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United States Nuclear Regulatory Commission
*Protecting People and the Environment*

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Volume 40

# Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities 2018

Fifty-First Annual Report

Office of Nuclear Regulatory Research

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## Fifty-First Annual Report

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| NUREG-0713 | Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 2017, Vol. 39, U.S. Nuclear Regulatory Commission, March 2019. |

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

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| 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 (NRC) Radiation Exposure Information and Reporting System (REIRS) database. The bulk of the information contained in this report was compiled from the 2018 annual reports submitted by five of the seven categories[1] of NRC licensees subject to the reporting requirements of Title 10 of the *Code of Federal Regulations* (10 CFR) 20.2206, *Reports of Individual Monitoring*. Because there are no geologic repositories for high-level waste currently licensed and no NRC-licensed low-level waste disposal facilities currently in operation, only five categories are considered in this report. 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.

Annual reports for 2018 were received from a total of **182** NRC licensees from the five categories included in this report. The summation of reports submitted by the **182** licensees indicated that **159,988** individuals were monitored, **67,835** of whom received a measurable dose (see Table 3.1). When adjusted for transient individuals, there were actually **110,861** unique individuals that were monitored, **49,445** of whom received a measurable dose (see Section 5).

The collective dose incurred by these individuals was **8,165** person-rem (81,650 person-millisieverts [mSv]), which represents a **1 percent increase** from the 2017 value (see Table 3.1). The 2018 collective dose is **4 percent lower** than the 5-year average of 8,506 person-rem (2013 – 2017), which is not a statistically significant change.[2] The increase in collective dose in 2018 was small due to decreases in three categories offsetting increases in the remaining two reporting categories; spent fuel storage licensees (**176 percent increase**) and industrial radiographers (**15 percent increase)**. Three reporting categories reported decreases; manufacturing and distribution (M&D) licensees (**2 percent decrease**), fuel cycle licensees (**10 percent decrease)**, and commercial nuclear power reactor licensees (**9 percent decrease)**. When compared to the 5-year average of collective dose for each category, fuel cycle licensees had a statistically significant decrease, and industrial radiographers had a statistically significant increase. The increases or decreases for the remaining three categories were not statistically significant.

The number of individuals receiving a measurable dose decreased by **4 percent** from 2017, but was still **7 percent below** the 5-year average and not statistically significant. When adjusted for transients, the average measurable dose of **0.17 rem** (1.7 mSv) was slightly higher in 2018, compared to **0.16 rem** (1.6 mSv) in 2017, and is not statistically significant when compared to the 5-year average. The average measurable dose is defined as the total effective dose equivalent (TEDE) divided by the number of individuals receiving a measurable dose. In 2018, one individual exceeded **5 rem** (50 mSv) TEDE at an industrial radiography licensee (see Section 6).

In calendar year 2018, the average annual collective dose per reactor for light-water reactor (LWR) licensees was **59** person-rem (590 person-mSv). This is a **9 percent decrease** from the value reported for 2017 (Table 4.3) but is not statistically significant when compared to the 5-year

[1] Commercial nuclear power reactors and test reactor facilities; industrial radiographers; fuel processors (including uranium enrichment facilities), fabricators, and reprocessors; manufacturing and distribution of byproduct material; independent spent fuel storage installations; facilities for land disposal of low-level waste; and geologic repositories for high-level waste. There are currently no NRC licensees involved in low-level waste disposal or geologic repositories for high-level waste.

[2] This report presents additional Statistical Comparisons in Section 2.2.

average. The total outage hours at commercial nuclear power plants decreased **4 percent** from 2017 to 2018 [Ref. 1]. The collective dose for the LWR licensee category decreased **587** person-rem (5,870 person-mSv) from **6,416** person-rem (64,160 person-mSv) in 2017 to **5,829** person-rem (58,290 person-mSv). The average annual collective dose per reactor was **111** person-rem (1,110 person-mSv) for the 33 boiling-water reactors (BWRs) and **34** person-rem (340 person-mSv) for 65 pressurized-water reactors (PWRs). The BWR 2018 value is **3 percent** lower than the 5-year average annual collective dose per BWR reactor. The 2018 value for PWR licensees is **15 percent** below the 5-year average annual collective dose per PWR reactor. Neither of these differences is statistically significant. The primary driver for the decrease in collective dose was the closure of Oyster Creek (BWR).

There were **26,395** individuals that were monitored at two or more licensees during the monitoring year. The assessment of the average measurable dose per individual is adjusted each year to account for the reporting of a measurable dose for transient individuals by multiple licensees. The adjustment to account for transient individuals has been specifically noted in footnotes in the figures and tables for commercial nuclear power reactors.

# FOREWORD

Through this annual report, the U.S. Nuclear Regulatory Commission (NRC) supports openness in its regulatory process by providing the public with accurate and timely information about the radiation protection program of NRC licensees. Toward that end, NUREG-0713, Volume 40, summarizes the 2018 occupational radiation exposure data maintained in the NRC Radiation Exposure Information and Reporting System (REIRS) database.

Seven categories of NRC licensees are required to report annually on individual exposure in accordance with Title 10 of the *Code of Federal Regulations* (10 CFR 20.2206, "Reports of Individual Monitoring"). Specifically, these categories include commercial nuclear power reactors and test reactor facilities; industrial radiographers; fuel processors (including uranium enrichment facilities), fabricators, and reprocessors; manufacturing and distribution of byproduct material; independent spent fuel storage installations; facilities for land disposal of low-level waste; and geologic repositories for high-level waste. Because the NRC has not licensed any geologic repositories for high-level waste and all low-level waste disposal facilities are regulated by Agreement States, this report considers only the first five categories of NRC licensees. As such, this report reflects the occupational radiation exposure data that the NRC received from 182 licensees.

The data submitted by licensees consist of radiation exposure records for each monitored individual. Adjusted for transient individuals who worked at two or more facilities during the year, 110,861 were monitored and 49,445 received a measurable dose in 2018. This report analyzes and presents these records in terms of collective dose and the distribution of dose among the monitored individuals.

# PREFACE

A number of U.S. Nuclear Regulatory Commission (NRC) licensees have inquired as to how the occupational radiation exposure data that are compiled from the individual exposure reports required by Title 10 of the *Code of Federal Regulations* (10 CFR) 20.2206, "Reports of Individual Monitoring," 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 for use in making decisions that impact public health and safety. The NRC staff uses this data for the following purposes:

1. The data permit the evaluation of trends, both favorable and unfavorable, from the viewpoint of the effectiveness of overall NRC/licensee radiation protection and as low as is reasonably achievable (ALARA) efforts by licensees.

2. The 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 (e.g., U.S./foreign, boiling-water reactors/pressurized-water reactors [BWRs/PWRs], civilian/military, facility/facility, nuclear industry/other industries).

3. The data are used within the NRC Reactor Oversight Process for inspection planning and in the Significance Determination Process.

4. The data permit an evaluation of radiation exposure to transient individuals.

5. The data are used to establish priorities for the use of NRC health physics resources: research, standards development, regulatory program development, and inspections conducted at NRC-licensed facilities.

6. The data provide facts for answering Congressional and administration inquiries and for responding to questions raised by the public.

7. The data are used to provide radiation exposure histories to individuals who were exposed to radiation at NRC-licensed facilities.

8. The data provide information that may be used to conduct epidemiologic studies.

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# ABBREVIATIONS AND ACRONYMS

| | |
|---|---|
| AEC | U.S. Atomic Energy Commission |
| ALARA | as low as is reasonably achievable |
| BWR | boiling-water reactor |
| CDE | committed dose equivalent |
| CEDE | committed effective dose equivalent |
| CFR | Code of Federal Regulations |
| D&D | decontamination and decommissioning |
| DDE | deep dose equivalent |
| DOE | U.S. Department of Energy |
| ERDA | Energy Research and Development Administration |
| EVESR | ESADA Vallecitos Experimental Superheat Reactor |
| FBR | fast breeder reactor |
| FSSR | final status survey report |
| IAEA | International Atomic Energy Agency |
| ICRP | International Commission on Radiological Protection |
| ISFSI | independent spent fuel storage installation |
| ISOE | Information System on Occupational Exposure |
| ISOEDAT | Information System on Occupational Exposure Database |
| LDE | lens dose equivalent |
| LTP | license termination plan |
| LWR | light-water reactor |
| M&D | manufacturing and distribution |
| mSv | millisievert |
| MW | megawatts |
| MWe | megawatts electric |
| MWt | megawatts thermal |
| MW-hr | megawatt-hour |
| MW-yr | megawatt-year |
| NEA | Nuclear Energy Agency |
| NMSS | Office of Nuclear Material Safety and Safeguards |
| NRC | U.S. Nuclear Regulatory Commission |
| NS | Nuclear Ship |
| OECD | Organisation for Economic Co-operation and Development |
| PSDAR | post-shutdown decommissioning activities report |
| PWR | pressurized-water reactor |
| REIRS | Radiation Exposure Information and Reporting System |

| | |
|---|---|
| SDE-ME | shallow dose equivalent maximally exposed extremity |
| SDE-WB | shallow dose equivalent whole body |
| SI | international system of units |
| SG | steam generator |
| Sv | sieverts |
| TBD | to be determined |
| TEDE | total effective dose equivalent |
| TMI | Three Mile Island |
| TODE | total organ dose equivalent |
| $UF_6$ | uranium hexafluoride |
| VBWR | Vallecitos Boiling-Water Reactor |

# 1 INTRODUCTION

## 1.1 Background

One of the basic purposes of the Atomic Energy Act and the implementing regulations in Title 10 of the *Code of Federal Regulations* (10 CFR) Part 20, *Standards for Protection Against Radiation*, is to protect the health and safety of the public, including the employees of the licensees conducting operations under those regulations.

On November 4, 1968, the U.S. Atomic Energy Commission (AEC) published an amendment to 10 CFR Part 20 requiring the reporting of a statistical summary of occupational radiation exposure information (but not individual exposure records) to a central repository at AEC Headquarters. At that time, there were only four categories[1] of AEC licensees required to report. These facilities were considered to have the greatest potential for significant occupational doses. Licensees were required to report the total number of individuals who were monitored per dose range (§20.407) and provide cumulative radiation exposure reports for individuals no longer employed (§20.408). Occupational exposure data were extracted from these reports and entered into the AEC 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, TN, until May 1990.

At that time, the data were transferred to a database management system and are now maintained at the Oak Ridge Institute for Science and Education, which is managed by Oak Ridge Associated Universities. The computerization of these data facilitates their collection 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 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 U.S. Department of Energy (DOE) is collected and published by the DOE Office of ES&H Reporting and Analysis within the Office of Environment, Health, Safety and Security in Germantown, MD.

In 1982 and 1983, 10 CFR 20.408(a) was amended to require three additional categories of NRC licensees to submit annual statistical exposure reports and individual termination exposure reports. The three additional NRC licensee categories were: (1) geologic repositories for high-level radioactive waste, (2) independent spent fuel storage installations (ISFSIs), 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 one of these additional categories

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

(i.e., ISFSIs), since there are no geologic repositories for high-level waste currently licensed and there are no low-level waste land disposal facilities currently in operation that report to the NRC.

In May 1991, 10 CFR Part 20 was revised to redefine the radiation monitoring and reporting requirements of NRC licensees. Instead of submitting annual reports summarizing the total number of individuals who were monitored (§20.407) and termination reports (§20.408), licensees were required to submit an annual report of the dose received by each monitored individual (§20.2206). Licensees were required to implement the new requirements no later than January 1994. The regulations in 10 CFR 20.1502 specify conditions that require individual monitoring of external and internal occupational dose. Each licensee is also required, under 10 CFR 20.2106, to maintain records of the results of such monitoring until the Commission terminates the license.

This report summarizes information reported for the current year and previous 10 years. More licensee-specific data for the previous 10 years, such as the annual reports submitted by each commercial nuclear power reactor pursuant to 10 CFR 20.407 and 20.2206 (after 1993) and their technical specifications (before Volume 20 of this report), may be found in the documents listed on the inside of the front cover of this report for the specific year desired. Additional operating data and statistics for each commercial nuclear power reactor for the years 1973 through 1982 may be found in a series of reports, “Nuclear Power Plant Operating Experience” [Refs. 3–11]. These documents are available for viewing at all NRC public document rooms, as well as on the NRC public Web site (https://www.nrc.gov), or they may be purchased from the National Technical Information Service, as shown in the References section.

## 1.2 Radiation Exposure Information on the Internet

In May 1995, the NRC began disseminating radiation exposure information at a Web site on the Internet. This site allows interested parties to access the data electronically rather than through the published NUREG-0713 document. A Web site was created for radiation exposure and linked to 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 on line or download information for further analysis. REIRView, a software package designed to validate a licensee’s annual data submittal, is available for downloading on the Web site. There are also links to other Web sites dealing with the topics of radiation and health physics. Individuals may submit requests for their dose records contained in REIRS on this Web site. In addition, organizations that have provided documentation to the NRC may submit requests for dose records contained in REIRS on this Web site.

The NRC intends to continue disseminating radiation exposure information on the Web and will focus more resources on the electronic distribution of information rather than on the publication of hard-copy reports.

The main Web address for the NRC is

https://www.nrc.gov

The NRC radiation exposure information Web URL is

https://www.reirs.com

Comments on this report or on the NRC's radiation exposure Web page should be directed to

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# 2 LIMITATIONS OF THE DATA

## 2.1 Limitations

All of the figures compiled in this report relating to exposures and occupational 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, assists in characterizing 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 at levels sufficient to demonstrate compliance with occupational dose limits. As a minimum, monitoring must be provided for adults likely to receive, in 1 year from sources external to the body, a dose in excess of 10 percent of the applicable limits in 10 CFR 20.1201(a) and all individuals entering a high or very high radiation area. Separate dose limits have been established for minors, declared pregnant women, and members of the public. Depending on the administrative policy of each licensee, persons such as visitors and administrative individuals may also be provided with monitoring devices, even though the probability of their exposure to measurable levels of radiation is extremely small.

Pursuant to 10 CFR 20.2206(b), certain categories of licensees must submit an annual report of the results of individual monitoring carried out by the licensee for each individual for whom monitoring was required by 10 CFR 20.1502. In addition to this requirement, many licensees elect to report the doses for every individual for whom they provided monitoring. This practice increases the number of individuals that are monitored for radiation exposure. In an effort to account for this increase, the number of individuals reported as having "no measurable dose"[1] is subtracted from the total number of monitored individuals. This resulting number can then be used to calculate the average measurable dose per individual with a measurable dose, as well as the average dose per monitored individual (i.e., with or without a measurable dose).

This report can be obtained from the Web site, www.reirs.com. This report does not include compilations of non-occupational exposures, such as exposures received by medical patients from X-rays, fluoroscopy, or accelerators.

This report contains information reported by NRC licensees. Since NRC licenses all commercial nuclear power reactors, fuel processors and fabricators, and ISFSIs, information shown for these categories reflect all relevant activity in the United States. This is not the case, however, for the remaining categories of industrial radiography, manufacturing and distribution (M&D) of specified quantities of byproduct material, and low-level waste disposal. Many companies that conduct these types of activities are located in Agreement States. More than six times as many facilities are licensed and regulated by Agreement States than are licensed and regulated by the NRC. Agreement States are not required to adopt the reporting requirements in 10 CFR 20.2206. As a result, Agreement State licensees are not required to submit occupational dose reports to the NRC.

Although some Agreement State licensees voluntarily submit occupational dose reports to the NRC, these results are not included in the analyses presented in Sections 3, 5, and 6 of this report. NUREG-2118, *Occupational Radiation Exposure at Agreement State-Licensed Materials*

[1] The number of individuals with measurable dose includes any individual with a total effective dose equivalent (TEDE) greater than zero rem. Individuals reported with zero dose, or no detectable dose, are included in the number of individuals with no measurable exposure.

*Facilities, 1997-2010*, provides information regarding occupational radiation exposures at Agreement State-licensed facilities [Ref. 12].

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 facilities. Section 5 contains an analysis that adjusts the data for transient individuals being counted more than once.

When examining the annual statistical data, it is important to note 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 commercial nuclear power reactors, may monitor numerous individuals for periods of much less than a year.

Considerable attention should be given when referencing the collective totals presented in this report. The differences between the totals presented for all licensees that reported versus only those licensees that are required to report should be noted. See Section 1.1 for the categories of licensees that are required to report to REIRS. A number of licensees are not required to report to REIRS, but voluntarily report for convenient recordkeeping or because they have reported in the past and have decided to continue to do so. These licensees are listed in Appendix A, Table A2 – "Other Facilities Reporting to the NRC, 2018."

The data contained in this report are subject to change because licensees may submit corrections or additions to data for previous years.

All dose equivalent values in this report are given in units of rem in accordance with the general provisions for records in 10 CFR 20.2101(a).

1 rem = 0.01 sievert (Sv)
1 rem = 10 millisievert (mSv)
1 Curie (Ci) = 3.7 X $10^{10}$ Becquerel (Bq)

## 2.2 Statistical Comparisons

For statistical comparisons of averages, a two-sided one-sample t test with a 0.05 significance level (i.e., 95 percent confidence) is used to determine whether the difference between the two averages is significantly different. For values that are not averages, such as total collective dose, a 5-year average from the previous 5 years (not including the current year under consideration) is calculated with 95 percent confidence interval based on the normal distribution. If the value for the current year falls within the 5-year 95 percent confidence interval, then it is not significantly different; whereas, if the value falls outside (i.e., below the lower limit or above the upper limit), there is an indication of a statistical significant change.

Two-sided one-sample t test formula:

$$t = \frac{\overline{X} - \mu}{\frac{s}{\sqrt{N}}}$$

Where:

t = calculated t statistic

$\bar{X}$ = sample mean

μ = population mean

S = sample standard deviation

N = sample number

Example:

We wish to determine if the average measurable dose for a type of nuclear reactor differs from the previous 5 years. The 5-year mean for the average measurable dose is 0.080. The population mean is the current year's average measurable dose, 0.060. The sample standard deviation is 0.01, and the sample number is 5. Using the formula,

$$t = \frac{0.080 - 0.060}{\frac{0.01}{2.236}} = 4.472$$

The two-tailed probability value (as obtained from a Student's t distribution table) given a t-value of 4.472 is 0.006 which is statistically significant at a 0.05 significance level.

It should be noted that an analysis of the uncertainties associated with dosimetry and dose measurement is not included in this report. The inferences and statements represented in the report are based upon the data as reported by the licensees, which does not include uncertainty values associated with the dosimetric calculations. All statistical inferences are made at the population level, i.e., aggregated doses for a licensee or group of licensees.

# 3 ANNUAL PERSONNEL MONITORING REPORTS – 10 CFR 20.2206

## 3.1 Definition of Terms and Methodologies

### 3.1.1 Number of Licensees Reporting

The number of licensees in each category is provided in Table 3.1 for each of the seven[1] categories that are required to report pursuant to 10 CFR 20.2206. The first column denotes the NRC license category and the program code. The program code is a five-digit number assigned by NRC to each licensee to designate the major activity or principal use authorized in the license. A full description and definition is referenced in *Consolidated Guidance about Materials Licenses*, NUREG-1556, Volume 20, Appendix G [Ref. 13]. The third column in Table 3.1 shows the number of licensees that have filed such reports during the past 11 years. All commercial nuclear power reactors, fuel processors and fabricators, and ISFSIs are required to report occupational exposures to the NRC, whether or not they are in an Agreement State.

Many companies that conduct industrial radiography and M&D activities are located in and regulated by Agreement States and are, therefore, not required to adopt the reporting requirements of 10 CFR 20.2206. However, industrial radiography and M&D licensees that are licensed and regulated by the NRC are required to report occupational exposure to the NRC. Appendix A, Table A1 lists all nonreactor licensees that reported occupational data to the NRC in 2018.

### 3.1.2 Number of Monitored Individuals

The number of monitored individuals refers to the total number of individuals that NRC licensees reported as being monitored for exposure to external or internal radiation during the year. This number includes both individuals for whom monitoring is required, as well as individuals for whom monitoring was voluntarily provided and reported (e.g., workers receiving a minimal dose below the monitoring threshold, visitors, service representatives, contract individuals, and administrative individuals).

The total number of individuals 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. 14].

### 3.1.3 Number of Individuals with Measurable Dose

The number of individuals with a measurable dose includes any individual with a TEDE that is reported as a positive value.

[1] These categories are commercial nuclear power reactors and test reactor facilities; industrial radiographers; fuel processors (including uranium enrichment facilities), fabricators, and reprocessors; manufacturing and distribution of byproduct material; ISFSIs; facilities for land disposal of low-level waste; and geologic repositories for high-level waste. There are currently no NRC licensees involved in low-level waste disposal or geologic repositories for high-level waste.

## Table 3.1 Average Annual Exposure Data for Certain Categories of NRC Licensees 2008–2018

| NRC License Category* and Program Code | Calendar Year | Number of Licensees Reporting | Number of Monitored Individuals | Number of Individuals with Measurable TEDE | Collective TEDE (person-rem) | Average TEDE (rem) | Average Measurable TEDE per Individual (rem) |
|---|---|---|---|---|---|---|---|
| **Industrial Radiography**<br><br>**03310**<br>**03320** | 2008 | 62 | 2,976 | 2,593 | 1,461.405 | 0.49 | 0.56 |
| | 2009 | 65 | 2,662 | 2,307 | 1,317.982 | 0.50 | 0.57 |
| | 2010 | 57 | 2,377 | 2,034 | 1,297.300 | 0.55 | 0.64 |
| | 2011 | 64 | 2,545 | 2,210 | 1,608.821 | 0.63 | 0.73 |
| | 2012 | 67 | 2,670 | 2,275 | 1,508.792 | 0.57 | 0.66 |
| | 2013 | 60 | 2,925 | 2,506 | 1,547.351 | 0.53 | 0.62 |
| | 2014 | 57 | 3,288 | 2,862 | 1,778.171 | 0.54 | 0.62 |
| | 2015 | 69 | 3,426 | 2,908 | 1,695.040 | 0.49 | 0.58 |
| | 2016 | 64 | 3,035 | 2,635 | 1,270.459 | 0.42 | 0.48 |
| | 2017 | 62 | 3,389 | 2,912 | 1,709.858 | 0.50 | 0.59 |
| | 2018 | 61 | 3,876 | 3,303 | 1,967.879 | 0.51 | 0.60 |
| **Manufacturing and Distribution**<br><br>**02500**<br>**03211**<br>**03212**<br>**03214** | 2008 | 18 | 1,934 | 1,341 | 222.123 | 0.11 | 0.17 |
| | 2009 | 17 | 1,939 | 1,388 | 179.539 | 0.09 | 0.13 |
| | 2010 | 18 | 976 | 672 | 146.667 | 0.15 | 0.22 |
| | 2011 | 16 | 903 | 702 | 112.023 | 0.12 | 0.16 |
| | 2012 | 22 | 1,057 | 713 | 118.709 | 0.11 | 0.17 |
| | 2013 | 20 | 994 | 627 | 114.550 | 0.12 | 0.18 |
| | 2014 | 19 | 962 | 656 | 138.631 | 0.14 | 0.21 |
| | 2015 | 21 | 949 | 634 | 155.688 | 0.16 | 0.25 |
| | 2016 | 21 | 905 | 606 | 142.958 | 0.16 | 0.24 |
| | 2017 | 21 | 940 | 615 | 139.071 | 0.15 | 0.23 |
| | 2018 | 14 | 1,086 | 718 | 136.505 | 0.13 | 0.19 |
| **Independent Spent Fuel Storage**<br><br>**23100**<br>**23200** | 2008 | 2 | 53 | 21 | 1.248 | 0.02 | 0.06 |
| | 2009 | 2 | 72 | 34 | 1.465 | 0.02 | 0.04 |
| | 2010 | 2 | 73 | 39 | 1.337 | 0.02 | 0.03 |
| | 2011 | 2 | 54 | 25 | 1.449 | 0.03 | 0.06 |
| | 2012 | 2 | 42 | 15 | 1.099 | 0.03 | 0.07 |
| | 2013 | 2 | 53 | 18 | 1.533 | 0.03 | 0.09 |
| | 2014 | 2 | 51 | 22 | 3.192 | 0.06 | 0.15 |
| | 2015 | 2 | 57 | 20 | 1.102 | 0.02 | 0.06 |
| | 2016 | 2 | 57 | 22 | 0.579 | 0.01 | 0.03 |
| | 2017 | 2 | 67 | 20 | 0.631 | 0.01 | 0.03 |
| | 2018 | 2 | 70 | 17 | 1.740 | 0.02 | 0.10 |
| **Fuel Cycle Licenses - Fabrication, Processing, and Uranium Enrichment, and $UF_6$ Production Plants**<br><br>**11400**<br>**21200**<br>**21210** | 2008 | 10 | 7,807 | 3,424 | 538.201 | 0.07 | 0.16 |
| | 2009 | 11 | 8,918 | 3,738 | 533.721 | 0.06 | 0.14 |
| | 2010 | 11 | 9,362 | 4,212 | 541.876 | 0.06 | 0.13 |
| | 2011 | 11 | 9,535 | 4,361 | 607.202 | 0.06 | 0.14 |
| | 2012 | 9 | 7,388 | 3,541 | 438.729 | 0.06 | 0.12 |
| | 2013 | 8 | 7,476 | 3,942 | 357.067 | 0.05 | 0.09 |
| | 2014 | 9 | 6,689 | 3,685 | 366.224 | 0.05 | 0.10 |
| | 2015 | 7 | 5,296 | 3,033 | 327.112 | 0.06 | 0.11 |
| | 2016 | 7 | 5,413 | 2,999 | 277.687 | 0.05 | 0.09 |
| | 2017 | 7 | 5,058 | 2,930 | 254.997 | 0.05 | 0.09 |
| | 2018 | 7 | 4,737 | 2,783 | 229.530 | 0.05 | 0.08 |
| **Commercial Light-Water Reactors (LWRs) ****<br><br>**41111** | 2008 | 104 | 169,325 | 79,450 | 9,195.940 | 0.05 | 0.12 |
| | 2009 | 104 | 176,381 | 81,754 | 10,024.804 | 0.06 | 0.12 |
| | 2010 | 104 | 179,648 | 75,010 | 8,631.384 | 0.05 | 0.12 |
| | 2011 | 104 | 191,538 | 81,321 | 8,771.326 | 0.05 | 0.11 |
| | 2012 | 104 | 193,977 | 79,549 | 8,035.393 | 0.04 | 0.10 |
| | 2013 | 100 | 174,614 | 67,236 | 6,759.547 | 0.04 | 0.10 |
| | 2014 | 100 | 174,853 | 70,847 | 7,124.519 | 0.04 | 0.10 |
| | 2015 | 99 | 176,886 | 70,798 | 7,019.088 | 0.04 | 0.10 |
| | 2016 | 99 | 155,574 | 59,353 | 5,365.709 | 0.03 | 0.09 |
| | 2017 | 99 | 157,072 | 64,761 | 6,416.548 | 0.04 | 0.10 |
| | 2018 | 98 | 150,219 | 61,014 | 5,829.471 | 0.04 | 0.10 |
| **Grand Totals and Averages** | 2008 | 196 | 182,095 | 86,829 | 11,418.917 | 0.06 | 0.13 |
| | 2009 | 199 | 189,972 | 89,221 | 12,057.511 | 0.06 | 0.14 |
| | 2010 | 192 | 192,436 | 81,967 | 10,618.564 | 0.06 | 0.13 |
| | 2011 | 197 | 204,575 | 88,619 | 11,100.821 | 0.05 | 0.13 |
| | 2012 | 204 | 205,134 | 86,093 | 10,102.722 | 0.05 | 0.12 |
| | 2013 | 190 | 186,062 | 74,329 | 8,780.048 | 0.05 | 0.12 |
| | 2014 | 187 | 185,843 | 78,072 | 9,410.737 | 0.05 | 0.12 |
| | 2015 | 198 | 186,614 | 77,393 | 9,198.030 | 0.05 | 0.12 |
| | 2016 | 193 | 164,984 | 65,615 | 7,057.392 | 0.04 | 0.11 |
| | 2017 | 193 | 166,137 | 70,952 | 8,085.593 | 0.05 | 0.11 |
| | 2018 | 182 | 159,988 | 67,835 | 8,165.125 | 0.05 | 0.12 |

NOTE: The data shown in this table for all categories of licensees have not been adjusted to account for transient workers (see Section 5).

* These categories consist only of NRC licensees required to submit an annual report (see Section 2).

** This category includes all LWRs in commercial operation for a full year for each of the years indicated.

### 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 individuals within a category and is reported in units of person-rem. Since 10 CFR 20.2206 requires that the TEDE be reported, the collective dose is calculated by summing the TEDE for all monitored individuals in each category.

The phrase “collective dose” is used throughout this report to mean the collective TEDE, unless otherwise specified.

Before the implementation of the revised dose-reporting requirements of 10 CFR 20.2206 in 1994, the collective dose, in some cases, was calculated from the dose distributions by multiplying the number of individuals reported in each of the dose ranges by the midpoint of the corresponding dose range and then summing the products. This assumed that the midpoint of the range was equal to the arithmetic mean of the individual doses in the range. Experience has shown that the actual mean dose of individuals 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 approximately 10 percent higher than the sum of the actual individual doses. Care should be taken when comparing the actual collective dose calculated for 1994 to 2018 with the collective dose for years before 1994 because of this change in methodology.

In addition, before 1994, doses only included the external whole-body dose with no internal dose contribution. Although the contribution of internal dose to the TEDE is minimal for most licensees, it should be considered when comparing collective doses for 1994 and later with the collective dose for years before 1994. One noted exception is for fuel fabrication licensees, where the committed effective dose equivalent (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 monitored individuals. This figure is usually less than the average measurable dose, because it includes the number of those individuals who received zero or less than measurable doses.

### 3.1.6 Average Measurable Dose

The average measurable dose is obtained by dividing the collective TEDE by the number of individuals with a measurable dose. This is the average most commonly used in this and other reports when examining trends and comparing doses received by individuals in various segments of the nuclear industry.

## 3.2 Annual TEDE Dose Distributions

Table 3.2 provides a statistical compilation of the occupational dose reports by 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 several licensee categories, a large number of individuals received doses that were less than measurable, and 1 individual exceeded 5 rem in 2018 (See Section 6.2). Ninety percent of the reported individuals with measurable doses (shown in Table 3.2) were monitored by commercial nuclear power reactors in 2018, where they received 71 percent of the total collective dose.

## Table 3.2 Distribution of Annual Collective TEDE by License Category 2018

| 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. <0.025 | 0.025-0.10 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.0 | 1.0-2.0 | 2.0-3.0 | 3.0-4.0 | 4.0-5.0 | 5.0-6.0 | >6.0 | | | |
| ***INDUSTRIAL RADIOGRAPHY*** | | | | | | | | | | | | | | | | |
| Fixed Locations (2) | 5 | 1 | 3 | - | 2 | - | - | - | - | - | - | - | - | 11 | 6 | 0.944 |
| Temporary Job Sites (59) | 568 | 339 | 460 | 519 | 589 | 451 | 194 | 493 | 122 | 21 | 8 | - | 1 | 3,865 | 3,297 | 1,966.935 |
| **Total (61)** | **573** | **340** | **463** | **519** | **591** | **451** | **294** | **493** | **122** | **21** | **8** | **0** | **1** | **3,876** | **3,303** | **1,967.879** |
| ***MANUFACTURING AND DISTRIBUTION*** | | | | | | | | | | | | | | | | |
| Type "A" Broad (2) | 120 | 59 | 53 | 39 | 31 | 16 | 6 | 28 | 3 | 2 | - | - | - | 357 | 237 | 88.338 |
| Type "B" Broad and Other (0) | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| Nuclear Pharmacies (12) | 248 | 202 | 158 | 73 | 36 | 7 | 1 | 1 | 3 | - | - | - | - | 729 | 481 | 48.167 |
| **Total (14)** | **368** | **261** | **211** | **112** | **67** | **23** | **7** | **29** | **6** | **2** | **0** | **0** | **0** | **1,086** | **718** | **136.505** |
| ***INDEPENDENT SPENT FUEL STORAGE*** | | | | | | | | | | | | | | | | |
| **Total (2)** | **53** | **10** | **3** | **1** | **2** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **70** | **17** | **1.740** |
| ***FUEL CYCLE**** | | | | | | | | | | | | | | | | |
| **Total (7)** | **1,954** | **1,415** | **677** | **407** | **229** | **47** | **3** | **5** | **0** | **0** | **0** | **0** | **0** | **4,737** | **2,783** | **229.530** |
| ***COMMERCIAL POWER REACTORS***** | | | | | | | | | | | | | | | | |
| Boiling Water (33) | 30,454 | 9,354 | 11,320 | 6,258 | 3,021 | 831 | 250 | 134 | 1 | 0 | 0 | 0 | 0 | 61,622 | 31,168 | 3,659.588 |
| Pressurized Water (65) | 58,751 | 11,145 | 12,387 | 4,772 | 1,186 | 255 | 66 | 34 | 0 | 0 | 0 | 0 | 0 | 88,597 | 29,846 | 2,169.883 |
| **Total (98)** | **89,205** | **20,499** | **23,707** | **11,030** | **4,207** | **1,086** | **316** | **168** | **1** | **0** | **0** | **0** | **0** | **150,219** | **61,014** | **5,829.471** |
| ***GRAND TOTALS*** | 92,153 | 22,525 | 25,061 | 12,069 | 5,096 | 1,608 | 620 | 695 | 129 | 23 | 8 | 0 | 1 | 159,988 | 67,835 | 8,165.125 |

NOTE: The data shown in this table for all categories of licensees have not been adjusted to account for transient workers (see Section 5).

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

** This category includes fabrication, processing, and uranium enrichment plants (see Section 3.3.5).

*** This category includes all reactors in commercial operation for a full year during 2018.

## 3.3 Summary of Occupational Dose Data by Licensee Category

### 3.3.1 Industrial Radiography Licensees - Fixed Location and Temporary Job Sites

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 temporary job 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 61 radiography licensees in 2018. Table 3.3 summarizes the reported data for the two types of industrial radiography licensees for 2016, 2017, and 2018 for comparison purposes.

The average measurable dose for individuals performing radiography at a fixed location ranged from 8 percent to 29 percent of the average measurable dose of individuals at temporary job sites over the past 3 years. This is because it is more difficult for individuals to avoid exposure to radiation at temporary job sites in the field, where conditions are not optimal and may change daily.

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 reducing exposure. A relatively small number of exposed individuals involved in radiographer licensee activities usually receive average measurable doses that are higher than those received by other license categories.

In 2018, there was one instance reported in which an industrial radiographer received an exposure in excess of the 5 rem regulatory limit. Section 6 contains additional information on exposures to personnel in excess of regulatory limits.

**Table 3.3 Annual Exposure Information for Industrial Radiography Licensees 2016–2018**

| Year | Type of License | Number of Licensees | Number of Monitored Individuals | Individuals with Measurable Dose | Collective Dose (person-rem) | Average Measurable Dose (rem) |
|---|---|---|---|---|---|---|
| 2016 | Fixed Location | 2 | 14 | 6 | 0.835 | 0.14 |
| | Temporary Job Sites | 62 | 3,021 | 2,629 | 1,269.624 | 0.48 |
| | **Total** | **64** | **3,035** | **2,635** | **1,270.459** | **0.48** |
| 2017 | Fixed Location | 2 | 12 | 7 | 0.325 | 0.05 |
| | Temporary Job Sites | 60 | 3,377 | 2,905 | 1,709.533 | 0.59 |
| | **Total** | **62** | **3,389** | **2,912** | **1,709.858** | **0.59** |
| 2018 | Fixed Location | 2 | 11 | 6 | 0.944 | 0.16 |
| | Temporary Job Sites | 59 | 3,865 | 3,297 | 1,966.935 | 0.60 |
| | **Total** | **61** | **3,876** | **3,303** | **1,967.879** | **0.60** |

Figure 3.1 shows the number of individuals with a measurable dose, the total collective dose, and the average measurable dose per individual for both types of industrial radiography licensees from 1994 through 2018. From 2017 to 2018, there was a 13 percent increase in the number of individuals with measurable TEDE and a 15 percent increase in the collective TEDE. Compared to the 5-year average of 2,765, the number of individuals with measurable TEDE was statistically

higher in 2018. Compared to the 5-year average of 1,600 person-rem (16,000 person-mSv), the collective TEDE was statistically higher in 2018. The average measurable TEDE increased to 0.60 rem (6.0 mSv) for 2018, but was not statistically different than the 5-year average of 0.59 rem (5.9 mSv).

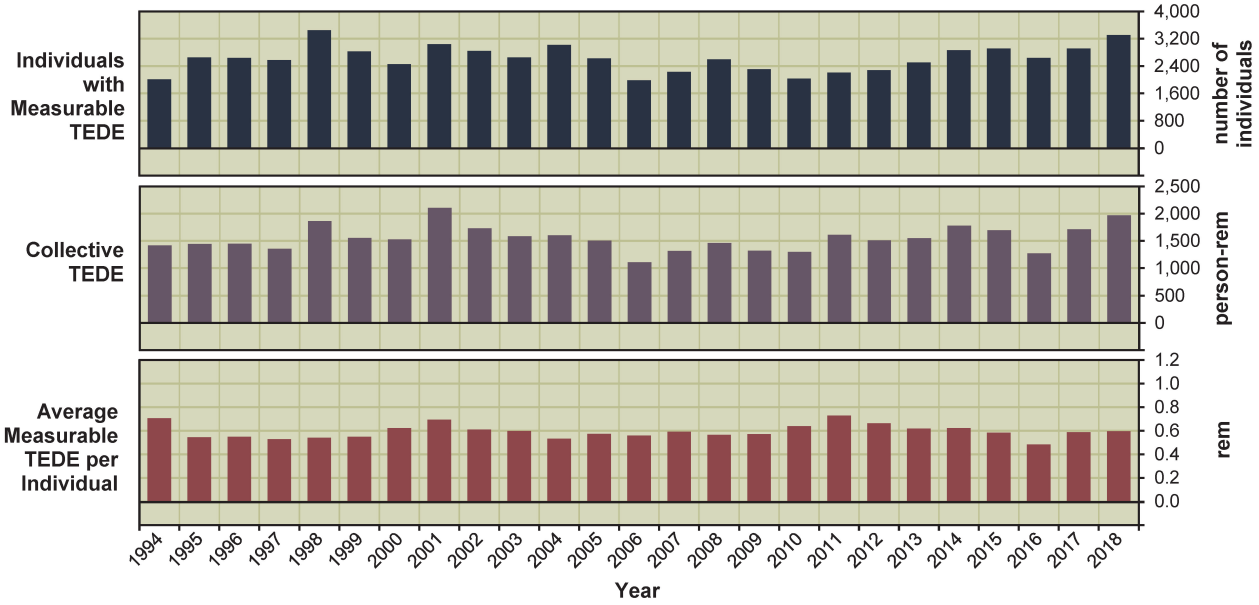



**Figure 3.1 Individuals with Measurable TEDE, Collective TEDE, and Average Measurable TEDE for Industrial Radiography Licensees 1994–2018**

### 3.3.2 Manufacturing and Distribution Licensees – Broad-Type A, Broad-Type B, Other, and Nuclear Pharmacies

M&D 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 organizations or companies specifically licensed by the NRC. Broad-Type A 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 Broad-Type A firms are medical suppliers that process, package, or distribute such products as diagnostic test kits, radioactive surgical implants, and tagged radiochemicals for use in medical research, diagnosis, and therapy. Broad-Type B licenses involve the processing, encapsulation, packaging, and distribution of the radionuclides that have been purchased in bulk quantities from production reactors and cyclotrons. Major products include gamma radiography sources, cobalt irradiation sources, well-logging sources, sealed sources for gauges and smoke detectors, and radiochemicals for nonmedical research. Note that no Broad-Type B licensees have reported to NRC since 2010. M&D Other licenses are usually issued to smaller organizations requiring a more restrictive license. These licenses are usually more specific in identifying each radionuclide, the chemical and physical form, and the authorized activities and users. Nuclear pharmacies are involved in the compounding and dispensing of radioactive materials for use in nuclear medicine procedures.

Table 3.4 presents the annual data that were reported by the three types of licensees for 2016, 2017, and 2018. As shown in the table below, the average measurable dose is generally higher for the Broad-Type A licensees, which includes only two licensees in the NRC's active licensee list.

Table 3.4 and Figure 3.2 show the number of individuals with measurable doses, the total collective dose, and the average measurable dose per individual for Broad-Type A, Broad-Type B and Other, and Nuclear Pharmacy licensees. In 2018 the number of individuals with a measurable dose increased by 17 percent and the collective TEDE decreased by 2 percent. In turn, the average measurable dose decreased by 17 percent from 0.23 rem to 0.19 rem. While the number of individuals with a measurable dose in 2018 was 14 percent more than the 5-year average of 628, the average measurable dose in 2018 (0.19 rem) was not statistically lower than the 5-year average of 0.22 rem.

The values for Broad-Type A licensees are attributed to Mallinckrodt, Inc. and International Isotopes Idaho, Inc., which accounted for 65 percent of the total collective dose in 2018.

**Table 3.4 Annual Exposure Information for Manufacturing and Distribution Licensees 2016–2018**

| Year | Type of License | Number of Licensees | Number of Monitored Individuals | Individuals with Measurable Dose | Collective Dose (person-rem) | Average Measurable Dose (rem) |
|---|---|---|---|---|---|---|
| 2016 | M & D - Type "A" Broad | 2 | 310 | 231 | 111.394 | 0.48 |
| | M & D - Type "B" Broad and Other | 0 | 0 | 0 | 0.000 | 0.00 |
| | M & D - Nuclear Pharmacies | 19 | 595 | 375 | 31.564 | 0.08 |
| | **Total** | **21** | **905** | **606** | **142.958** | **0.24** |
| 2017 | M & D - Type "A" Broad | 2 | 315 | 205 | 99.578 | 0.49 |
| | M & D - Type "B" Broad and Other | 1 | 1 | 1 | 0.010 | 0.01 |
| | M & D - Nuclear Pharmacies | 18 | 624 | 409 | 39.483 | 0.10 |
| | **Total** | **21** | **940** | **615** | **139.071** | **0.23** |
| 2018 | M & D - Type "A" Broad | 2 | 357 | 237 | 88.338 | 0.37 |
| | M & D - Type "B" Broad and Other | 0 | 0 | 0 | 0.000 | 0.00 |
| | M & D - Nuclear Pharmacies | 12 | 729 | 481 | 48.167 | 0.10 |
| | **Total** | **14** | **1,086** | **718** | **136.505** | **0.19** |

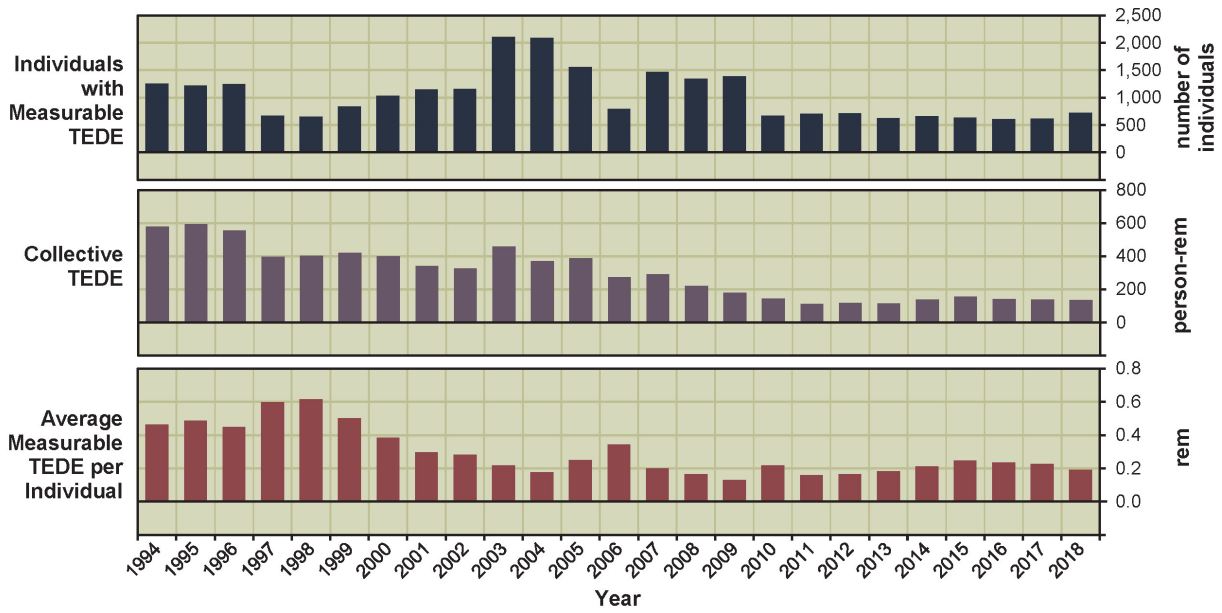



**Figure 3.2 Individuals with Measurable TEDE, Collective TEDE, and Average Measurable TEDE for Manufacturing and Distribution Licensees 1994–2018**

### 3.3.3 Low-Level Waste Disposal Licensees

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 places such as hospitals and laboratories, store them for a short time, and dispose of them in a properly prepared burial ground. Since 1999, all licensees that have conducted these activities have been located in Agreement States, which have primary regulatory authority over the licensees' activities; therefore, there are no NRC low-level waste licensees who report radiation exposure data to REIRS.

### 3.3.4 Independent Spent Fuel Storage Installation Licensees

The NRC issues ISFSI licenses to allow the possession of commercial nuclear power reactor spent fuel and other associated radioactive materials for the purpose of storage. According to 10 CFR 72.3, "Definitions" [Ref. 15], spent fuel means "fuel that has been withdrawn from a nuclear reactor following irradiation, has undergone at least 1 year of decay since being used as a source of energy in a power reactor, and has not been chemically separated into its constituent elements by reprocessing. Spent fuel includes the special nuclear material, byproduct material, source material, and other radioactive materials associated with fuel assemblies." The spent fuel that is removed from the reactor is initially stored in a spent fuel pool and usually cooled for at least 5 years in the pool before it is transferred to dry cask storage at an ISFSI. The NRC has authorized transfer as early as 3 years; however, the industry norm is approximately 10 years. An ISFSI provides interim storage of spent fuel and protection and safeguarding, pending its final disposal.

The majority of ISFSI facilities are located on site at commercial nuclear power reactors. The occupational dose information from ISFSI facilities is usually included with the dose information reported by the commercial nuclear power reactors and is not reported separately to the NRC. Since 2005, two ISFSI licensees reported dose information to the NRC. One is the GE Morris facility located in Illinois and the second is the Trojan ISFSI located in Oregon. The GE Morris

facility is the only spent fuel pool that is not located at an existing or former reactor site. The GE Morris ISFSI license has been renewed by the NRC until 2022. The Trojan commercial nuclear power reactor is no longer in commercial operation and has been decommissioned. However, the ISFSI facility at Trojan remains in operation and the occupational dose information is reported to the NRC under the ISFSI license. Appendix A, Table A1 summarizes the occupational dose information reported by these licensees.

Figure 3.3 shows the number of individuals with a measurable dose, the total collective dose, and the average measurable dose per individual for ISFSI facilities. Table 3.1 shows that the number of individuals with a measurable dose decreased to 17 individuals in 2018 from 20 individuals in 2017. Although the collective TEDE increased by 176 percent from 2017 to 2018, the dose increase was relatively small (0.631 person-rem in 2017 to 1.740 person-rem in 2018) and was statistically insignificant. The effect of a slight increase in the collective TEDE and the decrease in number of individuals with a measurable dose resulted in a slight (but not significantly different) increase in the average measurable TEDE per individual which increased to 0.10 rem. The average measurable dose was not significantly different from the 5-year average.

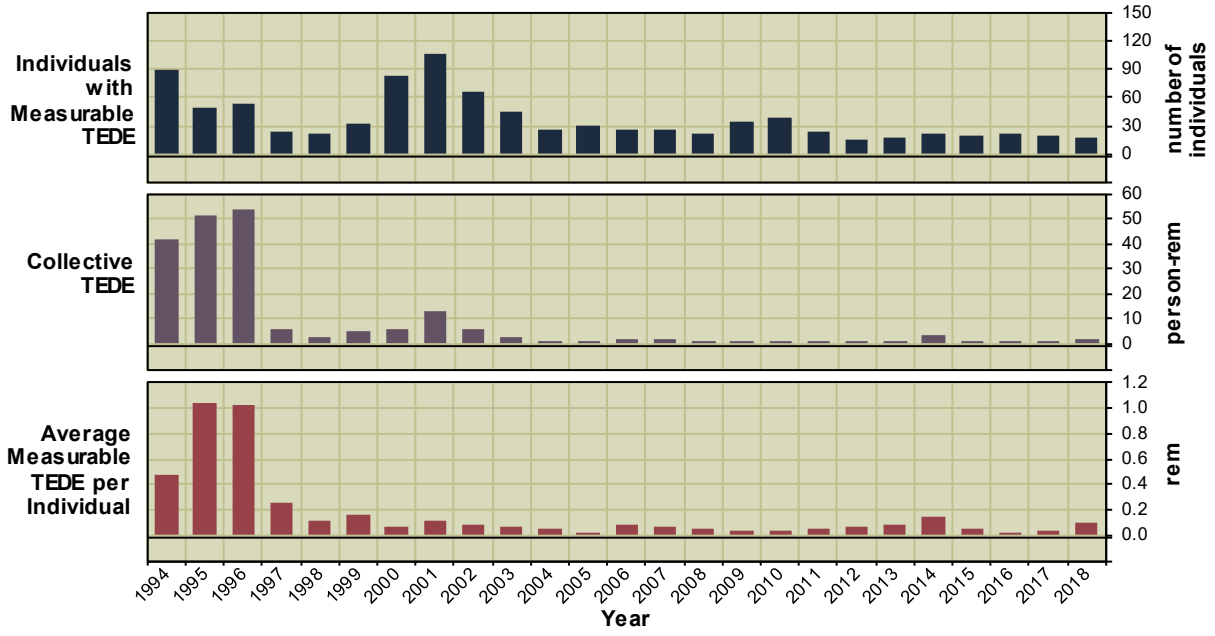



**Figure 3.3 Individuals with Measurable TEDE, Collective TEDE, and Average Measurable TEDE for Independent Spent Fuel Storage Installation Licensees 1994–2018**

### 3.3.5 Fuel Cycle Licensees

The fuel cycle category addresses the use and handling of special nuclear material as described in 10 CFR Part 70, *Domestic Licensing of Special Nuclear Material* [Ref. 16]. While the bulk of exposure cited in this report addresses reactor fuel production, there are other uses of special nuclear material in education, research, and homeland security. The fuel cycle facilities are licensed by the NRC to process and handle special nuclear material, source material, or both. These forms of nuclear material are highly regulated to ensure the safe use and enhanced security.

The majority of fuel cycle licenses are issued to allow the processing, enrichment, and fabrication of reactor fuels. Many of the fuel cycle facilities are different from each other—in purpose and technology—as they comprise the different stages of the Nuclear Fuel Cycle. The fuel cycle facilities that are currently operational fall into three different categories: uranium enrichment, uranium conversion, and fuel fabrication. Fuel fabrication facilities convert enriched uranium into fuel for nuclear reactors. Fabrication also can involve mixed oxide fuel, which is a combination of uranium and plutonium. Fuel cycle facilities make nuclear fuel for commercial nuclear reactors or manufacture specialty nuclear materials for the U.S. Navy's nuclear fleet.

Figure 3.4 shows the number of individuals with a measurable dose, the total collective dose, and the average measurable dose per individual for fuel cycle licensees. The collective deep dose equivalent (DDE), the DDE average measurable dose, the collective CEDE, and the CEDE average measurable dose are also shown, because they make a significant contribution to the TEDE for fuel fabrication facilities.

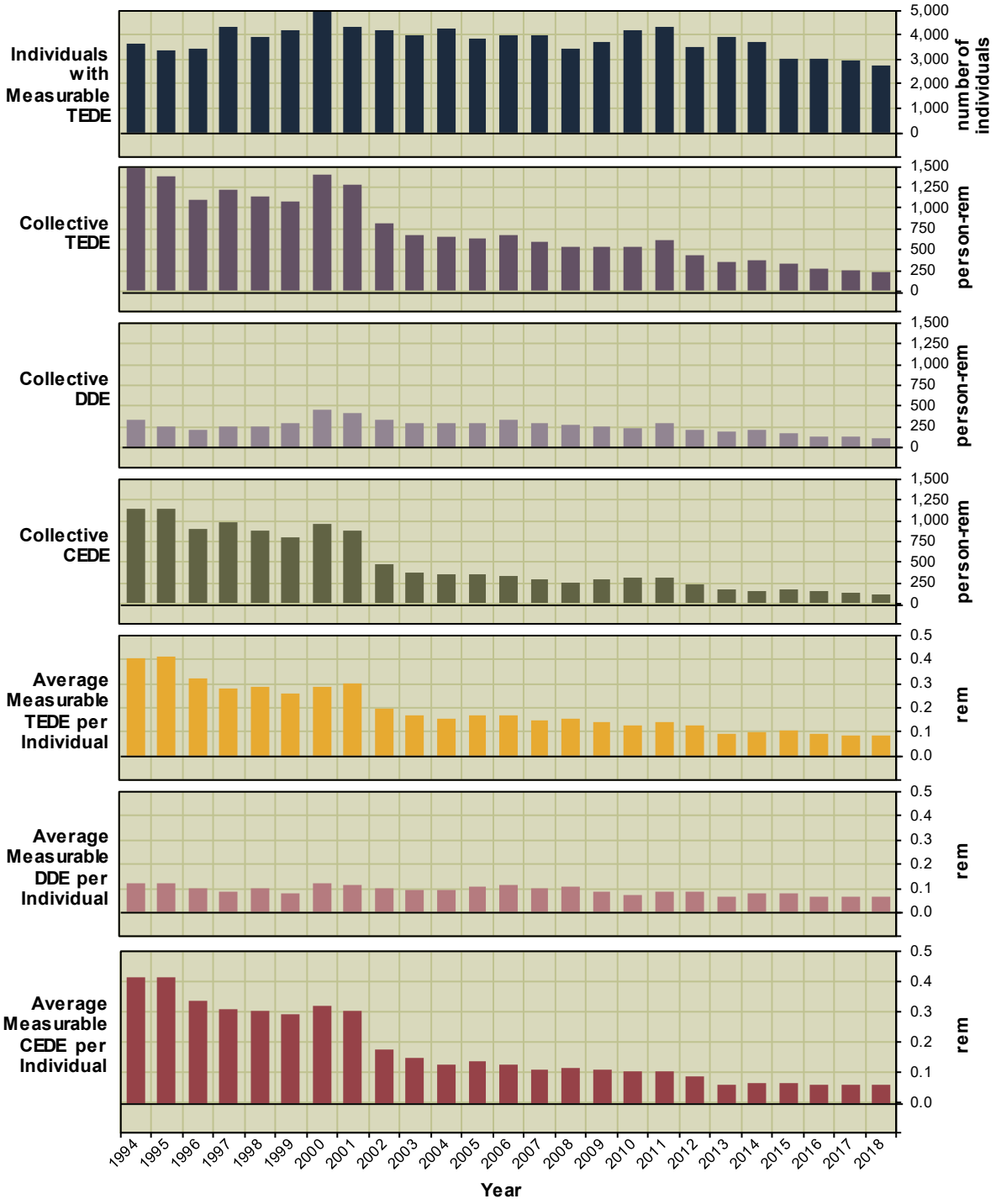



**Figure 3.4 Annual Exposure Information for Fuel Cycle Licensees 1994–2018**

Table 3.5 shows that there were seven licensed fuel cycle (fabrication processing, uranium enrichment, and $UF_6$ production) facilities reporting in 2018. The collective TEDE and DDE decreased in 2018 by 10 percent and 7 percent, respectively, and the collective CEDE decreased by 13 percent from 2017. When compared to the 5-year average, the decreases in collective TEDE, collective DDE, and collective CEDE were statistically significant.

