.7 | | | 728 | | 0.59 |
| 6/70, 11/71 | 1973 | 1,112.2 | | 1,341 | 939 | 0.70 | 0.84 |
| Type - BWRs | 1974 | 842.5 | 54.9 | 1,594 | 1,662 | 1.04 | 1.97 |
| Capacity - (197), 772, 773 MWe | 1975 | 708.1 | 54.6 | 2,310 | 3,423 | 1.48 | 4.83 |
| | 1976 | 1,127.2 | 80.8 | 1,746 | 1,680 | 0.96 | 1.49 |
| | 1977 | 1,132.9 | 77.0 | 1,862 | 1,694 | 0.91 | 1.50 |
| | 1978 | 1,242.2 | 79.5 | 1,946 | 1,529 | 0.79 | 1.23 |
| | 1979 | 1,013.0 | 74.7 | 2,407 | 1,800 | 0.75 | 1.78 |
| | 1980 | 1,074.4 | 55.0 | 2,717 | 2,105 | 0.77 | 1.96 |
| | 1981 | 1,035.7 | 51.5 | 2,331 | 2,802 | 1.20 | 2.71 |
| | 1982 | 1,085.3 | 77.9 | 2,572 | 2,923 | 1.14 | 2.69 |
| | 1983 | 913.6 | 65.6 | 2,854 | 3,582 | 1.26 | 3.92 |
| | 1984 | 789.8 | 55.3 | 2,261 | 1,774 | 0.78 | 2.25 |
| | 1985 | 903.0 | 64.5 | 2,817 | 1,686 | 0.60 | 1.87 |
| | 1986 | 740.5 | 52.6 | 3,111 | 2,668 | 0.86 | 3.60 |
| | 1987 | 933.9 | 74.0 | 2,052 | 1,145 | 0.56 | 1.23 |
| | 1988 | 1,014.7 | 75.8 | 2,414 | 1,409 | 0.58 | 1.39 |
| | 1989 | 1,184.2 | 83.1 | 2,259 | 1,131 | 0.50 | 0.96 |
| | 1990 | 1,107.8 | 76.6 | 2,235 | 1,400 | 0.63 | 1.26 |
| | 1991 | 675.2 | 60.7 | 2,044 | 1,005 | 0.49 | 1.49 |
| | 1992 | 872.4 | 75.4 | 1,812 | 619 | 0.34 | 0.71 |
| | 1993 | 960.1 | 68.5 | 2,751 | 1,655 | 0.60 | 1.72 |
| | 1994 | 690.2 | 51.7 | 2,336 | 833 | 0.36 | 1.21 |
| | 1995 | 643.1 | 49.8 | 2,482 | 875 | 0.35 | 1.36 |
| | 1996 | 612.6 | 47.7 | 1,788 | 456 | 0.26 | 0.74 |
| | 1997 | 1,096.2 | 79.5 | 2,747 | 467 | 0.17 | 0.43 |
| | 1998 | 1,354.7 | 90.6 | 2,311 | 427 | 0.18 | 0.32 |
| | 1999 | 1,410.9 | 92.5 | 3,243 | 591 | 0.18 | 0.42 |
| | 2000 | 1,506.4 | 97.3 | 2,341 | 262 | 0.11 | 0.17 |
| | 2001 | 1,427.4 | 94.5 | 2,769 | 401 | 0.14 | 0.28 |
| **DUANE ARNOLD** | 1976 | 305.2 | 78.0 | 350 | 105 | 0.30 | 0.34 |
| Docket 50-331; DPR-49 | 1977 | 353.6 | 78.9 | 538 | 299 | 0.56 | 0.85 |
| 1st commercial operation 2/75 | 1978 | 149.2 | 33.2 | 1,112 | 974 | 0.88 | 6.53 |
| Type - BWR | 1979 | 352.0 | 78.0 | 757 | 275 | 0.36 | 0.78 |
| Capacity - 566 MWe | 1980 | 339.1 | 73.3 | 1,108 | 671 | 0.61 | 1.98 |
| | 1981 | 277.7 | 69.8 | 1,286 | 790 | 0.61 | 2.84 |
| | 1982 | 278.5 | 74.7 | 524 | 229 | 0.44 | 0.82 |
| | 1983 | 283.0 | 62.9 | 1,468 | 1,135 | 0.77 | 4.01 |
| | 1984 | 329.4 | 72.9 | 611 | 189 | 0.31 | 0.57 |
| | 1985 | 236.2 | 53.8 | 1,414 | 1,112 | 0.79 | 4.71 |
| | 1986 | 365.5 | 82.0 | 476 | 187 | 0.39 | 0.51 |
| | 1987 | 308.4 | 64.7 | 1,094 | 667 | 0.61 | 2.16 |
| | 1988 | 386.5 | 75.2 | 1,136 | 614 | 0.54 | 1.59 |
| | 1989 | 388.5 | 79.0 | 425 | 194 | 0.46 | 0.50 |
| | 1990 | 367.4 | 75.8 | 1,460 | 861 | 0.59 | 2.34 |
| | 1991 | 503.7 | 94.5 | 336 | 202 | 0.60 | 0.40 |
| | 1992 | 416.5 | 81.9 | 1,043 | 502 | 0.48 | 1.21 |

[4] 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 operating reactors. Parentheses indicate plant capacity when plant was operational.

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **DUANE ARNOLD** | 1993 | 393.4 | 79.5 | 1,043 | 407 | 0.39 | 1.03 |
| (continued) | 1994 | 498.6 | 94.0 | 493 | 120 | 0.24 | 0.24 |
| | 1995 | 452.5 | 83.8 | 1,129 | 357 | 0.32 | 0.79 |
| | 1996 | 476.8 | 90.7 | 1,093 | 270 | 0.25 | 0.57 |
| | 1997 | 474.4 | 94.4 | 352 | 63 | 0.18 | 0.13 |
| | 1998 | 438.3 | 86.6 | 1,019 | 237 | 0.23 | 0.54 |
| | 1999 | 416.6 | 84.3 | 834 | 201 | 0.24 | 0.48 |
| | 2000 | 507.3 | 98.4 | 317 | 44 | 0.14 | 0.09 |
| | 2001 | 439.5 | 86.8 | 898 | 138 | 0.15 | 0.31 |
| **FARLEY 1, 2** | 1978 | 713.8 | 86.5 | 527 | 108 | 0.20 | 0.15 |
| Docket 50-348, 50-364; | 1979 | 211.0 | 28.6 | 1,227 | 643 | 0.52 | 3.05 |
| NPF-2, -8 | 1980 | 557.3 | 69.3 | 1,330 | 435 | 0.33 | 0.78 |
| 1st commercial operation | 1981 | 310.2 | 41.4 | 1,331 | 512 | 0.38 | 1.65 |
| 12/77, 7/81 | 1982 | 1,271.5 | 79.2 | 1,453 | 484 | 0.33 | 0.38 |
| Type - PWRs | 1983 | 1,356.5 | 83.0 | 1,938 | 1,021 | 0.53 | 0.75 |
| Capacity - 833, 842 MWe | 1984 | 1,447.0 | 86.6 | 2,046 | 902 | 0.44 | 0.62 |
| | 1985 | 1,368.2 | 81.1 | 2,551 | 799 | 0.31 | 0.58 |
| | 1986 | 1,409.4 | 83.8 | 2,314 | 858 | 0.37 | 0.61 |
| | 1987 | 1,369.7 | 84.7 | 1,871 | 598 | 0.32 | 0.44 |
| | 1988 | 1,567.7 | 92.3 | 1,840 | 552 | 0.30 | 0.35 |
| | 1989 | 1,402.9 | 84.6 | 2,206 | 749 | 0.34 | 0.53 |
| | 1990 | 1,464.0 | 86.7 | 1,700 | 457 | 0.27 | 0.31 |
| | 1991 | 1,464.0 | 88.1 | 1,645 | 648 | 0.39 | 0.44 |
| | 1992 | 1,331.7 | 81.8 | 2,018 | 805 | 0.40 | 0.60 |
| | 1993 | 1,455.5 | 88.3 | 1,284 | 333 | 0.26 | 0.23 |
| | 1994 | 1,587.2 | 93.0 | 1,035 | 250 | 0.24 | 0.16 |
| | 1995 | 1,311.2 | 83.8 | 1,574 | 460 | 0.29 | 0.35 |
| | 1996 | 1,549.2 | 90.9 | 1,150 | 232 | 0.20 | 0.15 |
| | 1997 | 1,449.7 | 89.0 | 1,105 | 278 | 0.25 | 0.19 |
| | 1998 | 1,313.9 | 80.9 | 1,380 | 432 | 0.31 | 0.33 |
| | 1999 | 1,436.0 | 91.4 | 1,102 | 190 | 0.17 | 0.13 |
| | 2000 | 1,430.1 | 88.6 | 1,683 | 360 | 0.21 | 0.25 |
| | 2001 | 1,384.3 | 84.4 | 1,810 | 321 | 0.18 | 0.23 |
| **FERMI 2** | 1989 | 624.0 | 68.5 | 1,270 | 255 | 0.20 | 0.41 |
| Docket 50-341; NPF-43 | 1990 | 848.2 | 84.7 | 462 | 83 | 0.18 | 0.10 |
| 1st commercial operation 1/88 | 1991 | 739.0 | 77.0 | 1,223 | 228 | 0.19 | 0.31 |
| Type - BWR | 1992 | 874.3 | 81.3 | 1,213 | 245 | 0.20 | 0.28 |
| Capacity - 1089 MWe | 1993 | 984.3 | 92.9 | 360 | 35 | 0.10 | 0.04 |
| | 1994 | 0.0 | 2.2 | 1,130 | 213 | 0.19 | --- |
| | 1995 | 618.3 | 86.9 | 390 | 28 | 0.07 | 0.05 |
| | 1996 | 577.5 | 69.1 | 1,402 | 157 | 0.11 | 0.27 |
| | 1997 | 637.0 | 66.6 | 623 | 49 | 0.08 | 0.08 |
| | 1998 | 815.8 | 79.9 | 1,362 | 208 | 0.15 | 0.25 |
| | 1999 | 1,082.7 | 99.5 | 461 | 36 | 0.08 | 0.03 |
| | 2000 | 939.6 | 87.6 | 1,266 | 146 | 0.12 | 0.15 |
| | 2001 | 975.0 | 90.9 | 1,202 | 169 | 0.14 | 0.17 |
| **FITZPATRICK** | 1976 | 489.0 | 71.6 | 600 | 202 | 0.34 | 0.41 |
| Docket 50-333; DPR-59 | 1977 | 460.5 | 68.4 | 1,380 | 1,080 | 0.78 | 2.35 |
| 1st commercial operation 7/75 | 1978 | 497.0 | 72.1 | 904 | 909 | 1.01 | 1.83 |
| Type - BWR | 1979 | 349.0 | 50.8 | 850 | 859 | 1.01 | 2.46 |
| Capacity - 813 MWe | 1980 | 509.5 | 70.3 | 2,056 | 2,040 | 0.99 | 4.00 |
| | 1981 | 562.9 | 74.7 | 2,490 | 1,425 | 0.57 | 2.53 |
| | 1982 | 583.6 | 75.0 | 2,322 | 1,190 | 0.51 | 2.04 |
| | 1983 | 546.2 | 70.6 | 1,715 | 1,090 | 0.64 | 2.00 |
| | 1984 | 576.2 | 76.8 | 1,610 | 971 | 0.60 | 1.69 |
| | 1985 | 492.3 | 63.7 | 1,845 | 1,051 | 0.57 | 2.13 |
| | 1986 | 711.2 | 90.6 | 1,185 | 411 | 0.35 | 0.58 |
| | 1987 | 496.2 | 70.3 | 1,578 | 940 | 0.60 | 1.89 |
| | 1988 | 514.0 | 69.0 | 1,553 | 786 | 0.51 | 1.53 |

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **FITZPATRICK** | 1989 | 727.5 | 92.3 | 1,027 | 377 | 0.37 | 0.52 |
| (continued) | 1990 | 543.8 | 72.6 | 1,536 | 884 | 0.58 | 1.63 |
| | 1991 | 399.7 | 53.4 | 1,269 | 333 | 0.26 | 0.83 |
| | 1992 | 0.0 | 0.0 | 2,374 | 674 | 0.28 | --- |
| | 1993 | 559.6 | 81.7 | 1,427 | 232 | 0.16 | 0.41 |
| | 1994 | 588.4 | 83.2 | 1,595 | 322 | 0.20 | 0.55 |
| | 1995 | 569.8 | 74.5 | 1,249 | 327 | 0.26 | 0.57 |
| | 1996 | 623.3 | 83.1 | 1,384 | 357 | 0.26 | 0.57 |
| | 1997 | 756.2 | 95.9 | 662 | 91 | 0.14 | 0.12 |
| | 1998 | 562.8 | 78.0 | 1,781 | 358 | 0.20 | 0.64 |
| | 1999 | 749.7 | 95.5 | 558 | 68 | 0.12 | 0.09 |
| | 2000 | 685.9 | 88.4 | 1267 | 301 | 0.24 | 0.44 |
| | 2001 | 807.2 | 98.9 | 665 | 63 | 0.10 | 0.08 |
| **FORT CALHOUN** | 1975 | 252.3 | 67.4 | 469 | 294 | 0.63 | 1.17 |
| Docket 50-285; DPR-40 | 1976 | 265.9 | 69.5 | 516 | 313 | 0.61 | 1.18 |
| 1st commercial operation 6/74 | 1977 | 351.8 | 79.4 | 535 | 297 | 0.56 | 0.84 |
| Type - PWR | 1978 | 342.3 | 75.1 | 596 | 410 | 0.69 | 1.20 |
| Capacity - 478 MWe | 1979 | 440.0 | 95.7 | 451 | 126 | 0.28 | 0.29 |
| | 1980 | 242.3 | 60.4 | 891 | 668 | 0.75 | 2.76 |
| | 1981 | 260.9 | 72.3 | 822 | 458 | 0.56 | 1.76 |
| | 1982 | 418.0 | 89.7 | 604 | 217 | 0.36 | 0.52 |
| | 1983 | 330.4 | 73.1 | 860 | 433 | 0.50 | 1.31 |
| | 1984 | 279.2 | 59.9 | 913 | 563 | 0.62 | 2.02 |
| | 1985 | 367.0 | 73.7 | 982 | 373 | 0.38 | 1.02 |
| | 1986 | 431.8 | 94.3 | 756 | 74 | 0.10 | 0.17 |
| | 1987 | 366.0 | 75.4 | 1,247 | 388 | 0.31 | 1.06 |
| | 1988 | 315.5 | 74.1 | 1,594 | 272 | 0.17 | 0.86 |
| | 1989 | 395.7 | 89.2 | 1,210 | 93 | 0.08 | 0.24 |
| | 1990 | 290.0 | 64.2 | 760 | 290 | 0.38 | 1.00 |
| | 1991 | 391.1 | 91.7 | 284 | 57 | 0.20 | 0.15 |
| | 1992 | 303.4 | 65.9 | 802 | 272 | 0.34 | 0.90 |
| | 1993 | 369.7 | 80.8 | 713 | 157 | 0.22 | 0.42 |
| | 1994 | 492.8 | 99.6 | 211 | 23 | 0.11 | 0.05 |
| | 1995 | 402.8 | 83.2 | 627 | 139 | 0.22 | 0.35 |
| | 1996 | 374.9 | 79.5 | 740 | 226 | 0.31 | 0.60 |
| | 1997 | 435.9 | 93.6 | 258 | 41 | 0.16 | 0.09 |
| | 1998 | 387.7 | 82.5 | 788 | 224 | 0.28 | 0.58 |
| | 1999 | 409.2 | 89.2 | 676 | 159 | 0.24 | 0.39 |
| | 2000 | 443.8 | 93.5 | 249 | 35 | 0.14 | 0.08 |
| | 2001 | 401.2 | 88.3 | 770 | 226 | 0.29 | 0.56 |
| **GINNA** | 1971 | 327.8 | | 340 | 430 | 1.26 | 1.31 |
| Docket 50-244; DPR-18 | 1972 | 293.6 | | 677 | 1,032 | 1.52 | 3.51 |
| 1st commercial operation 7/70 | 1973 | 409.5 | | 319 | 224 | 0.70 | 0.55 |
| Type - PWR | 1974 | 253.7 | 62.4 | 884 | 1,225 | 1.39 | 4.83 |
| Capacity - 480 MWe | 1975 | 365.2 | 76.7 | 685 | 538 | 0.79 | 1.47 |
| | 1976 | 248.8 | 58.2 | 758 | 636 | 0.84 | 2.56 |
| | 1977 | 365.6 | 85.5 | 530 | 401 | 0.76 | 1.10 |
| | 1978 | 386.5 | 80.6 | 657 | 450 | 0.68 | 1.16 |
| | 1979 | 355.0 | 72.8 | 878 | 592 | 0.67 | 1.67 |
| | 1980 | 370.5 | 76.0 | 1,073 | 708 | 0.66 | 1.91 |
| | 1981 | 399.0 | 82.1 | 925 | 655 | 0.71 | 1.64 |
| | 1982 | 289.0 | 58.8 | 1,117 | 1,140 | 1.02 | 3.94 |
| | 1983 | 365.0 | 74.6 | 969 | 855 | 0.88 | 2.34 |
| | 1984 | 378.1 | 77.2 | 713 | 395 | 0.55 | 1.04 |
| | 1985 | 436.7 | 87.9 | 845 | 426 | 0.50 | 0.98 |
| | 1986 | 433.3 | 87.4 | 901 | 357 | 0.40 | 0.82 |
| | 1987 | 459.0 | 91.5 | 773 | 344 | 0.45 | 0.75 |
| | 1988 | 423.1 | 87.4 | 897 | 295 | 0.33 | 0.70 |
| | 1989 | 369.2 | 75.9 | 1,254 | 605 | 0.48 | 1.64 |

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **GINNA** | 1990 | 414.3 | 84.4 | 991 | 347 | 0.35 | 0.84 |
| (continued) | 1991 | 418.6 | 86.7 | 947 | 328 | 0.35 | 0.78 |
| | 1992 | 417.6 | 86.9 | 832 | 261 | 0.31 | 0.63 |
| | 1993 | 419.6 | 86.3 | 856 | 193 | 0.23 | 0.46 |
| | 1994 | 405.3 | 83.2 | 679 | 138 | 0.20 | 0.34 |
| | 1995 | 437.0 | 89.6 | 738 | 136 | 0.18 | 0.31 |
| | 1996 | 347.9 | 71.1 | 976 | 168 | 0.17 | 0.48 |
| | 1997 | 444.6 | 91.8 | 533 | 81 | 0.15 | 0.18 |
| | 1998 | 491.8 | 100.0 | 161 | 15 | 0.09 | 0.03 |
| | 1999 | 403.4 | 85.6 | 641 | 175 | 0.27 | 0.43 |
| | 2000 | 434.2 | 91.6 | 429 | 76 | 0.18 | 0.18 |
| | 2001 | 488.0 | 100.0 | 140 | 10 | 0.07 | 0.02 |
| **GRAND GULF** | 1986 | 494.7 | 60.9 | 1,486 | 436 | 0.29 | 0.88 |
| Docket 50-416; NPF-29 | 1987 | 920.7 | 82.2 | 1,358 | 420 | 0.31 | 0.46 |
| 1st commercial operation 7/85 | 1988 | 1,136.6 | 96.7 | 692 | 147 | 0.21 | 0.13 |
| Type - BWR | 1989 | 932.6 | 80.0 | 1,972 | 498 | 0.25 | 0.53 |
| Capacity - 1210 MWe | 1990 | 883.5 | 78.9 | 1,765 | 482 | 0.27 | 0.55 |
| | 1991 | 1,085.2 | 94.0 | 699 | 94 | 0.13 | 0.09 |
| | 1992 | 969.0 | 83.7 | 2,032 | 484 | 0.24 | 0.50 |
| | 1993 | 936.4 | 81.5 | 1,807 | 332 | 0.18 | 0.35 |
| | 1994 | 1,143.2 | 96.6 | 455 | 56 | 0.12 | 0.05 |
| | 1995 | 952.9 | 80.4 | 1,589 | 342 | 0.22 | 0.36 |
| | 1996 | 1,096.2 | 88.7 | 1,564 | 357 | 0.23 | 0.33 |
| | 1997 | 1,234.9 | 100.0 | 514 | 105 | 0.20 | 0.09 |
| | 1998 | 1,049.2 | 88.9 | 1,410 | 304 | 0.22 | 0.29 |
| | 1999 | 962.1 | 81.3 | 1,180 | 226 | 0.19 | 0.23 |
| | 2000 | 1,217.5 | 99.4 | 289 | 35 | 0.12 | 0.03 |
| | 2001 | 1,129.8 | 93.0 | 1,109 | 185 | 0.17 | 0.16 |
| **HADDAM NECK**[5] | 1969 | 438.5 | | 138 | 106 | 0.77 | 0.24 |
| Docket 50-213; DPR-61 | 1970 | 424.7 | | 734 | 689 | 0.94 | 1.62 |
| 1st commercial operation 1/68 | 1971 | 502.2 | | 289 | 342 | 1.18 | 0.68 |
| Type - PWR | 1972 | 515.6 | | 355 | 325 | 0.91 | 0.63 |
| Capacity - (560) MWe | 1973 | 293.1 | | 951 | 697 | 0.73 | 2.38 |
| | 1974 | 521.4 | 91.2 | 550 | 201 | 0.37 | 0.39 |
| | 1975 | 494.3 | 89.9 | 795 | 703 | 0.88 | 1.42 |
| | 1976 | 482.9 | 82.5 | 644 | 449 | 0.70 | 0.93 |
| | 1977 | 480.7 | 83.9 | 894 | 641 | 0.72 | 1.33 |
| | 1978 | 563.4 | 98.6 | 216 | 117 | 0.54 | 0.21 |
| | 1979 | 493.0 | 87.5 | 1,226 | 1,162 | 0.95 | 2.36 |
| | 1980 | 426.8 | 75.0 | 1,860 | 1,353 | 0.73 | 3.17 |
| | 1981 | 487.5 | 84.3 | 1,554 | 1,036 | 0.67 | 2.13 |
| | 1982 | 543.9 | 93.4 | 559 | 126 | 0.23 | 0.23 |
| | 1983 | 453.7 | 77.8 | 1,645 | 1,384 | 0.84 | 3.05 |
| | 1984 | 404.0 | 71.7 | 1,430 | 1,216 | 0.85 | 3.01 |
| | 1985 | 556.1 | 98.4 | 384 | 101 | 0.26 | 0.18 |
| | 1986 | 294.8 | 53.6 | 1,945 | 1,567 | 0.81 | 5.32 |
| | 1987 | 304.6 | 54.0 | 1,763 | 750 | 0.43 | 2.46 |
| | 1988 | 397.4 | 70.3 | 735 | 237 | 0.32 | 0.60 |
| | 1989 | 356.4 | 67.2 | 1,455 | 596 | 0.41 | 1.67 |
| | 1990 | 142.7 | 32.2 | 979 | 421 | 0.43 | 2.95 |
| | 1991 | 444.4 | 76.4 | 1,168 | 590 | 0.51 | 1.33 |
| | 1992 | 465.2 | 80.1 | 797 | 202 | 0.25 | 0.43 |
| | 1993 | 448.6 | 81.6 | 1,004 | 408 | 0.41 | 0.91 |
| | 1994 | 455.6 | 77.7 | 463 | 135 | 0.29 | 0.30 |
| | 1995 | 439.4 | 77.7 | 1,006 | 442 | 0.44 | 1.01 |
| | 1996 | 331.8 | 55.7 | 673 | 175 | 0.26 | 0.53 |

[5] Haddam Neck (also known as Connecticut Yankee) was shut down 12/4/96 and is no longer in the count of operating reactors. Parentheses indicate plant capacity when plant was operational.

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **HADDAM NECK**[5] | 1997 | -1.3 | 0.0 | 219 | 11 | 0.05 | --- |
| (continued) | 1998 | 0.0 | 0.0 | 423 | 94 | 0.22 | --- |
| | 1999 | 0.0 | 0.0 | 545 | 109 | 0.20 | --- |
| | 2000 | 0.0 | 0.0 | 555 | 262 | 0.47 | --- |
| | 2001 | 0.0 | 0.0 | 361 | 95 | 0.26 | --- |
| **HARRIS 1** | 1988 | 652.9 | 75.0 | 721 | 169 | 0.23 | 0.26 |
| Docket 50-400; NPF-63 | 1989 | 690.6 | 79.5 | 929 | 156 | 0.17 | 0.23 |
| 1st commercial operation 5/87 | 1990 | 776.4 | 89.6 | 453 | 85 | 0.19 | 0.11 |
| Type - PWR | 1991 | 724.8 | 81.5 | 872 | 226 | 0.26 | 0.31 |
| Capacity - 860 MWe | 1992 | 661.8 | 74.9 | 930 | 213 | 0.23 | 0.32 |
| | 1993 | 913.0 | 99.7 | 327 | 31 | 0.09 | 0.03 |
| | 1994 | 740.8 | 82.7 | 1,089 | 222 | 0.20 | 0.30 |
| | 1995 | 731.1 | 83.8 | 1,068 | 174 | 0.16 | 0.24 |
| | 1996 | 860.6 | 95.4 | 444 | 17 | 0.04 | 0.02 |
| | 1997 | 673.6 | 80.4 | 1,131 | 149 | 0.13 | 0.22 |
| | 1998 | 766.2 | 90.4 | 931 | 133 | 0.14 | 0.17 |
| | 1999 | 827.0 | 97.9 | 247 | 16 | 0.06 | 0.02 |
| | 2000 | 783.0 | 92.5 | 888 | 101 | 0.11 | 0.13 |
| | 2001 | 611.2 | 72.4 | 1,586 | 252 | 0.16 | 0.41 |
| **HATCH 1, 2** | 1976 | 496.3 | 83.8 | 630 | 134 | 0.21 | 0.27 |
| Docket 50-321, 50-366; | 1977 | 446.8 | 66.3 | 1,303 | 465 | 0.36 | 1.04 |
| DPR-57; NPF-05 | 1978 | 513.0 | 72.8 | 1,304 | 248 | 0.19 | 0.48 |
| 1st commercial operation | 1979 | 401.0 | 54.6 | 2,131 | 582 | 0.27 | 1.45 |
| 12/75, 9/79 | 1980 | 1,008.7 | 70.9 | 1,930 | 449 | 0.23 | 0.45 |
| Type - BWRs | 1981 | 870.9 | 64.3 | 2,899 | 1,337 | 0.46 | 1.54 |
| Capacity - 863, 878 MWe | 1982 | 768.0 | 56.6 | 3,418 | 1,460 | 0.43 | 1.90 |
| | 1983 | 934.7 | 68.6 | 3,428 | 1,299 | 0.38 | 1.39 |
| | 1984 | 658.6 | 47.3 | 4,110 | 2,218 | 0.54 | 3.37 |
| | 1985 | 1,211.0 | 79.6 | 2,841 | 818 | 0.29 | 0.68 |
| | 1986 | 872.0 | 64.8 | 3,486 | 1,497 | 0.43 | 1.72 |
| | 1987 | 1,295.4 | 89.7 | 2,202 | 816 | 0.37 | 0.63 |
| | 1988 | 1,001.4 | 70.4 | 2,509 | 1,401 | 0.56 | 1.40 |
| | 1989 | 1,271.1 | 87.1 | 1,350 | 556 | 0.41 | 0.44 |
| | 1990 | 1,268.0 | 83.5 | 2,902 | 1,455 | 0.50 | 1.15 |
| | 1991 | 1,152.4 | 77.4 | 2,508 | 1,161 | 0.46 | 1.01 |
| | 1992 | 1,293.8 | 88.6 | 1,615 | 550 | 0.34 | 0.43 |
| | 1993 | 1,189.6 | 85.5 | 1,733 | 669 | 0.39 | 0.56 |
| | 1994 | 1,289.0 | 87.1 | 2,243 | 864 | 0.39 | 0.67 |
| | 1995 | 1,376.3 | 90.6 | 1,458 | 488 | 0.33 | 0.35 |
| | 1996 | 1,519.6 | 94.0 | 1,495 | 441 | 0.29 | 0.29 |
| | 1997 | 1,374.7 | 88.1 | 1,945 | 722 | 0.37 | 0.53 |
| | 1998 | 1,458.4 | 91.7 | 1,610 | 320 | 0.20 | 0.22 |
| | 1999 | 1,487.4 | 90.0 | 1,866 | 329 | 0.18 | 0.22 |
| | 2000 | 1,515.0 | 88.7 | 1,913 | 402 | 0.21 | 0.26 |
| | 2001 | 1,603.0 | 93.5 | 1,407 | 230 | 0.16 | 0.14 |
| **HOPE CREEK 1** | 1987 | 869.2 | 86.4 | 589 | 117 | 0.20 | 0.13 |
| Docket 50-354; NPF-57 | 1988 | 832.7 | 80.7 | 1,734 | 287 | 0.17 | 0.34 |
| 1st commercial operation 12/86 | 1989 | 791.1 | 77.8 | 1,873 | 465 | 0.25 | 0.59 |
| Type - BWR | 1990 | 966.4 | 91.6 | 1,394 | 196 | 0.14 | 0.20 |
| Capacity - 1049 MWe | 1991 | 882.5 | 84.2 | 1,700 | 373 | 0.22 | 0.42 |
| | 1992 | 841.9 | 80.8 | 1,694 | 436 | 0.26 | 0.52 |
| | 1993 | 1,049.2 | 97.8 | 688 | 98 | 0.14 | 0.09 |
| | 1994 | 852.0 | 81.2 | 1,779 | 326 | 0.18 | 0.38 |
| | 1995 | 844.5 | 79.8 | 1,571 | 196 | 0.12 | 0.23 |
| | 1996 | 806.9 | 77.4 | 1,069 | 158 | 0.15 | 0.20 |

[5] Haddam Neck (also known as Connecticut Yankee) was shut down 12/4/96 and is no longer in the count of operating reactors. Parentheses indicate plant capacity when plant was operational.

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **HOPE CREEK 1** | 1997 | 731.8 | 77.8 | 1,747 | 350 | 0.20 | 0.48 |
| (continued) | 1998 | 993.2 | 98.0 | 620 | 55 | 0.09 | 0.06 |
| | 1999 | 879.1 | 86.7 | 1,111 | 279 | 0.25 | 0.32 |
| | 2000 | 827.8 | 87.9 | 1,236 | 188 | 0.15 | 0.23 |
| | 2001 | 918.2 | 91.1 | 1,532 | 156 | 0.10 | 0.17 |
| **HUMBOLDT BAY**[6] | 1969 | 44.6 | | 125 | 164 | 1.31 | 3.68 |
| Docket 50-133; DPR-7 | 1970 | 49.3 | | 115 | 209 | 1.82 | 4.24 |
| 1st commercial operation 8/63 | 1971 | 39.6 | | 140 | 292 | 2.09 | 7.37 |
| Type - BWR | 1972 | 43.1 | | 127 | 253 | 1.99 | 5.87 |
| Capacity - (63) MWe | 1973 | 50.1 | | 210 | 266 | 1.27 | 5.31 |
| | 1974 | 43.4 | 83.8 | 296 | 318 | 1.07 | 7.33 |
| | 1975 | 45.3 | 83.9 | 265 | 339 | 1.28 | 7.48 |
| | 1976 | 23.5 | 46.4 | 523 | 683 | 1.31 | 29.06 |
| | 1977 | 0.0 | 0.0 | 1,063 | 1,905 | 1.79 | --- |
| | 1978 | 0.0 | 0.0 | 320 | 335 | 1.05 | --- |
| | 1979 | 0.0 | 0.0 | 135 | 31 | 0.23 | --- |
| | 1980 | 0.0 | 0.0 | 142 | 22 | 0.15 | --- |
| | 1981 | 0.0 | 0.0 | 75 | 9 | 0.12 | --- |
| | 1982 | 0.0 | 0.0 | 71 | 19 | 0.27 | --- |
| | 1983 | 0.0 | 0.0 | 84 | 17 | 0.20 | --- |
| | 1993 | 0.0 | 0.0 | 24 | 1 | 0.04 | --- |
| | 1994 | 0.0 | 0.0 | 21 | 1 | 0.05 | --- |
| | 1995 | 0.0 | 0.0 | 42 | 2 | 0.05 | --- |
| | 1996 | 0.0 | 0.0 | 66 | 5 | 0.08 | --- |
| | 1997 | 0.0 | 0.0 | 105 | 16 | 0.15 | --- |
| | 1998 | 0.0 | 0.0 | 38 | 1 | 0.03 | --- |
| | 1999 | 0.0 | 0.0 | 28 | 1 | 0.04 | --- |
| | 2000 | 0.0 | 0.0 | 20 | 1 | 0.05 | --- |
| | 2001 | 0.0 | 0.0 | 10 | 0 | 0.04 | --- |
| **INDIAN POINT 1**[7]**, 2, 3**[8] | 1969 | 206.2 | | | 298 | | 1.45 |
| Docket 50-3, 50-247, 50-286; | 1970 | 43.3 | | | 1,639 | | 37.85 |
| DPR-5, -26, -64 | 1971 | 154.0 | | | 768 | | 4.99 |
| 1st commercial operation | 1972 | 142.3 | | | 967 | | 6.80 |
| 10/62, 8/74, 8/76 | 1973 | 0.0 | | 2,998 | 5,262 | 1.76 | --- |
| Type - PWRs | 1974 | 556.1 | 59.4 | 1,019 | 910 | 0.89 | 1.64 |
| Capacity - (265), 951, 965 MWe | 1975 | 584.4 | 74.8 | 891 | 705 | 0.79 | 1.21 |
| | 1976 | 273.9 | 34.8 | 1,590 | 1,950 | 1.23 | 7.12 |
| | 1977 | 1,278.3 | 75.3 | 1,391 | 1,070 | 0.77 | 0.84 |
| | 1978 | 1,172.3 | 67.8 | 1,909 | 2,006 | 1.05 | 1.71 |
| **INDIAN POINT 1**[7]**, 2** | 1979 | 574.0 | 71.4 | 1,349 | 1,279 | 0.95 | 2.23 |
| | 1980 | 510.8 | 64.8 | 1,577 | 971 | 0.62 | 1.90 |
| | 1982 | 532.4 | 65.4 | 2,144 | 1,635 | 0.76 | 3.07 |
| | 1983 | 702.6 | 84.0 | 1,057 | 486 | 0.46 | 0.69 |
| **INDIAN POINT 2** | 1984 | 416.7 | 51.9 | 2,919 | 2,644 | 0.91 | 6.35 |
| Docket 50-247; DPR-26 | 1985 | 791.4 | 95.7 | 708 | 192 | 0.27 | 0.24 |
| 1st commercial operation 8/74 | 1986 | 457.5 | 56.2 | 1,926 | 1,250 | 0.65 | 2.73 |
| Type - PWR | 1987 | 611.4 | 73.4 | 1,980 | 1,217 | 0.61 | 1.99 |
| Capacity - 951 MWe | 1988 | 719.3 | 86.9 | 890 | 235 | 0.26 | 0.33 |
| | 1989 | 532.5 | 64.6 | 2,093 | 1,436 | 0.69 | 2.70 |

[6] Humboldt Bay had been shut down since 1976, and in 1984 it was decided that it would not be placed in operation again. Therefore, it is no longer included in the count of operating reactors. Parentheses indicate plant capacity when plant was operational.

[7] 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 operating reactors. Parentheses indicate plant capacity when plant was operational.

[8] Indian Point 3 was purchased by a different utility and now reports separately.

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **INDIAN POINT 2** | 1990 | 618.0 | 66.6 | 1,061 | 608 | 0.57 | 0.98 |
| (continued) | 1991 | 461.2 | 55.7 | 1,810 | 1,468 | 0.81 | 3.18 |
| | 1992 | 930.9 | 99.1 | 489 | 97 | 0.20 | 0.10 |
| | 1993 | 702.1 | 75.7 | 1,514 | 675 | 0.45 | 0.96 |
| | 1994 | 903.8 | 100.0 | 381 | 48 | 0.13 | 0.05 |
| | 1995 | 582.4 | 70.8 | 1,690 | 548 | 0.32 | 0.94 |
| | 1996 | 927.8 | 94.8 | 388 | 54 | 0.14 | 0.06 |
| | 1997 | 360.6 | 45.1 | 1,340 | 367 | 0.27 | 1.02 |
| | 1998 | 282.8 | 31.5 | 1,154 | 290 | 0.25 | 1.03 |
| | 1999 | 831.8 | 88.2 | 350 | 41 | 0.12 | 0.05 |
| | 2000 | 115.4 | 13.0 | 2,003 | 567 | 0.28 | 4.90 |
| | 2001 | 887.2 | 97.2 | 399 | 22 | 0.06 | 0.02 |
| **INDIAN POINT 3**[8] | 1979 | 574.0 | 66.5 | 808 | 636 | 0.79 | 1.11 |
| Docket 50-286; DPR-64 | 1980 | 367.3 | 53.2 | 977 | 308 | 0.32 | 0.84 |
| 1st commercial operation 8/76 | 1981 | 367.5 | 59.8 | 677 | 364 | 0.54 | 0.99 |
| Type - PWR | 1982 | 171.5 | 22.5 | 1,477 | 1,226 | 0.83 | 7.15 |
| Capacity - 965 MWe | 1983 | 7.8 | 2.6 | 941 | 607 | 0.65 | 77.82 |
| | 1984 | 714.4 | 76.3 | 658 | 230 | 0.35 | 0.32 |
| | 1985 | 566.5 | 66.0 | 1,093 | 570 | 0.52 | 1.01 |
| | 1986 | 655.3 | 73.4 | 588 | 202 | 0.34 | 0.31 |
| | 1987 | 574.6 | 62.7 | 1,308 | 500 | 0.38 | 0.87 |
| | 1988 | 792.5 | 83.3 | 451 | 93 | 0.21 | 0.12 |
| | 1989 | 587.8 | 61.1 | 1,800 | 876 | 0.49 | 1.49 |
| | 1990 | 595.3 | 62.9 | 1,066 | 358 | 0.34 | 0.60 |
| | 1991 | 862.8 | 87.5 | 299 | 40 | 0.13 | 0.05 |
| | 1992 | 561.7 | 61.4 | 1,003 | 212 | 0.21 | 0.38 |
| | 1993 | 140.5 | 14.9 | 478 | 60 | 0.13 | 0.43 |
| | 1994 | 0.0 | 0.0 | 529 | 58 | 0.11 | --- |
| | 1995 | 174.8 | 21.4 | 638 | 67 | 0.11 | 0.38 |
| | 1996 | 695.3 | 74.8 | 289 | 22 | 0.08 | 0.03 |
| | 1997 | 495.1 | 54.9 | 1,608 | 234 | 0.15 | 0.47 |
| | 1998 | 874.0 | 95.3 | 213 | 15 | 0.07 | 0.02 |
| | 1999 | 829.8 | 88.3 | 893 | 117 | 0.13 | 0.14 |
| | 2000 | 960.0 | 99.3 | 143 | 9 | 0.06 | 0.01 |
| | 2001 | 903.9 | 93.1 | 1,014 | 118 | 0.12 | 0.13 |
| **KEWAUNEE** | 1975 | 401.9 | 88.2 | 104 | 28 | 0.27 | 0.07 |
| Docket 50-305; DPR-43 | 1976 | 405.9 | 78.9 | 381 | 270 | 0.71 | 0.67 |
| 1st commercial operation 6/74 | 1977 | 425.0 | 79.9 | 312 | 140 | 0.45 | 0.33 |
| Type - PWR | 1978 | 466.6 | 89.5 | 335 | 154 | 0.46 | 0.33 |
| Capacity - 511 MWe | 1979 | 412.0 | 79.0 | 343 | 127 | 0.37 | 0.31 |
| | 1980 | 433.8 | 82.1 | 401 | 165 | 0.41 | 0.38 |
| | 1981 | 451.8 | 86.7 | 383 | 141 | 0.37 | 0.31 |
| | 1982 | 458.4 | 87.6 | 353 | 101 | 0.29 | 0.22 |
| | 1983 | 444.1 | 83.7 | 445 | 165 | 0.37 | 0.37 |
| | 1984 | 455.3 | 85.7 | 482 | 139 | 0.29 | 0.31 |
| | 1985 | 443.1 | 82.4 | 519 | 176 | 0.34 | 0.40 |
| | 1986 | 461.7 | 85.8 | 502 | 169 | 0.34 | 0.37 |
| | 1987 | 480.0 | 89.7 | 755 | 226 | 0.30 | 0.47 |
| | 1988 | 467.5 | 88.3 | 705 | 210 | 0.30 | 0.45 |
| | 1989 | 449.1 | 84.9 | 570 | 239 | 0.42 | 0.53 |
| | 1990 | 468.8 | 87.9 | 490 | 145 | 0.30 | 0.31 |
| | 1991 | 441.8 | 83.4 | 495 | 221 | 0.45 | 0.50 |
| | 1992 | 471.4 | 88.0 | 450 | 122 | 0.27 | 0.26 |
| | 1993 | 457.1 | 86.8 | 436 | 106 | 0.24 | 0.23 |
| | 1994 | 475.6 | 88.8 | 364 | 72 | 0.20 | 0.15 |
| | 1995 | 455.6 | 87.8 | 415 | 109 | 0.26 | 0.24 |
| | 1996 | 380.4 | 71.8 | 474 | 126 | 0.27 | 0.33 |

[8] Indian Point 3 was purchased by a different utility and now reports separately.

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **KEWAUNEE** | 1997 | 269.8 | 56.0 | 278 | 56 | 0.20 | 0.21 |
| (continued) | 1998 | 423.0 | 87.2 | 284 | 88 | 0.23 | 0.21 |
| | 1999 | 505.1 | 100.0 | 103 | 5 | 0.05 | 0.01 |
| | 2000 | 432.6 | 88.8 | 394 | 100 | 0.25 | 0.23 |
| | 2001 | 394.1 | 80.8 | 1,110 | 200 | 0.18 | 0.51 |
| **LACROSSE**[9] | 1970 | 15.3 | | | 111 | | 7.25 |
| Docket 50-409; DPR-45 | 1971 | 323.1 | | 218 | 158 | 0.72 | 0.49 |
| 1st commercial operation 11/69 | 1972 | 29.2 | | | 151 | 1.14 | 5.17 |
| Type - BWR | 1973 | 24.4 | | | 157 | 1.41 | 6.43 |
| Capacity - (48) MWe | 1974 | 37.9 | 81.0 | 115 | 139 | 1.21 | 3.67 |
| | 1975 | 32.0 | 69.6 | 165 | 234 | 1.42 | 7.31 |
| | 1976 | 21.2 | 47.6 | 118 | 110 | 0.93 | 5.19 |
| | 1977 | 11.3 | 33.7 | 141 | 225 | 1.60 | 19.91 |
| | 1978 | 21.6 | 62.0 | 182 | 164 | 0.90 | 7.59 |
| | 1979 | 24.0 | 71.8 | 153 | 186 | 1.22 | 7.75 |
| | 1980 | 26.4 | 68.5 | 124 | 218 | 1.76 | 8.26 |
| | 1981 | 29.6 | 76.0 | 187 | 123 | 0.66 | 4.16 |
| | 1982 | 17.2 | 44.6 | 148 | 205 | 1.39 | 11.92 |
| | 1983 | 24.8 | 59.7 | 160 | 313 | 1.96 | 12.62 |
| | 1984 | 38.5 | 80.5 | 288 | 252 | 0.88 | 6.55 |
| | 1985 | 39.2 | 86.7 | 373 | 173 | 0.46 | 4.41 |
| | 1986 | 19.6 | 46.1 | 260 | 290 | 1.12 | 14.80 |
| | 1987 | 0.0 | 0.0 | 127 | 68 | 0.54 | --- |
| | 1993 | 0.0 | 0.0 | 48 | 8 | 0.17 | --- |
| | 1994 | 0.0 | 0.0 | 65 | 8 | 0.12 | --- |
| | 1995 | 0.0 | 0.0 | 31 | 3 | 0.10 | --- |
| | 1996 | 0.0 | 0.0 | 25 | 4 | 0.15 | --- |
| | 1997 | 0.0 | 0.0 | 23 | 2 | 0.09 | --- |
| | 1998 | 0.0 | 0.0 | 27 | 2 | 0.07 | --- |
| | 1999 | 0.0 | 0.0 | 66 | 4 | 0.06 | --- |
| | 2000 | 0.0 | 0.0 | 37 | 4 | 0.10 | --- |
| | 2001 | 0.0 | 0.0 | 45 | 3 | 0.06 | --- |
| **LASALLE 1, 2** | 1984 | 677.8 | 77.8 | 1,245 | 252 | 0.20 | 0.37 |
| Docket 50-373, -374; | 1985 | 987.9 | 53.0 | 1,635 | 685 | 0.42 | 0.69 |
| NPF-11, -18 | 1986 | 929.5 | 50.6 | 1,614 | 898 | 0.56 | 0.97 |
| 1st commercial operation | 1987 | 1,030.0 | 59.3 | 1,744 | 1,396 | 0.80 | 1.36 |
| 1/84, 6/84 | 1988 | 1,317.6 | 71.6 | 2,737 | 2,471 | 0.90 | 1.88 |
| Type - BWRs | 1989 | 1,503.5 | 73.1 | 2,475 | 1,386 | 0.56 | 0.92 |
| Capacity - 1111, 1111 MWe | 1990 | 1,754.3 | 84.6 | 1,830 | 948 | 0.52 | 0.54 |
| | 1991 | 1,837.0 | 86.7 | 1,985 | 806 | 0.41 | 0.44 |
| | 1992 | 1,447.4 | 72.0 | 2,418 | 1,167 | 0.48 | 0.81 |
| | 1993 | 1,542.0 | 76.0 | 1,701 | 854 | 0.50 | 0.55 |
| | 1994 | 1,580.0 | 77.6 | 1,812 | 726 | 0.40 | 0.46 |
| | 1995 | 1,696.6 | 82.1 | 1,623 | 512 | 0.32 | 0.30 |
| | 1996 | 1,053.8 | 54.3 | 2,782 | 819 | 0.29 | 0.78 |
| | 1997 | 0.0 | 0.0 | 1,661 | 316 | 0.19 | --- |
| | 1998 | 380.9 | 19.3 | 2,099 | 422 | 0.20 | 1.11 |
| | 1999 | 1,671.9 | 81.8 | 2,689 | 576 | 0.21 | 0.34 |
| | 2000 | 2,138.6 | 97.1 | 1,831 | 260 | 0.14 | 0.12 |
| | 2001 | 2,223.8 | 98.9 | 535 | 83 | 0.15 | 0.04 |

[9] 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 operating reactors. Parentheses indicate plant capacity when plant was operational.