Honeywell International, Inc. reported the largest decrease (82 percent) in collective TEDE in 2018. Since the 2011 Fukushima Daiichi event, demand for nuclear fuel has dropped while global supply overall has increased, resulting in decreased fuel production by this licensee. In addition, after a routine outage in October of 2017, Honeywell announced in November that they were suspending operations at the $UF_6$ production plant. Both of these factors contributed to the large decrease in dose in 2018.

**Table 3.5 Annual Exposure Information for Fuel Cycle Licensees 2016–2018**

| Year | Type of License | Number of Licensees | Number of Monitored Individuals | Individuals with Meas. TEDE | Collective TEDE (person-rem) | Average Meas. TEDE (rem) | Individuals with Meas. DDE | Collective DDE (person-rem) | Average Meas. DDE (rem) | Individuals with Meas. CEDE | Collective CEDE (person-rem) | Average Meas. CEDE (rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2016 | Fuel Cycle | 7 | 5,413 | 2,999 | 277.687 | 0.09 | 1,985 | 133.898 | 0.07 | 2,434 | 143.789 | 0.06 |
| 2017 | Fuel Cycle | 7 | 5,058 | 2,930 | 254.997 | 0.09 | 1,879 | 127.017 | 0.07 | 2,220 | 127.980 | 0.06 |
| 2018 | Fuel Cycle | 7 | 4,737 | 2,783 | 229.530 | 0.08 | 1,764 | 117.856 | 0.07 | 1,913 | 111.674 | 0.06 |

### 3.3.6 Light-Water Reactor Licensees

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

Table 3.1 shows the number of licensees, number of monitored individuals, number of individuals with a measurable dose, total collective dose, average collective dose and average measurable dose per individual for reactor facilities that were in commercial operation for at least 1 full year for each of the years 2008 through 2018. The values do not include reactors that have been permanently shut down or reactors that have not been in commercial operation for 1 full year. The figures for reactors have not been adjusted for the multiple counting of transient individuals (see Section 5).

Appendix B presents the reported dose distribution of individuals monitored at each plant site for the year 2018 in alphabetical order by plant name. Sections 4 and 5 contain more detailed presentations and analyses of the annual dose information reported by commercial nuclear power reactors.

### 3.3.7 Other Facilities Reporting to the NRC

Appendix A, Table A2 contains data for additional facilities that provided occupational radiation dose reports to the NRC in 2018. These facilities are not among the seven categories of licensees required to report under 10 CFR 20.2206 and are not included in the analyses presented in this report. However, these facilities may be of interest to researchers and are included in this report for completeness.

## 3.4 Summary of Intake and Internal Dose Data by Licensee Category

All internal dose estimates are based on the amount of the intake as the basis for the calculation. The intake is the total amount of radioactive material that enters the human body, and internal dose (as defined in 10 CFR 20.1003) means that portion of the dose equivalent received from radioactive material taken into the body. For each intake recorded, licensees are required to list the radionuclide that was taken into the body, pulmonary clearance class, intake mode, and amount of

the intake. An NRC Form 5, its equivalent paper document, or an electronic format containing this information is required to be completed and submitted to the NRC under 10 CFR 20.2206.

Tables 3.6 and 3.7 summarize the intake data reported to the NRC during 2018. The data are categorized by licensee type and are listed in order of radionuclide and pulmonary clearance class or pulmonary solubility type. Table 3.6 lists the intakes where the mode of intake into the body was recorded as ingestion or "other," such as absorption through the skin or injection through a puncture or wound.

**Table 3.6 Intake by Licensee Category and Radionuclide Mode of Intake—Ingestion and Other 2018**

| Mode | Licensee Category | Program Code | Radionuclide | Number of Intake Records | Collective Intake in Microcuries (sci. notation) |
|---|---|---|---|---|---|
| Ingestion | Nuclear Power Reactor | 41111 | Co-60 | 5 | 4.17E-01 |
| Ingestion | Nuclear Power Reactor | 41111 | Mn-54 | 4 | 6.87E-01 |
| Ingestion | Nuclear Power Reactor | 41111 | Zn-65 | 2 | 4.19E-01 |
| Ingestion | Uranium Fuel Processing Plants | 21210 | U-234 | 1 | 2.87E-05 |

Table 3.7 lists the intakes where the mode of intake was inhalation from ambient airborne radioactive material in the workplace. The pulmonary clearance class or pulmonary solubility type is recorded as D, W, Y (days, weeks, years) or F, M, S (fast, medium, slow), respectively, corresponding to the clearance half-time from the pulmonary region of the lung into the blood and gastrointestinal tract. The pulmonary clearance class designation depends on whether the licensee is using the nomenclature in International Commission on Radiological Protection (ICRP) Publication 30 (D, W, Y) [Ref. 17], which is described in 10 CFR Part 20, or ICRP Publication 68 (F, M, S) [Ref. 18]. Licensees that use the methodology described in ICRP Publication 30 use D, W, and Y pulmonary clearance classes to determine the dose. Licensees that use the methodology described in ICRP Publication 68 use F, M, and S pulmonary solubility types to determine the dose. The amount of material taken into the body is given in microcuries, a unit of measure of the quantity of radioactive material. For each licensee category, the maximum number of intake records and the maximum intake are highlighted in the table in bold and boxed for ease of reference.

Table 3.8 lists the number of individuals with a measurable CEDE, the collective CEDE, and the average measurable CEDE per individual for each licensee category. The number of individuals with a measurable CEDE and the collective CEDE differed significantly from their respective 5-year averages. Fuel fabrication facilities combined with the $UF_6$ production facility had the majority of internal doses (99.7 percent of total collective CEDE) in 2018. The $UF_6$ production facility had a collective dose of 5.514 person-rem with an average of 0.019 rem per individual. The average CEDE of 0.019 rem for $UF_6$ production facilities in 2018 was statistically lower than the 5-year average of 0.044 rem. The fuel fabrication licensee with the highest collective dose reported 45.864 person-rem and an average of 0.137 rem per individual. This is due to the exposure of individuals to uranium during the processing and fabrication of the uranium fuel. Although not statistically significant, the average CEDE for fuel fabrication facilities increased to 0.065 rem in 2018 which was below the 5-year average of 0.069 rem. This increase corresponds with a small increase in collective CEDE and a decrease in the number with measurable CEDE.

Table 3.9 shows the distribution of internal doses (CEDE) from 1994 to 2018 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 were received by individuals working at fuel fabrication facilities.
In 2018, the collective CEDE decreased by 13 percent from 2017 while the number of individuals with a measurable CEDE decreased by 10 percent. The collective CEDE was significantly lower from the 5-year average of 151.503 person-rem, and the number of individuals with a measurable CEDE in 2018 (2,045) was also significantly lower than the 5-year average of 2,530. The collective CEDE of 128.373 person-rem in all facilities in 2017 decreased to 112.004 person-rem primarily as a result of a 75 percent decrease in the collective CEDE at the $UF_6$ production facility in 2018. With the decrease in the number of individuals reported with CEDE dose and the decrease in the collective CEDE, the average measurable CEDE decreased by 4 percent to 0.055 rem for 2018. However, the average measurable CEDE in 2018 was not statistically different from the 5-year average.

**Table 3.7 Intake by Licensee Category and Radionuclide Mode of Intake—Inhalation 2018**

| Licensee Category | Program Code | Radionuclide | Pulmonary Clearance Class or Solubility Type | Number of Intake Records * | Collective Intake in Microcuries (sci. notation) |
|---|---|---|---|---|---|
| Nuclear Pharmacies | 02500 | I-123 | D | 6 | 8.62E-01 |
| | 02500 | I-131 | D | **94** | **1.28E+00** |
| Manufacturing and Distribution Type A Broad | 03211 | Co-60 | Y | 3 | 2.85E-01 |
| | 03211 | I-131 | D | **6** | **9.40E-01** |
| Uranium Hexafluoride ($UF_6$) Production Plants | 11400 | Ac-227 | D | 2 | 2.00E-06 |
| | 11400 | Ac-227 | W | 126 | 1.54E-04 |
| | 11400 | Pa-231 | W | 128 | 1.56E-04 |
| | 11400 | Pb-210 | D | 102 | 1.18E-04 |
| | 11400 | Po-210 | D | 1 | 1.00E-06 |
| | 11400 | Po-210 | W | 81 | 9.00E-05 |
| | 11400 | Ra-226 | W | 217 | 4.10E-04 |
| | 11400 | Ra-228 | W | 75 | 8.20E-05 |
| | 11400 | Ra-228 | W | 323 | 4.13E-04 |
| | 11400 | Th-228 | W | 75 | 8.20E-05 |
| | 11400 | Th-228 | W | 323 | 4.13E-04 |
| | 11400 | Th-230 | D | 2 | 5.00E-06 |
| | 11400 | Th-230 | W | 287 | 4.18E-03 |
| | 11400 | Th-230 | W | 572 | 1.66E-02 |
| | 11400 | Th-230 | W | **814** | 3.68E-02 |
| | 11400 | Th-230 | Y | 1 | 6.00E-06 |
| | 11400 | Th-232 | W | 75 | 8.20E-05 |
| | 11400 | Th-232 | W | 323 | 4.13E-04 |
| | 11400 | Th-232 | W | 600 | 9.61E-04 |
| | 11400 | U-234 | D | 3 | 4.58E-03 |
| | 11400 | U-234 | D | 9 | 1.85E-03 |
| | 11400 | U-234 | D | 3 | 4.66E-04 |
| | 11400 | U-234 | W | 285 | 3.82E-01 |
| | 11400 | U-234 | W | 571 | 1.53E+00 |
| | 11400 | U-234 | W | **814** | **3.40E+00** |
| | 11400 | U-234 | Y | 1 | 5.39E-04 |
| | 11400 | U-235 | D | 3 | 2.14E-04 |
| | 11400 | U-235 | D | 9 | 8.70E-05 |
| | 11400 | U-235 | D | 3 | 2.20E-05 |
| | 11400 | U-235 | W | 285 | 1.78E-02 |

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

* An intake event may involve multiple nuclides; 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.

## Table 3.7 Intake by Licensee Category and Radionuclide Mode of Intake—Inhalation 2018 (continued)

| Licensee Category | Program Code | Radionuclide | Pulmonary Clearance Class or Solubility Type | Number of Intake Records * | Collective Intake in Microcuries (sci. notation) |
|---|---|---|---|---|---|
| Uranium Hexafluoride | 11400 | U-235 | W | 571 | 7.13E-02 |
| ($UF_6$) Production Plants | 11400 | U-235 | W | **814** | 1.58E-01 |
| (continued) | 11400 | U-235 | Y | 1 | 2.50E-05 |
| | 11400 | U-238 | D | 3 | 3.81E-03 |
| | 11400 | U-238 | D | 9 | 1.54E-03 |
| | 11400 | U-238 | D | 3 | 3.88E-04 |
| | 11400 | U-238 | W | 285 | 3.18E-01 |
| | 11400 | U-238 | W | 571 | 1.27E+00 |
| | 11400 | U-238 | W | **814** | 2.83E+00 |
| | 11400 | U-238 | Y | 1 | 4.49E-04 |
| Uranium Fuel Processing | 21210 | Am-241 | W | 26 | 1.09E-04 |
| Plants | 21210 | Pu-239 | W | 41 | 3.95E-04 |
| | 21210 | Sr-90 | S | 220 | 2.57E-01 |
| | 21210 | Th-228 | W | 51 | 4.30E-05 |
| | 21210 | Th-232 | W | 2 | 1.00E-09 |
| | 21210 | Th-232 | Y | 27 | 6.49E-04 |
| | 21210 | U-232 | W | 1 | 4.00E-09 |
| | 21210 | U-232 | Y | 103 | 9.33E-05 |
| | 21210 | U-234 | D | 746 | 2.14E-01 |
| | 21210 | U-234 | S | 223 | 4.19E-01 |
| | 21210 | U-234 | W | 564 | 4.08E-02 |
| | 21210 | U-234 | Y | **1,971** | **3.18E+00** |
| | 21210 | U-235 | D | 155 | 3.57E-03 |
| | 21210 | U-235 | W | 55 | 1.36E-03 |
| | 21210 | U-235 | Y | 580 | 9.64E-02 |
| | 21210 | U-236 | D | 653 | 2.76E-03 |
| | 21210 | U-236 | W | 55 | 5.83E-05 |
| | 21210 | U-236 | Y | 305 | 5.01E-03 |
| | 21210 | U-238 | D | 211 | 2.69E-02 |
| | 21210 | U-238 | W | 533 | 5.48E-03 |
| | 21210 | U-238 | Y | 944 | 4.38E-01 |
| Nuclear Power Reactor | 41111 | Am-241 | W | 1 | 1.25E-05 |
| | 41111 | Co-58 | Y | 10 | **8.16E+00** |
| | 41111 | Co-60 | Y | 10 | 5.72E-02 |
| | 41111 | I-131 | D | **33** | 3.87E-01 |
| | 41111 | Nb-95 | Y | 1 | 1.21E-01 |

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

* 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.

## Table 3.8 Collective and Average CEDE by Licensee Category 2018

| Licensee Category | Licensee Name | License Number | Number with Meas. CEDE | Collective CEDE (person-rem) | Average Meas. CEDE (rem) |
|---|---|---|---|---|---|
| ***MANUFACTURING AND DISTRIBUTION*** | | | | | |
| 02500 | CARDINAL HEALTH | 34-29200-01MD | **14** | 0.015 | 0.001 |
| 02500 | CARDINAL HEALTH | 34-31473-02MD | 1 | 0.002 | 0.002 |
| 02500 | GE HEALTHCARE - KENTWOOD | 21-26707-01MD | 4 | 0.009 | 0.002 |
| 02500 | GE HEALTHCARE - ST. LOUIS/OVERLAND | 24-32462-01MD | 1 | 0.001 | 0.001 |
| 03211 | INTERNATIONAL ISOTOPES IDAHO, INC. | 11-27680-01 | 9 | **0.084** | **0.009** |
| | **Totals and Averages** | | **29** | **0.111** | **0.004** |
| ***$UF_6$ PRODUCTION*** | | | | | |
| 11400 | HONEYWELL PERFORMANCE MATERIALS AND TECHNOLOGY | SUB-0526 | **285** | **5.514** | **0.019** |
| | **Totals and Averages** | | **285** | **5.514** | **0.019** |
| ***FUEL FABRICATION*** | | | | | |
| 21210 | BWXT NUCLEAR OPERATIONS GROUP, INC | SNM-0042 | 207 | 10.576 | 0.051 |
| 21210 | FRAMATOME INC | SNM-1227 | 239 | 28.318 | 0.118 |
| 21210 | GLOBAL NUCLEAR FUEL - AMERICAS, LLC | SNM-1097 | 362 | 19.261 | 0.053 |
| 21210 | NUCLEAR FUEL SERVICES, INC. | SNM-0124 | **485** | 2.141 | 0.004 |
| 21210 | WESTINGHOUSE ELECTRIC COMPANY, LLC | SNM-1107 | 335 | **45.864** | **0.137** |
| | **Totals and Averages** | | **1,628** | **106.160** | **0.065** |
| ***COMMERCIAL LIGHT WATER REACTORS*** | | | | | |
| 41111 | DIABLO CANYON | DPR-80 | 1 | 0.006 | **0.006** |
| 41111 | DUANE ARNOLD | DPR-49 | 4 | 0.016 | 0.004 |
| 41111 | INDIAN POINT | DPR-05 | 1 | 0.002 | 0.002 |
| 41111 | MILLSTONE | NPF-49 | 1 | 0.001 | 0.001 |
| 41111 | WOLF CREEK | NPF-42 | **96** | **0.194** | 0.002 |
| | **Totals and Averages** | | **103** | **0.219** | **0.002** |
| **Grand Totals and Averages** | | | **2,045** | **112.004** | **0.055** |

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

## Table 3.9 Internal Dose (CEDE) Distribution 1994–2018

| Year | Number of Individuals with CEDE in the Ranges (rem) * | | | | | | | | | | Indiv. 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 | 0.750-1.0 | 1.0-2.0 | 2.0-3.0 | 3.0-4.0 | 4.0-5.0 | | | |
| 1994 | 3,425 | 577 | 287 | 683 | 237 | 141 | 293 | 69 | 2 | - | 5,714 | 1,170.453 | 0.205 |
| 1995 | 2,869 | 691 | 338 | 730 | 254 | 147 | 290 | 49 | 2 | - | 5,370 | 1,167.105 | 0.217 |
| 1996 | 3,096 | 598 | 305 | 584 | 324 | 138 | 187 | 22 | 2 | 2 | 5,258 | 931.799 | 0.177 |
| 1997 | 3,835 | 869 | 381 | 827 | 267 | 148 | 169 | 30 | - | - | 6,526 | 998.406 | 0.153 |
| 1998 | 3,310 | 932 | 426 | 746 | 246 | 140 | 153 | 21 | 2 | - | 5,976 | 922.935 | 0.154 |
| 1999 | 3,423 | 752 | 466 | 438 | 206 | 117 | 173 | 29 | - | - | 5,604 | 813.605 | 0.145 |
| 2000 | 3,275 | 1,001 | 570 | 383 | 216 | 98 | 224 | 58 | 7 | 1 | 5,833 | 988.640 | 0.169 |
| 2001 | 1,774 | 827 | 716 | 364 | 128 | 53 | 146 | 82 | 15 | 1 | 4,106 | 884.134 | 0.215 |
| 2002 | 1,760 | 746 | 647 | 531 | 144 | 33 | 23 | 3 | - | - | 3,887 | 494.821 | 0.127 |
| 2003 | 2,208 | 778 | 726 | 388 | 116 | 17 | 5 | - | - | - | 4,238 | 395.573 | 0.093 |
| 2004 | 1,989 | 838 | 657 | 381 | 105 | 17 | 3 | - | - | - | 3,990 | 375.021 | 0.094 |
| 2005 | 1,205 | 706 | 685 | 341 | 98 | 33 | 2 | - | - | - | 3,070 | 365.258 | 0.119 |
| 2006 | 1,302 | 726 | 686 | 346 | 96 | 18 | 3 | - | - | - | 3,177 | 346.918 | 0.109 |
| 2007 | 1,480 | 805 | 646 | 310 | 52 | 5 | 3 | - | - | - | 3,301 | 300.863 | 0.091 |
| 2008 | 1,008 | 761 | 526 | 303 | 41 | 8 | 4 | - | - | - | 2,651 | 267.415 | 0.101 |
| 2009 | 1,115 | 711 | 597 | 229 | 80 | 21 | 7 | - | - | - | 2,760 | 293.251 | 0.106 |
| 2010 | 1,216 | 884 | 669 | 210 | 67 | 30 | 6 | - | - | - | 3,082 | 308.332 | 0.100 |
| 2011 | 1,243 | 916 | 628 | 270 | 72 | 19 | 14 | 1 | - | - | 3,163 | 322.615 | 0.102 |
| 2012 | 1,158 | 933 | 554 | 155 | 52 | 6 | 3 | - | - | - | 2,861 | 232.462 | 0.081 |
| 2013 | 1,632 | 758 | 353 | 149 | 20 | 1 | - | - | - | - | 2,913 | 164.799 | 0.057 |
| 2014 | 1,175 | 829 | 417 | 86 | 24 | 1 | - | - | - | - | 2,532 | 157.191 | 0.062 |
| 2015 | 1,036 | 838 | 442 | 103 | 16 | - | - | - | - | - | 2,435 | 162.670 | 0.067 |
| 2016 | 1,100 | 920 | 407 | 69 | 7 | - | - | - | - | - | 2,503 | 144.627 | 0.058 |
| 2017 | 1,073 | 766 | 324 | 99 | 6 | - | - | - | - | - | 2,268 | 128.373 | 0.057 |
| 2018 | 1,159 | 489 | 297 | 99 | 1 | - | - | - | - | - | 2,045 | 112.004 | 0.055 |

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

# 4 COMMERCIAL POWER REACTORS

## 4.1 Introduction

General trends in occupational radiation exposure at commercial nuclear power reactors are best evaluated within the context of other pertinent information. In this section, some of the tables and appendices that summarize dose data also show the type, capacity, amount of electricity generated, and age of the reactor. Dose 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 are the number of BWRs, PWRs, and LWRs that were in commercial operation during the year listed. This is the number of reactors that the average number of individuals with a measurable dose and the average collective dose per reactor are based. Excluded are reactors that have not yet completed a first full year of commercial operation and those reactors that have been permanently defueled. The date that each reactor was declared to be in commercial operation was taken from licensed operating reactors, Monthly Operating Report Data [Ref. 1].

In September 2018, Oyster Creek ceased operation, dropping the number of active BWRs from 34 to 33. The dose information for these operational reactors and for others that are no longer in commercial operation is listed at the end of Appendix B and the current status of plants no longer in operation can be found in Appendix E. Watts Bar Unit 2 began commercial power operation on November 21, 2016, and reported its dose information with Watts Bar Unit 1 beginning in 2017.

### 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 (MW-hr) of electricity annually produced by each facility by 8,760, the number of hours in the year, except for leap years, when the number was 8,784 hours. The number of MW-hr of electricity produced each year was obtained from Licensed Operating Reactors, Status Summary Report [Ref. 1].

For the years 1973 to 1996, the electricity generated is the gross electricity output of the reactor. For 1997 to 2018, the number reflects the net electricity produced, which is the gross electricity minus the amount the plant used for operations. This change is the result of a change in NRC power generation reporting requirements. The electricity generated in MW-yr 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.

As shown in Table 4.3, in 2018, the net electricity generated at LWRs was nearly equivalent to 2017 and not significantly different from the 5-year trend. Thirty reactor sites had decreased power production and 29 reactor sites had increased power production from 2017 to 2018. Cooper Station had the largest percentage of decreased power production (19 percent), while Fermi 2 and Wolf Creek 1 both experienced a 14 percent decrease in power production. Cooper Station was shut down 48.8 days due to refueling and 11.8 days for maintenance/testing for a

total of 60.6 days off line. Fermi 2 and Wolf Creek 1 were shut down 82.8 and 48.4 total outage days, respectively. From 2017 to 2018, Watts Bar 1, 2 had the largest increase in power production as Unit 2 came online.

### 4.2.3 Collective Dose per Megawatt-Year

The number of MW-yr of electricity generated was used in determining the ratio of the average value of the annual collective dose (TEDE) to the number of MW-yr of electricity generated. The ratio was calculated by dividing the total collective dose in person-rem by the electric energy generated in MW-yr and is a measure of the dose incurred by individuals at commercial nuclear power reactors 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 2018, the number reflects the net electricity produced. The ratio of collective dose to the number of MW-yr is calculated by year for BWRs, PWRs, and LWRs, and the ratios are presented in Tables 4.1, 4.2, and 4.3. This ratio is also calculated for each reactor site (see Appendix C). The average collective dose per MW-yr for LWRs decreased to 0.06 rem/MW-yr in 2018. This value is not statistically different from the 5-year average of 0.07 rem/MW-yr.

### 4.2.4 Average Maximum Dependable Capacity

The average maximum dependable capacity, as shown in Tables 4.1, 4.2, and 4.3, is calculated by dividing the sum of the net maximum dependable capacities of the reactors in megawatts (net megawatts electric [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. The capacity of each plant was found in Licensed Operating Reactors, Status Summary Report [Ref. 1]. As shown in Table 4.3 for 2018, the value for the average electricity generated per reactor was the highest reported since 1994.

### 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 with the maximum dependable capacity that could have been 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.

## Table 4.1 Summary of Information Reported by Commercial Boiling-Water Reactors 1994–2018

| Year | Number of Reactors Included* | No. of Individuals with Measurable Dose** | Annual Collective Dose (person-rem) | Average Measurable Dose per Individual (rem)** | Average Collective Dose per Reactor (person-rem) | Average No. Individuals with Measurable Doses per Reactor** | Electricity Generated*** (MW-yr) | Average Collective Dose per MW-yr (person-rem/ MW-yr) | Average Electricity Generated per Reactor (MW-yr) | Average Maximum Dependable Capacity Net (MWe) | Maximum Dependable Capacity Achieved |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1994 | 37 | 39,171 | 12,098 | 0.31 | 327 | 1,059 | 22,139.0 | 0.55 | 598 | 801 | 75% |
| 1995 | 37 | 35,686 | 9,471 | 0.27 | 256 | 964 | 24,737.0 | 0.38 | 669 | 835 | 80% |
| 1996 | 37 | 37,792 | 9,466 | 0.25 | 256 | 1,021 | 24,322.2 | 0.39 | 657 | 838 | 78% |
| 1997 | 37 | 34,021 | 7,603 | 0.22 | 205 | 919 | 22,866.1 | 0.33 | 618 | 845 | 73% |
| 1998 | 36 | 32,899 | 6,829.296 | 0.21 | 190 | 914 | 23,781.2 | 0.29 | 661 | 874 | 76% |
| 1999 | 35 | 31,482 | 6,434.430 | 0.20 | 184 | 899 | 26,962.6 | 0.24 | 770 | 885 | 87% |
| 2000 | 35 | 31,186 | 6,089.676 | 0.20 | 174 | 891 | 28,476.9 | 0.21 | 814 | 893 | 91% |
| 2001 | 35 | 28,797 | 4,835.397 | 0.17 | 138 | 823 | 28,730.4 | 0.17 | 821 | 895 | 92% |
| 2002 | 35 | 30,978 | 6,107.767 | 0.20 | 175 | 885 | 29,460.0 | 0.21 | 842 | 907 | 93% |
| 2003 | 35 | 30,759 | 5,659.434 | 0.18 | 162 | 879 | 29,094.4 | 0.19 | 831 | 912 | 91% |
| 2004 | 35 | 33,948 | 5,450.982 | 0.16 | 156 | 970 | 29,424.8 | 0.19 | 841 | 893 | 94% |
| 2005 | 35 | 33,544 | 5,995.975 | 0.18 | 171 | 958 | 29,386.8 | 0.20 | 840 | 946 | 89% |
| 2006 | 35 | 34,159 | 4,989.761 | 0.15 | 143 | 976 | 30,238.4 | 0.17 | 864 | 954 | 91% |
| 2007 | 35 | 37,515 | 5,388.416 | 0.14 | 154 | 1,072 | 30,189.3 | 0.18 | 863 | 955 | 90% |
| 2008 | 35 | 34,642 | 4,522.413 | 0.13 | 129 | 990 | 31,248.3 | 0.14 | 893 | 957 | 93% |
| 2009 | 35 | 36,207 | 5,282.869 | 0.15 | 151 | 1,034 | 30,762.7 | 0.17 | 879 | 959 | 92% |
| 2010 | 35 | 37,214 | 4,807.656 | 0.13 | 137 | 1,063 | 31,274.6 | 0.15 | 894 | 961 | 93% |
| 2011 | 35 | 38,202 | 4,976.503 | 0.13 | 142 | 1,091 | 30,549.7 | 0.16 | 873 | 937 | 93% |
| 2012 | 35 | 38,164 | 4,200.281 | 0.11 | 120 | 1,090 | 30,485.4 | 0.14 | 871 | 968 | 90% |
| 2013 | 35 | 36,513 | 4,459.270 | 0.12 | 127 | 1,043 | 31,221.1 | 0.14 | 892 | 967 | 92% |
| 2014 | 35 | 33,706 | 3,798.108 | 0.11 | 109 | 963 | 31,904.2 | 0.12 | 912 | 976 | 93% |
| 2015 | 34 | 35,346 | 4,155.273 | 0.12 | 122 | 1,040 | 31,720.1 | 0.13 | 933 | 992 | 94% |
| 2016 | 34 | 31,299 | 3,339.055 | 0.11 | 98 | 921 | 31,464.8 | 0.11 | 925 | 995 | 93% |
| 2017 | 34 | 32,234 | 4,007.342 | 0.12 | 118 | 948 | 31,820.0 | 0.13 | 936 | 995 | 94% |
| 2018 | 33 | 31,168 | 3,659.588 | 0.12 | 111 | 944 | 30,722.7 | 0.12 | 931 | 1,008 | 92% |

* Includes only those reactors that had been in commercial operation for at least 1 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).
*** Beginning in 1997, the electricity reflects the net electricity generated.

## Table 4.2 Summary of Information Reported by Commercial Pressurized-Water Reactors 1994–2018

| Year | Number of Reactors Included* | No. of Individuals with Measurable Dose** | Annual Collective Dose (person-rem) | Average Measurable Dose per Individual (rem)** | Average Collective Dose per Reactor (person-rem) | Average No. Individuals with Measurable Doses per Reactor** | Electricity Generated*** (MW-yr) | Average Collective Dose per MW-yr (person-rem/ MW-yr) | Average Electricity Generated per Reactor (MW-yr) | Average Maximum Dependable Capacity Net (MWe) | Maximum Dependable Capacity Achieved |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1994 | 70 | 44,283 | 9,574 | 0.22 | 137 | 633 | 52,397.6 | 0.18 | 749 | 928 | 81% |
| 1995 | 70 | 49,985 | 11,762 | 0.24 | 168 | 714 | 54,138.2 | 0.22 | 773 | 929 | 83% |
| 1996 | 72 | 46,852 | 9,417 | 0.20 | 131 | 651 | 55,337.8 | 0.17 | 769 | 935 | 82% |
| 1997 | 72 | 50,690 | 9,546 | 0.19 | 133 | 704 | 48,985.3 | 0.19 | 680 | 943 | 72% |
| 1998 | 69 | 38,586 | 6,358.096 | 0.16 | 92 | 559 | 53,288.7 | 0.12 | 772 | 942 | 82% |
| 1999 | 69 | 43,938 | 7,231.281 | 0.16 | 105 | 637 | 56,235.0 | 0.13 | 815 | 942 | 87% |
| 2000 | 69 | 42,922 | 6,562.006 | 0.15 | 95 | 622 | 57,529.9 | 0.11 | 834 | 943 | 88% |
| 2001 | 69 | 38,773 | 6,273.155 | 0.16 | 91 | 562 | 58,822.4 | 0.11 | 852 | 946 | 90% |
| 2002 | 69 | 42,264 | 6,018.423 | 0.14 | 87 | 613 | 59,369.7 | 0.10 | 860 | 947 | 91% |
| 2003 | 69 | 44,054 | 6,296.136 | 0.14 | 91 | 638 | 57,920.6 | 0.11 | 839 | 949 | 88% |
| 2004 | 69 | 35,901 | 4,916.915 | 0.14 | 71 | 520 | 60,398.7 | 0.08 | 875 | 943 | 93% |
| 2005 | 69 | 44,583 | 5,459.832 | 0.12 | 79 | 646 | 59,790.9 | 0.09 | 867 | 955 | 91% |
| 2006 | 69 | 46,106 | 6,031.425 | 0.13 | 87 | 668 | 59,751.3 | 0.10 | 866 | 960 | 90% |
| 2007 | 69 | 42,015 | 4,731.597 | 0.11 | 69 | 609 | 61,955.6 | 0.08 | 898 | 961 | 93% |
| 2008 | 69 | 44,808 | 4,673.527 | 0.10 | 68 | 649 | 60,586.0 | 0.08 | 878 | 964 | 91% |
| 2009 | 69 | 45,547 | 4,741.935 | 0.10 | 69 | 660 | 60,467.9 | 0.08 | 876 | 966 | 91% |
| 2010 | 69 | 37,796 | 3,823.728 | 0.10 | 55 | 548 | 60,859.4 | 0.06 | 882 | 967 | 91% |
| 2011 | 69 | 43,119 | 3,795.601 | 0.09 | 55 | 625 | 59,682.5 | 0.06 | 865 | 937 | 92% |
| 2012 | 69 | 41,385 | 3,835.112 | 0.09 | 56 | 600 | 57,272.5 | 0.07 | 830 | 974 | 85% |
| 2013 | 65 | 30,723 | 2,300.277 | 0.07 | 35 | 473 | 58,785.5 | 0.04 | 904 | 987 | 92% |
| 2014 | 65 | 37,141 | 3,326.411 | 0.09 | 51 | 571 | 59,262.2 | 0.06 | 912 | 989 | 92% |
| 2015 | 65 | 35,452 | 2,863.815 | 0.08 | 44 | 545 | 59,377.2 | 0.05 | 913 | 990 | 92% |
| 2016 | 65 | 28,054 | 2,026.654 | 0.07 | 31 | 432 | 60,052.5 | 0.03 | 924 | 1,001 | 92% |
| 2017 | 65 | 32,527 | 2,409.206 | 0.07 | 37 | 500 | 60,148.9 | 0.04 | 925 | 1,001 | 92% |
| 2018 | 65 | 29,846 | 2,169.883 | 0.07 | 34 | 459 | 61,113.7 | 0.04 | 940 | 1,002 | 94% |

* Includes only those reactors that had been in commercial operation for at least 1 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).
*** Beginning in 1997, the electricity reflects the net electricity generated.

## Table 4.3 Summary of Information Reported by Commercial Light-Water Reactors 1994–2018

| Year | Number of Reactors Included* | No. of Individuals with Measurable Dose** | Annual Collective Dose (person-rem) | Average Measurable Dose per Individual (rem)** | Average Collective Dose per Reactor (person-rem) | Average No. Individuals with Measurable Doses per Reactor** | Electricity Generated*** (MW-yr) | Average Collective Dose per MW-yr (person-rem/ MW-yr) | Average Electricity Generated per Reactor (MW-yr) | Average Maximum Dependable Capacity Net (MWe) | Maximum Dependable Capacity Achieved |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1994 | 107 | 83,454 | 21,672 | 0.26 | 203 | 780 | 74,536.6 | 0.29 | 697 | 884 | 79% |
| 1995 | 107 | 85,671 | 21,233 | 0.25 | 198 | 801 | 78,875.2 | 0.27 | 737 | 896 | 82% |
| 1996 | 109 | 84,644 | 18,883 | 0.22 | 173 | 777 | 79,660.0 | 0.24 | 731 | 902 | 81% |
| 1997 | 109 | 84,711 | 17,149 | 0.20 | 157 | 777 | 71,851.4 | 0.24 | 659 | 910 | 72% |
| 1998 | 105 | 71,485 | 13,187.392 | 0.18 | 126 | 681 | 77,069.9 | 0.17 | 734 | 918 | 80% |
| 1999 | 104 | 75,420 | 13,665.711 | 0.18 | 131 | 725 | 83,197.6 | 0.16 | 800 | 923 | 87% |
| 2000 | 104 | 74,108 | 12,651.682 | 0.17 | 122 | 713 | 86,006.8 | 0.15 | 827 | 926 | 89% |
| 2001 | 104 | 67,570 | 11,108.552 | 0.16 | 107 | 650 | 87,552.8 | 0.13 | 842 | 929 | 91% |
| 2002 | 104 | 73,242 | 12,126.190 | 0.17 | 117 | 704 | 88,829.7 | 0.14 | 854 | 934 | 91% |
| 2003 | 104 | 74,813 | 11,955.570 | 0.16 | 115 | 719 | 87,015.0 | 0.14 | 837 | 936 | 89% |
| 2004 | 104 | 69,849 | 10,367.897 | 0.15 | 100 | 672 | 89,823.5 | 0.12 | 864 | 926 | 93% |
| 2005 | 104 | 78,127 | 11,455.807 | 0.15 | 110 | 751 | 89,177.7 | 0.13 | 857 | 952 | 90% |
| 2006 | 104 | 80,265 | 11,021.186 | 0.14 | 106 | 772 | 89,989.7 | 0.12 | 865 | 958 | 90% |
| 2007 | 104 | 79,530 | 10,120.013 | 0.13 | 97 | 765 | 92,144.9 | 0.11 | 886 | 959 | 92% |
| 2008 | 104 | 79,450 | 9,195.940 | 0.12 | 88 | 764 | 91,834.3 | 0.10 | 883 | 961 | 92% |
| 2009 | 104 | 81,754 | 10,024.804 | 0.12 | 96 | 786 | 91,230.6 | 0.11 | 877 | 964 | 91% |
| 2010 | 104 | 75,010 | 8,631.384 | 0.12 | 83 | 721 | 92,134.0 | 0.09 | 886 | 965 | 92% |
| 2011 | 104 | 81,321 | 8,771.326 | 0.11 | 84 | 782 | 90,232.2 | 0.10 | 868 | 967 | 90% |
| 2012 | 104 | 79,549 | 8,035.393 | 0.10 | 77 | 765 | 87,757.9 | 0.09 | 844 | 972 | 87% |
| 2013 | 100 | 67,236 | 6,759.547 | 0.10 | 68 | 672 | 90,006.6 | 0.08 | 900 | 980 | 92% |
| 2014 | 100 | 70,847 | 7,124.519 | 0.10 | 71 | 708 | 91,166.4 | 0.08 | 912 | 985 | 93% |
| 2015 | 99 | 70,798 | 7,019.088 | 0.10 | 71 | 715 | 91,097.3 | 0.08 | 920 | 991 | 93% |
| 2016 | 99 | 59,353 | 5,365.709 | 0.09 | 54 | 600 | 91,517.3 | 0.06 | 924 | 999 | 93% |
| 2017 | 99 | 64,761 | 6,416.548 | 0.10 | 65 | 654 | 91,968.8 | 0.07 | 929 | 999 | 93% |
| 2018 | 98 | 61,014 | 5,829.471 | 0.10 | 59 | 623 | 91,836.4 | 0.06 | 937 | 1,004 | 93% |

* Includes only those reactors that had been in commercial operation for at least 1 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).
*** Beginning in 1997, the electricity reflects the net electricity generated.

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 for LWRs has remained unchanged since 2014 at 93 percent.

## 4.3 Annual TEDE Distributions

Table 4.4a summarizes the distribution of the annual TEDE doses received by individuals (unadjusted for transient workers) at all commercial LWRs during each of the years 1994 through 2018. This distribution is the sum of the annual dose distributions reported by each licensed LWR each year. As previously noted, Appendix B shows the distribution reported by each LWR site for 2018. Table 4.4a includes only those reactors that have been in operation for at least a full year. In 2018, the total collective dose decreased by 9 percent to a value of 5,829 person-rem.

Each year, this report identifies the reactors with the largest increases and decreases in collective dose from the previous year and identifies the main reasons for these changes. The changes generally are driven by whether the sites had an increase or decrease in outages from one year to the next. During an outage, more work is performed by individuals working in radiation areas, thereby resulting in increased collective doses. This is particularly true during a refueling outage, which entails the opening of the reactor vessel by removing the vessel head and transferring spent fuel to the spent fuel pool. In addition, the sites usually schedule maintenance and inspections during a refueling outage, which tend to increase the collective dose. If a site does not have a refueling outage during a year, the collective dose for that site is normally much lower. For example, in 2018 Harris 1 was the PWR with the largest percentage increase in collective dose which increased from 0.217 person-rem in 2017, to 31.736 person-rem in 2018. This increase in collective dose coincided with an increase in refueling outage days in 2018, increasing from 2.2 days in 2017 to 38.2 days in 2018. Outage days for PWRs ranged from 0 to 139.9 days during 2018. Waterford 3 had the largest percentage decrease in collective dose (60.728 to 1.130 person-rem) along with the fewest number of total outage days (0) in 2018.

For BWRs from 2017 to 2018, Hope Creek 1 had the highest percent increase in collective dose. In 2017, Hope Creek 1 had 0 total outage days and reported a collective dose of 31.919 person-rem, while in 2018, Hope Creek 1 had over 28 total outage days (refueling outage) and reported a collective dose of 150.044 person-rem. In 2018, Perry had a 91 percent decrease in collective dose. In 2017, Perry had 29.4 total outage days and reported a dose of 327.717 person-rem, while in 2018, Perry had 0 total outage days and reported a collective dose of 29.848 person-rem.

Combined, the refueling outage hours remained similar from 2017 to 2018 (20 percent increase for BWRs and 13 percent decrease for PWRs) which was a primary factor in the lack of change in collective dose.

Table 4.4b summarizes the distribution of the annual TEDE doses received by unique individuals (adjusted for transient workers) at all commercial LWRs during each of the years 1994 through 2018. The values do not include reactors that have been permanently shut down or reactors that have not been in commercial operation for 1 full year. See Section 5 for a detailed analysis of the impact of transient individuals on the distribution of annual doses in 2018.

## Table 4.4a Summary of Distribution of Annual Doses* at Commercial Light-Water Reactors** 1994–2018

| Year | Number of Individuals with Annual Doses* in the Ranges (rem) *** Note: Numbers of individuals shown have not been adjusted for the multiple reporting of transient individuals (see Section 5). | | | | | | | | | | | | Total Number Monitored | Number with Measurable Exposure | Collective Dose (person-rem) | Average Measurable Dose (person-rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. Measurable Exposure | Measurable <0.1 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.0 | 1.0-2.0 | 2.0-3.0 | 3.0-4.0 | 4.0-5.0 | 5.0-6.0 | >6.0 | | | | |
| 1994 | 85,145 | 36,528 | 18,633 | 14,246 | 6,800 | 3,502 | 3,323 | 215 | 6 | - | - | - | 168,398 | 83,253 | 21,534.000 | 0.259 |
| 1995 | 81,032 | 38,575 | 20,245 | 15,279 | 6,884 | 3,336 | 3,077 | 125 | 5 | - | - | - | 168,558 | 87,526 | 21,674.000 | 0.248 |
| 1996 | 78,197 | 39,426 | 19,955 | 14,201 | 5,809 | 2,648 | 2,342 | 68 | - | - | - | - | 162,646 | 84,449 | 18,874.000 | 0.223 |
| 1997 | 80,163 | 41,759 | 19,951 | 13,396 | 5,394 | 2,240 | 1,671 | 59 | 3 | - | - | - | 164,636 | 84,473 | 17,136.000 | 0.203 |
| 1998 | 77,080 | 37,039 | 17,189 | 10,467 | 3,930 | 1,562 | 1,129 | 35 | - | - | - | - | 148,431 | 71,351 | 13,169.366 | 0.185 |
| 1999 | 74,867 | 39,663 | 18,063 | 10,964 | 3,994 | 1,569 | 1,141 | 24 | 2 | - | - | - | 150,287 | 75,420 | 13,665.711 | 0.181 |
| 2000 | 73,793 | 40,301 | 17,598 | 10,310 | 3,525 | 1,375 | 976 | 23 | - | - | - | - | 147,901 | 74,108 | 12,651.682 | 0.171 |
| 2001 | 73,206 | 37,461 | 16,078 | 9,231 | 2,930 | 1,060 | 747 | 63 | - | - | - | - | 140,776 | 67,570 | 11,108.552 | 0.164 |
| 2002 | 76,270 | 41,588 | 16,752 | 9,426 | 3,121 | 1,245 | 1,003 | 105 | 2 | - | - | - | 149,512 | 73,242 | 12,126.190 | 0.166 |
| 2003 | 77,889 | 42,720 | 17,231 | 9,589 | 3,139 | 1,233 | 864 | 37 | - | - | - | - | 152,702 | 74,813 | 11,955.570 | 0.160 |
| 2004 | 80,473 | 41,583 | 15,626 | 8,245 | 2,733 | 978 | 668 | 16 | - | - | - | - | 150,322 | 69,849 | 10,367.897 | 0.148 |
| 2005 | 82,574 | 46,444 | 17,754 | 9,191 | 2,934 | 1,104 | 683 | 17 | - | - | - | - | 160,701 | 78,127 | 11,455.807 | 0.147 |
| 2006 | 84,558 | 48,571 | 18,269 | 9,312 | 2,675 | 904 | 532 | 2 | - | - | - | - | 164,823 | 80,265 | 11,021.186 | 0.137 |
| 2007 | 84,551 | 49,998 | 17,672 | 8,294 | 2,329 | 824 | 402 | 11 | - | - | - | - | 164,081 | 79,530 | 10,120.013 | 0.127 |
| 2008 | 89,875 | 51,831 | 17,337 | 7,578 | 1,847 | 583 | 269 | 5 | - | - | - | - | 169,325 | 79,450 | 9,195.940 | 0.116 |
| 2009 | 94,627 | 52,670 | 17,417 | 8,352 | 2,161 | 741 | 413 | - | - | - | - | - | 176,381 | 81,754 | 10,024.804 | 0.123 |
| 2010 | 104,638 | 49,571 | 16,042 | 6,656 | 1,801 | 602 | 333 | 5 | - | - | - | - | 179,648 | 75,010 | 8,631.384 | 0.115 |
| 2011 | 110,217 | 55,407 | 16,651 | 6,753 | 1,675 | 559 | 276 | - | - | - | - | - | 191,538 | 81,321 | 8,771.326 | 0.108 |
| 2012 | 114,428 | 55,735 | 15,593 | 6,072 | 1,509 | 385 | 242 | 13 | - | - | - | - | 193,977 | 79,549 | 8,035.393 | 0.101 |
| 2013 | 107,378 | 47,190 | 13,158 | 5,088 | 1,227 | 380 | 191 | 2 | - | - | - | - | 174,614 | 67,236 | 6,759.547 | 0.101 |
| 2014 | 104,006 | 50,110 | 13,650 | 5,231 | 1,167 | 421 | 235 | 33 | - | - | - | - | 174,853 | 70,847 | 7,124.519 | 0.101 |
| 2015 | 106,088 | 50,067 | 13,856 | 4,980 | 1,230 | 421 | 242 | 2 | - | - | - | - | 176,886 | 70,798 | 7,019.088 | 0.099 |
| 2016 | 96,221 | 43,386 | 10,938 | 3,829 | 865 | 243 | 92 | - | - | - | - | - | 155,574 | 59,353 | 5,365.709 | 0.090 |
| 2017 | 92,311 | 45,920 | 12,376 | 4,745 | 1,184 | 382 | 154 | - | - | - | - | - | 157,072 | 64,761 | 6,416.548 | 0.099 |
| 2018 | 89,205 | 44,206 | 11,030 | 4,207 | 1,086 | 316 | 168 | 1 | - | - | - | - | 150,219 | 61,014 | 5,829.471 | 0.096 |

* These doses are annual TEDE doses.

** Summary of reports submitted in accordance with 10 CFR 20.2206 by BWRs and PWRs 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 not been adjusted for the multiple reporting of transient individuals (see Table 4.4b and Section 5).

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

## Table 4.4b Summary of Distribution of Annual Doses* at Commercial Light-Water Reactors**, Adjusted for Transients 1994–2018

| Year | Number of Individuals with Annual Doses* in the Ranges (rem) *** Note: Numbers of individuals shown have been adjusted for the multiple reporting of transient individuals (see Section 5). | | | | | | | | | | | | Total Number Monitored | Number with Measurable Exposure | Collective Dose (person-rem) | Average Measurable Dose (person-rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No. Measurable Exposure | Measurable <0.1 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.0 | 1.0-2.0 | 2.0-3.0 | 3.0-4.0 | 4.0-5.0 | 5.0-6.0 | >6.0 | | | | |
| 1994 | 67,700 | 29,847 | 14,841 | 11,716 | 6,124 | 3,586 | 4,222 | 508 | 40 | - | - | - | 138,584 | 70,884 | 21,534.000 | 0.304 |
| 1995 | 61,505 | 29,588 | 15,097 | 12,020 | 6,121 | 3,300 | 3,906 | 595 | 133 | 2 | - | - | 132,267 | 70,762 | 21,674.000 | 0.306 |
| 1996 | 58,292 | 30,021 | 14,831 | 11,340 | 5,418 | 2,831 | 3,194 | 408 | 67 | - | - | - | 126,402 | 68,110 | 18,874.000 | 0.277 |
| 1997 | 58,647 | 31,751 | 14,881 | 10,902 | 5,228 | 2,447 | 2,598 | 286 | 41 | - | - | - | 126,781 | 68,134 | 17,136.000 | 0.252 |
| 1998 | 57,041 | 27,905 | 12,829 | 8,802 | 3,930 | 1,839 | 1,829 | 182 | 15 | 1 | - | - | 114,373 | 57,332 | 13,169.366 | 0.230 |
| 1999 | 55,121 | 29,271 | 13,278 | 9,017 | 3,806 | 1,908 | 1,898 | 245 | 18 | - | - | - | 114,562 | 59,441 | 13,665.711 | 0.230 |
| 2000 | 53,324 | 28,480 | 12,921 | 8,679 | 3,571 | 1,644 | 1,734 | 186 | 18 | - | - | - | 110,557 | 57,233 | 12,651.682 | 0.221 |
| 2001 | 52,636 | 27,246 | 11,491 | 7,659 | 2,907 | 1,323 | 1,392 | 221 | 53 | - | - | - | 104,928 | 52,292 | 11,108.552 | 0.212 |
| 2002 | 53,440 | 28,523 | 11,610 | 7,668 | 3,004 | 1,479 | 1,820 | 320 | 35 | 1 | - | - | 107,900 | 54,460 | 12,126.190 | 0.223 |
| 2003 | 54,028 | 29,161 | 11,971 | 8,190 | 3,253 | 1,527 | 1,651 | 184 | 18 | - | - | - | 109,983 | 55,955 | 11,955.570 | 0.214 |
| 2004 | 57,420 | 28,863 | 11,178 | 7,335 | 2,873 | 1,233 | 1,190 | 188 | 13 | - | - | - | 110,293 | 52,873 | 10,367.897 | 0.196 |
| 2005 | 56,709 | 31,035 | 12,422 | 7,813 | 3,106 | 1,537 | 1,490 | 147 | 3 | - | - | - | 114,262 | 57,553 | 11,455.807 | 0.199 |
| 2006 | 57,546 | 32,439 | 12,687 | 7,802 | 2,971 | 1,415 | 1,407 | 82 | 2 | - | - | - | 116,351 | 58,805 | 11,021.186 | 0.187 |
| 2007 | 57,314 | 32,706 | 11,961 | 7,396 | 2,714 | 1,284 | 1,100 | 97 | 9 | - | - | - | 114,581 | 57,267 | 10,120.013 | 0.177 |
| 2008 | 61,336 | 33,832 | 12,322 | 6,786 | 2,430 | 1,026 | 922 | 38 | - | - | - | - | 118,692 | 57,356 | 9,195.940 | 0.160 |
| 2009 | 66,310 | 35,877 | 12,318 | 7,317 | 2,562 | 1,174 | 1,144 | 68 | 4 | - | - | - | 126,774 | 60,464 | 10,024.804 | 0.166 |
| 2010 | 74,218 | 33,873 | 11,670 | 6,356 | 2,231 | 946 | 832 | 42 | 3 | - | - | - | 130,171 | 55,953 | 8,631.384 | 0.154 |
| 2011 | 78,090 | 36,745 | 12,119 | 6,307 | 2,226 | 1,008 | 837 | 23 | - | - | - | - | 137,355 | 59,265 | 8,771.326 | 0.148 |
| 2012 | 79,222 | 36,990 | 11,943 | 5,904 | 1,962 | 774 | 672 | 37 | - | - | - | - | 137,504 | 58,282 | 8,035.393 | 0.138 |
| 2013 | 76,261 | 32,326 | 10,166 | 5,231 | 1,680 | 674 | 430 | 18 | - | - | - | - | 126,786 | 50,525 | 6,759.547 | 0.134 |
| 2014 | 73,390 | 32,917 | 10,285 | 5,212 | 1,685 | 695 | 589 | 58 | - | - | - | - | 124,831 | 51,441 | 7,124.519 | 0.138 |
| 2015 | 71,980 | 31,806 | 10,208 | 5,034 | 1,686 | 708 | 647 | 27 | 3 | - | - | - | 122,099 | 50,119 | 7,019.088 | 0.140 |
| 2016 | 67,685 | 29,063 | 8,736 | 4,196 | 1,236 | 429 | 332 | 16 | 1 | - | - | - | 111,694 | 44,009 | 5,365.709 | 0.122 |
| 2017 | 62,882 | 29,448 | 9,210 | 4,695 | 1,666 | 671 | 532 | 11 | - | - | - | - | 109,115 | 46,233 | 5,365.709 | 0.116 |
| 2018 | 59,356 | 28,012 | 8,146 | 4,205 | 1,488 | 663 | 462 | 20 | 2 | - | - | - | 102,354 | 42,998 | 5,829.471 | 0.136 |

* These doses are annual TEDE doses.

** Summary of reports submitted in accordance with 10 CFR 20.2206 by BWRs and PWRs that had been in commercial operation for at least 1 full year as of December 31 of each of the indicated years.

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

## 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 individuals per BWR have been higher than those for PWRs for all years depicted. BWRs generally have higher collective doses because the steam produced directly from the reactor is used to drive turbines to produce electricity, which results in radioactivity being present in both the reactor and turbine systems. PWR systems are designed to keep the radioactivity within the reactor vessel and primary system and not in the turbine systems.

In 2018, the average collective dose per reactor for BWRs was 111 person-rem and the average collective dose per reactor for PWRs was 34 person-rem. In comparison with the 2017 values, the average collective dose per reactor for BWRs decreased by 6 percent and the average collective dose per reactor for PWRs decreased by 8 percent. Neither of these decreases was significantly different from the 5-year average. The average collective dose per reactor for LWRs decreased by 9 percent from 2017 but was not significantly different from the 5-year trend. This is the ninth year since tracking began in 1973 that the average collective dose per reactor for LWRs has been below 90 person-rem. The overall decreasing trend in average reactor collective doses since 1994 indicates that licensees are continuing to successfully implement as low as is reasonably achievable (ALARA) dose reduction processes at their facilities. Further impacting this decreasing trend, in 2018, eight LWRs reported substantial decreases in collective dose due to fewer outages. In 2018, the number of individuals with a measurable dose per reactor decreased to 944 for BWRs and decreased to 459 for PWRs. Neither of these decreases were statistically significant when compared to the 5-year average.

Figures 4.2 and 4.3 are plots of most of the other information that is presented in Tables 4.1, 4.2, and 4.3. Table 4.3 shows that the net electricity generated at LWRs decreased slightly from 91,969 MW-yr in 2017 to 91,836 MW-yr in 2018, while the number of operating reactors decreased to 98 in 2018. The net electricity generated in 2018 was not significantly different than the 5-year trend. Table 4.3 also shows that the value for the total collective dose for all LWRs decreased by 9 percent to 5,829 person-rem in 2018 from 6,417 person-rem in 2017, and was not a statistically significant decrease from the 5-year trend. Table 4.3 shows that the average measurable dose per individual remained the same at 0.10 rem (not adjusted for transient individuals). However, the average collective dose for all LWRs per MW-yr was significantly lower than the 5-year average.

The decrease seen in dose trends since 1994 may be attributed to several factors. For example, utilities have completed the tasks initiated as a result of the lessons learned from the 1979 TMI accident, and they are increasing efforts to avoid and reduce exposure. 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 exposure control processes, techniques, and procedures.

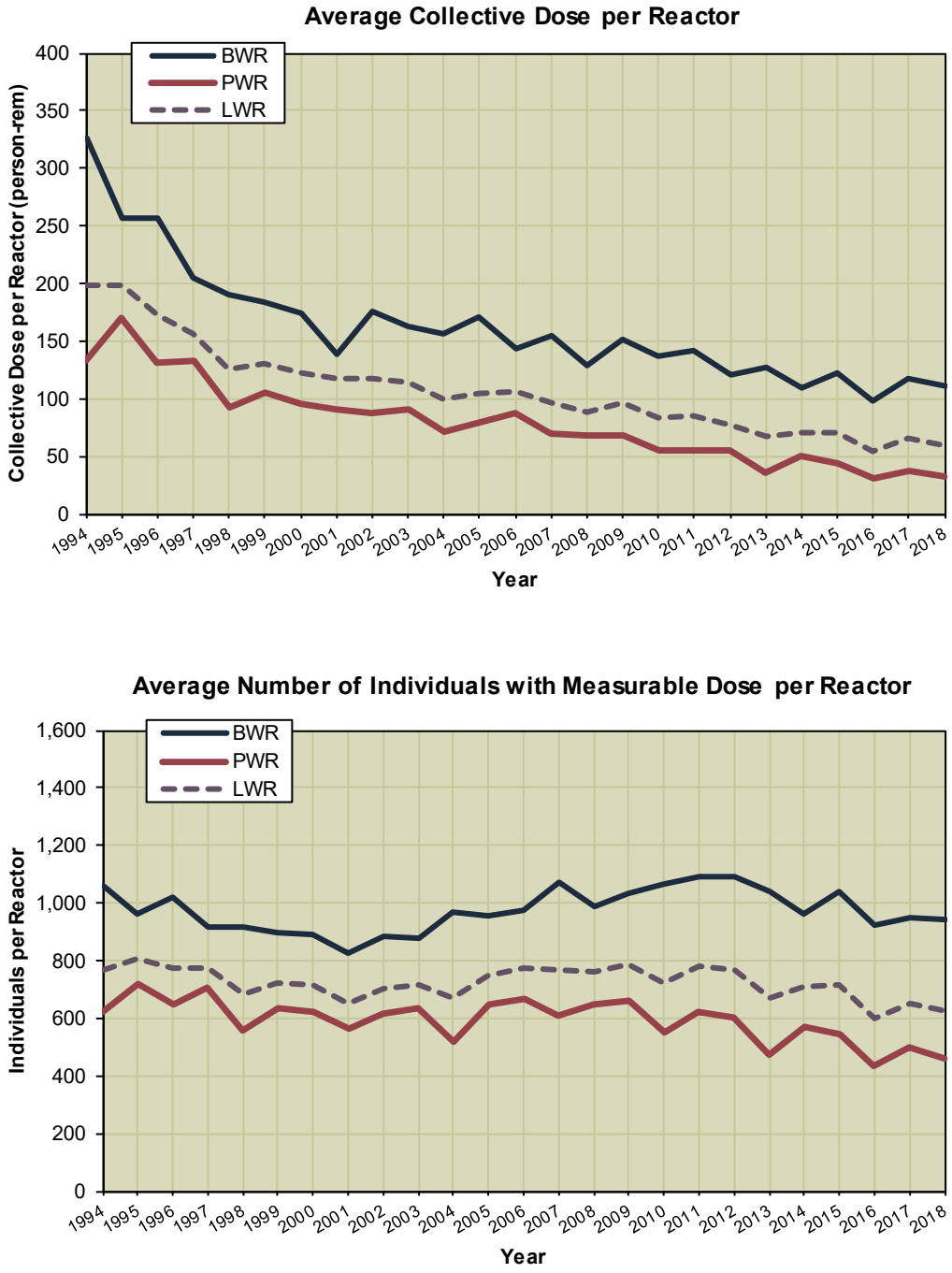
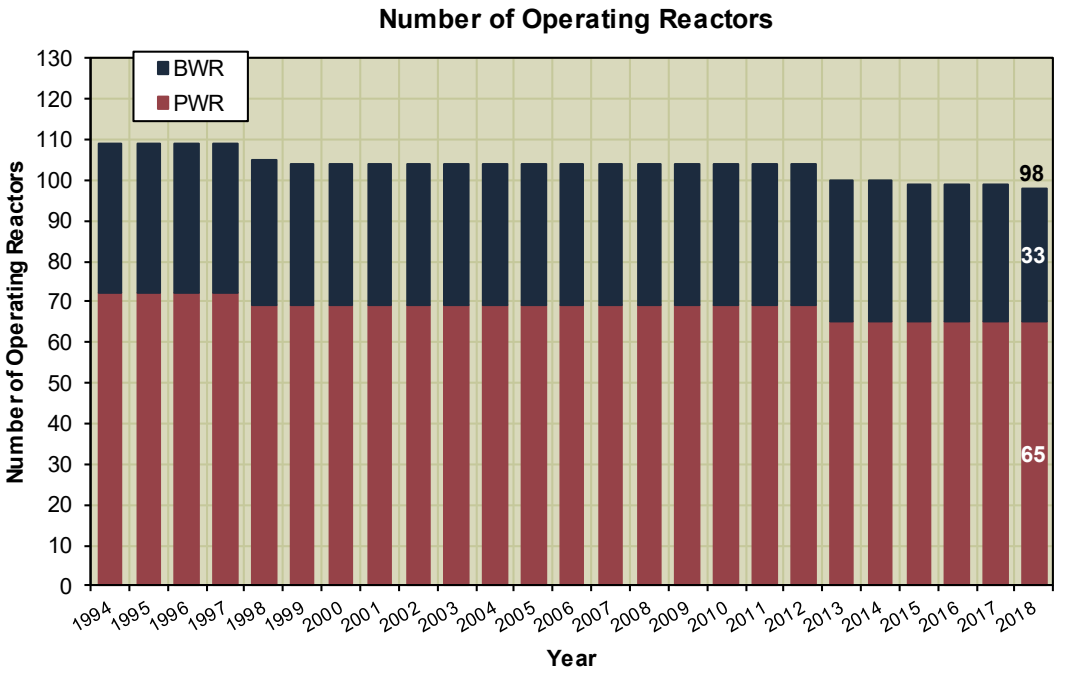
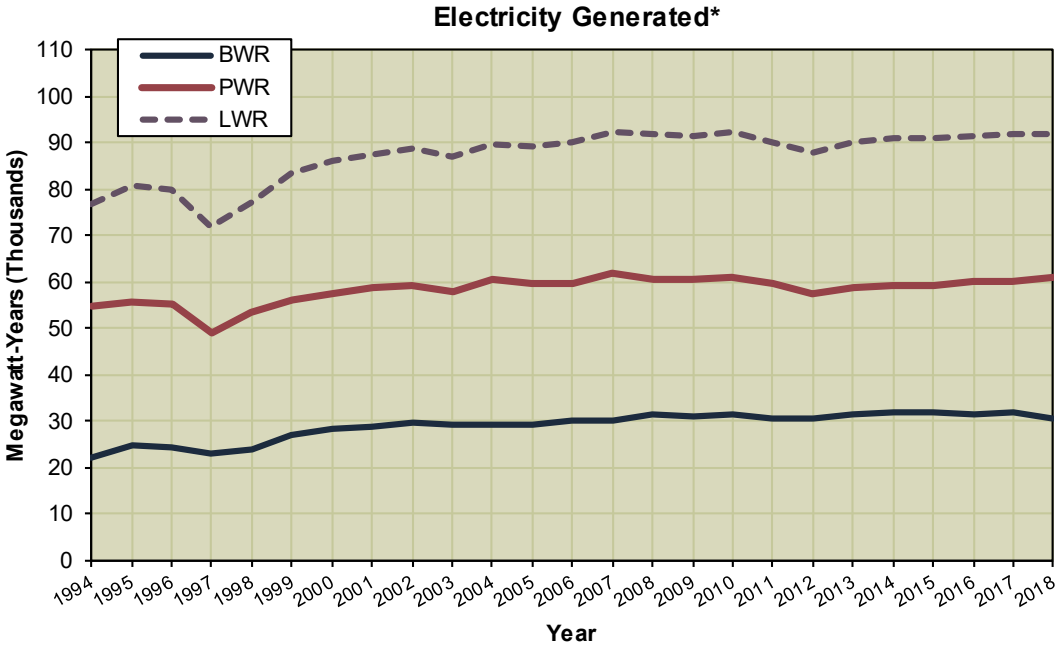


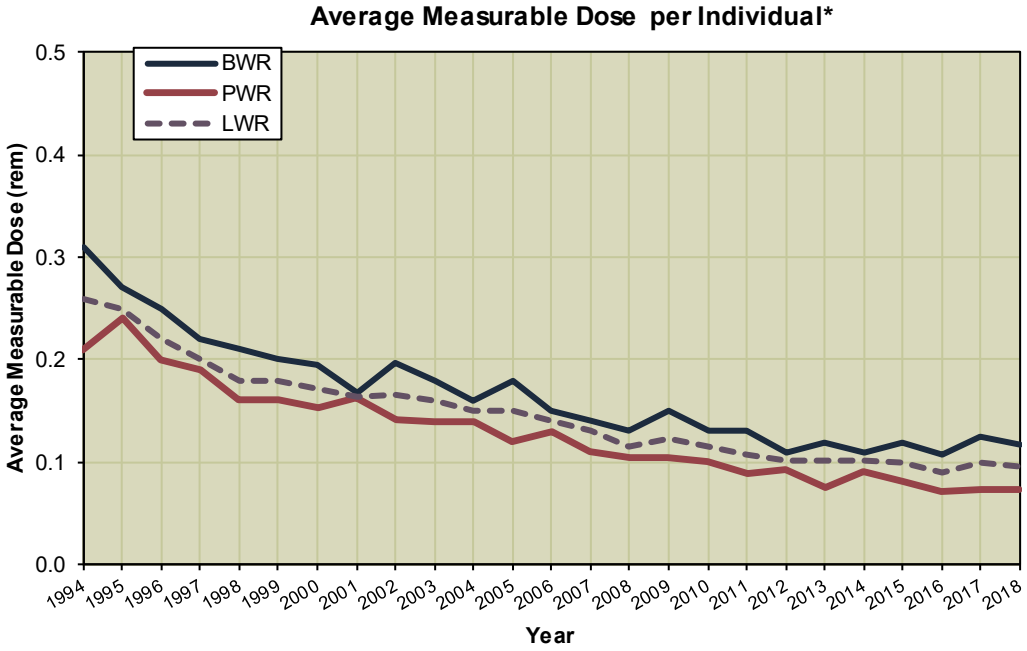

**Figure 4.1 Average Collective Dose per Reactor and Average Number of Individuals with Measurable Dose per Reactor 1994–2018**

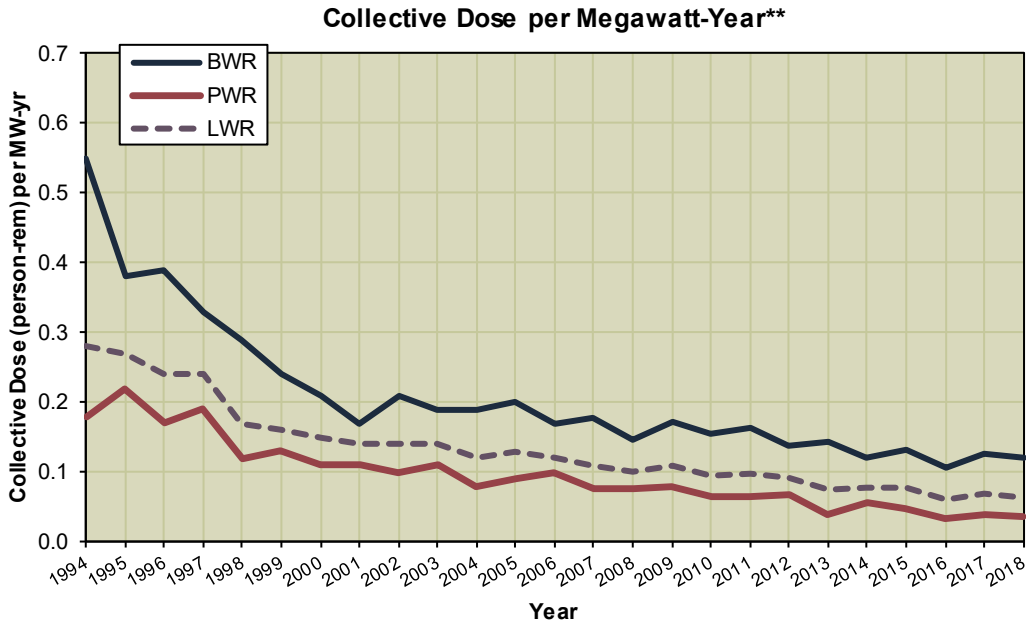



* Gross electricity is shown for 1994–1996, net electricity is shown for 1997–2018.

**Figure 4.2 Number of Operating Reactors and Electricity Generated 1994–2018**




* Not adjusted for transient workers. See Section 5.
** Gross electricity is shown for 1994–1996, net electricity is shown for 1997–2018.

**Figure 4.3 Average Measurable Dose per Individual and Collective Dose per Megawatt-Year 1994–2018**

To further assist in the identification of any trends that might exist, Figures 4.4a and 4.4b display the average and median values of the collective dose per reactor for BWRs and for PWRs for the years 1994 through 2018. The median values are included here for statistical completeness and are not used in other sections of this report. 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.

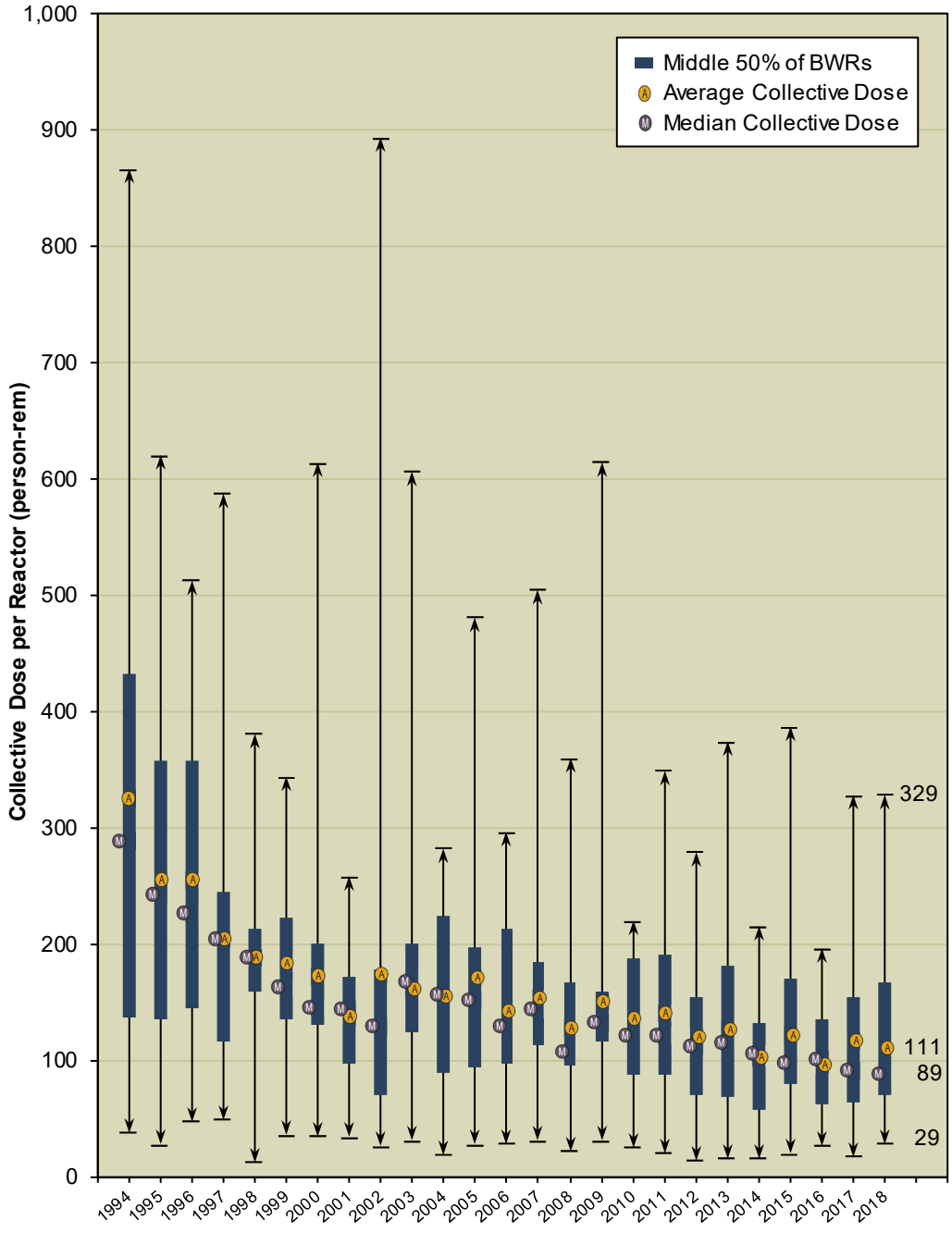



**Figure 4.4a Average, Median, and Extreme Values of the Collective Dose per BWR Reactor 1994–2018**

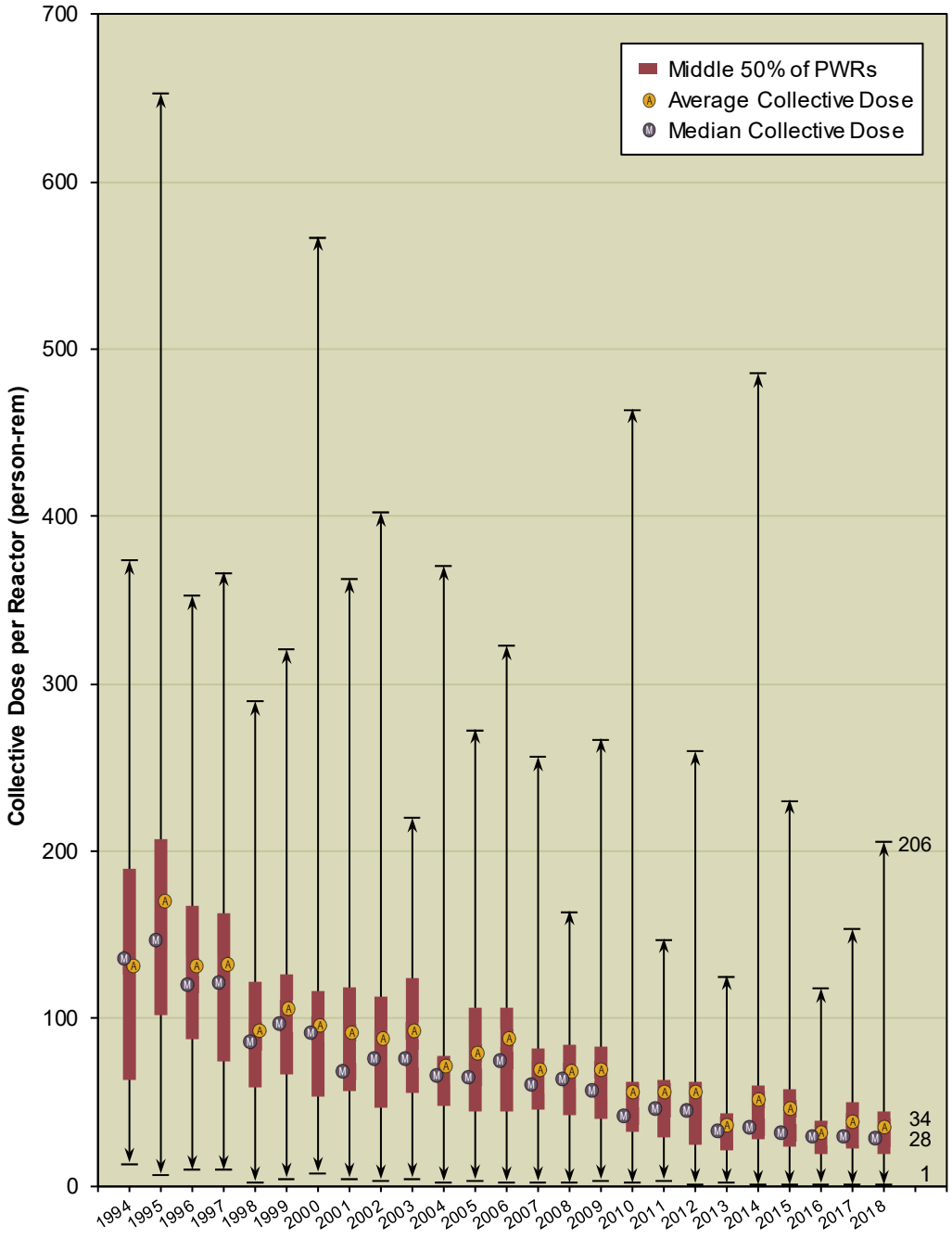



**Figure 4.4b Average, Median, and Extreme Values of the Collective Dose per PWR Reactor 1994–2018**

The rectangles indicate the range of values of the collective dose exhibited by those plants ranked in the 25th through the 75th percentiles. Figure 4.4a shows that the median collective dose for BWRs decreased from 92 person-rem in 2017 to 89 person-rem in 2018. The median collective dose in 2018 is significantly lower than the 5-year median of 103 person-rem. The median collective dose for PWRs decreased to 28 person-rem in 2018 and was not significantly lower than the 5-year median of 31 person-rem. Figure 4.4a and Figure 4.4b show that, in 2018, 50 percent of the BWRs reported collective doses between 70 and 167 person-rem, while

50 percent of the PWRs reported collective doses between 19 and 44 person-rem. The middle 50 percent of BWRs and PWRs in Figures 4.4a and 4.4b are the reactors between the 25 percent and 75 percent dose ranges. These values are based on annual collective dose values, not the 3-year rolling average that is presented in Section 4.5. Nearly every year, the median collective dose is less than the average, which indicates that more of the reactors tend to be at lower collective doses than is reflected by the average. This is a result of the wide difference between the maximum and minimum annual collective doses at power plants and the fact that some plants accrue higher collective doses during refueling outages. The plants that have outages during the year (and thus higher collective doses) increase the value of the average collective dose, while the median (or middle-point of the doses) remains lower.

## 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 Reactor Oversight Process for inspection planning and in the Significance Determination Process. Tables 4.5 and 4.6 list the sites that had been in commercial operation for at least 3 years as of December 31, 2018, and show the values of several parameters for each of the sites. These tables also give averages for the two types of reactors.

Based on the 99 reactor-years of operation accumulated over a 3-year period by the 33 BWRs listed, the average 3-year collective TEDE per reactor was found to be 110 person-rem, the average measurable TEDE per individual was 0.116 rem, and the average collective TEDE per MW-yr was 0.12 rem. For BWRs, although most values decreased slightly from 2017 to 2018, the changes in these values were not statistically significant when compared to the 5-year average.

Based on the 194 reactor-years of operation accumulated over a 3-year period at the 65 PWRs listed, the average annual collective TEDE per reactor, average measurable TEDE per individual, and average collective TEDE per MW-yr were found to be 34 person-rem, 0.072 rem, and 0.04 rem, respectively. Each of these values was significantly lower in 2018 when compared to the 5-year trend.

In addition to the listings provided in Tables 4.5 and 4.6, the quartile ranking is used by the NRC as a factor in planning the number of inspection hours assigned per site. For this reason, Tables 4.7 and 4.8 are included in the 2018 annual report for BWRs and PWRs, respectively. These tables show the plant name, 3-year collective TEDE per reactor year, the percent change in the 3-year average from the previous 3-year period, and the quartile ranking from the previous period if the ranking has changed.

## Table 4.5 Three-Year Totals and Averages Listed in Ascending Order of Collective TEDE per BWR 2016–2018

| Plant Name* | Reactor Years | Three-year Collective TEDE per Reactor Year 2016-2018 (person-rem) | Three-year Collective TEDE per Site (person-rem) | Number of Workers with Measurable TEDE | Average TEDE per Worker (rem) | Total MW-Yrs | Average TEDE per MW-Yr (rem) |
|---|---|---|---|---|---|---|---|
| MONTICELLO | 3 | 57.866 | 173.599 | 1,401 | 0.124 | 1,869.3 | 0.09 |
| DRESDEN 2,3 | 6 | 64.987 | 389.924 | 5,689 | 0.069 | 5,303.4 | 0.07 |
| DUANE ARNOLD | 3 | 68.644 | 205.933 | 2,053 | 0.100 | 1,690.8 | 0.12 |
| LIMERICK 1,2 | 6 | 71.931 | 431.588 | 5,110 | 0.084 | 6,557.1 | 0.07 |
| HATCH 1,2 | 6 | 77.276 | 463.655 | 4,092 | 0.113 | 4,975.1 | 0.09 |
| QUAD CITIES 1,2 | 6 | 79.658 | 477.945 | 5,441 | 0.088 | 5,312.0 | 0.09 |
| PILGRIM 1 | 3 | 82.006 | 246.017 | 2,966 | 0.083 | 1,701.0 | 0.14 |
| COLUMBIA GENERATING | 3 | 83.386 | 250.158 | 2,804 | 0.089 | 3,135.0 | 0.08 |
| CLINTON | 3 | 88.537 | 265.610 | 2,958 | 0.090 | 2,930.6 | 0.09 |
| SUSQUEHANNA 1,2 | 6 | 91.689 | 550.131 | 5,007 | 0.110 | 6,936.2 | 0.08 |
| BRUNSWICK 1,2 | 6 | 94.421 | 566.524 | 5,047 | 0.112 | 5,181.0 | 0.11 |
| PEACH BOTTOM 2,3 | 6 | 96.229 | 577.372 | 5,593 | 0.103 | 7,454.1 | 0.08 |
| HOPE CREEK 1 | 3 | 107.282 | 321.850 | 3,666 | 0.088 | 3,411.1 | 0.09 |
| COOPER STATION | 3 | 119.565 | 358.695 | 2,686 | 0.134 | 2,108.1 | 0.17 |
| NINE MILE POINT 1,2 | 6 | 130.573 | 783.435 | 4,985 | 0.157 | 5,351.7 | 0.15 |
| PERRY | 3 | 131.318 | 393.954 | 2,017 | 0.195 | 3,533.2 | 0.11 |
| GRAND GULF | 3 | 133.971 | 401.914 | 3,282 | 0.122 | 2,326.2 | 0.17 |
| RIVER BEND 1 | 3 | 137.909 | 413.726 | 2,605 | 0.159 | 2,420.3 | 0.17 |
| BROWNS FERRY 1,2,3 | 9 | 139.255 | 1,253.297 | 9,285 | 0.135 | 9,102.4 | 0.14 |
| FITZPATRICK | 3 | 140.683 | 422.048 | 2,969 | 0.142 | 2,119.7 | 0.20 |
| LASALLE 1,2 | 6 | 209.774 | 1,258.642 | 8,400 | 0.150 | 6,558.7 | 0.19 |
| FERMI 2 | 3 | 216.286 | 648.858 | 5,377 | 0.121 | 2,887.2 | 0.22 |
| **Totals and Averages** | **99** | **-** | **10,854.875** | **93,433** | **0.116** | **92,864.2** | **0.12** |
| **Average per Reactor-Year** | **-** | **109.645** | **-** | **944** | **-** | **938.0** | **-** |

* Sites where not all reactors had completed 3 full years of commercial operations as of December 31, 2018, are not included.

## Table 4.6 Three-Year Totals and Averages Listed in Ascending Order of Collective TEDE per PWR 2016–2018

| Plant Name* | Reactor Years | Three-year Collective TEDE per Reactor Year 2016-2018 (person-rem) | Three-year Collective TEDE per Site (person-rem) | Number of Workers with Measurable TEDE | Average TEDE per Worker (rem) | Total MW-Yrs | Average TEDE per MW-Yr (rem) |
|---|---|---|---|---|---|---|---|
| OCONEE 1,2,3 | 9 | 16.433 | 147.900 | 3,286 | 0.045 | 7,336.7 | 0.02 |
| PALO VERDE 1,2,3 | 9 | 17.754 | 159.787 | 3,390 | 0.047 | 10,923.5 | 0.01 |
| DIABLO CANYON 1,2 | 6 | 19.610 | 117.657 | 2,312 | 0.051 | 6,302.0 | 0.02 |
| PRAIRIE ISLAND 1,2 | 6 | 20.022 | 120.131 | 1,822 | 0.066 | 2,968.3 | 0.04 |
| FARLEY 1,2 | 6 | 21.258 | 127.546 | 2,124 | 0.060 | 4,859.3 | 0.03 |
| SEABROOK | 3 | 21.427 | 64.281 | 1,047 | 0.061 | 3,517.3 | 0.02 |
| WATERFORD 3 | 3 | 21.750 | 65.250 | 1,247 | 0.052 | 3,287.2 | 0.02 |
| WATTS BAR 1,2 ** | 5** | 23.416 | 117.081 | 2,042 | 0.057 | 4,952.4 | 0.02 |
| CALLAWAY 1 | 3 | 24.565 | 73.694 | 1,240 | 0.059 | 3,246.8 | 0.02 |
| HARRIS 1 | 3 | 25.276 | 75.829 | 1,295 | 0.059 | 2,661.0 | 0.03 |
| GINNA | 3 | 25.329 | 75.986 | 1,155 | 0.066 | 1,648.3 | 0.05 |
| SOUTH TEXAS 1,2 | 6 | 26.319 | 157.912 | 1,749 | 0.090 | 7,316.7 | 0.02 |
| BYRON 1,2 | 6 | 27.836 | 167.013 | 2,779 | 0.060 | 6,712.8 | 0.02 |
| BEAVER VALLEY 1,2 | 6 | 28.776 | 172.654 | 2,448 | 0.071 | 5,158.1 | 0.03 |
| BRAIDWOOD 1,2 | 6 | 29.911 | 179.463 | 2,711 | 0.066 | 6,748.6 | 0.03 |
| VOGTLE 1,2 | 6 | 30.981 | 185.883 | 2,357 | 0.079 | 6,734.5 | 0.03 |
| POINT BEACH 1,2 | 6 | 31.334 | 188.001 | 1,791 | 0.105 | 3,417.7 | 0.06 |
| CALVERT CLIFFS 1,2 | 6 | 31.945 | 191.668 | 2,465 | 0.078 | 5,121.6 | 0.04 |
| COOK 1,2 | 6 | 32.038 | 192.225 | 2,990 | 0.064 | 5,772.1 | 0.03 |
| CATAWBA 1,2 | 6 | 32.773 | 196.635 | 2,853 | 0.069 | 6,626.1 | 0.03 |
| COMANCHE PEAK 1,2 | 6 | 33.220 | 199.321 | 2,240 | 0.089 | 6,634.3 | 0.03 |
| THREE MILE ISLAND 1 | 3 | 34.047 | 102.141 | 1,396 | 0.073 | 2,429.2 | 0.04 |
| SUMMER 1 | 3 | 34.140 | 102.421 | 1,752 | 0.058 | 2,618.5 | 0.04 |
| SURRY 1,2 | 6 | 36.714 | 220.281 | 2,596 | 0.085 | 4,823.9 | 0.05 |
| NORTH ANNA 1,2 | 6 | 36.845 | 221.068 | 2,583 | 0.086 | 5,393.3 | 0.04 |
| TURKEY POINT 3,4 | 6 | 39.260 | 235.557 | 2,676 | 0.088 | 4,589.8 | 0.05 |
| MILLSTONE 2,3 | 6 | 40.472 | 242.833 | 2,751 | 0.088 | 5,715.8 | 0.04 |
| ROBINSON 2 | 3 | 41.480 | 124.441 | 1,974 | 0.063 | 2,013.7 | 0.06 |
| MCGUIRE 1,2 | 6 | 42.541 | 255.248 | 3,689 | 0.069 | 6,682.9 | 0.04 |
| ST. LUCIE 1,2 | 6 | 43.445 | 260.670 | 3,204 | 0.081 | 5,431.9 | 0.05 |
| INDIAN POINT 2,3 | 6 | 43.977 | 263.861 | 4,580 | 0.058 | 5,328.0 | 0.05 |
| SEQUOYAH 1,2 | 6 | 45.732 | 274.390 | 3,331 | 0.082 | 6,073.1 | 0.05 |
| SALEM 1,2 | 6 | 46.256 | 277.538 | 3,374 | 0.082 | 6,026.5 | 0.05 |
| WOLF CREEK 1 | 3 | 55.650 | 166.950 | 2,792 | 0.060 | 3,205.0 | 0.05 |
| ARKANSAS 1,2 | 6 | 55.664 | 333.983 | 5,454 | 0.061 | 4,443.9 | 0.08 |
| DAVIS-BESSE 1 | 3 | 57.032 | 171.096 | 1,807 | 0.095 | 2,471.6 | 0.07 |
| PALISADES | 3 | 122.031 | 366.093 | 1,927 | 0.190 | 2,122.7 | 0.17 |
| **Totals and Averages** | **194** | **-** | **6,594.488** | **91,229** | **0.072** | **181,315.1** | **0.04** |
| **Average per Reactor-Year** | **-** | **33.992** | **-** | **470** | **-** | **934.6** | **-** |

* Sites where not all reactors had completed 3 full years of commercial operation as of December 31, 2018, are not included.

** Watts Bar 2 came online in October of 2016 and even though the unit has not completed 3 full years of commercial operation as of December 31, 2018, it is included in the total because Watts Bar 1 and 2 report together.

## Table 4.7 Three-year Collective TEDE per Reactor-Year for BWRs 2016–2018

| | Plant Name | Three-Year Coll. TEDE per Reactor Year 2016-2018 | Percent Change From 2015-2017 | 2015-2017 Quartile (if changed) |
|---|---|---|---|---|
| 1st Quartile | MONTICELLO | 57.866 | -37% ▼ | 2 |
| | DRESDEN 2,3 | 64.987 | -5% ▼ | - |
| | DUANE ARNOLD | 68.644 | 39% ▲ | - |
| | LIMERICK 1,2 | 71.931 | -1% ▼ | - |
| | HATCH 1,2 | 77.276 | -6% ▼ | 2 |
| | QUAD CITIES 1,2 | 79.658 | -2% ▼ | - |
| 2nd Quartile | PILGRIM 1 | 82.006 | -42% ▼ | 4 |
| | COLUMBIA GENERATING | 83.386 | -50% ▼ | 4 |
| | CLINTON | 88.537 | -7% ▼ | - |
| | SUSQUEHANNA 1,2 | 91.689 | -10% ▼ | 3 |
| | BRUNSWICK 1,2 | 94.421 | -8% ▼ | 3 |
| 3rd Quartile | PEACH BOTTOM 2,3 | 96.229 | -27% ▼ | - |
| | HOPE CREEK 1 | 107.282 | -6% ▼ | - |
| | COOPER STATION | 119.565 | 42% ▲ | 2 |
| | NINE MILE POINT 1,2 | 130.573 | 40% ▲ | 2 |
| | PERRY | 131.318 | -48% ▼ | 4 |
| 4th Quartile | GRAND GULF | 133.971 | 54% ▲ | 2 |
| | RIVER BEND 1 | 137.909 | -12% ▼ | - |
| | BROWNS FERRY 1,2,3 | 139.255 | 20% ▲ | 3 |
| | FITZPATRICK | 140.683 | 100% ▲ | 1 |
| | LASALLE 1,2 | 209.774 | -11% ▼ | - |
| | FERMI 2 | 216.286 | 17% ▲ | - |
| | **Average per Reactor-Year** | **109.645** | **-3%** ▼ | |

*Average 109.645*

## Table 4.8 Three-Year Collective TEDE per Reactor-Year for PWRs 2016–2018

| | Plant Name | Three-Year Coll. TEDE per Reactor Year 2016-2018 | Percent Change From 2015-2017 | 2015-2017 Quartile (if changed) | |
|---|---|---|---|---|---|
| 1st Quartile | OCONEE 1,2,3 | 16.433 | -7% ▼ | - | |
| | PALO VERDE 1,2,3 | 17.754 | -10% ▼ | - | |
| | DIABLO CANYON 1,2 | 19.610 | -18% ▼ | - | |
| | PRAIRIE ISLAND 1,2 | 20.022 | -17% ▼ | - | |
| | FARLEY 1,2 | 21.258 | -13% ▼ | - | |
| | SEABROOK | 21.427 | -49% ▼ | 3 | |
| | WATERFORD 3 | 21.750 | -50% ▼ | 3 | |
| | WATTS BAR 1,2 | 23.416 | -35% ▼ | 3 | |
| | CALLAWAY 1 | 24.565 | 0% ▲ | - | |
| | HARRIS 1 | 25.276 | -26% ▼ | 2 | |
| 2nd Quartile | GINNA | 25.329 | 5% ▲ | 1 | |
| | SOUTH TEXAS 1,2 | 26.319 | -8% ▼ | 1 | |
| | BYRON 1,2 | 27.836 | -10% ▼ | - | |
| | BEAVER VALLEY 1,2 | 28.776 | -11% ▼ | - | |
| | BRAIDWOOD 1,2 | 29.911 | 5% ▲ | 1 | |
| | VOGTLE 1,2 | 30.981 | -7% ▼ | - | |
| | POINT BEACH 1,2 | 31.334 | -2% ▼ | - | |
| | CALVERT CLIFFS 1,2 | 31.945 | 6% ▲ | 1 | |
| | COOK 1,2 | 32.038 | 6% ▲ | - | |
| 3rd Quartile | CATAWBA 1,2 | 32.773 | -5% ▼ | 2 | |
| | COMANCHE PEAK 1,2 | 33.220 | -1% ▼ | 2 | |
| | THREE MILE ISLAND 1 | 34.047 | -62% ▼ | 4 | *Average 33.993* |
| | SUMMER 1 | 34.140 | -13% ▼ | - | |
| | SURRY 1,2 | 36.714 | -23% ▼ | 4 | |
| | NORTH ANNA 1,2 | 36.845 | 6% ▲ | 2 | |
| | TURKEY POINT 3,4 | 39.260 | -11% ▼ | 4 | |
| | MILLSTONE 2,3 | 40.472 | 1% ▲ | - | |
| | ROBINSON 2 | 41.480 | 5% ▲ | - | |
| 4th Quartile | MCGUIRE 1,2 | 42.541 | -4% ▼ | - | |
| | ST. LUCIE 1,2 | 43.445 | -22% ▼ | - | |
| | INDIAN POINT 2,3 | 43.977 | 12% ▲ | 3 | |
| | SEQUOYAH 1,2 | 45.732 | -5% ▼ | - | |
| | SALEM 1,2 | 46.256 | 6% ▲ | 3 | |
| | WOLF CREEK 1 | 55.650 | -1% ▼ | - | |
| | ARKANSAS 1,2 | 55.664 | 0% ▼ | - | |
| | DAVIS-BESSE 1 | 57.032 | 41% ▲ | 3 | |
| | PALISADES | 122.031 | -6% ▼ | - | |
| | **Average per Reactor-Year** | **33.993** | **-9% ▼** | | |

## 4.6 International Occupational Radiation Exposure

In 1992, the Nuclear Energy Agency of the Organisation for Economic Co-operation and Development (NEA/OECD), with sponsorship from the International Atomic Energy Agency (IAEA), created the Information System on Occupational Exposure (ISOE) Program as an international forum for representatives from nuclear electric utilities and regulatory agencies to share dose reduction information, operational experience, and information to improve the optimization of radiological protection at commercial nuclear power plants. The ISOE database, ISOEDAT, includes occupational exposure information for 400 operating units and 80 units in cold-shutdown or some stage of decommissioning in 29 countries, covering about 90 percent of the world's operating commercial nuclear power reactors. One of the purposes of ISOEDAT is to allow a comparison of radiation protection effectiveness and trends among the participating countries and among the various types of commercial nuclear power reactors.

As part of the agency's international cooperative research program initiatives, the NRC joined the ISOE Program as a regulatory member in December 1994. The NRC's REIRS database is the U.S. system comparable with ISOEDAT on the global scale. Since joining the ISOE Program, the NRC has leveraged experience in data management and analysis of the REIRS database, as well as provided input to NEA/OECD and IAEA for streamlining certain ISOEDAT methods for capturing, maintaining, and displaying data.

Figures 4.5 and 4.6 show the average collective dose per reactor for both PWRs and BWRs for the United States and participating reactors from ISOEDAT. For PWRs, the international average collective dose per unit increased from 42 to 49 person-rem per reactor in 2018, while the U.S. average decreased from 37 to 33 person-rem per reactor. The international average for BWRs decreased to 26 person-rem per reactor in 2018, which is approximately 23 percent of the average for U.S. BWRs (111 person-rem per reactor).

It should be noted that the information from reactor sites in Japan has been affected by the Fukushima Daiichi event that occurred in 2011. Following the earthquake and tsunami at the Fukushima Daiichi and Daini reactor sites, all Japanese reactors were shut down to assess safety concerns. While these plants ceased power production, they were still officially counted as "operational" reactors. The collective dose at these sites decreased significantly as most operational activities were not required when the reactors were not producing power. Similarly, the collective dose data for German reactors in the ISOE database includes reactors that were shut down in 2011 by the German government following the Fukushima event. This resulted in a significant reduction in the average collective dose per reactor as operational activities ceased. The decrease in the average collective dose per reactor from these two countries decreased the overall international averages for both types of reactors since 2011. Since the Japan data represent a large percent (30 percent of the total BWRs), the decrease in the average collective dose per BWR in Japan is the primary factor in the decrease for international BWRs since 2011 as can be seen in Figure 4.6.

The data were compiled from the ISOEDAT online database. The NEA publishes an annual report entitled "Occupational Exposures at Nuclear Power Plants" that is available on the ISOE Web site at www.isoe-network.net [Ref. 19].

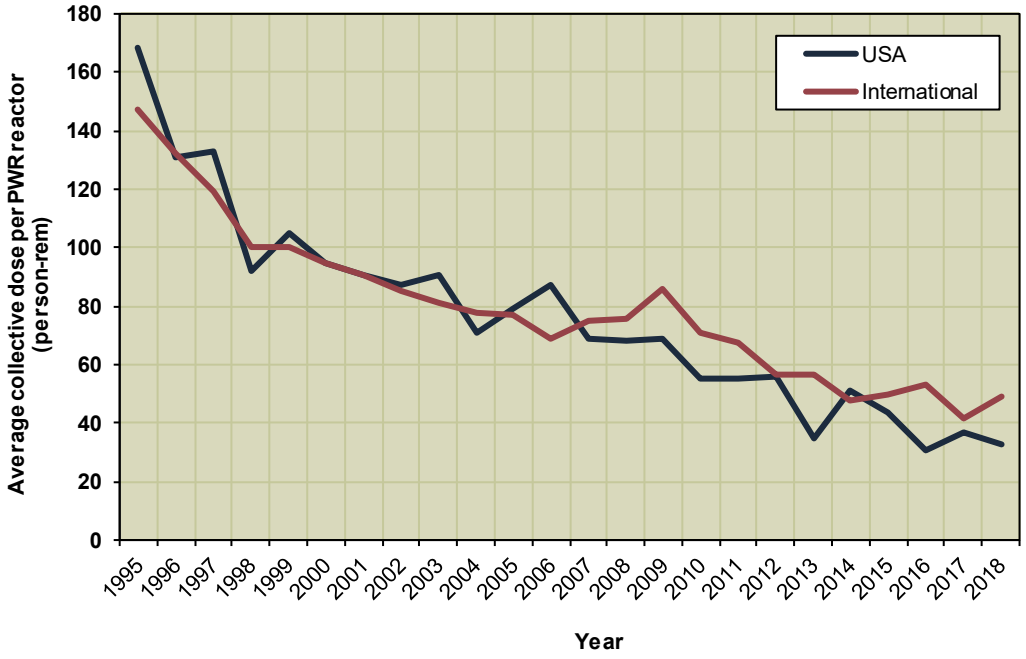



**Figure 4.5 Average Collective Dose per PWR Reactor 1995–2018**

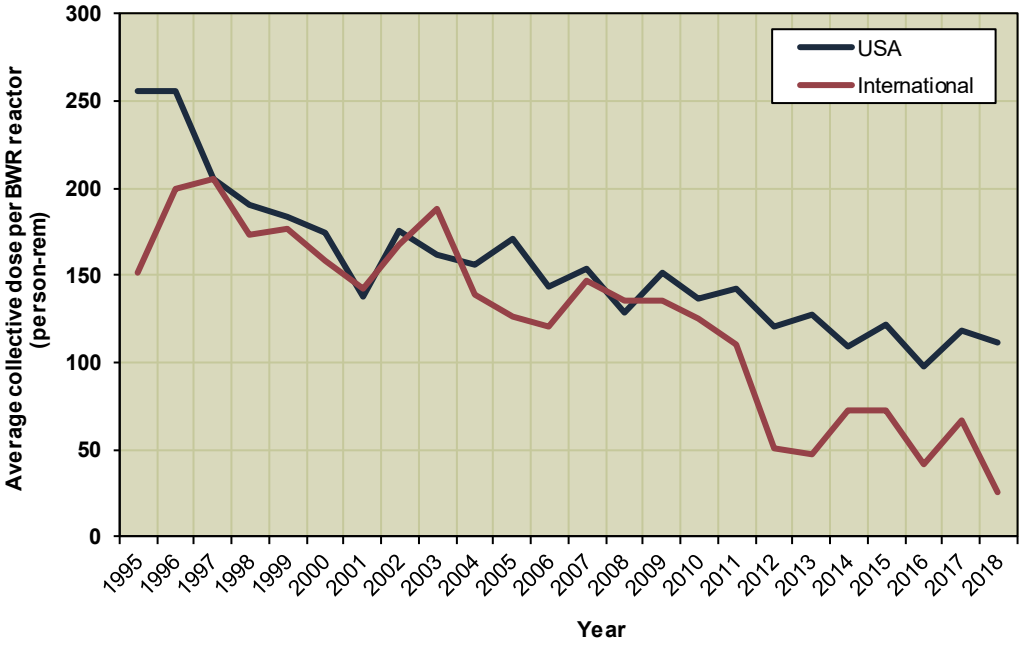



**Figure 4.6 Average collective dose per BWR reactor 1995–2018**

## 4.7 Decontamination and Decommissioning of Commercial Nuclear Power Reactors

The NRC regulates the decontamination and decommissioning (D&D) of commercial nuclear power reactors. The purpose of the NRC Decommissioning Program is to ensure that NRC-licensed sites are decommissioned in a safe, timely, and effective manner so that they can be returned to beneficial use and to ensure that stakeholders are informed and involved in the process, as appropriate.

The NRC Office of Nuclear Material Safety and Safeguards (NMSS) has project management responsibilities for decommissioning commercial nuclear power reactors. The NRC's commercial nuclear power reactor decommissioning activities include project management, technical review of licensee submittals in support of decommissioning, licensing amendments and exemptions in support of the progressive stages of decommissioning, inspections of decommissioning activities, support for the development of rulemaking guidance, public outreach efforts, international activities, and participation in industry conferences and workshops. The NMSS staff regularly coordinates with other offices on issues affecting all commercial nuclear power reactors, both operating and decommissioning, and specifically in regard to the ISFSIs at reactor sites undergoing decommissioning [Ref. 20].

### Decommissioning Process

The decommissioning process begins when a licensee decides to permanently cease operations. The major steps that comprise the commercial nuclear power reactor decommissioning process are notification of cessation of operations; submittal and review of the post-shutdown decommissioning activities report (PSDAR); submittal, review, and approval of the license termination plan (LTP); implementation of the LTP; and completion of decommissioning. The flowchart in Figure 4.7 illustrates the D&D process.

#### *Notification*

When a licensee has decided to permanently cease operations, it is required to submit a written notification to the NRC. In addition, the licensee is required to notify the NRC in writing once fuel has been permanently removed from the reactor vessel.

#### *Post-Shutdown Decommissioning Activities Report*

Within 2 years of cessation of operations, the licensee must submit a PSDAR to the NRC and a copy to the affected State(s). The PSDAR must include a description and schedule for the planned decommissioning activities, an estimate of the expected costs, and a discussion of the means for concluding that the environmental impacts associated with site-specific decommissioning activities will be bounded by appropriate, previously issued environmental impact statements. The NRC will provide notice of receipt of the PSDAR in the Federal Register and make the PSDAR available for public comment. In addition, the NRC will hold a public meeting in the vicinity of the licensee's facility to discuss the PSDAR.

#### *License Termination Plan*

Each commercial nuclear power reactor licensee must submit an application for termination of its license. An LTP must be submitted at least 2 years before the license termination date. The NRC and licensee hold pre-submittal meetings to agree on the format and content of the LTP. These

meetings are intended to improve the efficiency of the LTP development and review process. The LTP must include the following: a site characterization; the identification of remaining dismantlement activities; plans for site remediation; detailed plans for the final radiation survey; a description of the end use of the site, if restricted; an updated site-specific estimate of remaining decommissioning costs; and a supplement to the environmental report describing any new information or significant environmental change associated with the licensee's proposed termination activities. In addition, the licensee must demonstrate that it will meet the applicable requirements of the License Termination Rule in 10 CFR Part 20, Subpart E, "Radiological Criteria for License Termination."

The NRC will provide notice of receipt of the LTP in the Federal Register and make the LTP available for public comment. In addition, the NRC will hold a public meeting in the vicinity of the licensee's facility to discuss the LTP and the LTP review process.

***Implementation of the License Termination Plan***

After approval of the LTP, the licensee or responsible party must complete decommissioning in accordance with the approved LTP. The NRC staff will periodically inspect the decommissioning activities at the site to ensure compliance with the LTP. These inspections will normally include in-process and confirmatory radiological surveys.

Decommissioning must be completed within 60 years of permanent cessation of operations, unless otherwise approved by the NRC.

***Completion of Decommissioning***

At the conclusion of decommissioning activities, the licensee will submit a final status survey report (FSSR), which identifies the final radiological conditions of the site and requests that the NRC either (1) terminate the 10 CFR Part 50 license, or (2) reduce the 10 CFR Part 50 license boundary to the footprint of the ISFSI. For decommissioning commercial nuclear power reactors with no ISFSI or an ISFSI holding a specific license under 10 CFR Part 72, completion of reactor decommissioning will result in the termination of the 10 CFR Part 50 license. The NRC will approve the FSSR and the licensee's request if it determines that the licensee has met both of the following conditions: the remaining dismantlement has been performed in accordance with the approved LTP, and the final radiation survey and associated documentation demonstrate that the facility and site are suitable for release in accordance with the License Termination Rule.

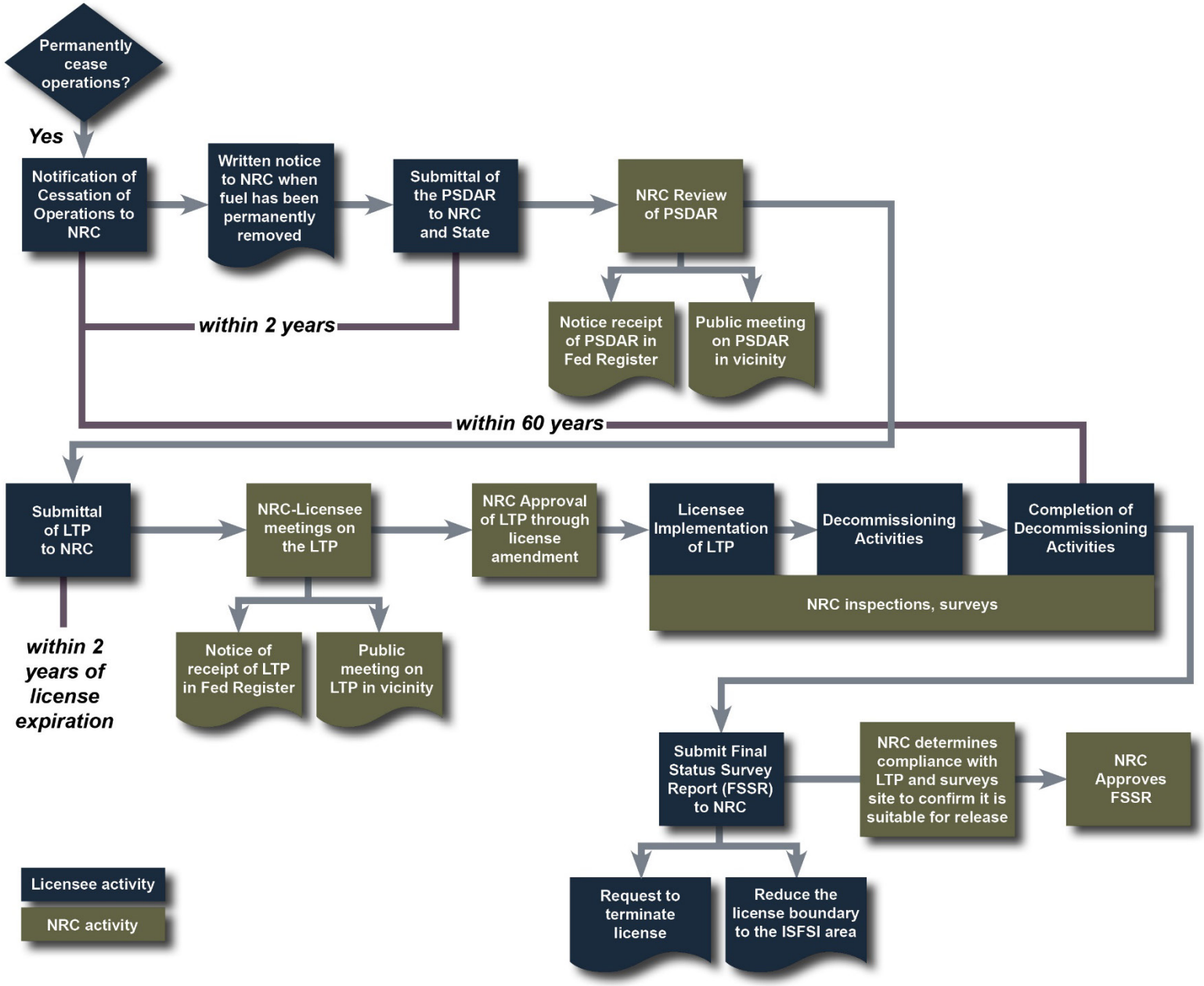



**Figure 4.7 D&D Process Flowchart**

### *Status of Decommissioning Activities at Commercial Nuclear Power Reactors*

While 98 commercial nuclear power reactors are currently in operation, several shutdown power reactors have undergone the D&D process. As more commercial nuclear power reactors permanently shut down, either because they have reached the end of their operating license or shut down for other reasons, there will be a commensurate increase in activities involving radiation exposure related to D&D. For this reason, there is an increased need to provide further information on plants undergoing D&D.