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **LIMERICK 1, 2** | 1987 | 636.1 | 70.2 | 2,156 | 174 | 0.08 | 0.27 |
| Docket 50-352, 50-353; | 1988 | 794.9 | 96.5 | 950 | 52 | 0.05 | 0.07 |
| NPF-39,-85 | 1989 | 628.4 | 66.0 | 1,818 | 266 | 0.15 | 0.42 |
| 1st commercial operation | 1990 | 1,527.7 | 78.2 | 1,422 | 175 | 0.12 | 0.11 |
| 2/86, 1/90 | 1991 | 1,810.9 | 86.8 | 1,151 | 106 | 0.09 | 0.06 |
| Type - BWRs | 1992 | 1,741.4 | 84.8 | 1,559 | 330 | 0.21 | 0.19 |
| Capacity - 1143, 1143 MWe | 1993 | 1,913.2 | 91.6 | 1,287 | 217 | 0.17 | 0.11 |
| | 1994 | 1,944.4 | 94.9 | 1,543 | 275 | 0.18 | 0.14 |
| | 1995 | 1,957.1 | 93.0 | 1,581 | 260 | 0.16 | 0.13 |
| | 1996 | 2,026.2 | 93.3 | 1,654 | 234 | 0.14 | 0.12 |
| | 1997 | 2,001.7 | 95.8 | 1,463 | 234 | 0.16 | 0.12 |
| | 1998 | 1,907.2 | 89.5 | 1,854 | 357 | 0.19 | 0.19 |
| | 1999 | 2,089.6 | 94.2 | 1,800 | 272 | 0.15 | 0.13 |
| | 2000 | 2,154.9 | 95.8 | 1,279 | 261 | 0.20 | 0.12 |
| | 2001 | 2,205.9 | 97.3 | 1,127 | 210 | 0.19 | 0.10 |
| **MAINE YANKEE**[10] | 1973 | 408.7 | | 782 | 117 | 0.15 | 0.29 |
| Docket 50-309; DPR-36 | 1974 | 432.6 | 68.7 | 619 | 420 | 0.68 | 0.97 |
| 1st commercial operation 12/72 | 1975 | 542.9 | 79.9 | 440 | 319 | 0.72 | 0.59 |
| Type - PWR | 1976 | 712.2 | 95.0 | 244 | 85 | 0.35 | 0.12 |
| Capacity - (860) MWe | 1977 | 617.6 | 82.2 | 508 | 245 | 0.48 | 0.40 |
| | 1978 | 642.7 | 84.1 | 638 | 420 | 0.66 | 0.65 |
| | 1979 | 537.0 | 68.4 | 393 | 154 | 0.39 | 0.29 |
| | 1980 | 527.0 | 72.2 | 735 | 462 | 0.63 | 0.88 |
| | 1981 | 624.2 | 78.2 | 868 | 424 | 0.49 | 0.68 |
| | 1982 | 542.5 | 69.1 | 1,295 | 619 | 0.48 | 1.14 |
| | 1983 | 677.1 | 83.6 | 592 | 165 | 0.28 | 0.24 |
| | 1984 | 605.7 | 74.4 | 1,262 | 884 | 0.70 | 1.46 |
| | 1985 | 635.4 | 79.2 | 1,009 | 700 | 0.69 | 1.10 |
| | 1986 | 737.6 | 87.8 | 495 | 100 | 0.20 | 0.14 |
| | 1987 | 478.1 | 65.3 | 1,100 | 722 | 0.66 | 1.51 |
| | 1988 | 591.9 | 79.1 | 1,058 | 725 | 0.69 | 1.22 |
| | 1989 | 819.2 | 93.7 | 375 | 99 | 0.26 | 0.12 |
| | 1990 | 573.0 | 71.0 | 1,359 | 682 | 0.50 | 1.19 |
| | 1991 | 738.1 | 86.6 | 426 | 105 | 0.25 | 0.14 |
| | 1992 | 631.7 | 79.1 | 1,189 | 461 | 0.39 | 0.73 |
| | 1993 | 674.8 | 79.8 | 1,016 | 377 | 0.37 | 0.56 |
| | 1994 | 782.8 | 90.9 | 297 | 84 | 0.28 | 0.11 |
| | 1995 | 23.6 | 3.7 | 1,167 | 653 | 0.56 | 27.67 |
| | 1996 | 602.9 | 78.1 | 408 | 56 | 0.14 | 0.09 |
| | 1997 | 0.0 | 0.0 | 991 | 153 | 0.15 | --- |
| | 1998 | 0.0 | 0.0 | 438 | 163 | 0.37 | --- |
| | 1999 | 0.0 | 0.0 | 365 | 135 | 0.37 | --- |
| | 2000 | 0.0 | 0.0 | 490 | 121 | 0.25 | --- |
| | 2001 | 0.0 | 0.0 | 412 | 68 | 0.17 | --- |
| **MCGUIRE 1, 2** | 1982 | 524.9 | 80.4 | 1,560 | 169 | 0.11 | 0.32 |
| Docket 50-369, -370; | 1983 | 558.3 | 55.4 | 1,751 | 521 | 0.30 | 0.93 |
| NPF-9, -17 | 1984 | 764.1 | 68.5 | 1,663 | 507 | 0.30 | 0.66 |
| 1st commercial operation | 1985 | 808.4 | 77.0 | 2,217 | 771 | 0.35 | 0.95 |
| 12/81, 3/84 | 1986 | 1,360.0 | 60.1 | 2,326 | 1,015 | 0.44 | 0.75 |
| Type - PWRs | 1987 | 1,774.7 | 79.2 | 2,865 | 1,043 | 0.36 | 0.59 |
| Capacity - 1100, 1100 MWe | 1988 | 1,830.7 | 80.2 | 2,808 | 1,104 | 0.39 | 0.60 |
| | 1989 | 1,810.2 | 80.8 | 1,994 | 620 | 0.31 | 0.34 |
| | 1990 | 1,340.3 | 61.3 | 2,289 | 727 | 0.32 | 0.54 |
| | 1991 | 1,945.1 | 85.0 | 1,723 | 361 | 0.21 | 0.19 |
| | 1992 | 1,696.8 | 74.4 | 1,619 | 418 | 0.26 | 0.25 |

[10] Maine Yankee was shut down in 8/97 and is no longer included in the count of operating reactors. Parentheses indicate plant capacity when plant was operational.

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **MCGUIRE** | 1993 | 1,470.4 | 66.2 | 1,685 | 463 | 0.27 | 0.31 |
| (continued) | 1994 | 1,848.0 | 80.2 | 1,637 | 397 | 0.24 | 0.21 |
| | 1995 | 2,132.3 | 92.9 | 1,259 | 138 | 0.11 | 0.06 |
| | 1996 | 1,881.8 | 82.8 | 1,622 | 238 | 0.15 | 0.13 |
| | 1997 | 1,558.2 | 73.0 | 2,193 | 492 | 0.22 | 0.32 |
| | 1998 | 2,139.8 | 95.1 | 1,045 | 142 | 0.14 | 0.07 |
| | 1999 | 1,961.7 | 88.9 | 1,274 | 257 | 0.20 | 0.13 |
| | 2000 | 2,100.1 | 94.2 | 940 | 133 | 0.14 | 0.06 |
| | 2001 | 2,113.3 | 93.9 | 963 | 137 | 0.14 | 0.06 |
| **MILLSTONE UNIT 1**[11] | 1972 | 377.6 | | 612 | 596 | 0.97 | 1.58 |
| Docket 50-245; DPR-21 | 1973 | 225.1 | | 1,184 | 663 | 0.56 | 2.95 |
| 1st commercial operation 3/71 | 1974 | 430.3 | 79.1 | 2,477 | 1,430 | 0.58 | 3.32 |
| Type - BWR | 1975 | 465.4 | 75.6 | 2,587 | 2,022 | 0.78 | 4.34 |
| Capacity - (641) MWe | 1976 | 449.8 | 76.1 | 1,387 | 1,194 | 0.86 | 2.65 |
| | 1977 | 575.7 | 89.6 | 1,075 | 394 | 0.37 | 0.68 |
| | 1978 | 556.6 | 87.6 | 1,391 | 1,416 | 1.02 | 2.54 |
| | 1979 | 505.0 | 77.3 | 2,001 | 1,795 | 0.90 | 3.55 |
| | 1980 | 405.8 | 69.0 | 3,024 | 2,157 | 0.71 | 5.32 |
| | 1981 | 304.3 | 51.6 | 2,506 | 1,496 | 0.60 | 4.92 |
| | 1982 | 490.2 | 79.9 | 1,370 | 929 | 0.68 | 1.90 |
| | 1983 | 640.1 | 95.6 | 309 | 244 | 0.79 | 0.38 |
| | 1984 | 516.1 | 78.8 | 1,992 | 836 | 0.42 | 1.62 |
| | 1985 | 548.5 | 83.6 | 732 | 608 | 0.83 | 1.11 |
| | 1986 | 626.8 | 95.4 | 389 | 150 | 0.39 | 0.24 |
| | 1987 | 523.4 | 79.6 | 1,588 | 684 | 0.43 | 1.31 |
| | 1988 | 658.8 | 98.6 | 327 | 144 | 0.44 | 0.22 |
| | 1989 | 554.6 | 84.2 | 852 | 462 | 0.54 | 0.83 |
| | 1990 | 608.3 | 91.6 | 365 | 131 | 0.36 | 0.22 |
| | 1991 | 213.1 | 35.4 | 1,154 | 409 | 0.35 | 1.92 |
| | 1992 | 431.8 | 68.1 | 348 | 99 | 0.28 | 0.23 |
| | 1993 | 627.9 | 96.8 | 305 | 81 | 0.27 | 0.13 |
| | 1994 | 394.0 | 63.6 | 1,321 | 391 | 0.30 | 0.99 |
| | 1995 | 520.6 | 80.0 | 910 | 620 | 0.68 | 1.19 |
| | 1996 | 0.0 | 0.0 | 747 | 431 | 0.58 | --- |
| | 1997 | -2.9 | 0.0 | 1,053 | 195 | 0.19 | --- |
| | 1998 | -2.7 | 0.0 | 347 | 13 | 0.04 | --- |
| | 1999 | 0.0 | 0.0 | 397 | 10 | 0.02 | --- |
| | 2000 | 0.0 | 0.0 | 478 | 60 | 0.13 | --- |
| | 2001 | 0.0 | 0.0 | 414 | 15 | 0.04 | --- |
| **MILLSTONE UNIT 2, 3** | 1976 | 545.7 | 78.7 | 620 | 168 | 0.27 | 0.31 |
| Docket 50-336, 50-423; | 1977 | 518.7 | 65.7 | 667 | 242 | 0.36 | 0.47 |
| DPR-65, NPF-49 | 1978 | 536.6 | 67.3 | 1,420 | 1,444 | 1.02 | 2.69 |
| 1st commercial operation | 1979 | 520.0 | 62.8 | 525 | 471 | 0.90 | 0.91 |
| 12/75, 4/86 | 1980 | 579.3 | 69.2 | 893 | 637 | 0.71 | 1.10 |
| Type - PWRs | 1981 | 722.4 | 82.6 | 890 | 531 | 0.60 | 0.74 |
| Capacity - 869, 1136 MWe | 1982 | 595.9 | 70.6 | 2,083 | 1,413 | 0.68 | 2.37 |
| | 1983 | 294.0 | 34.2 | 2,383 | 1,881 | 0.79 | 6.40 |
| | 1984 | 782.7 | 93.5 | 285 | 120 | 0.42 | 0.15 |
| | 1985 | 417.8 | 49.4 | 1,905 | 1,581 | 0.83 | 3.78 |
| | 1986 | 1,313.8 | 80.4 | 2,393 | 993 | 0.41 | 0.76 |
| | 1987 | 1,624.5 | 84.1 | 1,441 | 505 | 0.35 | 0.31 |
| | 1988 | 1,594.8 | 83.2 | 1,827 | 804 | 0.44 | 0.50 |
| | 1989 | 1,428.3 | 72.9 | 1,984 | 1,079 | 0.54 | 0.76 |
| | 1990 | 1,614.9 | 87.1 | 1,652 | 593 | 0.36 | 0.37 |
| | 1991 | 819.5 | 69.7 | 1,084 | 381 | 0.35 | 0.46 |
| | 1992 | 1,115.1 | 59.9 | 3,190 | 1,280 | 0.40 | 1.15 |

[11] Millstone Unit 1 was shut down 6/30/98 and is no longer included in the count of operating reactors. Parentheses indicate plant capacity when plant was operational.

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **MILLSTONE UNIT 2, 3** | 1993 | 1,525.2 | 79.7 | 2,064 | 557 | 0.27 | 0.37 |
| (continued) | 1994 | 1,556.6 | 73.1 | 1,249 | 188 | 0.15 | 0.12 |
| | 1995 | 1,278.1 | 60.5 | 1,691 | 416 | 0.25 | 0.33 |
| | 1996 | 418.1 | 19.3 | 983 | 126 | 0.13 | 0.30 |
| | 1997 | 0.0 | 0.0 | 1,435 | 253 | 0.18 | --- |
| | 1998 | 374.9 | 20.9 | 1,179 | 113 | 0.10 | 0.30 |
| | 1999 | 1,446.3 | 73.3 | 1,688 | 252 | 0.15 | 0.17 |
| | 2000 | 1,865.8 | 92.4 | 1,385 | 143 | 0.10 | 0.08 |
| | 2001 | 1,759.3 | 92.0 | 1,327 | 174 | 0.13 | 0.10 |
| **MONTICELLO** | 1972 | 424.4 | | 99 | 61 | 0.62 | 0.14 |
| Docket 50-263; DPR-22 | 1973 | 389.5 | | 401 | 176 | 0.44 | 0.45 |
| 1st commercial operation 6/71 | 1974 | 349.3 | 74.9 | 842 | 349 | 0.41 | 1.00 |
| Type - BWR | 1975 | 344.8 | 72.2 | 1,353 | 1,353 | 1.00 | 3.92 |
| Capacity - 578 MWe | 1976 | 476.4 | 91.5 | 325 | 263 | 0.81 | 0.55 |
| | 1977 | 425.6 | 79.9 | 860 | 1,000 | 1.16 | 2.35 |
| | 1978 | 459.4 | 87.2 | 679 | 375 | 0.55 | 0.82 |
| | 1979 | 522.0 | 97.6 | 372 | 157 | 0.42 | 0.30 |
| | 1980 | 411.8 | 78.2 | 1,114 | 531 | 0.48 | 1.29 |
| | 1981 | 389.3 | 72.6 | 1,446 | 1,004 | 0.69 | 2.58 |
| | 1982 | 291.1 | 63.3 | 1,307 | 993 | 0.76 | 3.41 |
| | 1983 | 494.6 | 96.3 | 416 | 121 | 0.29 | 0.24 |
| | 1984 | 33.7 | 9.2 | 1,872 | 2,462 | 1.32 | 73.06 |
| | 1985 | 509.8 | 91.7 | 586 | 327 | 0.56 | 0.64 |
| | 1986 | 402.7 | 79.1 | 895 | 596 | 0.67 | 1.48 |
| | 1987 | 422.5 | 81.9 | 941 | 568 | 0.60 | 1.34 |
| | 1988 | 542.5 | 99.8 | 375 | 110 | 0.29 | 0.20 |
| | 1989 | 318.2 | 76.2 | 1,102 | 507 | 0.46 | 1.59 |
| | 1990 | 536.0 | 96.9 | 336 | 94 | 0.28 | 0.18 |
| | 1991 | 429.4 | 80.8 | 964 | 465 | 0.48 | 1.08 |
| | 1992 | 528.3 | 97.5 | 454 | 114 | 0.25 | 0.22 |
| | 1993 | 458.1 | 84.4 | 954 | 494 | 0.52 | 1.08 |
| | 1994 | 471.3 | 87.0 | 788 | 395 | 0.50 | 0.84 |
| | 1995 | 564.7 | 100.0 | 200 | 44 | 0.22 | 0.08 |
| | 1996 | 461.6 | 86.9 | 757 | 240 | 0.32 | 0.52 |
| | 1997 | 417.4 | 75.9 | 399 | 106 | 0.27 | 0.25 |
| | 1998 | 470.2 | 88.1 | 674 | 209 | 0.31 | 0.44 |
| | 1999 | 530.7 | 92.9 | 451 | 70 | 0.16 | 0.13 |
| | 2000 | 483.2 | 84.2 | 792 | 216 | 0.27 | 0.45 |
| | 2001 | 441.3 | 78.5 | 834 | 221 | 0.26 | 0.50 |
| **NINE MILE POINT 1, 2** | 1970 | 227.0 | | 821 | 44 | 0.05 | 0.19 |
| Docket 50-220, 50-410; | 1971 | 346.5 | | 1,006 | 195 | 0.19 | 0.56 |
| DPR-63, NPF-69 | 1972 | 381.8 | | 735 | 285 | 0.39 | 0.75 |
| 1st commercial operation | 1973 | 411.0 | | 550 | 567 | 1.03 | 1.38 |
| 12/69, 4/88 | 1974 | 385.9 | 70.5 | 740 | 824 | 1.11 | 2.14 |
| Type - BWRs | 1975 | 359.0 | 72.1 | 649 | 681 | 1.05 | 1.90 |
| Capacity - 565, 1120 MWe | 1976 | 484.6 | 88.2 | 392 | 428 | 1.09 | 0.88 |
| | 1977 | 347.4 | 59.2 | 1,093 | 1,383 | 1.27 | 3.98 |
| | 1978 | 527.7 | 95.1 | 561 | 314 | 0.56 | 0.60 |
| | 1979 | 354.0 | 66.1 | 1,326 | 1,497 | 1.13 | 4.23 |
| | 1980 | 533.9 | 92.3 | 1,174 | 591 | 0.50 | 1.11 |
| | 1981 | 385.2 | 66.0 | 2,029 | 1,592 | 0.78 | 4.13 |
| | 1982 | 133.5 | 21.4 | 1,352 | 1,264 | 0.93 | 9.47 |
| | 1983 | 329.8 | 56.2 | 1,405 | 860 | 0.61 | 2.61 |
| | 1984 | 426.8 | 71.9 | 1,530 | 890 | 0.58 | 2.09 |
| | 1985 | 580.9 | 96.4 | 1,007 | 265 | 0.26 | 0.46 |
| | 1986 | 371.0 | 65.3 | 1,878 | 1,275 | 0.68 | 3.44 |
| | 1987 | 542.6 | 93.3 | 1,190 | 141 | 0.12 | 0.26 |
| | 1988 | 0.0 | 0.0 | 2,626 | 854 | 0.33 | --- |
| | 1989 | 527.5 | 29.7 | 2,737 | 564 | 0.21 | 1.07 |

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **NINE MILE POINT 1, 2** | 1990 | 656.2 | 46.6 | 2,405 | 699 | 0.29 | 1.07 |
| (continued) | 1991 | 1,250.8 | 79.7 | 1,543 | 292 | 0.19 | 0.23 |
| | 1992 | 965.9 | 61.8 | 1,800 | 563 | 0.31 | 0.58 |
| | 1993 | 1,380.2 | 84.6 | 2,352 | 633 | 0.27 | 0.46 |
| | 1994 | 1,589.6 | 95.9 | 800 | 149 | 0.19 | 0.09 |
| | 1995 | 1,382.2 | 82.5 | 2,304 | 759 | 0.33 | 0.55 |
| | 1996 | 1,598.6 | 91.6 | 1,596 | 290 | 0.18 | 0.18 |
| | 1997 | 1,321.5 | 74.8 | 1,425 | 429 | 0.30 | 0.32 |
| | 1998 | 1,387.3 | 87.0 | 1,744 | 378 | 0.22 | 0.27 |
| | 1999 | 1,409.5 | 81.3 | 1,709 | 447 | 0.26 | 0.32 |
| | 2000 | 1,443.9 | 88.1 | 1,783 | 283 | 0.16 | 0.20 |
| | 2001 | 1,506.9 | 88.9 | 1,371 | 343 | 0.25 | 0.23 |
| **NORTH ANNA 1, 2** | 1979 | 507.0 | 61.7 | 2,025 | 449 | 0.22 | 0.89 |
| Docket 50-338; NPF-04, -09 | 1980 | 681.8 | 86.5 | 2,086 | 218 | 0.10 | 0.32 |
| 1st commercial operation | 1981 | 1,241.9 | 71.5 | 2,416 | 680 | 0.28 | 0.55 |
| 6/78, 12/80 | 1982 | 777.7 | 45.8 | 2,872 | 1,915 | 0.67 | 2.46 |
| Type - PWRs | 1983 | 1,338.4 | 76.1 | 2,228 | 665 | 0.30 | 0.50 |
| Capacity - 925, 917 MWe | 1984 | 1,021.3 | 58.8 | 3,062 | 1,945 | 0.64 | 1.90 |
| | 1985 | 1,516.9 | 86.1 | 2,436 | 838 | 0.34 | 0.55 |
| | 1986 | 1,484.5 | 83.0 | 2,831 | 722 | 0.26 | 0.49 |
| | 1987 | 1,112.6 | 67.8 | 2,624 | 1,521 | 0.58 | 1.37 |
| | 1988 | 1,772.7 | 96.7 | 992 | 112 | 0.11 | 0.06 |
| | 1989 | 1,226.8 | 72.5 | 2,861 | 1,471 | 0.51 | 1.20 |
| | 1990 | 1,590.4 | 90.5 | 2,161 | 590 | 0.27 | 0.37 |
| | 1991 | 1,597.5 | 88.6 | 2,085 | 629 | 0.30 | 0.39 |
| | 1992 | 1,403.2 | 84.1 | 2,159 | 576 | 0.27 | 0.41 |
| | 1993 | 1,428.4 | 80.1 | 2,768 | 908 | 0.33 | 0.64 |
| | 1994 | 1,717.1 | 95.9 | 1,036 | 193 | 0.19 | 0.11 |
| | 1995 | 1,666.4 | 90.8 | 1,551 | 367 | 0.24 | 0.22 |
| | 1996 | 1,569.6 | 89.1 | 1,203 | 291 | 0.24 | 0.19 |
| | 1997 | 1,711.5 | 96.2 | 856 | 103 | 0.12 | 0.06 |
| | 1998 | 1,632.8 | 92.7 | 1,201 | 266 | 0.22 | 0.16 |
| | 1999 | 1,747.7 | 96.1 | 727 | 94 | 0.13 | 0.05 |
| | 2000 | 1,734.1 | 95.8 | 730 | 65 | 0.09 | 0.04 |
| | 2001 | 1,491.0 | 84.8 | 1,231 | 309 | 0.25 | 0.21 |
| **OCONEE 1, 2, 3** | 1974 | 650.6 | 60.1 | 844 | 517 | 0.61 | 0.79 |
| Docket 50-269, 50-270, | 1975 | 1,838.3 | 75.5 | 829 | 497 | 0.60 | 0.27 |
| 50-287; | 1976 | 1,561.4 | 63.0 | 1,215 | 1,026 | 0.84 | 0.66 |
| DPR-38, -47, -55 | 1977 | 1,566.4 | 65.9 | 1,595 | 1,329 | 0.83 | 0.85 |
| 1st commercial operation | 1978 | 1,909.0 | 75.8 | 1,636 | 1,393 | 0.85 | 0.73 |
| 7/73, 9/74, 12/74 | 1979 | 1,708.0 | 67.7 | 2,100 | 1,001 | 0.48 | 0.59 |
| Type - PWRs | 1980 | 1,703.7 | 70.1 | 2,124 | 1,055 | 0.50 | 0.62 |
| Capacity - 846, 846, 846 MWe | 1981 | 1,661.5 | 66.8 | 2,445 | 1,211 | 0.50 | 0.73 |
| | 1982 | 1,293.1 | 52.5 | 2,445 | 1,792 | 0.73 | 1.39 |
| | 1983 | 2,141.5 | 82.2 | 1,902 | 1,207 | 0.63 | 0.56 |
| | 1984 | 2,242.9 | 85.7 | 2,085 | 1,106 | 0.53 | 0.49 |
| | 1985 | 2,036.3 | 80.5 | 2,729 | 1,304 | 0.48 | 0.64 |
| | 1986 | 1,995.6 | 79.0 | 2,499 | 949 | 0.38 | 0.48 |
| | 1987 | 1,962.6 | 82.4 | 2,672 | 1,142 | 0.43 | 0.58 |
| | 1988 | 2,228.9 | 87.2 | 2,672 | 871 | 0.33 | 0.39 |
| | 1989 | 2,188.6 | 85.4 | 2,205 | 684 | 0.31 | 0.31 |
| | 1990 | 2,405.2 | 91.4 | 1,948 | 404 | 0.21 | 0.17 |
| | 1991 | 2,275.0 | 86.7 | 1,966 | 551 | 0.28 | 0.24 |
| | 1992 | 2,110.7 | 82.0 | 1,954 | 612 | 0.31 | 0.29 |
| | 1993 | 2,399.2 | 91.3 | 1,499 | 237 | 0.16 | 0.10 |
| | 1994 | 2,144.3 | 82.2 | 1,923 | 537 | 0.28 | 0.25 |
| | 1995 | 2,366.1 | 89.5 | 1,586 | 304 | 0.19 | 0.13 |
| | 1996 | 1,847.9 | 70.3 | 1,479 | 257 | 0.17 | 0.14 |
| | 1997 | 1,563.7 | 67.7 | 1,379 | 223 | 0.16 | 0.14 |

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **OCONEE 1, 2, 3** | 1998 | 1,989.1 | 81.3 | 1,695 | 366 | 0.22 | 0.18 |
| (continued) | 1999 | 2,264.5 | 90.3 | 1,568 | 202 | 0.13 | 0.09 |
| | 2000 | 2,321.0 | 91.6 | 1,686 | 273 | 0.16 | 0.12 |
| | 2001 | 2,167.6 | 86.8 | 2,002 | 579 | 0.29 | 0.27 |
| **OYSTER CREEK** | 1970 | 413.6 | | 95 | 63 | 0.66 | 0.15 |
| Docket 50-219; DPR-16 | 1971 | 448.9 | | 249 | 240 | 0.96 | 0.53 |
| 1st commercial operation 12/69 | 1972 | 515.0 | | 339 | 582 | 1.72 | 1.13 |
| Type - BWR | 1973 | 424.6 | | 782 | 1,236 | 1.58 | 2.91 |
| Capacity - 619 MWe | 1974 | 434.5 | 70.4 | 935 | 984 | 1.05 | 2.26 |
| | 1975 | 373.6 | 73.3 | 1,210 | 1,140 | 0.94 | 3.05 |
| | 1976 | 456.5 | 79.3 | 1,582 | 1,078 | 0.68 | 2.36 |
| | 1977 | 385.7 | 70.1 | 1,673 | 1,614 | 0.96 | 4.18 |
| | 1978 | 431.8 | 74.3 | 1,411 | 1,279 | 0.91 | 2.96 |
| | 1979 | 541.0 | 85.9 | 842 | 467 | 0.55 | 0.86 |
| | 1980 | 232.9 | 41.4 | 1,966 | 1,733 | 0.88 | 7.44 |
| | 1981 | 314.8 | 59.8 | 1,689 | 917 | 0.54 | 2.91 |
| | 1982 | 242.7 | 62.5 | 1,270 | 865 | 0.68 | 3.56 |
| | 1983 | 27.9 | 11.5 | 2,303 | 2,257 | 0.98 | 80.90 |
| | 1984 | 37.1 | 9.6 | 2,369 | 2,054 | 0.87 | 55.36 |
| | 1985 | 446.1 | 89.4 | 2,342 | 748 | 0.32 | 1.68 |
| | 1986 | 157.3 | 31.5 | 3,740 | 2,436 | 0.65 | 15.49 |
| | 1987 | 371.0 | 64.2 | 1,932 | 522 | 0.27 | 1.41 |
| | 1988 | 419.6 | 65.9 | 2,875 | 1,504 | 0.52 | 3.58 |
| | 1989 | 287.5 | 57.3 | 2,395 | 910 | 0.38 | 3.17 |
| | 1990 | 511.8 | 89.1 | 1,941 | 310 | 0.16 | 0.61 |
| | 1991 | 351.6 | 60.5 | 3,089 | 1,185 | 0.38 | 3.37 |
| | 1992 | 536.3 | 85.9 | 2,771 | 657 | 0.24 | 1.23 |
| | 1993 | 551.9 | 87.8 | 2,560 | 416 | 0.16 | 0.75 |
| | 1994 | 431.7 | 70.8 | 2,382 | 844 | 0.35 | 1.96 |
| | 1995 | 615.4 | 97.4 | 761 | 90 | 0.12 | 0.15 |
| | 1996 | 515.0 | 82.6 | 1,833 | 449 | 0.24 | 0.87 |
| | 1997 | 579.1 | 94.3 | 509 | 50 | 0.10 | 0.09 |
| | 1998 | 490.8 | 82.4 | 1,408 | 308 | 0.22 | 0.63 |
| | 1999 | 615.1 | 100.0 | 466 | 42 | 0.09 | 0.07 |
| | 2000 | 444.9 | 83.3 | 2,044 | 614 | 0.30 | 1.38 |
| | 2001 | 595.0 | 97.6 | 442 | 46 | 0.10 | 0.08 |
| **PALISADES** | 1972 | 216.8 | | | 78 | | 0.36 |
| Docket 50-255; DPR-20 | 1973 | 286.8 | | 975 | 1,133 | 1.16 | 3.95 |
| 1st commercial operation 12/71 | 1974 | 10.7 | 5.5 | 774 | 627 | 0.81 | 58.60 |
| Type - PWR | 1975 | 302.0 | 64.5 | 495 | 306 | 0.62 | 1.01 |
| Capacity - 730 MWe | 1976 | 346.9 | 55.2 | 742 | 696 | 0.94 | 2.01 |
| | 1977 | 616.6 | 91.4 | 332 | 100 | 0.30 | 0.16 |
| | 1978 | 320.2 | 49.7 | 849 | 764 | 0.90 | 2.39 |
| | 1979 | 415.0 | 59.9 | 1,599 | 854 | 0.53 | 2.06 |
| | 1980 | 288.3 | 42.9 | 1,307 | 424 | 0.32 | 1.47 |
| | 1981 | 418.2 | 57.2 | 2,151 | 902 | 0.42 | 2.16 |
| | 1982 | 404.3 | 54.7 | 1,554 | 330 | 0.21 | 0.82 |
| | 1983 | 454.4 | 60.3 | 2,167 | 977 | 0.45 | 2.15 |
| | 1984 | 98.7 | 15.2 | 1,344 | 573 | 0.43 | 5.81 |
| | 1985 | 639.2 | 83.8 | 1,355 | 507 | 0.37 | 0.79 |
| | 1986 | 102.3 | 15.1 | 1,438 | 672 | 0.47 | 6.57 |
| | 1987 | 319.2 | 48.2 | 1,122 | 456 | 0.41 | 1.43 |
| | 1988 | 413.4 | 56.8 | 1,472 | 730 | 0.50 | 1.77 |
| | 1989 | 442.8 | 69.1 | 1,026 | 314 | 0.31 | 0.71 |
| | 1990 | 366.7 | 58.7 | 2,414 | 766 | 0.32 | 2.09 |
| | 1991 | 587.0 | 78.1 | 1,315 | 211 | 0.16 | 0.36 |
| | 1992 | 581.9 | 76.1 | 1,267 | 295 | 0.23 | 0.51 |
| | 1993 | 424.4 | 53.7 | 908 | 289 | 0.32 | 0.68 |
| | 1994 | 541.8 | 67.0 | 397 | 60 | 0.15 | 0.11 |

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **PALISADES** | 1995 | 583.5 | 75.8 | 1,230 | 462 | 0.38 | 0.79 |
| (continued) | 1996 | 638.2 | 81.4 | 1,109 | 318 | 0.29 | 0.50 |
| | 1997 | 662.5 | 89.9 | 338 | 48 | 0.14 | 0.07 |
| | 1998 | 615.4 | 83.5 | 895 | 217 | 0.24 | 0.35 |
| | 1999 | 585.4 | 80.2 | 939 | 218 | 0.23 | 0.37 |
| | 2000 | 654.4 | 88.0 | 255 | 26 | 0.10 | 0.04 |
| | 2001 | 268.2 | 36.3 | 1,032 | 363 | 0.35 | 1.35 |
| **PALO VERDE 1, 2, 3** | 1987 | 1,638.1 | 66.1 | 1,792 | 669 | 0.37 | 0.41 |
| Docket 50-528, 50-529; 50-530 | 1988 | 1,700.9 | 65.5 | 2,173 | 688 | 0.32 | 0.40 |
| NPF-41, NPF-51, NPF-74 | 1989 | 965.3 | 26.5 | 2,615 | 720 | 0.28 | 0.75 |
| 1st commercial operation | 1990 | 2,500.9 | 67.5 | 2,236 | 499 | 0.22 | 0.20 |
| 1/86,9/86,1/88 | 1991 | 3,043.9 | 78.9 | 2,242 | 605 | 0.27 | 0.20 |
| Type - PWRs | 1992 | 3,102.3 | 82.0 | 1,981 | 541 | 0.27 | 0.17 |
| Capacity - 1243, 1243, | 1993 | 2,677.1 | 74.3 | 2,124 | 592 | 0.28 | 0.22 |
| 1247 MWe | 1994 | 2,827.6 | 79.1 | 2,048 | 462 | 0.23 | 0.16 |
| | 1995 | 3,265.2 | 85.6 | 1,875 | 482 | 0.26 | 0.15 |
| | 1996 | 3,482.7 | 90.0 | 1,717 | 302 | 0.18 | 0.09 |
| | 1997 | 3,369.2 | 92.2 | 1,585 | 246 | 0.16 | 0.07 |
| | 1998 | 3,454.4 | 93.2 | 1,410 | 192 | 0.14 | 0.06 |
| | 1999 | 3,471.2 | 93.2 | 1,275 | 146 | 0.11 | 0.04 |
| | 2000 | 3,458.6 | 93.0 | 1,279 | 158 | 0.12 | 0.05 |
| | 2001 | 3,280.2 | 88.6 | 1,361 | 182 | 0.13 | 0.06 |
| **PEACH BOTTOM 2, 3** | 1975 | 1,234.3 | 80.9 | 971 | 228 | 0.23 | 0.18 |
| Docket 50-277, 50-278; | 1976 | 1,379.2 | 73.0 | 2,136 | 840 | 0.39 | 0.61 |
| DPR-44, -56 | 1977 | 1,052.4 | 58.7 | 2,827 | 2,036 | 0.72 | 1.93 |
| 1st commercial operation | 1978 | 1,636.3 | 84.0 | 2,244 | 1,317 | 0.59 | 0.80 |
| 7/74, 12/74 | 1979 | 1,740.0 | 84.5 | 2,276 | 1,388 | 0.61 | 0.80 |
| Type - BWRs | 1980 | 1,374.2 | 66.3 | 2,774 | 2,302 | 0.83 | 1.68 |
| Capacity - 1093, 1093 MWe | 1981 | 1,161.8 | 58.0 | 2,857 | 2,506 | 0.88 | 2.16 |
| | 1982 | 1,583.3 | 76.9 | 2,734 | 1,977 | 0.72 | 1.25 |
| | 1983 | 824.7 | 41.0 | 3,107 | 2,963 | 0.95 | 3.59 |
| | 1984 | 1,165.8 | 57.5 | 3,313 | 2,450 | 0.74 | 2.10 |
| | 1985 | 682.7 | 37.5 | 4,209 | 3,354 | 0.80 | 4.91 |
| | 1986 | 1,395.0 | 71.7 | 2,454 | 1,080 | 0.44 | 0.77 |
| | 1987 | 365.7 | 20.3 | 4,363 | 2,195 | 0.50 | 6.00 |
| | 1988 | 0.0 | 0.0 | 4,204 | 2,327 | 0.55 | --- |
| | 1989 | 491.0 | 35.0 | 2,301 | 728 | 0.32 | 1.48 |
| | 1990 | 1,684.0 | 85.7 | 1,585 | 377 | 0.24 | 0.22 |
| | 1991 | 1,210.9 | 62.3 | 2,702 | 934 | 0.35 | 0.77 |
| | 1992 | 1,516.6 | 78.7 | 1,911 | 502 | 0.26 | 0.33 |
| | 1993 | 1,654.0 | 81.9 | 1,757 | 552 | 0.31 | 0.33 |
| | 1994 | 1,927.4 | 93.8 | 2,133 | 579 | 0.27 | 0.30 |
| | 1995 | 1,955.9 | 95.1 | 1,940 | 398 | 0.21 | 0.20 |
| | 1996 | 2,012.4 | 96.9 | 1,657 | 282 | 0.17 | 0.14 |
| | 1997 | 1,956.3 | 95.0 | 1,872 | 490 | 0.26 | 0.25 |
| | 1998 | 1,881.2 | 93.2 | 1,903 | 366 | 0.19 | 0.19 |
| | 1999 | 2,057.2 | 96.0 | 1,630 | 319 | 0.20 | 0.16 |
| | 2000 | 2,058.3 | 96.7 | 1,729 | 331 | 0.19 | 0.16 |
| | 2001 | 2,037.1 | 95.8 | 1,445 | 344 | 0.24 | 0.17 |
| **PERRY** | 1988 | 869.3 | 79.0 | 782 | 105 | 0.13 | 0.12 |
| Docket 50-440; NPF-58 | 1989 | 642.2 | 57.0 | 1,883 | 767 | 0.41 | 1.19 |
| 1st commercial operation 11/87 | 1990 | 792.7 | 67.1 | 1,537 | 638 | 0.42 | 0.80 |
| Type - BWR | 1991 | 1,074.2 | 91.9 | 600 | 146 | 0.24 | 0.14 |
| Capacity - 1241 MWe | 1992 | 856.2 | 75.5 | 1,487 | 571 | 0.38 | 0.67 |
| | 1993 | 479.2 | 48.2 | 1,235 | 278 | 0.23 | 0.58 |
| | 1994 | 550.8 | 50.2 | 2,098 | 691 | 0.33 | 1.25 |
| | 1995 | 1,090.9 | 95.6 | 587 | 64 | 0.11 | 0.06 |
| | 1996 | 895.6 | 77.2 | 1,622 | 307 | 0.19 | 0.34 |
| | 1997 | 930.6 | 84.7 | 1,524 | 272 | 0.18 | 0.29 |

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **PERRY** | 1998 | 1,163.1 | 99.3 | 385 | 42 | 0.11 | 0.04 |
| (continued) | 1999 | 1,041.7 | 89.9 | 1,758 | 326 | 0.19 | 0.31 |
| | 2000 | 1,148.2 | 97.1 | 501 | 56 | 0.11 | 0.05 |
| | 2001 | 885.9 | 79.6 | 1,392 | 258 | 0.19 | 0.29 |
| **PILGRIM 1** | 1973 | 484.0 | | 230 | 126 | 0.55 | 0.26 |
| Docket 50-293; DPR-35 | 1974 | 234.1 | 39.2 | 454 | 415 | 0.91 | 1.77 |
| 1st commercial operation 12/72 | 1975 | 308.1 | 71.3 | 473 | 798 | 1.69 | 2.59 |
| Type - BWR | 1976 | 287.8 | 60.7 | 1,317 | 2,648 | 2.01 | 9.20 |
| Capacity - 653 MWe | 1977 | 316.6 | 61.4 | 1,875 | 3,142 | 1.68 | 9.92 |
| | 1978 | 519.5 | 83.1 | 1,667 | 1,327 | 0.80 | 2.55 |
| | 1979 | 574.0 | 89.4 | 2,458 | 1,015 | 0.41 | 1.77 |
| | 1980 | 360.3 | 56.2 | 3,549 | 3,626 | 1.02 | 10.06 |
| | 1981 | 408.9 | 65.9 | 2,803 | 1,836 | 0.66 | 4.49 |
| | 1982 | 389.9 | 63.9 | 2,854 | 1,539 | 0.54 | 3.95 |
| | 1983 | 559.5 | 87.2 | 2,326 | 1,162 | 0.50 | 2.08 |
| | 1984 | 1.4 | 0.4 | 4,542 | 4,082 | 0.90 | 2915.71 |
| | 1985 | 587.3 | 91.5 | 2,209 | 893 | 0.40 | 1.52 |
| | 1986 | 121.9 | 18.8 | 2,635 | 874 | 0.33 | 7.17 |
| | 1987 | 0.0 | 0.0 | 4,710 | 1,579 | 0.34 | --- |
| | 1988 | 0.0 | 0.0 | 2,073 | 392 | 0.19 | --- |
| | 1989 | 204.6 | 64.1 | 1,797 | 207 | 0.12 | 1.01 |
| | 1990 | 503.5 | 82.1 | 1,898 | 225 | 0.12 | 0.45 |
| | 1991 | 406.3 | 65.8 | 2,836 | 605 | 0.21 | 1.49 |
| | 1992 | 561.0 | 85.4 | 1,332 | 281 | 0.21 | 0.50 |
| | 1993 | 513.7 | 80.9 | 1,328 | 435 | 0.33 | 0.85 |
| | 1994 | 453.6 | 71.4 | 758 | 200 | 0.26 | 0.44 |
| | 1995 | 531.7 | 80.7 | 1,294 | 482 | 0.37 | 0.91 |
| | 1996 | 631.3 | 95.4 | 517 | 116 | 0.22 | 0.18 |
| | 1997 | 492.1 | 80.7 | 1,655 | 588 | 0.36 | 1.19 |
| | 1998 | 650.5 | 100.0 | 530 | 71 | 0.13 | 0.11 |
| | 1999 | 510.7 | 84.4 | 1,222 | 344 | 0.28 | 0.67 |
| | 2000 | 627.5 | 98.3 | 422 | 51 | 0.12 | 0.08 |
| | 2001 | 585.6 | 91.0 | 1,113 | 180 | 0.16 | 0.31 |
| **POINT BEACH 1, 2** | 1971 | 393.4 | | | 164 | | 0.42 |
| Docket 50-266, 50-301; | 1972 | 378.3 | | | 580 | | 1.53 |
| DPR-24, -27 | 1973 | 693.7 | | 501 | 588 | 1.17 | 0.85 |
| 1st commercial operation | 1974 | 760.2 | 81.3 | 400 | 295 | 0.74 | 0.39 |
| 12/70, 10/72 | 1975 | 801.2 | 82.9 | 339 | 459 | 1.35 | 0.57 |
| Type - PWRs | 1976 | 857.3 | 86.7 | 313 | 370 | 1.18 | 0.43 |
| Capacity - 510, 512 MWe | 1977 | 873.9 | 87.3 | 417 | 430 | 1.03 | 0.49 |
| | 1978 | 914.4 | 90.9 | 336 | 320 | 0.95 | 0.35 |
| | 1979 | 808.0 | 80.8 | 610 | 644 | 1.06 | 0.80 |
| | 1980 | 727.2 | 82.5 | 561 | 598 | 1.07 | 0.82 |
| | 1981 | 760.4 | 83.6 | 773 | 596 | 0.77 | 0.78 |
| | 1982 | 757.2 | 84.3 | 767 | 609 | 0.79 | 0.80 |
| | 1983 | 648.2 | 72.7 | 1,702 | 1,403 | 0.82 | 2.16 |
| | 1984 | 788.9 | 78.6 | 1,372 | 789 | 0.58 | 1.00 |
| | 1985 | 831.3 | 82.5 | 671 | 482 | 0.72 | 0.58 |
| | 1986 | 858.9 | 85.7 | 664 | 402 | 0.61 | 0.47 |
| | 1987 | 857.5 | 85.5 | 720 | 554 | 0.77 | 0.65 |
| | 1988 | 899.3 | 88.6 | 734 | 410 | 0.56 | 0.46 |
| | 1989 | 847.8 | 85.5 | 736 | 504 | 0.68 | 0.59 |
| | 1990 | 875.5 | 86.5 | 617 | 378 | 0.61 | 0.43 |
| | 1991 | 874.8 | 87.1 | 724 | 265 | 0.37 | 0.30 |
| | 1992 | 866.7 | 85.8 | 617 | 256 | 0.41 | 0.30 |
| | 1993 | 911.0 | 90.0 | 559 | 186 | 0.33 | 0.20 |
| | 1994 | 914.5 | 91.2 | 548 | 170 | 0.31 | 0.19 |
| | 1995 | 858.4 | 86.1 | 548 | 190 | 0.35 | 0.22 |
| | 1996 | 831.6 | 84.7 | 1,029 | 276 | 0.27 | 0.33 |
| | 1997 | 186.8 | 21.8 | 670 | 92 | 0.14 | 0.49 |