Appendix B contains a list of the plants that are no longer in commercial operation, along with the dose distribution and collective dose for these plants. It should be noted that these plants may be in different stages of D&D, so that a comparison of the dose at one plant versus another would not be meaningful. In addition, Appendix B lists the plant units that are no longer in commercial operation but report along with other units at the site. Under the licensing conditions and reporting requirements, it is permissible to report this information together in one report. Table 4.9 lists the plants that have ceased operation and have changed operational status as of the date shown [Ref. 21]. In addition, Appendix E provides descriptions of the decommissioning activities currently underway at these commercial nuclear power reactors, as well as the total collective TEDE for each plant, based on available data through 2018.

## Table 4.9 Plants No Longer in Operation 2018

| Plant Name | Date of First Commercial Operation | Ceased Operations | License Termination Plan Approved by NRC | PSDAR Submitted | Plant Status | Completion of Decommissioning |
|---|---|---|---|---|---|---|
| CRYSTAL RIVER 3 | 3/1977 | 2/2013 | TBD | 12/2013 | SAFSTOR | 2074 |
| DRESDEN 1 | 8/1/1960 | 10/1978 | TBD | 6/1998 | SAFSTOR | 2036 |
| FERMI 1 | 5/10/1963 | 9/1972 | TBD | 4/1998 | SAFSTOR | 2032 |
| FORT CALHOUN | 6/20/1974 | 10/2016 | TBD | 3/2017 | SAFSTOR | 2065 |
| HUMBOLDT BAY 3 | 8/1/1963 | 7/1976 | 5/2016 | 2/1998 | DECON | 2019 |
| INDIAN POINT 1 | 8/1962 | 10/1974 | TBD | 1/1996 | SAFSTOR | 2026 |
| KEWAUNEE | 6/1974 | 5/2013 | TBD | 2/2013 | SAFSTOR | 2073 |
| LA CROSSE | 11/1/1969 | 4/1987 | TBD | 5/1991 | DECON | 2019 |
| MILLSTONE 1 | 3/1971 | 7/1998 | TBD | 6/1999 | SAFSTOR | 2056 |
| OYSTER CREEK | 12/1969 | 9/2018 | TBD | 6/2018 | SAFSTOR | 2078 |
| PEACH BOTTOM 1 | 6/1/1967 | 10/1974 | TBD | 6/1998 | SAFSTOR | 2034 |
| SAN ONOFRE 1 | 1/1/1968 | 11/1992 | TBD | 12/1998 | SAFSTOR | 2030 |
| SAN ONOFRE 2 | 8/1983 | 6/2013 | TBD | 9/2014 | DECON | 2030 |
| SAN ONOFRE 3 | 4/1984 | 6/2013 | TBD | 9/2014 | DECON | 2030 |
| THREE MILE ISLAND 2 | 12/30/1978 | 3/1979 | TBD | 6/2013 | Post-Defueling Monitored Storage | 2036 |
| VERMONT YANKEE | 11/30/1972 | 12/2014 | TBD | 12/2014 | SAFSTOR | 2073 |
| ZION 1 | 12/31/1973 | 2/1997 | 9/2018 | 2/2000 | DECON | 2020 |
| ZION 2 | 9/17/1974 | 9/1996 | 9/2018 | 2/2000 | DECON | 2020 |
| **DECOMMISSIONING COMPLETED** | | | | | | |
| BIG ROCK POINT | 3/29/1963 | 8/1997 | TBD | 9/1997 | ISFSI only | 2007 |
| HADDAM NECK | 1/1968 | 12/1996 | TBD | 8/1997 | ISFSI only | 2007 |
| MAINE YANKEE | 12/1972 | 12/1996 | TBD | 8/1997 | ISFSI only | 2005 |
| RANCHO SECO | 4/17/1975 | 6/1989 | TBD | 3/1997 | ISFSI only | 2009 |
| TROJAN | 5/20/1976 | 11/1992 | 2/2001 | 8/1995 | ISFSI only | 2004 |
| YANKEE ROWE | 7/1961 | 10/1991 | TBD | - | ISFSI only | 2007 |

NOTE: Information regarding the latest decommissioning status of plants listed in this table can be found in Status of the Decommissioning Program: 2017 Annual Report from the NRC's public library under ADAMS Accession No. ML17276B120. Rows displayed in gray represent plants that have completed decommissioning [Refs. 21–22].

TBD = To Be Determined.

SAFSTOR = (often considered 'delayed DECON'): a nuclear facility that is maintained and monitored in a condition that allows the radioactivity to decay; afterwards, it is dismantled.

DECON = (immediate dismantlement): soon after the nuclear facility closes, equipment, structures, and portions of the facility containing radioactive contaminants are removed or decontaminated to a level that permits release of the property and termination of the NRC license.

# 5 TRANSIENT INDIVIDUALS AT NRC-LICENSED FACILITIES

The following analysis examines the individuals who had more than one Form 5 dose record at more than one NRC-licensed facility during the monitoring year. These individuals 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 given in 10 CFR 20.1003, which defines a year as “the period of time beginning in January used to determine compliance with the provisions of 10 CFR Part 20. 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.”

Examination of the data reported for individuals 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 transients and the individual doses received by them can be determined from examining these data.

Additionally, the distribution of the doses received by transient individuals 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 commercial nuclear power reactors and all NRC licensees combined (one of the issues mentioned in Section 2). Table 5.1 shows the actual distribution of transient individual doses as determined from the NRC Form 5 termination reports and compares it with the reported distribution of the doses of these individuals as they would have appeared in a summation of the annual reports submitted by each of the licensees.

In 2018, over 98 percent of the transient individuals were reported by commercial nuclear power reactors. For this reason, these data are shown separately in Table 5.1.

Table 5.1 illustrates the impact that the multiple reporting of these transient individuals had on the summation of the dose reports for 2018. Each licensee reports the radiation dose received by individuals monitored at its facility. Many of these individuals are monitored at more than one facility during the year. When these dose records are summed for all licensees, they appear to be separate individuals reported by each facility. If an individual visited five facilities during a year, this individual would appear in the summation to be five different people, with one dose record for each of the five facilities. When these dose records are summed per individual, these records appear as one person, with a total annual dose that accurately represents the dose received for the entire monitoring year. Thus, while the total collective dose would remain the same, the number of individuals, their dose distributions, and average doses would be affected by this multiple reporting.

For example, in 2018, Table 5.1 shows that the initial summation (see line [2] Transients, As Reported) of the Form 5 reports for reactor licensees indicated that no individuals received a dose greater than 2.0 rem. After accounting for those individuals who were reported more than once, the corrected distribution indicated that there were 21 transient individuals who received doses between 2.0 and 4.0 rem. One individual that was not transient received a dose above 2 rem bringing the total to 22. Correcting for the multiple counting of individuals also had a significant effect (see line [3] Transients, Actual) on the average measurable dose for these individuals. The corrected average measurable dose for transient individuals is twice as high as the value calculated by the summation of the Form 5 records. For all reporting licensees, the transient individuals represent 37 percent of the workforce that received a measurable dose. The correction

for the transient individuals increased the average measurable dose from 0.10 rem to 0.21 rem for the transient workforce for all licensees. It should be noted that the analysis of transient individuals does not include individuals who may have been exposed at facilities that are not required to report to the NRC (see Section 1), such as Agreement State licensees and 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 dose limits because of multiple exposures at different facilities throughout the year. The REIRS database stores the radiation dose information for an individual by his/her unique identification number and identification type [Ref. 14, Section 1.5] and sums the dose for all facilities during the monitoring year. An individual exceeding the 5 rem per year regulatory limit (TEDE) would be identified in Table 5.1 in one of the dose ranges greater than 5 rem. In 2018, there were 152 unique individuals receiving doses between 2 to 3 rem, 26 individuals receiving between 3 to 4 rem, 9 individuals receiving between 4 to 5 rem, and 1 individual greater than 5 rem, as reported by NRC licensees to the REIRS database. The one individual receiving greater than 5 rem in 2018 was not a transient individual. See Section 6 for more information on individuals who received exposures in excess of the NRC regulatory limits.

## Table 5.1 Effects of Transient Individuals on Annual Statistical Compilations 2018

| License Category | Number of Individuals with TEDE in the Ranges (rem)* | | | | | | | | | | | | Total Number Monitored | Number with Measurable TEDE | 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 | >6.0 | | | | |
| ***COMMERCIAL LIGHT-WATER REACTORS*** | | | | | | | | | | | | | | | | |
| (1) Form 5 Summation | 89,205 | 44,206 | 11,030 | 4,207 | 1,086 | 316 | 168 | 1 | - | - | - | - | 150,219 | 61,014 | 5,829.471 | 0.10 |
| (2) Transients, As Reported | 37,891 | 25,172 | 6,985 | 2,690 | 687 | 194 | 85 | - | - | - | - | - | 73,704 | 35,813 | 3,630.988 | 0.10 |
| (3) Transients, Actual | 8,042 | 8,978 | 4,101 | 2,688 | 1,089 | 541 | 379 | 19 | 2 | - | - | - | 25,839 | 17,797 | 3,630.988 | 0.20 |
| **Corrected Distribution (1-[2-3]) **** | **59,356** | **28,012** | **8,146** | **4,205** | **1,488** | **663** | **462** | **20** | **2** | **-** | **-** | **-** | **102,354** | **42,998** | **5,829.471** | **0.14** |
| ***ALL LICENSEES*** | | | | | | | | | | | | | | | | |
| (1) Form 5 Summation | 92,153 | 47,586 | 12,069 | 5,096 | 1,608 | 620 | 695 | 129 | 23 | 8 | - | 1 | 159,988 | 67,835 | 8,165.125 | 0.12 |
| (2) Transients, As Reported | 38,967 | 25,636 | 7,126 | 2,772 | 721 | 206 | 92 | 2 | - | - | - | - | 75,522 | 36,555 | 3,744.886 | 0.10 |
| (3) Transients, Actual | 8,230 | 9,131 | 4,180 | 2,758 | 1,119 | 555 | 393 | 25 | 3 | 1 | - | - | 26,395 | 18,165 | 3,744.886 | 0.21 |
| **Corrected Distribution (1-[2-3]) **** | **61,416** | **31,081** | **9,123** | **5,082** | **2,006** | **969** | **996** | **152** | **26** | **9** | **-** | **1** | **110,861** | **49,445** | **8,165.125** | **0.17** |

* Dose values exactly equal to the values separating ranges are reported in the next higher range.
** The corrected distribution only applies to the number of individuals.

# 6 EXPOSURES TO PERSONNEL IN EXCESS OF REGULATORY LIMITS

## 6.1 Reporting Categories

Doses in excess of regulatory limits are sometimes referred to as “overexposures.” The phrase “doses in excess of regulatory limits” is preferred to “overexposures” because the latter suggests that an individual has been subjected to an unacceptable biological risk, which may or may not be the case.

Regulations in 10 CFR 20.2202 and 10 CFR 20.2203 require that all licensees submit reports of all incidents involving personnel radiation doses that exceed certain levels, thus providing for investigations and corrective actions as necessary. Based on the magnitude of the dose, the occurrence may be placed into one of three categories as follows:

1. Category A
   10 CFR 20.2202(a)(1) — a TEDE to any individual of 25 rem or more, a lens 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 and the U.S. Congress is notified annually through the U.S. NRC Abnormal Occurrence Report.

2. Category B
   10 CFR 20.2202(b)(1) — in a 24-hour period, the Commission must be notified of the following events: a TEDE to any individual exceeding 5 rem, a lens dose equivalent exceeding 15 rem, or a shallow dose equivalent to the skin or extremities exceeding 50 rem.

3. Category C
   10 CFR 20.2203 — in addition to the notification required by 10 CFR 20.2202 (Category A or B events), each licensee must submit a written report within 30 days after learning of any of the following occurrences:

   a. any incident for which notification is required by 10 CFR 20.2202; or

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

   c. 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 10 CFR Part 20 or in the license (whether or not involving a dose of any individual in excess of the limits in §20.1301); or

   d. for licensees subject to the provisions of the U.S. Environmental Protection Agency’s generally applicable environmental radiation standards in 40 CFR Part 190, levels of radiation or releases of radioactive material in excess of those standards or license conditions related to those standards.

Doses in excess of regulatory limits that are reported as either Category A, B, or C typically undergo a review and evaluation process by the licensee, NRC inspectors, and NRC Headquarters staff. Preliminary dose estimates submitted by licensees are often conservatively high and do not represent the final (legal) dose of record assigned for the event. It is, therefore, not uncommon for a dose in excess of a regulatory limit event to be reassessed and the final assigned dose to be categorized as not having been in excess of a regulatory limit. In other cases,

the exposure event may not be identified until a later date, such as during the next scheduled audit or inspection of the licensee's event records.

## 6.2 Summary of Occupational Radiation Doses in Excess of NRC Regulatory Limits

The exposure events summary presented here is for events that occurred in 2018. An event that has been reassessed and determined not to be a dose in excess of a regulatory limit 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.

It is important to note that this summary of events includes:
- occupational radiation doses in excess of the annual 5 rem regulatory limit;
- events at NRC-licensed facilities; and
- the dose of record assigned to an individual.

It **does not** include:
- medical events as defined in 10 CFR Part 35;
- doses in excess of the regulatory limits to the general public;
- Agreement State-licensed activities or DOE facilities; or
- 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 licensee.

In 2018, there were no Category A occurrences, one Category B occurrence, and no Category C occurrences reported under the licensed activities included in this report.

Applied Technical Services, a company that is both an NRC licensee and an Agreement State licensee, reported that a radiographer's whole-body badge received a radiation exposure of 11.2 rem for the month of April 2018. An investigation determined that the exposure was to the badge only and not the radiographer. Exposure adjustments were made by Applied Technical Services and approved by Alabama Department of Health, Office of Radiation Control. The cause was determined to be human error and corrective actions included providing personnel with additional training.

## 6.3 Summary of Annual Dose Distributions for Certain NRC Licensees

Table 6.1 gives a summary of the annual occupational dose records reported to the NRC, as required by 10 CFR 20.2206, by certain categories of NRC licensees. Table 6.1 shows that for the past 11 years, the percentage of individuals with less than 2 rem has been greater than 99 percent.

## 6.4 Maximum Occupational Radiation Doses Below NRC Regulatory Limits

Certain researchers have expressed an interest in a listing of the maximum doses received at NRC licensees that do not exceed the regulatory limits. This information allows for an examination of these doses and could possibly provide insights into where certain improvements could be made in the licensee's radiation protection program. Table 6.2 shows the maximum doses for each dose category required to be reported to the NRC. In addition, the number of doses in certain dose ranges is shown to reflect the number of doses that approach NRC regulatory limits. As shown in Table 6.2, 86 individuals exceed half of the TEDE dose limit, 13 individuals exceeded 75 percent of the TEDE dose limit, and 3 individuals exceeded 95 percent of the TEDE dose limit.

The other dose categories where individuals exceeded 50 percent of the dose limit were the shallow dose equivalent to the maximally exposed extremity (SDE-ME) and dose to the lens dose equivalent to the lens of the eye (LDE).

### Table 6.1 Summary of Annual Dose Distributions for Certain* NRC Licensees 2008–2018

| Year | Total Number of Monitored Individuals | | Individuals with Dose (TEDE) *** | | | |
|---|---|---|---|---|---|---|
| | | | < 2 rem | > 2 rem | < 5 rem | > 5 rem |
| | Reported Number | Corrected Number ** | % | Number | % | Number |
| 2008 | 182,095 | 132,273 | 99.9% | 169 | 100% | - |
| 2009 | 189,972 | 139,381 | 99.9% | 181 | 100% | - |
| 2010 | 192,436 | 142,523 | 99.9% | 185 | 100% | - |
| 2011 | 204,575 | 149,971 | 99.9% | 199 | 100% | - |
| 2012 | 205,134 | 148,316 | 99.9% | 207 | 100% | - |
| 2013 | 186,062 | 138,233 | 99.8% | 142 | 100% | - |
| 2014 | 185,843 | 135,817 | 99.8% | 224 | 100% | - |
| 2015 | 186,614 | 131,827 | 99.9% | 133 | 99.9% | 2 |
| 2016 | 164,984 | 121,129 | 99.9% | 81 | 100% | - |
| 2017 | 166,526 | 118,715 | 99.9% | 164 | 99.9% | 2 |
| 2018 | 159,988 | 110,861 | 99.8% | 188 | 99.9% | 1 |

* Licensees required to submit radiation exposure reports to the NRC under 10 CFR 20.2206.
** This column lists the actual number of persons who may have been counted more than once because they worked at more than one facility during the calendar year (see Section 5).
*** Data for 2008–2018 are based on the distribution of individual doses after adjusting for the multiple counting of transient individuals (see Section 5).

### Table 6.2 Maximum Occupational Doses for each Exposure Category* 2018

| Dose Category** | Annual Dose Limit 10CFR20*** | Maximum Dose 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 | Number of Individuals > Limit |
|---|---|---|---|---|---|---|---|---|---|
| **SDE-ME** | 50 rem | 40.344 | 81% | 43,348 | 52 | 10 | - | - | - |
| **SDE-WB** | 50 rem | 11.855 | 24% | 48,995 | - | - | - | - | - |
| **LDE** | 15 rem | 11.907 | 79% | 47,759 | 15 | 1 | - | - | - |
| **CEDE** | | 0.500 | | 2,045 | | | | | |
| **CDE** | | 4.177 | | 2,051 | | | | | |
| **DDE** | | 11.904 | | 48,745 | | | | | |
| **TEDE** | 5 rem | 11.904 | 238% | 49,769 | 675 | 86 | 13 | 3 | 1 |
| **TODE** | 50 rem | 11.904 | 24% | 49,599 | - | - | - | - | - |

* 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 to the maximally exposed extremity
SDE-WB= shallow dose equivalent to the whole body
LDE = lens 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 Part 20.

# 7 REFERENCES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* Report is available for purchase from the National Technical Information Service, Springfield, VA, 22161, and/or the Superintendent of Documents, U.S. Government Printing Office, P.O. Box 37082, Washington, DC 20402-9328.
* Report is available for purchase from the National Technical Information Service, Springfield, VA, 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 NONREACTOR NRC LICENSEES AND OTHER FACILITIES REPORTING TO THE NRC

# 2018

## Table A1 Annual TEDE for Nonreactor NRC Licensees

| PROGRAM CODE - LICENSEE NAME | LICENSE # | Number of Individuals with Whole Body Doses in the Ranges (rem)* | | | | | | | | | | | | Total Number Monitored | Number with Meas. Dose | Total Collective TEDE (person-rem) | Average Meas. TEDE (rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | Meas. <0.10 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.0 | 1.0-2.0 | 2.0-3.0 | 3.0-4.0 | 4.0-5.0 | 5.0-6.0 | >6.0 | | | | |
| ***INDUSTRIAL RADIOGRAPHY — FIXED LOCATION — 03310*** | | | | | | | | | | | | | | | | | |
| HARRISON STEEL CASTINGS CO. | 13-02141-01 | 5 | 2 | - | - | - | - | - | - | - | - | - | - | **7** | 2 | 0.098 | 0.049 |
| METALTEK INTERNATIONAL | 24-26136-01 | - | 2 | - | 2 | - | - | - | - | - | - | - | - | 4 | **4** | **0.846** | **0.212** |
| **Total** | **2** | **5** | **4** | **0** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **11** | **6** | **0.944** | **0.157** |
| ***INDUSTRIAL RADIOGRAPHY — TEMPORARY JOB SITE — 03320*** | | | | | | | | | | | | | | | | | |
| ACUREN INSPECTION, INC. | 22-27593-01 | 12 | 10 | 22 | 26 | 14 | 14 | 5 | - | - | - | - | - | 103 | 91 | 39.221 | 0.431 |
| ACUREN USA, INC | 50-32443-01 | - | 3 | 1 | 3 | 1 | 1 | - | - | - | - | - | - | 9 | 9 | 2.791 | 0.310 |
| ADVEX CORPORATION | 45-16452-01 | 1 | 5 | 1 | - | - | - | - | - | - | - | - | - | 7 | 6 | 0.266 | 0.044 |
| ALASKA INDUSTRIAL X-RAY | 50-16084-01 | 3 | 2 | - | 1 | 2 | 1 | 3 | - | - | - | - | - | 12 | 9 | 6.709 | 0.745 |
| ALONSO & CARUS IRON WORKS, INC. | 52-21350-01 | - | - | 3 | - | - | - | - | - | - | - | - | - | 3 | 3 | 0.549 | 0.183 |
| AMERICAN ENGINEERING TESTING, INC. | 22-20271-02 | 1 | 2 | 1 | - | 5 | - | - | - | - | - | - | - | 9 | 8 | 3.379 | 0.422 |
| AMERICAN PIPING INSPECTION | 35-35011-01 | 70 | 74 | 48 | 73 | 48 | 46 | 62 | 15 | 1 | 2 | - | - | 439 | 369 | 244.069 | 0.661 |
| APPLIED TECHNICAL SERVICES, INC. | 10-35278-01 | 46 | 83 | 44 | 35 | 21 | 10 | 14 | 5 | - | 1 | - | 1 | 260 | 214 | 95.293 | 0.445 |
| APPLUS RTD USA WEST | 04-29076-02 | 5 | 19 | 8 | 11 | 9 | 4 | 10 | - | - | - | - | - | 66 | 61 | 27.957 | 0.458 |
| CALUMET TESTING SERVICES, INC. | 13-16347-01 | 3 | 3 | - | - | - | 2 | 4 | 1 | - | - | - | - | 13 | 10 | 9.475 | 0.948 |
| CERTIFIED TESTING LABS, INC. | 29-14150-01 | 7 | 4 | 3 | - | - | - | - | - | - | - | - | - | 14 | 7 | 0.637 | 0.091 |
| CONCRETE IMAGING, INC. | 47-31316-01 | 2 | 2 | - | - | 3 | - | 1 | - | - | - | - | - | 8 | 6 | 2.806 | 0.468 |
| CONSUMERS POWER COMPANY | 21-08606-03 | 18 | 8 | 10 | 6 | - | - | - | - | - | - | - | - | 42 | 24 | 3.981 | 0.166 |
| DBI, INC | 15-29301-02 | 2 | 15 | 11 | 14 | 15 | 10 | 40 | 25 | 1 | - | - | - | 133 | 131 | 152.585 | 1.165 |
| DIAMOND TECHNICAL SERVICES, INC. | 37-31259-01 | 15 | 14 | 3 | 11 | 12 | 3 | 17 | - | - | - | - | - | 75 | 60 | 40.488 | 0.675 |
| DOMINION NDT SERVICES, INC. | 45-35118-01 | - | 2 | - | 2 | 1 | 2 | - | - | - | - | - | - | 7 | 7 | 5.919 | 0.846 |
| ELECTRIC BOAT CORPORATION | 06-01781-08 | 4 | 27 | 2 | - | - | - | - | - | - | - | - | - | 33 | 29 | 0.934 | 0.032 |
| ENGINEERING & INSPECTIONS - HAWAII | 53-27731-01 | 1 | 1 | 2 | 2 | 1 | 4 | 8 | 2 | - | - | - | - | 21 | 20 | 20.695 | 1.035 |
| GE INSPECTION SERVICE, INC. | 04-24888-01 | 10 | 4 | 2 | 1 | - | - | - | - | - | - | - | - | 17 | 7 | 1.041 | 0.149 |
| GENERAL TESTING & INSPECTION CO. | 04-24888-01 | 10 | 4 | 2 | 1 | - | - | - | - | - | - | - | - | 17 | 7 | 1.041 | 0.163 |
| H & H X-RAY SERVICES, INC | 17-19236-01 | 6 | 18 | 14 | 22 | 22 | 19 | 49 | 13 | 4 | - | - | - | 167 | 161 | 153.452 | 0.953 |
| HIGH COUNTRY FABRICATION | 49-29300-01 | 2 | 2 | - | - | - | - | 2 | - | - | - | - | - | 6 | 4 | 2.624 | 0.656 |
| HIGH MOUNTAIN INSPECTION SERVICES | 49-26808-02 | 3 | 9 | 8 | 7 | 10 | 5 | 35 | 15 | 3 | 3 | - | - | 98 | 95 | 122.353 | 1.288 |

NOTE: The data values shown bolded and in boxes represent the highest value in each category. These values have not been adjusted for the multiple counting of transient workers (see section 5).

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

## Table A1 Annual TEDE for Nonreactor NRC Licensees (continued)

| PROGRAM CODE - LICENSEE NAME | LICENSE # | Number of Individuals with Whole Body Doses in the Ranges (rem)* | | | | | | | | | | | | Total Number Monitored | Number with Meas. Dose | Total Collective TEDE (person-rem) | Average Meas. TEDE (rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | Meas. <0.10 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.0 | 1.0-2.0 | 2.0-3.0 | 3.0-4.0 | 4.0-5.0 | 5.0-6.0 | >6.0 | | | | |
| ***INDUSTRIAL RADIOGRAPHY — TEMPORARY JOB SITE — 03320 (Continued)*** | | | | | | | | | | | | | | | | | |
| HSI GROUP, INC. | 53-35428-01 | - | 3 | 2 | 2 | 1 | - | - | - | - | - | - | - | 8 | 8 | 1.822 | 0.228 |
| HUNTINGTON INGALLS, INC. | 45-09428-02 | 5 | 18 | 5 | 3 | - | - | - | - | - | - | - | - | 31 | 26 | 2.112 | 0.081 |
| INSPECTION SERVICES ORGANIZATION | 41-06832-06 | 7 | 2 | 2 | - | - | - | - | - | - | - | - | - | 11 | 4 | 0.341 | 0.085 |
| INTEGRITY TESTLAB | 07-30791-01 | 6 | 10 | 7 | 8 | 8 | 4 | 6 | 1 | 1 | - | - | - | 51 | 45 | 25.987 | 0.577 |
| INTERTEK | 17-29308-01 | 3 | 36 | 9 | 13 | 7 | 2 | 1 | 2 | - | - | - | - | 73 | 70 | 19.513 | 0.279 |
| J CORE DRILLING, INC. | 45-30846-01 | 2 | 1 | 1 | - | - | - | - | - | - | - | - | - | 4 | 2 | 0.154 | 0.077 |
| JAN X-RAY SERVICES, INC. | 21-16560-01 | 158 | 43 | 57 | 90 | 92 | 55 | 77 | 7 | - | - | - | - | **579** | **421** | **267.006** | 0.634 |
| KAKIVIK ASSET MANAGEMENT | 50-27667-01 | 39 | 86 | 45 | 63 | 40 | 21 | 5 | - | - | - | - | - | 299 | 260 | 82.299 | 0.317 |
| LEHIGH TESTING LABORATORIES, INC. | 07-01173-03 | 2 | - | - | - | - | - | - | - | - | - | - | - | 2 | - | - | - |
| LKS INSPECTION SERVICES, LLC | 53-27795-01 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | 5 | 3 | 0.120 | 0.040 |
| MAGNUM MIDSTREAM, LP | 37-35141-01 | 2 | 5 | 3 | 8 | 5 | 2 | 6 | 2 | - | - | - | - | 33 | 31 | 21.972 | 0.709 |
| MARYLAND Q.C. LABORATORIES, INC. | 19-28683-01 | 4 | 6 | 4 | 1 | - | - | - | - | - | - | - | - | 15 | 11 | 1.266 | 0.115 |
| MATERIALS INTEGRITY, INC. | 50-27722-01 | 5 | 1 | - | - | - | - | - | - | - | - | - | - | 6 | 1 | 0.064 | 0.064 |
| METALS TESTING SERVICES, INC. | 37-29406-02 | - | 5 | 2 | 3 | 3 | 1 | 7 | 1 | - | - | - | - | 22 | 22 | 16.412 | 0.746 |
| MID AMERICAN INSPECTION SERVICES | 21-26060-01 | 1 | 2 | 1 | 6 | 3 | 3 | 2 | - | - | - | - | - | 18 | 17 | 9.795 | 0.576 |
| MISTRAS GROUP, INC. | 12-16559-02 | 6 | 24 | 18 | 9 | 3 | 2 | 2 | - | - | - | - | - | 64 | 58 | 12.624 | 0.218 |
| NATIONAL INSPECTION SERVICE | 17-35438-01 | - | - | - | - | 1 | - | 6 | 2 | 2 | - | - | - | 11 | 11 | 21.148 | 1.923 |
| NONDESTRUCTIVE & VISUAL INSPECTION | 17-29410-01 | - | 1 | 8 | 3 | 9 | 8 | 29 | 14 | 5 | 1 | - | - | 78 | 78 | 113.730 | **1.458** |
| PREMIER TECHNOLOGY, INC. | 11-27746-01 | 4 | - | - | - | - | - | - | - | - | - | - | - | 4 | - | - | - |
| PRIME NDT SERVICES, INC. | 37-23370-01 | 3 | 8 | 17 | 19 | 18 | 15 | 19 | 1 | - | 1 | - | - | 101 | 98 | 67.428 | 0.688 |
| POLE BROTHERS IMAGING, LLC. | 45-25383-01 | - | 1 | 1 | - | 1 | - | - | - | - | - | - | - | 3 | 3 | 0.913 | 0.304 |
| QCI TESTING LAB | 11-29245-01 | 1 | 1 | - | - | - | 1 | 1 | - | - | - | - | - | 4 | 3 | 2.110 | 0.703 |
| QUALITY INSPECTION & TESTING | 17-35492-01 | - | 5 | 4 | 2 | 2 | 7 | 7 | 5 | - | - | - | - | 32 | 32 | 32.855 | 1.027 |
| QUALITY TESTING SERVICES, INC. | 24-32292-01 | 5 | 11 | 5 | 6 | 1 | 1 | 1 | - | - | - | - | - | 30 | 25 | 6.593 | 0.264 |
| RNDT, INC. | 37-30942-02 | 1 | 9 | 6 | 9 | 4 | 4 | 10 | - | - | - | - | - | 43 | 42 | 24.006 | 0.572 |
| SCIENTIFIC TECHNICAL, INC. | 45-24882-01 | 3 | 3 | - | - | - | - | - | - | - | - | - | - | 6 | 3 | 0.089 | 0.030 |
| SHAW PIPELINE SERVICES, INC. | 35-23193-03 | 18 | 79 | 56 | 42 | 34 | 18 | 17 | 3 | - | - | - | - | 267 | 249 | 93.412 | 0.375 |
| SYSTEM ONE HOLDINGS, LLC. | 37-27891-02 | 5 | 26 | 9 | 3 | 1 | 2 | 5 | - | - | - | - | - | 51 | 46 | 13.400 | 0.291 |

NOTE: The data values shown bolded and in boxes represent the highest value in each category. These values have not been adjusted for the multiple counting of transient workers (see section 5).

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

## Table A1 Annual TEDE for Nonreactor NRC Licensees (continued)

| PROGRAM CODE - LICENSEE NAME | LICENSE # | Number of Individuals with Whole Body Doses in the Ranges (rem)* | | | | | | | | | | | | Total Number Monitored | Number with Meas. Dose | Total Collective TEDE (person-rem) | Average Meas. TEDE (rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | Meas. <0.10 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.0 | 1.0-2.0 | 2.0-3.0 | 3.0-4.0 | 4.0-5.0 | 5.0-6.0 | >6.0 | | | | |
| ***INDUSTRIAL RADIOGRAPHY — TEMPORARY JOB SITE — 03320 (Continued)*** | | | | | | | | | | | | | | | | | |
| TEAM INDUSTRIAL SERVICES, INC. | 42-32219-01 | 14 | 59 | 41 | 42 | 21 | 11 | 16 | 2 | - | - | - | - | 206 | 192 | 71.789 | 0.374 |
| TECH CORR USA, LLC | 42-29261-01 | - | 1 | 1 | 1 | 2 | 1 | 3 | - | 1 | - | - | - | 10 | 10 | 11.173 | 1.117 |
| TEI ANALYTICAL SERVICE | 37-28004-01 | 9 | 16 | 10 | 8 | 2 | 7 | - | - | - | - | - | - | 52 | 43 | 19.030 | 0.443 |
| TERRACON CONSULTANTS | 24-35241-01 | - | - | 1 | - | 1 | - | - | - | - | - | - | - | 2 | 2 | 0.811 | 0.406 |
| TESTING TECHNOLOGIES, INC. | 45-25007-01 | 2 | 9 | - | 6 | 3 | 1 | - | - | - | - | - | - | 21 | 19 | 5.467 | 0.288 |
| VALLEY INSPECTION SERVICE, INC. | 37-28385-01 | 1 | 1 | 2 | 2 | 1 | 1 | 3 | 1 | | | | | 12 | 11 | 9.508 | 0.864 |
| VERSA INTEGRITY GROUP | 17-35243-01 | 49 | 17 | 21 | 24 | 18 | 11 | 13 | 5 | 2 | - | - | - | 160 | 111 | 70.586 | 0.636 |
| **Total** | **59** | **568** | **799** | **519** | **589** | **451** | **294** | **493** | **122** | **21** | **8** | **0** | **1** | **3,865** | **3,297** | **1,966.935** | **0.597** |
| ***MANUFACTURING AND DISTRIBUTION – NUCLEAR PHARMACIES – 02500*** | | | | | | | | | | | | | | | | | |
| ADVANCED ISOTOPES OF IDAHO | 11-29216-01MD | 1 | 9 | 7 | 1 | - | - | - | - | - | - | - | - | 18 | 17 | 1.755 | 0.103 |
| CARDINAL HEALTH | 34-29200-01MD | 118 | 278 | 54 | 28 | 7 | 1 | 1 | 3 | - | - | - | - | **490** | **372** | **39.861** | 0.107 |
| CARDINAL HEALTH | 34-31473-02MD | 2 | 11 | 1 | - | - | - | - | - | - | - | - | - | 14 | 12 | 0.566 | 0.047 |
| GE HEALTHCARE - KENTWOOD | 21-26707-01MD | 9 | 12 | - | - | - | - | - | - | - | - | - | - | 21 | 12 | 0.397 | 0.033 |
| GE HEALTHCARE - LIVONIA | 21-24828-01MD | 10 | 7 | 3 | - | - | - | - | - | - | - | - | - | 20 | 10 | 0.808 | 0.081 |
| GE HEALTHCARE - ST. LOUIS/OVERLAND | 24-32462-01MD | 6 | 4 | - | - | - | - | - | - | - | - | - | - | 10 | 4 | 0.125 | **0.031** |
| MID-AMERICA ISOTOPES, INC. | 24-26241-01MD | 28 | 2 | 1 | 2 | - | - | - | - | - | - | - | - | 33 | 5 | 0.858 | 0.172 |
| PHARMALOGIC MT, INC. | 09-29398-01MD | 7 | 15 | 2 | - | - | - | - | - | - | - | - | - | 24 | 17 | 0.651 | 0.038 |
| PHARMALOGIC WY, INC. | 49-27629-01MD | 14 | 4 | - | - | - | - | - | - | - | - | - | - | 18 | 4 | 0.093 | 0.023 |
| RADIOPHARMACY OF INDIANAPOLIS | 13-32637-01MD | 29 | - | 1 | 4 | - | - | - | - | - | - | - | - | 34 | 5 | 1.552 | 0.310 |
| RADIOPHARMACY, INC. | 13-26246-01MD | 22 | 7 | 4 | 1 | - | - | - | - | - | - | - | - | 34 | 12 | 1.234 | 0.103 |
| TRIAD ISOTOPES | 09-32781-04MD | 2 | 11 | - | - | - | - | - | - | - | - | - | - | 13 | 11 | 0.267 | 0.024 |
| **Total** | **12** | **248** | **360** | **73** | **36** | **7** | **1** | **1** | **3** | **0** | **0** | **0** | **0** | **729** | **481** | **48.167** | **0.100** |
| ***MANUFACTURING AND DISTRIBUTION – TYPE "A" BROAD – 03211*** | | | | | | | | | | | | | | | | | |
| INTERNATIONAL ISOTOPES IDAHO, INC. | 11-27680-01 | - | - | 3 | 5 | 2 | 1 | 7 | 3 | 2 | - | - | - | 23 | 23 | 30.372 | **1.321** |
| MALLINCKRODT, LLC | 24-04206-01 | 120 | 112 | 36 | 26 | 14 | 5 | 21 | - | - | - | - | - | **334** | **214** | **57.966** | 0.271 |
| **Total** | **2** | **120** | **112** | **39** | **31** | **16** | **6** | **28** | **3** | **2** | **0** | **0** | **0** | **357** | **237** | **88.338** | **0.373** |

NOTE: The data values shown bolded and in boxes represent the highest value in each category. These values have not been adjusted for the multiple counting of transient workers (see section 5).

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

## Table A1 Annual TEDE for Nonreactor NRC Licensees (continued)

| PROGRAM CODE - LICENSEE NAME | LICENSE # | Number of Individuals with Whole Body Doses in the Ranges (rem)* | | | | | | | | | | | | Total Number Monitored | Number with Meas. Dose | Total Collective TEDE (person-rem) | Average Meas. TEDE (rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | Meas. <0.10 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.0 | 1.0-2.0 | 2.0-3.0 | 3.0-4.0 | 4.0-5.0 | 5.0-6.0 | >6.0 | | | | |
| ***INDEPENDENT SPENT FUEL STORAGE INSTALLATION – 23200*** | | | | | | | | | | | | | | | | | |
| GENERAL ELECTRIC - MORRIS ISFSI | SNM-2500 | 6 | 13 | 1 | 2 | 1 | - | - | - | - | - | - | - | 23 | **17** | **1.740** | **0.102** |
| PORTLAND GENERAL ELECTRIC CO. | SNM-2509 | 47 | - | - | - | - | - | - | - | - | - | - | - | **47** | - | - | - |
| **Total** | **2** | **53** | **13** | **1** | **2** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **70** | **17** | **1.740** | **0.102** |
| ***URANIUM HEXAFLUORIDE (UF6) PRODUCTION PLANTS - 11400*** | | | | | | | | | | | | | | | | | |
| HONEYWELL INTERNATIONAL, INC. | SUB-0526 | 69 | 281 | 5 | 5 | - | - | - | - | - | - | - | - | **360** | **291** | **8.574** | **0.029** |
| **Total** | **1** | **69** | **281** | **5** | **5** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **360** | **291** | **8.574** | **0.029** |
| ***FUEL CYCLE URANIUM ENRICHMENT PLANTS – 21200*** | | | | | | | | | | | | | | | | | |
| CENTRUS ENERGY | SNM-7003 | 59 | - | - | - | - | - | - | - | - | - | - | - | 59 | - | - | - |
| **Total** | **1** | **59** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **59** | **0** | **0** | **0** |
| ***FUEL CYCLE FUEL FABRICATION FACILITIES – 21210*** | | | | | | | | | | | | | | | | | |
| BWXT NUCLEAR OPERATIONS GROUP, INC | SNM-0042 | 49 | 189 | 37 | 2 | - | - | 4 | - | - | - | - | - | 281 | 232 | 17.607 | 0.076 |
| FRAMATOME INC. | SNM-1227 | 697 | 622 | 68 | 71 | 8 | - | - | - | - | - | - | - | 1,466 | 769 | 52.486 | 0.068 |
| GLOBAL NUCLEAR FUEL - AMERICAS, LLC | SNM-1097 | 206 | 337 | 104 | 31 | 2 | 1 | - | - | - | - | - | - | 681 | 475 | 40.080 | 0.084 |
| NUCLEAR FUEL SERVICES, INC. | SNM-0124 | 644 | 466 | 32 | - | - | - | - | - | - | - | - | - | 1,142 | 498 | 9.820 | 0.020 |
| WESTINGHOUSE ELECTRIC COMPANY | SNM-1107 | 230 | 197 | 161 | 120 | 37 | 2 | 1 | - | - | - | - | - | 748 | 518 | 100.963 | 0.195 |
| **Total** | **5** | **1,826** | **1,811** | **402** | **224** | **47** | **3** | **5** | **0** | **0** | **0** | **0** | **0** | **4,318** | **2,492** | **220.956** | **0.089** |

NOTE: The data values shown bolded and in boxes represent the highest value in each category. These values have not been adjusted for the multiple counting of transient workers (see section 5).

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

## Table A2 Other Facilities Reporting to the NRC

| PROGRAM CODE - LICENSEE NAME | LICENSE # | Number of Individuals with Whole Body Doses in the Ranges (rem)* | | | | | | | | | | | | Total Number Monitored | Number with Meas. Dose | Total Collective TEDE (person-rem) | Average Meas. TEDE (rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | Meas. <0.10 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.0 | 1.0-2.0 | 2.0-3.0 | 3.0-4.0 | 4.0-5.0 | 5.0-6.0 | >6.0 | | | | |
| ***MEDICAL INSTITUTION - QMP NOT REQUIRED - 02121*** | | | | | | | | | | | | | | | | | |
| MINIDOKA MEMORIAL HOSPITAL | 11-29085-01 | - | 1 | - | - | - | - | - | - | - | - | - | - | **1** | **1** | **0.041** | **0.041** |
| **Total** | **1** | **0** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **1** | **1** | **0.041** | **0.041** |
| ***INSTRUMENT CALIBRATION SERVICE ONLY – SOURCE < 100 CURIES – 03221*** | | | | | | | | | | | | | | | | | |
| HUNTINGTON INGALLS, INC. | 45-09428-03 | 8 | 2 | - | - | - | - | - | - | - | - | - | - | **10** | **2** | **0.005** | **0.003** |
| **Total** | **1** | **8** | **2** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **10** | **2** | **0.005** | **0.003** |
| ***INSTRUMENT CALIBRATION SERVICE ONLY – SOURCE > 100 CURIES – 03222*** | | | | | | | | | | | | | | | | | |
| ELECTRIC BOAT CORPORATION | 06-01781-03 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | **5** | **3** | **0.039** | **0.013** |
| **Total** | **1** | **2** | **3** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **5** | **3** | **0.039** | **0.013** |
| ***OTHER SERVICES - 03225*** | | | | | | | | | | | | | | | | | |
| VEGA AMERICAS, INC. | 34-00639-04 | 10 | 21 | 3 | 3 | - | - | - | - | - | - | - | - | **37** | **27** | **2.104** | **0.078** |
| **Total** | **1** | **10** | **21** | **3** | **3** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **37** | **27** | **2.104** | **0.078** |
| ***MASTER MATERIALS - ISSUED TO GOVERNMENT AGENCIES - 03614*** | | | | | | | | | | | | | | | | | |
| NAVY, DEPARTMENT OF THE | 45-23645-01NP | 77 | 168 | 7 | - | - | - | - | - | - | - | - | - | **252** | **175** | **3.064** | **0.018** |
| **Total** | **1** | **77** | **168** | **7** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **252** | **175** | **3.064** | **0.018** |
| ***RESEARCH AND DEVELOPMENT, OTHER - 03620*** | | | | | | | | | | | | | | | | | |
| HEALTH & HUMAN SERVICES, DEPT. OF | 19-07538-05 | 4 | 1 | - | - | - | - | - | - | - | - | - | - | **5** | **1** | **0.002** | **0.002** |
| **Total** | **1** | **4** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **5** | **1** | **0.002** | **0.002** |
| ***MEASURING SYSTEMS PORTABLE GAUGES - 03121*** | | | | | | | | | | | | | | | | | |
| KOKUA GEOTECH, LLC | 53-35490-01 | 4 | - | - | - | - | - | - | - | - | - | - | - | **4** | **-** | **-** | **-** |
| **Total** | **1** | **4** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **4** | **0** | **0.000** | **0** |
| ***ACCELERATOR-PRODUCED RADIONUCLIDES - 03210*** | | | | | | | | | | | | | | | | | |
| CARDINAL HEALTH | 34-32780-02 | - | 5 | 1 | 2 | 2 | 1 | 1 | - | - | - | - | - | 12 | 12 | 4.931 | 0.411 |
| CARDINAL HEALTH | 34-32840-01 | - | 1 | 2 | 6 | 3 | - | 2 | - | - | - | - | - | **14** | **14** | **7.142** | **0.510** |
| **Total** | **2** | **0** | **6** | **3** | **8** | **5** | **1** | **3** | **0** | **0** | **0** | **0** | **0** | **26** | **26** | **12.073** | **0.464** |

NOTE: The data values shown bolded and in boxes represent the highest value in each category. These values have not been adjusted for the multiple counting of transient workers (see section 5).

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

** Test reactor facilities are required to report to the NRC, but only two facilities report under this category and one of the facilities is in decommissioning.

## Table A2 Other Facilities Reporting to the NRC (continued)

| PROGRAM CODE - LICENSEE NAME | LICENSE # | Number of Individuals with Whole Body Doses in the Ranges (rem)* | | | | | | | | | | | | Total Number Monitored | Number with Meas. Dose | Total Collective TEDE (person-rem) | Average Meas. TEDE (rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | Meas. <0.10 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.0 | 1.0-2.0 | 2.0-3.0 | 3.0-4.0 | 4.0-5.0 | 5.0-6.0 | >6.0 | | | | |
| ***LEAK TEST SERVICE ONLY - 03220*** | | | | | | | | | | | | | | | | | |
| NATIONAL INSPECTION SERVICE | 17-35438-01 | - | - | - | - | 1 | - | 6 | 2 | 2 | - | - | - | 11 | 11 | 21.148 | 1.923 |
| QUALITY INSPECTION & TESTING | 17-35492-01 | - | 5 | 4 | 2 | 2 | 7 | 7 | 5 | - | - | - | - | **32** | **32** | **32.855** | **1.027** |
| **Total** | **2** | **0** | **5** | **4** | **2** | **3** | **7** | **13** | **7** | **2** | **0** | **0** | **0** | **43** | **43** | **54** | **1.256** |
| ***WASTE DISPOSAL SERVICE PROCESSING AND/OR REPACKAGING - 03234*** | | | | | | | | | | | | | | | | | |
| ENERGYSOLUTIONS | 39-35044-01 | 31 | 12 | - | - | - | - | - | - | - | - | - | - | **43** | **12** | **0.212** | **0.018** |
| **Total** | **1** | **31** | **12** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **43** | **12** | **0.212** | **0.018** |
| ***TEST REACTOR FACILITIES – 42140**** | | | | | | | | | | | | | | | | | |
| NAT'L INSTITUTE OF STANDARDS & TECH | TR-5 | 27 | 121 | 17 | 7 | 2 | - | - | - | - | - | - | - | **174** | **147** | **11.284** | **0.077** |
| **Total** | **1** | **25** | **111** | **21** | **5** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **174** | **147** | **11.284** | **0.077** |
| ***PROGRAM CODE - 42150*** | | | | | | | | | | | | | | | | | |
| AEROTEST OPERATIONS, INC. | R-98 | 5 | 3 | - | - | - | - | - | - | - | - | - | - | **8** | **3** | **0.044** | **0.015** |
| **Total** | **1** | **5** | **3** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **8** | **3** | **0.044** | **0.015** |

NOTE: The data values shown bolded and in boxes represent the highest value in each category. These values have not been adjusted for the multiple counting of transient workers (see section 5).

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

** Test reactor facilities are required to report to the NRC, but only two facilities report under this category and one of the facilities is in decommissioning.

# APPENDIX B

# ANNUAL DOSES AT LICENSED NUCLEAR POWER FACILITIES

# 2018

## Table B1 Annual Doses* at Licensed Nuclear Power Facilities

| PLANT NAME | TYPE | Number of Individuals with Annual Doses* in the Ranges (rem)** | | | | | | | | | | | | Total Number Monitored | Number with Meas. Dose | Total Collective TEDE per Site (person-rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | Meas. <0.10 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.0 | 1.0-2.0 | 2.0-3.0 | 3.0-4.0 | 4.0-5.0 | 5.0-6.0 | >6.0 | | | |
| ARKANSAS 1, 2 | PWR | 1,532 | 1,575 | 292 | 74 | 26 | 3 | - | - | - | - | - | - | 3,502 | 1,970 | 136.374 |
| BEAVER VALLEY 1, 2 | PWR | 1,858 | 753 | 184 | 46 | 2 | - | - | - | - | - | - | - | 2,843 | 985 | 74.802 |
| BRAIDWOOD 1, 2 | PWR | 2,532 | 748 | 139 | 38 | 1 | - | - | - | - | - | - | - | 3,458 | 926 | 61.100 |
| BROWNS FERRY 1, 2, 3 | BWR | 1,629 | 2,148 | 646 | 359 | 145 | 47 | 43 | 1 | - | - | - | - | **5,018** | **3,389** | **498.650** |
| BRUNSWICK 1, 2 | BWR | 2,284 | 969 | 336 | 192 | 42 | 4 | - | - | - | - | - | - | 3,827 | 1,543 | 183.275 |
| BYRON 1, 2 | PWR | 1,894 | 563 | 51 | 1 | - | - | - | - | - | - | - | - | 2,509 | 615 | 25.155 |
| CALLAWAY 1 | PWR | 909 | 82 | 1 | 1 | - | - | - | - | - | - | - | - | 993 | 84 | 3.211 |
| CALVERT CLIFFS 1, 2 | PWR | 1,218 | 699 | 134 | 40 | 2 | - | - | - | - | - | - | - | 2,093 | 875 | 56.494 |
| CATAWBA 1, 2 | PWR | 1,985 | 929 | 237 | 39 | 5 | 1 | - | - | - | - | - | - | 3,196 | 1,211 | 87.302 |
| CLINTON | BWR | 2,069 | 909 | 178 | 45 | 5 | - | - | - | - | - | - | - | 3,206 | 1,137 | 77.813 |
| COLUMBIA GENERATING | BWR | 937 | 365 | 88 | 31 | 3 | 4 | 3 | - | - | - | - | - | 1,431 | 494 | 43.078 |
| COMANCHE PEAK 1, 2 | PWR | 1,402 | 408 | 125 | 20 | 1 | - | - | - | - | - | - | - | 1,956 | 554 | 41.677 |
| COOK 1, 2 | PWR | 2,284 | 737 | 80 | 8 | - | - | - | - | - | - | - | - | 3,109 | 825 | 40.511 |
| COOPER STATION | BWR | 774 | 638 | 191 | 115 | 34 | 15 | 3 | - | - | - | - | - | 1,770 | 996 | 132.984 |
| DAVIS-BESSE 1 | PWR | 1,138 | 588 | 123 | 30 | 1 | - | - | - | - | - | - | - | 1,880 | 742 | 51.003 |
| DIABLO CANYON 1, 2 | PWR | 1,602 | 647 | 64 | 7 | - | - | - | - | - | - | - | - | 2,320 | 718 | 32.013 |
| DRESDEN 2, 3 | BWR | 1,402 | 1,523 | 307 | 50 | 3 | - | - | - | - | - | - | - | 3,285 | 1,883 | 118.831 |
| DUANE ARNOLD | BWR | 971 | 423 | 193 | 73 | 7 | 1 | - | - | - | - | - | - | 1,668 | 697 | 77.984 |
| FARLEY 1, 2 | PWR | 1,494 | 483 | 96 | 12 | 1 | - | - | - | - | - | - | - | 2,086 | 592 | 36.355 |
| FERMI 2 | BWR | 745 | 1,659 | 363 | 248 | 106 | 41 | 34 | - | - | - | - | - | 3,196 | 2,451 | 329.015 |
| FITZPATRICK | BWR | 1,115 | 798 | 363 | 204 | 56 | 23 | 12 | - | - | - | - | - | 2,571 | 1,456 | 231.548 |
| GINNA | PWR | 1,129 | 382 | 72 | 7 | 1 | - | - | - | - | - | - | - | 1,591 | 462 | 27.931 |
| GRAND GULF | BWR | 2,137 | 765 | 324 | 142 | 40 | 6 | 7 | - | - | - | - | - | 3,421 | 1,284 | 166.908 |
| HARRIS 1 | PWR | 1,492 | 512 | 78 | 6 | - | - | - | - | - | - | - | - | 2,088 | 596 | 31.736 |
| HATCH 1, 2 | BWR | 1,508 | 847 | 296 | 132 | 20 | 2 | - | - | - | - | - | - | 2,805 | 1,297 | 139.368 |
| HOPE CREEK 1 | BWR | 1,405 | 1,175 | 235 | 124 | 44 | 12 | 4 | - | - | - | - | - | 2,999 | 1,594 | 150.044 |
| INDIAN POINT 2, 3 | PWR | 801 | 1,372 | 168 | 58 | 25 | 1 | - | - | - | - | - | - | 2,425 | 1,624 | 88.211 |
| LASALLE 1, 2 | BWR | 985 | 1,947 | 512 | 347 | 87 | 26 | 4 | - | - | - | - | - | 3,908 | 2,923 | 349.268 |
| LIMERICK 1, 2 | BWR | 1,790 | 1,313 | 280 | 71 | 9 | 2 | 1 | - | - | - | - | - | 3,466 | 1,676 | 121.053 |
| MCGUIRE 1, 2 | PWR | 1,798 | 795 | 78 | 8 | - | - | - | - | - | - | - | - | 2,679 | 881 | 40.005 |
| MILLSTONE 2, 3 | PWR | 1,828 | 577 | 140 | 47 | 10 | 1 | 2 | - | - | - | - | - | 2,605 | 777 | 66.110 |
| MONTICELLO | BWR | 1,387 | 161 | 85 | 25 | 1 | 1 | | - | - | - | - | - | 1,660 | 273 | 29.238 |
| NINE MILE POINT 1, 2 | BWR | 1,521 | 896 | 454 | 343 | 145 | 50 | 17 | - | - | - | - | - | 3,426 | 1,905 | 385.491 |
| NORTH ANNA 1, 2 | PWR | 2,481 | 635 | 122 | 32 | 7 | - | - | - | - | - | - | - | 3,277 | 796 | 56.845 |

NOTE: The data values shown bolded and in boxes represent the highest value in each category. Totals corrected for transients on page B-2.

* These doses are annual TEDE doses.