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **POINT BEACH 1, 2** | 1998 | 649.7 | 69.7 | 881 | 169 | 0.19 | 0.26 |
| (continued) | 1999 | 806.0 | 83.1 | 962 | 194 | 0.20 | 0.24 |
| | 2000 | 872.0 | 88.7 | 765 | 139 | 0.18 | 0.16 |
| | 2001 | 915.9 | 93.4 | 740 | 132 | 0.18 | 0.14 |
| **PRAIRIE ISLAND 1, 2** | 1974 | 181.9 | 43.9 | 150 | 18 | 0.12 | 0.10 |
| Docket 50-282, 50-306; | 1975 | 836.0 | 83.3 | 477 | 123 | 0.26 | 0.15 |
| DPR-42, -60 | 1976 | 725.2 | 76.6 | 818 | 447 | 0.55 | 0.62 |
| 1st commercial operation | 1977 | 922.9 | 87.2 | 718 | 300 | 0.42 | 0.33 |
| 12/73, 12/74 | 1978 | 941.1 | 92.2 | 546 | 221 | 0.40 | 0.23 |
| Type - PWRs | 1979 | 865.0 | 86.0 | 594 | 180 | 0.30 | 0.21 |
| Capacity - 522, 522 MWe | 1980 | 800.7 | 79.9 | 983 | 353 | 0.36 | 0.44 |
| | 1981 | 844.9 | 80.5 | 836 | 329 | 0.39 | 0.39 |
| | 1982 | 944.9 | 90.4 | 645 | 229 | 0.36 | 0.24 |
| | 1983 | 921.1 | 86.8 | 654 | 233 | 0.36 | 0.25 |
| | 1984 | 972.4 | 91.7 | 546 | 147 | 0.27 | 0.15 |
| | 1985 | 882.6 | 84.0 | 1,082 | 416 | 0.38 | 0.47 |
| | 1986 | 930.6 | 90.3 | 818 | 255 | 0.31 | 0.27 |
| | 1987 | 969.6 | 91.6 | 593 | 135 | 0.23 | 0.14 |
| | 1988 | 932.0 | 89.1 | 732 | 199 | 0.27 | 0.21 |
| | 1989 | 1,001.8 | 94.7 | 476 | 99 | 0.21 | 0.10 |
| | 1990 | 925.4 | 89.2 | 737 | 188 | 0.26 | 0.20 |
| | 1991 | 1,023.3 | 95.6 | 586 | 98 | 0.17 | 0.10 |
| | 1992 | 811.6 | 76.2 | 845 | 211 | 0.25 | 0.26 |
| | 1993 | 978.3 | 90.7 | 532 | 106 | 0.20 | 0.11 |
| | 1994 | 996.9 | 91.5 | 478 | 109 | 0.10 | 0.11 |
| | 1995 | 1,023.2 | 93.9 | 499 | 107 | 0.21 | 0.10 |
| | 1996 | 992.1 | 91.4 | 558 | 112 | 0.20 | 0.11 |
| | 1997 | 817.6 | 81.4 | 753 | 174 | 0.23 | 0.21 |
| | 1998 | 860.3 | 83.4 | 582 | 117 | 0.20 | 0.14 |
| | 1999 | 989.3 | 93.8 | 542 | 72 | 0.13 | 0.07 |
| | 2000 | 992.2 | 93.1 | 632 | 106 | 0.17 | 0.11 |
| | 2001 | 900.8 | 85.8 | 691 | 125 | 0.18 | 0.14 |
| **QUAD CITIES 1, 2** | 1974 | 958.1 | 72.3 | 678 | 482 | 0.71 | 0.50 |
| Docket 50-254, 50-265; | 1975 | 833.6 | 68.4 | 1,083 | 1,618 | 1.49 | 1.94 |
| DPR-29, -30 | 1976 | 951.2 | 73.1 | 1,225 | 1,651 | 1.35 | 1.74 |
| 1st commercial operation | 1977 | 970.1 | 84.0 | 907 | 1,031 | 1.14 | 1.06 |
| 2/73, 3/73 | 1978 | 1,124.5 | 88.6 | 1,207 | 1,618 | 1.34 | 1.44 |
| Type - BWRs | 1979 | 1,075.0 | 84.6 | 1,688 | 2,158 | 1.28 | 2.01 |
| Capacity - 769, 769 MWe | 1980 | 866.9 | 64.4 | 3,089 | 4,838 | 1.57 | 5.58 |
| | 1981 | 1,156.9 | 81.1 | 2,246 | 3,146 | 1.40 | 2.72 |
| | 1982 | 1,018.7 | 76.0 | 2,314 | 3,757 | 1.62 | 3.69 |
| | 1983 | 1,088.5 | 79.2 | 1,802 | 2,491 | 1.38 | 2.29 |
| | 1984 | 994.6 | 65.7 | 1,678 | 1,579 | 0.94 | 1.59 |
| | 1985 | 1,268.0 | 82.7 | 1,184 | 990 | 0.84 | 0.78 |
| | 1986 | 1,093.2 | 71.0 | 1,451 | 950 | 0.65 | 0.87 |
| | 1987 | 1,126.6 | 75.3 | 1,429 | 720 | 0.50 | 0.64 |
| | 1988 | 1,173.7 | 84.1 | 1,486 | 827 | 0.56 | 0.70 |
| | 1989 | 1,196.3 | 85.9 | 1,721 | 900 | 0.52 | 0.75 |
| | 1990 | 1,148.9 | 77.8 | 2,186 | 1,028 | 0.47 | 0.89 |
| | 1991 | 1,044.5 | 73.2 | 1,722 | 509 | 0.30 | 0.49 |
| | 1992 | 960.8 | 68.0 | 2,413 | 1,157 | 0.48 | 1.20 |
| | 1993 | 974.9 | 67.0 | 2,150 | 849 | 0.39 | 0.87 |
| | 1994 | 681.5 | 48.7 | 2,163 | 1,128 | 0.52 | 1.66 |
| | 1995 | 1,002.5 | 70.4 | 2,041 | 736 | 0.36 | 0.73 |
| | 1996 | 876.6 | 60.1 | 2,248 | 1,025 | 0.46 | 1.17 |
| | 1997 | 935.3 | 66.5 | 2,474 | 654 | 0.26 | 0.70 |
| | 1998 | 794.8 | 55.1 | 2,177 | 761 | 0.35 | 0.96 |
| | 1999 | 1,476.5 | 95.9 | 1,000 | 201 | 0.20 | 0.14 |
| | 2000 | 1,410.4 | 93.9 | 2,840 | 894 | 0.32 | 0.63 |
| | 2001 | 1,478.2 | 95.9 | 736 | 144 | 0.20 | 0.10 |

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **RANCHO SECO**[12] | 1976 | 268.1 | 30.4 | 297 | 58 | 0.20 | 0.22 |
| Docket 50-312; DPR-54 | 1977 | 706.4 | 77.1 | 515 | 391 | 0.76 | 0.55 |
| 1st commercial operation 4/75 | 1978 | 607.7 | 80.5 | 508 | 323 | 0.64 | 0.53 |
| Type - PWR | 1979 | 687.0 | 91.1 | 287 | 126 | 0.44 | 0.18 |
| Capacity - (873) MWe | 1980 | 530.9 | 60.4 | 890 | 412 | 0.46 | 0.78 |
| | 1981 | 321.2 | 40.2 | 772 | 402 | 0.52 | 1.25 |
| | 1982 | 409.5 | 53.3 | 766 | 337 | 0.44 | 0.82 |
| | 1983 | 347.9 | 46.8 | 1,338 | 787 | 0.59 | 2.26 |
| | 1984 | 460.0 | 58.3 | 802 | 222 | 0.28 | 0.48 |
| | 1985 | 238.7 | 30.8 | 1,764 | 756 | 0.43 | 3.17 |
| | 1986 | 0.0 | 0.0 | 1,513 | 402 | 0.27 | --- |
| | 1987 | 0.0 | 0.0 | 1,533 | 300 | 0.20 | --- |
| | 1988 | 355.8 | 63.1 | 693 | 78 | 0.11 | 0.22 |
| | 1989 | 179.9 | 54.7 | 603 | 81 | 0.13 | 0.45 |
| | 1990 | 0.0 | 0.0 | 111 | 13 | 0.12 | --- |
| | 1991 | 0.0 | 0.0 | 101 | 9 | 0.09 | --- |
| | 1992 | 0.0 | 0.0 | 70 | 7 | 0.10 | --- |
| | 1993 | 0.0 | 0.0 | 35 | 4 | 0.11 | --- |
| | 1994 | 0.0 | 0.0 | 18 | 1 | 0.06 | --- |
| | 1995 | 0.0 | 0.0 | 16 | 1 | 0.06 | --- |
| | 1996 | 0.0 | 0.0 | 16 | 1 | 0.04 | --- |
| | 1997 | 0.0 | 0.0 | 16 | 0 | 0.00 | --- |
| | 1998 | 0.0 | 0.0 | 61 | 3 | 0.05 | --- |
| | 1999 | 0.0 | 0.0 | 302 | 11 | 0.04 | --- |
| | 2000 | 0.0 | 0.0 | 219 | 26 | 0.12 | --- |
| | 2001 | 0.0 | 0.0 | 210 | 18 | 0.09 | --- |
| **RIVER BEND 1** | 1987 | 605.2 | 68.4 | 1,268 | 378 | 0.30 | 0.62 |
| Docket 50-458; NPF-47 | 1988 | 880.7 | 94.3 | 513 | 107 | 0.21 | 0.12 |
| 1st commercial operation 6/86 | 1989 | 584.5 | 69.1 | 1,566 | 558 | 0.36 | 0.95 |
| Type - BWR | 1990 | 682.2 | 78.0 | 1,616 | 489 | 0.30 | 0.72 |
| Capacity - 936 MWe | 1991 | 814.7 | 87.2 | 780 | 144 | 0.18 | 0.18 |
| | 1992 | 336.1 | 39.7 | 2,022 | 710 | 0.35 | 2.11 |
| | 1993 | 640.0 | 71.6 | 847 | 180 | 0.21 | 0.28 |
| | 1994 | 595.7 | 64.9 | 2,209 | 519 | 0.24 | 0.87 |
| | 1995 | 967.1 | 99.6 | 667 | 85 | 0.13 | 0.09 |
| | 1996 | 836.1 | 85.3 | 2,093 | 473 | 0.23 | 0.57 |
| | 1997 | 778.8 | 86.3 | 1,671 | 347 | 0.21 | 0.45 |
| | 1998 | 894.2 | 96.2 | 466 | 58 | 0.12 | 0.06 |
| | 1999 | 651.2 | 75.2 | 1,327 | 344 | 0.26 | 0.53 |
| | 2000 | 837.1 | 89.7 | 1,104 | 216 | 0.20 | 0.26 |
| | 2001 | 889.3 | 93.6 | 1,249 | 208 | 0.17 | 0.23 |
| **ROBINSON 2** | 1972 | 580.0 | | 245 | 215 | 0.88 | 0.37 |
| Docket 50-261; DPR-23 | 1973 | 455.1 | | 831 | 695 | 0.84 | 1.53 |
| 1st commercial operation 3/71 | 1974 | 578.1 | 83.3 | 853 | 672 | 0.79 | 1.16 |
| Type - PWR | 1975 | 501.8 | 72.7 | 849 | 1,142 | 1.35 | 2.28 |
| Capacity - 683 MWe | 1976 | 585.5 | 84.7 | 597 | 715 | 1.20 | 1.22 |
| | 1977 | 511.5 | 85.2 | 634 | 455 | 0.72 | 0.89 |
| | 1978 | 480.5 | 72.0 | 943 | 963 | 1.02 | 2.00 |
| | 1979 | 482.0 | 70.8 | 1,454 | 1,188 | 0.82 | 2.46 |
| | 1980 | 387.3 | 62.2 | 2,009 | 1,852 | 0.92 | 4.78 |
| | 1981 | 426.6 | 73.0 | 1,462 | 733 | 0.50 | 1.72 |
| | 1982 | 277.5 | 48.9 | 2,011 | 1,426 | 0.71 | 5.14 |
| | 1983 | 409.8 | 75.5 | 2,244 | 923 | 0.41 | 2.25 |
| | 1984 | 28.0 | 7.0 | 4,127 | 2,880 | 0.70 | 102.86 |

[12] Rancho Seco was shut down 6/89 and is no longer in the count of operating reactors. Parentheses indicate plant capacity when plant was operational.

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **ROBINSON 2** | 1985 | 629.5 | 87.9 | 1,378 | 311 | 0.23 | 0.49 |
| (continued) | 1986 | 577.1 | 80.3 | 1,571 | 539 | 0.34 | 0.93 |
| | 1987 | 510.1 | 72.5 | 1,379 | 499 | 0.36 | 0.98 |
| | 1988 | 385.0 | 65.9 | 1,351 | 564 | 0.42 | 1.46 |
| | 1989 | 336.6 | 48.7 | 1,098 | 195 | 0.18 | 0.58 |
| | 1990 | 400.3 | 64.8 | 1,626 | 437 | 0.27 | 1.09 |
| | 1991 | 575.1 | 81.4 | 885 | 193 | 0.22 | 0.34 |
| | 1992 | 487.2 | 66.8 | 1,267 | 352 | 0.28 | 0.72 |
| | 1993 | 502.7 | 70.7 | 1,221 | 337 | 0.28 | 0.67 |
| | 1994 | 560.3 | 79.5 | 420 | 63 | 0.15 | 0.11 |
| | 1995 | 618.7 | 84.7 | 1,058 | 215 | 0.20 | 0.35 |
| | 1996 | 654.8 | 88.6 | 1,031 | 167 | 0.16 | 0.26 |
| | 1997 | 707.5 | 99.0 | 304 | 13 | 0.04 | 0.02 |
| | 1998 | 628.5 | 88.9 | 978 | 170 | 0.17 | 0.27 |
| | 1999 | 648.9 | 91.8 | 807 | 124 | 0.15 | 0.19 |
| | 2000 | 710.0 | 99.7 | 138 | 8 | 0.06 | 0.01 |
| | 2001 | 627.9 | 90.6 | 827 | 125 | 0.15 | 0.20 |
| **SALEM 1, 2** | 1978 | 546.4 | 55.6 | 574 | 122 | 0.21 | 0.22 |
| Docket 50-272, -311; | 1979 | 250.0 | 25.5 | 1,488 | 584 | 0.39 | 2.34 |
| DPR-70, -75 | 1980 | 680.6 | 69.2 | 1,704 | 449 | 0.26 | 0.66 |
| 1st commercial operation | 1981 | 743.0 | 78.1 | 1,652 | 254 | 0.15 | 0.34 |
| 6/77, 10/81 | 1982 | 1,440.4 | 72.6 | 3,228 | 1,203 | 0.37 | 0.84 |
| Type - PWRs | 1983 | 742.0 | 30.5 | 2,383 | 581 | 0.24 | 0.78 |
| Capacity - 1096, 1092 MWe | 1984 | 650.1 | 31.8 | 1,395 | 681 | 0.49 | 1.05 |
| | 1985 | 1,657.7 | 75.8 | 1,112 | 204 | 0.18 | 0.12 |
| | 1986 | 1,484.3 | 70.4 | 3,554 | 599 | 0.17 | 0.40 |
| | 1987 | 1,478.2 | 73.3 | 2,543 | 600 | 0.24 | 0.41 |
| | 1988 | 1,591.6 | 73.6 | 1,609 | 503 | 0.31 | 0.32 |
| | 1989 | 1,675.4 | 79.5 | 2,944 | 338 | 0.11 | 0.20 |
| | 1990 | 1,362.6 | 65.1 | 3,636 | 272 | 0.07 | 0.20 |
| | 1991 | 1,726.4 | 79.3 | 4,201 | 458 | 0.11 | 0.27 |
| | 1992 | 1,200.9 | 61.1 | 4,376 | 431 | 0.10 | 0.36 |
| | 1993 | 1,366.3 | 65.4 | 3,559 | 408 | 0.11 | 0.30 |
| | 1994 | 1,367.4 | 73.8 | 950 | 188 | 0.20 | 0.14 |
| | 1995 | 558.1 | 29.3 | 1,195 | 218 | 0.18 | 0.39 |
| | 1996 | 0.0 | 0.0 | 1,671 | 300 | 0.18 | --- |
| | 1997 | 279.3 | 17.8 | 894 | 175 | 0.20 | 0.63 |
| | 1998 | 1,629.3 | 79.1 | 408 | 41 | 0.10 | 0.03 |
| | 1999 | 1,821.8 | 86.8 | 1,200 | 318 | 0.27 | 0.17 |
| | 2000 | 1,973.4 | 93.0 | 1,191 | 198 | 0.17 | 0.10 |
| | 2001 | 1,961.2 | 91.1 | 1,274 | 153 | 0.12 | 0.08 |
| **SAN ONOFRE 1[13], 2, 3** | 1969 | 314.1 | | 123 | 42 | 0.34 | 0.13 |
| Docket 50-206, -361, -362; | 1970 | 365.9 | | 251 | 155 | 0.62 | 0.42 |
| DPR-13, NPF-10, NPF-15 | 1971 | 362.1 | | 121 | 50 | 0.41 | 0.14 |
| 1st commercial operation | 1972 | 338.5 | | 326 | 256 | 0.79 | 0.76 |
| 1/68, 8/83, 4/84 | 1973 | 273.7 | | 570 | 353 | 0.62 | 1.29 |
| Type - PWRs | 1974 | 377.8 | 86.1 | 219 | 71 | 0.32 | 0.19 |
| Capacity - (436), 1070, | 1975 | 389.0 | 87.4 | 424 | 292 | 0.69 | 0.75 |
| 1080 MWe | 1976 | 297.9 | 70.2 | 1,330 | 880 | 0.66 | 2.95 |
| | 1977 | 281.2 | 63.7 | 985 | 847 | 0.86 | 3.01 |
| | 1978 | 323.2 | 80.2 | 764 | 401 | 0.52 | 1.24 |
| | 1979 | 401.0 | 90.2 | 521 | 139 | 0.27 | 0.35 |
| | 1980 | 97.3 | 22.3 | 3,063 | 2,386 | 0.78 | 24.52 |
| | 1981 | 95.9 | 26.7 | 2,902 | 3,223 | 1.11 | 33.61 |
| | 1982 | 61.6 | 15.7 | 3,055 | 832 | 0.27 | 13.51 |
| | 1983 | 0.0 | 0.0 | 1,701 | 155 | 0.09 | --- |

[13] San Onofre 1 was shut down 11/92 and is no longer in the count of operating reactors. Parentheses indicate plant capacity when plant was operational.

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **SAN ONOFRE 1[13], 2, 3** (continued) | 1984 | 670.4 | 68.3 | 7,514 | 986 | 0.27 | 1.47 |
| | 1985 | 1,381.8 | 132.9 | 5,742 | 722 | 0.24 | 0.52 |
| | 1986 | 1,698.2 | 61.1 | 3,594 | 824 | 0.24 | 0.49 |
| | 1987 | 1,983.0 | 78.8 | 2,138 | 696 | 0.33 | 0.35 |
| | 1988 | 1,982.3 | 68.4 | 2,324 | 781 | 0.34 | 0.39 |
| | 1989 | 1,840.8 | 64.9 | 2,237 | 567 | 0.25 | 0.31 |
| | 1990 | 1,980.5 | 69.1 | 2,224 | 885 | 0.40 | 0.45 |
| | 1991 | 1,987.6 | 75.3 | 1,814 | 412 | 0.23 | 0.21 |
| | 1992 | 2,228.6 | 87.1 | 1,651 | 324 | 0.20 | 0.15 |
| | 1993 | 1,771.3 | 79.9 | 2,193 | 767 | 0.35 | 0.43 |
| | 1994 | 2,220.7 | 100.0 | 528 | 32 | 0.06 | 0.01 |
| | 1995 | 1,686.9 | 79.1 | 1,914 | 455 | 0.24 | 0.27 |
| | 1996 | 2,089.3 | 93.2 | 1,272 | 129 | 0.10 | 0.06 |
| | 1997 | 1,533.9 | 72.9 | 1,652 | 341 | 0.21 | 0.22 |
| | 1998 | 1,996.4 | 92.0 | 1,091 | 196 | 0.18 | 0.10 |
| **SAN ONOFRE 1[13]** Docket 50-206; DPR-13, 1st commercial operation 1/68 Type - PWR Capacity - (436) MWe | 1999 | 0.0 | 0.0 | 241 | 16 | 0.07 | --- |
| | 2000 | 0.0 | 0.0 | 416 | 71 | 0.17 | --- |
| | 2001 | 0.0 | 0.0 | 338 | 58 | 0.17 | --- |
| **SAN ONOFRE 2, 3** Docket 50-361, -362; NPF-10, NPF-15 1st commercial operation 8/83, 4/84 Type - PWRs Capacity - 1070, 1080 MWe | 1999 | 1,901.4 | 86.9 | 1,477 | 354 | 0.24 | 0.19 |
| | 2000 | 2,067.2 | 94.7 | 1,073 | 115 | 0.11 | 0.06 |
| | 2001 | 1,727.2 | 78.9 | 1,083 | 131 | 0.12 | 0.08 |
| **SEABROOK** Docket 50-443; NPF-86 1st commercial operation 8/90 Type - PWR Capacity - 1155 Mwe | 1991 | 810.4 | 75.9 | 699 | 92 | 0.13 | 0.11 |
| | 1992 | 932.4 | 81.3 | 806 | 147 | 0.18 | 0.16 |
| | 1993 | 1,071.5 | 93.6 | 110 | 6 | 0.05 | 0.01 |
| | 1994 | 736.4 | 63.5 | 852 | 113 | 0.13 | 0.15 |
| | 1995 | 995.5 | 87.5 | 800 | 102 | 0.13 | 0.10 |
| | 1996 | 1,168.6 | 99.6 | 206 | 10 | 0.05 | 0.01 |
| | 1997 | 907.0 | 79.8 | 1,571 | 186 | 0.12 | 0.21 |
| | 1998 | 957.6 | 84.5 | 559 | 19 | 0.03 | 0.02 |
| | 1999 | 991.5 | 87.5 | 1,339 | 106 | 0.08 | 0.11 |
| | 2000 | 901.8 | 79.3 | 1,158 | 70 | 0.06 | 0.08 |
| | 2001 | 989.6 | 89.1 | 423 | 9 | 0.02 | 0.01 |
| **SEQUOYAH 1, 2** Docket 50-327, -328; DPR-77, -79 1st commercial operation 7/81, 6/82 Type - PWR Capacity - 1122, 1117 MWe | 1982 | 583.5 | 52.8 | 1,968 | 570 | 0.29 | 0.98 |
| | 1983 | 1,663.7 | 75.1 | 1,769 | 491 | 0.28 | 0.30 |
| | 1984 | 1,481.9 | 69.0 | 2,373 | 1,119 | 0.47 | 0.76 |
| | 1985 | 1,151.3 | 51.3 | 1,853 | 1,072 | 0.58 | 0.93 |
| | 1986 | 0.0 | 0.0 | 1,738 | 527 | 0.30 | --- |
| | 1987 | 0.0 | 0.0 | 2,080 | 420 | 0.20 | --- |
| | 1988 | 490.8 | 31.8 | 2,441 | 678 | 0.28 | 1.38 |
| | 1989 | 1,851.7 | 85.7 | 2,007 | 657 | 0.33 | 0.35 |
| | 1990 | 1,662.6 | 77.2 | 2,935 | 1,687 | 0.57 | 1.01 |
| | 1991 | 1,965.4 | 88.0 | 1,933 | 700 | 0.36 | 0.36 |
| | 1992 | 1,849.0 | 85.4 | 1,714 | 465 | 0.27 | 0.25 |
| | 1993 | 405.7 | 21.8 | 1,631 | 373 | 0.23 | 0.92 |
| | 1994 | 1,418.7 | 66.3 | 1,702 | 295 | 0.17 | 0.21 |
| | 1995 | 1,864.2 | 86.1 | 1,650 | 368 | 0.22 | 0.20 |
| | 1996 | 2,003.9 | 87.9 | 1,444 | 269 | 0.19 | 0.13 |
| | 1997 | 1,946.1 | 89.0 | 1,962 | 420 | 0.21 | 0.22 |

[13] San Onofre 1 was shut down 11/92 and is no longer in the count of operating reactors. Parentheses indicate plant capacity when plant was operational.

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **SEQUOYAH 1, 2** | 1998 | 2,135.3 | 95.3 | 1,530 | 266 | 0.17 | 0.12 |
| (continued) | 1999 | 2,165.1 | 97.0 | 1,346 | 165 | 0.12 | 0.08 |
| | 2000 | 1,910.0 | 86.8 | 2,039 | 357 | 0.18 | 0.19 |
| | 2001 | 2,158.3 | 95.7 | 1,292 | 145 | 0.11 | 0.07 |
| **SOUTH TEXAS 1, 2** | 1989 | 769.3 | 65.6 | 989 | 161 | 0.16 | 0.21 |
| Docket 50-498, 50-499; | 1990 | 1,504.1 | 65.9 | 1,136 | 206 | 0.18 | 0.14 |
| NPF -76,-80 | 1991 | 1,741.5 | 72.4 | 1,144 | 257 | 0.22 | 0.15 |
| 1st commercial operation | 1992 | 2,096.0 | 83.8 | 923 | 147 | 0.16 | 0.07 |
| 8/88, 6/89 | 1993 | 163.1 | 8.3 | 1,138 | 251 | 0.22 | 1.54 |
| Type - PWRs | 1994 | 1,700.2 | 70.6 | 661 | 47 | 0.07 | 0.03 |
| Capacity - 1251, 1251 MWe | 1995 | 2,294.2 | 89.9 | 1,485 | 291 | 0.20 | 0.13 |
| | 1996 | 2,465.9 | 95.0 | 1,145 | 137 | 0.12 | 0.06 |
| | 1997 | 2,265.5 | 93.6 | 1,583 | 273 | 0.17 | 0.12 |
| | 1998 | 2,379.4 | 96.9 | 1,171 | 184 | 0.16 | 0.08 |
| | 1999 | 2,219.7 | 91.6 | 1,328 | 260 | 0.20 | 0.12 |
| | 2000 | 2,180.0 | 89.7 | 1,372 | 232 | 0.17 | 0.11 |
| | 2001 | 2,262.7 | 92.2 | 1,325 | 238 | 0.18 | 0.11 |
| **ST. LUCIE 1, 2** | 1977 | 649.1 | 84.7 | 445 | 152 | 0.34 | 0.23 |
| Docket 50-335, -389; | 1978 | 606.4 | 76.5 | 797 | 337 | 0.42 | 0.56 |
| DPR-67; NPF-16 | 1979 | 592.0 | 74.0 | 907 | 438 | 0.48 | 0.74 |
| 1st commercial operation | 1980 | 627.9 | 77.5 | 1,074 | 532 | 0.50 | 0.85 |
| 12/76, 8/83 | 1981 | 599.1 | 72.7 | 1,473 | 929 | 0.63 | 1.55 |
| Type - PWRs | 1982 | 816.8 | 94.0 | 1,045 | 272 | 0.26 | 0.33 |
| Capacity - 839, 839 MWe | 1983 | 290.3 | 15.4 | 2,211 | 1,204 | 0.54 | 4.15 |
| | 1984 | 1,183.0 | 69.6 | 2,090 | 1,263 | 0.60 | 1.07 |
| | 1985 | 1,445.8 | 82.5 | 1,971 | 1,344 | 0.68 | 0.93 |
| | 1986 | 1,588.6 | 89.1 | 1,279 | 491 | 0.38 | 0.31 |
| | 1987 | 1,407.9 | 81.9 | 2,012 | 951 | 0.47 | 0.68 |
| | 1988 | 1,639.7 | 93.0 | 1,448 | 611 | 0.42 | 0.37 |
| | 1989 | 1,493.1 | 85.1 | 1,414 | 495 | 0.35 | 0.33 |
| | 1990 | 1,188.4 | 70.0 | 1,876 | 777 | 0.41 | 0.65 |
| | 1991 | 1,592.8 | 90.8 | 1,282 | 479 | 0.37 | 0.30 |
| | 1992 | 1,511.9 | 87.3 | 1,251 | 264 | 0.21 | 0.17 |
| | 1993 | 1,227.6 | 77.7 | 1,462 | 492 | 0.34 | 0.40 |
| | 1994 | 1,424.8 | 85.0 | 1,896 | 505 | 0.27 | 0.35 |
| | 1995 | 1,306.6 | 76.0 | 1,498 | 413 | 0.28 | 0.32 |
| | 1996 | 1,473.4 | 86.5 | 1,433 | 385 | 0.27 | 0.26 |
| | 1997 | 1,394.6 | 83.6 | 2,314 | 646 | 0.28 | 0.46 |
| | 1998 | 1,572.5 | 94.2 | 1,170 | 134 | 0.11 | 0.09 |
| | 1999 | 1,569.1 | 93.8 | 1,107 | 177 | 0.16 | 0.11 |
| | 2000 | 1,630.0 | 96.0 | 990 | 99 | 0.10 | 0.06 |
| | 2001 | 1,527.5 | 91.6 | 1,375 | 228 | 0.17 | 0.15 |
| **SUMMER 1** | 1984 | 504.6 | 61.1 | 1,120 | 295 | 0.26 | 0.58 |
| Docket 50-395; NPF-12 | 1985 | 627.7 | 71.6 | 1,201 | 379 | 0.32 | 0.60 |
| 1st commercial operation 1/84 | 1986 | 853.7 | 95.3 | 392 | 23 | 0.06 | 0.03 |
| Type - PWR | 1987 | 618.7 | 71.0 | 1,075 | 560 | 0.52 | 0.91 |
| Capacity - 966 MWe | 1988 | 605.3 | 69.1 | 1,127 | 511 | 0.45 | 0.84 |
| | 1989 | 652.4 | 83.1 | 374 | 52 | 0.14 | 0.08 |
| | 1990 | 730.0 | 83.9 | 1,090 | 376 | 0.34 | 0.52 |
| | 1991 | 642.5 | 82.9 | 984 | 291 | 0.30 | 0.45 |
| | 1992 | 892.6 | 97.4 | 249 | 27 | 0.11 | 0.03 |
| | 1993 | 728.3 | 84.0 | 1,121 | 297 | 0.26 | 0.41 |
| | 1994 | 536.7 | 69.5 | 1,549 | 374 | 0.24 | 0.70 |
| | 1995 | 899.8 | 97.2 | 257 | 13 | 0.05 | 0.01 |
| | 1996 | 850.4 | 90.3 | 701 | 97 | 0.14 | 0.11 |
| | 1997 | 829.7 | 89.8 | 820 | 163 | 0.20 | 0.20 |
| | 1998 | 934.8 | 98.8 | 285 | 14 | 0.05 | 0.01 |
| | 1999 | 842.0 | 89.4 | 827 | 120 | 0.15 | 0.14 |
| | 2000 | 723.9 | 76.6 | 933 | 167 | 0.18 | 0.23 |
| | 2001 | 769.3 | 83.3 | 486 | 69 | 0.14 | 0.09 |

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **SURRY 1, 2** | 1973 | 420.6 | | 936 | 152 | 0.16 | 0.36 |
| Docket 50-280, 50-281; | 1974 | 717.4 | 49.8 | 1,715 | 884 | 0.52 | 1.23 |
| DPR-32, -37 | 1975 | 1,079.0 | 70.8 | 1,948 | 1,649 | 0.85 | 1.53 |
| 1st commercial operation | 1976 | 930.7 | 60.4 | 2,753 | 3,165 | 1.15 | 3.40 |
| 12/72, 5/73 | 1977 | 1,139.0 | 72.2 | 1,860 | 2,307 | 1.24 | 2.03 |
| Type - PWRs | 1978 | 1,210.6 | 77.2 | 2,203 | 1,837 | 0.83 | 1.52 |
| Capacity - 810, 815 MWe | 1979 | 343.0 | 42.3 | 5,065 | 3,584 | 0.71 | 10.45 |
| | 1980 | 568.2 | 40.3 | 5,317 | 3,836 | 0.72 | 6.75 |
| | 1981 | 907.6 | 59.3 | 3,753 | 4,244 | 1.13 | 4.68 |
| | 1982 | 1,323.3 | 88.5 | 1,878 | 1,490 | 0.79 | 1.13 |
| | 1983 | 916.2 | 61.3 | 2,754 | 3,220 | 1.17 | 3.51 |
| | 1984 | 1,026.7 | 71.0 | 3,198 | 2,247 | 0.70 | 2.19 |
| | 1985 | 1,166.4 | 78.2 | 3,206 | 1,815 | 0.57 | 1.56 |
| | 1986 | 1,080.5 | 69.0 | 3,763 | 2,356 | 0.63 | 2.18 |
| | 1987 | 1,132.7 | 72.7 | 2,675 | 712 | 0.27 | 0.63 |
| | 1988 | 750.4 | 50.0 | 3,184 | 1,542 | 0.48 | 2.05 |
| | 1989 | 489.3 | 33.0 | 3,100 | 836 | 0.27 | 1.71 |
| | 1990 | 1,276.4 | 83.9 | 1,947 | 575 | 0.30 | 0.45 |
| | 1991 | 1,271.9 | 84.5 | 1,547 | 510 | 0.33 | 0.40 |
| | 1992 | 1,396.3 | 88.9 | 1,660 | 539 | 0.32 | 0.39 |
| | 1993 | 1,283.1 | 84.6 | 1,402 | 383 | 0.27 | 0.30 |
| | 1994 | 1,320.9 | 85.2 | 1,530 | 378 | 0.25 | 0.29 |
| | 1995 | 1,333.0 | 84.2 | 1,883 | 406 | 0.22 | 0.30 |
| | 1996 | 1,562.9 | 93.1 | 983 | 209 | 0.21 | 0.13 |
| | 1997 | 1,380.3 | 87.1 | 1,335 | 320 | 0.24 | 0.23 |
| | 1998 | 1,476.2 | 91.6 | 1,165 | 189 | 0.16 | 0.13 |
| | 1999 | 1,483.0 | 93.5 | 995 | 138 | 0.14 | 0.09 |
| | 2000 | 1,490.0 | 92.7 | 1,197 | 193 | 0.16 | 0.13 |
| | 2001 | 1,441.5 | 89.5 | 1,243 | 329 | 0.26 | 0.23 |
| **SUSQUEHANNA 1, 2** | 1984 | 719.9 | 72.6 | 2,827 | 308 | 0.11 | 0.43 |
| Docket 50-387, 50-388; | 1985 | 1,452.2 | 76.4 | 3,669 | 1,106 | 0.30 | 0.76 |
| NPF-14; NPF-22 | 1986 | 1,344.8 | 67.0 | 2,996 | 828 | 0.28 | 0.62 |
| 1st commercial operation | 1987 | 1,749.5 | 85.3 | 2,548 | 621 | 0.24 | 0.35 |
| 6/83, 2/85 | 1988 | 1,691.0 | 83.5 | 1,904 | 516 | 0.27 | 0.31 |
| Type - BWRs | 1989 | 1,572.5 | 77.1 | 2,063 | 704 | 0.34 | 0.45 |
| Capacity - 1090, 1111 MWe | 1990 | 1,746.9 | 85.4 | 1,691 | 440 | 0.26 | 0.25 |
| | 1991 | 1,878.0 | 89.8 | 1,844 | 507 | 0.27 | 0.27 |
| | 1992 | 1,604.2 | 79.7 | 1,885 | 724 | 0.38 | 0.45 |
| | 1993 | 1,602.1 | 77.3 | 1,488 | 335 | 0.23 | 0.21 |
| | 1994 | 1,814.4 | 85.4 | 1,580 | 442 | 0.28 | 0.24 |
| | 1995 | 1,850.8 | 85.3 | 1,773 | 476 | 0.27 | 0.26 |
| | 1996 | 1,998.7 | 90.7 | 1,430 | 289 | 0.20 | 0.14 |
| | 1997 | 1,918.9 | 89.6 | 1,646 | 433 | 0.26 | 0.23 |
| | 1998 | 1,879.6 | 88.3 | 1,575 | 361 | 0.23 | 0.19 |
| | 1999 | 1,896.0 | 89.6 | 1,787 | 431 | 0.24 | 0.23 |
| | 2000 | 1,994.6 | 92.6 | 1,812 | 331 | 0.18 | 0.17 |
| | 2001 | 2,027.6 | 94.2 | 1,807 | 288 | 0.16 | 0.14 |

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **THREE MILE ISLAND 1[14], 2[15]** | 1975 | 675.9 | 82.2 | 131 | 73 | 0.56 | 0.11 |
| Docket 50-289, -320; | 1976 | 530.0 | 65.4 | 819 | 286 | 0.35 | 0.54 |
| DPR-50, -73 | 1977 | 664.5 | 80.9 | 1,122 | 360 | 0.32 | 0.54 |
| 1st commercial operation | 1978 | 690.0 | 85.1 | 1,929 | 504 | 0.26 | 0.73 |
| 9/74, 12/78 | 1979 | 266.0 | 21.9 | 3,975 | 1,392 | 0.35 | 5.23 |
| Type - PWRs | 1980 | 0.0 | 0.0 | 2,328 | 394 | 0.17 | --- |
| Capacity - 786, (880) MWe | 1981 | 0.0 | 0.0 | 2,103 | 376 | 0.18 | --- |
| | 1982 | 0.0 | 0.0 | 2,123 | 1,004 | 0.47 | --- |
| | 1983 | 0.0 | 0.0 | 1,592 | 1,159 | 0.73 | --- |
| | 1984 | 0.0 | 0.0 | 1,079 | 688 | 0.64 | --- |
| | 1985 | 103.6 | 10.6 | 1,890 | 857 | 0.45 | 8.27 |
| **THREE MILE ISLAND 1[14]** | 1986 | 585.2 | 70.9 | 1,360 | 213 | 0.16 | 0.36 |
| Docket 50-289; DPR-50 | 1987 | 610.7 | 73.6 | 1,259 | 149 | 0.12 | 0.24 |
| 1st commercial operation 9/74 | 1988 | 661.0 | 77.8 | 1,012 | 210 | 0.21 | 0.32 |
| Type - PWR | 1989 | 871.3 | 100.0 | 670 | 54 | 0.08 | 0.06 |
| Capacity - 786 MWe | 1990 | 645.5 | 84.6 | 1,319 | 264 | 0.20 | 0.41 |
| | 1991 | 688.7 | 86.4 | 1,542 | 198 | 0.13 | 0.29 |
| | 1992 | 836.8 | 100.0 | 558 | 34 | 0.06 | 0.04 |
| | 1993 | 722.0 | 88.5 | 1,835 | 206 | 0.11 | 0.29 |
| | 1994 | 798.7 | 95.5 | 434 | 40 | 0.09 | 0.05 |
| | 1995 | 772.9 | 90.8 | 1,220 | 213 | 0.17 | 0.28 |
| | 1996 | 857.4 | 100.0 | 267 | 16 | 0.06 | 0.02 |
| | 1997 | 675.7 | 84.3 | 1,049 | 204 | 0.19 | 0.30 |
| | 1998 | 805.8 | 100.0 | 280 | 17 | 0.06 | 0.02 |
| | 1999 | 722.4 | 89.7 | 1,171 | 155 | 0.13 | 0.21 |
| | 2000 | 813.4 | 100.0 | 183 | 9 | 0.05 | 0.01 |
| | 2001 | 616.7 | 84.2 | 1,196 | 197 | 0.16 | 0.32 |
| **THREE MILE ISLAND 2[15]** | 1986 | 0.0 | 0.0 | 1,497 | 915 | 0.61 | --- |
| Docket 50-320; DPR-73 | 1987 | 0.0 | 0.0 | 1,378 | 977 | 0.71 | --- |
| 1st commercial operation 12/78 | 1988 | 0.0 | 0.0 | 1,247 | 917 | 0.74 | --- |
| Type - PWR | 1989 | 0.0 | 0.0 | 1,014 | 639 | 0.63 | --- |
| Capacity - (880) MWe | 1990 | 0.0 | 0.0 | 484 | 136 | 0.28 | --- |
| | 1991 | 0.0 | 0.0 | 153 | 37 | 0.24 | --- |
| | 1992 | 0.0 | 0.0 | 315 | 157 | 0.50 | --- |
| | 1993 | 0.0 | 0.0 | 167 | 33 | 0.20 | --- |
| | 1994 | 0.0 | 0.0 | 259 | 7 | 0.03 | --- |
| | 1995 | 0.0 | 0.0 | 191 | 2 | 0.01 | --- |
| | 1996 | 0.0 | 0.0 | 122 | 2 | 0.02 | --- |
| | 1997 | 0.0 | 0.0 | 232 | 1 | 0.00 | --- |
| | 1998 | 0.0 | 0.0 | 105 | 1 | 0.01 | --- |
| | 1999 | 0.0 | 0.0 | 203 | 1 | 0.00 | --- |
| | 2000 | 0.0 | 0.0 | 70 | 0 | 0.01 | --- |
| | 2001 | 0.0 | 0.0 | 0 | 0 | | --- |
| **TROJAN[16]** | 1977 | 792.0 | 92.6 | 591 | 174 | 0.29 | 0.22 |
| Docket 50-344; NPF-1 | 1978 | 205.5 | 20.6 | 711 | 319 | 0.45 | 1.55 |
| 1st commercial operation 5/76 | 1979 | 631.0 | 58.1 | 736 | 258 | 0.35 | 0.41 |
| Type - PWR | 1980 | 727.5 | 72.5 | 1,159 | 421 | 0.36 | 0.58 |
| Capacity - (1080) MWe | 1981 | 775.6 | 74.1 | 1,311 | 609 | 0.46 | 0.79 |
| | 1982 | 579.5 | 60.8 | 977 | 419 | 0.43 | 0.72 |

[14] Three Mile Island 1 resumed commercial power generation 10/85 after being under regulatory restraint since 1979. Parentheses indicate plant capacity when plant was operational.

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

[16] Trojan ended commercial operation as of 1/93, and will not be put in commercial operation again. It is no longer in the count of operating reactors. Parentheses indicate plant capacity when plant was operational.

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **TROJAN** | 1983 | 494.2 | 62.4 | 969 | 307 | 0.32 | 0.62 |
| (continued) | 1984 | 567.0 | 54.4 | 1,042 | 433 | 0.42 | 0.76 |
| | 1985 | 829.1 | 76.7 | 852 | 363 | 0.43 | 0.44 |
| | 1986 | 852.4 | 79.7 | 1,321 | 381 | 0.29 | 0.45 |
| | 1987 | 525.5 | 54.0 | 1,209 | 363 | 0.30 | 0.69 |
| | 1988 | 758.6 | 67.5 | 1,408 | 401 | 0.28 | 0.53 |
| | 1989 | 666.8 | 61.9 | 1,360 | 421 | 0.31 | 0.63 |
| | 1990 | 732.4 | 66.3 | 1,169 | 258 | 0.22 | 0.35 |
| | 1991 | 181.6 | 16.1 | 1,496 | 567 | 0.38 | 3.12 |
| | 1992 | 553.9 | 68.4 | 567 | 84 | 0.15 | 0.15 |
| | 1993 | 0.0 | 68.4 | 54 | 21 | 0.39 | --- |
| | 1994 | 0.0 | 0.0 | 51 | 9 | 0.18 | --- |
| | 1995 | 0.0 | 0.0 | 141 | 44 | 0.31 | --- |
| | 1996 | 0.0 | 0.0 | 112 | 41 | 0.37 | --- |
| | 1997 | 0.0 | 0.0 | 227 | 41 | 0.18 | --- |
| | 1998 | 0.0 | 0.0 | 283 | 46 | 0.16 | --- |
| | 1999 | 0.0 | 0.0 | 274 | 52 | 0.19 | --- |
| | 2000 | 0.0 | 0.0 | 127 | 18 | 0.14 | --- |
| | 2001 | 0.0 | 0.0 | 14 | 1 | 0.08 | --- |
| **TURKEY POINT 3, 4** | 1973 | 401.9 | | 444 | 78 | 0.18 | 0.19 |
| Docket 50-250, 50-251; | 1974 | 953.6 | | 794 | 454 | 0.57 | 0.48 |
| DPR-31, -41 | 1975 | 1,003.7 | 74.9 | 1,176 | 876 | 0.74 | 0.87 |
| 1st commercial operation | 1976 | 974.2 | 71.2 | 1,647 | 1,184 | 0.72 | 1.22 |
| 12/72, 9/73 | 1977 | 979.5 | 72.1 | 1,319 | 1,036 | 0.79 | 1.06 |
| Type - PWRs | 1978 | 1,000.2 | 78.8 | 1,336 | 1,032 | 0.77 | 1.03 |
| Capacity - 693, 693 MWe | 1979 | 811.0 | 62.4 | 2,002 | 1,680 | 0.84 | 2.07 |
| | 1980 | 990.6 | 73.6 | 1,803 | 1,651 | 0.92 | 1.67 |
| | 1981 | 654.0 | 46.8 | 2,932 | 2,251 | 0.77 | 3.44 |
| | 1982 | 915.7 | 65.2 | 2,956 | 2,119 | 0.72 | 2.31 |
| | 1983 | 878.4 | 62.8 | 2,930 | 2,681 | 0.92 | 3.05 |
| | 1984 | 946.7 | 68.5 | 2,010 | 1,255 | 0.62 | 1.33 |
| | 1985 | 1,034.9 | 74.7 | 1,905 | 1,253 | 0.66 | 1.21 |
| | 1986 | 754.1 | 54.9 | 1,808 | 946 | 0.52 | 1.25 |
| | 1987 | 431.3 | 36.6 | 1,980 | 1,371 | 0.69 | 3.18 |
| | 1988 | 809.8 | 59.5 | 1,841 | 738 | 0.40 | 0.91 |
| | 1989 | 689.9 | 56.8 | 1,625 | 433 | 0.27 | 0.63 |
| | 1990 | 933.1 | 69.0 | 2,099 | 730 | 0.35 | 0.78 |
| | 1991 | 258.2 | 21.0 | 2,087 | 939 | 0.45 | 3.64 |
| | 1992 | 968.9 | 75.5 | 1,374 | 325 | 0.24 | 0.34 |
| | 1993 | 1,244.8 | 91.0 | 1,271 | 275 | 0.22 | 0.22 |
| | 1994 | 1,172.9 | 87.2 | 1,489 | 476 | 0.32 | 0.41 |
| | 1995 | 1,320.3 | 94.6 | 1,142 | 215 | 0.19 | 0.16 |
| | 1996 | 1,307.8 | 94.0 | 1,157 | 187 | 0.16 | 0.14 |
| | 1997 | 1,220.9 | 88.6 | 1,581 | 414 | 0.26 | 0.34 |
| | 1998 | 1,323.0 | 94.5 | 1,045 | 156 | 0.15 | 0.12 |
| | 1999 | 1,352.5 | 96.5 | 919 | 128 | 0.14 | 0.09 |
| | 2000 | 1,283.7 | 92.2 | 1,292 | 220 | 0.17 | 0.17 |
| | 2001 | 1,324.1 | 95.0 | 827 | 102 | 0.12 | 0.08 |
| **VERMONT YANKEE** | 1973 | 222.1 | | 244 | 85 | 0.35 | 0.38 |
| Docket 50-271; DPR-28 | 1974 | 303.5 | | 357 | 216 | 0.61 | 0.71 |
| 1st commercial operation 11/72 | 1975 | 429.0 | 87.8 | 282 | 153 | 0.54 | 0.36 |
| Type - BWR | 1976 | 389.6 | 77.1 | 815 | 411 | 0.50 | 1.05 |
| Capacity - 510 MWe | 1977 | 423.5 | 85.1 | 641 | 258 | 0.40 | 0.61 |
| | 1978 | 387.5 | 75.9 | 934 | 339 | 0.36 | 0.87 |
| | 1979 | 414.0 | 82.1 | 1,220 | 1,170 | 0.96 | 2.83 |
| | 1980 | 357.8 | 71.5 | 1,443 | 1,338 | 0.93 | 3.74 |
| | 1981 | 429.1 | 84.6 | 1,264 | 731 | 0.58 | 1.70 |
| | 1982 | 501.0 | 96.0 | 481 | 205 | 0.43 | 0.41 |
| | 1983 | 346.1 | 69.3 | 1,316 | 1,527 | 1.16 | 4.41 |