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

## Table B1 Annual Doses* at Licensed Nuclear Power Facilities (continued)

| PLANT NAME | TYPE | Number of Individuals with Annual Doses* in the Ranges (rem)** | | | | | | | | | | | | Total Number Monitored | Number with Meas. Dose | Total Collective TEDE per Site (person-rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | Meas. <0.10 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.0 | 1.0-2.0 | 2.0-3.0 | 3.0-4.0 | 4.0-5.0 | 5.0-6.0 | >6.0 | | | |
| OCONEE 1, 2, 3 | PWR | 2,680 | 997 | 138 | 6 | - | - | - | - | - | - | - | - | 3,821 | 1,141 | 57.201 |
| PALISADES | PWR | 1,203 | 444 | 237 | 160 | 60 | 38 | 19 | - | - | - | - | - | 2,161 | 958 | 206.284 |
| PALO VERDE 1, 2, 3 | PWR | 2,852 | 927 | 99 | 9 | 1 | - | - | - | - | - | - | - | 3,888 | 1,036 | 41.103 |
| PEACH BOTTOM 2, 3 | BWR | 1,512 | 1,173 | 359 | 146 | 29 | 7 | 3 | - | - | - | - | - | 3,229 | 1,717 | 177.337 |
| PERRY | BWR | 869 | 112 | 73 | 26 | 5 | 1 | - | - | - | - | - | - | 1,086 | 217 | 29.848 |
| PILGRIM 1 | BWR | 459 | 506 | 91 | 29 | 3 | - | - | - | - | - | - | - | 1,088 | 629 | 38.777 |
| POINT BEACH 1, 2 | PWR | 864 | 378 | 105 | 19 | 6 | 2 | 1 | - | - | - | - | - | 1,375 | 511 | 43.228 |
| PRAIRIE ISLAND 1, 2 | PWR | 1,306 | 443 | 91 | 24 | 1 | - | - | - | - | - | - | - | 1,865 | 559 | 37.731 |
| QUAD CITIES 1, 2 | BWR | 1,502 | 1,121 | 412 | 131 | 12 | 1 | 1 | - | - | - | - | - | 3,180 | 1,678 | 162.171 |
| RIVER BEND 1 | BWR | 1,211 | 353 | 137 | 64 | 13 | 6 | - | - | - | - | - | - | 1,784 | 573 | 69.580 |
| ROBINSON 2 | PWR | 1,388 | 762 | 174 | 20 | 2 | - | - | - | - | - | - | - | 2,346 | 958 | 61.998 |
| SALEM 1, 2 | PWR | 460 | 384 | 77 | 40 | 14 | 4 | 1 | - | - | - | - | - | 980 | 520 | 49.086 |
| SEABROOK | PWR | 1,212 | 348 | 101 | 15 | - | - | - | - | - | - | - | - | 1,676 | 464 | 33.418 |
| SEQUOYAH 1, 2 | PWR | 1,978 | 1,014 | 254 | 71 | 17 | 5 | 6 | - | - | - | - | - | 3,345 | 1,367 | 121.426 |
| SOUTH TEXAS 1, 2 | PWR | 1,838 | 462 | 175 | 57 | 8 | 1 | - | - | - | - | - | - | 2,541 | 703 | 70.050 |
| ST LUCIE 1, 2 | PWR | 1,444 | 788 | 220 | 65 | 23 | 7 | 4 | - | - | - | - | - | 2,551 | 1,107 | 112.919 |
| SUMMER 1 | PWR | 1,300 | 529 | 171 | 17 | 1 | - | - | - | - | - | - | - | 2,018 | 718 | 49.251 |
| SURRY 1, 2 | PWR | 2,919 | 787 | 262 | 100 | 18 | 2 | 1 | - | - | - | - | - | 4,089 | 1,170 | 117.837 |
| SUSQUEHANNA 1, 2 | BWR | 2,242 | 873 | 335 | 124 | 22 | 1 | 2 | - | - | - | - | - | 3,599 | 1,357 | 147.327 |
| THREE MILE ISLAND 1 | PWR | 794 | 75 | 3 | - | - | - | - | - | - | - | - | - | 872 | 78 | 2.641 |
| TURKEY POINT 3, 4 | PWR | 1,489 | 495 | 129 | 15 | 11 | 1 | - | - | - | - | - | - | 2,140 | 651 | 51.088 |
| VOGTLE 1, 2 | PWR | 1,584 | 494 | 123 | 24 | - | - | - | - | - | - | - | - | 2,225 | 641 | 46.855 |
| WATERFORD 3 | PWR | 1,423 | 98 | - | - | - | - | - | - | - | - | - | - | 1,521 | 98 | 1.130 |
| WATTS BAR 1, 2 | PWR | 1,928 | 693 | 70 | 16 | - | - | - | - | - | - | - | - | 2,707 | 779 | 36.920 |
| WOLF CREEK 1 | PWR | 712 | 929 | 159 | 54 | 11 | - | - | - | - | - | - | - | 1,865 | 1,153 | 72.882 |
| **Totals BWRs (33 Units)** | **BWR** | **30,454** | **20,674** | **6,258** | **3,021** | **831** | **250** | **134** | **1** | **0** | **0** | **0** | **0** | **61,623** | **31,169** | **3,659.588** |
| **Totals PWRs (65 Units)** | **PWR** | **58,751** | **23,532** | **4,772** | **1,186** | **255** | **66** | **34** | **0** | **0** | **0** | **0** | **0** | **88,596** | **29,845** | **2,169.883** |
| **Total LWRs (98 Units)** | **LWRs** | **89,205** | **44,206** | **11,030** | **4,207** | **1,086** | **316** | **168** | **1** | **0** | **0** | **0** | **0** | **150,219** | **61,014** | **5,829.471** |
| **Corrected for Transients †** | **LWRs** | **59,356** | **28,012** | **8,146** | **4,205** | **1,488** | **663** | **462** | **20** | **2** | **0** | **0** | **0** | **102,354** | **42,998** | **5,829.471** |

* These doses are annual TEDE doses.

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

† Totals corrected for transients and include all LWRs in commercial operation for a full year.

## Annual Doses* at Licensed Nuclear Power Facilities (continued)

| PLANT NAME | TYPE | Number of Individuals with Annual Doses* in the Ranges (rem)** | | | | | | | | | | | | Total Number Monitored | Number with Meas. Dose | Total Collective TEDE per Site (person-rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | No Meas. Exposure | Meas. <0.10 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.0 | 1.0-2.0 | 2.0-3.0 | 3.0-4.0 | 4.0-5.0 | 5.0-6.0 | >6.0 | | | |
| ***REACTORS NO LONGER IN COMMERCIAL OPERATION*** | | | | | | | | | | | | | | | | |
| CRYSTAL RIVER 3 | PWR | 317 | 22 | 3 | - | - | - | - | - | - | - | - | - | 342 | 25 | 1.215 |
| FERMI 1 | FBR | 87 | - | - | - | - | - | - | - | - | - | - | - | 87 | - | - |
| FT CALHOUN | PWR | 417 | 49 | 18 | 6 | 1 | - | - | - | - | - | - | - | 491 | 74 | 6.939 |
| GE VALLECITOS | VBWR | 90 | 47 | 7 | 9 | 4 | - | - | - | - | - | - | - | 157 | 67 | 6.977 |
| GE ESADA VALLECITOS | EVESR | No longer required to report. | | | | | | | | | | | | | | |
| HUMBOLDT BAY 3 | BWR | No longer required to report. | | | | | | | | | | | | | | |
| KEWAUNEE | PWR | 74 | 4 | 3 | 1 | - | - | - | - | - | - | - | - | 82 | 8 | 1.002 |
| LACROSSE | BWR | 113 | 21 | - | - | - | - | - | - | - | - | - | - | 134 | 21 | 0.633 |
| OYSTER CREEK | BWR | 652 | 247 | 68 | 29 | 11 | 2 | - | - | - | - | - | - | **1,009** | **357** | **37.887** |
| PEACH BOTTOM 1 | HTGR | No longer required to report. | | | | | | | | | | | | | | |
| SAN ONOFRE 1, 2, 3 | PWR | 636 | 46 | 44 | 27 | 8 | 2 | - | - | - | - | - | - | 763 | 127 | 24.574 |
| SAVANNAH, NUCLEAR SHIP | NS | No longer required to report. | | | | | | | | | | | | | | |
| VERMONT YANKEE | BWR | 279 | 129 | 33 | 20 | 3 | | - | - | - | - | - | - | 464 | 185 | 17.807 |
| ZION 1, 2 | PWR | 296 | 7 | - | - | - | - | - | - | - | - | - | - | 303 | 7 | 0.085 |
| **Total Reporting*** ** | **13** | 2,961 | 572 | 176 | 92 | 27 | 4 | **0** | **0** | **0** | **0** | **0** | **0** | **3,832** | **871** | **97.119** |
| ***REACTORS NO LONGER IN COMMERCIAL OPERATION, REPORTED WITH OTHER UNITS*** | | | | | | | | | | | | | | | | |
| DRESDEN 1 | BWR | Reported with Dresden 2, 3. | | | | | | | | | | | | | | |
| INDIAN POINT 1 | PWR | Reported with Indian Point 2, 3. | | | | | | | | | | | | | | |
| MILLSTONE 1 | BWR | Reported with Millstone 2, 3. | | | | | | | | | | | | | | |
| THREE MILE ISLAND 2 | PWR | Reported with Three Mile Island 1. | | | | | | | | | | | | | | |
| ***REACTORS NO LONGER IN COMMERCIAL OPERATION, DECOMMISSIONED*** | | | | | | | | | | | | | | | | |
| BIG ROCK POINT | BWR | 28 | - | - | - | - | - | - | - | - | - | - | - | 28 | - | - |
| HADDAM NECK | PWR | 28 | 15 | - | - | - | - | - | - | - | - | - | - | 43 | 15 | 0.250 |
| MAINE YANKEE | PWR | 40 | 6 | - | - | - | - | - | - | - | - | - | - | 46 | 6 | 0.089 |
| TROJAN | PWR | Reported as ISFSI (See Appendix A, Portland General Electric Company). | | | | | | | | | | | | | | |
| YANKEE-ROWE | PWR | 32 | 4 | - | - | - | - | - | - | - | - | - | - | **36** | **4** | **0.045** |
| **Total Reporting*** ** | **5** | **128** | **25** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **153** | **25** | **0.384** |

* These doses are annual TEDE doses.
** Dose values exactly equal to the values separating ranges are reported in the next higher range.
*** These numbers are for the reactors no longer in commercial operation that report their doses separately (i.e., do not report their doses with other units).

# APPENDIX C

# PERSONNEL, DOSE, AND POWER GENERATION SUMMARY

## 1969–2018

A discussion of the methods used to collect and calculate the information contained in this appendix is given in Sections 3.1 and 4.2.

# PERSONNEL, DOSE, AND POWER GENERATION SUMMARY
# 1969–2018

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | 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, 988 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 | 166.599 | 0.13 | 0.11 |
| | 1999 | 1,477.3 | 86.9 | 1,463 | 183.997 | 0.13 | 0.12 |
| | 2000 | 1,329.2 | 79.5 | 1,977 | 242.326 | 0.12 | 0.18 |
| | 2001 | 1,684.0 | 95.8 | 1,082 | 106.040 | 0.10 | 0.06 |
| | 2002 | 1,659.0 | 91.8 | 1,581 | 265.337 | 0.17 | 0.16 |
| | 2003 | 1,675.8 | 93.1 | 973 | 99.003 | 0.10 | 0.06 |
| | 2004 | 1,759.5 | 95.0 | 1,227 | 106.172 | 0.09 | 0.06 |
| | 2005 | 1,560.0 | 84.5 | 2,335 | 475.784 | 0.20 | 0.30 |
| | 2006 | 1,739.8 | 95.0 | 1,184 | 143.296 | 0.12 | 0.08 |
| | 2007 | 1,769.3 | 96.0 | 1,387 | 105.310 | 0.08 | 0.06 |
| | 2008 | 1,614.8 | 89.7 | 1,791 | 196.047 | 0.11 | 0.12 |
| | 2009 | 1,733.7 | 95.5 | 1,139 | 102.732 | 0.09 | 0.06 |
| | 2010 | 1,716.6 | 93.7 | 1,388 | 99.376 | 0.07 | 0.06 |
| | 2011 | 1,621.9 | 90.5 | 1,526 | 116.884 | 0.08 | 0.07 |
| | 2012 | 1,764.5 | 96.2 | 931 | 43.908 | 0.05 | 0.02 |
| | 2013 | 1,366.6 | 74.3 | 1,098 | 50.041 | 0.05 | 0.04 |
| | 2014 | 1,654.6 | 92.3 | 1,372 | 71.561 | 0.05 | 0.04 |
| | 2015 | 1,582.0 | 87.5 | 1,881 | 136.727 | 0.07 | 0.09 |
| | 2016 | 1,535.7 | 84.0 | 1,674 | 111.105 | 0.07 | 0.07 |
| | 2017 | 1,451.4 | 83.4 | 1,757 | 86.504 | 0.05 | 0.06 |
| | 2018 | 1,456.8 | 81.8 | 1,970 | 136.374 | 0.07 | 0.09 |
| **BEAVER VALLEY 1, 2** | 1977 | 355.6 | 57.0 | 331 | 87 | 0.26 | 0.24 |
| 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 - 908, 905 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 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **BEAVER VALLEY 1, 2** (continued) | 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 | 59.311 | 0.08 | 0.11 |
| | 1999 | 1,353.7 | 85.9 | 841 | 99.461 | 0.12 | 0.07 |
| | 2000 | 1,378.7 | 87.3 | 1,730 | 337.867 | 0.20 | 0.25 |
| | 2001 | 1,500.8 | 92.3 | 1,202 | 184.361 | 0.15 | 0.12 |
| | 2002 | 1,548.0 | 95.4 | 1,048 | 90.479 | 0.09 | 0.06 |
| | 2003 | 1,437.0 | 88.4 | 1,623 | 277.168 | 0.17 | 0.19 |
| | 2004 | 1,593.1 | 96.3 | 1,270 | 156.509 | 0.12 | 0.10 |
| | 2005 | 1,590.4 | 96.7 | 978 | 79.055 | 0.08 | 0.05 |
| | 2006 | 1,385.6 | 84.0 | 2,174 | 370.146 | 0.17 | 0.27 |
| | 2007 | 1,664.1 | 96.0 | 955 | 86.595 | 0.09 | 0.05 |
| | 2008 | 1,670.2 | 94.4 | 991 | 83.394 | 0.08 | 0.05 |
| | 2009 | 1,599.3 | 89.6 | 1,504 | 224.516 | 0.15 | 0.14 |
| | 2010 | 1,714.2 | 95.6 | 750 | 49.983 | 0.07 | 0.03 |
| | 2011 | 1,705.5 | 95.1 | 831 | 72.206 | 0.09 | 0.04 |
| | 2012 | 1,622.6 | 90.4 | 1,272 | 125.166 | 0.10 | 0.08 |
| | 2013 | 1,687.4 | 93.3 | 746 | 41.712 | 0.06 | 0.02 |
| | 2014 | 1,684.6 | 92.5 | 907 | 62.951 | 0.07 | 0.04 |
| | 2015 | 1,659.6 | 91.1 | 1,115 | 95.208 | 0.09 | 0.06 |
| | 2016 | 1,737.4 | 94.8 | 687 | 44.146 | 0.06 | 0.03 |
| | 2017 | 1,747.9 | 95.5 | 776 | 53.706 | 0.07 | 0.03 |
| | 2018 | 1,672.8 | 93.0 | 985 | 74.802 | 0.08 | 0.04 |
| **BIG ROCK POINT**[1] Docket 50-155; DPR-6 1st commercial operation 3/63 Type - BWR Capacity - (67) MWe | 1969 | 48.1 | --- | 165 | 136 | 0.82 | 2.83 |
| | 1970 | 43.5 | --- | 290 | 194 | 0.67 | 4.46 |
| | 1971 | 44.4 | --- | 260 | 184 | 0.71 | 4.14 |
| | 1972 | 43.5 | --- | 195 | 181 | 0.93 | 4.16 |
| | 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 |
| | 1996 | 41.5 | 76.5 | 1,688 | 449 | 0.27 | 0.35 |
| | 1997 | 22.4 | 54.1 | 258 | 55 | 0.21 | 2.46 |
| | 1998 | 0.0 | 0.0 | 432 | 104.130 | 0.24 | --- |
| | 1999 | 0.0 | 0.0 | 285 | 86.577 | 0.30 | --- |
| | 2000 | 0.0 | 0.0 | 226 | 89.271 | 0.40 | --- |
| | 2001 | 0.0 | 0.0 | 167 | 47.556 | 0.28 | --- |
| | 2002 | 0.0 | 0.0 | 170 | 43.538 | 0.26 | --- |
| | 2003 | 0.0 | 0.0 | 336 | 121.045 | 0.36 | --- |
| | 2004 | 0.0 | 0.0 | 227 | 57.599 | 0.25 | --- |

[1] Big Rock Point ceased operations in August 1997 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 per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **BIG ROCK POINT**[1] | 2005 | 0.0 | 0.0 | 223 | 20.227 | 0.09 | --- |
| (continued) | 2006 | 0.0 | 0.0 | 27 | 0.382 | 0.01 | --- |
| | 2007 | 0.0 | 0.0 | 0 | 0.000 | --- | --- |
| **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 - 1,166, 1,144 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 | 259.236 | 0.14 | 0.13 |
| | 1999 | 2,161.6 | 95.8 | 1,153 | 145.976 | 0.13 | 0.07 |
| | 2000 | 2,142.8 | 94.9 | 1,562 | 194.126 | 0.12 | 0.09 |
| | 2001 | 2,186.4 | 95.8 | 881 | 100.570 | 0.11 | 0.05 |
| | 2002 | 2,284.0 | 96.8 | 975 | 90.716 | 0.09 | 0.04 |
| | 2003 | 2,279.9 | 95.6 | 1,572 | 244.860 | 0.16 | 0.11 |
| | 2004 | 2,277.8 | 97.3 | 986 | 94.942 | 0.10 | 0.04 |
| | 2005 | 2,253.7 | 96.6 | 926 | 88.084 | 0.10 | 0.04 |
| | 2006 | 2,234.1 | 95.0 | 1,624 | 199.168 | 0.12 | 0.09 |
| | 2007 | 2,244.0 | 96.0 | 1,258 | 98.040 | 0.08 | 0.04 |
| | 2008 | 2,252.5 | 96.3 | 1,235 | 103.180 | 0.08 | 0.05 |
| | 2009 | 2,195.0 | 93.8 | 1,397 | 142.066 | 0.10 | 0.06 |
| | 2010 | 2,111.9 | 94.0 | 870 | 63.856 | 0.07 | 0.03 |
| | 2011 | 2,257.5 | 96.8 | 1,071 | 70.165 | 0.07 | 0.03 |
| | 2012 | 2,141.0 | 92.1 | 1,818 | 167.655 | 0.09 | 0.08 |
| | 2013 | 2,244.2 | 96.2 | 633 | 31.847 | 0.05 | 0.01 |
| | 2014 | 2,313.9 | 97.3 | 866 | 42.493 | 0.05 | 0.02 |
| | 2015 | 2,250.0 | 94.9 | 986 | 52.468 | 0.05 | 0.02 |
| | 2016 | 2,265.9 | 96.0 | 733 | 39.695 | 0.05 | 0.02 |
| | 2017 | 2,281.4 | 96.4 | 1,052 | 78.668 | 0.07 | 0.03 |
| | 2018 | 2,201.3 | 93.8 | 926 | 61.100 | 0.07 | 0.03 |
| **BROWNS FERRY 1**[2]**, 2, 3** | 1975 | 161.7 | 17.8 | 2,743 | 347 | 0.13 | 2.15 |
| Docket 50-259, 50-260, 50-296; | 1976 | 337.6 | 26.9 | 2,530 | 232 | 0.09 | 0.69 |
| DPR-33, DPR-52, DPR-68 | 1977 | 1,327.5 | 73.7 | 1,985 | 876 | 0.44 | 0.66 |
| 1st commercial operation | 1978 | 1,992.1 | 73.5 | 2,479 | 1,776 | 0.72 | 0.89 |
| 8/74, 3/75, 3/77 | 1979 | 2,393.0 | 79.1 | 2,869 | 1,593 | 0.56 | 0.67 |
| Type - BWRs | 1980 | 2,182.1 | 73.6 | 2,838 | 1,768 | 0.62 | 0.81 |
| Capacity - 1,101, 1,104, | 1981 | 2,132.9 | 69.5 | 3,497 | 2,398 | 0.69 | 1.12 |
| 1,105 MWe | 1982 | 2,025.4 | 67.6 | 3,360 | 2,230 | 0.66 | 1.10 |
| | 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 |
| | 1985 | 368.2 | 11.9 | 2,854 | 1,164 | 0.41 | 3.16 |
| | 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 | 367.716 | 0.23 | 0.19 |
| | 1999 | 2,091.0 | 85.1 | 1,741 | 446.941 | 0.26 | 0.21 |
| | 2000 | 2,143.8 | 97.1 | 1,657 | 333.215 | 0.20 | 0.16 |

[1] Big Rock Point ceased operations in August 1997 and is no longer included in the count of operating reactors. Parentheses indicate plant capacity when plant was operational.

[2] All three Browns Ferry units were placed on administrative hold in 1985. Units 2 and 3 were restarted in 1991 and 1995, respectively. Browns Ferry Unit 1 was restarted during 2007.

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **BROWNS FERRY 1[2], 2, 3** (continued) | 2001 | 2,074.0 | 90.7 | 1,525 | 293.879 | 0.19 | 0.14 |
| | 2002 | 2,069.0 | 95.4 | 1,977 | 357.573 | 0.18 | 0.17 |
| | 2003 | 2,014.5 | 93.6 | 2,608 | 602.535 | 0.23 | 0.30 |
| | 2004 | 2,104.7 | 95.5 | 3,242 | 672.714 | 0.21 | 0.32 |
| | 2005 | 2,044.2 | 94.3 | 3,743 | 636.282 | 0.17 | 0.31 |
| | 2006 | 2,040.1 | 94.0 | 3,618 | 641.154 | 0.18 | 0.31 |
| | 2007 | 2,420.2 | 90.0 | 3,027 | 554.314 | 0.18 | 0.23 |
| | 2008 | 2,837.4 | 88.5 | 2,633 | 482.127 | 0.18 | 0.17 |
| | 2009 | 2,933.1 | 91.2 | 2,188 | 348.257 | 0.16 | 0.12 |
| | 2010 | 2,828.0 | 92.3 | 2,825 | 556.749 | 0.20 | 0.20 |
| | 2011 | 2,845.8 | 87.9 | 2,079 | 296.642 | 0.14 | 0.10 |
| | 2012 | 2,969.2 | 91.2 | 3,139 | 464.325 | 0.15 | 0.16 |
| | 2013 | 3,050.0 | 93.5 | 2,543 | 382.609 | 0.15 | 0.13 |
| | 2014 | 3,052.3 | 94.0 | 2,401 | 389.854 | 0.16 | 0.13 |
| | 2015 | 3,158.6 | 96.4 | 2,282 | 288.063 | 0.13 | 0.09 |
| | 2016 | 2,992.6 | 93.3 | 3,077 | 404.585 | 0.13 | 0.14 |
| | 2017 | 3,179.0 | 96.9 | 2,819 | 350.062 | 0.12 | 0.11 |
| | 2018 | 2,930.8 | 90.5 | 3,389 | 498.650 | 0.15 | 0.17 |
| **BRUNSWICK 1, 2** Docket 50-324, 50-325; DPR-62, DPR-71 1st commercial operation 3/77, 11/75 Type - BWRs Capacity - 938, 932 MWe | 1976 | 297.2 | 56.0 | 1,265 | 326 | 0.26 | 1.10 |
| | 1977 | 291.1 | 55.7 | 1,512 | 1,120 | 0.74 | 3.85 |
| | 1978 | 1,173.1 | 83.7 | 1,458 | 1,004 | 0.69 | 0.86 |
| | 1979 | 810.0 | 60.1 | 2,891 | 2,602 | 0.90 | 3.21 |
| | 1980 | 687.2 | 52.2 | 3,788 | 3,870 | 1.02 | 5.63 |
| | 1981 | 925.2 | 56.9 | 3,854 | 2,638 | 0.68 | 2.85 |
| | 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 | 0.33 | 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 | 395.526 | 0.20 | 0.26 |
| | 1999 | 1,494.7 | 92.8 | 1,818 | 418.417 | 0.23 | 0.28 |
| | 2000 | 1,571.2 | 95.6 | 1,648 | 321.785 | 0.20 | 0.20 |
| | 2001 | 1,576.0 | 95.8 | 1,623 | 302.812 | 0.19 | 0.19 |
| | 2002 | 1,568.0 | 94.5 | 1,743 | 275.534 | 0.16 | 0.18 |
| | 2003 | 1,676.9 | 95.6 | 1,794 | 248.622 | 0.14 | 0.15 |
| | 2004 | 1,690.6 | 94.5 | 2,140 | 244.577 | 0.11 | 0.14 |
| | 2005 | 1,654.9 | 92.2 | 1,944 | 305.978 | 0.16 | 0.18 |
| | 2006 | 1,661.2 | 90.0 | 2,103 | 280.465 | 0.13 | 0.17 |
| | 2007 | 1,714.9 | 92.0 | 2,186 | 290.093 | 0.13 | 0.17 |
| | 2008 | 1,694.5 | 91.7 | 2,546 | 354.212 | 0.14 | 0.21 |
| | 2009 | 1,647.9 | 89.6 | 2,683 | 350.347 | 0.13 | 0.21 |
| | 2010 | 1,690.7 | 91.3 | 3,227 | 407.424 | 0.13 | 0.24 |
| | 2011 | 1,662.7 | 90.5 | 2,778 | 381.057 | 0.14 | 0.23 |
| | 2012 | 1,629.3 | 89.4 | 3,368 | 369.873 | 0.11 | 0.23 |
| | 2013 | 1,650.6 | 89.9 | 3,978 | 361.148 | 0.09 | 0.22 |
| | 2014 | 1,750.6 | 94.5 | 3,498 | 261.897 | 0.07 | 0.15 |
| | 2015 | 1,745.6 | 93.7 | 2,660 | 230.570 | 0.09 | 0.13 |
| | 2016 | 1,756.7 | 95.7 | 1,756 | 167.236 | 0.10 | 0.10 |
| | 2017 | 1,754.6 | 96.0 | 1,748 | 216.013 | 0.12 | 0.12 |
| | 2018 | 1,669.7 | 93.2 | 1,543 | 183.275 | 0.12 | 0.11 |

[2] All three Browns Ferry units were placed on administrative hold in 1985. Units 2 and 3 were restarted in 1991 and 1995, respectively. Browns Ferry Unit 1 was restarted during 2007.

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **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 - 1,157, 1,127 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 |
| | 1997 | 1,856.7 | 86.6 | 1,546 | 241 | 0.16 | 0.13 |
| | 1998 | 1,869.8 | 85.9 | 1,809 | 275.221 | 0.15 | 0.15 |
| | 1999 | 2,064.2 | 92.3 | 1,478 | 239.102 | 0.16 | 0.12 |
| | 2000 | 2,196.9 | 97.4 | 959 | 193.871 | 0.20 | 0.09 |
| | 2001 | 2,301.5 | 97.8 | 719 | 59.451 | 0.08 | 0.03 |
| | 2002 | 2,205.0 | 93.8 | 1,287 | 195.013 | 0.15 | 0.09 |
| | 2003 | 2,294.8 | 97.2 | 824 | 87.129 | 0.11 | 0.04 |
| | 2004 | 2,277.4 | 97.7 | 906 | 89.147 | 0.10 | 0.04 |
| | 2005 | 2,175.6 | 94.2 | 1,542 | 199.812 | 0.13 | 0.09 |
| | 2006 | 2,223.3 | 95.0 | 1,163 | 134.497 | 0.12 | 0.06 |
| | 2007 | 2,152.1 | 93.0 | 1,311 | 128.797 | 0.10 | 0.06 |
| | 2008 | 2,203.7 | 94.6 | 1,483 | 140.809 | 0.09 | 0.06 |
| | 2009 | 2,250.9 | 96.7 | 985 | 83.443 | 0.08 | 0.04 |
| | 2010 | 2,266.6 | 97.4 | 922 | 56.425 | 0.06 | 0.02 |
| | 2011 | 2,077.9 | 91.0 | 1,849 | 244.104 | 0.13 | 0.12 |
| | 2012 | 2,085.4 | 94.6 | 924 | 50.973 | 0.06 | 0.02 |
| | 2013 | 2,231.4 | 96.8 | 1,002 | 57.708 | 0.06 | 0.03 |
| | 2014 | 2,197.8 | 94.2 | 1,184 | 80.774 | 0.07 | 0.04 |
| | 2015 | 2,222.8 | 96.8 | 878 | 42.935 | 0.05 | 0.02 |
| | 2016 | 2,237.5 | 96.0 | 884 | 54.012 | 0.06 | 0.02 |
| | 2017 | 2,186.4 | 93.7 | 1,280 | 87.846 | 0.07 | 0.04 |
| | 2018 | 2,288.9 | 97.9 | 615 | 25.155 | 0.04 | 0.01 |
| **CALLAWAY 1** | 1985 | 967.4 | 90.0 | 964 | 36 | 0.04 | 0.04 |
| Docket 50-483; | 1986 | 865.2 | 81.3 | 1,052 | 225 | 0.21 | 0.26 |
| NPF-30 | 1987 | 759.0 | 71.1 | 1,082 | 393 | 0.36 | 0.52 |
| 1st commercial operation 12/84 | 1988 | 1,069.2 | 93.4 | 353 | 27 | 0.08 | 0.03 |
| Type - PWR | 1989 | 1,000.3 | 85.4 | 1,055 | 283 | 0.27 | 0.28 |
| Capacity - 1,190 MWe | 1990 | 960.7 | 84.1 | 1,134 | 442 | 0.39 | 0.46 |
| | 1991 | 1,193.1 | 99.7 | 280 | 21 | 0.08 | 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 | 200.729 | 0.22 | 0.21 |
| | 1999 | 981.3 | 88.7 | 1,098 | 320.554 | 0.29 | 0.33 |
| | 2000 | 1,137.5 | 99.8 | 244 | 16.058 | 0.07 | 0.01 |
| | 2001 | 954.5 | 86.7 | 873 | 106.782 | 0.12 | 0.11 |
| | 2002 | 955.0 | 86.2 | 983 | 95.648 | 0.10 | 0.10 |
| | 2003 | 1,104.3 | 96.2 | 252 | 8.297 | 0.03 | 0.01 |
| | 2004 | 892.8 | 78.9 | 1,124 | 120.621 | 0.11 | 0.14 |
| | 2005 | 913.2 | 80.7 | 1,600 | 222.629 | 0.14 | 0.24 |
| | 2006 | 1,152.8 | 95.0 | 225 | 6.308 | 0.03 | 0.01 |
| | 2007 | 1,069.7 | 89.0 | 1,079 | 73.236 | 0.07 | 0.07 |
| | 2008 | 1,067.6 | 89.8 | 729 | 45.738 | 0.06 | 0.04 |
| | 2009 | 1,170.3 | 97.6 | 164 | 4.821 | 0.03 | 0.00 |
| | 2010 | 1,029.9 | 84.8 | 800 | 58.735 | 0.07 | 0.06 |
| | 2011 | 1,071.7 | 88.9 | 838 | 80.215 | 0.10 | 0.07 |
| | 2012 | 1,220.2 | 100.0 | 169 | 4.525 | 0.03 | 0.00 |
| | 2013 | 959.9 | 80.9 | 680 | 43.123 | 0.06 | 0.04 |
| | 2014 | 1,061.3 | 88.0 | 649 | 37.173 | 0.06 | 0.04 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **CALLAWAY 1** | 2015 | 1,192.2 | 99.1 | 96 | 3.128 | 0.03 | 0.00 |
| (continued) | 2016 | 1,078.3 | 89.8 | 641 | 46.770 | 0.07 | 0.04 |
| | 2017 | 951.9 | 80.3 | 507 | 23.713 | 0.05 | 0.02 |
| | 2018 | 1,216.6 | 100.0 | 84 | 3.211 | 0.04 | 0.00 |
| **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, DPR-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 - 877, 855 MWe | 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 | 186.887 | 0.18 | 0.12 |
| | 1999 | 1,521.4 | 90.1 | 1,134 | 191.778 | 0.17 | 0.13 |
| | 2000 | 1,575.7 | 92.7 | 912 | 134.689 | 0.15 | 0.09 |
| | 2001 | 1,554.7 | 91.7 | 895 | 166.864 | 0.19 | 0.11 |
| | 2002 | 1,380.0 | 81.7 | 1,582 | 245.075 | 0.16 | 0.18 |
| | 2003 | 1,558.4 | 90.9 | 1,671 | 265.164 | 0.16 | 0.17 |
| | 2004 | 1,653.7 | 95.7 | 1,205 | 143.944 | 0.12 | 0.09 |
| | 2005 | 1,678.1 | 97.2 | 942 | 168.390 | 0.18 | 0.10 |
| | 2006 | 1,581.8 | 92.0 | 1,215 | 203.790 | 0.17 | 0.13 |
| | 2007 | 1,641.6 | 95.0 | 1,191 | 153.335 | 0.13 | 0.09 |
| | 2008 | 1,670.7 | 97.4 | 745 | 74.149 | 0.10 | 0.04 |
| | 2009 | 1,660.9 | 96.6 | 891 | 95.756 | 0.11 | 0.06 |
| | 2010 | 1,597.3 | 93.5 | 834 | 128.581 | 0.15 | 0.08 |
| | 2011 | 1,635.9 | 95.7 | 703 | 95.233 | 0.14 | 0.06 |
| | 2012 | 1,545.6 | 89.9 | 725 | 115.525 | 0.16 | 0.07 |
| | 2013 | 1,632.6 | 94.0 | 580 | 61.079 | 0.11 | 0.04 |
| | 2014 | 1,638.3 | 94.9 | 586 | 62.065 | 0.11 | 0.04 |
| | 2015 | 1,672.4 | 95.6 | 583 | 45.624 | 0.08 | 0.03 |
| | 2016 | 1,685.6 | 96.3 | 904 | 85.891 | 0.10 | 0.05 |
| | 2017 | 1,725.0 | 97.2 | 686 | 49.283 | 0.07 | 0.03 |
| | 2018 | 1,711.0 | 96.5 | 875 | 56.494 | 0.06 | 0.03 |
| **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 - 1,160, 1,150 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 |
| | 1997 | 2,028.2 | 89.3 | 1,561 | 266 | 0.17 | 0.13 |
| | 1998 | 2,006.4 | 89.6 | 1,123 | 162.068 | 0.14 | 0.08 |
| | 1999 | 2,046.7 | 90.2 | 1,024 | 118.662 | 0.12 | 0.06 |
| | 2000 | 2,038.3 | 90.3 | 1,185 | 186.532 | 0.16 | 0.09 |
| | 2001 | 2,119.9 | 92.9 | 960 | 116.241 | 0.12 | 0.05 |
| | 2002 | 2,238.0 | 97.2 | 884 | 81.325 | 0.09 | 0.04 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **CATAWBA 1, 2** | 2003 | 1,991.8 | 89.2 | 1,409 | 210.617 | 0.15 | 0.11 |
| (continued) | 2004 | 2,111.4 | 93.0 | 1,123 | 122.831 | 0.11 | 0.06 |
| | 2005 | 2,194.5 | 96.0 | 1,019 | 83.679 | 0.08 | 0.04 |
| | 2006 | 1,928.6 | 85.0 | 1,792 | 212.570 | 0.12 | 0.11 |
| | 2007 | 2,102.5 | 92.0 | 1,399 | 144.218 | 0.10 | 0.07 |
| | 2008 | 2,160.3 | 93.5 | 1,110 | 85.080 | 0.08 | 0.04 |
| | 2009 | 2,044.8 | 89.1 | 1,385 | 169.409 | 0.12 | 0.08 |
| | 2010 | 2,164.8 | 94.8 | 1,045 | 97.010 | 0.09 | 0.04 |
| | 2011 | 2,144.2 | 93.9 | 961 | 52.321 | 0.05 | 0.02 |
| | 2012 | 2,029.7 | 88.8 | 1,157 | 94.734 | 0.08 | 0.05 |
| | 2013 | 2,187.9 | 95.5 | 1,053 | 82.906 | 0.08 | 0.04 |
| | 2014 | 2,136.0 | 93.3 | 996 | 50.777 | 0.05 | 0.02 |
| | 2015 | 2,098.6 | 92.2 | 1,299 | 97.678 | 0.08 | 0.05 |
| | 2016 | 2,232.7 | 96.1 | 1,000 | 77.097 | 0.08 | 0.03 |
| | 2017 | 2,249.6 | 96.8 | 642 | 32.236 | 0.05 | 0.01 |
| | 2018 | 2,143.8 | 93.0 | 1,211 | 87.302 | 0.07 | 0.04 |
| **CLINTON** | 1988 | 701.3 | 84.2 | 769 | 130 | 0.17 | 0.19 |
| Docket 50-461; | 1989 | 348.3 | 48.5 | 1,196 | 372 | 0.31 | 1.07 |
| NPF-62 | 1990 | 435.8 | 55.1 | 1,390 | 553 | 0.40 | 1.27 |
| 1st commercial operation 11/87 | 1991 | 722.7 | 80.8 | 1,010 | 233 | 0.23 | 0.32 |
| Type - BWR | 1992 | 589.7 | 68.6 | 1,195 | 431 | 0.36 | 0.73 |
| Capacity - 1,022 MWe | 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 | 144.140 | 0.17 | --- |
| | 1999 | 537.0 | 63.5 | 637 | 87.489 | 0.14 | 0.16 |
| | 2000 | 784.2 | 87.8 | 1,248 | 253.382 | 0.20 | 0.32 |
| | 2001 | 896.8 | 98.5 | 329 | 33.770 | 0.10 | 0.04 |
| | 2002 | 872.0 | 90.5 | 1,418 | 208.094 | 0.15 | 0.24 |
| | 2003 | 990.5 | 99.1 | 372 | 57.118 | 0.15 | 0.06 |
| | 2004 | 910.8 | 92.6 | 1,622 | 282.833 | 0.17 | 0.31 |
| | 2005 | 989.1 | 97.4 | 298 | 36.019 | 0.12 | 0.04 |
| | 2006 | 939.9 | 92.0 | 1,649 | 295.720 | 0.18 | 0.32 |
| | 2007 | 1,049.2 | 100.0 | 310 | 30.618 | 0.10 | 0.03 |
| | 2008 | 973.0 | 93.3 | 1,381 | 205.086 | 0.15 | 0.21 |
| | 2009 | 1,014.6 | 96.6 | 435 | 48.009 | 0.11 | 0.05 |
| | 2010 | 983.1 | 93.5 | 1,540 | 219.954 | 0.14 | 0.22 |
| | 2011 | 989.9 | 94.4 | 1,683 | 228.447 | 0.14 | 0.23 |
| | 2012 | 1,067.1 | 100.0 | 215 | 14.250 | 0.07 | 0.01 |
| | 2013 | 950.2 | 91.9 | 1,182 | 128.781 | 0.11 | 0.14 |
| | 2014 | 1,038.6 | 98.8 | 186 | 17.866 | 0.10 | 0.02 |
| | 2015 | 922.9 | 94.1 | 1,197 | 97.634 | 0.08 | 0.11 |
| | 2016 | 1,017.8 | 97.2 | 480 | 33.218 | 0.07 | 0.03 |
| | 2017 | 954.1 | 91.9 | 1,341 | 154.579 | 0.12 | 0.16 |
| | 2018 | 958.7 | 92.3 | 1,137 | 77.813 | 0.07 | 0.08 |
| **COLUMBIA GENERATING**[3] | 1985 | 616.0 | 87.6 | 755 | 119 | 0.16 | 0.19 |
| Docket 50-397; | 1986 | 616.0 | 74.4 | 1,013 | 222 | 0.22 | 0.36 |
| NPF-21 | 1987 | 639.0 | 70.8 | 1,201 | 406 | 0.34 | 0.64 |
| 1st commercial operation 12/84 | 1988 | 707.7 | 71.8 | 1,050 | 353 | 0.34 | 0.50 |
| Type - BWR | 1989 | 727.2 | 78.3 | 1,299 | 492 | 0.38 | 0.68 |
| Capacity - 1,131 MWe | 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 | 286.020 | 0.23 | 0.36 |
| | 1999 | 694.7 | 70.0 | 1,022 | 155.109 | 0.15 | 0.22 |

[3] Energy Northwest changed the name of Washington Nuclear 2 to Columbia Generating Station in 2001.

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **COLUMBIA GENERATING**[3] (continued) | 2000 | 979.6 | 96.3 | 706 | 53.152 | 0.08 | 0.05 |
| | 2001 | 939.3 | 88.1 | 1,515 | 226.675 | 0.15 | 0.24 |
| | 2002 | 1,023.0 | 97.5 | 647 | 46.650 | 0.07 | 0.05 |
| | 2003 | 866.9 | 81.8 | 1,618 | 205.225 | 0.13 | 0.24 |
| | 2004 | 1,022.5 | 94.6 | 716 | 66.130 | 0.09 | 0.06 |
| | 2005 | 938.3 | 87.3 | 1,718 | 325.025 | 0.19 | 0.35 |
| | 2006 | 1,064.9 | 98.0 | 623 | 55.817 | 0.09 | 0.05 |
| | 2007 | 925.6 | 87.0 | 2,147 | 306.443 | 0.14 | 0.33 |
| | 2008 | 1,055.3 | 98.3 | 715 | 54.957 | 0.08 | 0.05 |
| | 2009 | 757.2 | 76.3 | 1,958 | 305.163 | 0.16 | 0.40 |
| | 2010 | 1,054.9 | 100.0 | 733 | 54.712 | 0.07 | 0.05 |
| | 2011 | 548.7 | 54.4 | 2,309 | 335.657 | 0.15 | 0.61 |
| | 2012 | 1,062.6 | 97.6 | 1,155 | 45.462 | 0.04 | 0.04 |
| | 2013 | 965.9 | 88.4 | 1,787 | 223.809 | 0.13 | 0.23 |
| | 2014 | 1,084.2 | 100.0 | 775 | 33.771 | 0.04 | 0.03 |
| | 2015 | 931.6 | 87.0 | 2,088 | 289.135 | 0.14 | 0.31 |
| | 2016 | 1,098.8 | 97.8 | 586 | 26.825 | 0.05 | 0.02 |
| | 2017 | 927.9 | 87.7 | 1,724 | 180.255 | 0.10 | 0.19 |
| | 2018 | 1,108.3 | 98.6 | 494 | 43.078 | 0.09 | 0.04 |
| **COMANCHE PEAK 1, 2** Docket 50-445, 50-446; NPF-87, NPF-89 1st commercial operation 8/90, 8/93 Type - PWR Capacity - 1,205, 1,195 MWe | 1991 | 644.4 | 82.2 | 985 | 148 | 0.15 | 0.23 |
| | 1992 | 830.8 | 84.0 | 1,128 | 188 | 0.17 | 0.23 |
| | 1993 | 853.8 | 81.2 | 945 | 109 | 0.12 | 0.13 |
| | 1994 | 1,750.0 | 93.7 | 970 | 90 | 0.09 | 0.05 |
| | 1995 | 2,022.6 | 92.5 | 951 | 179 | 0.19 | 0.09 |
| | 1996 | 1,804.8 | 81.4 | 1,462 | 288 | 0.20 | 0.16 |
| | 1997 | 2,002.4 | 93.4 | 870 | 146 | 0.17 | 0.07 |
| | 1998 | 2,037.8 | 94.9 | 967 | 232.026 | 0.24 | 0.11 |
| | 1999 | 1,981.5 | 90.9 | 1,316 | 251.276 | 0.19 | 0.13 |
| | 2000 | 2,104.7 | 95.3 | 759 | 77.679 | 0.10 | 0.04 |
| | 2001 | 2,085.9 | 94.7 | 853 | 114.968 | 0.13 | 0.06 |
| | 2002 | 1,887.0 | 86.9 | 1,106 | 225.317 | 0.20 | 0.12 |
| | 2003 | 2,020.6 | 91.6 | 639 | 66.313 | 0.10 | 0.03 |
| | 2004 | 2,169.5 | 95.1 | 864 | 135.388 | 0.16 | 0.06 |
| | 2005 | 2,099.6 | 91.5 | 1,365 | 242.481 | 0.18 | 0.12 |
| | 2006 | 2,271.3 | 97.0 | 686 | 59.959 | 0.09 | 0.03 |
| | 2007 | 2,151.3 | 93.0 | 1,616 | 219.799 | 0.14 | 0.10 |
| | 2008 | 2,189.7 | 94.3 | 1,037 | 168.836 | 0.16 | 0.08 |
| | 2009 | 2,299.3 | 96.7 | 938 | 51.420 | 0.05 | 0.02 |
| | 2010 | 2,316.8 | 96.3 | 1,037 | 70.807 | 0.07 | 0.03 |
| | 2011 | 2,216.8 | 92.6 | 1,580 | 154.716 | 0.10 | 0.07 |
| | 2012 | 2,279.9 | 94.6 | 1,001 | 66.742 | 0.07 | 0.03 |
| | 2013 | 2,353.5 | 96.8 | 745 | 45.237 | 0.06 | 0.02 |
| | 2014 | 2,141.7 | 88.6 | 1,123 | 139.246 | 0.12 | 0.07 |
| | 2015 | 2,294.6 | 94.7 | 641 | 42.889 | 0.07 | 0.02 |
| | 2016 | 2,340.7 | 96.0 | 624 | 36.648 | 0.06 | 0.02 |
| | 2017 | 1,947.3 | 81.5 | 1,052 | 120.996 | 0.12 | 0.06 |
| | 2018 | 2,346.3 | 96.5 | 554 | 41.677 | 0.08 | 0.02 |
| **COOK 1, 2** Docket 50-315, 50-316; DPR-58, DPR-74 1st commercial operation 8/75, 7/78 Type - PWRs Capacity - 1,030, 1,168 MWe | 1976 | 807.4 | 83.1 | 395 | 116 | 0.29 | 0.14 |
| | 1977 | 573.0 | 76.1 | 802 | 300 | 0.37 | 0.52 |
| | 1978 | 744.8 | 73.6 | 778 | 336 | 0.43 | 0.45 |
| | 1979 | 1,373.0 | 65.3 | 1,445 | 718 | 0.50 | 0.52 |
| | 1980 | 1,552.4 | 74.1 | 1,345 | 493 | 0.37 | 0.32 |
| | 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 |

[3] Energy Northwest changed the name of Washington Nuclear 2 to Columbia Generating Station in 2001.

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **COOK 1, 2** (continued) | 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 | 104.638 | 0.09 | --- |
| | 1999 | 0.0 | 0.0 | 1,662 | 171.479 | 0.10 | --- |
| | 2000 | 560.1 | 28.1 | 2,506 | 337.584 | 0.13 | 0.60 |
| | 2001 | 1,794.3 | 89.2 | 423 | 27.290 | 0.06 | 0.02 |
| | 2002 | 1,756.0 | 87.3 | 1,624 | 278.001 | 0.17 | 0.16 |
| | 2003 | 1,557.6 | 75.7 | 1,408 | 209.526 | 0.15 | 0.13 |
| | 2004 | 1,909.2 | 91.4 | 1,015 | 156.213 | 0.15 | 0.08 |
| | 2005 | 1,989.0 | 95.0 | 852 | 91.192 | 0.11 | 0.05 |
| | 2006 | 1,790.5 | 86.0 | 1,780 | 312.214 | 0.18 | 0.17 |
| | 2007 | 1,983.7 | 93.0 | 1,310 | 238.829 | 0.18 | 0.12 |
| | 2008 | 1,711.8 | 80.8 | 971 | 76.460 | 0.08 | 0.04 |
| | 2009 | 950.5 | 45.3 | 693 | 40.007 | 0.06 | 0.04 |
| | 2010 | 1,786.1 | 86.7 | 1,116 | 83.276 | 0.07 | 0.05 |
| | 2011 | 1,981.5 | 94.2 | 842 | 57.169 | 0.07 | 0.03 |
| | 2012 | 2,017.5 | 94.7 | 754 | 49.112 | 0.07 | 0.02 |
| | 2013 | 1,858.5 | 87.1 | 1,187 | 103.772 | 0.09 | 0.06 |
| | 2014 | 2,012.7 | 94.3 | 727 | 53.798 | 0.07 | 0.03 |
| | 2015 | 1,885.7 | 87.4 | 626 | 29.827 | 0.05 | 0.02 |
| | 2016 | 1,753.5 | 82.3 | 1,123 | 93.715 | 0.08 | 0.05 |
| | 2017 | 2,008.2 | 89.7 | 830 | 57.999 | 0.07 | 0.03 |
| | 2018 | 2,010.4 | 90.5 | 825 | 40.511 | 0.05 | 0.02 |
| **COOPER STATION** Docket 50-298; DPR-46 1st commercial operation 7/74 Type - BWR Capacity - 769 MWe | 1975 | 456.4 | 83.6 | 579 | 117 | 0.20 | 0.26 |
| | 1976 | 433.3 | 75.5 | 763 | 350 | 0.46 | 0.81 |
| | 1977 | 538.2 | 86.2 | 315 | 198 | 0.63 | 0.37 |
| | 1978 | 576.0 | 91.0 | 297 | 158 | 0.53 | 0.27 |
| | 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 | 0.15 | 0.28 |
| | 1998 | 555.9 | 75.9 | 977 | 181.858 | 0.19 | 0.33 |
| | 1999 | 743.2 | 98.1 | 318 | 47.815 | 0.15 | 0.06 |
| | 2000 | 539.2 | 74.2 | 963 | 199.589 | 0.21 | 0.37 |
| | 2001 | 592.7 | 80.9 | 1,309 | 168.665 | 0.13 | 0.28 |
| | 2002 | 719.0 | 98.6 | 362 | 38.739 | 0.11 | 0.05 |
| | 2003 | 511.4 | 74.1 | 882 | 135.249 | 0.15 | 0.26 |
| | 2004 | 702.6 | 94.7 | 481 | 47.064 | 0.10 | 0.07 |
| | 2005 | 670.8 | 89.4 | 1,266 | 275.652 | 0.22 | 0.41 |
| | 2006 | 674.7 | 90.0 | 1,265 | 270.135 | 0.21 | 0.40 |
| | 2007 | 761.6 | 99.0 | 730 | 49.902 | 0.07 | 0.07 |
| | 2008 | 679.0 | 89.9 | 1,715 | 359.926 | 0.21 | 0.53 |
| | 2009 | 654.6 | 86.6 | 1,638 | 254.032 | 0.16 | 0.39 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **COOPER STATION** | 2010 | 775.4 | 100.0 | 773 | 61.303 | 0.08 | 0.08 |
| (continued) | 2011 | 658.5 | 84.8 | 1,737 | 349.247 | 0.20 | 0.53 |
| | 2012 | 662.9 | 87.6 | 1,800 | 279.301 | 0.16 | 0.42 |
| | 2013 | 776.5 | 100.0 | 548 | 35.870 | 0.07 | 0.05 |
| | 2014 | 675.3 | 88.8 | 1,274 | 202.670 | 0.16 | 0.30 |
| | 2015 | 776.1 | 99.4 | 408 | 27.634 | 0.07 | 0.04 |
| | 2016 | 676.1 | 88.2 | 1,291 | 195.518 | 0.15 | 0.29 |
| | 2017 | 789.1 | 100.0 | 394 | 30.193 | 0.08 | 0.04 |
| | 2018 | 642.9 | 84.5 | 996 | 132.984 | 0.13 | 0.21 |
| **CRYSTAL RIVER 3**[4] | 1978 | 311.5 | 41.4 | 643 | 321 | 0.50 | 1.03 |
| Docket 50-302; | 1979 | 453.0 | 58.9 | 1,150 | 495 | 0.43 | 1.09 |
| DPR-72 | 1980 | 404.1 | 53.2 | 1,053 | 625 | 0.59 | 1.55 |
| 1st commercial operation 3/77 | 1981 | 490.4 | 62.2 | 1,120 | 408 | 0.36 | 0.83 |
| Type - PWR | 1982 | 589.8 | 76.0 | 780 | 177 | 0.23 | 0.30 |
| Capacity - (860) MWe | 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 | 19.298 | 0.06 | 0.03 |
| | 1999 | 727.5 | 87.8 | 1,324 | 251.077 | 0.19 | 0.35 |
| | 2000 | 819.4 | 97.6 | 257 | 14.649 | 0.06 | 0.02 |
| | 2001 | 741.6 | 89.2 | 902 | 147.946 | 0.16 | 0.20 |
| | 2002 | 831.0 | 99.4 | 128 | 5.039 | 0.04 | 0.01 |
| | 2003 | 749.0 | 90.8 | 961 | 126.554 | 0.13 | 0.17 |
| | 2004 | 831.4 | 98.1 | 131 | 4.044 | 0.03 | 0.00 |
| | 2005 | 723.0 | 88.5 | 939 | 122.608 | 0.13 | 0.17 |
| | 2006 | 793.8 | 95.0 | 138 | 4.474 | 0.03 | 0.01 |
| | 2007 | 761.7 | 91.0 | 1,135 | 184.554 | 0.16 | 0.24 |
| | 2008 | 796.9 | 93.7 | 282 | 16.110 | 0.06 | 0.02 |
| | 2009 | 615.0 | 72.5 | 1,705 | 222.344 | 0.13 | 0.36 |
| | 2010 | 0.0 | 0.0 | 666 | 31.922 | 0.05 | --- |
| | 2011 | 0.0 | 0.0 | 251 | 8.292 | 0.03 | --- |
| | 2012 | 0.0 | 0.0 | 94 | 1.876 | 0.02 | --- |
| | 2013 | 0.0 | 0.0 | 40 | 0.794 | 0.02 | --- |
| | 2014 | 0.0 | 0.0 | 26 | 0.696 | 0.03 | --- |
| | 2015 | 0.0 | 0.0 | 20 | 0.700 | 0.04 | --- |
| | 2016 | 0.0 | 0.0 | 95 | 14.746 | 0.16 | --- |
| | 2017 | 0.0 | 0.0 | 68 | 4.133 | 0.06 | --- |
| | 2018 | 0.0 | 0.0 | 25 | 1.215 | 0.05 | --- |
| **DAVIS-BESSE 1** | 1978 | 326.4 | 48.7 | 421 | 48 | 0.11 | 0.15 |
| Docket 50-346; | 1979 | 381.0 | 67.0 | 304 | 30 | 0.10 | 0.08 |
| NPF-3 | 1980 | 256.4 | 36.2 | 1,283 | 154 | 0.12 | 0.60 |
| 1st commercial operation 7/78 | 1981 | 531.4 | 67.4 | 578 | 58 | 0.10 | 0.11 |
| Type - PWR | 1982 | 390.8 | 51.5 | 1,350 | 164 | 0.12 | 0.42 |
| Capacity - 894 MWe | 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 |