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **VERMONT YANKEE** | 1984 | 398.1 | 79.0 | 954 | 626 | 0.66 | 1.57 |
| (continued) | 1985 | 361.4 | 71.8 | 1,392 | 1,051 | 0.76 | 2.91 |
| | 1986 | 248.1 | 48.9 | 1,389 | 1,188 | 0.86 | 4.79 |
| | 1987 | 423.6 | 84.2 | 827 | 303 | 0.37 | 0.72 |
| | 1988 | 492.1 | 95.7 | 379 | 124 | 0.33 | 0.25 |
| | 1989 | 432.8 | 84.7 | 832 | 288 | 0.35 | 0.67 |
| | 1990 | 433.1 | 85.9 | 849 | 307 | 0.36 | 0.71 |
| | 1991 | 492.3 | 94.3 | 310 | 118 | 0.38 | 0.24 |
| | 1992 | 446.8 | 88.1 | 921 | 381 | 0.41 | 0.85 |
| | 1993 | 402.3 | 80.1 | 833 | 217 | 0.26 | 0.54 |
| | 1994 | 515.8 | 98.7 | 220 | 38 | 0.17 | 0.07 |
| | 1995 | 462.1 | 87.0 | 737 | 182 | 0.25 | 0.39 |
| | 1996 | 452.7 | 85.2 | 951 | 231 | 0.24 | 0.51 |
| | 1997 | 487.1 | 96.0 | 260 | 57 | 0.22 | 0.12 |
| | 1998 | 383.4 | 77.9 | 944 | 199 | 0.21 | 0.52 |
| | 1999 | 463.4 | 91.0 | 854 | 176 | 0.21 | 0.38 |
| | 2000 | 517.8 | 99.6 | 198 | 38 | 0.19 | 0.07 |
| | 2001 | 474.9 | 93.5 | 863 | 143 | 0.17 | 0.30 |
| **VOGTLE 1, 2** | 1988 | 820.4 | 77.7 | 1,108 | 138 | 0.12 | 0.17 |
| Docket 50-424; 50-425; | 1989 | 1,045.8 | 96.0 | 427 | 32 | 0.07 | 0.03 |
| NPF-68, -81 | 1990 | 1,710.9 | 82.7 | 1,602 | 466 | 0.29 | 0.27 |
| 1st commercial operation | 1991 | 1,966.5 | 89.2 | 1,357 | 362 | 0.27 | 0.18 |
| 6/87, 5/89 | 1992 | 2,047.9 | 90.0 | 1,262 | 426 | 0.34 | 0.21 |
| Type - PWRs | 1993 | 2,060.4 | 88.3 | 1,338 | 367 | 0.27 | 0.18 |
| Capacity - 1148, 1149 MWe | 1994 | 2,170.1 | 91.3 | 1,048 | 217 | 0.21 | 0.10 |
| | 1995 | 2,285.4 | 95.2 | 953 | 199 | 0.21 | 0.09 |
| | 1996 | 2,056.8 | 86.5 | 1,395 | 452 | 0.32 | 0.22 |
| | 1997 | 2,121.1 | 91.4 | 994 | 158 | 0.16 | 0.07 |
| | 1998 | 2,123.9 | 92.3 | 994 | 162 | 0.16 | 0.08 |
| | 1999 | 2,106.0 | 91.5 | 1,359 | 229 | 0.17 | 0.11 |
| | 2000 | 2,223.9 | 95.6 | 899 | 121 | 0.14 | 0.05 |
| | 2001 | 2,231.5 | 96.2 | 870 | 129 | 0.15 | 0.06 |
| **WATERFORD** | 1986 | 875.7 | 79.1 | 1,244 | 223 | 0.18 | 0.25 |
| Docket 50-382; NPF-38 | 1987 | 891.8 | 82.5 | 959 | 156 | 0.16 | 0.17 |
| 1st commercial operation 9/85 | 1988 | 784.3 | 75.4 | 1,246 | 259 | 0.21 | 0.33 |
| Type - PWR | 1989 | 909.8 | 82.6 | 1,306 | 265 | 0.20 | 0.29 |
| Capacity - 1075 MWe | 1990 | 1,027.9 | 92.8 | 432 | 47 | 0.11 | 0.05 |
| | 1991 | 870.6 | 79.8 | 1,301 | 364 | 0.28 | 0.42 |
| | 1992 | 909.6 | 83.2 | 1,213 | 226 | 0.19 | 0.25 |
| | 1993 | 1,088.3 | 99.4 | 195 | 15 | 0.08 | 0.01 |
| | 1994 | 949.1 | 87.0 | 1,167 | 191 | 0.16 | 0.20 |
| | 1995 | 927.4 | 83.4 | 1,092 | 153 | 0.14 | 0.16 |
| | 1996 | 1,064.8 | 94.2 | 342 | 27 | 0.08 | 0.03 |
| | 1997 | 767.2 | 71.2 | 1,186 | 148 | 0.13 | 0.19 |
| | 1998 | 984.1 | 91.9 | 282 | 24 | 0.09 | 0.02 |
| | 1999 | 849.5 | 79.6 | 833 | 123 | 0.15 | 0.14 |
| | 2000 | 965.1 | 88.8 | 825 | 132 | 0.16 | 0.14 |
| | 2001 | 1,086.0 | 99.6 | 91 | 5 | 0.05 | 0.00 |
| **WATTS BAR 1** | 1997 | 867.6 | 83.8 | 1,103 | 113 | 0.10 | 0.13 |
| Docket 50-390; NPF-90 | 1998 | 1,105.1 | 99.1 | 96 | 3 | 0.03 | 0.00 |
| 1st commercial operation 5/96 | 1999 | 943.1 | 87.2 | 975 | 99 | 0.10 | 0.10 |
| Type - PWR | 2000 | 1,033.3 | 92.8 | 1,053 | 122 | 0.12 | 0.12 |
| Capacity - 1125 MWe | 2001 | 1,095.9 | 96.5 | 197 | 6 | 0.03 | 0.01 |

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **WOLF CREEK 1** | 1986 | 832.8 | 73.3 | 682 | 143 | 0.21 | 0.17 |
| Docket 50-482; NPF-42 | 1987 | 778.8 | 71.1 | 675 | 138 | 0.20 | 0.18 |
| 1st commercial operation 9/85 | 1988 | 794.7 | 70.7 | 1,010 | 297 | 0.29 | 0.37 |
| Type - PWR | 1989 | 1,108.4 | 99.5 | 186 | 18 | 0.10 | 0.02 |
| Capacity - 1170 MWe | 1990 | 940.2 | 81.0 | 798 | 195 | 0.24 | 0.21 |
| | 1991 | 707.6 | 71.9 | 1,010 | 331 | 0.33 | 0.47 |
| | 1992 | 1,010.8 | 86.7 | 446 | 78 | 0.17 | 0.08 |
| | 1993 | 940.5 | 80.6 | 975 | 183 | 0.19 | 0.19 |
| | 1994 | 1,017.2 | 86.8 | 1,082 | 235 | 0.22 | 0.23 |
| | 1995 | 1,198.0 | 98.7 | 242 | 14 | 0.06 | 0.01 |
| | 1996 | 980.6 | 81.2 | 986 | 171 | 0.17 | 0.17 |
| | 1997 | 964.3 | 83.8 | 989 | 265 | 0.27 | 0.27 |
| | 1998 | 1,187.3 | 100.0 | 184 | 10 | 0.05 | 0.01 |
| | 1999 | 1,045.3 | 90.1 | 812 | 148 | 0.18 | 0.14 |
| | 2000 | 1,032.7 | 89.5 | 861 | 143 | 0.17 | 0.14 |
| | 2001 | 1,177.9 | 100.0 | 105 | 5 | 0.05 | 0.00 |
| **YANKEE ROWE**[17] | 1969 | 138.3 | | 193 | 215 | 1.11 | 1.55 |
| Docket 50-29; DPR-3 | 1970 | 146.1 | | 355 | 255 | 0.72 | 1.75 |
| 1st commercial operation 7/61 | 1971 | 173.5 | | 155 | 90 | 0.58 | 0.52 |
| Type - PWR | 1972 | 78.7 | | 282 | 255 | 0.90 | 3.24 |
| Capacity - (175) MWe | 1973 | 127.1 | | 133 | 99 | 0.74 | 0.78 |
| | 1974 | 111.3 | | 243 | 205 | 0.84 | 1.84 |
| | 1975 | 145.1 | 82.4 | 249 | 116 | 0.47 | 0.80 |
| | 1976 | 152.2 | 89.8 | 152 | 59 | 0.39 | 0.39 |
| | 1977 | 124.6 | 73.9 | 725 | 356 | 0.49 | 2.86 |
| | 1978 | 145.0 | 81.0 | 565 | 282 | 0.50 | 1.94 |
| | 1979 | 149.0 | 81.6 | 441 | 127 | 0.29 | 0.85 |
| | 1980 | 35.6 | 22.0 | 502 | 213 | 0.42 | 5.98 |
| | 1981 | 109.0 | 74.4 | 515 | 302 | 0.59 | 2.77 |
| | 1982 | 108.6 | 73.4 | 814 | 474 | 0.58 | 4.36 |
| | 1983 | 163.5 | 91.4 | 395 | 68 | 0.17 | 0.42 |
| | 1984 | 124.8 | 71.4 | 654 | 348 | 0.53 | 2.79 |
| | 1985 | 144.3 | 85.3 | 653 | 211 | 0.32 | 1.46 |
| | 1986 | 169.7 | 95.0 | 384 | 45 | 0.12 | 0.27 |
| | 1987 | 138.7 | 82.7 | 593 | 217 | 0.37 | 1.56 |
| | 1988 | 136.4 | 85.2 | 738 | 227 | 0.31 | 1.66 |
| | 1989 | 159.4 | 92.9 | 496 | 62 | 0.12 | 0.39 |
| | 1990 | 101.1 | 61.5 | 702 | 246 | 0.35 | 2.43 |
| | 1991 | 121.2 | 72.3 | 162 | 40 | 0.25 | 0.33 |
| | 1992 | 0.0 | 0.0 | 324 | 94 | 0.29 | --- |
| | 1993 | 0.0 | 0.0 | 313 | 163 | 0.52 | --- |
| | 1994 | 0.0 | 0.0 | 222 | 156 | 0.70 | --- |
| | 1995 | 0.0 | 0.0 | 191 | 78 | 0.41 | --- |
| | 1996 | 0.0 | 0.0 | 239 | 95 | 0.40 | --- |
| | 1997 | 0.0 | 0.0 | 323 | 65 | 0.20 | --- |
| | 1998 | 0.0 | 0.0 | 125 | 5 | 0.04 | --- |
| | 1999 | 0.0 | 0.0 | 83 | 2 | 0.02 | --- |
| | 2000 | 0.0 | 0.0 | 38 | 2 | 0.06 | --- |
| | 2001 | 0.0 | 0.0 | 48 | 4 | 0.08 | --- |

[17] Yankee Rowe ended commercial operation as of 10/91, and will not be put in commercial operation again. It is no longer in the count of operating reactors. Parentheses indicate plant capacity when plant was operational.

| Reporting Organization | Year | Megawatt Years MW-YR | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose | Average Measurable Dose (rems) | Collective Dose MW-yr |
|---|---|---|---|---|---|---|---|
| **ZION 1**[18]**, 2**[18] | 1974 | 425.3 | 71.1 | 306 | 56 | 0.18 | 0.13 |
| Docket 50-295; 50-304; | 1975 | 1,181.5 | 74.9 | 436 | 127 | 0.29 | 0.11 |
| DPR-39, -48 | 1976 | 1,134.9 | 61.9 | 774 | 571 | 0.74 | 0.50 |
| 1st commercial operation | 1977 | 1,358.6 | 75.0 | 784 | 1,003 | 1.28 | 0.74 |
| 12/73, 9/74 | 1978 | 1,613.5 | 80.2 | 1,104 | 1,017 | 0.92 | 0.63 |
| Type - PWRs | 1979 | 1,238.0 | 67.6 | 1,472 | 1,274 | 0.87 | 1.03 |
| Capacity - (1040), (1040) MWe | 1980 | 1,411.2 | 74.1 | 1,363 | 920 | 0.67 | 0.65 |
| | 1981 | 1,366.9 | 72.3 | 1,754 | 1,720 | 0.98 | 1.26 |
| | 1982 | 1,186.4 | 64.3 | 1,575 | 2,103 | 1.34 | 1.77 |
| | 1983 | 1,222.3 | 69.4 | 1,285 | 1,311 | 1.02 | 1.07 |
| | 1984 | 1,389.9 | 69.6 | 1,110 | 786 | 0.71 | 0.57 |
| | 1985 | 1,187.9 | 62.9 | 1,498 | 1,166 | 0.78 | 0.98 |
| | 1986 | 1,462.0 | 73.2 | 967 | 474 | 0.49 | 0.32 |
| | 1987 | 1,337.0 | 71.0 | 1,046 | 653 | 0.62 | 0.49 |
| | 1988 | 1,549.1 | 78.3 | 1,926 | 1,260 | 0.65 | 0.81 |
| | 1989 | 1,514.1 | 77.6 | 1,282 | 624 | 0.49 | 0.41 |
| | 1990 | 860.4 | 46.9 | 1,385 | 696 | 0.50 | 0.81 |
| | 1991 | 1,125.7 | 58.2 | 902 | 173 | 0.19 | 0.15 |
| | 1992 | 1,128.8 | 59.0 | 1,732 | 1,043 | 0.60 | 0.92 |
| | 1993 | 1,458.2 | 70.9 | 1,772 | 643 | 0.36 | 0.44 |
| | 1994 | 1,224.9 | 59.9 | 1,176 | 306 | 0.26 | 0.25 |
| | 1995 | 1,471.6 | 72.4 | 1,807 | 797 | 0.44 | 0.54 |
| | 1996 | 1,538.4 | 75.8 | 1,567 | 437 | 0.28 | 0.28 |
| | 1997 | 123.2 | 7.1 | 924 | 119 | 0.13 | 0.97 |
| | 1998 | 0.0 | 0.0 | 246 | 12 | 0.05 | --- |
| | 1999 | 0.0 | 0.0 | 67 | 4 | 0.06 | --- |
| | 2000 | 0.0 | 0.0 | 26 | 3 | 0.12 | --- |
| | 2001 | 0.0 | 0.0 | 6 | 0 | 0.05 | --- |

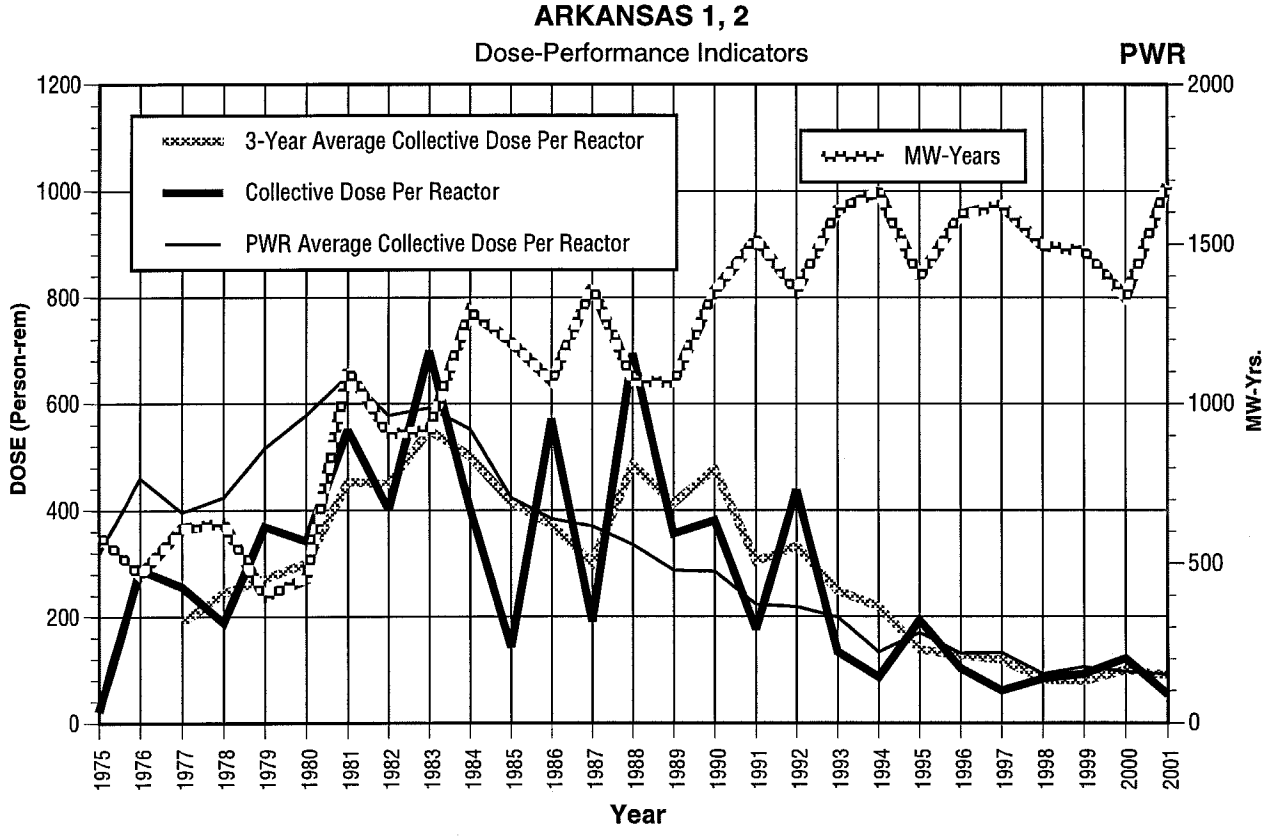
[18] Zion 1, 2 was shut down 12/97 and is no longer included in the count of operating reactors. Parentheses indicate plant capacity when plant was operational.

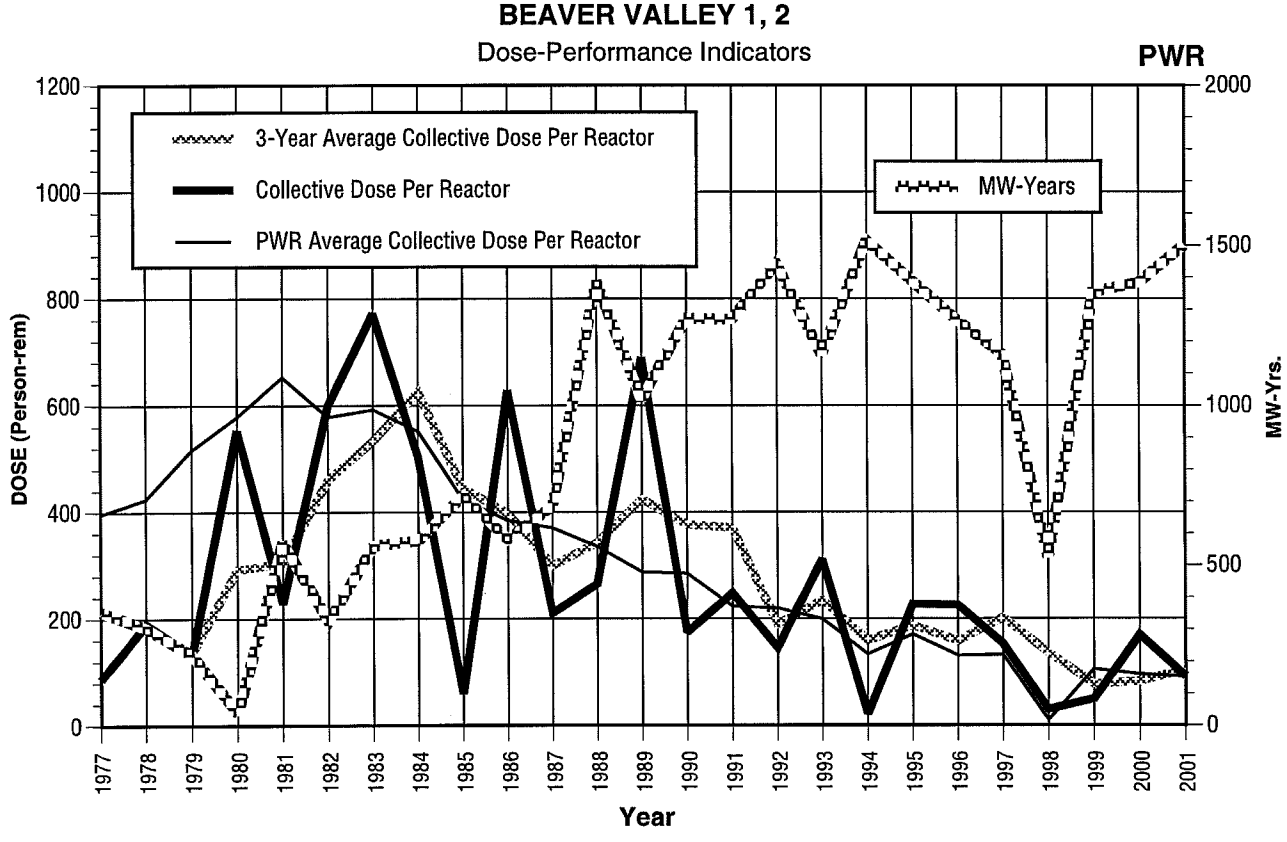
Appendix D

# DOSE PERFORMANCE INDICATORS BY REACTOR SITE

# 1973 - 2001

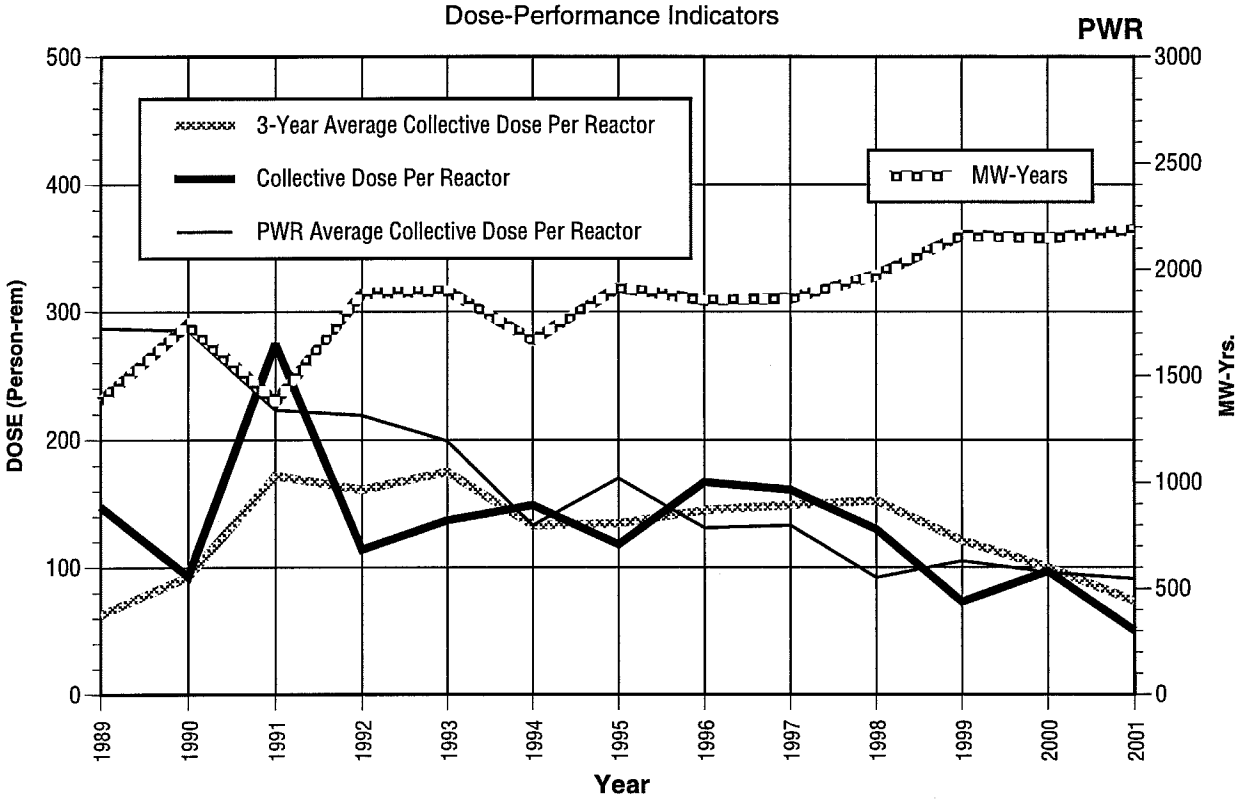
NOTE: Appendix D contains data on operating plants as well as plants which are no longer in commercial operation.


ARKANSAS 1, 2
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


BEAVER VALLEY 1, 2
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year

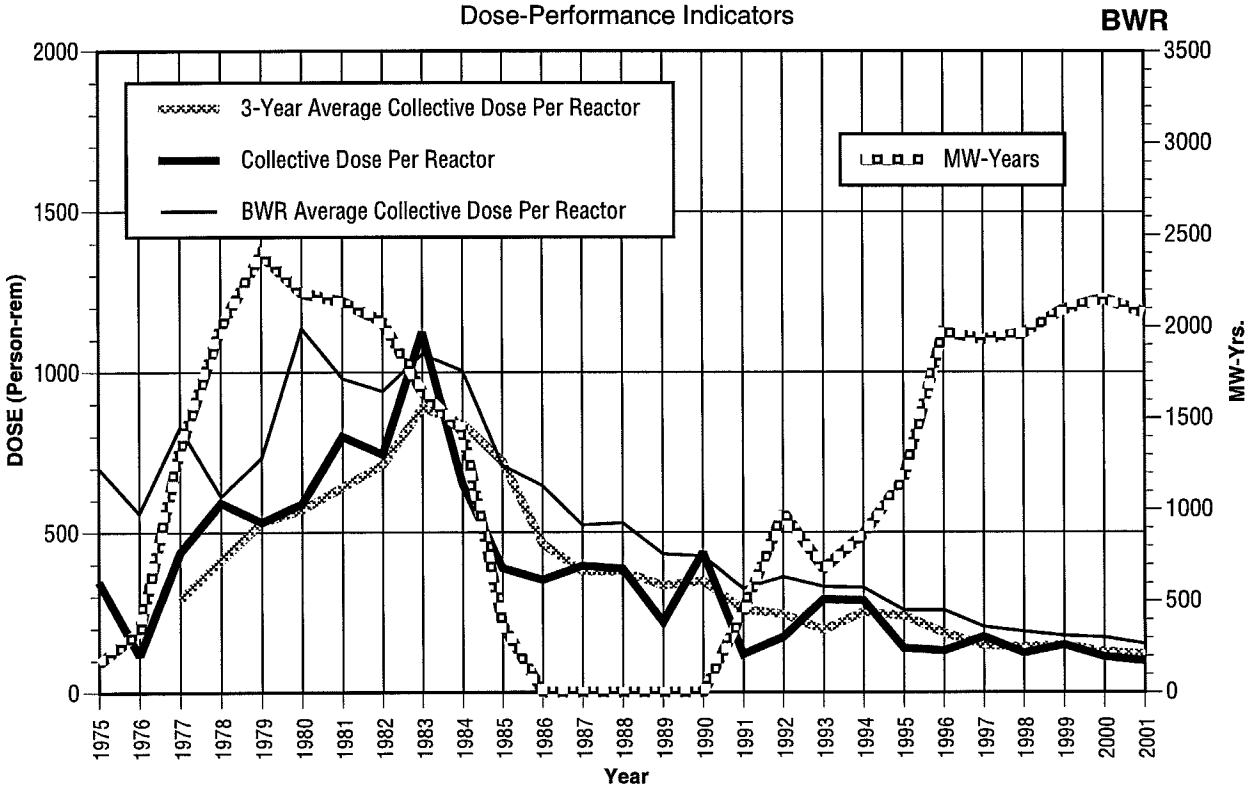
**BRAIDWOOD 1, 2**

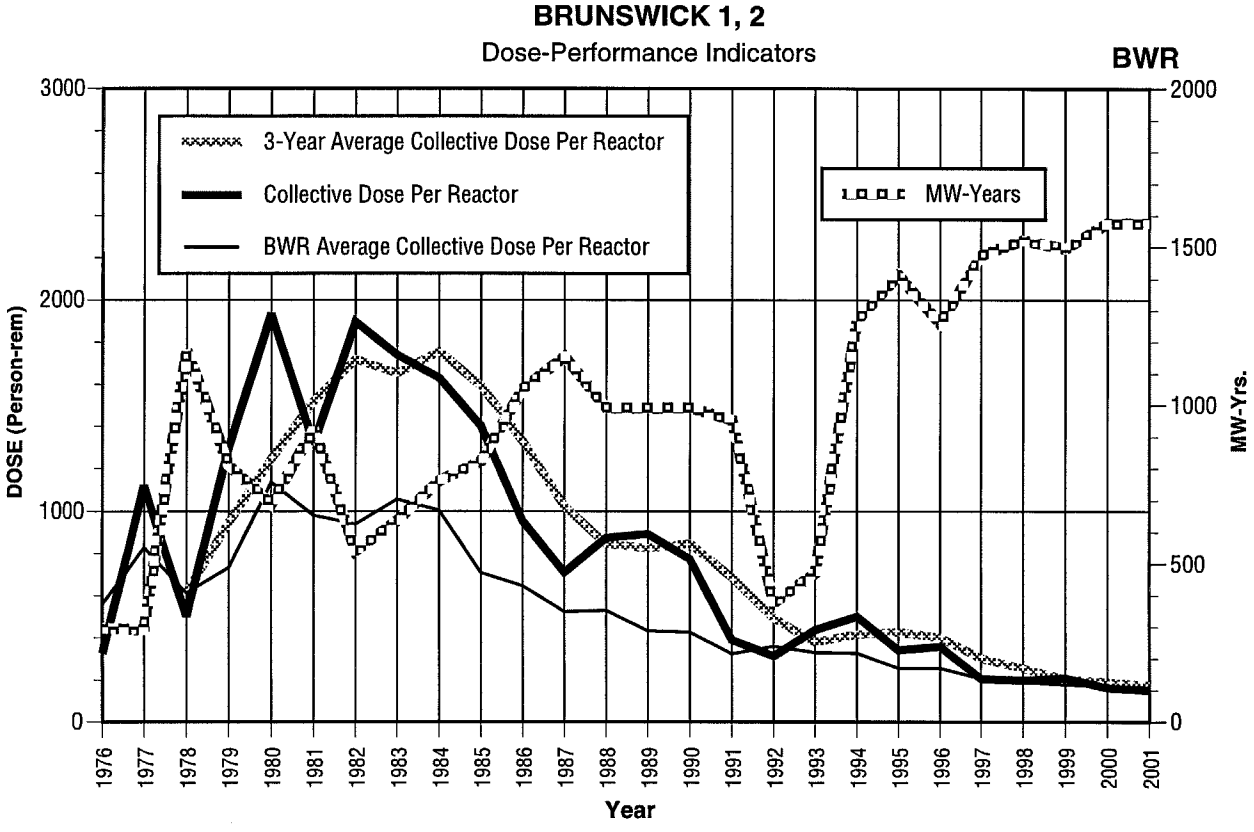
Dose-Performance Indicators

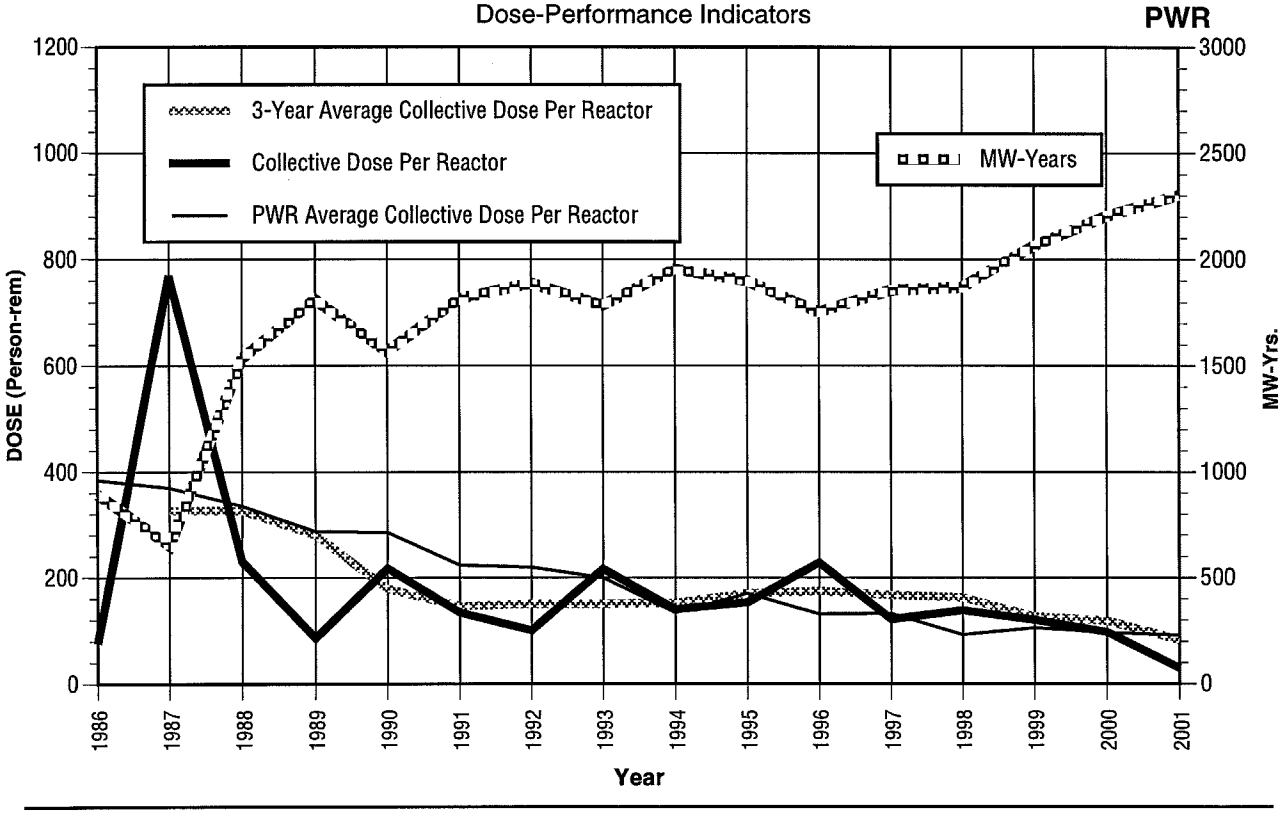



**BROWNS FERRY 1, 2, 3**

Dose-Performance Indicators



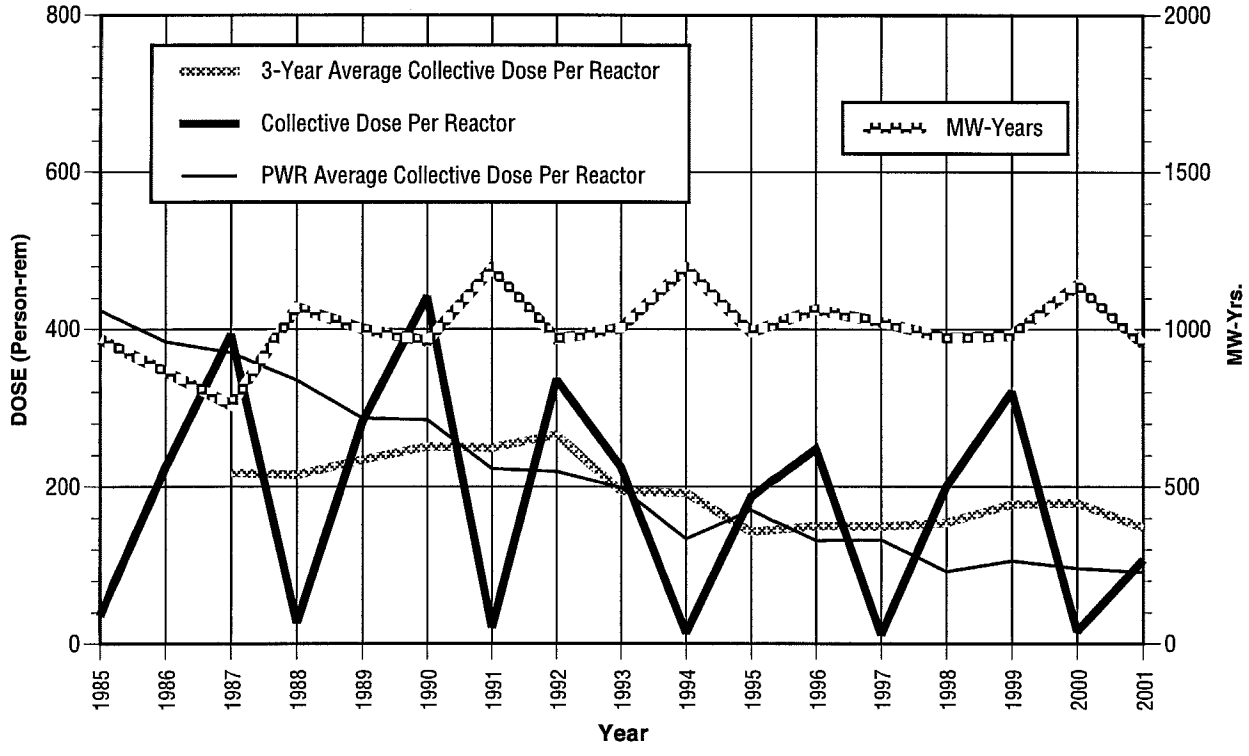

BRUNSWICK 1, 2
Dose-Performance Indicators
BWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
BWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year
0
1000
2000
3000
500
1500
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001


BYRON 1, 2
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year
0
200
400
600
800
1000
1200
500
1000
1500
2000
2500
3000
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001

## CALLAWAY 1

Dose-Performance Indicators

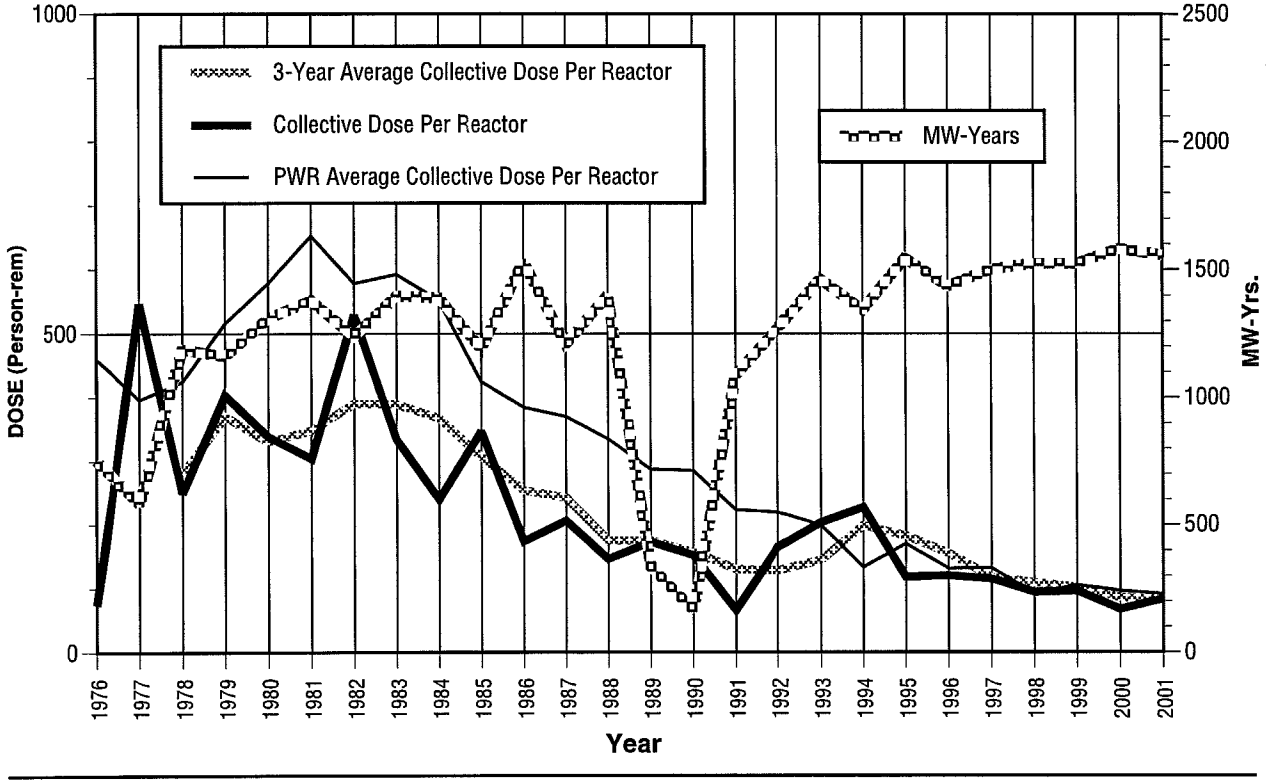
PWR

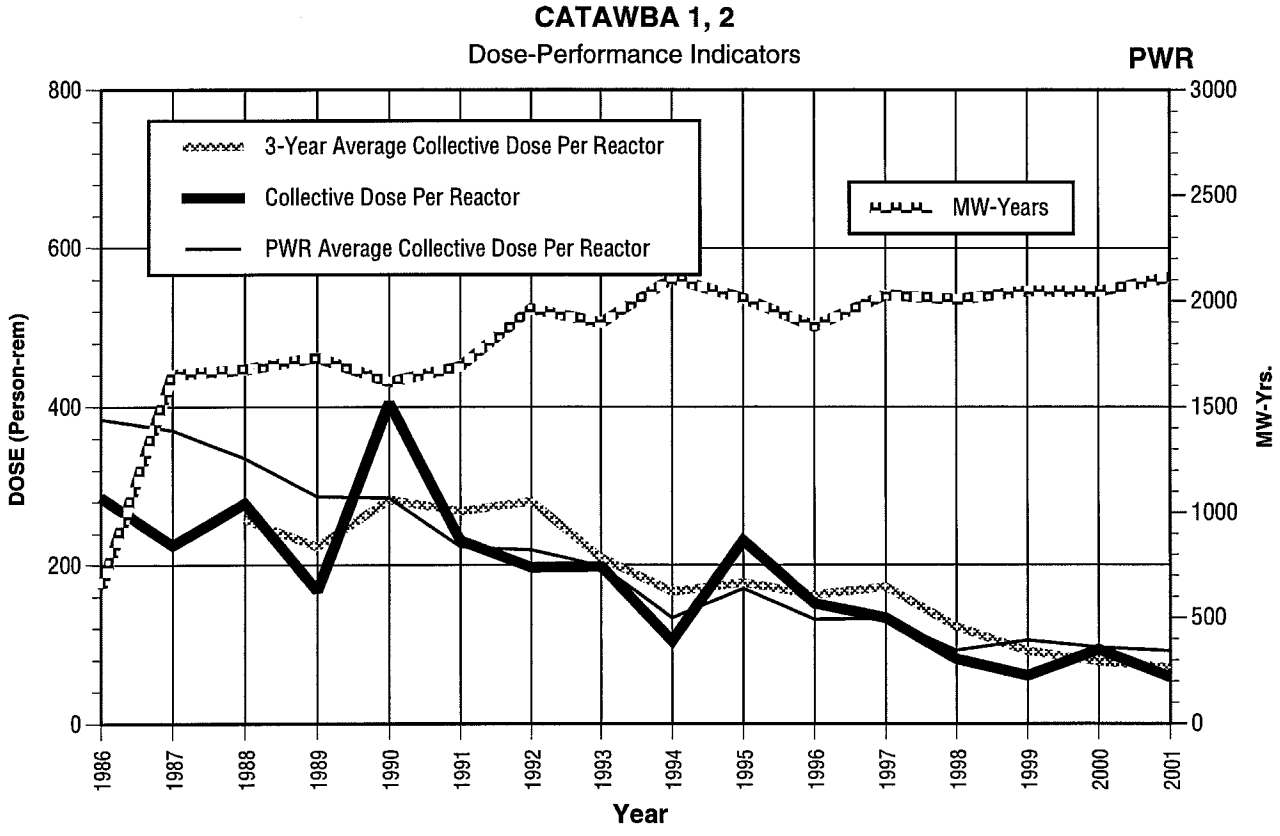


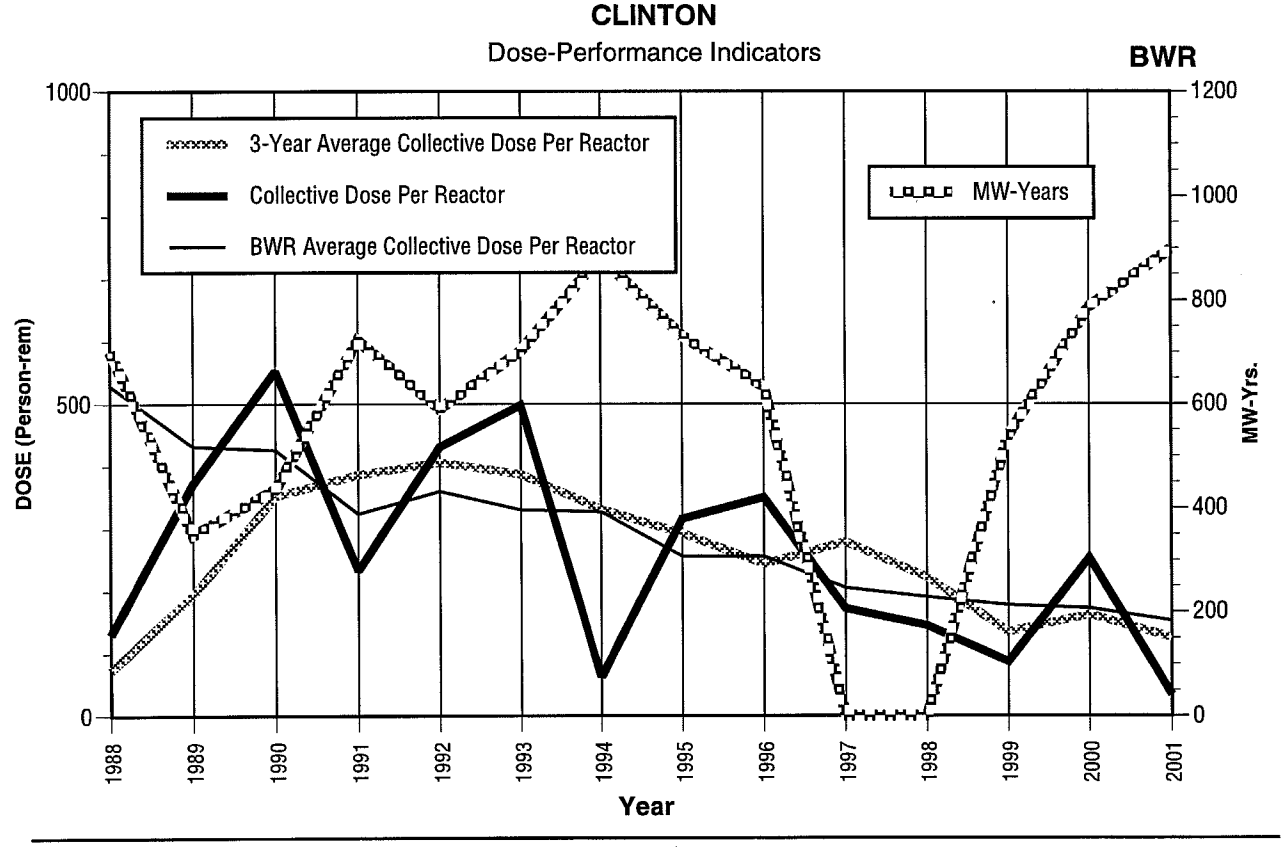

## CALVERT CLIFFS 1, 2

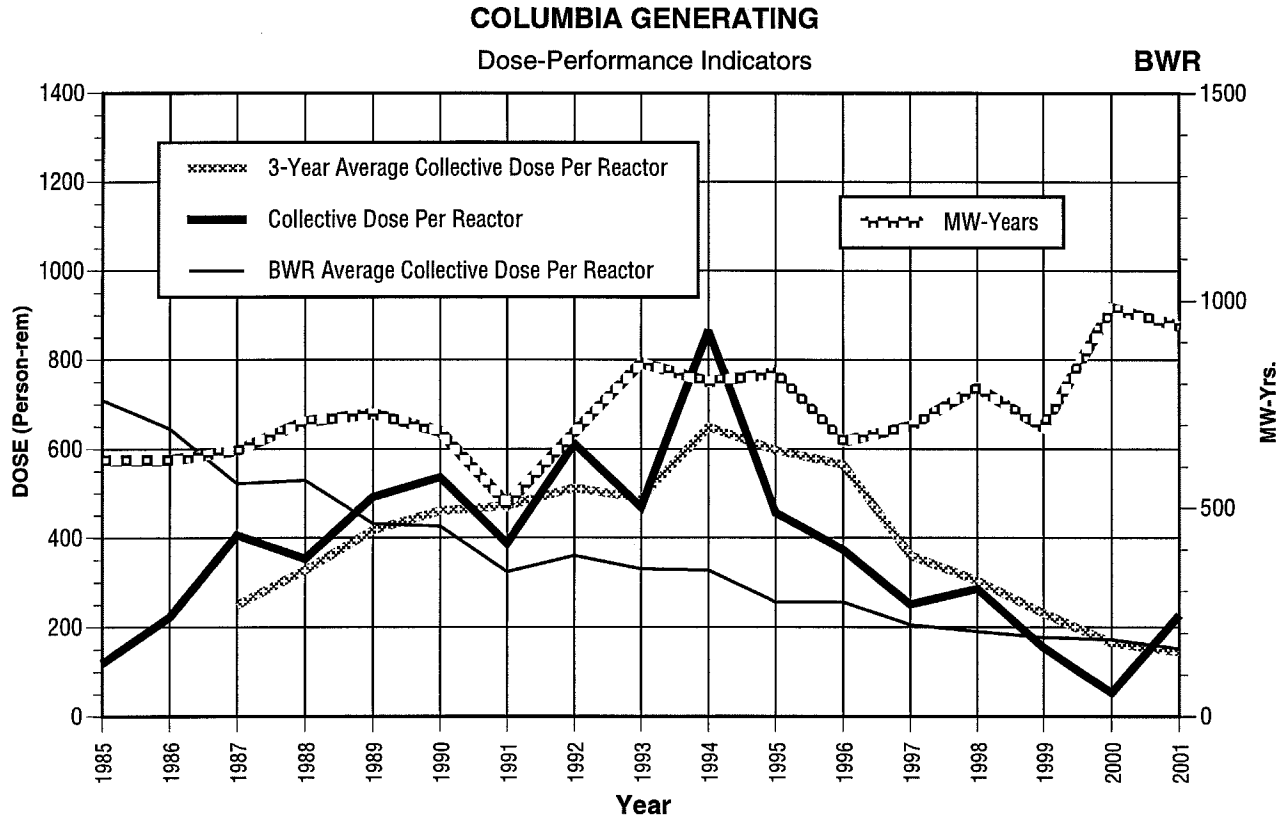
Dose-Performance Indicators

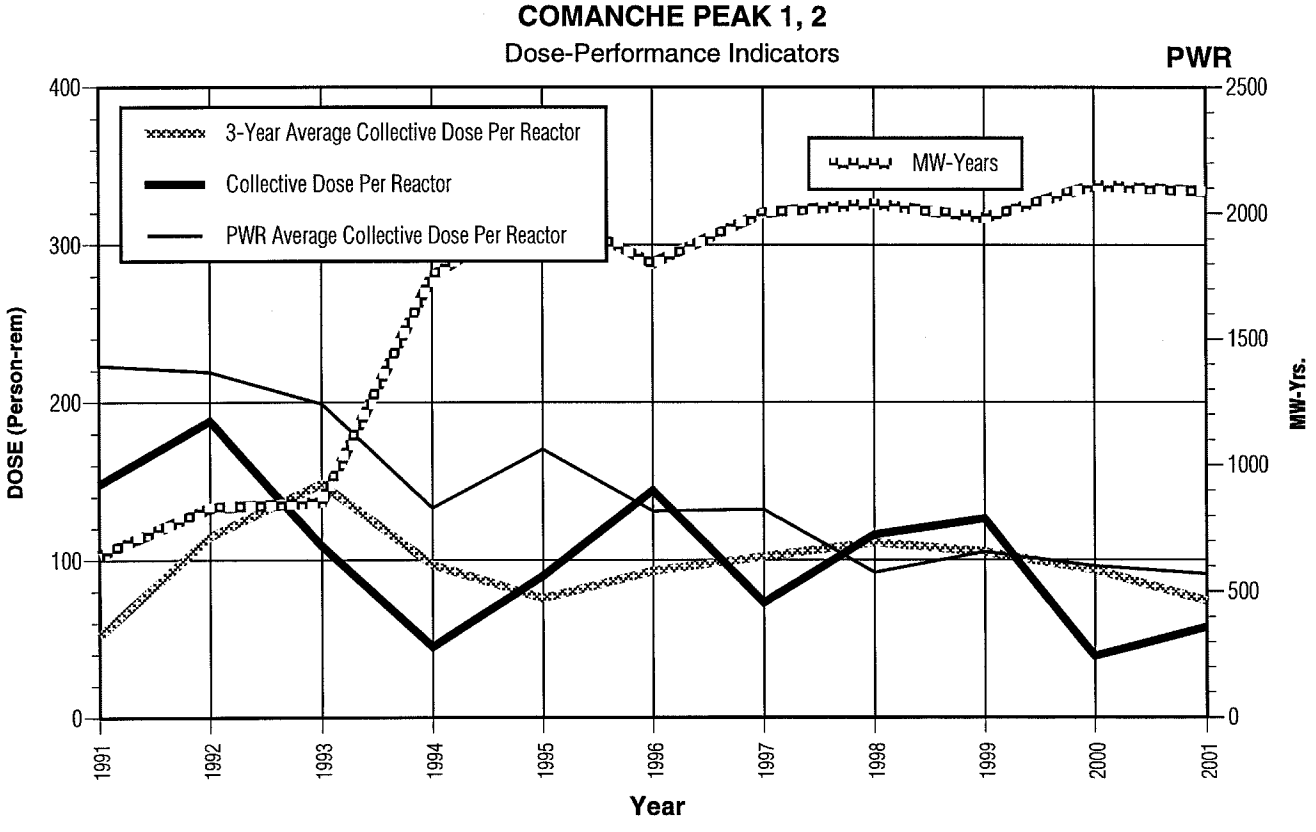
PWR




CATAWBA 1, 2
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year
0
200
400
600
800
500
1000
1500
2000
2500
3000
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001