[4] Crystal River ceased power generation in 2010 due to problems associated with containment building delamination. In June 2013, it was decided that it would not be put in commercial operation again and, 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 per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **DAVIS-BESSE 1** | 1989 | 880.0 | 98.6 | 404 | 38 | 0.09 | 0.04 |
| (continued) | 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 | 155.269 | 0.16 | 0.22 |
| | 1999 | 841.3 | 95.6 | 397 | 27.951 | 0.07 | 0.03 |
| | 2000 | 770.8 | 87.3 | 1,109 | 168.044 | 0.15 | 0.22 |
| | 2001 | 875.6 | 100.0 | 119 | 5.505 | 0.05 | 0.01 |
| | 2002 | 106.0 | 12.6 | 1,983 | 402.766 | 0.20 | 3.80 |
| | 2003 | 0.0 | 0.0 | 1,047 | 219.696 | 0.21 | --- |
| | 2004 | 657.8 | 77.6 | 161 | 6.594 | 0.04 | 0.01 |
| | 2005 | 817.1 | 93.3 | 577 | 51.332 | 0.09 | 0.06 |
| | 2006 | 727.8 | 84.0 | 1,331 | 204.201 | 0.15 | 0.28 |
| | 2007 | 879.7 | 100.0 | 189 | 7.088 | 0.04 | 0.01 |
| | 2008 | 777.5 | 89.4 | 985 | 106.603 | 0.11 | 0.14 |
| | 2009 | 868.7 | 95.7 | 115 | 3.621 | 0.03 | 0.00 |
| | 2010 | 598.0 | 67.1 | 1,649 | 464.095 | 0.28 | 0.78 |
| | 2011 | 723.7 | 80.7 | 1,182 | 73.360 | 0.06 | 0.10 |
| | 2012 | 808.5 | 90.0 | 659 | 43.071 | 0.07 | 0.05 |
| | 2013 | 876.6 | 96.6 | 92 | 2.558 | 0.03 | 0.00 |
| | 2014 | 681.8 | 74.1 | 2,029 | 200.466 | 0.10 | 0.29 |
| | 2015 | 901.1 | 99.5 | 32 | 0.995 | 0.03 | 0.00 |
| | 2016 | 730.0 | 84.7 | 996 | 118.472 | 0.12 | 0.16 |
| | 2017 | 899.1 | 100.0 | 69 | 1.621 | 0.02 | 0.00 |
| | 2018 | 842.5 | 93.7 | 742 | 51.003 | 0.07 | 0.06 |
| **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 - 1,122, 1,118 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 | 0.25 | 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 |
| | 1997 | 1,948.7 | 92.7 | 1,331 | 219 | 0.16 | 0.11 |
| | 1998 | 1,955.1 | 92.8 | 1,313 | 173.238 | 0.13 | 0.09 |
| | 1999 | 1,902.8 | 90.1 | 1,566 | 448.634 | 0.29 | 0.24 |
| | 2000 | 1,940.1 | 92.0 | 1,057 | 180.792 | 0.17 | 0.09 |
| | 2001 | 2,067.7 | 96.4 | 1,074 | 117.804 | 0.11 | 0.06 |
| | 2002 | 1,860.0 | 88.4 | 1,016 | 148.690 | 0.15 | 0.08 |
| | 2003 | 1,970.7 | 91.6 | 1,004 | 135.482 | 0.13 | 0.07 |
| | 2004 | 1,736.3 | 83.5 | 1,230 | 254.367 | 0.21 | 0.15 |
| | 2005 | 2,022.4 | 94.8 | 955 | 124.469 | 0.13 | 0.06 |
| | 2006 | 2,109.0 | 94.0 | 1,086 | 82.248 | 0.08 | 0.04 |
| | 2007 | 2,131.4 | 95.0 | 1,269 | 111.866 | 0.09 | 0.05 |
| | 2008 | 1,952.1 | 87.7 | 2,121 | 235.034 | 0.11 | 0.12 |
| | 2009 | 1,873.0 | 85.3 | 2,534 | 337.831 | 0.13 | 0.18 |
| | 2010 | 2,115.2 | 94.7 | 1,367 | 125.457 | 0.09 | 0.06 |
| | 2011 | 2,131.1 | 94.6 | 747 | 31.625 | 0.04 | 0.01 |
| | 2012 | 2,023.0 | 91.8 | 894 | 43.531 | 0.05 | 0.02 |
| | 2013 | 2,064.1 | 92.4 | 760 | 28.767 | 0.04 | 0.01 |
| | 2014 | 1,947.1 | 88.8 | 979 | 67.599 | 0.07 | 0.03 |
| | 2015 | 2,116.8 | 94.9 | 807 | 57.244 | 0.07 | 0.03 |
| | 2016 | 2,162.2 | 95.7 | 794 | 37.734 | 0.05 | 0.02 |
| | 2017 | 2,051.4 | 92.0 | 787 | 47.910 | 0.06 | 0.02 |
| | 2018 | 2,088.4 | 94.6 | 718 | 32.013 | 0.04 | 0.02 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **DRESDEN 1[5], 2, 3** | 1969 | 99.7 | --- | --- | 286 | --- | 2.87 |
| Docket 50-010, 50-237, 50-249; | 1970 | 163.1 | --- | --- | 143 | --- | 0.88 |
| DPR-2, DPR-19, DPR-25 | 1971 | 394.5 | --- | --- | 715 | --- | 1.81 |
| 1st commercial operation 8/60, | 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), 870, 869 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 | 426.918 | 0.18 | 0.32 |
| | 1999 | 1,410.9 | 92.5 | 3,243 | 591.443 | 0.18 | 0.42 |
| | 2000 | 1,506.4 | 97.3 | 2,341 | 261.684 | 0.11 | 0.17 |
| | 2001 | 1,427.4 | 94.5 | 2,769 | 400.702 | 0.14 | 0.28 |
| | 2002 | 1,547.0 | 95.7 | 2,819 | 355.011 | 0.13 | 0.23 |
| | 2003 | 1,555.9 | 93.5 | 2,098 | 356.572 | 0.17 | 0.23 |
| | 2004 | 1,405.5 | 84.8 | 2,044 | 381.054 | 0.19 | 0.27 |
| | 2005 | 1,550.8 | 92.0 | 2,006 | 258.799 | 0.13 | 0.17 |
| | 2006 | 1,649.0 | 96.0 | 2,042 | 289.167 | 0.14 | 0.18 |
| | 2007 | 1,658.8 | 97.0 | 2,310 | 275.697 | 0.12 | 0.17 |
| | 2008 | 1,638.0 | 95.9 | 2,307 | 198.153 | 0.09 | 0.12 |
| | 2009 | 1,628.7 | 95.4 | 1,932 | 231.688 | 0.12 | 0.14 |
| | 2010 | 1,665.9 | 96.3 | 2,152 | 213.825 | 0.10 | 0.13 |
| | 2011 | 1,679.7 | 96.7 | 2,382 | 236.427 | 0.10 | 0.14 |
| | 2012 | 1,685.5 | 96.3 | 2,084 | 139.615 | 0.07 | 0.08 |
| | 2013 | 1,759.9 | 96.8 | 1,823 | 136.942 | 0.08 | 0.08 |
| | 2014 | 1,727.8 | 95.9 | 1,782 | 116.933 | 0.07 | 0.07 |
| | 2015 | 1,734.4 | 95.8 | 1,900 | 138.864 | 0.07 | 0.08 |
| | 2016 | 1,763.2 | 97.8 | 1,878 | 141.827 | 0.08 | 0.08 |
| | 2017 | 1,763.3 | 97.5 | 1,928 | 129.266 | 0.07 | 0.07 |
| | 2018 | 1,776.9 | 98.1 | 1,883 | 118.831 | 0.06 | 0.07 |
| **DUANE ARNOLD** | 1976 | 305.2 | 78.0 | 350 | 105 | 0.30 | 0.34 |
| Docket 50-331; | 1977 | 353.6 | 78.9 | 538 | 299 | 0.56 | 0.85 |
| DPR-49 | 1978 | 149.2 | 33.2 | 1,112 | 974 | 0.88 | 6.53 |
| 1st commercial operation 2/75 | 1979 | 352.0 | 78.0 | 757 | 275 | 0.36 | 0.78 |
| Type - BWR | 1980 | 339.1 | 73.3 | 1,108 | 671 | 0.61 | 1.98 |
| Capacity - 602 MWe | 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 |

[5] Dresden 1 ceased power generation in 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 per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **DUANE ARNOLD** (continued) | 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 |
| | 1993 | 393.4 | 79.5 | 1,043 | 407 | 0.39 | 1.03 |
| | 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 | 236.693 | 0.23 | 0.54 |
| | 1999 | 416.6 | 84.3 | 834 | 201.196 | 0.24 | 0.48 |
| | 2000 | 507.3 | 98.4 | 317 | 44.181 | 0.14 | 0.09 |
| | 2001 | 439.5 | 86.8 | 898 | 137.564 | 0.15 | 0.31 |
| | 2002 | 522.0 | 94.4 | 319 | 35.061 | 0.11 | 0.07 |
| | 2003 | 455.2 | 84.8 | 829 | 124.402 | 0.15 | 0.27 |
| | 2004 | 561.2 | 98.3 | 220 | 18.993 | 0.09 | 0.03 |
| | 2005 | 517.4 | 90.5 | 879 | 139.622 | 0.16 | 0.27 |
| | 2006 | 581.7 | 99.0 | 254 | 29.392 | 0.12 | 0.05 |
| | 2007 | 515.8 | 88.0 | 1,062 | 183.609 | 0.17 | 0.36 |
| | 2008 | 601.4 | 100.0 | 276 | 24.187 | 0.09 | 0.04 |
| | 2009 | 534.1 | 91.3 | 960 | 140.206 | 0.15 | 0.26 |
| | 2010 | 508.1 | 86.9 | 1,093 | 200.601 | 0.18 | 0.39 |
| | 2011 | 595.3 | 98.6 | 400 | 29.663 | 0.07 | 0.05 |
| | 2012 | 494.9 | 84.9 | 1,169 | 134.515 | 0.12 | 0.27 |
| | 2013 | 598.6 | 100.0 | 262 | 16.414 | 0.06 | 0.03 |
| | 2014 | 474.0 | 86.0 | 1,043 | 121.986 | 0.12 | 0.26 |
| | 2015 | 598.6 | 100.0 | 391 | 20.441 | 0.05 | 0.03 |
| | 2016 | 536.8 | 92.5 | 1,106 | 110.613 | 0.10 | 0.21 |
| | 2017 | 595.2 | 99.3 | 228 | 17.336 | 0.08 | 0.03 |
| | 2018 | 558.8 | 94.7 | 697 | 77.984 | 0.11 | 0.14 |
| **FARLEY 1, 2**<br>Docket 50-348, 50-364;<br>NPF-2, NPF-8<br>1st commercial operation<br>12/77, 7/81<br>Type - PWRs<br>Capacity - 874, 883 MWe | 1978 | 713.8 | 86.5 | 527 | 108 | 0.20 | 0.15 |
| | 1979 | 211.0 | 28.6 | 1,227 | 643 | 0.52 | 3.05 |
| | 1980 | 557.3 | 69.3 | 1,330 | 435 | 0.33 | 0.78 |
| | 1981 | 310.2 | 41.4 | 1,331 | 512 | 0.38 | 1.65 |
| | 1982 | 1,271.5 | 79.2 | 1,453 | 484 | 0.33 | 0.38 |
| | 1983 | 1,356.5 | 83.0 | 1,938 | 1,021 | 0.53 | 0.75 |
| | 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 | 431.821 | 0.31 | 0.33 |
| | 1999 | 1,436.0 | 91.4 | 1,102 | 190.463 | 0.17 | 0.13 |
| | 2000 | 1,430.1 | 88.6 | 1,683 | 359.855 | 0.21 | 0.25 |
| | 2001 | 1,384.3 | 84.4 | 1,810 | 320.509 | 0.18 | 0.23 |
| | 2002 | 1,558.0 | 93.5 | 772 | 96.431 | 0.12 | 0.06 |
| | 2003 | 1,592.6 | 95.3 | 788 | 111.016 | 0.14 | 0.07 |
| | 2004 | 1,496.8 | 89.4 | 1,141 | 107.227 | 0.09 | 0.07 |
| | 2005 | 1,564.2 | 93.3 | 810 | 67.826 | 0.08 | 0.04 |
| | 2006 | 1,602.7 | 94.0 | 747 | 66.189 | 0.09 | 0.04 |
| | 2007 | 1,495.8 | 88.0 | 1,226 | 139.716 | 0.11 | 0.09 |
| | 2008 | 1,602.6 | 94.4 | 669 | 40.833 | 0.06 | 0.03 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **FARLEY 1, 2** | 2009 | 1,595.2 | 94.1 | 657 | 41.851 | 0.06 | 0.03 |
| (continued) | 2010 | 1,503.4 | 89.0 | 1,321 | 121.313 | 0.09 | 0.08 |
| | 2011 | 1,647.4 | 95.1 | 723 | 37.510 | 0.05 | 0.02 |
| | 2012 | 1,680.7 | 95.8 | 563 | 29.817 | 0.05 | 0.02 |
| | 2013 | 1,609.4 | 92.8 | 775 | 53.212 | 0.07 | 0.03 |
| | 2014 | 1,655.9 | 94.5 | 713 | 37.703 | 0.05 | 0.02 |
| | 2015 | 1,631.0 | 93.6 | 888 | 55.942 | 0.06 | 0.03 |
| | 2016 | 1,563.7 | 90.0 | 957 | 59.840 | 0.06 | 0.04 |
| | 2017 | 1,690.0 | 96.1 | 575 | 31.351 | 0.05 | 0.02 |
| | 2018 | 1,605.6 | 94.2 | 592 | 36.355 | 0.06 | 0.02 |
| **FERMI 2** | 1989 | 624.0 | 68.5 | 1,270 | 255 | 0.20 | 0.41 |
| Docket 50-341; | 1990 | 848.2 | 84.7 | 462 | 83 | 0.18 | 0.10 |
| NPF-43 | 1991 | 739.0 | 77.0 | 1,223 | 228 | 0.19 | 0.31 |
| 1st commercial operation 1/88 | 1992 | 874.3 | 81.3 | 1,213 | 245 | 0.20 | 0.28 |
| Type - BWR | 1993 | 984.3 | 92.9 | 360 | 35 | 0.10 | 0.04 |
| Capacity - 1,095 MWe | 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 | 207.593 | 0.15 | 0.25 |
| | 1999 | 1,082.7 | 99.5 | 461 | 36.152 | 0.08 | 0.03 |
| | 2000 | 939.6 | 87.6 | 1,266 | 145.964 | 0.12 | 0.16 |
| | 2001 | 975.0 | 90.9 | 1,202 | 168.689 | 0.14 | 0.17 |
| | 2002 | 1,059.0 | 98.7 | 463 | 38.235 | 0.08 | 0.04 |
| | 2003 | 925.3 | 86.9 | 1,207 | 168.138 | 0.14 | 0.18 |
| | 2004 | 962.3 | 90.0 | 1,302 | 145.090 | 0.11 | 0.15 |
| | 2005 | 998.1 | 91.7 | 538 | 61.626 | 0.11 | 0.06 |
| | 2006 | 855.9 | 83.0 | 1,430 | 181.300 | 0.13 | 0.21 |
| | 2007 | 950.2 | 87.0 | 1,484 | 194.039 | 0.13 | 0.20 |
| | 2008 | 1,094.5 | 99.5 | 460 | 35.186 | 0.08 | 0.03 |
| | 2009 | 847.8 | 79.3 | 1,497 | 148.846 | 0.10 | 0.18 |
| | 2010 | 885.0 | 86.4 | 1,625 | 146.490 | 0.09 | 0.17 |
| | 2011 | 1,017.9 | 95.7 | 387 | 24.080 | 0.06 | 0.02 |
| | 2012 | 589.3 | 65.2 | 1,420 | 144.973 | 0.10 | 0.25 |
| | 2013 | 754.5 | 93.0 | 704 | 26.179 | 0.04 | 0.03 |
| | 2014 | 891.5 | 85.9 | 1,806 | 199.698 | 0.11 | 0.22 |
| | 2015 | 838.6 | 75.8 | 1,866 | 234.853 | 0.13 | 0.28 |
| | 2016 | 1,045.0 | 96.2 | 779 | 54.761 | 0.07 | 0.05 |
| | 2017 | 993.0 | 91.2 | 2,025 | 265.082 | 0.13 | 0.27 |
| | 2018 | 849.2 | 78.3 | 2,451 | 329.015 | 0.13 | 0.39 |
| **FITZPATRICK** | 1976 | 489.0 | 71.6 | 600 | 202 | 0.34 | 0.41 |
| Docket 50-333; | 1977 | 460.5 | 68.4 | 1,380 | 1,080 | 0.78 | 2.35 |
| DPR-59 | 1978 | 497.0 | 72.1 | 904 | 909 | 1.01 | 1.83 |
| 1st commercial operation 7/75 | 1979 | 349.0 | 50.8 | 850 | 859 | 1.01 | 2.46 |
| Type - BWR | 1980 | 509.5 | 70.3 | 2,056 | 2,040 | 0.99 | 4.00 |
| Capacity - 813 MWe | 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 |
| | 1989 | 727.5 | 92.3 | 1,027 | 377 | 0.37 | 0.52 |
| | 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 | 357.826 | 0.20 | 0.64 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **FITZPATRICK** (continued) | 1999 | 749.7 | 95.5 | 558 | 68.409 | 0.12 | 0.09 |
| | 2000 | 685.9 | 88.4 | 1,267 | 300.997 | 0.24 | 0.44 |
| | 2001 | 807.2 | 98.9 | 665 | 63.229 | 0.10 | 0.08 |
| | 2002 | 751.0 | 93.3 | 1,234 | 230.523 | 0.19 | 0.31 |
| | 2003 | 793.0 | 97.9 | 298 | 51.156 | 0.17 | 0.06 |
| | 2004 | 735.0 | 92.1 | 1,091 | 186.055 | 0.17 | 0.25 |
| | 2005 | 802.9 | 96.3 | 382 | 62.697 | 0.16 | 0.08 |
| | 2006 | 771.5 | 93.0 | 1,527 | 234.425 | 0.15 | 0.30 |
| | 2007 | 790.1 | 96.0 | 526 | 58.741 | 0.11 | 0.07 |
| | 2008 | 761.7 | 92.9 | 1,430 | 184.772 | 0.13 | 0.24 |
| | 2009 | 844.5 | 100.0 | 487 | 35.119 | 0.07 | 0.04 |
| | 2010 | 726.2 | 91.3 | 1,429 | 219.887 | 0.15 | 0.30 |
| | 2011 | 826.9 | 100.0 | 513 | 35.217 | 0.07 | 0.04 |
| | 2012 | 691.1 | 87.2 | 1,546 | 169.886 | 0.11 | 0.25 |
| | 2013 | 780.8 | 98.9 | 603 | 39.392 | 0.07 | 0.05 |
| | 2014 | 665.4 | 87.8 | 1,674 | 135.890 | 0.08 | 0.20 |
| | 2015 | 842.7 | 100.0 | 250 | 20.785 | 0.08 | 0.02 |
| | 2016 | 668.7 | 95.4 | 362 | 28.304 | 0.08 | 0.04 |
| | 2017 | 705.8 | 89.0 | 1,139 | 162.196 | 0.14 | 0.23 |
| | 2018 | 745.2 | 92.6 | 1,456 | 231.548 | 0.16 | 0.31 |
| **FORT CALHOUN**[6] Docket 50-285; DPR-40 1st commercial operation 6/74 Type - PWR Capacity - (482) MWe | 1975 | 252.3 | 67.4 | 469 | 294 | 0.63 | 1.17 |
| | 1976 | 265.9 | 69.5 | 516 | 313 | 0.61 | 1.18 |
| | 1977 | 351.8 | 79.4 | 535 | 297 | 0.56 | 0.84 |
| | 1978 | 342.3 | 75.1 | 596 | 410 | 0.69 | 1.20 |
| | 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 | 75 | 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 | 223.847 | 0.28 | 0.58 |
| | 1999 | 409.2 | 89.2 | 676 | 158.843 | 0.23 | 0.39 |
| | 2000 | 443.8 | 93.5 | 249 | 35.215 | 0.14 | 0.08 |
| | 2001 | 401.2 | 88.3 | 770 | 225.891 | 0.29 | 0.56 |
| | 2002 | 434.0 | 92.3 | 742 | 163.806 | 0.22 | 0.38 |
| | 2003 | 399.6 | 87.0 | 914 | 212.422 | 0.23 | 0.53 |
| | 2004 | 463.5 | 97.0 | 215 | 21.574 | 0.10 | 0.05 |
| | 2005 | 332.4 | 72.2 | 1,069 | 272.876 | 0.26 | 0.82 |
| | 2006 | 353.9 | 75.0 | 1,591 | 289.100 | 0.18 | 0.82 |
| | 2007 | 499.9 | 100.0 | 100 | 3.990 | 0.04 | 0.01 |
| | 2008 | 400.4 | 82.2 | 839 | 96.155 | 0.11 | 0.24 |
| | 2009 | 422.7 | 87.0 | 870 | 110.918 | 0.13 | 0.26 |
| | 2010 | 486.5 | 98.5 | 171 | 9.763 | 0.06 | 0.02 |
| | 2011 | 134.4 | 26.8 | 1,042 | 79.226 | 0.08 | 0.59 |
| | 2012 | 0.0 | 0.0 | 494 | 39.377 | 0.08 | --- |
| | 2013 | 10.9 | 3.6 | 678 | 63.853 | 0.09 | 5.86 |
| | 2014 | 477.7 | 97.7 | 159 | 5.053 | 0.03 | 0.01 |
| | 2015 | 402.5 | 81.5 | 747 | 75.987 | 0.10 | 0.19 |

[6] Fort Calhoun ceased power generation in October 2016 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 per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **FORT CALHOUN**[6] | 2016 | 0.0 | 0.0 | 166 | 11.255 | 0.07 | 0.00 |
| (continued) | 2017 | 0.0 | 0.0 | 72 | 2.770 | 0.04 | --- |
| | 2018 | 0.0 | 0.0 | 74 | 6.939 | 0.09 | --- |
| **GINNA** | 1971 | 327.8 | --- | 340 | 430 | 1.26 | 1.31 |
| Docket 50-244; | 1972 | 293.6 | --- | 677 | 1,032 | 1.52 | 3.51 |
| DPR-18 | 1973 | 409.5 | --- | 319 | 224 | 0.70 | 0.55 |
| 1st commercial operation 7/70 | 1974 | 253.7 | 62.4 | 884 | 1,225 | 1.39 | 4.83 |
| Type - PWR | 1975 | 365.2 | 76.7 | 685 | 538 | 0.79 | 1.47 |
| Capacity - 560 MWe | 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 |
| | 1990 | 414.3 | 84.4 | 991 | 347 | 0.35 | 0.84 |
| | 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 | 14.892 | 0.09 | 0.03 |
| | 1999 | 403.4 | 85.6 | 641 | 175.173 | 0.27 | 0.43 |
| | 2000 | 434.2 | 91.6 | 429 | 76.435 | 0.18 | 0.18 |
| | 2001 | 488.0 | 100.0 | 140 | 10.156 | 0.07 | 0.02 |
| | 2002 | 438.0 | 91.3 | 535 | 80.432 | 0.15 | 0.18 |
| | 2003 | 440.4 | 91.1 | 510 | 74.533 | 0.15 | 0.17 |
| | 2004 | 490.5 | 99.5 | 111 | 7.486 | 0.07 | 0.02 |
| | 2005 | 455.0 | 93.9 | 564 | 72.841 | 0.13 | 0.16 |
| | 2006 | 470.2 | 94.0 | 514 | 44.580 | 0.09 | 0.09 |
| | 2007 | 564.4 | 99.0 | 111 | 4.412 | 0.04 | 0.01 |
| | 2008 | 540.1 | 94.5 | 976 | 101.996 | 0.10 | 0.19 |
| | 2009 | 529.2 | 94.3 | 633 | 41.809 | 0.07 | 0.08 |
| | 2010 | 564.9 | 98.9 | 75 | 3.168 | 0.04 | 0.01 |
| | 2011 | 492.1 | 86.4 | 931 | 100.711 | 0.11 | 0.20 |
| | 2012 | 523.9 | 92.1 | 654 | 54.636 | 0.08 | 0.10 |
| | 2013 | 570.0 | 99.1 | 104 | 3.434 | 0.03 | 0.01 |
| | 2014 | 532.2 | 93.5 | 621 | 58.380 | 0.09 | 0.11 |
| | 2015 | 544.5 | 95.1 | 415 | 24.163 | 0.06 | 0.04 |
| | 2016 | 575.6 | 100.0 | 79 | 1.882 | 0.02 | 0.00 |
| | 2017 | 536.3 | 94.5 | 614 | 46.173 | 0.08 | 0.09 |
| | 2018 | 536.4 | 94.9 | 462 | 27.931 | 0.06 | 0.05 |
| **GRAND GULF** | 1986 | 494.7 | 60.9 | 1,486 | 436 | 0.29 | 0.88 |
| Docket 50-416; | 1987 | 920.7 | 82.2 | 1,358 | 420 | 0.31 | 0.46 |
| NPF-29 | 1988 | 1,136.6 | 96.7 | 692 | 147 | 0.21 | 0.13 |
| 1st commercial operation 7/85 | 1989 | 932.6 | 80.0 | 1,972 | 498 | 0.25 | 0.53 |
| Type - BWR | 1990 | 883.5 | 78.9 | 1,765 | 482 | 0.27 | 0.55 |
| Capacity - 1,428 MWe | 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 |

[6] Fort Calhoun ceased power generation in October 2016 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 per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **GRAND GULF** (continued) | 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 | 303.695 | 0.22 | 0.29 |
| | 1999 | 962.1 | 81.3 | 1,180 | 226.277 | 0.19 | 0.23 |
| | 2000 | 1,217.5 | 99.4 | 289 | 34.877 | 0.12 | 0.03 |
| | 2001 | 1,129.8 | 93.0 | 1,109 | 185.214 | 0.17 | 0.16 |
| | 2002 | 1,145.0 | 93.6 | 1,060 | 176.396 | 0.17 | 0.15 |
| | 2003 | 1,241.2 | 98.6 | 290 | 31.250 | 0.11 | 0.03 |
| | 2004 | 1,165.2 | 92.2 | 1,243 | 158.112 | 0.13 | 0.14 |
| | 2005 | 1,147.3 | 91.9 | 1,326 | 167.914 | 0.13 | 0.15 |
| | 2006 | 1,233.7 | 98.0 | 1,016 | 59.935 | 0.06 | 0.05 |
| | 2007 | 1,070.5 | 88.0 | 1,750 | 177.884 | 0.10 | 0.17 |
| | 2008 | 1,072.1 | 89.5 | 1,843 | 167.859 | 0.09 | 0.16 |
| | 2009 | 1,255.5 | 100.0 | 521 | 30.721 | 0.06 | 0.02 |
| | 2010 | 1,102.0 | 91.5 | 1,822 | 188.370 | 0.10 | 0.17 |
| | 2011 | 1,180.0 | 100.0 | 530 | 21.084 | 0.04 | 0.02 |
| | 2012 | 835.2 | 67.8 | 2,446 | 276.378 | 0.11 | 0.33 |
| | 2013 | 1,231.1 | 92.2 | 396 | 35.449 | 0.09 | 0.03 |
| | 2014 | 1,173.5 | 89.5 | 1,726 | 181.746 | 0.11 | 0.15 |
| | 2015 | 1,337.8 | 98.2 | 587 | 25.241 | 0.04 | 0.02 |
| | 2016 | 682.8 | 52.4 | 1,443 | 194.755 | 0.13 | 0.29 |
| | 2017 | 849.1 | 75.4 | 538 | 40.251 | 0.07 | 0.05 |
| | 2018 | 794.3 | 69.4 | 1,284 | 166.908 | 0.13 | 0.21 |
| **HADDAM NECK**[7] Docket 50-213; DPR-61 1st commercial operation 1/68 Type - PWR Capacity - (560) MWe | 1969 | 438.5 | --- | 138 | 106 | 0.77 | 0.24 |
| | 1970 | 424.7 | --- | 734 | 689 | 0.94 | 1.62 |
| | 1971 | 502.2 | --- | 289 | 342 | 1.18 | 0.68 |
| | 1972 | 515.6 | --- | 355 | 325 | 0.92 | 0.63 |
| | 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 |
| | 1997 | -1.3 | 0.0 | 219 | 11 | 0.05 | --- |
| | 1998 | 0.0 | 0.0 | 423 | 93.743 | 0.22 | --- |
| | 1999 | 0.0 | 0.0 | 545 | 108.602 | 0.20 | --- |
| | 2000 | 0.0 | 0.0 | 555 | 262.192 | 0.47 | --- |
| | 2001 | 0.0 | 0.0 | 361 | 95.348 | 0.26 | --- |
| | 2002 | 0.0 | 0.0 | 258 | 51.668 | 0.20 | --- |
| | 2003 | 0.0 | 0.0 | 400 | 82.022 | 0.21 | --- |
| | 2004 | 0.0 | 0.0 | 564 | 91.981 | 0.16 | --- |
| | 2005 | 0.0 | 0.0 | 350 | 36.479 | 0.10 | --- |
| | 2006 | 0.0 | 0.0 | 124 | 11.883 | 0.10 | --- |

[7] Haddam Neck (also known as Connecticut Yankee) ceased operations on December 4, 1996, 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 per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **HADDAM NECK**[7] | 2007 | 0.0 | 0.0 | 0 | 0.000 | --- | --- |
| (continued) | 2008 | 0.0 | 0.0 | 1 | 0.011 | 0.01 | --- |
| | 2009 | 0.0 | 0.0 | 1 | 0.010 | 0.01 | --- |
| | 2010 | 0.0 | 0.0 | 2 | 0.024 | 0.01 | --- |
| | 2011 | 0.0 | 0.0 | 6 | 0.364 | 0.06 | --- |
| | 2012 | 0.0 | 0.0 | 2 | 0.024 | 0.01 | --- |
| | 2013 | 0.0 | 0.0 | 9 | 0.182 | 0.02 | --- |
| | 2014 | 0.0 | 0.0 | 11 | 0.185 | 0.02 | --- |
| | 2015 | 0.0 | 0.0 | 13 | 0.204 | 0.02 | --- |
| | 2016 | 0.0 | 0.0 | 15 | 0.244 | 0.02 | --- |
| | 2017 | 0.0 | 0.0 | 11 | 0.182 | 0.02 | --- |
| | 2018 | 0.0 | 0.0 | 15 | 0.25 | 0.02 | --- |
| **HARRIS 1** | 1988 | 652.9 | 75.0 | 721 | 169 | 0.23 | 0.26 |
| Docket 50-400; | 1989 | 690.6 | 79.5 | 929 | 156 | 0.17 | 0.23 |
| NPF-63 | 1990 | 776.4 | 89.6 | 453 | 85 | 0.19 | 0.11 |
| 1st commercial operation 5/87 | 1991 | 724.8 | 81.5 | 872 | 226 | 0.26 | 0.31 |
| Type - PWR | 1992 | 661.8 | 74.9 | 930 | 213 | 0.23 | 0.32 |
| Capacity - 932 MWe | 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 | 133.497 | 0.14 | 0.17 |
| | 1999 | 827.0 | 97.9 | 247 | 15.538 | 0.06 | 0.02 |
| | 2000 | 783.0 | 92.5 | 888 | 100.981 | 0.11 | 0.13 |
| | 2001 | 611.2 | 72.4 | 1,586 | 252.241 | 0.16 | 0.41 |
| | 2002 | 892.0 | 99.4 | 145 | 6.674 | 0.05 | 0.01 |
| | 2003 | 823.9 | 93.2 | 786 | 68.463 | 0.09 | 0.08 |
| | 2004 | 797.9 | 88.2 | 747 | 57.103 | 0.08 | 0.07 |
| | 2005 | 902.9 | 99.5 | 164 | 8.483 | 0.05 | 0.01 |
| | 2006 | 802.4 | 89.0 | 917 | 87.225 | 0.10 | 0.11 |
| | 2007 | 845.1 | 94.0 | 870 | 64.808 | 0.07 | 0.08 |
| | 2008 | 890.4 | 97.4 | 192 | 10.356 | 0.05 | 0.01 |
| | 2009 | 845.1 | 92.7 | 742 | 41.401 | 0.06 | 0.05 |
| | 2010 | 808.3 | 89.0 | 1,069 | 82.578 | 0.08 | 0.10 |
| | 2011 | 926.0 | 100.0 | 157 | 4.724 | 0.03 | 0.01 |
| | 2012 | 810.8 | 87.4 | 1,066 | 79.845 | 0.07 | 0.10 |
| | 2013 | 786.3 | 85.4 | 861 | 54.874 | 0.06 | 0.07 |
| | 2014 | 918.8 | 97.5 | 52 | 1.275 | 0.02 | 0.00 |
| | 2015 | 830.2 | 88.4 | 875 | 57.978 | 0.07 | 0.07 |
| | 2016 | 857.7 | 91.1 | 687 | 43.876 | 0.06 | 0.05 |
| | 2017 | 937.1 | 99.7 | 12 | 0.217 | 0.02 | 0.00 |
| | 2018 | 866.2 | 90.0 | 596 | 31.736 | 0.05 | 0.04 |
| **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-5 | 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 - 876, 883 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 |

[7] Haddam Neck (also known as Connecticut Yankee) ceased operations on December 4, 1996, 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 per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **HATCH 1, 2** (continued) | 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 | 320.469 | 0.20 | 0.22 |
| | 1999 | 1,487.4 | 90.0 | 1,866 | 328.583 | 0.18 | 0.22 |
| | 2000 | 1,515.0 | 88.7 | 1,913 | 401.891 | 0.21 | 0.27 |
| | 2001 | 1,603.0 | 93.5 | 1,407 | 230.242 | 0.16 | 0.14 |
| | 2002 | 1,600.0 | 94.0 | 1,299 | 214.441 | 0.17 | 0.13 |
| | 2003 | 1,606.3 | 94.5 | 1,295 | 168.281 | 0.13 | 0.10 |
| | 2004 | 1,641.3 | 95.3 | 1,209 | 180.129 | 0.15 | 0.11 |
| | 2005 | 1,562.1 | 91.3 | 1,288 | 207.295 | 0.16 | 0.13 |
| | 2006 | 1,604.9 | 94.0 | 1,405 | 259.313 | 0.18 | 0.16 |
| | 2007 | 1,626.5 | 94.0 | 1,341 | 137.273 | 0.10 | 0.08 |
| | 2008 | 1,584.0 | 92.7 | 1,397 | 189.433 | 0.14 | 0.12 |
| | 2009 | 1,416.5 | 83.2 | 1,310 | 186.013 | 0.14 | 0.13 |
| | 2010 | 1,586.9 | 93.0 | 1,734 | 245.797 | 0.14 | 0.15 |
| | 2011 | 1,550.4 | 93.1 | 1,681 | 176.976 | 0.11 | 0.11 |
| | 2012 | 1,637.5 | 94.5 | 1,592 | 191.189 | 0.12 | 0.12 |
| | 2013 | 1,578.1 | 92.1 | 1,348 | 140.994 | 0.10 | 0.09 |
| | 2014 | 1,656.4 | 95.6 | 1,608 | 189.428 | 0.12 | 0.11 |
| | 2015 | 1,654.9 | 95.6 | 1,584 | 83.419 | 0.05 | 0.05 |
| | 2016 | 1,672.1 | 95.8 | 1,669 | 222.865 | 0.13 | 0.13 |
| | 2017 | 1,658.8 | 95.7 | 1,126 | 101.422 | 0.09 | 0.06 |
| | 2018 | 1,644.2 | 95.9 | 1,297 | 139.368 | 0.11 | 0.08 |
| **HOPE CREEK 1** Docket 50-354; NPF-57 1st commercial operation 12/86 Type - BWR Capacity - 1,172 MWe | 1987 | 869.2 | 86.4 | 589 | 117 | 0.20 | 0.13 |
| | 1988 | 832.7 | 80.7 | 1,734 | 287 | 0.17 | 0.34 |
| | 1989 | 791.1 | 77.8 | 1,873 | 465 | 0.25 | 0.59 |
| | 1990 | 966.4 | 91.6 | 1,394 | 196 | 0.14 | 0.20 |
| | 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 |
| | 1997 | 731.8 | 77.8 | 1,747 | 350 | 0.20 | 0.48 |
| | 1998 | 993.2 | 98.0 | 620 | 54.816 | 0.09 | 0.06 |
| | 1999 | 879.1 | 86.7 | 1,111 | 279.063 | 0.25 | 0.32 |
| | 2000 | 827.8 | 87.9 | 1,236 | 188.295 | 0.15 | 0.23 |
| | 2001 | 918.2 | 91.1 | 1,532 | 156.180 | 0.10 | 0.17 |
| | 2002 | 1,007.0 | 99.2 | 220 | 25.922 | 0.12 | 0.03 |
| | 2003 | 826.6 | 84.6 | 1,597 | 139.295 | 0.09 | 0.17 |
| | 2004 | 688.6 | 71.3 | 2,440 | 239.540 | 0.10 | 0.35 |
| | 2005 | 874.9 | 88.6 | 881 | 67.063 | 0.08 | 0.08 |
| | 2006 | 983.8 | 93.0 | 2,135 | 133.570 | 0.06 | 0.14 |
| | 2007 | 929.3 | 91.0 | 2,221 | 191.068 | 0.09 | 0.21 |
| | 2008 | 1,139.1 | 100.0 | 999 | 34.510 | 0.03 | 0.03 |
| | 2009 | 1,111.4 | 93.3 | 2,090 | 169.362 | 0.08 | 0.15 |
| | 2010 | 1,082.0 | 92.1 | 1,985 | 160.910 | 0.08 | 0.15 |
| | 2011 | 1,199.3 | 99.4 | 426 | 24.677 | 0.06 | 0.02 |
| | 2012 | 1,091.3 | 93.4 | 2,207 | 153.866 | 0.07 | 0.14 |
| | 2013 | 1,040.3 | 89.7 | 2,019 | 150.568 | 0.07 | 0.14 |
| | 2014 | 1,187.9 | 98.8 | 853 | 36.543 | 0.04 | 0.03 |
| | 2015 | 1,078.9 | 91.7 | 2,915 | 169.862 | 0.06 | 0.16 |
| | 2016 | 1,100.4 | 92.8 | 1,661 | 139.883 | 0.08 | 0.13 |
| | 2017 | 1,216.7 | 100.0 | 412 | 31.919 | 0.08 | 0.03 |
| | 2018 | 1,094.0 | 92.6 | 1,593 | 150.044 | 0.09 | 0.14 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **HUMBOLDT BAY**[8] | 1969 | 44.6 | --- | 125 | 164 | 1.31 | 3.68 |
| Docket 50-133; | 1970 | 49.3 | --- | 115 | 209 | 1.82 | 4.24 |
| DPR-7 | 1971 | 39.6 | --- | 140 | 292 | 2.09 | 7.37 |
| 1st commercial operation 8/63 | 1972 | 43.1 | --- | 127 | 253 | 1.99 | 5.87 |
| Type - BWR | 1973 | 50.1 | --- | 210 | 266 | 1.27 | 5.31 |
| Capacity - (63) MWe | 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 | --- |
| | 1984 | | | "Data not available" | | | |
| | 1985 | 0.0 | 0.0 | 178 | 51 | 0.29 | --- |
| | 1986 | 0.0 | 0.0 | 115 | 50 | 0.43 | --- |
| | 1987 | | | "Data not available" | | | |
| | 1988 | 0.0 | 0.0 | 10 | 1 | 0.10 | --- |
| | 1989 | 0.0 | 0.0 | 0 | 0 | 0.00 | --- |
| | 1990 | 0.0 | 0.0 | 0 | 0 | 0.00 | --- |
| | 1991 | 0.0 | 0.0 | 0 | 0 | 0.00 | --- |
| | 1992 | 0.0 | 0.0 | 8 | 0 | 0.00 | --- |
| | 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 | 0.929 | 0.02 | --- |
| | 1999 | 0.0 | 0.0 | 28 | 0.720 | 0.03 | --- |
| | 2000 | 0.0 | 0.0 | 20 | 0.911 | 0.05 | --- |
| | 2001 | 0.0 | 0.0 | 10 | 0.360 | 0.04 | --- |
| | 2002 | 0.0 | 0.0 | 18 | 1.504 | 0.08 | --- |
| | 2003 | 0.0 | 0.0 | 14 | 0.351 | 0.03 | --- |
| | 2004 | 0.0 | 0.0 | 11 | 0.454 | 0.04 | --- |
| | 2005 | 0.0 | 0.0 | 11 | 0.547 | 0.05 | --- |
| | 2006 | 0.0 | 0.0 | 40 | 4.086 | 0.10 | --- |
| | 2007 | 0.0 | 0.0 | 45 | 3.271 | 0.07 | --- |
| | 2008 | 0.0 | 0.0 | 56 | 2.051 | 0.04 | --- |
| | 2009 | 0.0 | 0.0 | 30 | 0.631 | 0.02 | --- |
| | 2010 | 0.0 | 0.0 | 136 | 7.691 | 0.06 | --- |
| | 2011 | 0.0 | 0.0 | 158 | 6.709 | 0.04 | --- |
| | 2012 | 0.0 | 0.0 | 156 | 15.859 | 0.10 | --- |
| | 2013 | 0.0 | 0.0 | 172 | 24.121 | 0.14 | --- |
| | 2014 | 0.0 | 0.0 | 125 | 12.381 | 0.10 | --- |
| | 2015 | 0.0 | 0.0 | 54 | 4.391 | 0.08 | --- |
| | 2016 | 0.0 | 0.0 | 0 | 0.000 | --- | --- |
| | 2017 | 0.0 | 0.0 | 0 | 0.000 | --- | --- |
| | 2018 | 0.0 | 0.0 | 0 | 0.000 | --- | --- |
| **INDIAN POINT 1**[9]**, 2, 3**[10] | 1969 | 206.2 | --- | --- | 298 | --- | 1.45 |
| Docket 50-3, 50-247, 50-286; | 1970 | 43.3 | --- | --- | 1,639 | --- | 37.85 |
| DPR-5, DPR-26, DPR-64 | 1971 | 154.0 | --- | --- | 768 | --- | 4.99 |
| 1st commercial operation | 1972 | 142.3 | --- | --- | 967 | --- | 6.80 |
| 8/62, 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), 998, 1,030 MWe | 1975 | 584.4 | 74.8 | 891 | 705 | 0.79 | 1.21 |

[8] Humboldt Bay had been shut down since 1976, and in 1983, PG&E announced its intention to decommission the unit. Therefore, it is no longer included in the count of operating reactors. Parentheses indicate plant capacity when plant was operational.

[9] Indian Point 1 was shut down October 31, 1974. All spent fuel was removed from the reactor vessel by January 1976. Therefore, it is no longer included in the count of operating reactors. Parentheses indicate plant capacity when plant was operational.

[10] Indian Point 3 was purchased by a different utility in 1979 and subsequently reported its dose separately. Indian Point 1, 2, and 3 have been owned by the same utility since 2001 and report together.

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **INDIAN POINT 1[9], 2, 3[10]** | 1976 | 273.9 | 34.8 | 1,590 | 1,950 | 1.23 | 7.12 |
| (continued) | 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[9], 2** | 1979 | 574.0 | 71.4 | 1,349 | 1,279 | 0.95 | 2.23 |
| Docket 50-3, 50-247; | 1980 | 510.8 | 64.8 | 1,577 | 971 | 0.62 | 1.90 |
| DPR-5, DPR-26 | 1981 | 367.5 | 46.0 | 2,595 | 2,731 | 1.05 | 7.43 |
| 1st commercial operation | 1982 | 532.4 | 65.4 | 2,144 | 1,635 | 0.76 | 3.07 |
| 10/62, 8/74 | 1983 | 702.6 | 84.0 | 1,057 | 486 | 0.46 | 0.69 |
| Type - PWRs | 1984 | 416.7 | 51.9 | 2,919 | 2,644 | 0.91 | 6.35 |
| Capacity - (265), 998 MWe | 1985 | 791.4 | 95.7 | 708 | 192 | 0.27 | 0.24 |
| | 1986 | 457.5 | 56.2 | 1,926 | 1,250 | 0.65 | 2.73 |
| | 1987 | 611.4 | 73.4 | 1,980 | 1,217 | 0.61 | 1.99 |
| | 1988 | 719.3 | 86.9 | 890 | 235 | 0.26 | 0.33 |
| | 1989 | 532.5 | 64.6 | 2,093 | 1,436 | 0.69 | 2.70 |
| | 1990 | 618.0 | 66.6 | 1,061 | 608 | 0.57 | 0.98 |
| | 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 | 289.600 | 0.25 | 1.02 |
| | 1999 | 831.8 | 88.2 | 350 | 40.931 | 0.12 | 0.05 |
| | 2000 | 115.4 | 13.0 | 2,003 | 567.224 | 0.28 | 4.92 |
| | 2001 | 887.2 | 97.2 | 399 | 22.067 | 0.06 | 0.02 |
| | 2002 | 860.0 | 91.3 | 1,361 | 248.487 | 0.18 | 0.29 |
| | 2003 | 953.0 | 98.9 | 241 | 11.778 | 0.05 | 0.01 |
| | 2004 | 0.0 | 0.0 | 156 | 3 | 0.02 | --- |
| **INDIAN POINT 1[9]** | 2005 | 0.0 | 0.0 | 151 | 6.692 | 0.04 | --- |
| Docket 50-3; | 2006 | 0.0 | 0.0 | 193 | 7.670 | 0.04 | --- |
| DPR-05 | 2007 | 0.0 | 0.0 | 210 | 2.554 | 0.01 | --- |
| 1st commercial operation 10/62 | 2008 | 0.0 | 0.0 | 234 | 4.322 | 0.02 | --- |
| Type - PWR | 2009 | 0.0 | 0.0 | 140 | 0.404 | 0.00 | --- |
| Capacity - (265) MWe | 2010 | 0.0 | 0.0 | 157 | 0.833 | 0.01 | --- |
| | 2011 | 0.0 | 0.0 | 103 | 0.262 | 0.00 | --- |
| | 2012 | 0.0 | 0.0 | 106 | 0.343 | 0.00 | --- |
| | 2013 | 0.0 | 0.0 | 3 | 0.283 | 0.09 | --- |
| **INDIAN POINT 3[10]** | 1979 | 574.0 | 66.5 | 808 | 636 | 0.79 | 1.11 |
| Docket 50-286; | 1980 | 367.3 | 53.2 | 977 | 308 | 0.32 | 0.84 |
| DPR-64 | 1981 | 367.5 | 59.8 | 677 | 364 | 0.54 | 0.99 |
| 1st commercial operation 8/76 | 1982 | 171.5 | 22.5 | 1,477 | 1,226 | 0.83 | 7.15 |
| Type - PWR | 1983 | 7.8 | 2.6 | 941 | 607 | 0.65 | 77.82 |
| Capacity - 1,030 MWe | 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 | 14.774 | 0.07 | 0.02 |

[9] 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.

[10] Indian Point 3 was purchased by a different utility in 1979 and subsequently reported its dose separately. Indian Point 1, 2, and 3 have been owned by the same utility since 2001 and report together.

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **INDIAN POINT 3**[10] | 1999 | 829.8 | 88.3 | 893 | 116.920 | 0.13 | 0.14 |
| (continued) | 2000 | 960.0 | 99.3 | 143 | 8.693 | 0.06 | 0.01 |
| | 2001 | 903.9 | 93.1 | 1,014 | 118.115 | 0.12 | 0.13 |
| | 2002 | 960.0 | 98.5 | 156 | 6.797 | 0.04 | 0.01 |
| | 2003 | 866.2 | 89.8 | 902 | 96.059 | 0.11 | 0.11 |
| **INDIAN POINT 2, 3**[10] | 2004 | 1,851.1 | 191.0 | 1,370 | 199.862 | 0.15 | 0.11 |
| Docket 50-247, 50-286; | 2005 | 1,922.2 | 191.7 | 1,363 | 85.280 | 0.06 | 0.04 |
| DPR-26, DPR-64 | 2006 | 1,936.0 | 191.0 | 1,634 | 289.701 | 0.18 | 0.15 |
| 1st commercial operation | 2007 | 1,899.3 | 188.0 | 1,971 | 109.969 | 0.06 | 0.06 |
| 8/74, 8/76 | 2008 | 1,977.2 | 192.6 | 1,456 | 142.728 | 0.10 | 0.07 |
| Type - PWRs | 2009 | 1,884.2 | 187.5 | 1,853 | 79.090 | 0.04 | 0.04 |
| Capacity - 998, 1,030 MWe | 2010 | 1,859.2 | 183.6 | 1,962 | 200.382 | 0.10 | 0.11 |
| | 2011 | 1,938.8 | 95.1 | 1,185 | 63.267 | 0.05 | 0.03 |
| | 2012 | 1,921.0 | 94.7 | 1,289 | 109.807 | 0.09 | 0.06 |
| | 2013 | 1,946.6 | 95.6 | 1,297 | 74.038 | 0.06 | 0.04 |
| | 2014 | 1,973.1 | 96.5 | 1,313 | 142.195 | 0.11 | 0.07 |
| | 2015 | 1,870.1 | 92.6 | 1,277 | 60.475 | 0.05 | 0.03 |
| | 2016 | 1,723.7 | 85.9 | 958 | 72.915 | 0.08 | 0.04 |
| | 2017 | 1,740.7 | 86.6 | 1,899 | 102.735 | 0.05 | 0.06 |
| | 2018 | 1,863.6 | 92.0 | 1,624 | 88.211 | 0.05 | 0.05 |
| **KEWAUNEE**[11] | 1975 | 401.9 | 88.2 | 104 | 28 | 0.27 | 0.07 |
| Docket 50-305; | 1976 | 405.9 | 78.9 | 381 | 270 | 0.71 | 0.67 |
| DPR-43 | 1977 | 425.0 | 79.9 | 312 | 140 | 0.45 | 0.33 |
| 1st commercial operation 6/74 | 1978 | 466.6 | 89.5 | 335 | 154 | 0.46 | 0.33 |
| Type - PWR | 1979 | 412.0 | 79.0 | 343 | 127 | 0.37 | 0.31 |
| Capacity - (556) MWe | 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 |
| | 1997 | 269.8 | 56.0 | 278 | 56 | 0.20 | 0.21 |
| | 1998 | 423.0 | 87.2 | 384 | 88.205 | 0.23 | 0.21 |
| | 1999 | 505.1 | 100.0 | 103 | 5.055 | 0.05 | 0.01 |
| | 2000 | 432.6 | 88.8 | 394 | 99.864 | 0.25 | 0.23 |
| | 2001 | 394.1 | 80.8 | 1,110 | 200.245 | 0.18 | 0.51 |
| | 2002 | 509.0 | 97.4 | 102 | 4.449 | 0.04 | 0.01 |
| | 2003 | 473.5 | 90.5 | 439 | 73.108 | 0.17 | 0.15 |
| | 2004 | 441.0 | 81.0 | 565 | 91.168 | 0.16 | 0.21 |
| | 2005 | 346.4 | 62.7 | 97 | 4.000 | 0.04 | 0.01 |
| | 2006 | 419.4 | 77.0 | 539 | 74.734 | 0.14 | 0.18 |
| | 2007 | 528.0 | 95.0 | 145 | 11.126 | 0.08 | 0.02 |
| | 2008 | 499.5 | 88.9 | 598 | 92.951 | 0.16 | 0.19 |
| | 2009 | 515.4 | 92.0 | 595 | 56.215 | 0.09 | 0.11 |
| | 2010 | 569.7 | 100.0 | 135 | 4.690 | 0.03 | 0.01 |
| | 2011 | 524.5 | 92.3 | 757 | 79.396 | 0.10 | 0.15 |
| | 2012 | 514.1 | 90.9 | 585 | 39.093 | 0.07 | 0.08 |
| | 2013 | 0.0 | 0.0 | 114 | 4.915 | 0.04 | --- |
| | 2014 | 0.0 | 0.0 | 57 | 1.964 | 0.03 | --- |

[10] Indian Point 3 was purchased by a different utility in 1979 and subsequently reported its dose separately. Indian Point 1, 2, and 3 have been owned by the same utility since 2001 and report together.

[11] Kewaunee ceased operations in May 2013 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 per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **KEWAUNEE**[11] | 2015 | 0.0 | 0.0 | 7 | 0.156 | 0.02 | --- |
| (continued) | 2016 | 0.0 | 0.0 | 5 | 0.092 | 0.02 | --- |
| | 2017 | 0.0 | 0.0 | 64 | 6.167 | 0.10 | --- |
| | 2018 | 0.0 | 0.0 | 8 | 1.002 | 0.13 | --- |
| **LA CROSSE**[12] | 1970 | 15.3 | --- | --- | 111 | --- | 7.25 |
| Docket 50-409; | 1971 | 33.1 | --- | 218 | 158 | 0.72 | 4.77 |
| DPR-45 | 1972 | 29.2 | --- | 151 | 172 | 1.14 | 5.89 |
| 1st commercial operation 11/69 | 1973 | 24.4 | --- | 157 | 221 | 1.41 | 9.06 |
| Type - BWR | 1974 | 37.9 | 81.0 | 115 | 139 | 1.21 | 3.67 |
| Capacity - (48) MWe | 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 | --- |
| | 1988 | 0.0 | 0.0 | 49 | 31 | 0.63 | --- |
| | 1989 | 0.0 | 0.0 | 60 | 15 | 0.25 | --- |
| | 1990 | 0.0 | 0.0 | 51 | 9 | 0.18 | --- |
| | 1991 | 0.0 | 0.0 | 42 | 8 | 0.19 | --- |
| | 1992 | 0.0 | 0.0 | 28 | 6 | 0.21 | --- |
| | 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 | 0.16 | --- |
| | 1997 | 0.0 | 0.0 | 23 | 2 | 0.09 | --- |
| | 1998 | 0.0 | 0.0 | 27 | 1.530 | 0.06 | --- |
| | 1999 | 0.0 | 0.0 | 66 | 3.725 | 0.06 | --- |
| | 2000 | 0.0 | 0.0 | 37 | 3.548 | 0.10 | --- |
| | 2001 | 0.0 | 0.0 | 45 | 2.782 | 0.06 | --- |
| | 2002 | 0.0 | 0.0 | 47 | 2.314 | 0.05 | --- |
| | 2003 | 0.0 | 0.0 | 65 | 1.836 | 0.03 | --- |
| | 2004 | 0.0 | 0.0 | 56 | 0.918 | 0.02 | --- |
| | 2005 | 0.0 | 0.0 | 51 | 8.139 | 0.16 | --- |
| | 2006 | 0.0 | 0.0 | 0 | 0.000 | --- | --- |
| | 2007 | 0.0 | 0.0 | 86 | 37.092 | 0.43 | --- |
| | 2008 | 0.0 | 0.0 | 40 | 1.759 | 0.04 | --- |
| | 2009 | 0.0 | 0.0 | 48 | 1.307 | 0.03 | --- |
| | 2010 | 0.0 | 0.0 | 78 | 2.971 | 0.04 | --- |
| | 2011 | 0.0 | 0.0 | 110 | 5.296 | 0.05 | --- |
| | 2012 | 0.0 | 0.0 | 100 | 7.652 | 0.08 | --- |
| | 2013 | 0.0 | 0.0 | 51 | 3.411 | 0.07 | --- |
| | 2014 | 0.0 | 0.0 | 59 | 5.499 | 0.09 | --- |
| | 2015 | 0.0 | 0.0 | 22 | 1.587 | 0.07 | --- |
| | 2016 | 0.0 | 0.0 | 34 | 3.904 | 0.11 | --- |
| | 2017 | 0.0 | 0.0 | 58 | 6.356 | 0.11 | --- |
| | 2018 | 0.0 | 0.0 | 21 | 0.633 | 0.03 | --- |
| **LASALLE 1, 2** | 1984 | 677.8 | 77.8 | 1,245 | 252 | 0.20 | 0.37 |
| Docket 50-373, 50-374; | 1985 | 987.9 | 53.0 | 1,635 | 685 | 0.42 | 0.69 |
| NPF-11, NPF-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 - 1,111, 1,111 MWe | 1990 | 1,754.3 | 84.6 | 1,830 | 948 | 0.52 | 0.54 |

[11] Kewaunee ceased operations in May 2013 and is no longer included in the count of operating reactors. Parentheses indicate plant capacity when plant was operational.

[12] La Crosse ceased operations 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 per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **LASALLE 1, 2** (continued) | 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 | 422.249 | 0.20 | 1.11 |
| | 1999 | 1,671.9 | 81.8 | 2,689 | 576.354 | 0.21 | 0.34 |
| | 2000 | 2,138.6 | 97.1 | 1,831 | 260.320 | 0.14 | 0.12 |
| | 2001 | 2,223.8 | 98.9 | 535 | 82.721 | 0.15 | 0.04 |
| | 2002 | 2,040.0 | 92.1 | 2,012 | 449.587 | 0.22 | 0.22 |
| | 2003 | 2,100.2 | 94.8 | 2,253 | 464.427 | 0.21 | 0.22 |
| | 2004 | 2,162.1 | 96.0 | 2,366 | 359.470 | 0.15 | 0.17 |
| | 2005 | 2,130.4 | 95.0 | 2,097 | 334.558 | 0.16 | 0.16 |
| | 2006 | 2,181.3 | 97.0 | 2,006 | 248.454 | 0.12 | 0.11 |
| | 2007 | 2,166.7 | 98.0 | 1,953 | 228.373 | 0.12 | 0.11 |
| | 2008 | 2,145.8 | 96.4 | 2,402 | 217.567 | 0.09 | 0.10 |
| | 2009 | 2,141.0 | 95.7 | 1,986 | 296.659 | 0.15 | 0.14 |
| | 2010 | 2,184.1 | 96.5 | 2,386 | 384.434 | 0.16 | 0.18 |
| | 2011 | 2,198.2 | 96.1 | 2,805 | 340.529 | 0.12 | 0.15 |
| | 2012 | 2,230.8 | 96.9 | 1,973 | 224.711 | 0.11 | 0.10 |
| | 2013 | 2,141.6 | 94.1 | 1,960 | 383.622 | 0.20 | 0.18 |
| | 2014 | 2,141.0 | 94.0 | 2,151 | 366.524 | 0.17 | 0.17 |
| | 2015 | 2,132.9 | 95.7 | 2,492 | 501.666 | 0.20 | 0.24 |
| | 2016 | 2,185.5 | 96.0 | 2,653 | 338.985 | 0.13 | 0.16 |
| | 2017 | 2,158.5 | 94.5 | 2,824 | 570.389 | 0.20 | 0.26 |
| | 2018 | 2,214.7 | 96.3 | 2,923 | 349.268 | 0.12 | 0.16 |
| **LIMERICK 1, 2**<br>Docket 50-352, 50-353;<br>NPF-39, NPF-85<br>1st commercial operation<br>2/86, 1/90<br>Type - BWRs<br>Capacity - 1,099, 1,108 MWe | 1987 | 636.1 | 70.2 | 2,156 | 174 | 0.08 | 0.27 |
| | 1988 | 794.9 | 96.5 | 950 | 52 | 0.05 | 0.07 |
| | 1989 | 628.4 | 66.0 | 1,818 | 266 | 0.15 | 0.42 |
| | 1990 | 1,527.7 | 78.2 | 1,422 | 175 | 0.12 | 0.11 |
| | 1991 | 1,810.9 | 86.8 | 1,151 | 106 | 0.09 | 0.06 |
| | 1992 | 1,741.4 | 84.8 | 1,559 | 330 | 0.21 | 0.19 |
| | 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 | 357.139 | 0.19 | 0.19 |
| | 1999 | 2,089.6 | 94.2 | 1,800 | 271.547 | 0.15 | 0.13 |
| | 2000 | 2,154.9 | 95.8 | 1,279 | 260.611 | 0.20 | 0.12 |
| | 2001 | 2,205.9 | 97.3 | 1,127 | 210.336 | 0.19 | 0.10 |
| | 2002 | 2,197.0 | 97.1 | 1,248 | 160.324 | 0.13 | 0.07 |
| | 2003 | 2,213.6 | 97.2 | 1,298 | 147.047 | 0.11 | 0.07 |
| | 2004 | 2,218.9 | 97.6 | 1,265 | 149.433 | 0.12 | 0.07 |
| | 2005 | 2,168.9 | 96.3 | 1,460 | 187.609 | 0.13 | 0.09 |
| | 2006 | 2,207.2 | 97.0 | 1,509 | 193.429 | 0.13 | 0.09 |
| | 2007 | 2,185.8 | 96.0 | 1,570 | 197.104 | 0.13 | 0.09 |
| | 2008 | 2,169.2 | 96.0 | 1,393 | 176.825 | 0.13 | 0.08 |
| | 2009 | 2,211.4 | 97.2 | 1,606 | 234.742 | 0.15 | 0.11 |
| | 2010 | 2,165.2 | 96.7 | 1,525 | 167.797 | 0.11 | 0.08 |
| | 2011 | 2,112.7 | 94.5 | 2,007 | 184.415 | 0.09 | 0.09 |
| | 2012 | 2,071.4 | 92.8 | 2,011 | 159.812 | 0.08 | 0.08 |
| | 2013 | 2,235.7 | 96.8 | 1,663 | 133.531 | 0.08 | 0.06 |
| | 2014 | 2,182.1 | 94.8 | 1,523 | 138.396 | 0.09 | 0.06 |
| | 2015 | 2,165.6 | 95.9 | 1,516 | 124.787 | 0.08 | 0.06 |
| | 2016 | 2,219.1 | 96.3 | 1,626 | 126.799 | 0.08 | 0.06 |
| | 2017 | 2,123.1 | 93.4 | 1,808 | 183.736 | 0.10 | 0.09 |
| | 2018 | 2,214.9 | 97.2 | 1,676 | 121.053 | 0.07 | 0.05 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **MAINE YANKEE**[13] | 1973 | 408.7 | --- | 782 | 117 | 0.15 | 0.29 |
| Docket 50-309; | 1974 | 432.6 | 68.7 | 619 | 420 | 0.68 | 0.97 |
| DPR-36 | 1975 | 542.9 | 79.9 | 440 | 319 | 0.73 | 0.59 |
| 1st commercial operation 12/72 | 1976 | 712.2 | 95.0 | 244 | 85 | 0.35 | 0.12 |
| Type - PWR | 1977 | 617.6 | 82.2 | 508 | 245 | 0.48 | 0.40 |
| Capacity - (860) MWe | 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 | 163.008 | 0.37 | --- |
| | 1999 | 0.0 | 0.0 | 365 | 135.057 | 0.37 | --- |
| | 2000 | 0.0 | 0.0 | 490 | 121.133 | 0.25 | --- |
| | 2001 | 0.0 | 0.0 | 412 | 68.121 | 0.17 | --- |
| | 2002 | 0.0 | 0.0 | 452 | 66.226 | 0.15 | --- |
| | 2003 | 0.0 | 0.0 | 342 | 43.775 | 0.13 | --- |
| | 2004 | 0.0 | 0.0 | 190 | 21.313 | 0.11 | --- |
| | 2005 | 0.0 | 0.0 | 2 | 0.048 | 0.02 | --- |
| | 2006 | 0.0 | 0.0 | 0 | 0.000 | --- | --- |
| | 2007 | 0.0 | 0.0 | 0 | 0.000 | --- | --- |
| | 2008 | 0.0 | 0.0 | 1 | 0.013 | 0.01 | --- |
| | 2009 | 0.0 | 0.0 | 3 | 0.137 | 0.05 | --- |
| | 2010 | 0.0 | 0.0 | 1 | 0.084 | 0.08 | --- |
| | 2011 | 0.0 | 0.0 | 2 | 0.060 | 0.03 | --- |
| | 2012 | 0.0 | 0.0 | 6 | 0.238 | 0.04 | --- |
| | 2013 | 0.0 | 0.0 | 4 | 0.186 | 0.05 | --- |
| | 2014 | 0.0 | 0.0 | 3 | 0.079 | 0.03 | --- |
| | 2015 | 0.0 | 0.0 | 9 | 0.176 | 0.02 | --- |
| | 2016 | 0.0 | 0.0 | 2 | 0.038 | 0.02 | --- |
| | 2017 | 0.0 | 0.0 | 3 | 0.054 | 0.02 | --- |
| | 2018 | 0.0 | 0.0 | 6 | 0.089 | 0.01 | --- |
| **MCGUIRE 1, 2** | 1982 | 524.9 | 80.4 | 1,560 | 169 | 0.11 | 0.32 |
| Docket 50-369, 50-370; | 1983 | 558.3 | 55.4 | 1,751 | 521 | 0.30 | 0.93 |
| NPF-9, NPF-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 - 1,158, 1,158 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 |
| | 1993 | 1,470.4 | 66.2 | 1,685 | 463 | 0.27 | 0.31 |

[13] Maine Yankee ceased operations in August 1997 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 per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **MCGUIRE 1, 2** (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 | 142.245 | 0.14 | 0.07 |
| | 1999 | 1,961.7 | 88.9 | 1,274 | 256.524 | 0.20 | 0.13 |
| | 2000 | 2,100.1 | 94.2 | 940 | 132.513 | 0.14 | 0.06 |
| | 2001 | 2,113.3 | 93.9 | 963 | 136.581 | 0.14 | 0.06 |
| | 2002 | 2,051.0 | 91.7 | 1,167 | 180.618 | 0.15 | 0.09 |
| | 2003 | 2,156.2 | 96.0 | 841 | 71.323 | 0.08 | 0.03 |
| | 2004 | 2,075.7 | 91.8 | 1,116 | 196.193 | 0.18 | 0.09 |
| | 2005 | 1,993.9 | 89.2 | 1,401 | 173.972 | 0.12 | 0.09 |
| | 2006 | 2,100.2 | 93.0 | 1,218 | 108.285 | 0.09 | 0.05 |
| | 2007 | 2,011.4 | 89.0 | 1,375 | 156.035 | 0.11 | 0.08 |
| | 2008 | 1,943.3 | 86.2 | 1,613 | 165.767 | 0.10 | 0.09 |
| | 2009 | 2,170.6 | 95.3 | 1,165 | 79.773 | 0.07 | 0.04 |
| | 2010 | 2,151.9 | 94.8 | 1,225 | 81.321 | 0.07 | 0.04 |
| | 2011 | 2,038.3 | 89.9 | 1,648 | 119.637 | 0.07 | 0.06 |
| | 2012 | 2,045.6 | 90.4 | 1,222 | 62.690 | 0.05 | 0.03 |
| | 2013 | 2,157.3 | 94.4 | 1,447 | 109.423 | 0.08 | 0.05 |
| | 2014 | 2,008.0 | 87.0 | 1,760 | 138.257 | 0.08 | 0.07 |
| | 2015 | 2,230.1 | 95.5 | 1,074 | 49.399 | 0.05 | 0.02 |
| | 2016 | 2,269.9 | 96.1 | 1,201 | 67.654 | 0.06 | 0.03 |
| | 2017 | 2,145.6 | 92.0 | 1,607 | 147.589 | 0.09 | 0.07 |
| | 2018 | 2,267.4 | 96.2 | 881 | 40.005 | 0.05 | 0.02 |
| **MILLSTONE 1**[14] Docket 50-245; DPR-21 1st commercial operation 3/71 Type - BWR Capacity - (641) MWe | 1972 | 377.6 | --- | 612 | 596 | 0.97 | 1.58 |
| | 1973 | 225.1 | --- | 1,184 | 663 | 0.56 | 2.95 |
| | 1974 | 430.3 | 79.1 | 2,477 | 1,430 | 0.58 | 3.32 |
| | 1975 | 465.4 | 75.6 | 2,587 | 2,022 | 0.78 | 4.34 |
| | 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 | 12.741 | 0.04 | --- |
| | 1999 | 0.0 | 0.0 | 397 | 9.790 | 0.02 | --- |
| | 2000 | 0.0 | 0.0 | 478 | 59.955 | 0.13 | --- |
| | 2001 | 0.0 | 0.0 | 414 | 14.946 | 0.04 | --- |
| | 2002 | 0.0 | 0.0 | 185 | 4.151 | 0.02 | --- |
| | 2003 | 0.0 | 0.0 | 195 | 10.675 | 0.05 | --- |
| | 2004 | 0.0 | 0.0 | 147 | 11.152 | 0.08 | --- |
| | 2005 | 0.0 | 0.0 | 145 | 0.897 | 0.01 | --- |
| | 2006 | 0.0 | 0.0 | 4 | 0.607 | 0.15 | --- |

[14] Millstone 1 ceased operations in 1998 and is no longer included in the count of operating reactors. Parentheses indicate plant capacity when plant was operational. From 2008-2014, Millstone 1 voluntarily provided an estimate of the collective dose for Unit 1, but not the number of individuals with measurable dose.

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **MILLSTONE 1**[14] | 2007 | 0.0 | 0.0 | 33 | 0.901 | 0.03 | --- |
| (continued) | 2008 | 0.0 | 0.0 | 0 | 0.222 | --- | --- |
| | 2009 | 0.0 | 0.0 | 0 | 0.114 | --- | --- |
| | 2010 | 0.0 | 0.0 | 0 | 0.142 | --- | --- |
| | 2011 | 0.0 | 0.0 | 0 | 0.265 | --- | --- |
| | 2012 | 0.0 | 0.0 | 0 | 0.137 | --- | --- |
| | 2013 | 0.0 | 0.0 | 0 | 0.313 | --- | --- |
| | 2014 | 0.0 | 0.0 | 0 | 0.313 | --- | --- |
| | 2015 | 0.0 | 0.0 | 0 | 0.000 | --- | --- |
| | 2016 | 0.0 | 0.0 | 0 | 0.000 | --- | --- |
| | 2017 | 0.0 | 0.0 | 0 | 0.000 | --- | --- |
| | 2018 | 0.0 | 0.0 | 0 | 0.000 | --- | --- |
| **MILLSTONE 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 - 870, 1,210 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 |
| | 1993 | 1,525.2 | 79.7 | 2,064 | 557 | 0.27 | 0.37 |
| | 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 | 112.543 | 0.10 | 0.30 |
| | 1999 | 1,446.3 | 73.3 | 1,688 | 252.138 | 0.15 | 0.17 |
| | 2000 | 1,865.8 | 92.4 | 1,385 | 142.664 | 0.10 | 0.08 |
| | 2001 | 1,759.3 | 92.0 | 1,327 | 174.238 | 0.13 | 0.10 |
| | 2002 | 1,703.0 | 87.5 | 1,548 | 292.197 | 0.19 | 0.17 |
| | 2003 | 1,834.6 | 91.0 | 1,274 | 322.923 | 0.25 | 0.18 |
| | 2004 | 1,887.5 | 95.0 | 803 | 136.459 | 0.17 | 0.07 |
| | 2005 | 1,777.1 | 88.8 | 1,329 | 202.490 | 0.15 | 0.11 |
| | 2006 | 1,898.5 | 93.0 | 1,160 | 174.164 | 0.15 | 0.09 |
| | 2007 | 1,875.1 | 94.0 | 1,150 | 163.780 | 0.14 | 0.09 |
| | 2008 | 1,761.1 | 87.7 | 1,467 | 272.693 | 0.19 | 0.15 |
| | 2009 | 1,906.1 | 89.6 | 983 | 159.203 | 0.16 | 0.08 |
| | 2010 | 1,916.8 | 93.1 | 718 | 81.589 | 0.11 | 0.04 |
| | 2011 | 1,822.7 | 87.7 | 1,044 | 169.417 | 0.16 | 0.09 |
| | 2012 | 1,948.9 | 92.2 | 726 | 73.270 | 0.10 | 0.04 |
| | 2013 | 1,954.5 | 94.6 | 747 | 64.232 | 0.09 | 0.03 |
| | 2014 | 1,812.7 | 87.5 | 1,250 | 160.502 | 0.13 | 0.09 |
| | 2015 | 1,992.4 | 95.0 | 818 | 63.940 | 0.08 | 0.03 |
| | 2016 | 1,896.1 | 93.1 | 856 | 64.125 | 0.07 | 0.03 |
| | 2017 | 1,888.0 | 91.2 | 1,118 | 112.598 | 0.10 | 0.06 |
| | 2018 | 1,931.7 | 91.5 | 777 | 66.110 | 0.09 | 0.03 |
| **MONTICELLO** | 1972 | 424.4 | --- | 99 | 61 | 0.62 | 0.14 |
| Docket 50-263; | 1973 | 389.5 | --- | 401 | 176 | 0.44 | 0.45 |
| DPR-22 | 1974 | 349.3 | 74.9 | 842 | 349 | 0.41 | 1.00 |
| 1st commercial operation 6/71 | 1975 | 344.8 | 72.2 | 1,353 | 1,353 | 1.00 | 3.92 |
| Type - BWR | 1976 | 476.4 | 91.5 | 325 | 263 | 0.81 | 0.55 |
| Capacity - 628 MWe | 1977 | 425.6 | 79.9 | 860 | 1,000 | 1.16 | 2.35 |

[14] Millstone 1 ceased operations in 1998 and is no longer included in the count of operating reactors. Parentheses indicate plant capacity when plant was operational. From 2008-2014, Millstone 1 voluntarily provided an estimate of the collective dose for Unit 1, but not the number of individuals with measurable dose.

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **MONTICELLO** (continued) | 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 | 209.137 | 0.31 | 0.44 |
| | 1999 | 530.7 | 92.9 | 451 | 70.075 | 0.16 | 0.13 |
| | 2000 | 483.2 | 84.2 | 792 | 216.136 | 0.27 | 0.45 |
| | 2001 | 441.3 | 78.5 | 834 | 220.683 | 0.26 | 0.50 |
| | 2002 | 571.0 | 99.0 | 399 | 40.030 | 0.10 | 0.07 |
| | 2003 | 522.8 | 91.7 | 858 | 168.896 | 0.20 | 0.32 |
| | 2004 | 573.2 | 99.2 | 279 | 35.081 | 0.13 | 0.06 |
| | 2005 | 509.4 | 90.0 | 919 | 175.201 | 0.19 | 0.34 |
| | 2006 | 579.1 | 100.0 | 273 | 33.416 | 0.12 | 0.06 |
| | 2007 | 478.6 | 85.0 | 1,075 | 191.398 | 0.18 | 0.40 |
| | 2008 | 555.3 | 95.8 | 351 | 43.777 | 0.12 | 0.08 |
| | 2009 | 473.1 | 85.2 | 1,235 | 173.624 | 0.14 | 0.37 |
| | 2010 | 536.0 | 98.5 | 534 | 56.116 | 0.11 | 0.10 |
| | 2011 | 383.4 | 71.3 | 1,903 | 236.997 | 0.12 | 0.62 |
| | 2012 | 556.7 | 98.6 | 528 | 38.786 | 0.07 | 0.07 |
| | 2013 | 342.3 | 62.5 | 1,247 | 198.968 | 0.16 | 0.58 |
| | 2014 | 493.6 | 95.0 | 282 | 35.306 | 0.13 | 0.07 |
| | 2015 | 532.4 | 85.5 | 846 | 130.057 | 0.15 | 0.24 |
| | 2016 | 639.0 | 100.0 | 313 | 28.547 | 0.09 | 0.04 |
| | 2017 | 589.0 | 92.2 | 815 | 115.814 | 0.14 | 0.20 |
| | 2018 | 641.3 | 100.0 | 273 | 29.238 | 0.11 | 0.05 |
| **NINE MILE POINT 1, 2** Docket 50-220, 50-410; DPR-63; NPF-69 1st commercial operation 12/69, 4/88 Type - BWRs Capacity - 565, 1,277 MWe | 1970 | 227.0 | --- | 821 | 44 | 0.05 | 0.19 |
| | 1971 | 346.5 | --- | 1,006 | 195 | 0.19 | 0.56 |
| | 1972 | 381.8 | --- | 735 | 285 | 0.39 | 0.75 |
| | 1973 | 411.0 | --- | 550 | 567 | 1.03 | 1.38 |
| | 1974 | 385.9 | 70.5 | 740 | 824 | 1.11 | 2.14 |
| | 1975 | 359.0 | 72.1 | 649 | 681 | 1.05 | 1.90 |
| | 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 |
| | 1990 | 656.2 | 46.6 | 2,405 | 699 | 0.29 | 1.07 |
| | 1991 | 1,250.8 | 79.7 | 1,543 | 292 | 0.19 | 0.23 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **NINE MILE POINT 1, 2** (continued) | 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 | 378.484 | 0.22 | 0.27 |
| | 1999 | 1,409.5 | 81.3 | 1,709 | 446.699 | 0.26 | 0.32 |
| | 2000 | 1,443.9 | 88.1 | 1,783 | 282.838 | 0.16 | 0.20 |
| | 2001 | 1,506.9 | 88.9 | 1,371 | 343.197 | 0.25 | 0.23 |
| | 2002 | 1,517.0 | 90.4 | 2,449 | 516.663 | 0.21 | 0.34 |
| | 2003 | 1,585.6 | 91.4 | 1,501 | 374.775 | 0.25 | 0.24 |
| | 2004 | 1,551.9 | 92.0 | 1,362 | 448.509 | 0.33 | 0.29 |
| | 2005 | 1,656.5 | 94.5 | 1,366 | 401.719 | 0.29 | 0.24 |
| | 2006 | 1,647.1 | 96.0 | 1,130 | 229.551 | 0.20 | 0.14 |
| | 2007 | 1,598.3 | 93.0 | 1,826 | 329.307 | 0.18 | 0.21 |
| | 2008 | 1,642.1 | 95.8 | 1,391 | 301.824 | 0.22 | 0.18 |
| | 2009 | 1,706.2 | 97.1 | 1,456 | 237.552 | 0.16 | 0.14 |
| | 2010 | 1,627.1 | 95.2 | 1,703 | 375.424 | 0.22 | 0.23 |
| | 2011 | 1,616.8 | 92.5 | 1,362 | 244.395 | 0.18 | 0.15 |
| | 2012 | 1,504.6 | 87.3 | 1,764 | 407.900 | 0.23 | 0.27 |
| | 2013 | 1,804.9 | 95.0 | 1,411 | 217.056 | 0.15 | 0.12 |
| | 2014 | 1,737.8 | 94.7 | 1,483 | 263.710 | 0.18 | 0.15 |
| | 2015 | 1,823.7 | 95.7 | 1,604 | 160.380 | 0.10 | 0.09 |
| | 2016 | 1,765.5 | 95.1 | 1,679 | 256.794 | 0.15 | 0.15 |
| | 2017 | 1,827.3 | 97.2 | 1,401 | 141.150 | 0.10 | 0.08 |
| | 2018 | 1,758.9 | 95.8 | 1,905 | 385.491 | 0.20 | 0.22 |
| **NORTH ANNA 1, 2** Docket 50-338, 50-339; NPF-4, NPF-7 1st commercial operation 6/78, 12/80 Type - PWRs Capacity - 948, 944 MWe | 1979 | 507.0 | 61.7 | 2,025 | 449 | 0.22 | 0.89 |
| | 1980 | 681.8 | 86.5 | 2,086 | 218 | 0.10 | 0.32 |
| | 1981 | 1,241.9 | 71.5 | 2,416 | 680 | 0.28 | 0.55 |
| | 1982 | 777.7 | 45.8 | 2,872 | 1,915 | 0.67 | 2.46 |
| | 1983 | 1,338.4 | 76.1 | 2,228 | 665 | 0.30 | 0.50 |
| | 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 | 265.922 | 0.22 | 0.16 |
| | 1999 | 1,747.7 | 96.1 | 727 | 94.402 | 0.13 | 0.05 |
| | 2000 | 1,734.1 | 95.8 | 730 | 65.405 | 0.09 | 0.04 |
| | 2001 | 1,491.0 | 84.8 | 1,231 | 308.907 | 0.25 | 0.21 |
| | 2002 | 1,557.0 | 84.3 | 914 | 143.312 | 0.16 | 0.09 |
| | 2003 | 1,569.1 | 87.2 | 1,041 | 187.014 | 0.18 | 0.12 |
| | 2004 | 1,685.6 | 92.0 | 965 | 129.686 | 0.13 | 0.08 |
| | 2005 | 1,751.5 | 96.0 | 686 | 58.844 | 0.09 | 0.03 |
| | 2006 | 1,723.0 | 95.0 | 749 | 82.069 | 0.11 | 0.05 |
| | 2007 | 1,596.7 | 88.0 | 1,581 | 309.237 | 0.20 | 0.19 |
| | 2008 | 1,643.1 | 91.2 | 795 | 61.003 | 0.08 | 0.04 |
| | 2009 | 1,735.5 | 95.6 | 745 | 78.126 | 0.10 | 0.05 |
| | 2010 | 1,529.6 | 84.9 | 1,032 | 182.289 | 0.18 | 0.12 |
| | 2011 | 1,429.1 | 76.5 | 792 | 90.763 | 0.11 | 0.06 |
| | 2012 | 1,745.6 | 91.4 | 762 | 106.518 | 0.14 | 0.06 |
| | 2013 | 1,712.9 | 89.2 | 948 | 121.803 | 0.13 | 0.07 |
| | 2014 | 1,813.8 | 94.1 | 753 | 71.914 | 0.10 | 0.04 |
| | 2015 | 1,857.4 | 96.6 | 663 | 43.838 | 0.07 | 0.02 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **NORTH ANNA 1, 2** | 2016 | 1,726.2 | 90.0 | 1,109 | 119.339 | 0.11 | 0.07 |
| (continued) | 2017 | 1,840.9 | 95.6 | 678 | 44.884 | 0.07 | 0.02 |
| | 2018 | 1,826.2 | 95.1 | 796 | 56.845 | 0.07 | 0.03 |
| **OCONEE 1, 2, 3** | 1974 | 650.6 | 60.1 | 844 | 517 | 0.61 | 0.79 |
| Docket 50-269, 50-270, 50-287; | 1975 | 1,838.3 | 75.5 | 829 | 497 | 0.60 | 0.27 |
| DPR-38, DPR-47, DPR-55 | 1976 | 1,561.4 | 63.0 | 1,215 | 1,026 | 0.84 | 0.66 |
| 1st commercial operation | 1977 | 1,566.4 | 65.9 | 1,595 | 1,329 | 0.83 | 0.85 |
| 7/73, 9/74, 12/74 | 1978 | 1,909.0 | 75.8 | 1,636 | 1,393 | 0.85 | 0.73 |
| Type - PWRs | 1979 | 1,708.0 | 67.7 | 2,100 | 1,001 | 0.48 | 0.59 |
| Capacity - 847, 848, 859 MWe | 1980 | 1,703.7 | 70.1 | 2,124 | 1,055 | 0.50 | 0.62 |
| | 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 |
| | 1998 | 1,989.1 | 81.3 | 1,695 | 366.028 | 0.22 | 0.18 |
| | 1999 | 2,264.5 | 90.3 | 1,568 | 202.025 | 0.13 | 0.09 |
| | 2000 | 2,321.0 | 91.6 | 1,686 | 272.697 | 0.16 | 0.12 |
| | 2001 | 2,167.6 | 86.8 | 2,002 | 579.209 | 0.29 | 0.27 |
| | 2002 | 2,355.0 | 92.5 | 1,723 | 224.672 | 0.13 | 0.10 |
| | 2003 | 2,177.7 | 86.3 | 2,180 | 245.349 | 0.11 | 0.11 |
| | 2004 | 2,125.2 | 84.1 | 2,295 | 367.891 | 0.16 | 0.17 |
| | 2005 | 2,349.5 | 92.3 | 1,516 | 148.694 | 0.10 | 0.06 |
| | 2006 | 2,274.8 | 90.0 | 1,859 | 221.222 | 0.12 | 0.10 |
| | 2007 | 2,347.8 | 92.0 | 1,915 | 252.936 | 0.13 | 0.11 |
| | 2008 | 2298.5 | 90.9 | 1,924 | 186.335 | 0.10 | 0.08 |
| | 2009 | 2,385.7 | 92.6 | 1,830 | 180.868 | 0.10 | 0.08 |
| | 2010 | 2,391.1 | 93.3 | 1,953 | 193.088 | 0.10 | 0.08 |
| | 2011 | 2,321.6 | 90.7 | 2,142 | 182.261 | 0.09 | 0.08 |
| | 2012 | 2,351.0 | 91.8 | 1,777 | 131.442 | 0.07 | 0.06 |
| | 2013 | 2,400.1 | 93.1 | 1,549 | 106.414 | 0.07 | 0.04 |
| | 2014 | 2,419.3 | 94.1 | 2,005 | 109.011 | 0.05 | 0.05 |
| | 2015 | 2,504.5 | 97.4 | 1,339 | 69.050 | 0.05 | 0.03 |
| | 2016 | 2,417.5 | 93.9 | 1,179 | 53.398 | 0.05 | 0.02 |
| | 2017 | 2,488.4 | 96.7 | 966 | 37.301 | 0.04 | 0.01 |
| | 2018 | 2,430.8 | 94.4 | 1,141 | 57.201 | 0.05 | 0.02 |
| **OYSTER CREEK**[15] | 1970 | 413.6 | --- | 95 | 63 | 0.66 | 0.15 |
| Docket 50-219; | 1971 | 448.9 | --- | 249 | 240 | 0.96 | 0.53 |
| DPR-16 | 1972 | 515.0 | --- | 339 | 582 | 1.72 | 1.13 |
| 1st commercial operation 12/69 | 1973 | 424.6 | --- | 782 | 1,236 | 1.58 | 2.91 |
| Type - BWR | 1974 | 434.5 | 70.4 | 935 | 984 | 1.05 | 2.26 |
| Capacity - (619) MWe | 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 |

[15] Oyster Creek ceased operations in September 2018 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 per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **OYSTER CREEK**[15] (continued) | 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 | 308.323 | 0.22 | 0.63 |
| | 1999 | 615.1 | 100.0 | 466 | 41.664 | 0.09 | 0.07 |
| | 2000 | 444.9 | 83.3 | 2,044 | 614.379 | 0.30 | 1.38 |
| | 2001 | 595.0 | 97.6 | 442 | 45.817 | 0.10 | 0.08 |
| | 2002 | 573.0 | 94.0 | 1,468 | 265.810 | 0.18 | 0.46 |
| | 2003 | 598.4 | 97.2 | 416 | 43.363 | 0.10 | 0.07 |
| | 2004 | 551.8 | 91.6 | 1,346 | 226.880 | 0.17 | 0.41 |
| | 2005 | 611.9 | 99.5 | 316 | 27.813 | 0.09 | 0.05 |
| | 2006 | 530.2 | 90.0 | 1,443 | 189.950 | 0.13 | 0.36 |
| | 2007 | 579.7 | 97.0 | 464 | 46.590 | 0.10 | 0.08 |
| | 2008 | 531.0 | 91.0 | 1,511 | 211.932 | 0.14 | 0.40 |
| | 2009 | 568.3 | 96.4 | 382 | 37.272 | 0.10 | 0.07 |
| | 2010 | 525.7 | 89.9 | 1,655 | 206.284 | 0.12 | 0.39 |
| | 2011 | 604.8 | 98.0 | 434 | 46.984 | 0.11 | 0.08 |
| | 2012 | 537.1 | 88.5 | 1,359 | 165.164 | 0.12 | 0.31 |
| | 2013 | 584.1 | 96.5 | 299 | 29.981 | 0.10 | 0.05 |
| | 2014 | 551.8 | 91.2 | 1,160 | 145.487 | 0.13 | 0.26 |
| | 2015 | 602.3 | 97.7 | 275 | 22.710 | 0.08 | 0.04 |
| | 2016 | 523.4 | 87.5 | 1,286 | 133.603 | 0.10 | 0.26 |
| | 2017 | 619.8 | 99.5 | 249 | 17.511 | 0.07 | 0.03 |
| | 2018 | 0.0 | 0.0 | 357 | 37.887 | 0.11 | --- |
| **PALISADES** Docket 50-255; DPR-20 1st commercial operation 12/71 Type - PWR Capacity - 777 MWe | 1972 | 216.8 | --- | --- | 78 | --- | 0.36 |
| | 1973 | 286.8 | --- | 975 | 1,133 | 1.16 | 3.95 |
| | 1974 | 10.7 | 5.5 | 774 | 627 | 0.81 | 58.60 |
| | 1975 | 302.0 | 64.5 | 495 | 306 | 0.62 | 1.01 |
| | 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 |

[15] Oyster Creek ceased operations in September 2018 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 per Site (person-rem) | Average Measurable Dose (rem) | 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 | 216.563 | 0.24 | 0.35 |
| | 1999 | 585.4 | 80.2 | 939 | 218.451 | 0.23 | 0.37 |
| | 2000 | 654.4 | 88.0 | 255 | 26.305 | 0.10 | 0.04 |
| | 2001 | 268.2 | 36.3 | 1,032 | 362.723 | 0.35 | 1.35 |
| | 2002 | 725.0 | 94.8 | 224 | 24.380 | 0.11 | 0.03 |
| | 2003 | 701.1 | 90.7 | 822 | 202.571 | 0.25 | 0.29 |
| | 2004 | 608.6 | 82.3 | 974 | 370.895 | 0.38 | 0.61 |
| | 2005 | 756.6 | 98.0 | 156 | 10.459 | 0.07 | 0.01 |
| | 2006 | 675.5 | 86.0 | 882 | 239.652 | 0.27 | 0.35 |
| | 2007 | 665.6 | 85.0 | 1,065 | 256.632 | 0.24 | 0.39 |
| | 2008 | 778.4 | 98.2 | 272 | 23.478 | 0.09 | 0.03 |
| | 2009 | 698.5 | 89.0 | 975 | 267.295 | 0.27 | 0.38 |
| | 2010 | 712.5 | 90.8 | 908 | 219.873 | 0.24 | 0.31 |
| | 2011 | 758.1 | 96.5 | 340 | 21.654 | 0.06 | 0.03 |
| | 2012 | 589.5 | 77.1 | 1,096 | 245.129 | 0.22 | 0.42 |
| | 2013 | 689.7 | 86.7 | 339 | 15.830 | 0.05 | 0.02 |
| | 2014 | 665.6 | 83.4 | 1,231 | 486.062 | 0.39 | 0.73 |
| | 2015 | 721.3 | 90.9 | 940 | 230.687 | 0.25 | 0.32 |
| | 2016 | 803.8 | 100.0 | 161 | 5.667 | 0.04 | 0.01 |
| | 2017 | 696.1 | 91.3 | 794 | 154.142 | 0.19 | 0.22 |
| | 2018 | 622.8 | 78.8 | 958 | 206.284 | 0.22 | 0.33 |
| **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 - 1,311, 1,314, | 1993 | 2,677.1 | 74.3 | 2,124 | 592 | 0.28 | 0.22 |
| 1,312 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 | 192.425 | 0.14 | 0.06 |
| | 1999 | 3,471.2 | 93.2 | 1,275 | 146.328 | 0.11 | 0.04 |
| | 2000 | 3,458.6 | 93.0 | 1,279 | 158.105 | 0.12 | 0.05 |
| | 2001 | 3,280.2 | 88.6 | 1,361 | 182.043 | 0.13 | 0.06 |
| | 2002 | 3,513.0 | 94.0 | 1,343 | 140.057 | 0.10 | 0.04 |
| | 2003 | 3,254.4 | 88.6 | 1,943 | 210.842 | 0.11 | 0.06 |
| | 2004 | 3,201.4 | 86.3 | 1,324 | 199.016 | 0.15 | 0.06 |
| | 2005 | 2,937.6 | 80.4 | 2,014 | 200.300 | 0.10 | 0.07 |
| | 2006 | 2,741.1 | 79.0 | 1,585 | 151.516 | 0.10 | 0.06 |
| | 2007 | 3,058.5 | 81.0 | 2,372 | 148.660 | 0.06 | 0.05 |
| | 2008 | 3,330.0 | 86.1 | 1,706 | 159.913 | 0.09 | 0.05 |
| | 2009 | 3,500.2 | 89.6 | 1,695 | 97.902 | 0.06 | 0.03 |
| | 2010 | 3,561.6 | 90.9 | 1,655 | 112.612 | 0.07 | 0.03 |
| | 2011 | 3,570.5 | 91.9 | 1,248 | 61.374 | 0.05 | 0.02 |
| | 2012 | 3,635.5 | 93.6 | 1,126 | 59.593 | 0.05 | 0.02 |
| | 2013 | 3,588.0 | 91.8 | 1,164 | 93.713 | 0.08 | 0.03 |
| | 2014 | 3,689.9 | 94.1 | 1,085 | 60.002 | 0.06 | 0.02 |
| | 2015 | 3,711.7 | 94.1 | 1,142 | 57.996 | 0.05 | 0.02 |
| | 2016 | 3,680.7 | 93.6 | 1,177 | 64.796 | 0.06 | 0.02 |
| | 2017 | 3,691.8 | 94.1 | 1,088 | 53.888 | 0.05 | 0.01 |
| | 2018 | 3,551.0 | 91.5 | 1,036 | 41.103 | 0.04 | 0.01 |
| **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, DPR-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 - 1,232, 1,251 MWe | 1981 | 1,161.8 | 58.0 | 2,857 | 2,506 | 0.88 | 2.16 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **PEACH BOTTOM 2, 3** (continued) | 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 | 366.040 | 0.19 | 0.19 |
| | 1999 | 2,057.2 | 96.0 | 1,630 | 319.307 | 0.20 | 0.16 |
| | 2000 | 2,058.3 | 96.7 | 1,729 | 330.928 | 0.19 | 0.16 |
| | 2001 | 2,037.1 | 95.8 | 1,445 | 344.283 | 0.24 | 0.17 |
| | 2002 | 2,105.0 | 96.7 | 1,915 | 333.056 | 0.17 | 0.16 |
| | 2003 | 2,072.4 | 94.9 | 1,641 | 355.969 | 0.22 | 0.17 |
| | 2004 | 2,148.8 | 96.4 | 1,422 | 264.727 | 0.19 | 0.12 |
| | 2005 | 2,102.0 | 95.6 | 1,801 | 306.201 | 0.17 | 0.15 |
| | 2006 | 2,169.1 | 97.0 | 1,513 | 247.676 | 0.16 | 0.11 |
| | 2007 | 2,163.8 | 97.0 | 1,906 | 384.795 | 0.20 | 0.18 |
| | 2008 | 2,115.3 | 95.1 | 1,816 | 212.741 | 0.12 | 0.10 |
| | 2009 | 2,130.4 | 95.5 | 2,032 | 310.517 | 0.15 | 0.15 |
| | 2010 | 2,145.3 | 96.2 | 1,716 | 219.372 | 0.13 | 0.10 |
| | 2011 | 2,152.0 | 95.7 | 2,758 | 389.814 | 0.14 | 0.18 |
| | 2012 | 2,142.5 | 94.8 | 2,460 | 305.431 | 0.12 | 0.14 |
| | 2013 | 2,143.5 | 94.7 | 2,902 | 483.936 | 0.17 | 0.23 |
| | 2014 | 2,142.3 | 94.2 | 3,053 | 430.941 | 0.14 | 0.20 |
| | 2015 | 2,267.6 | 95.6 | 2,938 | 395.597 | 0.13 | 0.17 |
| | 2016 | 2,498.1 | 97.7 | 2,052 | 202.221 | 0.10 | 0.08 |
| | 2017 | 2,481.1 | 98.0 | 1,824 | 197.814 | 0.11 | 0.08 |
| | 2018 | 2,474.9 | 96.6 | 1,717 | 177.337 | 0.10 | 0.07 |
| **PERRY** Docket 50-440; NPF-58 1st commercial operation 11/87 Type - BWR Capacity - 1,240 MWe | 1988 | 869.3 | 79.0 | 782 | 105 | 0.13 | 0.12 |
| | 1989 | 642.2 | 57.0 | 1,883 | 767 | 0.41 | 1.19 |
| | 1990 | 792.7 | 67.1 | 1,537 | 638 | 0.42 | 0.80 |
| | 1991 | 1,074.2 | 91.9 | 600 | 146 | 0.24 | 0.14 |
| | 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 |
| | 1998 | 1,163.1 | 99.3 | 385 | 41.945 | 0.11 | 0.04 |
| | 1999 | 1,041.7 | 89.9 | 1,758 | 326.014 | 0.19 | 0.31 |
| | 2000 | 1,148.2 | 97.1 | 501 | 55.827 | 0.11 | 0.05 |
| | 2001 | 885.9 | 79.6 | 1,392 | 258.268 | 0.19 | 0.29 |
| | 2002 | 1,136.0 | 95.0 | 436 | 70.258 | 0.16 | 0.06 |
| | 2003 | 973.7 | 83.8 | 1,880 | 607.384 | 0.32 | 0.62 |
| | 2004 | 1,164.3 | 95.9 | 496 | 73.481 | 0.15 | 0.06 |
| | 2005 | 872.9 | 73.8 | 1,734 | 416.608 | 0.24 | 0.48 |
| | 2006 | 1,195.8 | 99.0 | 488 | 65.152 | 0.13 | 0.05 |
| | 2007 | 919.7 | 79.0 | 1,650 | 505.121 | 0.31 | 0.55 |
| | 2008 | 1,215.9 | 97.9 | 528 | 52.058 | 0.10 | 0.04 |
| | 2009 | 869.2 | 73.3 | 1,818 | 614.959 | 0.34 | 0.71 |
| | 2010 | 1,213.3 | 98.5 | 278 | 32.186 | 0.12 | 0.03 |
| | 2011 | 978.2 | 82.4 | 1,640 | 307.866 | 0.19 | 0.31 |
| | 2012 | 1,194.3 | 98.6 | 408 | 43.374 | 0.11 | 0.04 |
| | 2013 | 964.5 | 82.1 | 1,630 | 373.747 | 0.23 | 0.39 |
| | 2014 | 1,193.5 | 97.4 | 442 | 84.578 | 0.19 | 0.07 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **PERRY** | 2015 | 1,082.5 | 87.5 | 1,644 | 386.778 | 0.24 | 0.36 |
| (continued) | 2016 | 1,189.5 | 96.9 | 351 | 36.389 | 0.10 | 0.03 |
| | 2017 | 1,120.1 | 92.2 | 1,449 | 327.717 | 0.23 | 0.29 |
| | 2018 | 1,223.6 | 100.0 | 217 | 29.848 | 0.14 | 0.02 |
| **PILGRIM 1** | 1973 | 484.0 | --- | 230 | 126 | 0.55 | 0.26 |
| Docket 50-293; | 1974 | 234.1 | 39.2 | 454 | 415 | 0.91 | 1.77 |
| DPR-35 | 1975 | 308.1 | 71.3 | 473 | 798 | 1.69 | 2.59 |
| 1st commercial operation 12/72 | 1976 | 287.8 | 60.7 | 1,317 | 2,648 | 2.01 | 9.20 |
| Type - BWR | 1977 | 316.6 | 61.4 | 1,875 | 3,142 | 1.68 | 9.92 |
| Capacity - 685 MWe | 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 | 2,915.71 |
| | 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 | 71.446 | 0.13 | 0.11 |
| | 1999 | 510.7 | 84.4 | 1,222 | 344.270 | 0.28 | 0.67 |
| | 2000 | 627.5 | 98.3 | 422 | 50.797 | 0.12 | 0.08 |
| | 2001 | 585.6 | 91.0 | 1,113 | 179.585 | 0.16 | 0.31 |
| | 2002 | 657.0 | 100.0 | 463 | 38.280 | 0.08 | 0.06 |
| | 2003 | 566.6 | 87.5 | 1,437 | 250.192 | 0.17 | 0.44 |
| | 2004 | 676.1 | 99.5 | 427 | 41.109 | 0.10 | 0.06 |
| | 2005 | 623.2 | 93.7 | 1,212 | 206.089 | 0.17 | 0.33 |
| | 2006 | 665.4 | 100.0 | 654 | 43.531 | 0.07 | 0.07 |
| | 2007 | 584.5 | 90.0 | 1,407 | 240.526 | 0.17 | 0.41 |
| | 2008 | 668.1 | 99.0 | 377 | 22.568 | 0.06 | 0.03 |
| | 2009 | 616.0 | 91.7 | 1,301 | 264.215 | 0.20 | 0.43 |
| | 2010 | 675.5 | 100.0 | 303 | 25.739 | 0.08 | 0.04 |
| | 2011 | 580.5 | 89.0 | 1,179 | 241.402 | 0.20 | 0.42 |
| | 2012 | 669.0 | 99.4 | 284 | 21.620 | 0.08 | 0.03 |
| | 2013 | 493.9 | 80.4 | 1,188 | 176.012 | 0.15 | 0.36 |
| | 2014 | 658.6 | 98.9 | 421 | 36.716 | 0.09 | 0.06 |
| | 2015 | 570.0 | 86.9 | 1,392 | 218.609 | 0.16 | 0.38 |
| | 2016 | 617.9 | 94.7 | 634 | 44.242 | 0.07 | 0.07 |
| | 2017 | 576.1 | 88.2 | 1,614 | 162.998 | 0.10 | 0.28 |
| | 2018 | 507.0 | 83.8 | 629 | 38.777 | 0.06 | 0.08 |
| **POINT BEACH 1, 2** | 1971 | 393.4 | --- | --- | 164 | --- | 0.42 |
| Docket 50-266, 50-301; | 1972 | 378.3 | --- | --- | 580 | --- | 1.53 |
| DPR-24, DPR-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 - 576, 578 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 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **POINT BEACH 1, 2** (continued) | 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 |
| | 1998 | 649.7 | 69.7 | 881 | 169.253 | 0.19 | 0.26 |
| | 1999 | 806.0 | 83.1 | 962 | 194.489 | 0.20 | 0.24 |
| | 2000 | 872.0 | 88.7 | 765 | 138.989 | 0.18 | 0.16 |
| | 2001 | 915.9 | 93.4 | 740 | 131.667 | 0.18 | 0.14 |
| | 2002 | 909.0 | 91.1 | 945 | 180.654 | 0.19 | 0.20 |
| | 2003 | 917.2 | 92.1 | 627 | 84.965 | 0.14 | 0.09 |
| | 2004 | 912.3 | 90.1 | 627 | 109.515 | 0.17 | 0.12 |
| | 2005 | 782.5 | 78.1 | 851 | 128.646 | 0.15 | 0.16 |
| | 2006 | 977.2 | 96.0 | 453 | 39.597 | 0.09 | 0.04 |
| | 2007 | 958.5 | 94.0 | 535 | 52.023 | 0.10 | 0.05 |
| | 2008 | 889.4 | 87.8 | 958 | 144.021 | 0.15 | 0.16 |
| | 2009 | 902.3 | 92.9 | 766 | 93.270 | 0.12 | 0.10 |
| | 2010 | 952.8 | 93.8 | 869 | 95.695 | 0.11 | 0.10 |
| | 2011 | 796.2 | 75.8 | 1,027 | 159.684 | 0.16 | 0.20 |
| | 2012 | 1,114.3 | 95.2 | 581 | 69.755 | 0.12 | 0.06 |
| | 2013 | 1,135.3 | 95.9 | 547 | 63.146 | 0.12 | 0.06 |
| | 2014 | 1,079.4 | 91.4 | 759 | 127.523 | 0.17 | 0.12 |
| | 2015 | 1,142.9 | 95.8 | 446 | 47.473 | 0.11 | 0.04 |
| | 2016 | 1,159.0 | 96.8 | 515 | 57.294 | 0.11 | 0.05 |
| | 2017 | 1,102.0 | 93.1 | 755 | 87.479 | 0.12 | 0.08 |
| | 2018 | 1,156.7 | 97.2 | 511 | 43.228 | 0.08 | 0.04 |
| **PRAIRIE ISLAND 1, 2** Docket 50-282, 50-306; DPR-42, DPR-60 1st commercial operation 12/73, 12/74 Type - PWRs Capacity - 522, 519 MWe | 1974 | 181.9 | 43.9 | 150 | 18 | 0.12 | 0.10 |
| | 1975 | 836.0 | 83.3 | 477 | 123 | 0.26 | 0.15 |
| | 1976 | 725.2 | 76.6 | 818 | 447 | 0.55 | 0.62 |
| | 1977 | 922.9 | 87.2 | 718 | 300 | 0.42 | 0.33 |
| | 1978 | 941.1 | 92.2 | 546 | 221 | 0.40 | 0.23 |
| | 1979 | 865.0 | 86.0 | 594 | 180 | 0.30 | 0.21 |
| | 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 | 0.23 | 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 | 116.649 | 0.20 | 0.14 |
| | 1999 | 989.3 | 93.8 | 542 | 72.496 | 0.13 | 0.07 |
| | 2000 | 992.2 | 93.1 | 632 | 106.091 | 0.17 | 0.11 |
| | 2001 | 900.8 | 85.8 | 691 | 124.708 | 0.18 | 0.14 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **PRAIRIE ISLAND 1, 2** (continued) | 2002 | 987.0 | 93.6 | 969 | 127.713 | 0.13 | 0.13 |
| | 2003 | 1,006.1 | 96.4 | 594 | 61.137 | 0.10 | 0.06 |
| | 2004 | 940.4 | 89.9 | 1,186 | 143.806 | 0.12 | 0.15 |
| | 2005 | 952.5 | 90.8 | 782 | 84.337 | 0.11 | 0.09 |
| | 2006 | 926.4 | 89.0 | 1,103 | 137.352 | 0.12 | 0.15 |
| | 2007 | 1,014.8 | 98.0 | 130 | 6.276 | 0.05 | 0.01 |
| | 2008 | 924.3 | 88.9 | 1,060 | 126.723 | 0.12 | 0.14 |
| | 2009 | 942.2 | 89.9 | 560 | 53.590 | 0.10 | 0.06 |
| | 2010 | 1,002.6 | 94.9 | 661 | 54.933 | 0.08 | 0.05 |
| | 2011 | 982.4 | 92.0 | 678 | 58.029 | 0.09 | 0.06 |
| | 2012 | 803.8 | 76.7 | 909 | 119.166 | 0.13 | 0.15 |
| | 2013 | 881.8 | 86.0 | 1,383 | 129.989 | 0.09 | 0.15 |
| | 2014 | 957.0 | 91.1 | 768 | 70.860 | 0.09 | 0.07 |
| | 2015 | 842.2 | 81.2 | 802 | 62.441 | 0.08 | 0.07 |
| | 2016 | 944.5 | 87.9 | 705 | 48.078 | 0.07 | 0.05 |
| | 2017 | 998.3 | 95.0 | 558 | 34.322 | 0.06 | 0.03 |
| | 2018 | 1,025.5 | 95.5 | 559 | 37.731 | 0.07 | 0.04 |
| **QUAD CITIES 1, 2** Docket 50-254, 50-265; DPR-29, DPR-30 1st commercial operation 2/73, 3/73 Type - BWRs Capacity - 887, 888 MWe | 1974 | 958.1 | 72.3 | 678 | 482 | 0.71 | 0.50 |
| | 1975 | 833.6 | 68.4 | 1,083 | 1,618 | 1.49 | 1.94 |
| | 1976 | 951.2 | 73.1 | 1,225 | 1,651 | 1.35 | 1.74 |
| | 1977 | 970.1 | 84.0 | 907 | 1,031 | 1.14 | 1.06 |
| | 1978 | 1,124.5 | 88.6 | 1,207 | 1,618 | 1.34 | 1.44 |
| | 1979 | 1,075.0 | 84.6 | 1,688 | 2,158 | 1.28 | 2.01 |
| | 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 | 760.596 | 0.35 | 0.96 |
| | 1999 | 1,476.5 | 95.9 | 1,000 | 200.556 | 0.20 | 0.14 |
| | 2000 | 1,410.4 | 93.9 | 2,840 | 893.766 | 0.31 | 0.63 |
| | 2001 | 1,478.2 | 95.9 | 736 | 143.849 | 0.20 | 0.10 |
| | 2002 | 1,396.0 | 89.0 | 3,818 | 1,786.021 | 0.47 | 1.28 |
| | 2003 | 1,569.4 | 93.1 | 998 | 438.144 | 0.44 | 0.28 |
| | 2004 | 1,443.8 | 95.5 | 2,334 | 510.521 | 0.22 | 0.35 |
| | 2005 | 1,516.2 | 94.2 | 2,869 | 961.026 | 0.33 | 0.63 |
| | 2006 | 1,524.9 | 93.0 | 2,329 | 559.362 | 0.24 | 0.37 |
| | 2007 | 1,650.3 | 97.0 | 1,945 | 249.927 | 0.13 | 0.15 |
| | 2008 | 1,619.4 | 95.2 | 2,065 | 274.444 | 0.13 | 0.17 |
| | 2009 | 1,662.6 | 95.4 | 2,366 | 318.418 | 0.13 | 0.19 |
| | 2010 | 1,688.9 | 95.0 | 2,267 | 241.444 | 0.11 | 0.14 |
| | 2011 | 1,735.3 | 95.9 | 2,453 | 288.618 | 0.12 | 0.17 |
| | 2012 | 1,765.3 | 95.9 | 2,173 | 194.311 | 0.09 | 0.11 |
| | 2013 | 1,776.0 | 96.3 | 2,210 | 192.059 | 0.09 | 0.11 |
| | 2014 | 1,756.7 | 95.2 | 2,068 | 156.168 | 0.08 | 0.09 |
| | 2015 | 1,776.5 | 96.9 | 1,860 | 170.123 | 0.09 | 0.10 |
| | 2016 | 1,787.1 | 97.6 | 1,875 | 142.607 | 0.08 | 0.08 |
| | 2017 | 1,758.2 | 96.8 | 1,888 | 173.167 | 0.09 | 0.10 |
| | 2018 | 1,766.7 | 97.1 | 1,678 | 162.171 | 0.10 | 0.09 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **RANCHO SECO**[16] | 1976 | 268.1 | 30.4 | 297 | 58 | 0.20 | 0.22 |
| Docket 50-312; | 1977 | 706.4 | 77.1 | 515 | 391 | 0.76 | 0.55 |
| DPR-54 | 1978 | 607.7 | 80.5 | 508 | 323 | 0.64 | 0.53 |
| 1st commercial operation 4/75 | 1979 | 687.0 | 91.1 | 287 | 126 | 0.44 | 0.18 |
| Type - PWR | 1980 | 530.9 | 60.4 | 890 | 412 | 0.46 | 0.78 |
| Capacity - (873) MWe | 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 | 0.06 | --- |
| | 1997 | 0.0 | 0.0 | 16 | 0 | 0.00 | --- |
| | 1998 | 0.0 | 0.0 | 61 | 2.661 | 0.04 | --- |
| | 1999 | 0.0 | 0.0 | 302 | 11.191 | 0.04 | --- |
| | 2000 | 0.0 | 0.0 | 219 | 25.795 | 0.12 | --- |
| | 2001 | 0.0 | 0.0 | 210 | 18.432 | 0.09 | --- |
| | 2002 | 0.0 | 0.0 | 193 | 27.346 | 0.14 | --- |
| | 2003 | 0.0 | 0.0 | 121 | 18.300 | 0.15 | --- |
| | 2004 | 0.0 | 0.0 | 122 | 14.890 | 0.12 | --- |
| | 2005 | 0.0 | 0.0 | 157 | 33.444 | 0.21 | --- |
| | 2006 | 0.0 | 0.0 | 143 | 31.793 | 0.22 | --- |
| | 2007 | 0.0 | 0.0 | 129 | 12.524 | 0.10 | --- |
| | 2008 | 0.0 | 0.0 | 84 | 2.434 | 0.03 | --- |
| **RIVER BEND 1** | 1987 | 605.2 | 68.4 | 1,268 | 378 | 0.30 | 0.62 |
| Docket 50-458; | 1988 | 880.7 | 94.3 | 513 | 107 | 0.21 | 0.12 |
| NPF-47 | 1989 | 584.5 | 69.1 | 1,566 | 558 | 0.36 | 0.95 |
| 1st commercial operation 6/86 | 1990 | 682.2 | 78.0 | 1,616 | 489 | 0.30 | 0.72 |
| Type - BWR | 1991 | 814.7 | 87.2 | 780 | 144 | 0.18 | 0.18 |
| Capacity - 967 MWe | 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 | 0.23 | 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 | 57.749 | 0.12 | 0.06 |
| | 1999 | 651.2 | 75.2 | 1,327 | 343.858 | 0.26 | 0.53 |
| | 2000 | 837.1 | 89.7 | 1,104 | 216.053 | 0.20 | 0.26 |
| | 2001 | 889.3 | 93.6 | 1,249 | 207.614 | 0.17 | 0.23 |
| | 2002 | 965.0 | 98.5 | 373 | 35.145 | 0.09 | 0.04 |
| | 2003 | 871.3 | 92.7 | 1,296 | 216.950 | 0.17 | 0.25 |
| | 2004 | 845.6 | 90.1 | 1,378 | 235.749 | 0.17 | 0.28 |
| | 2005 | 890.5 | 94.4 | 498 | 55.816 | 0.11 | 0.06 |
| | 2006 | 853.7 | 92.0 | 1,494 | 214.409 | 0.14 | 0.25 |
| | 2007 | 823.0 | 92.0 | 1,131 | 131.373 | 0.12 | 0.16 |
| | 2008 | 724.8 | 78.7 | 1,809 | 311.697 | 0.17 | 0.43 |
| | 2009 | 895.6 | 92.6 | 1,978 | 219.446 | 0.11 | 0.25 |
| | 2010 | 955.1 | 98.9 | 888 | 40.356 | 0.05 | 0.04 |
| | 2011 | 878.6 | 91.9 | 1,880 | 211.212 | 0.11 | 0.24 |
| | 2012 | 890.2 | 94.5 | 648 | 34.178 | 0.05 | 0.04 |
| | 2013 | 867.6 | 90.8 | 1,915 | 188.331 | 0.10 | 0.22 |