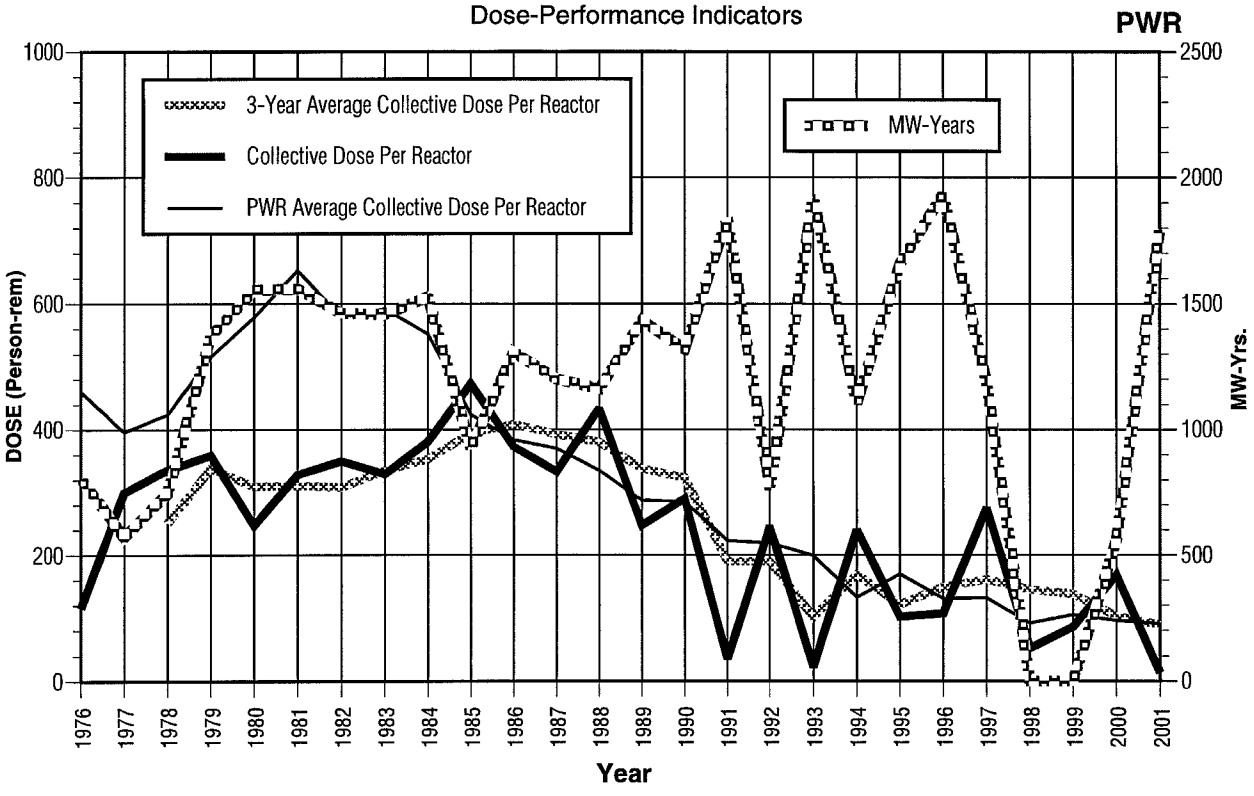

CLINTON
Dose-Performance Indicators
BWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
BWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year
0
500
1000
200
400
600
800
1200
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001


COLUMBIA GENERATING
Dose-Performance Indicators
BWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
BWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year
0
200
400
600
800
1000
1200
1400
500
1500
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001


COMANCHE PEAK 1, 2
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year
0
100
200
300
400
500
1000
1500
2000
2500
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001

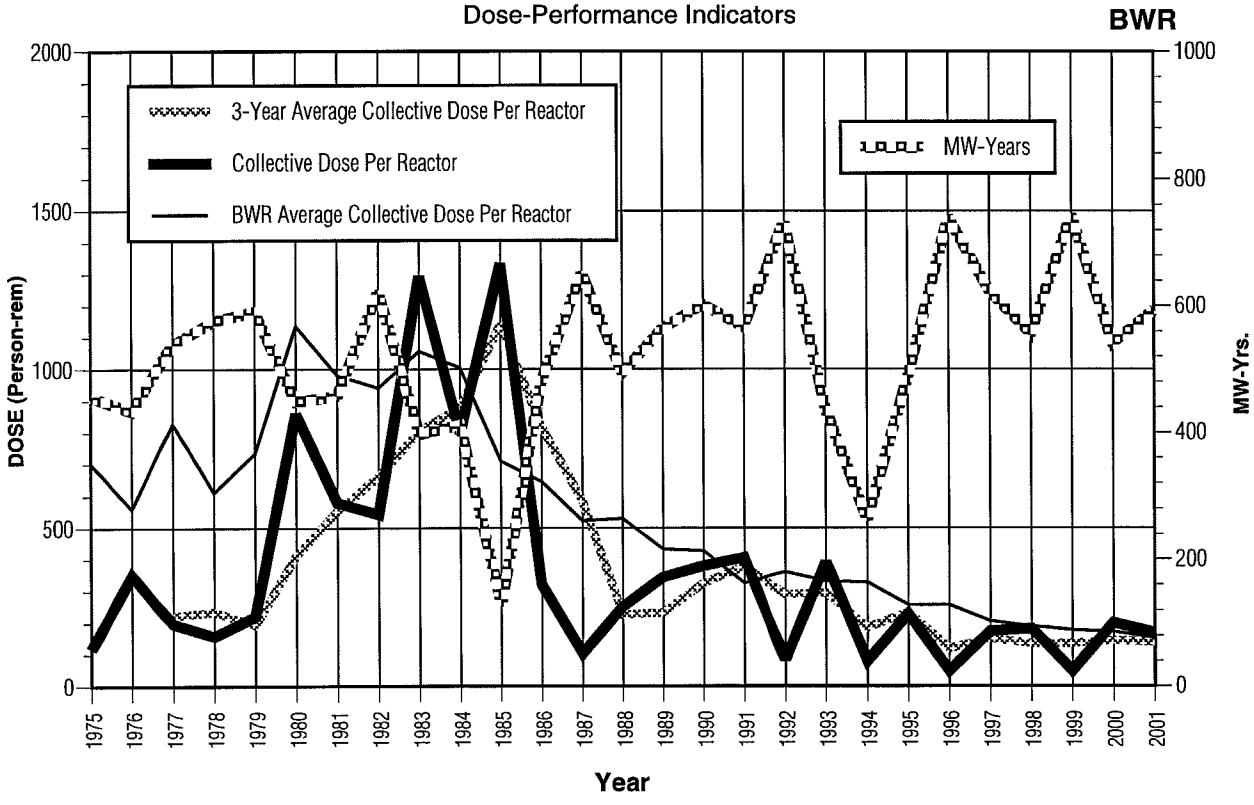
## COOK 1, 2

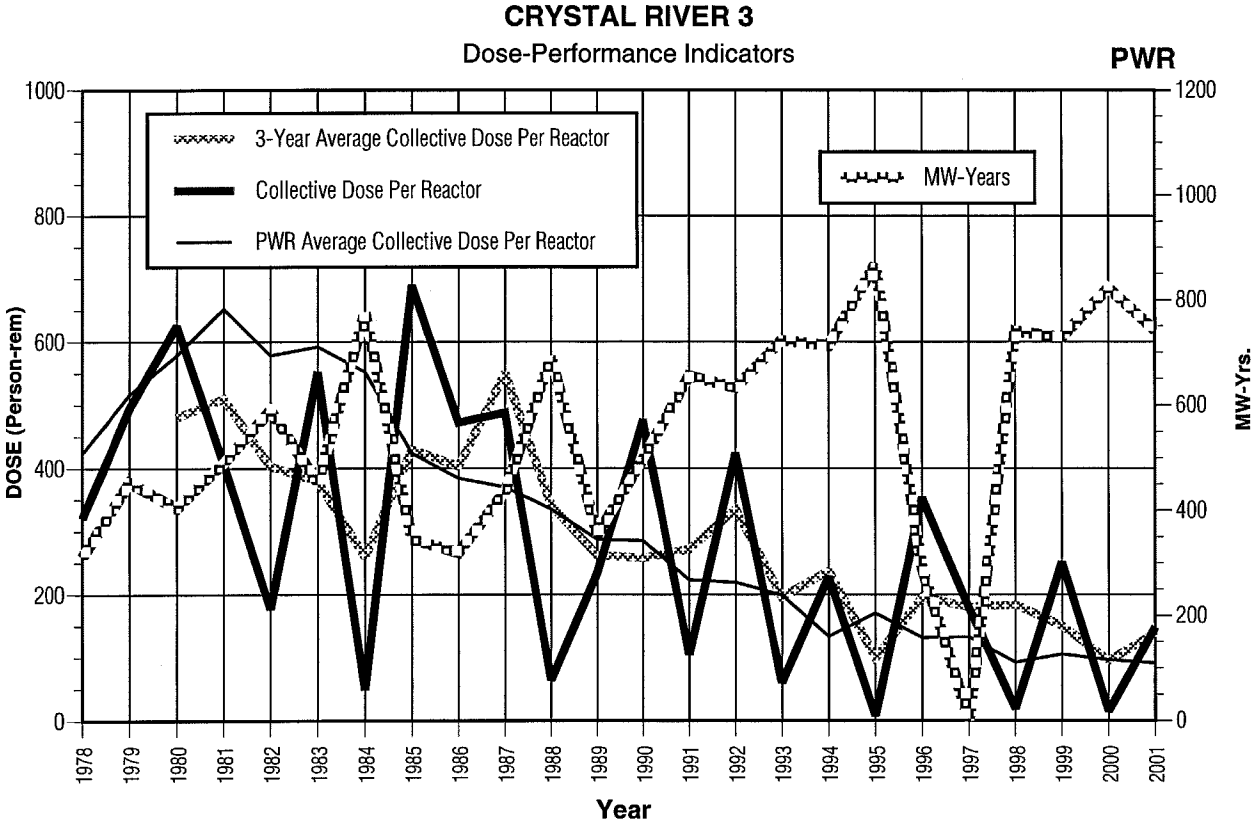
Dose-Performance Indicators

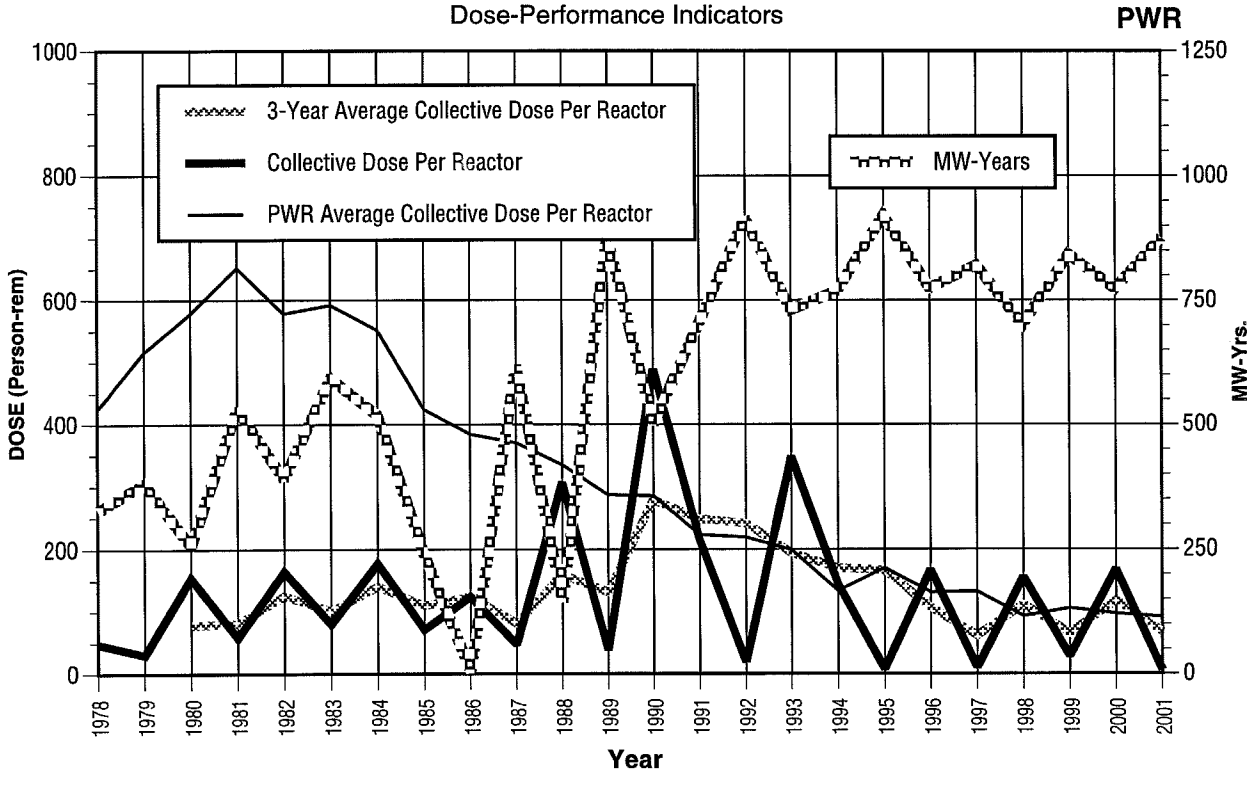


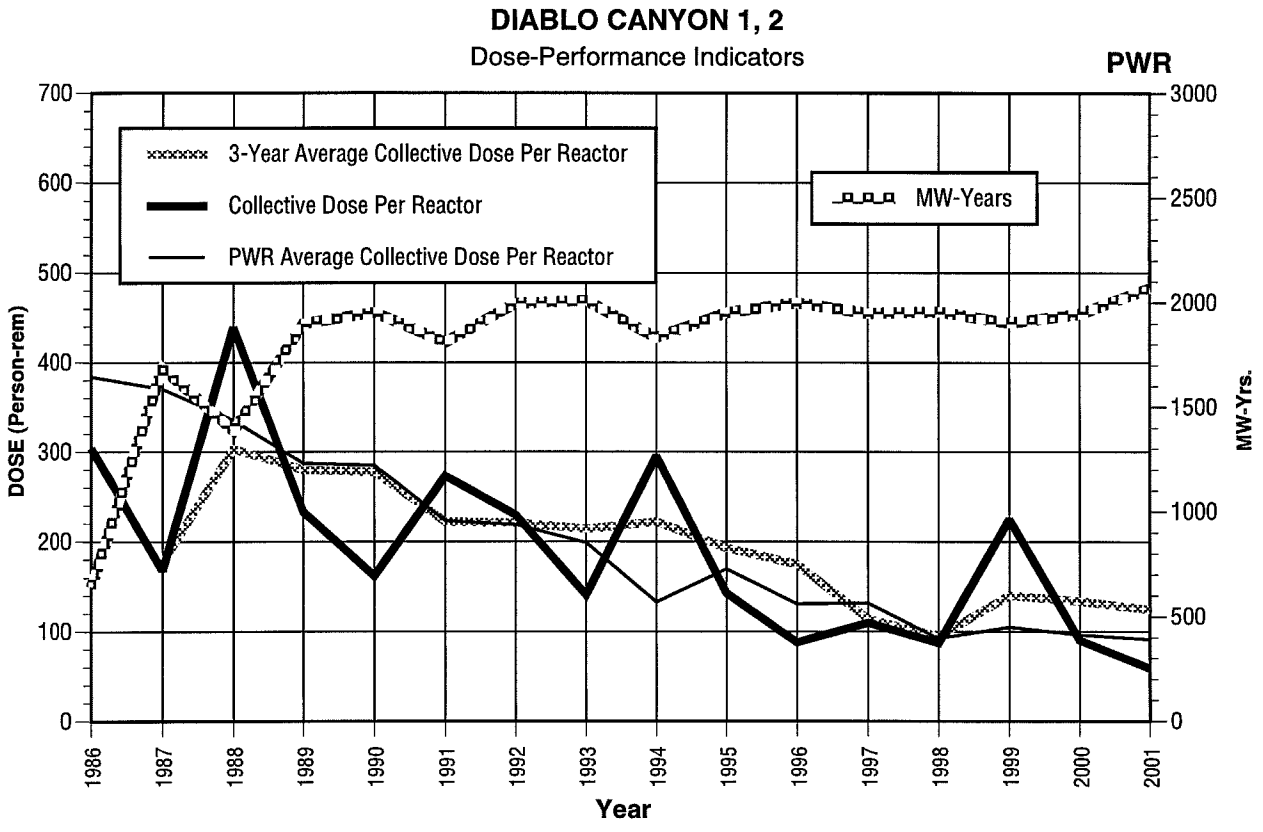

## COOPER STATION

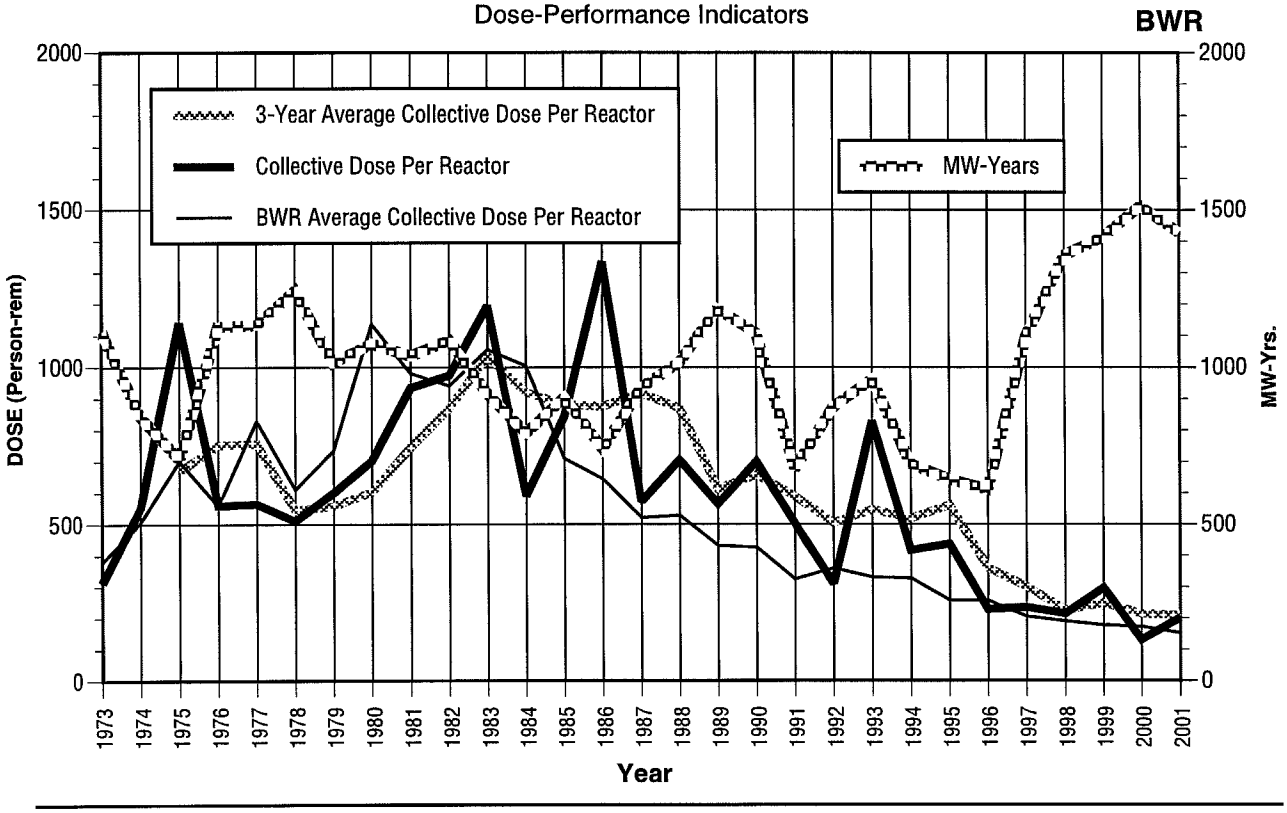
Dose-Performance Indicators

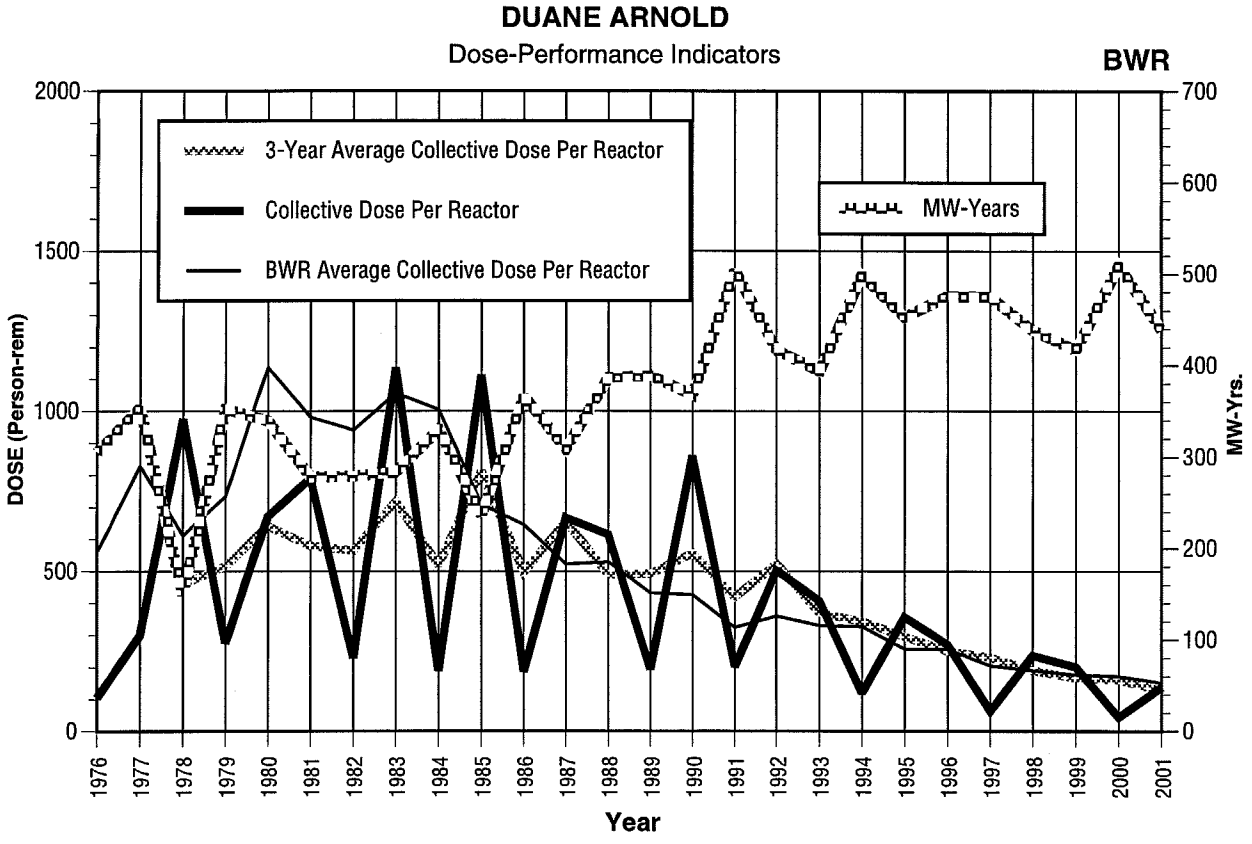


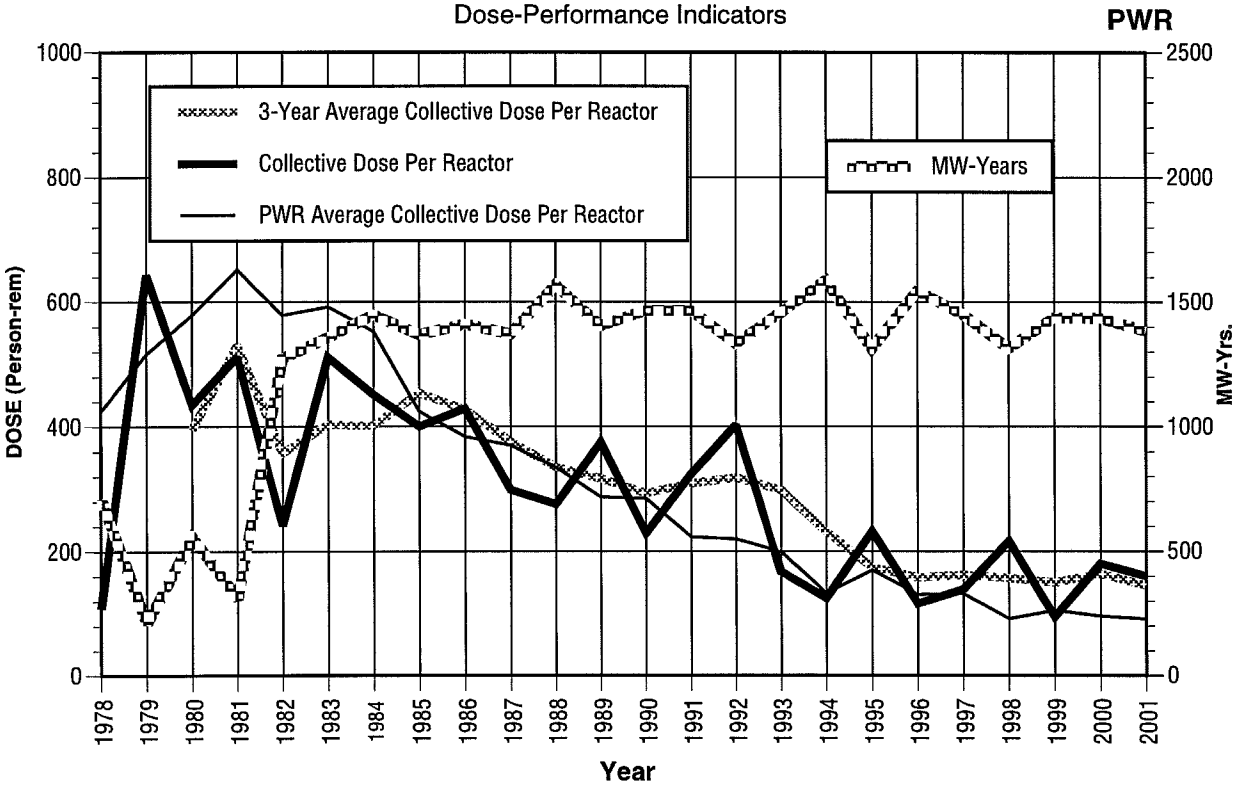

CRYSTAL RIVER 3
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


DAVIS-BESSE
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


DIABLO CANYON 1, 2
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


DRESDEN 2, 3
Dose-Performance Indicators
BWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
BWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year

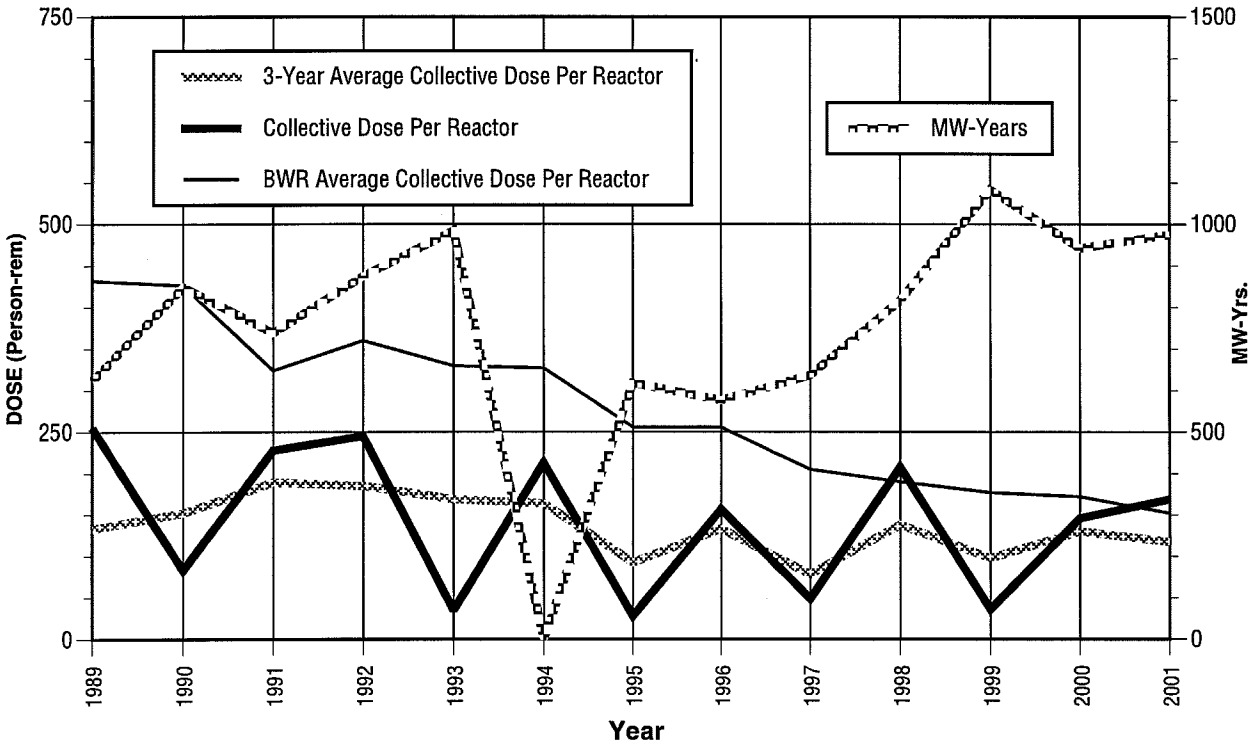

DUANE ARNOLD
Dose-Performance Indicators
BWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
BWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


FARLEY 1, 2
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year

**FERMI 2**

Dose-Performance Indicators

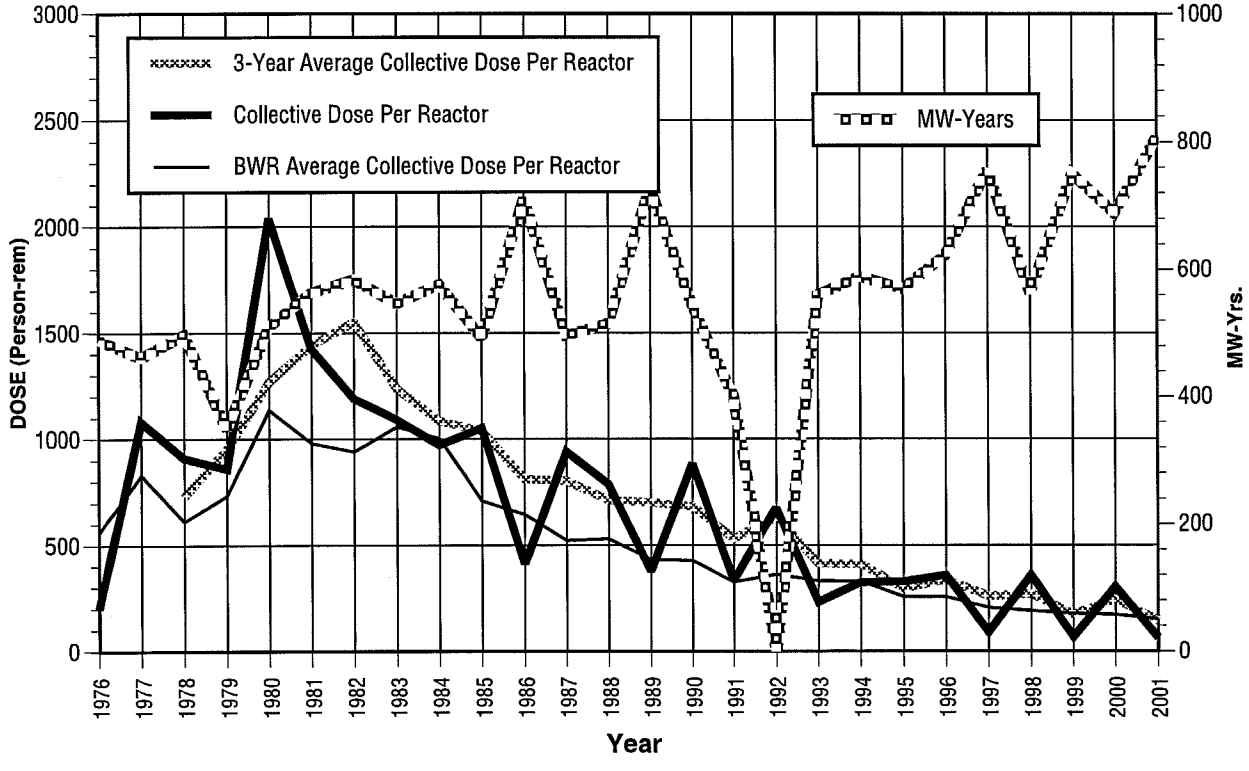
**BWR**



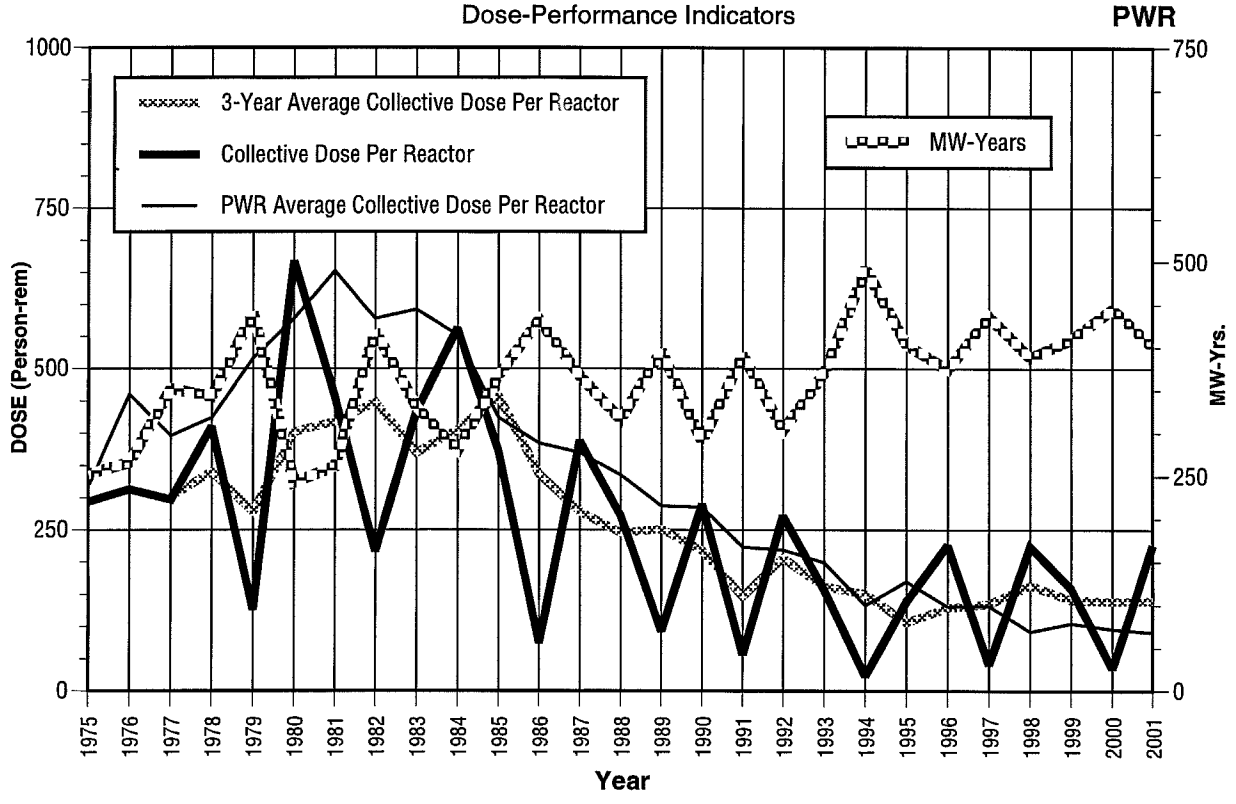

**FITZPATRICK**

Dose-Performance Indicators

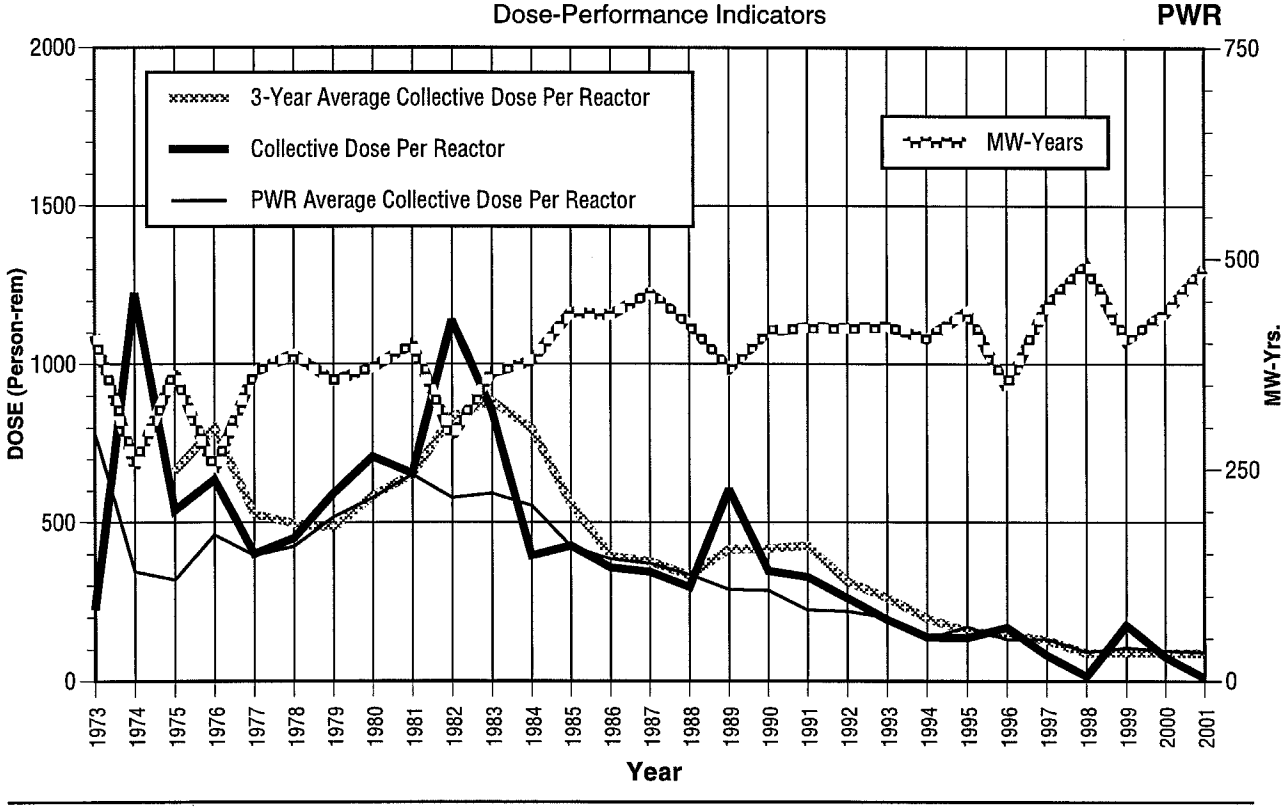
**BWR**

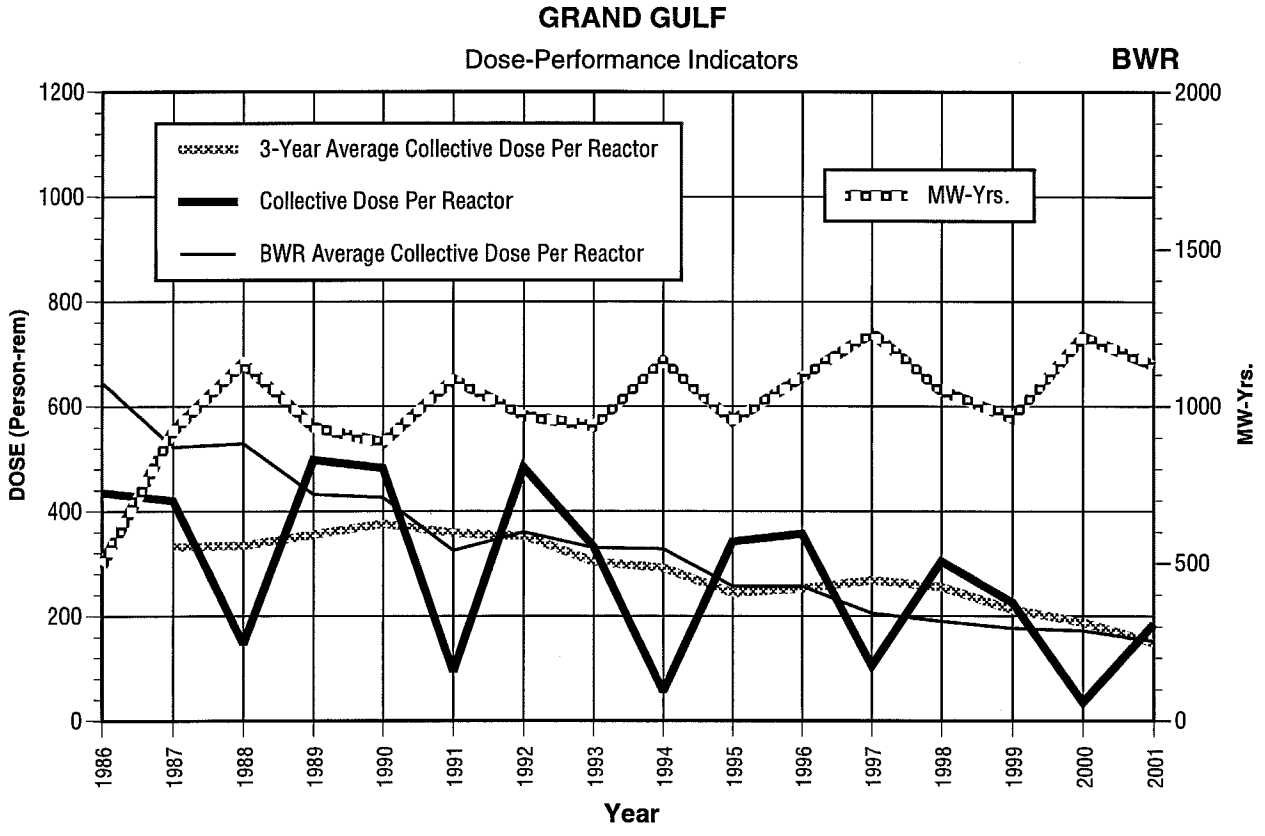


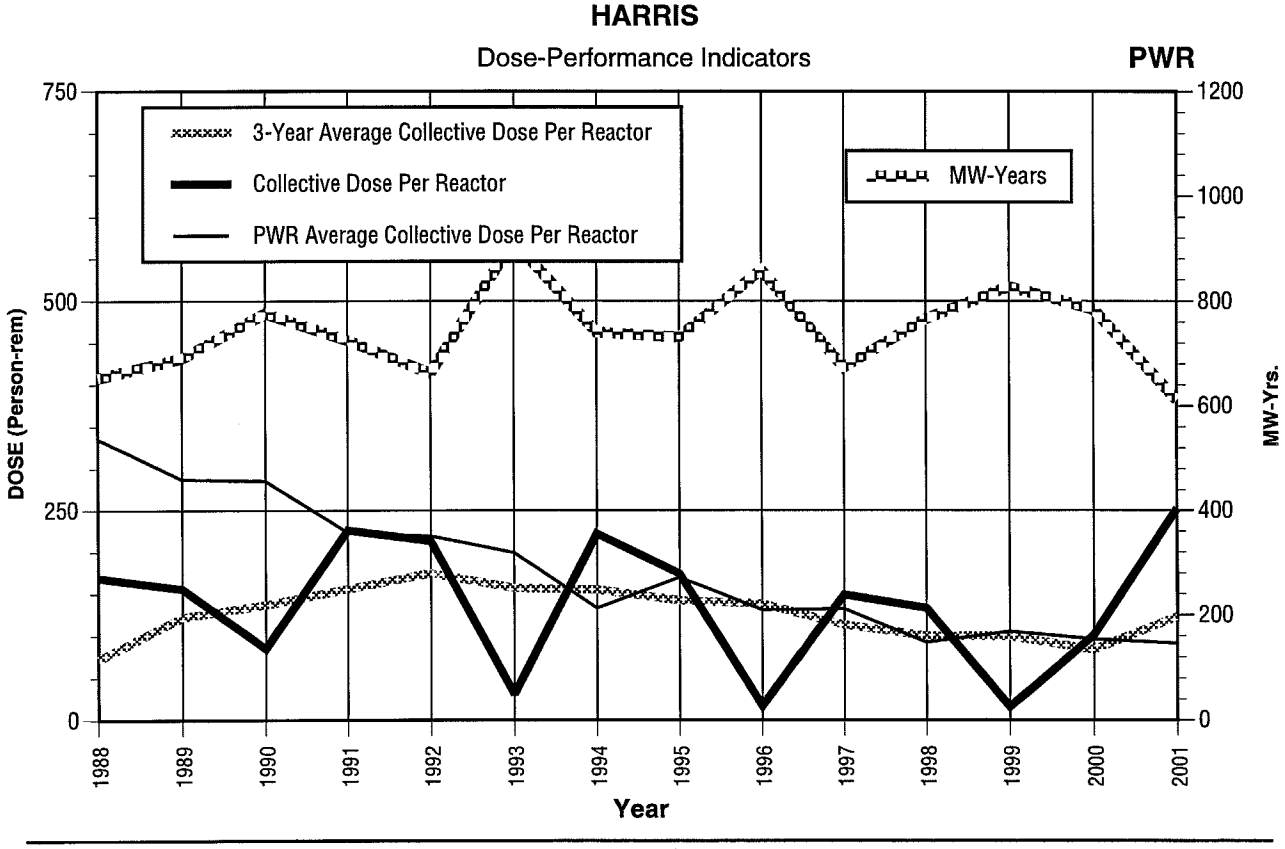
## FORT CALHOUN

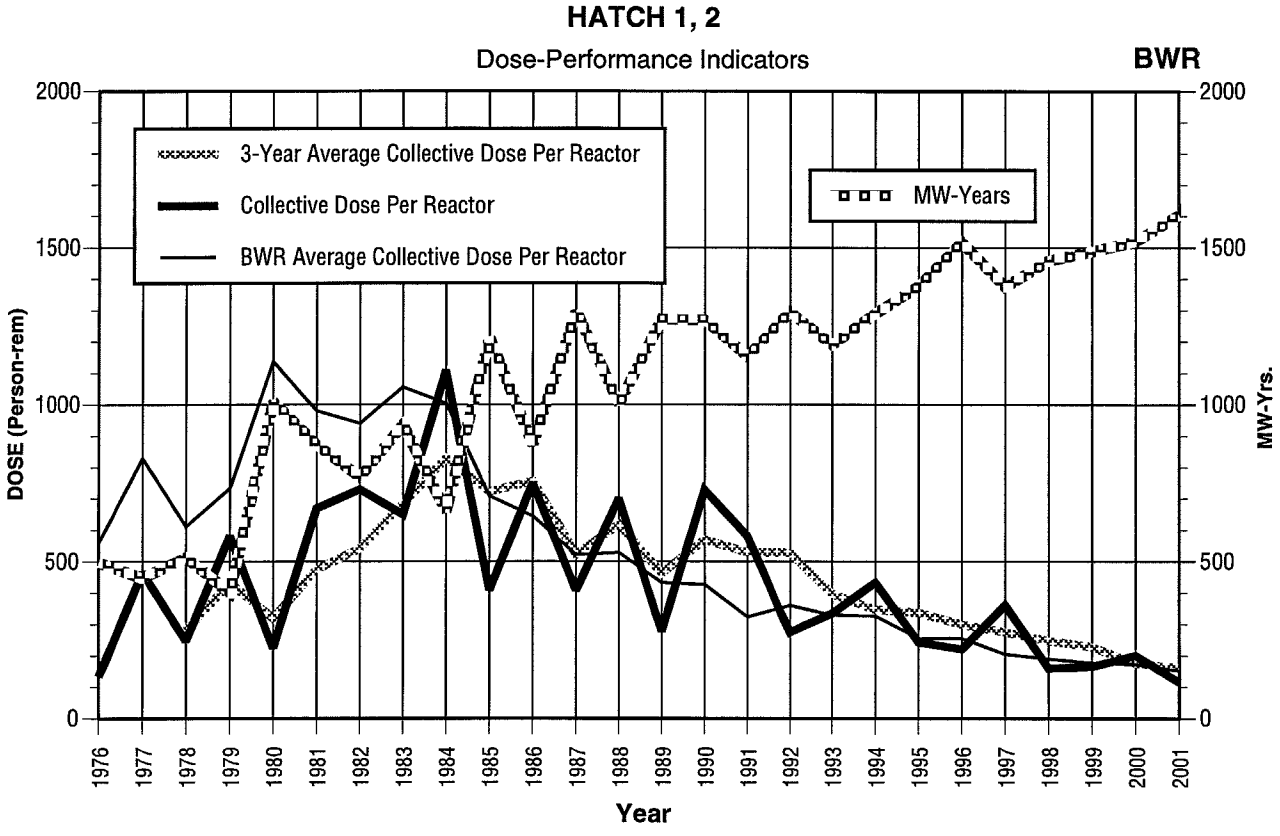


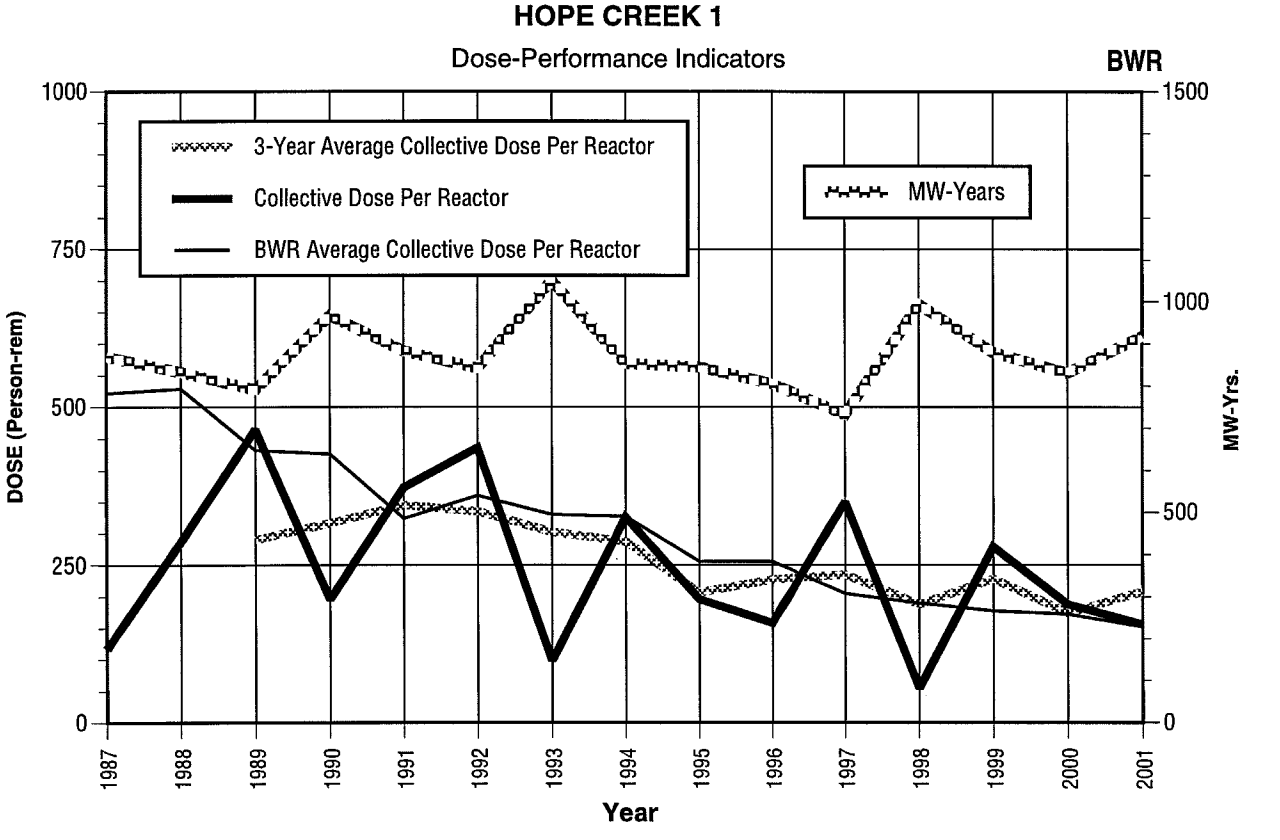

## GINNA




GRAND GULF
Dose-Performance Indicators
BWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
BWR Average Collective Dose Per Reactor
MW-Yrs.
DOSE (Person-rem)
MW-Yrs.
Year


HARRIS
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year

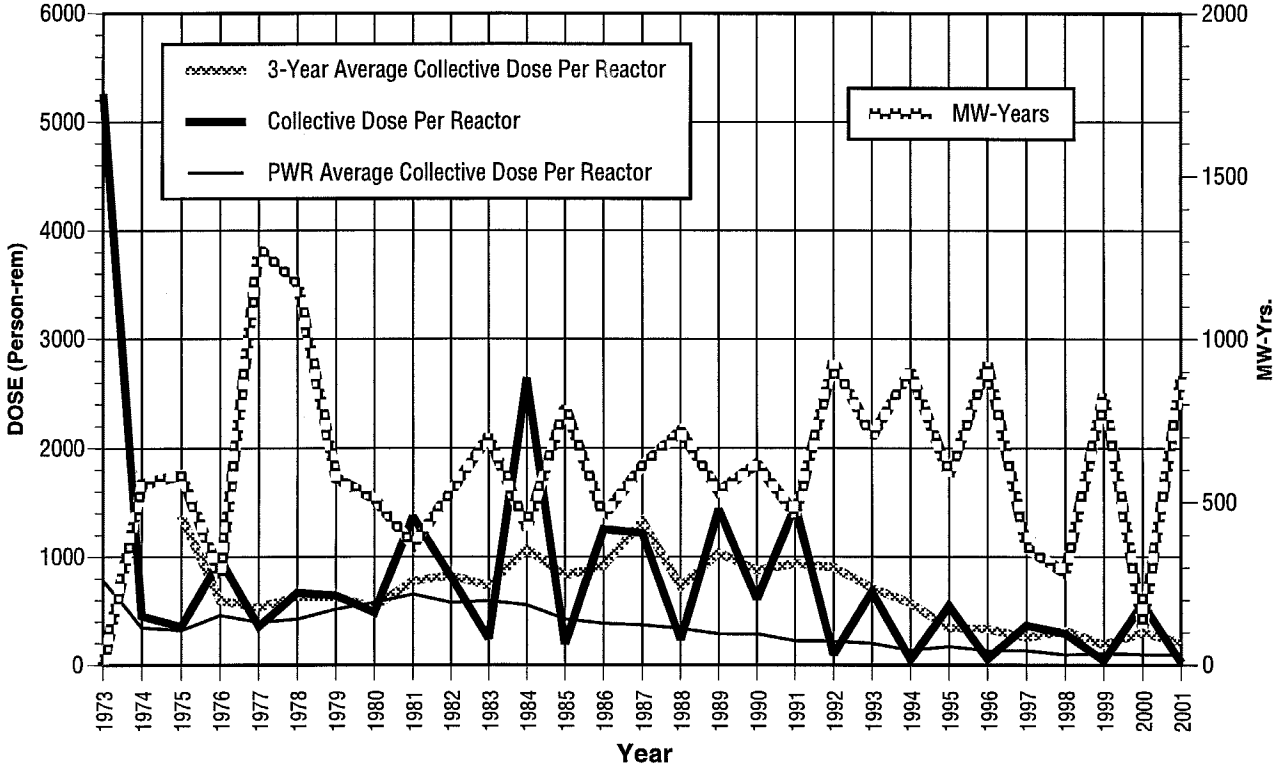

HATCH 1, 2
Dose-Performance Indicators
BWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
BWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


HOPE CREEK 1
Dose-Performance Indicators
BWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
BWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year

## INDIAN POINT 2

Dose-Performance Indicators

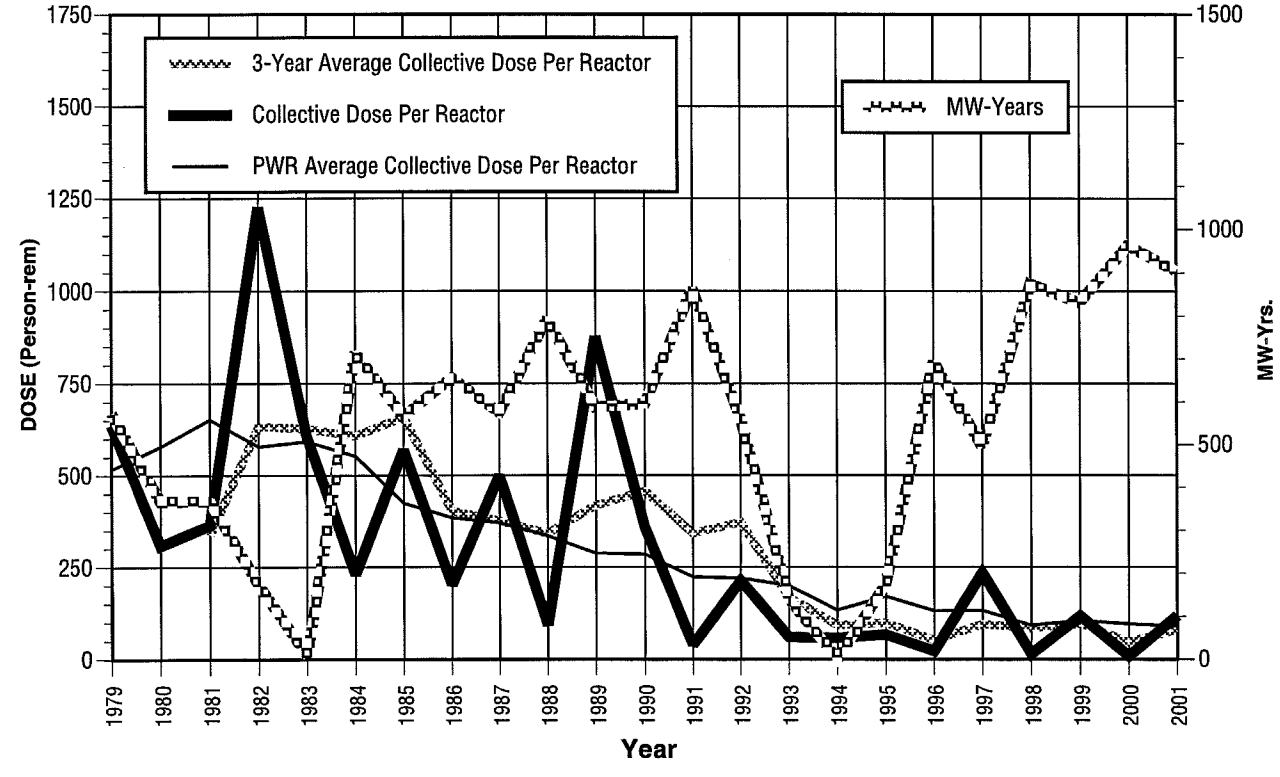
**PWR**

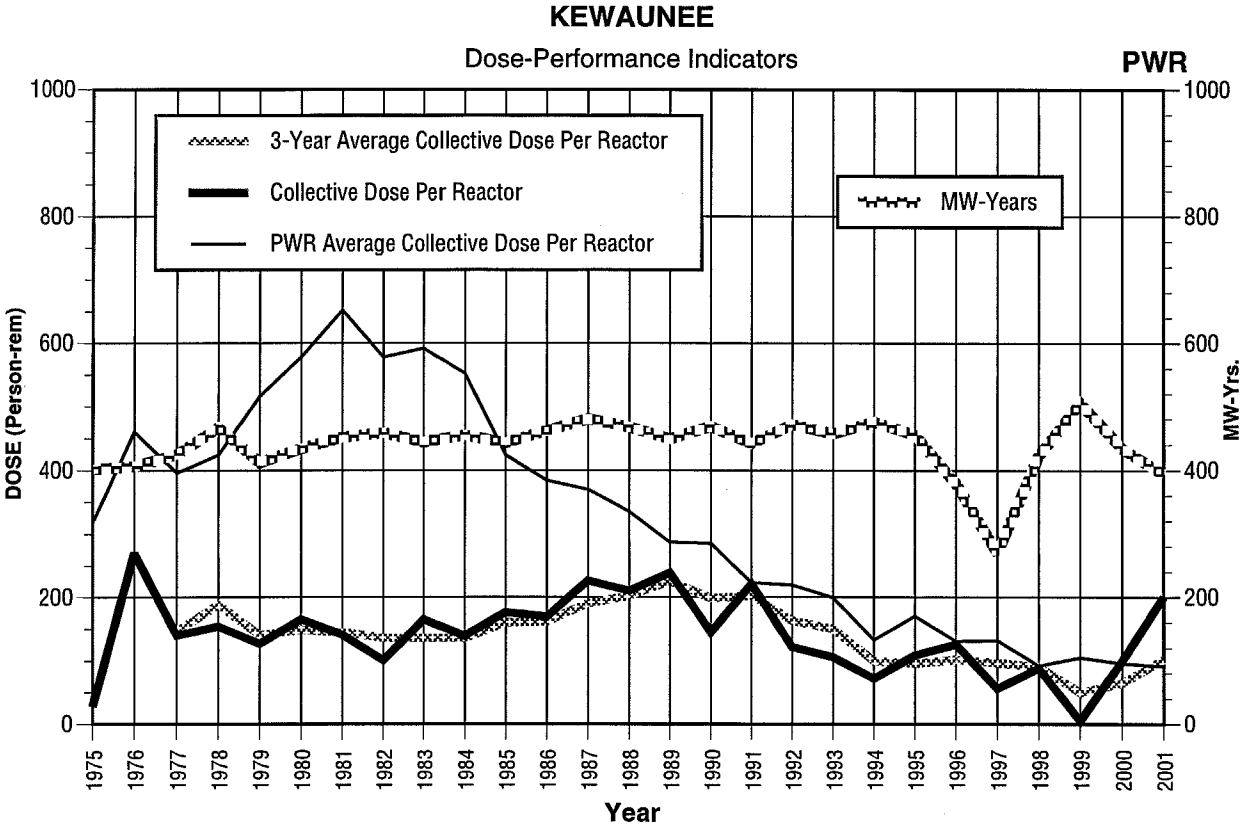


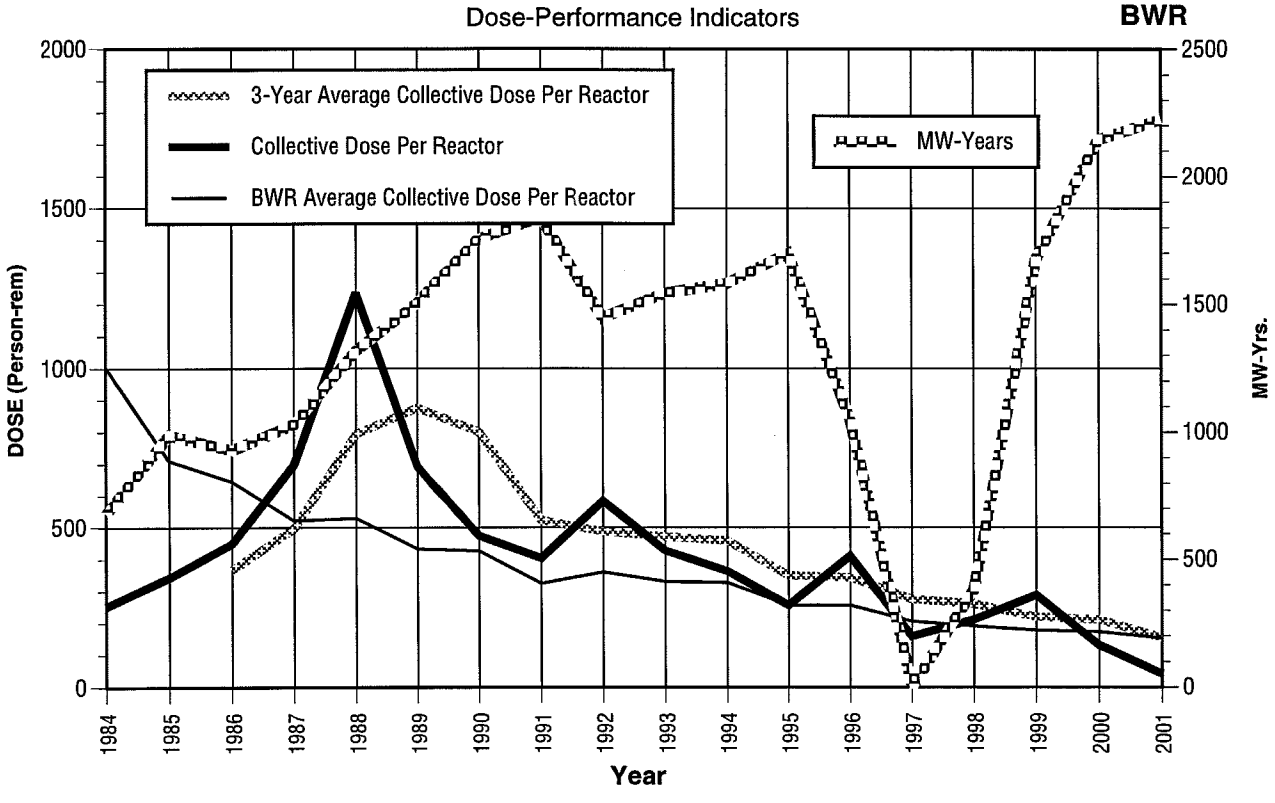

## INDIAN POINT 3

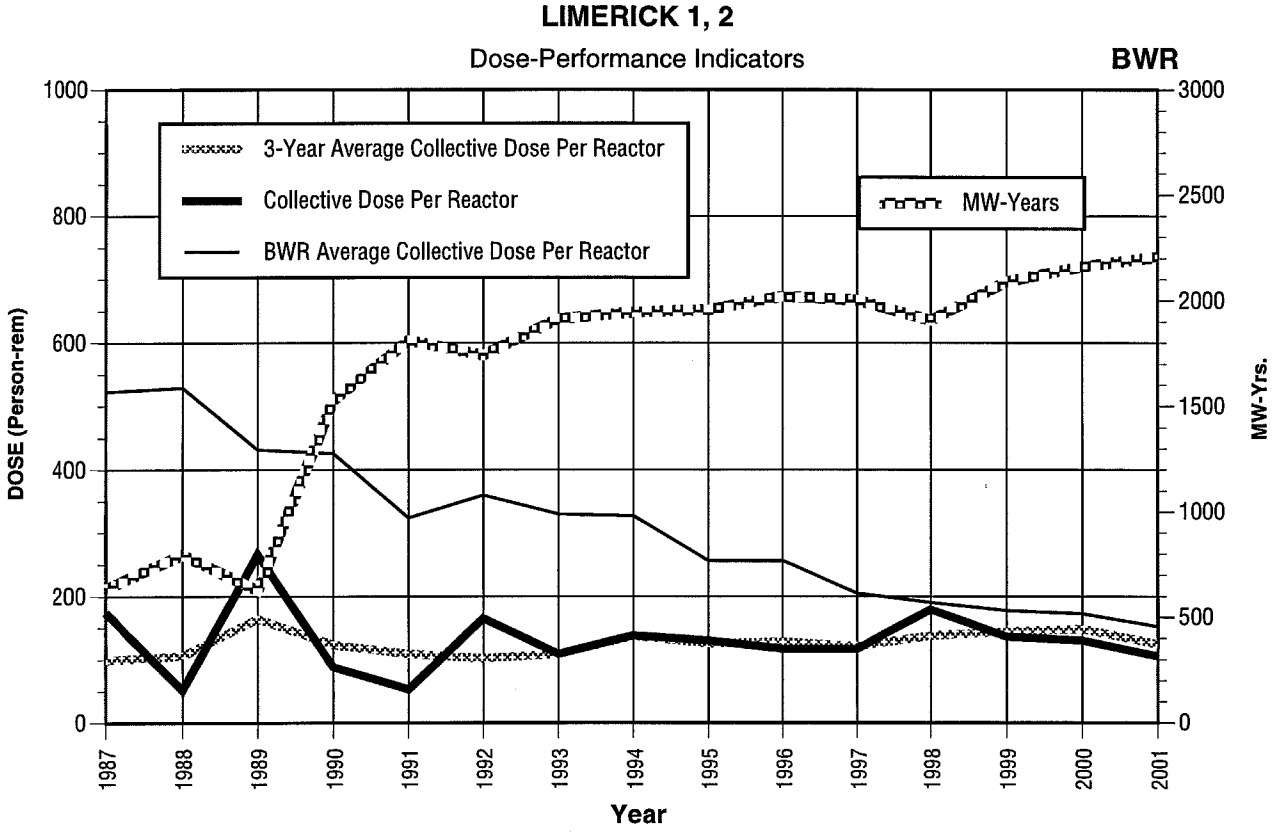
Dose-Performance Indicators

**PWR**




KEWAUNEE
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


LASALLE 1, 2
Dose-Performance Indicators
BWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
BWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


LIMERICK 1, 2
Dose-Performance Indicators
BWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
BWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year
0
200
400
600
800
1000
500
1000
1500
2000
2500
3000
1987
1988
1989
1990
1991
1992
1993
1994
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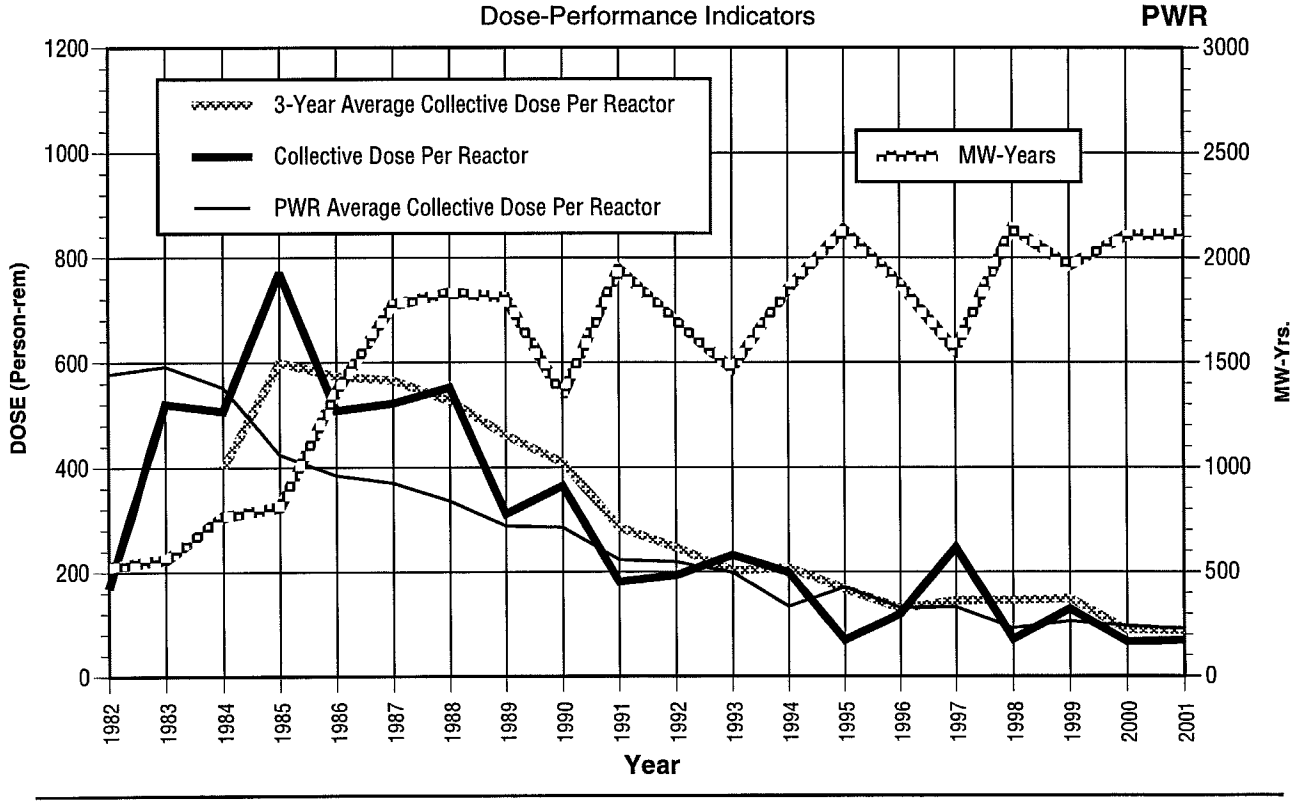
1996
1997
1998
1999
2000
2001


MCGUIRE 1, 2
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year
0
200
400
600
800
1000
1200
500
1000
1500
2000
2500
3000
1982
1983
1984
1985
1986
1987
1988
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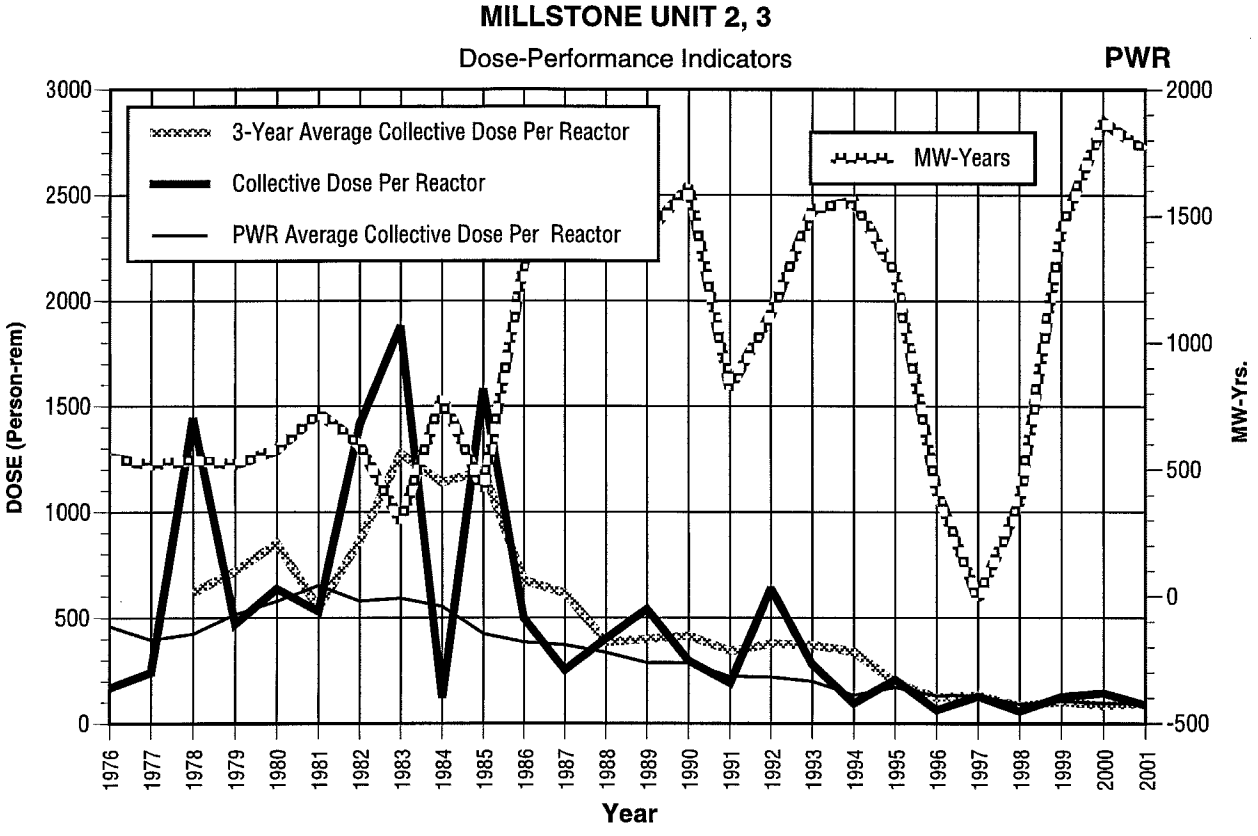
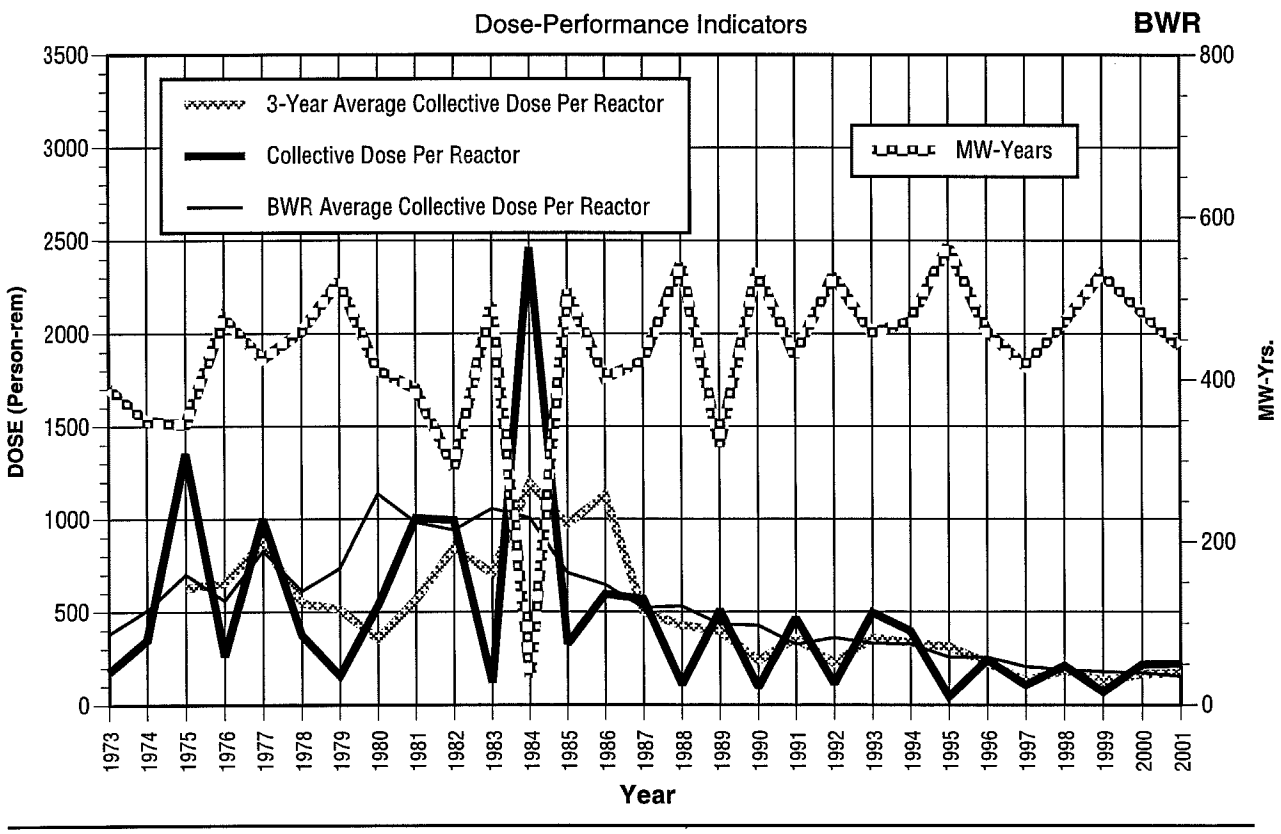
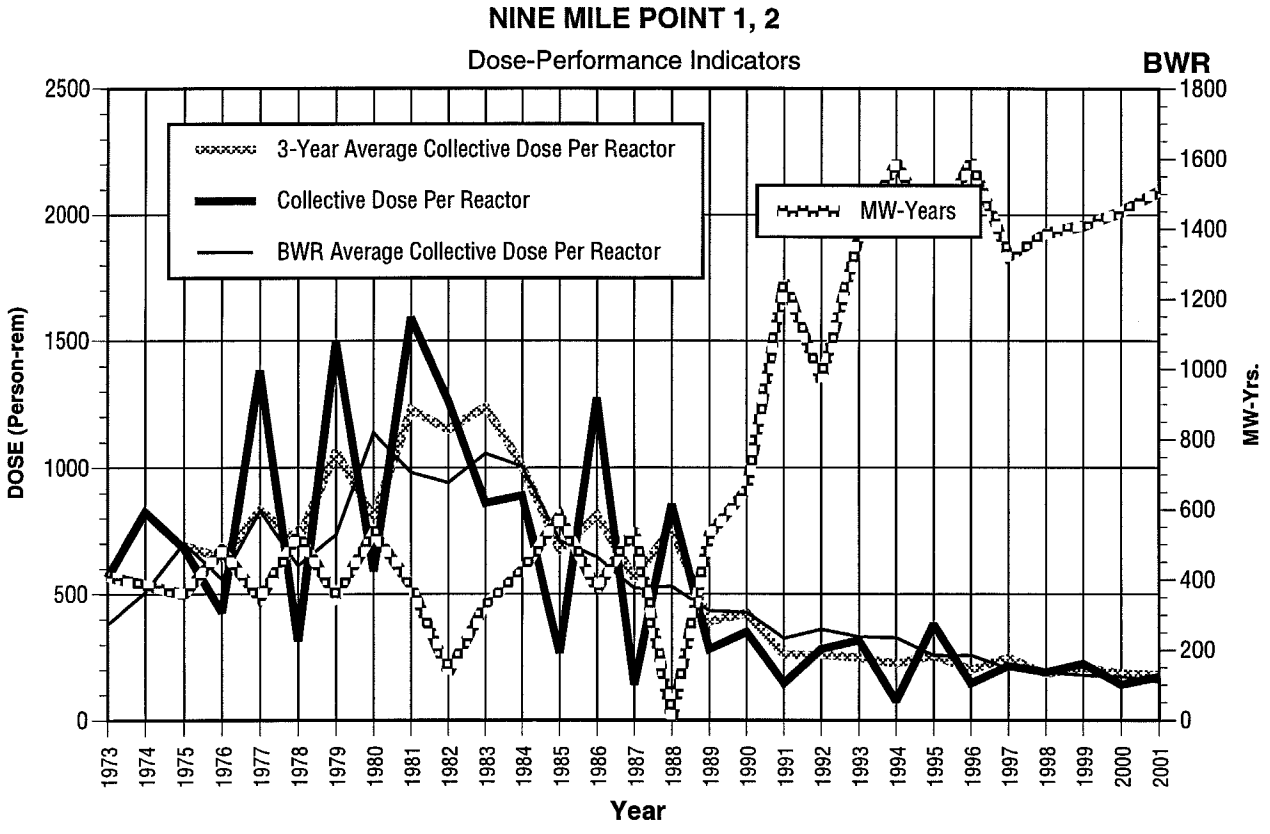
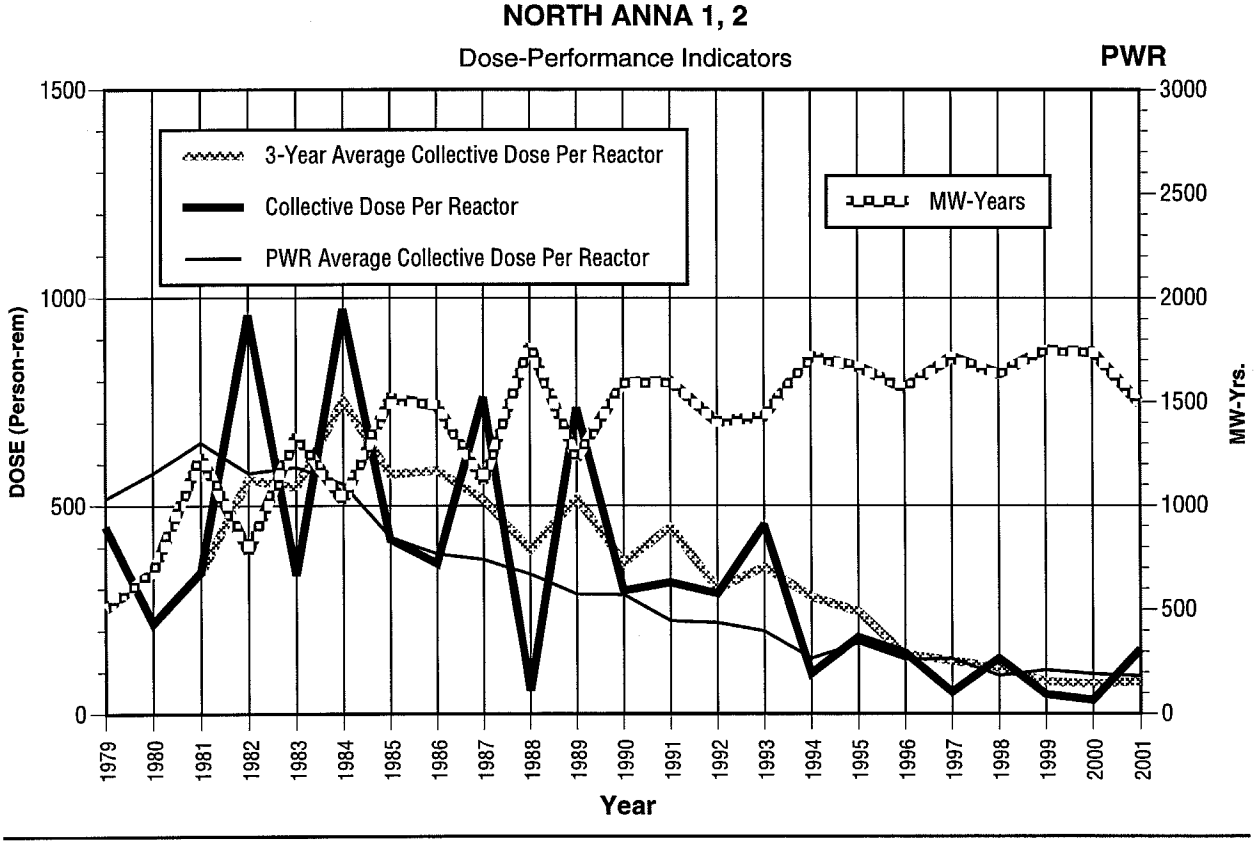
1996
1997
1998
1999
2000
2001


MILLSTONE UNIT 2, 3
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


MONTICELLO
Dose-Performance Indicators
BWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
BWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year

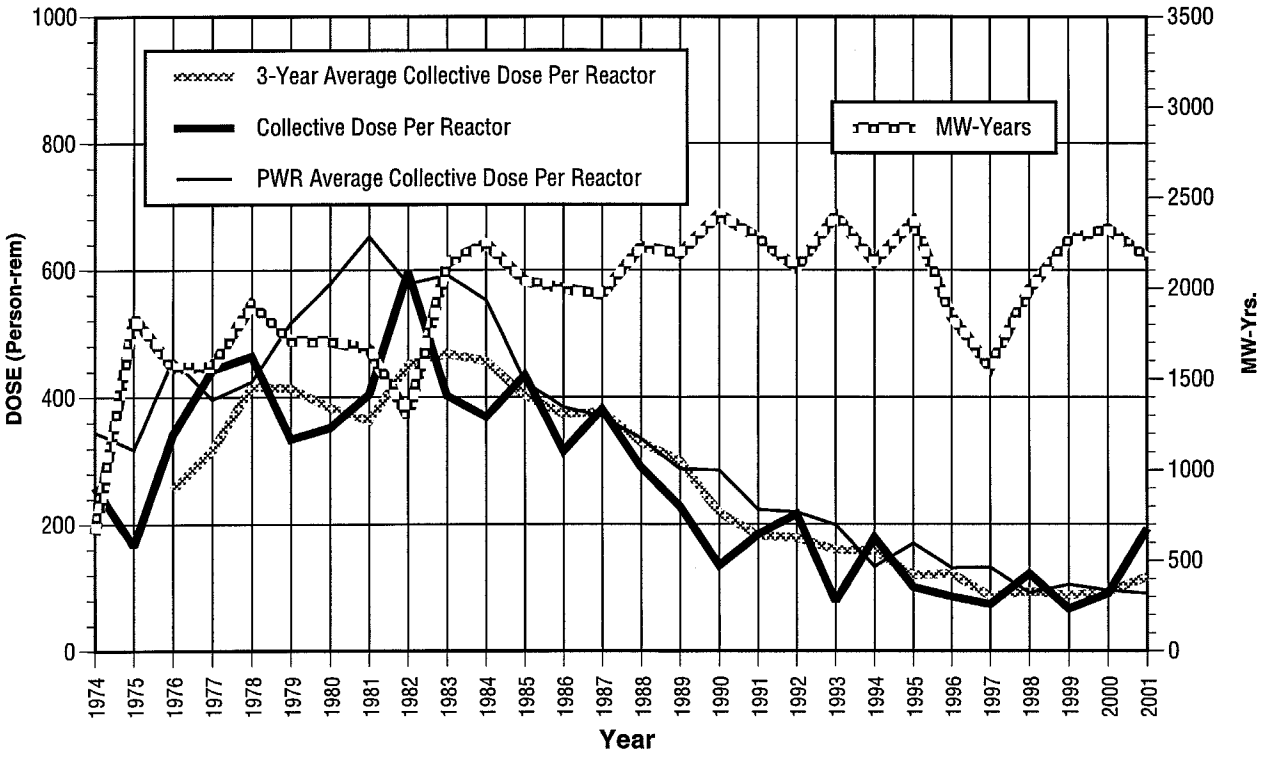

NINE MILE POINT 1, 2
Dose-Performance Indicators
BWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
BWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


NORTH ANNA 1, 2
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year

## OCONEE 1, 2, 3

Dose-Performance Indicators

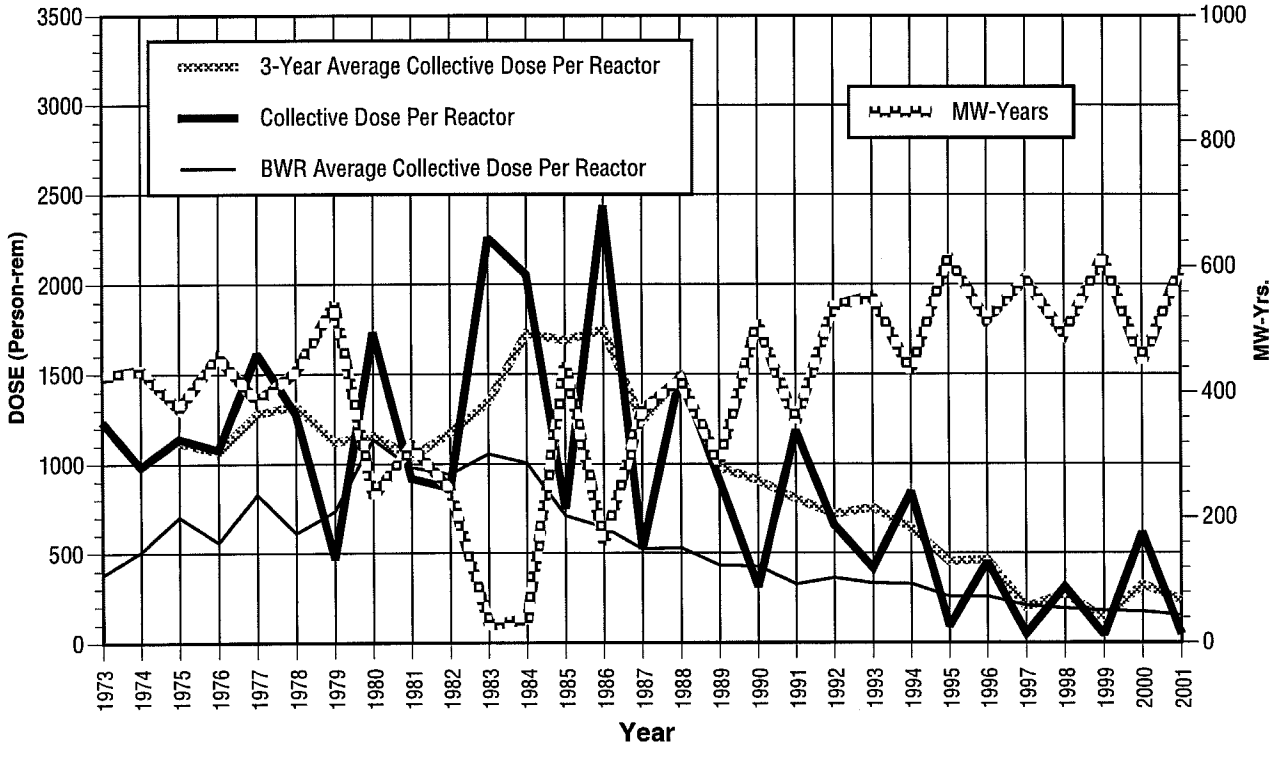
PWR

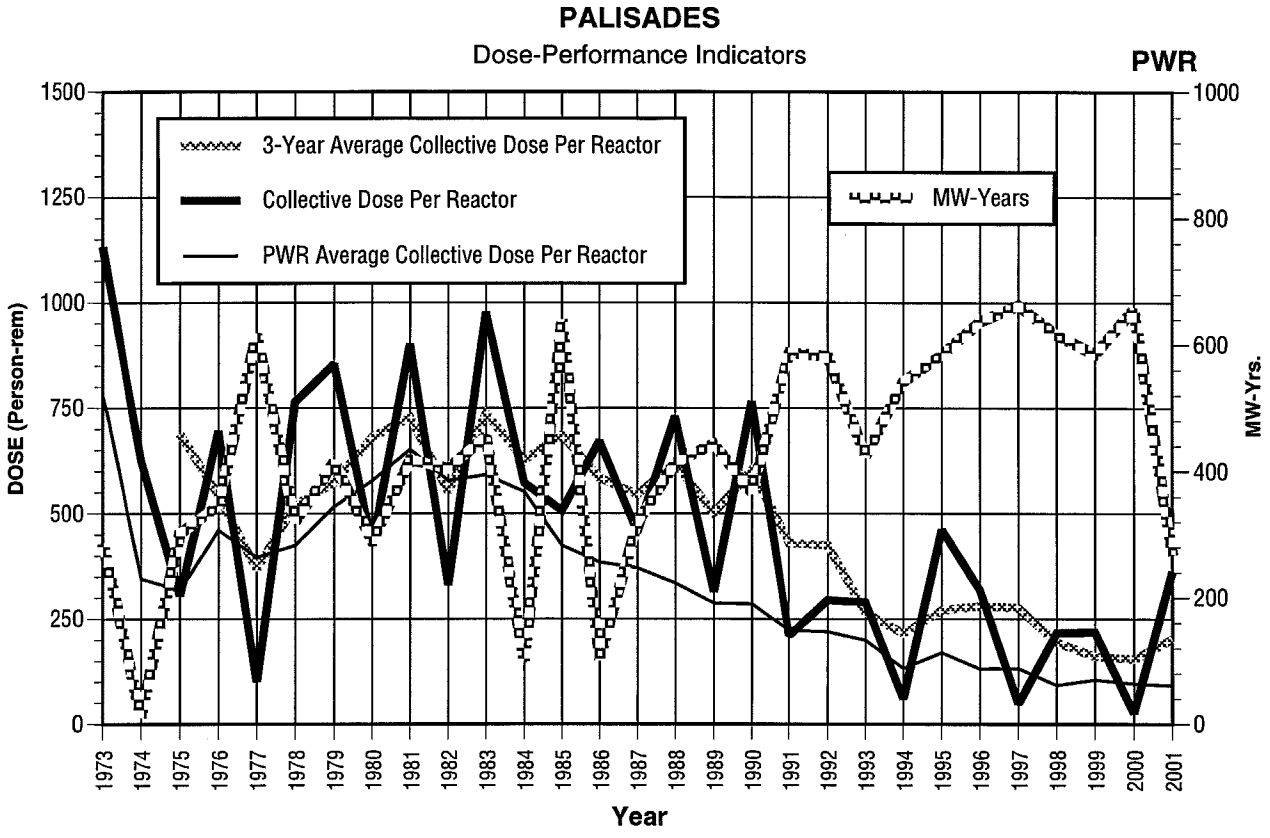


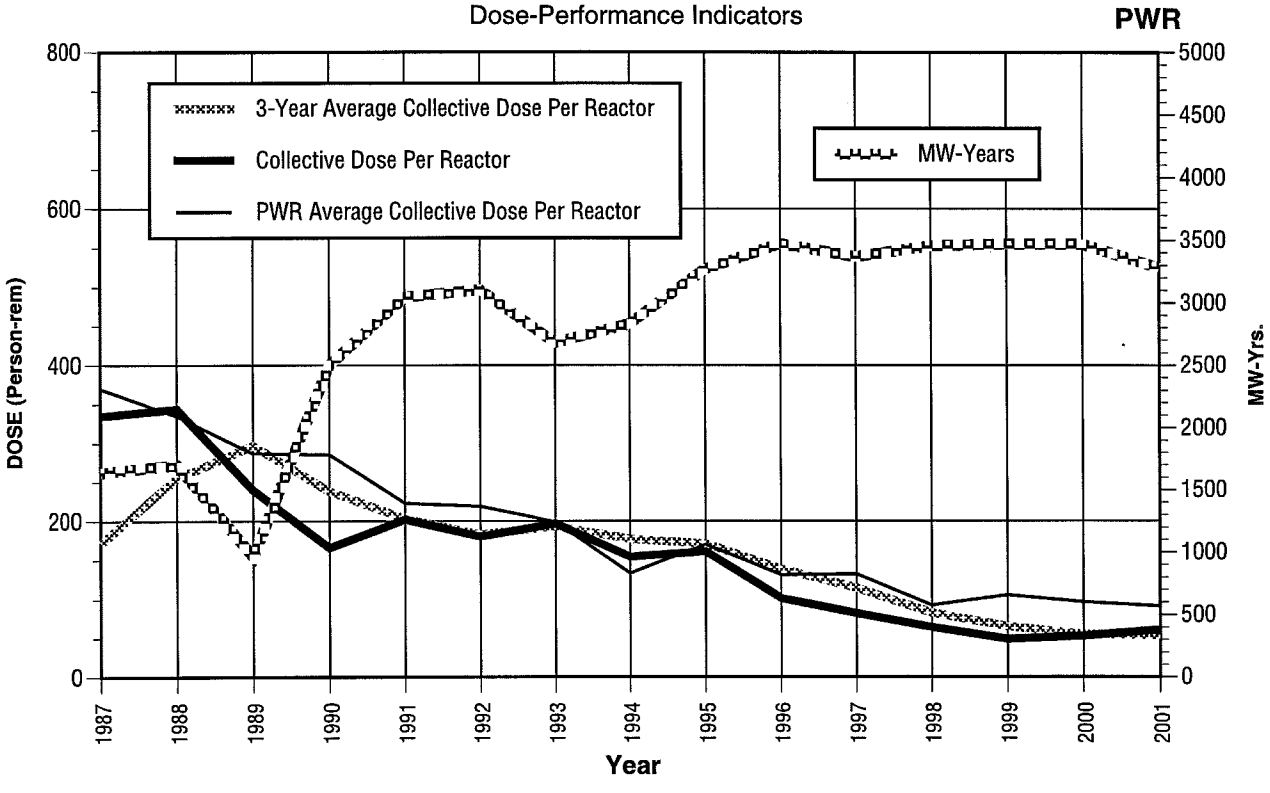

## OYSTER CREEK

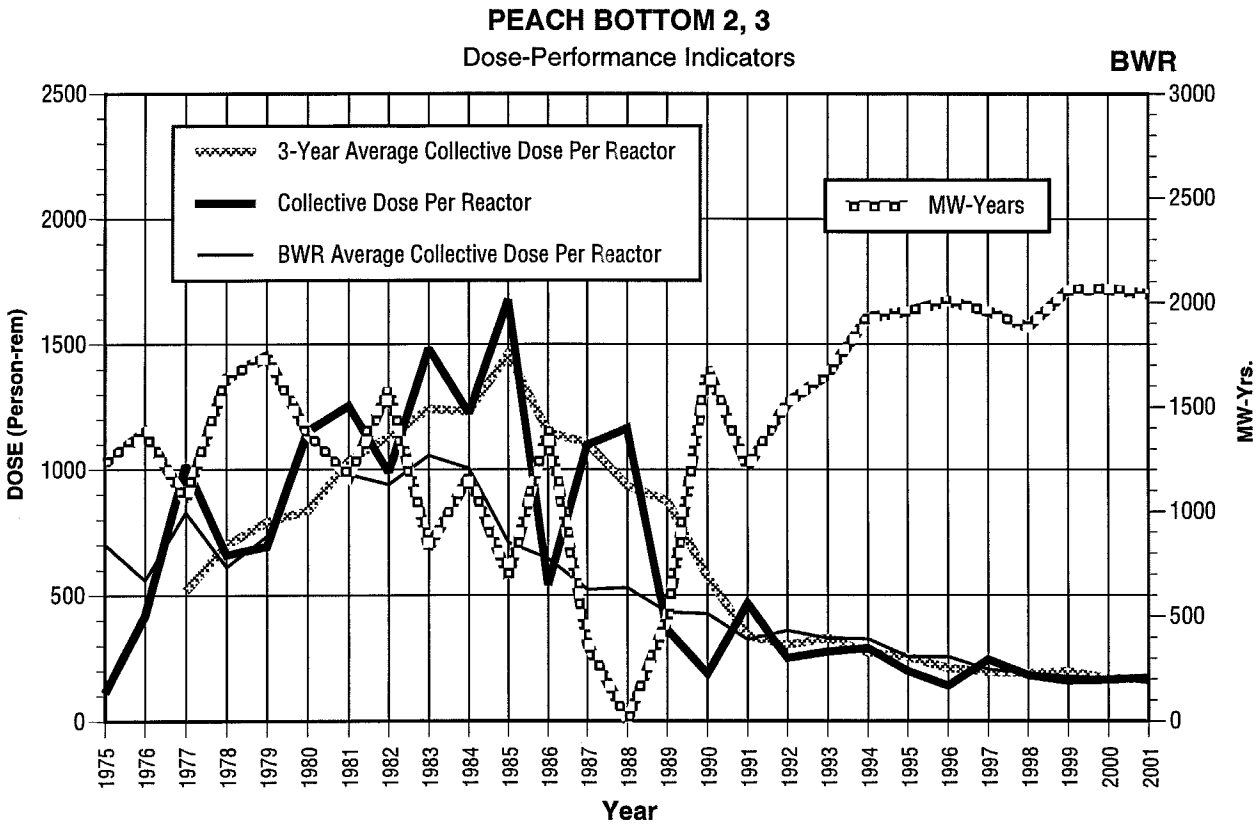
Dose-Performance Indicators

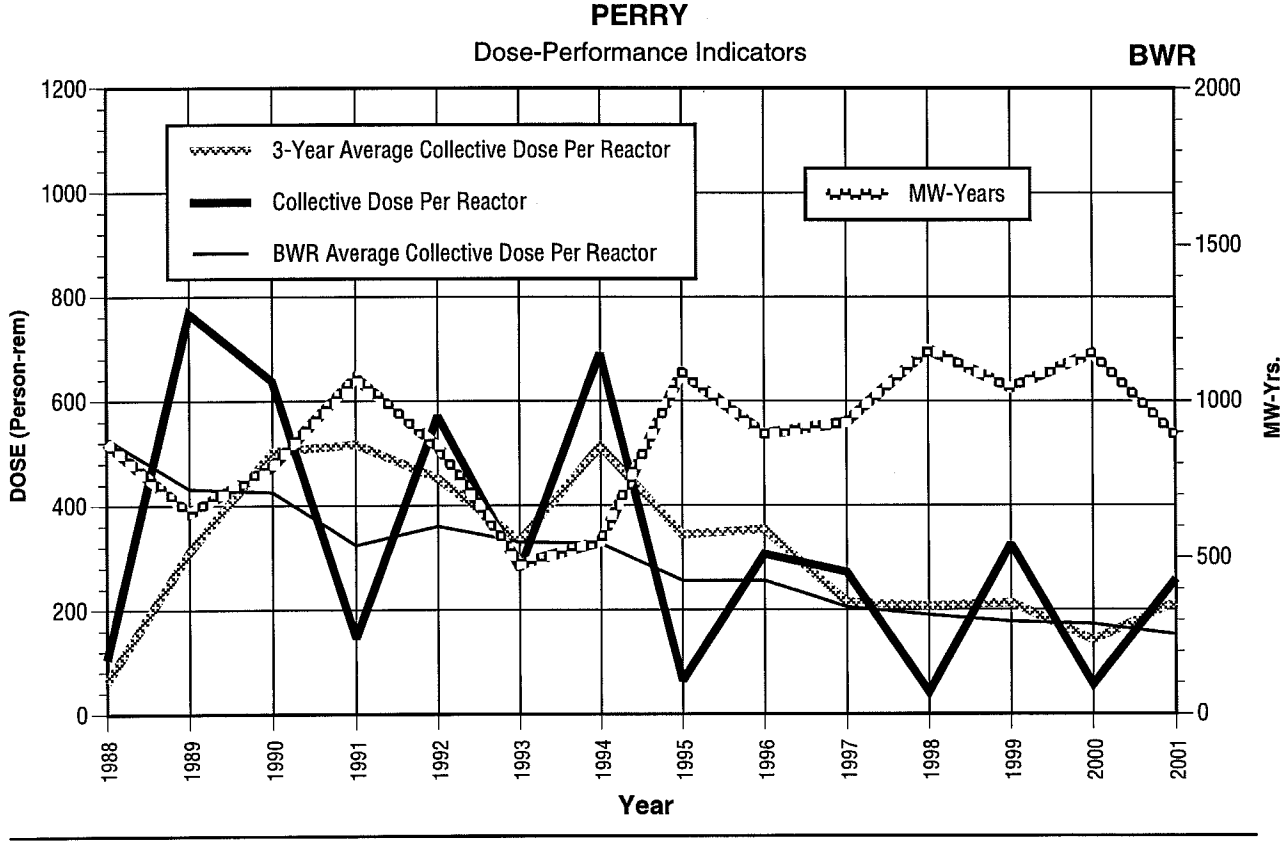
BWR




PALISADES
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


PALO VERDE 1, 2, 3
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year

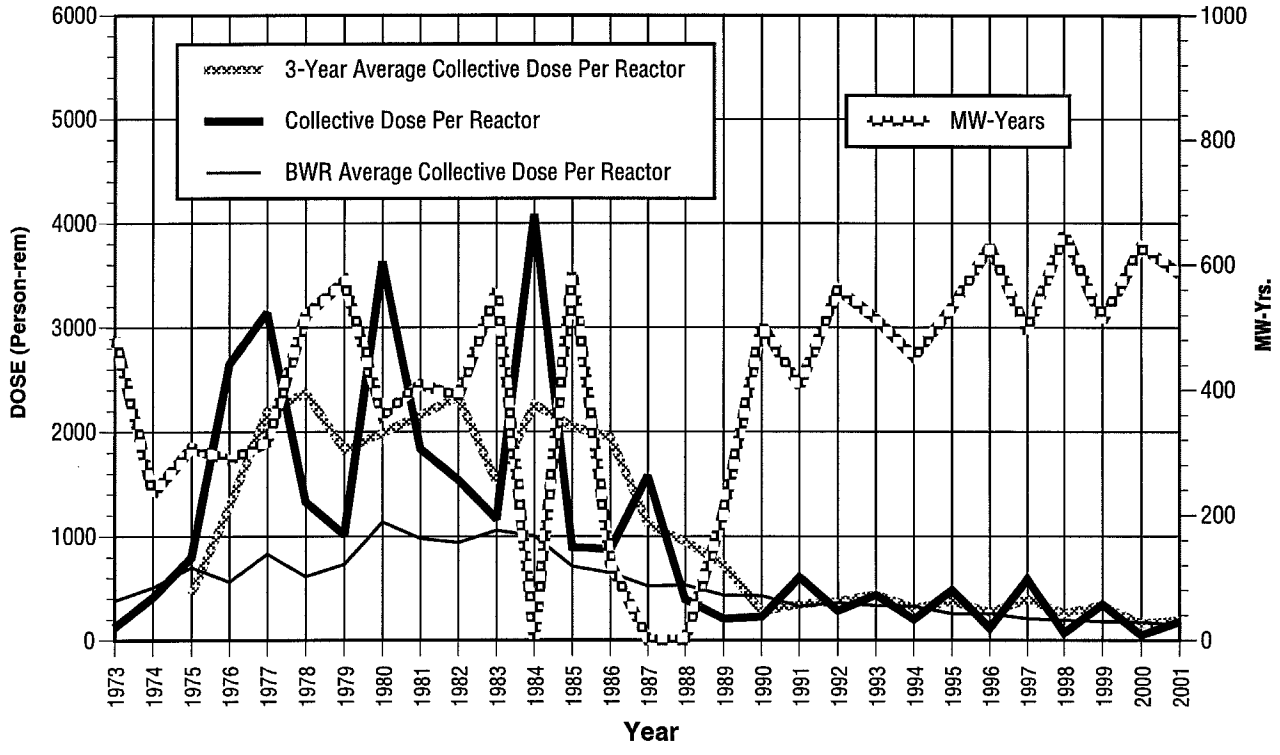

PEACH BOTTOM 2, 3
Dose-Performance Indicators
BWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
BWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


PERRY
Dose-Performance Indicators
BWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
BWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year

**PILGRIM**

Dose-Performance Indicators

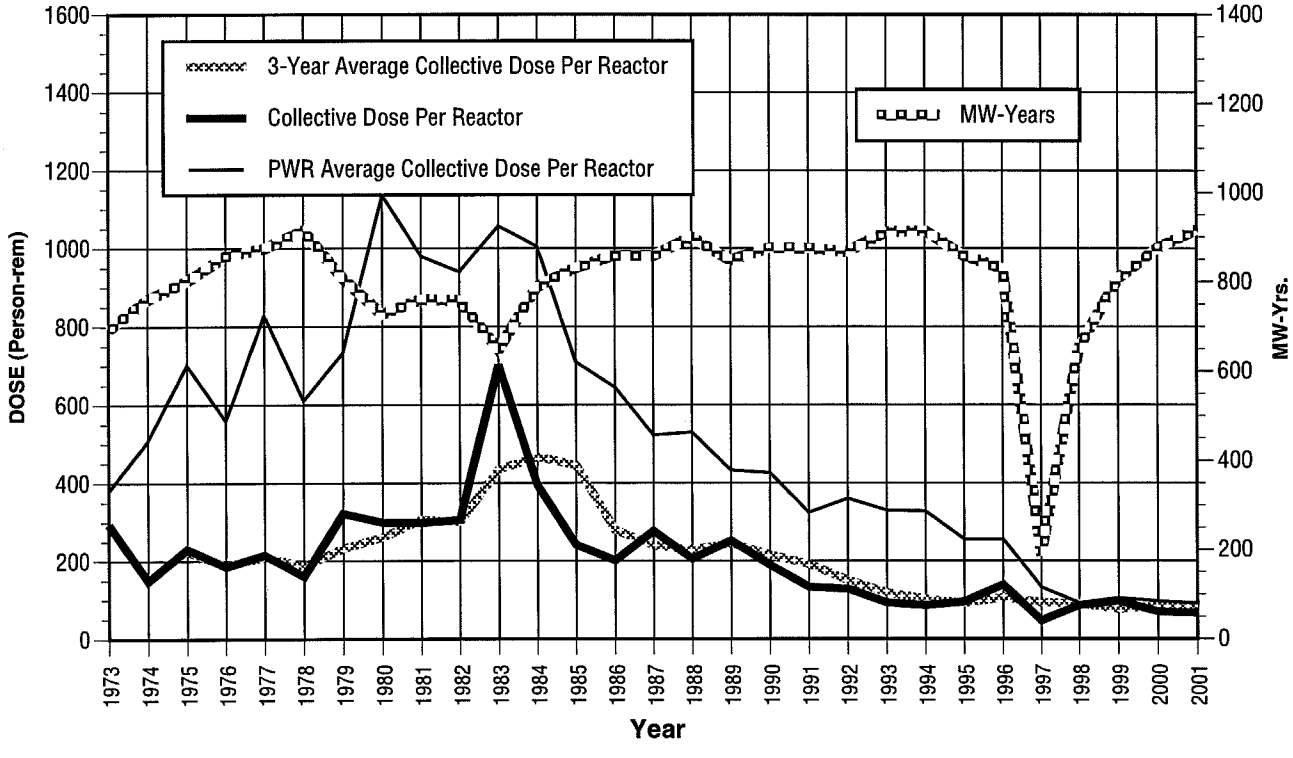
**BWR**

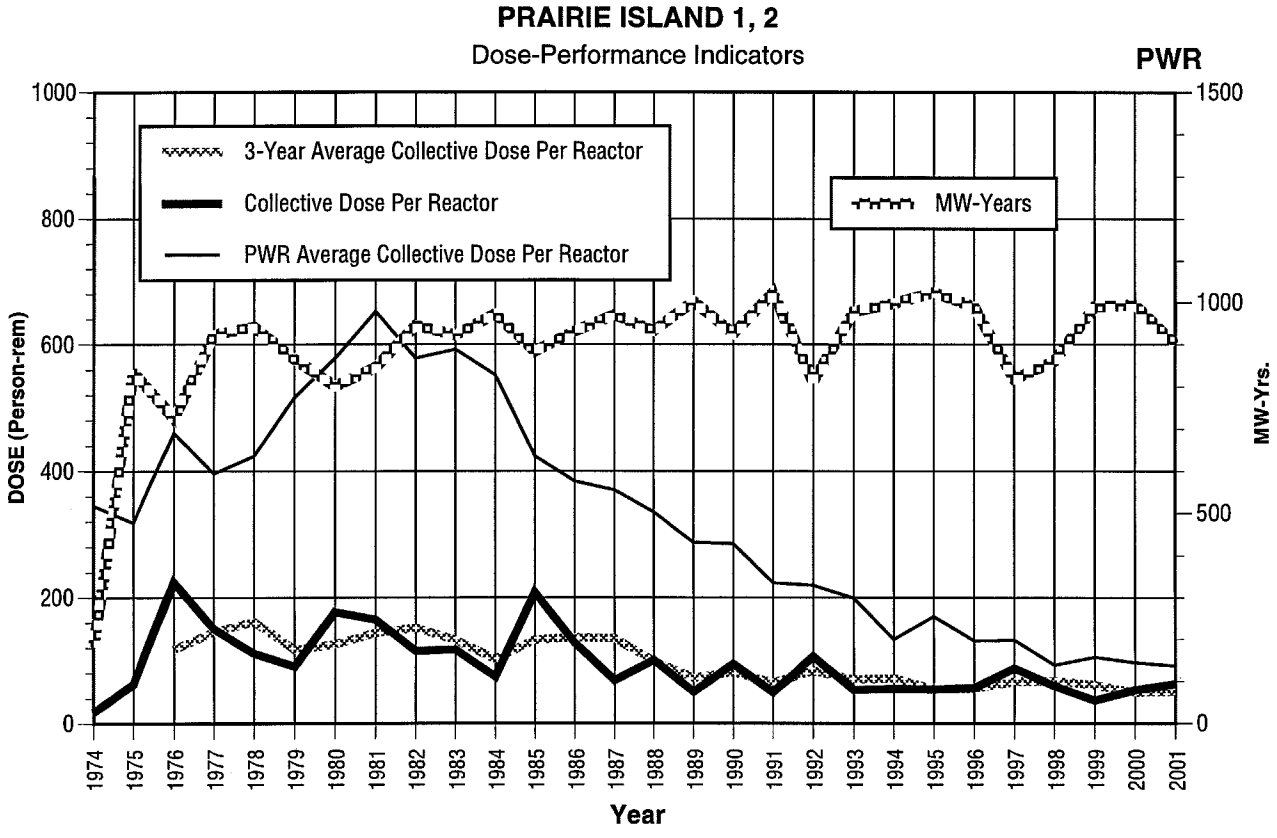


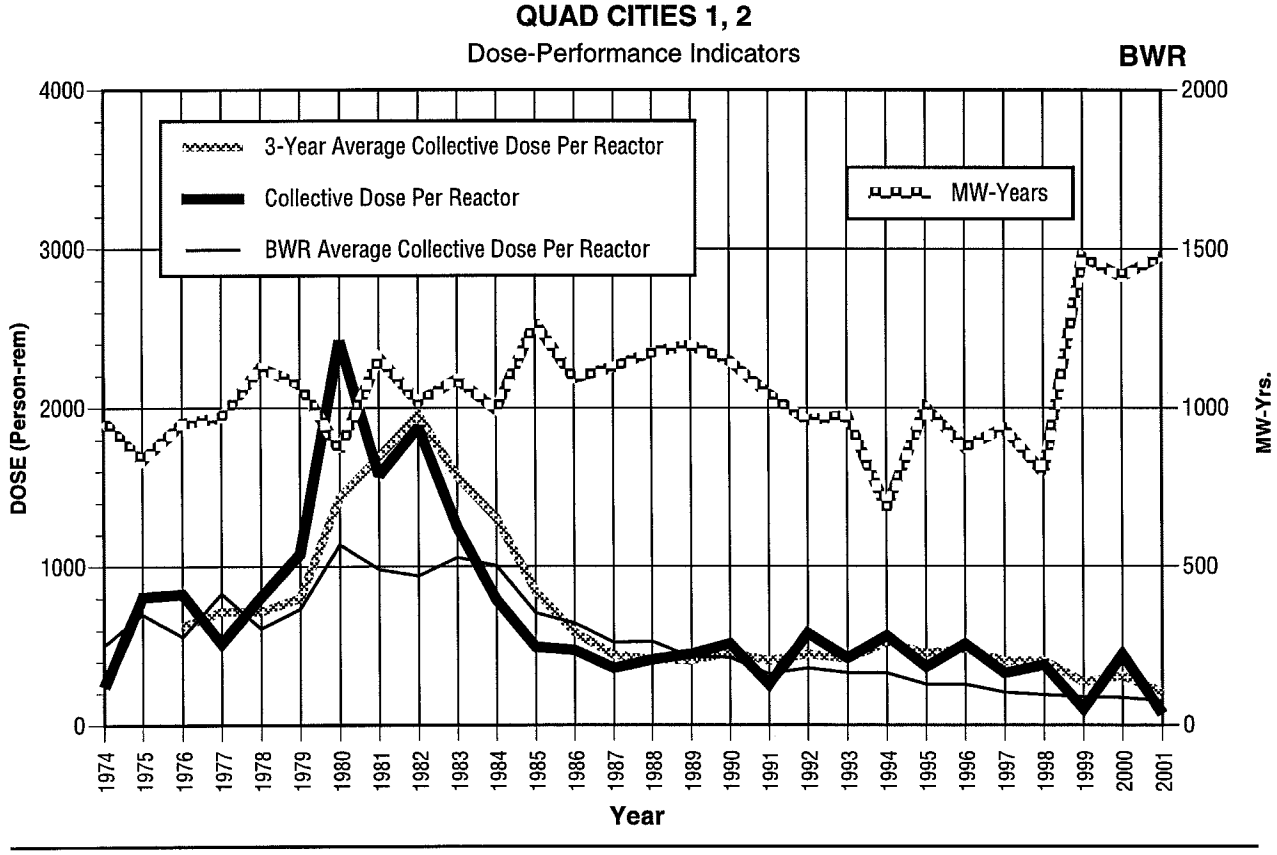

**POINT BEACH 1, 2**

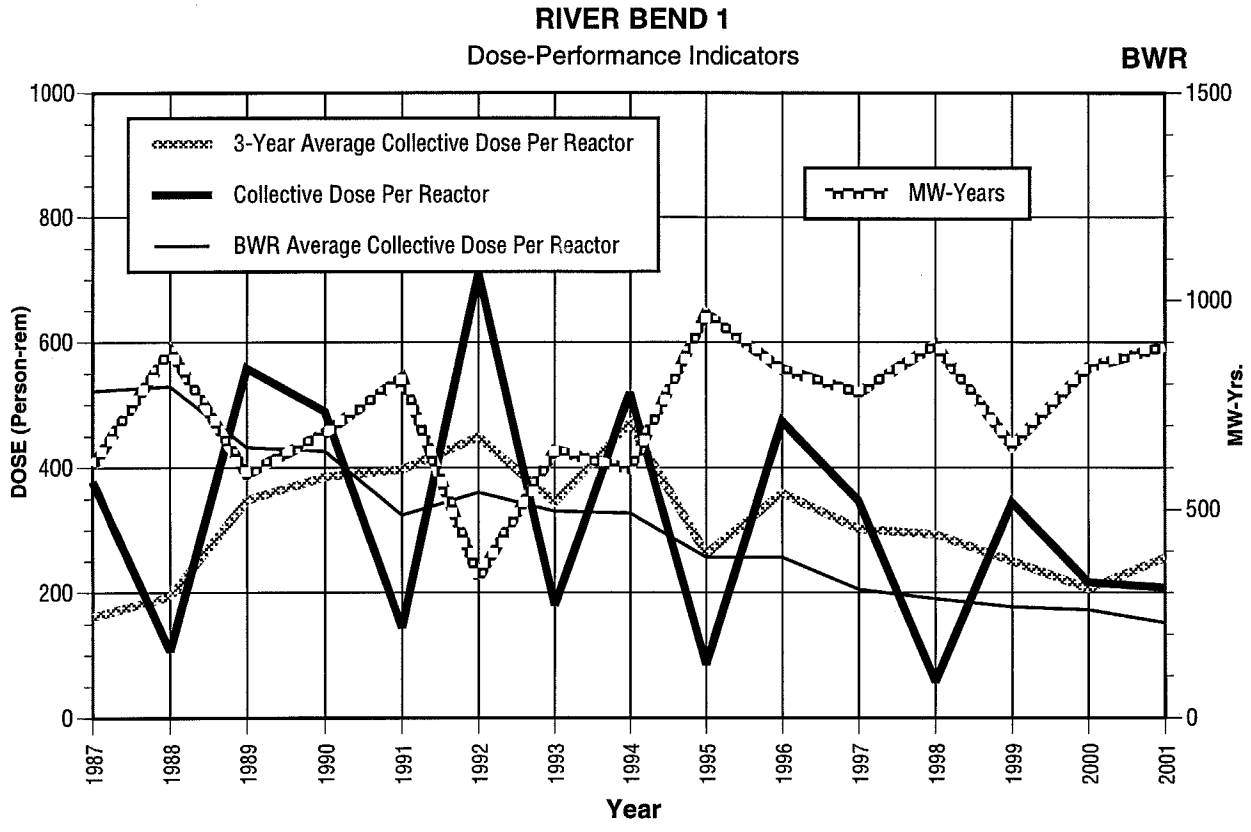
Dose-Performance Indicators

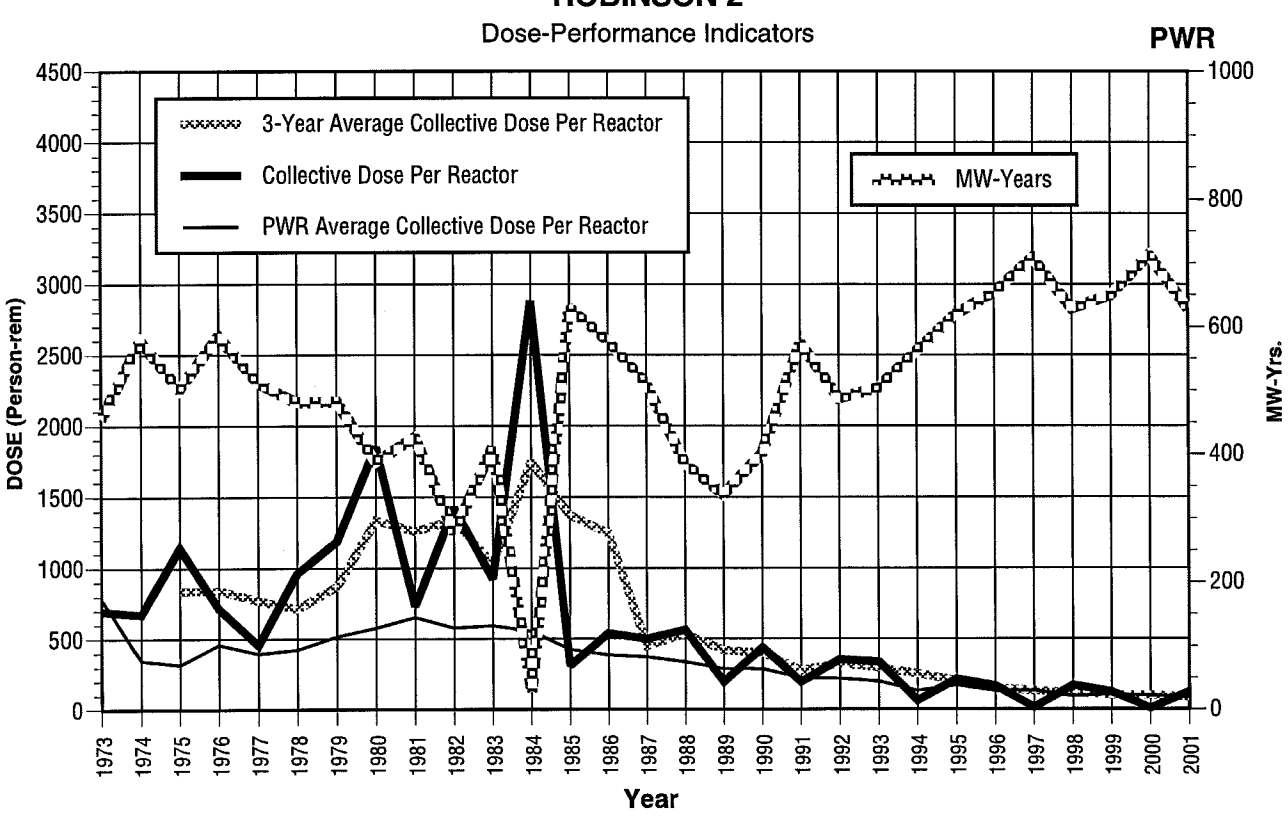
**PWR**

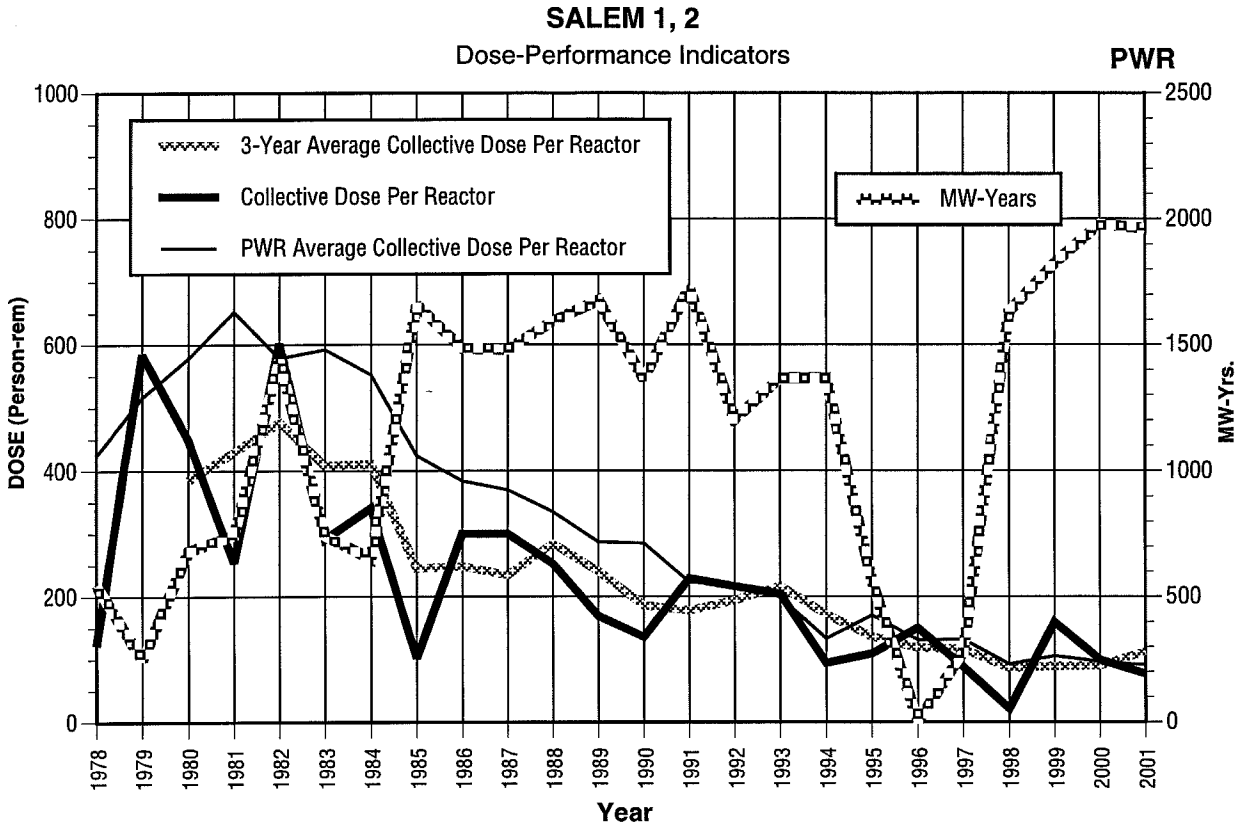


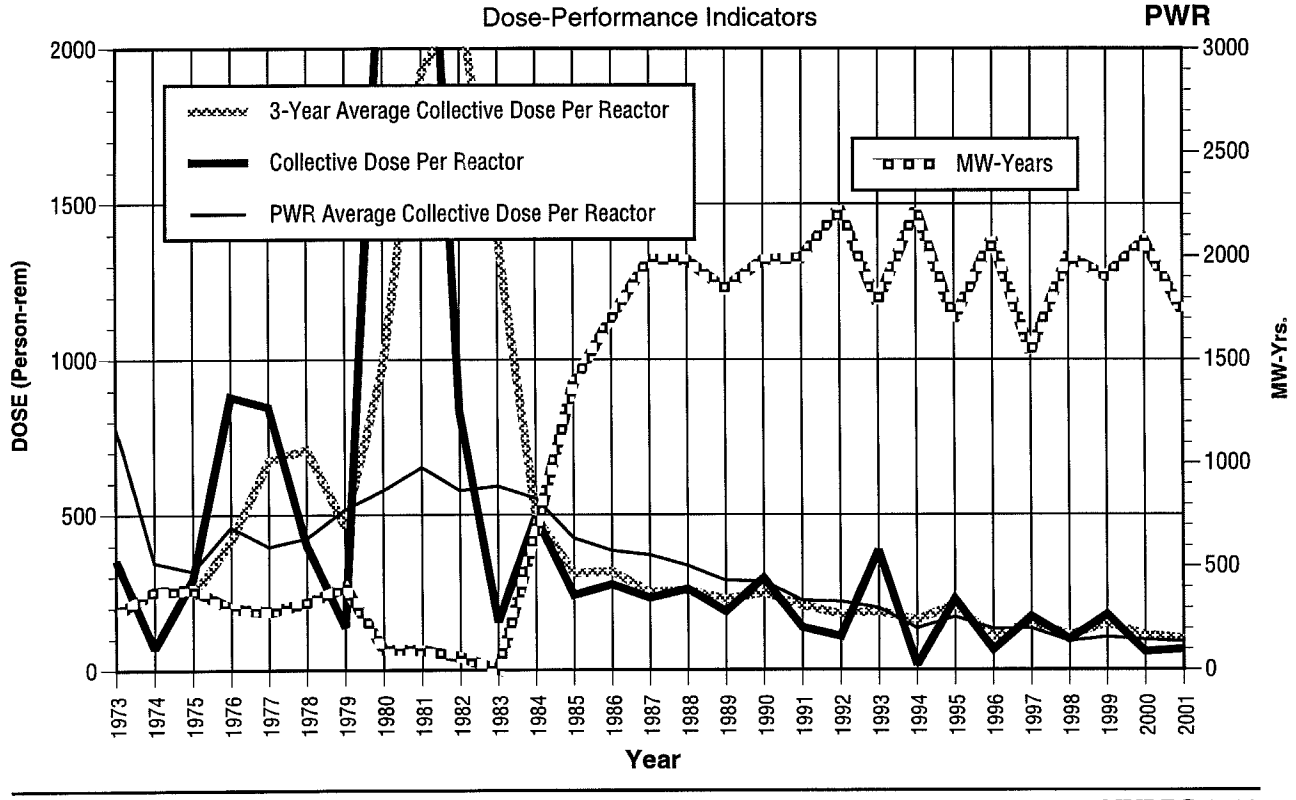

PRAIRIE ISLAND 1, 2
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


QUAD CITIES 1, 2
Dose-Performance Indicators
BWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
BWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


RIVER BEND 1
Dose-Performance Indicators
BWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
BWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


ROBINSON 2
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


SALEM 1, 2
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


SAN ONOFRE 1, 2, 3
Dose-Performance Indicators
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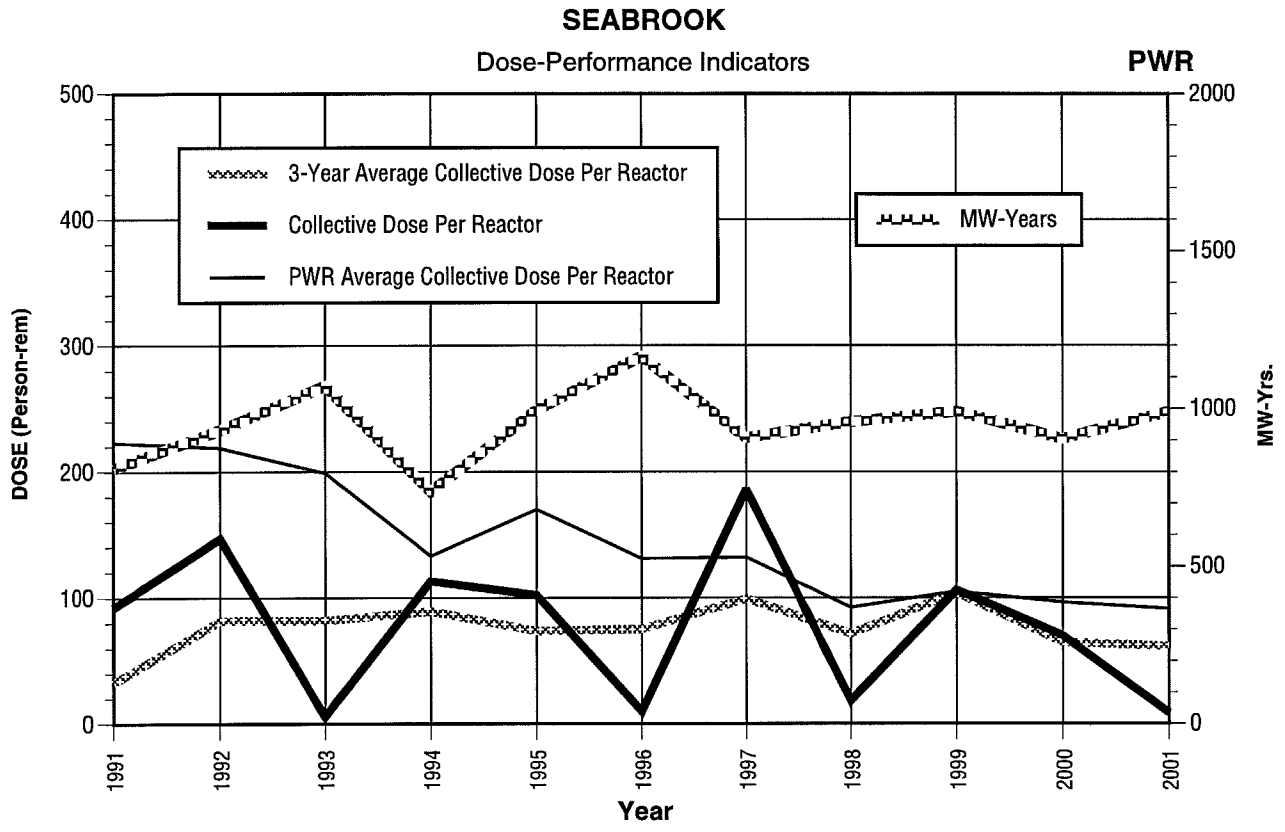
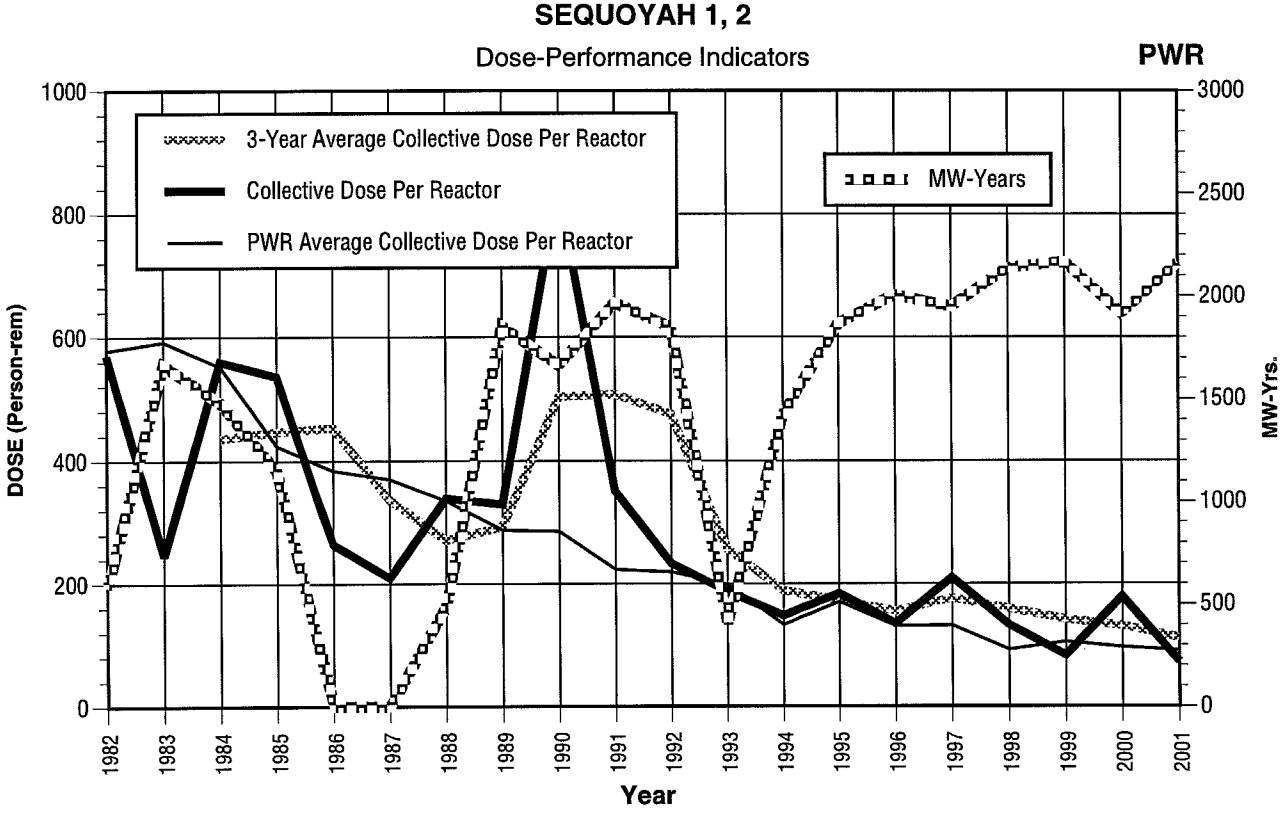
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


SEABROOK
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year
0
100
200
300
400
500
500
1000
1500
2000
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001


SEQUOYAH 1, 2
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year
0
200
400
600
800
1000
500
1000
1500
2000
2500
3000
1982
1983
1984
1985
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
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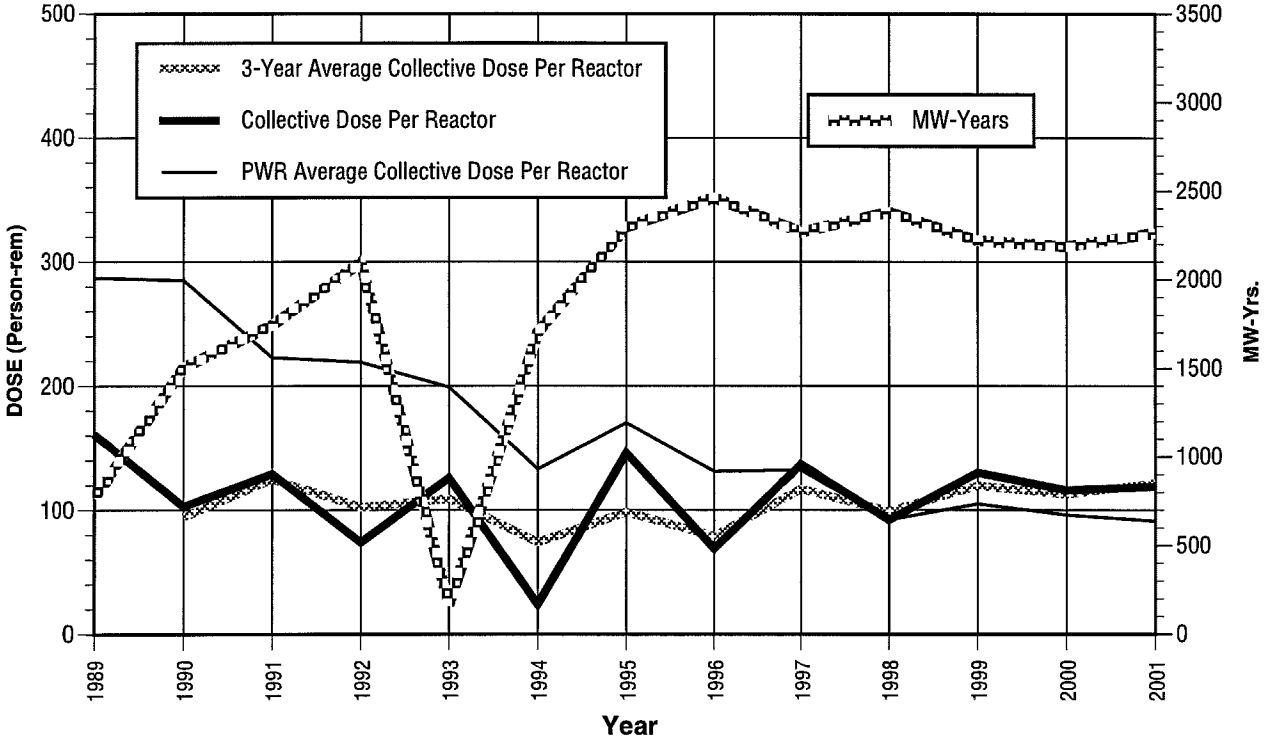
1997
1998
1999
2000
2001

## SOUTH TEXAS 1, 2

Dose-Performance Indicators

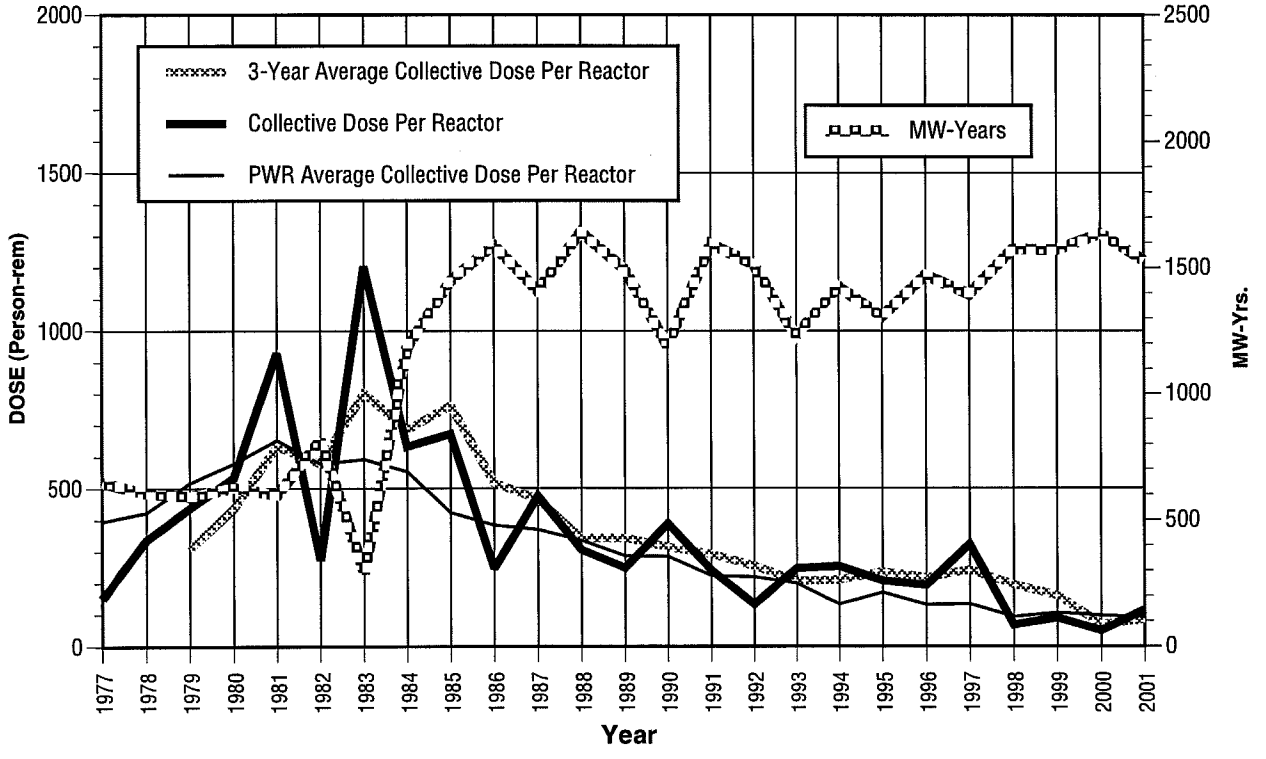
PWR

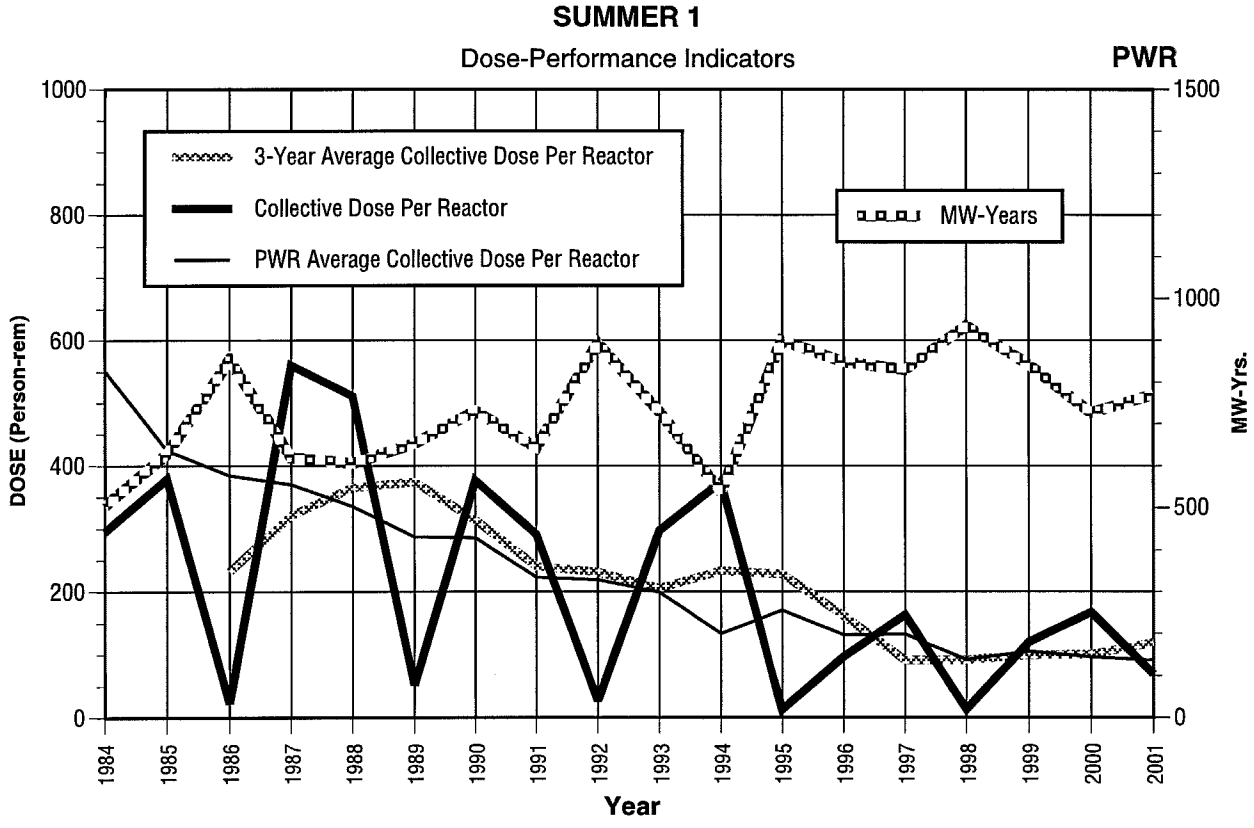


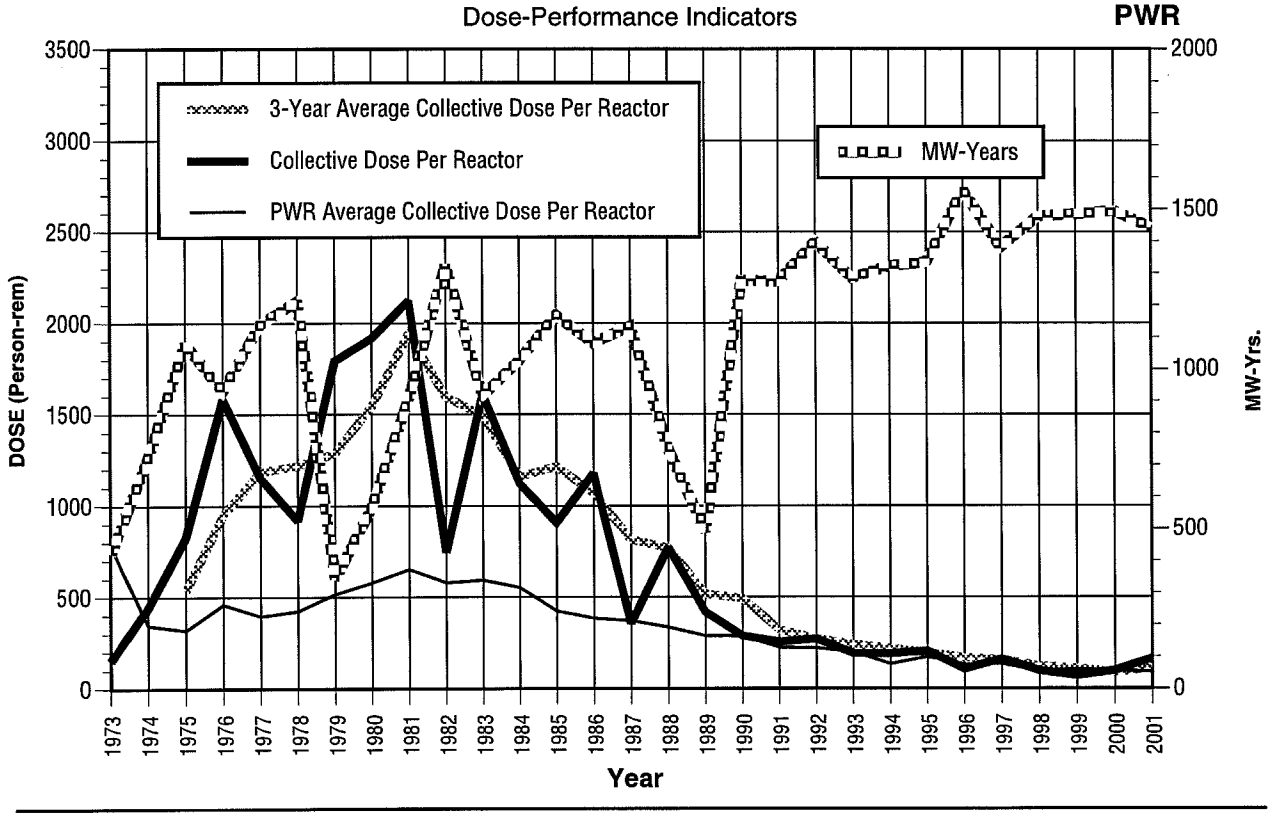

## ST. LUCIE 1, 2

Dose-Performance Indicators

PWR

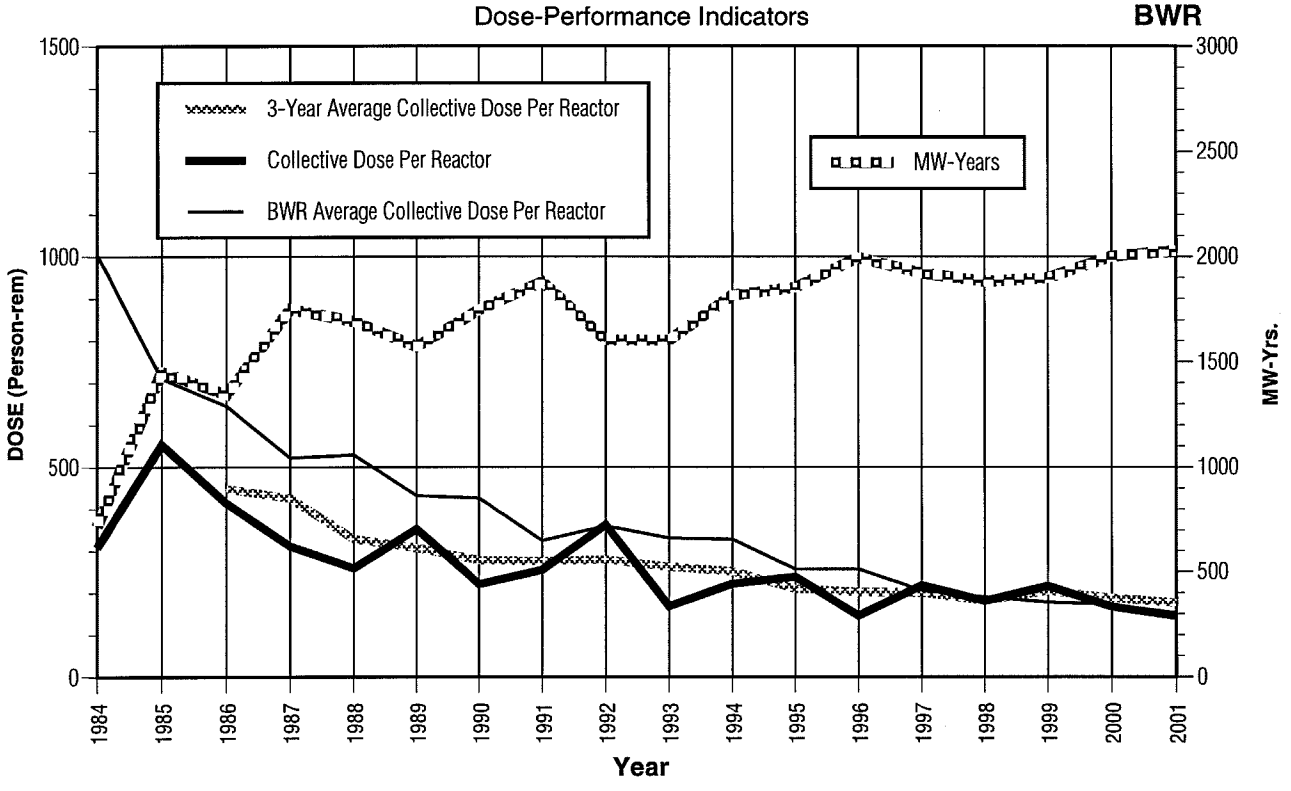



SUMMER 1
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


SURRY 1, 2
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year

## SUSQUEHANNA 1, 2

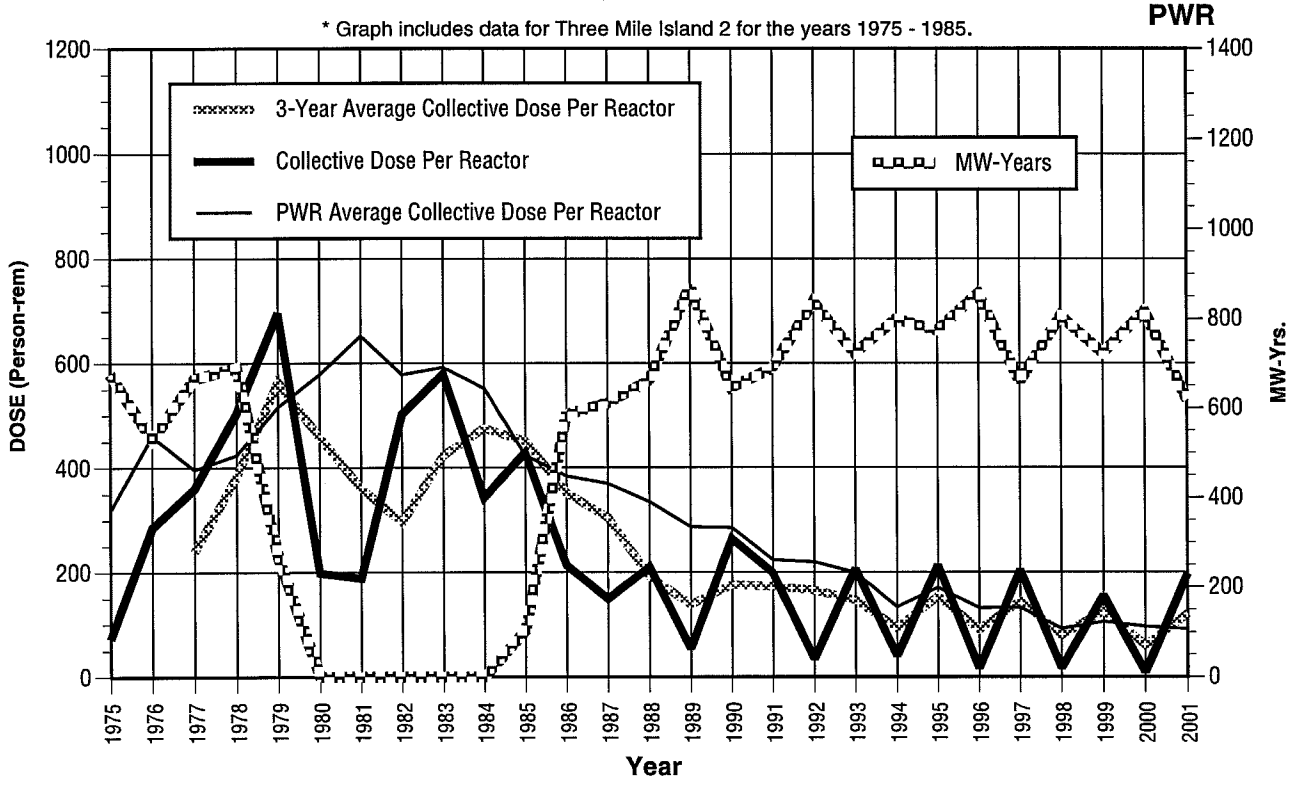
Dose-Performance Indicators

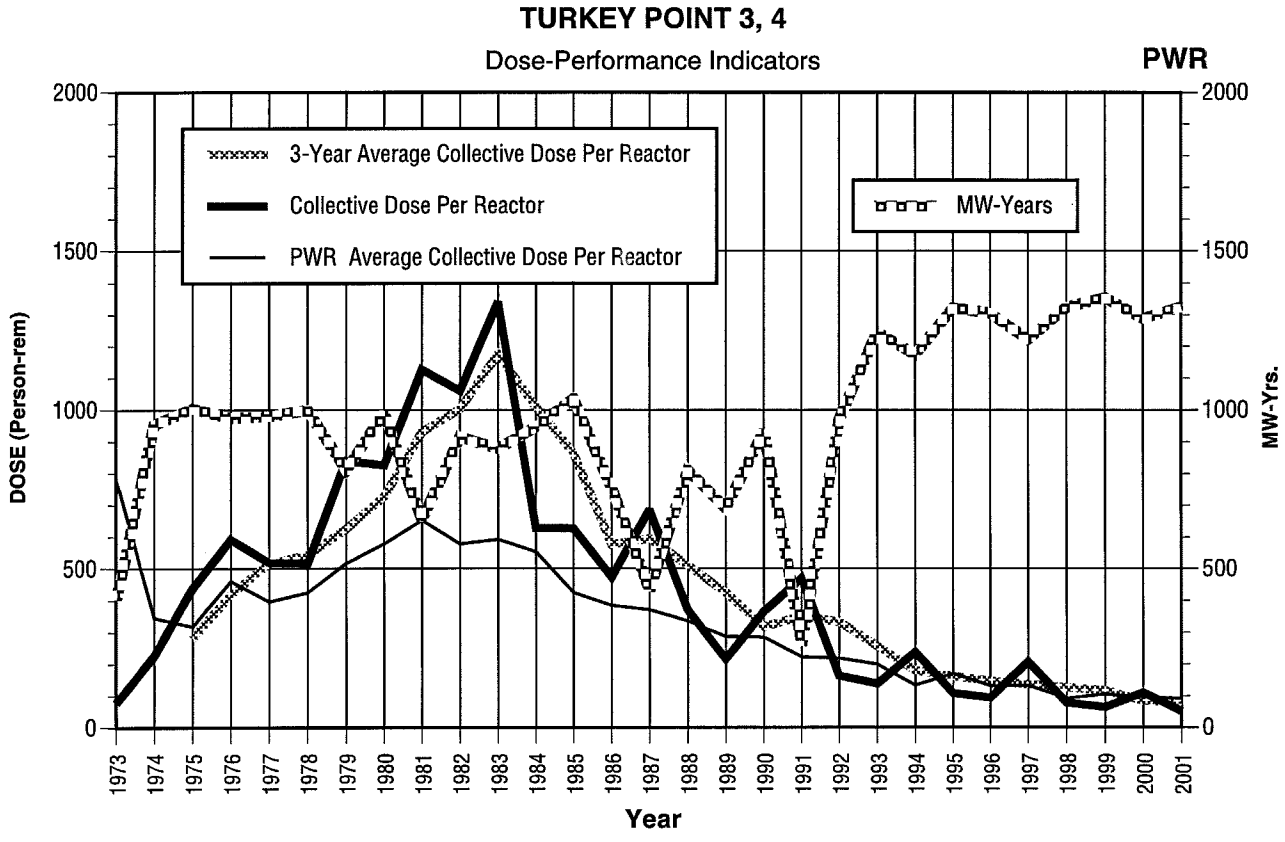


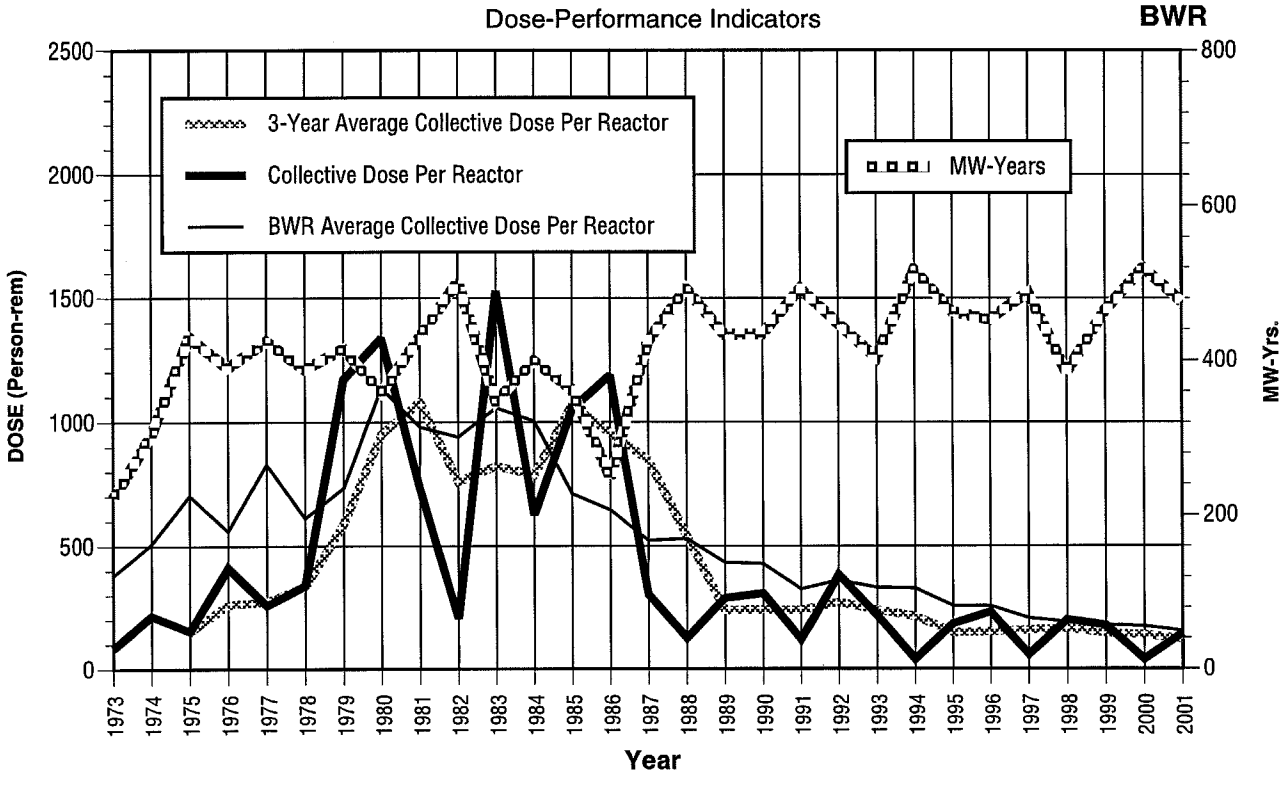

## THREE MILE ISLAND 1*

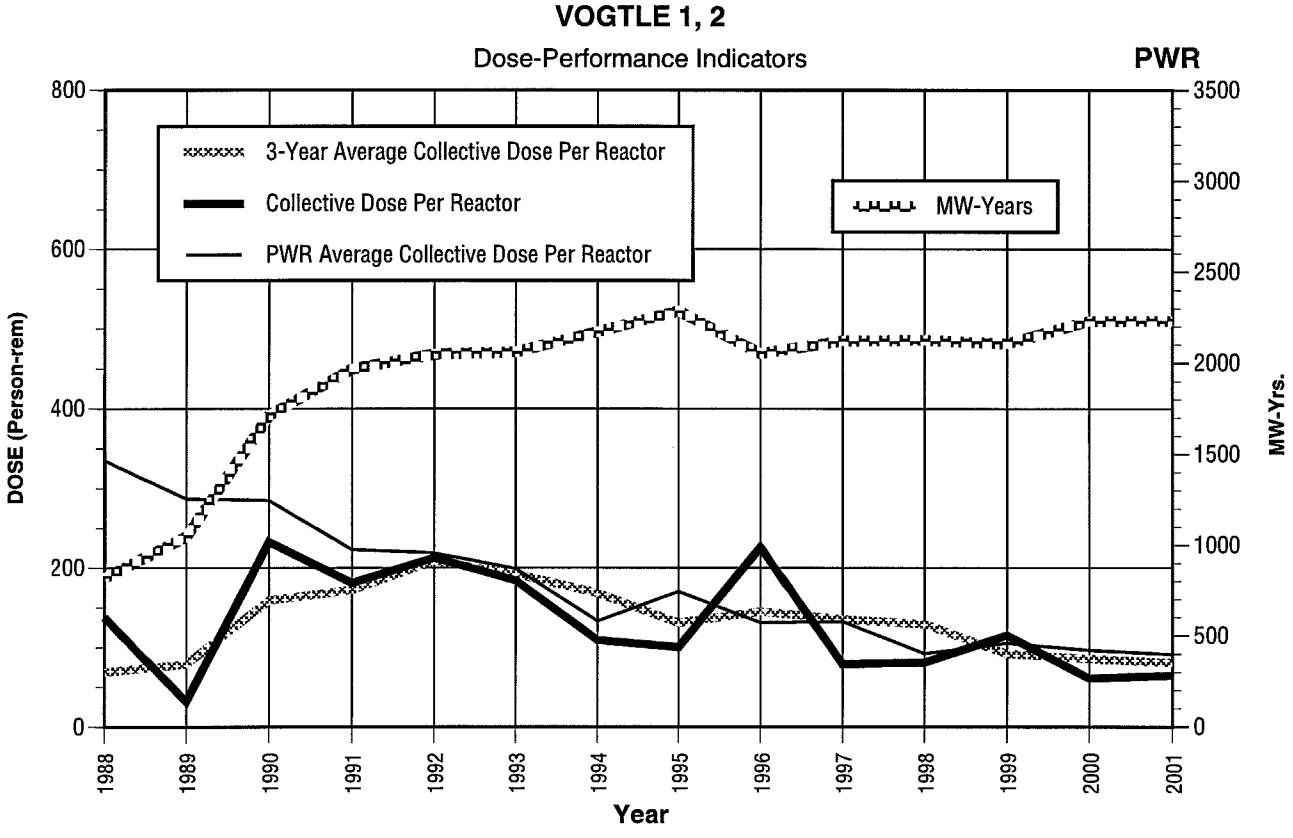
Dose-Performance Indicators

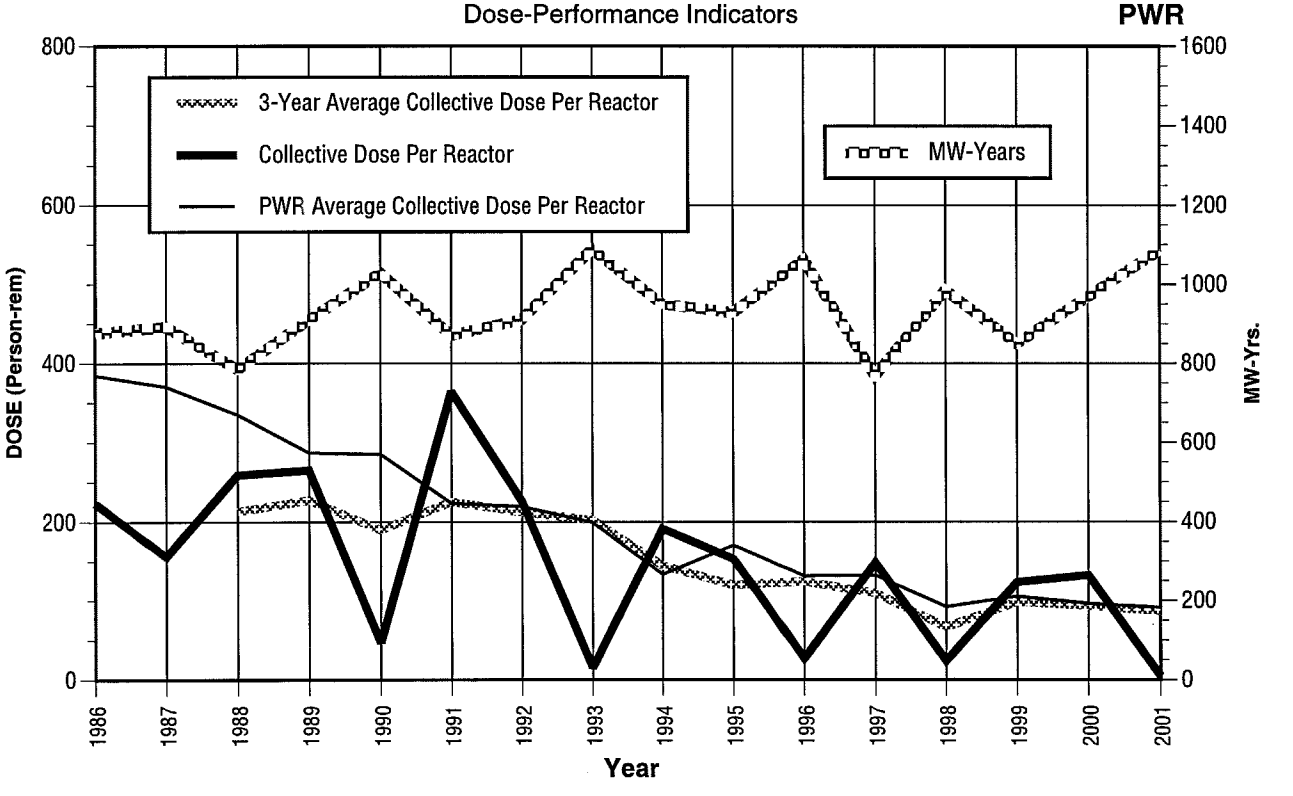
* Graph includes data for Three Mile Island 2 for the years 1975 - 1985.

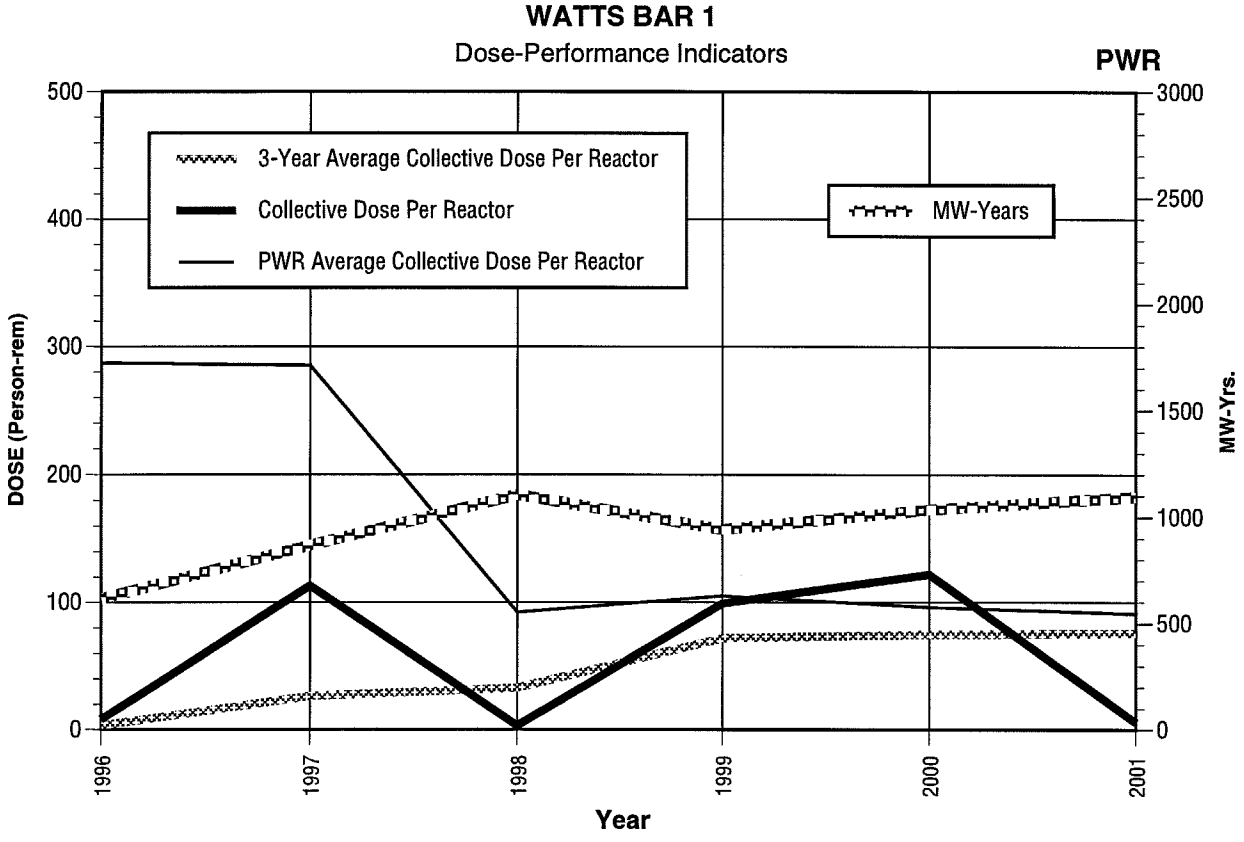


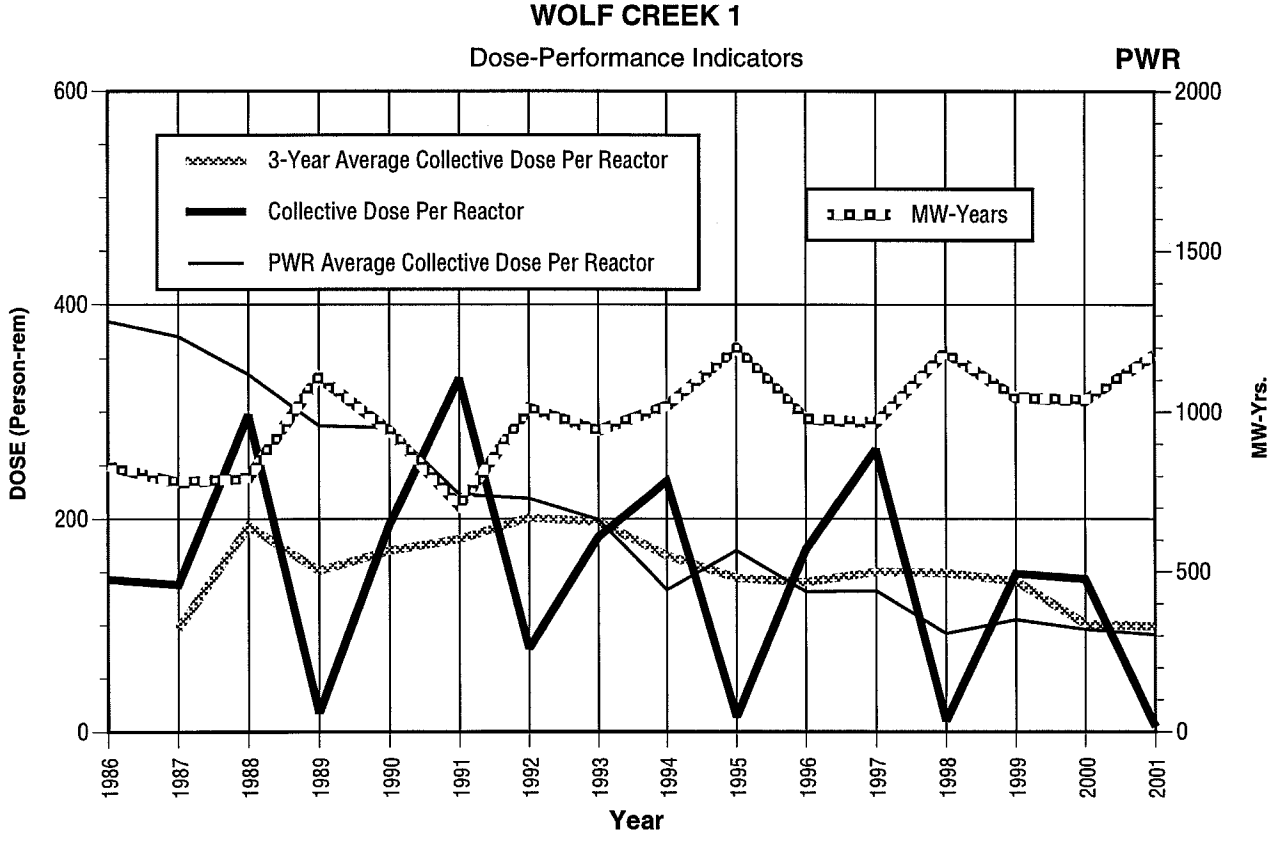

TURKEY POINT 3, 4
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


VERMONT YANKEE
Dose-Performance Indicators
BWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
BWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year


VOGTLE 1, 2
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year
0
200
400
600
800
500
1000
1500
2000
2500
3000
3500
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001


WATERFORD 3
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year
0
200
400
600
800
200
400
600
800
1000
1200
1400
1600
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001


WATTS BAR 1
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year
0
100
200
300
400
500
500
1000
1500
2000
2500
3000
1996
1997
1998
1999
2000
2001


WOLF CREEK 1
Dose-Performance Indicators
PWR
3-Year Average Collective Dose Per Reactor
Collective Dose Per Reactor
PWR Average Collective Dose Per Reactor
MW-Years
DOSE (Person-rem)
MW-Yrs.
Year
0
200
400
600
500
1000
1500
2000
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001