[16] Rancho Seco ceased operations in June 1989 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 per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **RIVER BEND 1** | 2014 | 935.8 | 98.1 | 343 | 16.138 | 0.05 | 0.02 |
| (continued) | 2015 | 791.6 | 87.9 | 888 | 128.492 | 0.14 | 0.16 |
| | 2016 | 811.5 | 86.6 | 532 | 71.142 | 0.13 | 0.09 |
| | 2017 | 804.5 | 87.7 | 1,500 | 273.004 | 0.18 | 0.34 |
| | 2018 | 804.3 | 88.6 | 573 | 69.580 | 0.12 | 0.09 |
| **ROBINSON 2** | 1972 | 580.0 | --- | 245 | 215 | 0.88 | 0.37 |
| Docket 50-261; | 1973 | 455.1 | --- | 831 | 695 | 0.84 | 1.53 |
| DPR-23 | 1974 | 578.1 | 83.3 | 853 | 672 | 0.79 | 1.16 |
| 1st commercial operation 3/71 | 1975 | 501.8 | 72.7 | 849 | 1,142 | 1.35 | 2.28 |
| Type - PWR | 1976 | 585.5 | 84.7 | 597 | 715 | 1.20 | 1.22 |
| Capacity - 741 MWe | 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 |
| | 1985 | 629.5 | 87.9 | 1,378 | 311 | 0.23 | 0.49 |
| | 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 | 170.476 | 0.17 | 0.27 |
| | 1999 | 648.9 | 91.8 | 807 | 123.952 | 0.15 | 0.19 |
| | 2000 | 710.0 | 99.7 | 138 | 8.396 | 0.06 | 0.01 |
| | 2001 | 627.9 | 90.6 | 827 | 124.750 | 0.15 | 0.20 |
| | 2002 | 638.0 | 91.2 | 830 | 110.631 | 0.13 | 0.17 |
| | 2003 | 733.1 | 100.0 | 109 | 4.838 | 0.04 | 0.01 |
| | 2004 | 653.7 | 89.3 | 952 | 118.159 | 0.12 | 0.18 |
| | 2005 | 656.9 | 89.7 | 791 | 64.662 | 0.08 | 0.10 |
| | 2006 | 735.5 | 100.0 | 86 | 3.320 | 0.04 | 0.00 |
| | 2007 | 655.0 | 90.0 | 890 | 80.752 | 0.09 | 0.12 |
| | 2008 | 618.1 | 84.6 | 788 | 68.381 | 0.09 | 0.11 |
| | 2009 | 738.9 | 99.3 | 126 | 6.643 | 0.05 | 0.01 |
| | 2010 | 410.8 | 57.0 | 996 | 85.917 | 0.09 | 0.21 |
| | 2011 | 726.5 | 99.3 | 137 | 3.630 | 0.03 | 0.00 |
| | 2012 | 613.4 | 82.2 | 1,027 | 65.258 | 0.06 | 0.11 |
| | 2013 | 650.3 | 85.3 | 1,116 | 80.595 | 0.07 | 0.12 |
| | 2014 | 703.1 | 91.2 | 477 | 28.666 | 0.06 | 0.04 |
| | 2015 | 653.4 | 84.9 | 957 | 56.373 | 0.06 | 0.09 |
| | 2016 | 734.3 | 96.3 | 133 | 3.704 | 0.03 | 0.01 |
| | 2017 | 676.9 | 89.1 | 883 | 58.739 | 0.07 | 0.09 |
| | 2018 | 602.5 | 80.3 | 958 | 61.998 | 0.06 | 0.10 |
| **SALEM 1, 2** | 1978 | 546.4 | 55.6 | 574 | 122 | 0.21 | 0.22 |
| Docket 50-272, 50-311; | 1979 | 250.0 | 25.5 | 1,488 | 584 | 0.39 | 2.34 |
| DPR-70, DPR-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 - 1,116, 1,134 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 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **SALEM 1, 2** (continued) | 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 | 41.100 | 0.10 | 0.03 |
| | 1999 | 1,821.8 | 86.8 | 1,200 | 317.545 | 0.27 | 0.17 |
| | 2000 | 1,973.4 | 93.0 | 1,191 | 198.068 | 0.17 | 0.10 |
| | 2001 | 1,961.2 | 91.1 | 1,274 | 153.088 | 0.12 | 0.08 |
| | 2002 | 1,934.0 | 89.4 | 2,460 | 292.692 | 0.12 | 0.15 |
| | 2003 | 1,957.2 | 90.7 | 1,301 | 124.042 | 0.10 | 0.06 |
| | 2004 | 1,850.2 | 85.8 | 1,496 | 148.694 | 0.10 | 0.08 |
| | 2005 | 2,086.4 | 91.7 | 3,162 | 240.567 | 0.08 | 0.12 |
| | 2006 | 2,211.8 | 97.0 | 1,446 | 90.541 | 0.06 | 0.04 |
| | 2007 | 2,158.2 | 96.0 | 1,365 | 117.604 | 0.09 | 0.05 |
| | 2008 | 1,998.6 | 87.8 | 3,362 | 328.761 | 0.10 | 0.16 |
| | 2009 | 2,252.9 | 96.2 | 1,249 | 101.186 | 0.08 | 0.04 |
| | 2010 | 2,147.3 | 93.9 | 964 | 77.828 | 0.08 | 0.04 |
| | 2011 | 2,054.6 | 91.4 | 2,180 | 126.716 | 0.06 | 0.06 |
| | 2012 | 2,123.8 | 93.4 | 674 | 47.003 | 0.07 | 0.02 |
| | 2013 | 2,213.1 | 94.7 | 797 | 59.430 | 0.07 | 0.03 |
| | 2014 | 1,870.1 | 81.7 | 2,558 | 109.633 | 0.04 | 0.06 |
| | 2015 | 2,131.3 | 93.8 | 580 | 33.810 | 0.06 | 0.02 |
| | 2016 | 1,800.9 | 84.2 | 1,108 | 93.255 | 0.08 | 0.05 |
| | 2017 | 2,060.5 | 89.7 | 1,745 | 135.197 | 0.08 | 0.07 |
| | 2018 | 2,165.1 | 95.2 | 521 | 49.086 | 0.09 | 0.02 |
| **SAN ONOFRE 1[17], 2, 3[18]** Docket 50-206, 50-361, 50-362; DPR-13; NPF-10, NPF-15 1st commercial operation 1/68, 8/83, 4/84 Type - PWRs Capacity - (436), (1,070), (1,080) MWe | 1969 | 314.1 | --- | 123 | 42 | 0.34 | 0.13 |
| | 1970 | 365.9 | --- | 251 | 155 | 0.62 | 0.42 |
| | 1971 | 362.1 | --- | 121 | 50 | 0.41 | 0.14 |
| | 1972 | 338.5 | --- | 326 | 256 | 0.79 | 0.76 |
| | 1973 | 273.7 | --- | 570 | 353 | 0.62 | 1.29 |
| | 1974 | 377.8 | 86.1 | 219 | 71 | 0.32 | 0.19 |
| | 1975 | 389.0 | 87.4 | 424 | 292 | 0.69 | 0.75 |
| | 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 | --- |
| | 1984 | 670.4 | 68.3 | 7,514 | 986 | 0.13 | 1.47 |
| | 1985 | 1,381.8 | 132.9 | 5,742 | 722 | 0.13 | 0.52 |
| | 1986 | 1,698.2 | 61.1 | 3,594 | 824 | 0.23 | 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 |

[17] San Onofre 1 ceased operations in November 1992 and is no longer in the count of operating reactors. Parentheses indicate plant capacity when plant was operational.

[18] San Onofre 2, 3 ceased power generation in January 2012, and in June 2013 it was decided that they would not be put back into commercial operation. Therefore, they are no longer included in the count of operating reactors. Parentheses indicate plant capacities when plants were operational.

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **SAN ONOFRE 1[17], 2, 3[18]** | 1996 | 2,089.3 | 93.2 | 1,272 | 129 | 0.10 | 0.06 |
| (continued) | 1997 | 1,533.9 | 72.9 | 1,652 | 341 | 0.21 | 0.22 |
| | 1998 | 1,996.4 | 92.0 | 1,091 | 195.600 | 0.18 | 0.10 |
| **SAN ONOFRE 1[17]** | 1999 | 0.0 | 0.0 | 241 | 15.863 | 0.07 | --- |
| Docket 50-206; | 2000 | 0.0 | 0.0 | 416 | 71.214 | 0.17 | --- |
| DPR-13 | 2001 | 0.0 | 0.0 | 338 | 57.785 | 0.17 | --- |
| 1st commercial operation 1/68 | 2002 | 0.0 | 0.0 | 308 | 61.214 | 0.20 | --- |
| Type - PWR | 2003 | 0.0 | 0.0 | 226 | 35.596 | 0.16 | --- |
| Capacity - (436) MWe | 2004 | 0.0 | 0.0 | 169 | 14.899 | 0.09 | --- |
| | 2005 | 0.0 | 0.0 | 198 | 20.624 | 0.10 | --- |
| | 2006 | 0.0 | 0.0 | 183 | 22.490 | 0.12 | --- |
| | 2007 | 0.0 | 0.0 | 20 | 0.417 | 0.02 | --- |
| | 2008 | 0.0 | 0.0 | 2 | 0.043 | 0.02 | --- |
| **SAN ONOFRE 2, 3[18]** | 1999 | 1,901.4 | 86.9 | 1,477 | 353.765 | 0.24 | 0.19 |
| Docket 50-361, 50-362; | 2000 | 2,067.2 | 94.7 | 1,073 | 115.499 | 0.11 | 0.06 |
| NPF-10, NPF-15 | 2001 | 1,727.2 | 78.9 | 1,083 | 131.384 | 0.12 | 0.08 |
| 1st commercial operation | 2002 | 2,056.0 | 93.4 | 1,140 | 136.443 | 0.12 | 0.07 |
| 8/83, 4/84 | 2003 | 2,084.3 | 94.0 | 1,275 | 163.804 | 0.13 | 0.08 |
| Type - PWRs | 2004 | 1,713.8 | 79.1 | 1,761 | 407.063 | 0.23 | 0.24 |
| Capacity - (1,070), (1,080) MWe | 2005 | 2,094.7 | 96.0 | 305 | 11.332 | 0.04 | 0.01 |
| | 2006 | 1,552.2 | 73.0 | 1,632 | 315.087 | 0.19 | 0.20 |
| | 2007 | 1,964.6 | 89.0 | 1,065 | 91.545 | 0.09 | 0.05 |
| | 2008 | 1,753.0 | 82.7 | 1,014 | 125.320 | 0.12 | 0.07 |
| **SAN ONOFRE 1[17], 2, 3[18]** | 2009 | 1,774.5 | 79.9 | 1,575 | 178.131 | 0.11 | 0.10 |
| Docket 50-206, 50-361, 50-362; | 2010 | 1,578.9 | 75.3 | 1,642 | 199.399 | 0.12 | 0.13 |
| DPR-13; NPF-10, NPF-15 | 2011 | 2,067.1 | 93.0 | 641 | 29.658 | 0.05 | 0.01 |
| 1st commercial operation | 2012 | 115.2 | 5.4 | 2,150 | 221.463 | 0.10 | 1.92 |
| 1/68, 8/83, 4/84 | 2013 | 0.0 | 0.0 | 210 | 5.701 | 0.03 | --- |
| Type - PWRs | 2014 | 0.0 | 0.0 | 68 | 1.369 | 0.02 | --- |
| Capacity - (436), (1,070), | 2015 | 0.0 | 0.0 | 136 | 1.202 | 0.01 | --- |
| (1,080) MWe | 2016 | 0.0 | 0.0 | 87 | 1.787 | 0.02 | --- |
| | 2017 | 0.0 | 0.0 | 1 | 0.005 | 0.01 | --- |
| | 2018 | 0.0 | 0.0 | 127 | 24.574 | 0.19 | --- |
| **SEABROOK** | 1991 | 810.4 | 75.9 | 699 | 92 | 0.13 | 0.11 |
| Docket 50-443; | 1992 | 932.4 | 81.3 | 806 | 147 | 0.18 | 0.16 |
| NPF-86 | 1993 | 1,071.5 | 93.6 | 110 | 6 | 0.05 | 0.01 |
| 1st commercial operation 8/90 | 1994 | 736.4 | 63.5 | 852 | 113 | 0.13 | 0.15 |
| Type - PWR | 1995 | 995.5 | 87.5 | 800 | 102 | 0.13 | 0.10 |
| Capacity - 1,246 MWe | 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 | 18.509 | 0.03 | 0.02 |
| | 1999 | 991.5 | 87.5 | 1,339 | 105.723 | 0.08 | 0.11 |
| | 2000 | 901.8 | 79.3 | 1,158 | 70.091 | 0.06 | 0.08 |
| | 2001 | 989.6 | 89.1 | 423 | 8.672 | 0.02 | 0.01 |
| | 2002 | 1,058.0 | 92.8 | 1,095 | 66.583 | 0.06 | 0.06 |
| | 2003 | 1,055.9 | 93.6 | 981 | 70.953 | 0.07 | 0.07 |
| | 2004 | 1,158.6 | 100.0 | 291 | 5.858 | 0.02 | 0.01 |
| | 2005 | 1,076.4 | 91.5 | 1,034 | 52.216 | 0.05 | 0.05 |
| | 2006 | 1,072.8 | 89.0 | 1,246 | 76.583 | 0.06 | 0.07 |
| | 2007 | 1,228.7 | 100.0 | 349 | 4.332 | 0.01 | 0.00 |
| | 2008 | 1,064.4 | 86.9 | 1,297 | 74.992 | 0.06 | 0.07 |
| | 2009 | 1,006.4 | 86.5 | 1,233 | 87.372 | 0.07 | 0.09 |
| | 2010 | 1,245.4 | 100.0 | 335 | 4.488 | 0.01 | 0.00 |
| | 2011 | 954.5 | 80.5 | 1,156 | 65.593 | 0.06 | 0.07 |
| | 2012 | 932.2 | 87.8 | 1,092 | 53.636 | 0.05 | 0.06 |
| | 2013 | 1,247.3 | 100.0 | 291 | 2.442 | 0.01 | 0.00 |

[17] San Onofre 1 ceased operations in November 1992 and is no longer in the count of operating reactors. Parentheses indicate plant capacity when plant was operational.

[18] San Onofre 2, 3 ceased power generation in January 2012, and in June 2013 it was decided that they would not be put back into commercial operation. Therefore, they are no longer included in the count of operating reactors. Parentheses indicate plant capacities when plants were operational.

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **SEABROOK** | 2014 | 1,160.7 | 93.8 | 1,056 | 39.983 | 0.04 | 0.03 |
| (continued) | 2015 | 1,082.6 | 88.3 | 1,219 | 96.053 | 0.08 | 0.09 |
| | 2016 | 1,228.4 | 98.8 | 59 | 1.672 | 0.03 | 0.00 |
| | 2017 | 1,140.4 | 92.0 | 519 | 29.191 | 0.06 | 0.03 |
| | 2018 | 1,148.5 | 92.7 | 464 | 33.418 | 0.07 | 0.03 |
| **SEQUOYAH 1, 2** | 1982 | 583.5 | 52.8 | 1,968 | 570 | 0.29 | 0.98 |
| Docket 50-327, 50-328; | 1983 | 1,663.7 | 75.1 | 1,769 | 491 | 0.28 | 0.30 |
| DPR-77, DPR-79 | 1984 | 1,481.9 | 69.0 | 2,373 | 1,119 | 0.47 | 0.76 |
| 1st commercial operation | 1985 | 1,151.3 | 51.3 | 1,853 | 1,072 | 0.58 | 0.93 |
| 7/81, 6/82 | 1986 | 0.0 | 0.0 | 1,738 | 527 | 0.30 | --- |
| Type - PWR | 1987 | 0.0 | 0.0 | 2,080 | 420 | 0.20 | --- |
| Capacity - 1,152, 1,140 MWe | 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 |
| | 1998 | 2,135.3 | 95.3 | 1,530 | 265.980 | 0.17 | 0.12 |
| | 1999 | 2,165.1 | 97.0 | 1,346 | 164.569 | 0.12 | 0.08 |
| | 2000 | 1,910.0 | 86.8 | 2,039 | 357.220 | 0.18 | 0.19 |
| | 2001 | 2,158.3 | 95.7 | 1,292 | 145.066 | 0.11 | 0.07 |
| | 2002 | 2,106.0 | 94.1 | 1,257 | 108.252 | 0.09 | 0.05 |
| | 2003 | 1,776.4 | 80.0 | 2,484 | 430.889 | 0.17 | 0.24 |
| | 2004 | 2,135.2 | 93.9 | 1,161 | 85.941 | 0.07 | 0.04 |
| | 2005 | 2,162.9 | 94.9 | 1,125 | 95.133 | 0.08 | 0.04 |
| | 2006 | 2,054.9 | 91.0 | 1,752 | 242.016 | 0.14 | 0.12 |
| | 2007 | 2,129.1 | 94.0 | 1,197 | 123.540 | 0.10 | 0.06 |
| | 2008 | 2,153.6 | 94.3 | 960 | 83.730 | 0.09 | 0.04 |
| | 2009 | 2,026.8 | 90.1 | 1,415 | 166.776 | 0.12 | 0.08 |
| | 2010 | 2,054.9 | 92.2 | 828 | 56.956 | 0.07 | 0.03 |
| | 2011 | 2,133.3 | 95.3 | 1,354 | 109.417 | 0.08 | 0.05 |
| | 2012 | 1,888.2 | 84.6 | 2,555 | 290.840 | 0.11 | 0.15 |
| | 2013 | 2,108.1 | 94.2 | 666 | 44.478 | 0.07 | 0.02 |
| | 2014 | 2,156.7 | 95.5 | 842 | 77.569 | 0.09 | 0.04 |
| | 2015 | 1,884.9 | 87.0 | 1,484 | 136.826 | 0.09 | 0.07 |
| | 2016 | 1,971.4 | 88.8 | 1,133 | 105.764 | 0.09 | 0.05 |
| | 2017 | 2,080.7 | 94.0 | 831 | 47.200 | 0.06 | 0.02 |
| | 2018 | 2,021.0 | 90.8 | 1,367 | 121.426 | 0.09 | 0.06 |
| **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, NPF-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 - 1,251, 1,251 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 | 183.977 | 0.16 | 0.08 |
| | 1999 | 2,219.7 | 91.6 | 1,328 | 259.770 | 0.20 | 0.12 |
| | 2000 | 2,180.0 | 89.7 | 1,372 | 231.634 | 0.17 | 0.11 |
| | 2001 | 2,262.7 | 92.2 | 1,325 | 237.645 | 0.18 | 0.11 |
| | 2002 | 2,173.0 | 87.5 | 1,510 | 329.091 | 0.22 | 0.15 |
| | 2003 | 1,796.3 | 72.1 | 909 | 143.495 | 0.16 | 0.08 |
| | 2004 | 2,437.1 | 96.0 | 842 | 119.834 | 0.14 | 0.05 |
| | 2005 | 2,258.5 | 90.0 | 1,268 | 247.655 | 0.20 | 0.11 |
| | 2006 | 2,439.6 | 95.0 | 1,078 | 150.323 | 0.14 | 0.06 |
| | 2007 | 2,527.3 | 96.0 | 881 | 91.613 | 0.10 | 0.04 |
| | 2008 | 2,452.1 | 92.3 | 1,181 | 187.295 | 0.16 | 0.08 |
| | 2009 | 2,444.5 | 91.9 | 1,138 | 79.687 | 0.07 | 0.03 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **SOUTH TEXAS 1, 2** | 2010 | 2,418.7 | 91.5 | 867 | 79.159 | 0.09 | 0.03 |
| (continued) | 2011 | 2,333.3 | 87.7 | 1,153 | 139.274 | 0.12 | 0.06 |
| | 2012 | 2,122.4 | 79.8 | 611 | 49.104 | 0.08 | 0.02 |
| | 2013 | 2,062.4 | 78.4 | 832 | 59.736 | 0.07 | 0.03 |
| | 2014 | 2,363.4 | 90.0 | 422 | 34.576 | 0.08 | 0.01 |
| | 2015 | 2,224.5 | 85.5 | 900 | 83.993 | 0.09 | 0.04 |
| | 2016 | 2,481.9 | 94.9 | 426 | 32.837 | 0.08 | 0.01 |
| | 2017 | 2,467.1 | 94.6 | 620 | 55.025 | 0.09 | 0.02 |
| | 2018 | 2,367.7 | 91.0 | 703 | 70.050 | 0.10 | 0.03 |
| **ST. LUCIE 1, 2** | 1977 | 649.1 | 84.7 | 445 | 152 | 0.34 | 0.23 |
| Docket 50-335, 50-389; | 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 - 981, 987 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 | 134.459 | 0.11 | 0.09 |
| | 1999 | 1,569.1 | 93.8 | 1,107 | 176.878 | 0.16 | 0.11 |
| | 2000 | 1,630.0 | 96.0 | 990 | 98.691 | 0.10 | 0.06 |
| | 2001 | 1,527.5 | 91.6 | 1,375 | 228.071 | 0.17 | 0.15 |
| | 2002 | 1,633.0 | 96.6 | 992 | 155.946 | 0.16 | 0.10 |
| | 2003 | 1,524.7 | 91.5 | 937 | 141.734 | 0.15 | 0.09 |
| | 2004 | 1,492.0 | 89.3 | 1,157 | 159.436 | 0.14 | 0.11 |
| | 2005 | 1,408.4 | 85.1 | 2,262 | 406.171 | 0.18 | 0.29 |
| | 2006 | 1,542.4 | 93.0 | 1,226 | 119.963 | 0.10 | 0.08 |
| | 2007 | 1,302.1 | 78.0 | 2,447 | 409.958 | 0.17 | 0.31 |
| | 2008 | 1,566.5 | 92.7 | 1,127 | 112.234 | 0.10 | 0.07 |
| | 2009 | 1,490.6 | 88.8 | 1,139 | 132.861 | 0.12 | 0.09 |
| | 2010 | 1,440.2 | 88.4 | 1,357 | 197.359 | 0.15 | 0.14 |
| | 2011 | 1,200.9 | 77.3 | 2,050 | 295.228 | 0.14 | 0.25 |
| | 2012 | 1,139.5 | 70.6 | 1,750 | 185.426 | 0.11 | 0.16 |
| | 2013 | 1,783.4 | 90.3 | 964 | 74.926 | 0.08 | 0.04 |
| | 2014 | 1,805.7 | 90.9 | 1,068 | 121.092 | 0.11 | 0.07 |
| | 2015 | 1,720.9 | 87.2 | 1,477 | 188.087 | 0.13 | 0.11 |
| | 2016 | 1,779.5 | 89.8 | 920 | 76.628 | 0.08 | 0.04 |
| | 2017 | 1,875.3 | 94.2 | 933 | 71.123 | 0.08 | 0.04 |
| | 2018 | 1,777.1 | 89.9 | 1,107 | 112.919 | 0.10 | 0.06 |
| **SUMMER 1** | 1984 | 504.6 | 61.1 | 1,120 | 295 | 0.26 | 0.58 |
| Docket 50-395; | 1985 | 627.7 | 71.6 | 1,201 | 379 | 0.32 | 0.60 |
| NPF-12 | 1986 | 853.7 | 95.3 | 392 | 23 | 0.06 | 0.03 |
| 1st commercial operation 1/84 | 1987 | 618.7 | 71.0 | 1,075 | 560 | 0.52 | 0.91 |
| Type - PWR | 1988 | 605.3 | 69.1 | 1,127 | 511 | 0.45 | 0.84 |
| Capacity - 966 MWe | 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 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **SUMMER 1** (continued) | 1997 | 829.7 | 89.8 | 820 | 163 | 0.20 | 0.20 |
| | 1998 | 934.8 | 98.8 | 285 | 13.513 | 0.05 | 0.01 |
| | 1999 | 842.0 | 89.4 | 827 | 120.172 | 0.15 | 0.14 |
| | 2000 | 723.9 | 76.6 | 933 | 166.561 | 0.18 | 0.23 |
| | 2001 | 769.3 | 83.3 | 486 | 69.398 | 0.14 | 0.09 |
| | 2002 | 840.0 | 87.9 | 685 | 59.644 | 0.09 | 0.07 |
| | 2003 | 837.0 | 87.4 | 745 | 70.828 | 0.10 | 0.08 |
| | 2004 | 938.4 | 96.8 | 200 | 10.085 | 0.05 | 0.01 |
| | 2005 | 850.3 | 88.9 | 734 | 72.454 | 0.10 | 0.09 |
| | 2006 | 858.6 | 90.0 | 676 | 61.333 | 0.09 | 0.07 |
| | 2007 | 967.9 | 100.0 | 75 | 2.691 | 0.04 | 0.00 |
| | 2008 | 817.2 | 84.8 | 623 | 49.091 | 0.08 | 0.06 |
| | 2009 | 784.5 | 82.6 | 767 | 56.050 | 0.07 | 0.07 |
| | 2010 | 968.8 | 99.4 | 104 | 2.129 | 0.02 | 0.00 |
| | 2011 | 847.7 | 87.6 | 598 | 31.580 | 0.05 | 0.04 |
| | 2012 | 829.0 | 85.3 | 766 | 82.261 | 0.11 | 0.10 |
| | 2013 | 955.5 | 97.2 | 172 | 5.113 | 0.03 | 0.01 |
| | 2014 | 789.4 | 82.6 | 934 | 110.929 | 0.12 | 0.14 |
| | 2015 | 812.3 | 83.8 | 811 | 64.958 | 0.08 | 0.08 |
| | 2016 | 988.4 | 100.0 | 137 | 2.862 | 0.02 | 0.00 |
| | 2017 | 789.2 | 81.3 | 856 | 50.308 | 0.06 | 0.06 |
| | 2018 | 840.9 | 86.4 | 718 | 49.251 | 0.07 | 0.06 |
| **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, DPR-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 - 838, 838 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 | 188.831 | 0.16 | 0.13 |
| | 1999 | 1,483.0 | 93.5 | 995 | 137.891 | 0.14 | 0.09 |
| | 2000 | 1,490.0 | 92.7 | 1,197 | 193.169 | 0.16 | 0.13 |
| | 2001 | 1,441.5 | 89.5 | 1,243 | 328.650 | 0.26 | 0.23 |
| | 2002 | 1,557.0 | 96.0 | 799 | 87.778 | 0.11 | 0.06 |
| | 2003 | 1,255.9 | 79.7 | 1,628 | 325.729 | 0.20 | 0.26 |
| | 2004 | 1,537.9 | 94.6 | 1,028 | 119.654 | 0.12 | 0.08 |
| | 2005 | 1,506.7 | 94.2 | 877 | 87.717 | 0.10 | 0.06 |
| | 2006 | 1,427.0 | 90.0 | 1,227 | 234.978 | 0.19 | 0.16 |
| | 2007 | 1,516.2 | 94.0 | 1,111 | 207.130 | 0.19 | 0.14 |
| | 2008 | 1,536.6 | 95.7 | 1,069 | 150.269 | 0.14 | 0.10 |
| | 2009 | 1,485.1 | 93.1 | 1,241 | 193.703 | 0.16 | 0.13 |
| | 2010 | 1,503.7 | 93.7 | 958 | 111.129 | 0.12 | 0.07 |
| | 2011 | 1,487.4 | 88.1 | 1,121 | 113.718 | 0.10 | 0.08 |
| | 2012 | 1,549.9 | 91.6 | 1,205 | 168.755 | 0.14 | 0.11 |
| | 2013 | 1,644.4 | 95.7 | 770 | 67.528 | 0.09 | 0.04 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **SURRY 1, 2** | 2014 | 1,636.1 | 95.2 | 743 | 57.491 | 0.08 | 0.04 |
| (continued) | 2015 | 1,345.9 | 80.1 | 1,275 | 182.980 | 0.14 | 0.14 |
| | 2016 | 1,667.9 | 96.8 | 645 | 44.432 | 0.07 | 0.03 |
| | 2017 | 1,647.0 | 96.0 | 781 | 58.012 | 0.07 | 0.04 |
| | 2018 | 1,509.0 | 88.6 | 1,170 | 117.837 | 0.10 | 0.08 |
| **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 - 1,257, 1,257 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 | 360.778 | 0.23 | 0.19 |
| | 1999 | 1,896.0 | 89.6 | 1,787 | 431.397 | 0.24 | 0.23 |
| | 2000 | 1,994.6 | 92.6 | 1,812 | 331.163 | 0.18 | 0.17 |
| | 2001 | 2,027.6 | 94.2 | 1,807 | 288.413 | 0.16 | 0.14 |
| | 2002 | 1,973.0 | 91.6 | 1,890 | 259.968 | 0.14 | 0.13 |
| | 2003 | 2,050.8 | 93.4 | 1,934 | 250.096 | 0.13 | 0.12 |
| | 2004 | 2,058.8 | 92.7 | 2,144 | 272.202 | 0.13 | 0.13 |
| | 2005 | 2,086.6 | 93.5 | 1,898 | 181.360 | 0.10 | 0.09 |
| | 2006 | 2,040.4 | 91.0 | 1,873 | 184.901 | 0.10 | 0.09 |
| | 2007 | 2,089.2 | 93.0 | 2,303 | 263.021 | 0.11 | 0.13 |
| | 2008 | 2,174.1 | 94.2 | 1,895 | 192.892 | 0.10 | 0.09 |
| | 2009 | 2,231.1 | 94.7 | 1,956 | 266.597 | 0.14 | 0.12 |
| | 2010 | 2,121.6 | 90.4 | 1,950 | 176.161 | 0.09 | 0.08 |
| | 2011 | 1,992.0 | 82.2 | 1,847 | 168.968 | 0.09 | 0.08 |
| | 2012 | 1,936.5 | 81.4 | 2,140 | 175.881 | 0.08 | 0.09 |
| | 2013 | 2,166.2 | 88.6 | 1,861 | 233.532 | 0.13 | 0.11 |
| | 2014 | 2,153.1 | 87.3 | 1,956 | 214.467 | 0.11 | 0.10 |
| | 2015 | 2,354.3 | 93.3 | 1,763 | 206.154 | 0.12 | 0.09 |
| | 2016 | 2,217.2 | 89.4 | 2,210 | 237.336 | 0.11 | 0.11 |
| | 2017 | 2,375.6 | 95.1 | 1,440 | 165.468 | 0.11 | 0.07 |
| | 2018 | 2,343.4 | 95.2 | 1,357 | 147.327 | 0.11 | 0.06 |
| **THREE MILE ISLAND 1[19], 2[20]** | 1975 | 675.9 | 82.2 | 131 | 73 | 0.56 | 0.11 |
| Docket 50-289, 50-320; | 1976 | 530.0 | 65.4 | 819 | 286 | 0.35 | 0.54 |
| DPR-50, DPR-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 - 802, (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[19]** | 1986 | 585.2 | 70.9 | 1,360 | 213 | 0.16 | 0.36 |
| Docket 50-289; | 1987 | 610.7 | 73.6 | 1,259 | 149 | 0.12 | 0.24 |
| DPR-50 | 1988 | 661.0 | 77.8 | 1,012 | 210 | 0.21 | 0.32 |
| 1st commercial operation 9/74 | 1989 | 871.3 | 100.0 | 670 | 54 | 0.08 | 0.06 |
| Type - PWR | 1990 | 645.5 | 84.6 | 1,319 | 264 | 0.20 | 0.41 |
| Capacity - 802 MWe | 1991 | 688.7 | 86.4 | 1,542 | 198 | 0.13 | 0.29 |
| | 1992 | 836.8 | 100.0 | 558 | 34 | 0.06 | 0.04 |

[19] Three Mile Island 1 resumed commercial power generation in October 1985 after being under regulatory restraint since 1979.

[20] 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. From 2001-2015, TMI voluntarily provided an estimate of the collective dose for Unit 2, but not the number of individuals with measurable dose.

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **THREE MILE ISLAND 1**[19] (continued) | 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 | 16.722 | 0.06 | 0.02 |
| | 1999 | 722.4 | 89.7 | 1,171 | 154.936 | 0.13 | 0.21 |
| | 2000 | 813.4 | 100.0 | 183 | 8.689 | 0.05 | 0.01 |
| | 2001 | 616.7 | 84.2 | 1,196 | 196.699 | 0.16 | 0.32 |
| | 2002 | 833.0 | 100.0 | 172 | 6.533 | 0.04 | 0.01 |
| | 2003 | 706.4 | 87.1 | 1,230 | 155.101 | 0.13 | 0.22 |
| | 2004 | 828.0 | 100.0 | 105 | 3.573 | 0.03 | 0.00 |
| | 2005 | 769.1 | 93.2 | 955 | 65.576 | 0.07 | 0.09 |
| | 2006 | 825.0 | 99.0 | 125 | 5.155 | 0.04 | 0.01 |
| | 2007 | 758.6 | 92.0 | 1,266 | 114.203 | 0.09 | 0.15 |
| | 2008 | 838.5 | 100.0 | 64 | 2.219 | 0.03 | 0.00 |
| | 2009 | 672.6 | 81.7 | 2,019 | 241.780 | 0.12 | 0.36 |
| | 2010 | 757.3 | 93.1 | 790 | 38.994 | 0.05 | 0.05 |
| | 2011 | 744.2 | 91.4 | 1,224 | 129.775 | 0.11 | 0.17 |
| | 2012 | 820.7 | 96.3 | 280 | 13.073 | 0.05 | 0.02 |
| | 2013 | 762.5 | 92.2 | 1,294 | 125.803 | 0.10 | 0.16 |
| | 2014 | 834.3 | 100.0 | 204 | 12.518 | 0.06 | 0.02 |
| | 2015 | 753.2 | 92.1 | 1,454 | 171.431 | 0.12 | 0.23 |
| | 2016 | 808.5 | 97.0 | 309 | 16.843 | 0.05 | 0.02 |
| | 2017 | 783.3 | 94.4 | 1,009 | 82.657 | 0.08 | 0.11 |
| | 2018 | 837.4 | 100.0 | 78 | 2.641 | 0.03 | 0.00 |
| **THREE MILE ISLAND 2**[20] Docket 50-320; DPR-73 1st commercial operation 12/78 Type - PWR Capacity - (880) MWe | 1986 | 0.0 | 0.0 | 1,497 | 915 | 0.61 | --- |
| | 1987 | 0.0 | 0.0 | 1,378 | 977 | 0.71 | --- |
| | 1988 | 0.0 | 0.0 | 1,247 | 917 | 0.74 | --- |
| | 1989 | 0.0 | 0.0 | 1,014 | 639 | 0.63 | --- |
| | 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 | 0.697 | 0.01 | --- |
| | 1999 | 0.0 | 0.0 | 203 | 0.512 | 0.00 | --- |
| | 2000 | 0.0 | 0.0 | 70 | 0.401 | 0.01 | --- |
| | 2001 | 0.0 | 0.0 | 0 | 0.228 | --- | --- |
| | 2002 | 0.0 | 0.0 | 0 | --- | --- | --- |
| | 2003 | 0.0 | 0.0 | 0 | 0.260 | --- | --- |
| | 2004 | 0.0 | 0.0 | 0 | 0.216 | --- | --- |
| | 2005 | 0.0 | 0.0 | 0 | --- | --- | --- |
| | 2006 | 0.0 | 0.0 | 0 | 0.372 | --- | --- |
| | 2007 | 0.0 | 0.0 | 0 | 0.082 | --- | --- |
| | 2008 | 0.0 | 0.0 | 0 | 0.138 | --- | --- |
| | 2009 | 0.0 | 0.0 | 0 | 0.113 | --- | --- |
| | 2010 | 0.0 | 0.0 | 0 | 0.359 | --- | --- |
| | 2011 | 0.0 | 0.0 | 0 | 0.291 | --- | --- |
| | 2012 | 0.0 | 0.0 | 0 | 0.194 | --- | --- |
| | 2013 | 0.0 | 0.0 | 0 | 0.229 | --- | --- |
| | 2014 | 0.0 | 0.0 | 0 | 0.188 | --- | --- |
| | 2015 | 0.0 | 0.0 | 0 | 0.255 | --- | --- |

[19] Three Mile Island 1 resumed commercial power generation in October 1985 after being under regulatory restraint since 1979.

[20] 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. From 2001-2015, TMI voluntarily provided an estimate of the collective dose for Unit 2, but not the number of individuals with measurable dose.

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **TROJAN**[21] | 1977 | 792.0 | 92.6 | 591 | 174 | 0.29 | 0.22 |
| Docket 50-344; | 1978 | 205.5 | 20.6 | 711 | 319 | 0.45 | 1.55 |
| NPF-1 | 1979 | 631.0 | 58.1 | 736 | 258 | 0.35 | 0.41 |
| 1st commercial operation 5/76 | 1980 | 727.5 | 72.5 | 1,159 | 421 | 0.36 | 0.58 |
| Type - PWR | 1981 | 775.6 | 74.1 | 1,311 | 609 | 0.46 | 0.79 |
| Capacity - (1,080) MWe | 1982 | 579.5 | 60.8 | 977 | 419 | 0.43 | 0.72 |
| | 1983 | 494.2 | 62.4 | 969 | 307 | 0.32 | 0.62 |
| | 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 | 46.417 | 0.16 | --- |
| | 1999 | 0.0 | 0.0 | 274 | 51.504 | 0.19 | --- |
| | 2000 | 0.0 | 0.0 | 127 | 17.631 | 0.14 | --- |
| | 2001 | 0.0 | 0.0 | 14 | 1.091 | 0.08 | --- |
| | 2002 | 0.0 | 0.0 | 13 | 0.536 | 0.04 | --- |
| | 2003 | 0.0 | 0.0 | 105 | 23.996 | 0.23 | --- |
| | 2004 | 0.0 | 0.0 | 5 | 0.079 | 0.02 | --- |
| **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, DPR-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 - 837, 821 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 | 156.415 | 0.15 | 0.12 |
| | 1999 | 1,352.5 | 96.5 | 919 | 127.567 | 0.14 | 0.09 |
| | 2000 | 1,283.7 | 92.2 | 1,292 | 219.852 | 0.17 | 0.17 |
| | 2001 | 1,324.1 | 95.0 | 827 | 101.575 | 0.12 | 0.08 |
| | 2002 | 1,374.0 | 97.9 | 793 | 73.764 | 0.09 | 0.05 |
| | 2003 | 1,253.2 | 91.6 | 1,442 | 247.053 | 0.17 | 0.20 |

[21] Trojan ceased operations in 1992 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. As of 2005, Trojan no longer reports under its reactor license, but does report under its ISFSI license (see Appendix A).

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **TURKEY POINT 3, 4** (continued) | 2004 | 1,231.0 | 89.9 | 1,089 | 117.404 | 0.11 | 0.10 |
| | 2005 | 1,143.0 | 84.9 | 1,136 | 109.996 | 0.10 | 0.10 |
| | 2006 | 1,251.8 | 90.0 | 1,321 | 149.208 | 0.11 | 0.12 |
| | 2007 | 1,281.5 | 91.0 | 1,085 | 107.601 | 0.10 | 0.08 |
| | 2008 | 1,294.9 | 92.0 | 1,067 | 97.357 | 0.09 | 0.08 |
| | 2009 | 1,219.7 | 87.6 | 1,359 | 166.217 | 0.12 | 0.14 |
| | 2010 | 1,290.9 | 91.9 | 1,025 | 86.749 | 0.08 | 0.07 |
| | 2011 | 1,245.7 | 89.6 | 921 | 62.326 | 0.07 | 0.05 |
| | 2012 | 878.0 | 67.9 | 2,024 | 241.151 | 0.12 | 0.27 |
| | 2013 | 1,245.9 | 82.7 | 882 | 82.215 | 0.09 | 0.07 |
| | 2014 | 1,375.7 | 89.4 | 1,271 | 114.326 | 0.09 | 0.08 |
| | 2015 | 1,489.7 | 92.7 | 933 | 79.124 | 0.08 | 0.05 |
| | 2016 | 1,567.7 | 95.6 | 892 | 76.269 | 0.09 | 0.05 |
| | 2017 | 1,451.9 | 88.8 | 1,104 | 108.200 | 0.10 | 0.07 |
| | 2018 | 1,570.2 | 94.9 | 651 | 51.088 | 0.08 | 0.03 |
| **VERMONT YANKEE**[22] Docket 50-271; DPR-28 1st commercial operation 11/72 Type - BWR Capacity - (605) MWe | 1973 | 222.1 | --- | 244 | 85 | 0.35 | 0.38 |
| | 1974 | 303.5 | --- | 357 | 216 | 0.61 | 0.71 |
| | 1975 | 429.0 | 87.8 | 282 | 153 | 0.54 | 0.36 |
| | 1976 | 389.6 | 77.1 | 815 | 411 | 0.50 | 1.05 |
| | 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 |
| | 1984 | 398.1 | 79.0 | 954 | 626 | 0.66 | 1.57 |
| | 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 | 199.399 | 0.21 | 0.52 |
| | 1999 | 463.4 | 91.0 | 854 | 175.795 | 0.21 | 0.38 |
| | 2000 | 517.8 | 99.6 | 198 | 37.846 | 0.19 | 0.07 |
| | 2001 | 474.9 | 93.5 | 863 | 143.010 | 0.17 | 0.30 |
| | 2002 | 451.0 | 91.7 | 946 | 150.446 | 0.16 | 0.33 |
| | 2003 | 505.9 | 98.8 | 359 | 54.348 | 0.15 | 0.11 |
| | 2004 | 439.2 | 87.2 | 1,379 | 211.529 | 0.15 | 0.48 |
| | 2005 | 467.5 | 94.2 | 1,105 | 198.003 | 0.18 | 0.42 |
| | 2006 | 582.9 | 100.0 | 380 | 49.537 | 0.13 | 0.08 |
| | 2007 | 537.0 | 93.0 | 1,191 | 171.200 | 0.14 | 0.32 |
| | 2008 | 557.3 | 94.1 | 1,402 | 213.680 | 0.15 | 0.38 |
| | 2009 | 611.9 | 100.0 | 392 | 61.105 | 0.16 | 0.10 |
| | 2010 | 548.6 | 91.2 | 1,071 | 206.321 | 0.19 | 0.38 |
| | 2011 | 562.1 | 93.3 | 1,029 | 176.129 | 0.17 | 0.31 |
| | 2013 | 555.5 | 92.9 | 1,034 | 170.340 | 0.16 | 0.31 |
| | 2014 | 580.4 | 99.3 | 196 | 21.350 | 0.11 | 0.04 |
| | 2015 | 0.0 | 0.0 | 413 | 49.557 | 0.12 | --- |
| | 2016 | 0.0 | 0.0 | 128 | 12.513 | 0.10 | --- |
| | 2017 | 0.0 | 0.0 | 128 | 13.698 | 0.11 | --- |
| | 2018 | 0.0 | 0.0 | 185 | 17.807 | 0.10 | --- |

[22] Vermont Yankee ceased operations in December 2014 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 per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **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, NPF-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 - 1,150, 1,152 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 | 162.210 | 0.16 | 0.08 |
| | 1999 | 2,106.0 | 91.5 | 1,359 | 228.942 | 0.17 | 0.11 |
| | 2000 | 2,223.9 | 95.6 | 899 | 121.312 | 0.14 | 0.05 |
| | 2001 | 2,231.5 | 96.2 | 870 | 129.270 | 0.15 | 0.06 |
| | 2002 | 1,942.0 | 85.3 | 1,152 | 243.957 | 0.21 | 0.13 |
| | 2003 | 2,179.9 | 94.8 | 806 | 84.344 | 0.10 | 0.04 |
| | 2004 | 2,200.7 | 95.7 | 765 | 80.763 | 0.11 | 0.04 |
| | 2005 | 2,027.9 | 88.6 | 1,099 | 151.096 | 0.14 | 0.07 |
| | 2006 | 2,048.8 | 89.0 | 892 | 115.509 | 0.13 | 0.06 |
| | 2007 | 2,089.9 | 92.0 | 951 | 120.515 | 0.13 | 0.06 |
| | 2008 | 2,023.9 | 89.3 | 1,185 | 137.620 | 0.12 | 0.07 |
| | 2009 | 2,201.6 | 95.7 | 931 | 79.681 | 0.09 | 0.04 |
| | 2010 | 2,238.6 | 95.8 | 924 | 89.182 | 0.10 | 0.04 |
| | 2011 | 2,138.0 | 92.6 | 1,179 | 118.931 | 0.10 | 0.06 |
| | 2012 | 2,226.6 | 95.7 | 776 | 59.317 | 0.08 | 0.03 |
| | 2013 | 2,178.4 | 95.3 | 857 | 78.298 | 0.09 | 0.04 |
| | 2014 | 2,065.8 | 91.6 | 1,404 | 156.744 | 0.11 | 0.08 |
| | 2015 | 2,210.0 | 95.3 | 843 | 60.565 | 0.07 | 0.03 |
| | 2016 | 2,267.1 | 97.0 | 778 | 58.472 | 0.08 | 0.03 |
| | 2017 | 2,189.0 | 94.3 | 938 | 80.556 | 0.09 | 0.04 |
| | 2018 | 2,278.4 | 97.1 | 641 | 46.855 | 0.07 | 0.02 |
| **WATERFORD 3** | 1986 | 875.7 | 79.1 | 1,244 | 223 | 0.18 | 0.25 |
| Docket 50-382; | 1987 | 891.8 | 82.5 | 959 | 156 | 0.16 | 0.17 |
| NPF-38 | 1988 | 784.3 | 75.4 | 1,246 | 259 | 0.21 | 0.33 |
| 1st commercial operation 9/85 | 1989 | 909.8 | 82.6 | 1,306 | 265 | 0.20 | 0.29 |
| Type - PWR | 1990 | 1,027.9 | 92.8 | 432 | 47 | 0.11 | 0.05 |
| Capacity - 1,152 MWe | 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 | 24.032 | 0.09 | 0.02 |
| | 1999 | 849.5 | 79.6 | 833 | 123.198 | 0.15 | 0.15 |
| | 2000 | 965.1 | 88.8 | 825 | 131.701 | 0.16 | 0.14 |
| | 2001 | 1,086.0 | 99.6 | 91 | 4.677 | 0.05 | 0.00 |
| | 2002 | 1,007.0 | 93.2 | 811 | 109.439 | 0.13 | 0.11 |
| | 2003 | 968.0 | 90.9 | 710 | 95.332 | 0.13 | 0.10 |
| | 2004 | 1,099.1 | 100.0 | 60 | 2.517 | 0.04 | 0.00 |
| | 2005 | 900.9 | 80.2 | 902 | 136.318 | 0.15 | 0.15 |
| | 2006 | 1,059.3 | 92.0 | 1,190 | 109.682 | 0.09 | 0.10 |
| | 2007 | 1,130.2 | 96.0 | 469 | 20.125 | 0.04 | 0.02 |
| | 2008 | 1,030.7 | 88.0 | 1,268 | 134.221 | 0.11 | 0.13 |
| | 2009 | 1,023.4 | 88.0 | 1,479 | 255.088 | 0.17 | 0.25 |
| | 2010 | 1,173.1 | 100.0 | 216 | 4.913 | 0.02 | 0.00 |
| | 2011 | 1,020.8 | 90.4 | 1,144 | 100.053 | 0.09 | 0.10 |
| | 2012 | 897.1 | 78.0 | 1,919 | 260.202 | 0.14 | 0.29 |
| | 2013 | 1,071.6 | 93.7 | 130 | 3.129 | 0.02 | 0.00 |
| | 2014 | 1,046.4 | 91.5 | 965 | 69.462 | 0.07 | 0.07 |
| | 2015 | 959.5 | 85.1 | 979 | 65.826 | 0.07 | 0.07 |
| | 2016 | 1,152.5 | 98.4 | 248 | 3.392 | 0.01 | 0.00 |
| | 2017 | 959.1 | 83.8 | 894 | 60.728 | 0.07 | 0.06 |
| | 2018 | 1,175.6 | 100.0 | 98 | 1.130 | 0.01 | 0.00 |

| Reporting Organization | Year | Megawatt Years (MW-yr) | Unit Availability Factor | Total Personnel with Measurable Doses | Collective Dose per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **WATTS BAR 1, 2** | 1997 | 867.6 | 83.8 | 1,103 | 113 | 0.10 | 0.13 |
| Docket 50-390, 50-391; | 1998 | 1,105.1 | 99.1 | 96 | 3.106 | 0.03 | 0.00 |
| NPF-90, NPF-96 | 1999 | 943.1 | 87.2 | 975 | 98.946 | 0.10 | 0.10 |
| 1st commercial operation | 2000 | 1,033.3 | 92.8 | 1,053 | 122.453 | 0.12 | 0.12 |
| 5/96, 10/16 | 2001 | 1,095.9 | 96.5 | 197 | 5.912 | 0.03 | 0.01 |
| Type - PWR | 2002 | 1,034.0 | 92.1 | 909 | 93.598 | 0.10 | 0.09 |
| Capacity - 1,037, 1,135 MWe | 2003 | 973.3 | 86.7 | 1,392 | 165.741 | 0.12 | 0.17 |
| | 2004 | 1,122.1 | 99.1 | 220 | 5.893 | 0.03 | 0.01 |
| | 2005 | 1,003.7 | 90.0 | 1,244 | 143.506 | 0.12 | 0.14 |
| | 2006 | 764.5 | 70.0 | 2,070 | 322.682 | 0.16 | 0.42 |
| | 2007 | 1,150.6 | 100.0 | 128 | 4.414 | 0.03 | 0.00 |
| | 2008 | 923.5 | 83.2 | 887 | 70.648 | 0.08 | 0.08 |
| | 2009 | 1,051.1 | 92.1 | 853 | 63.846 | 0.07 | 0.06 |
| | 2010 | 1,111.7 | 98.3 | 129 | 6.193 | 0.05 | 0.01 |
| | 2011 | 939.6 | 85.4 | 900 | 51.021 | 0.06 | 0.05 |
| | 2012 | 969.5 | 86.5 | 1,002 | 62.779 | 0.06 | 0.06 |
| | 2013 | 1,137.9 | 99.5 | 85 | 2.616 | 0.03 | 0.00 |
| | 2014 | 1,003.4 | 89.0 | 600 | 28.268 | 0.05 | 0.03 |
| | 2015 | 964.5 | 87.5 | 976 | 64.320 | 0.07 | 0.07 |
| | 2016 | 1,284.1 | 97.8 | 189 | 4.489 | 0.02 | 0.00 |
| | 2017 | 1,558.2 | 69.6 | 1,074 | 75.672 | 0.07 | 0.05 |
| | 2018 | 2,110.1 | 92.3 | 779 | 36.920 | 0.05 | 0.02 |
| **WOLF CREEK 1** | 1986 | 832.8 | 73.3 | 682 | 143 | 0.21 | 0.17 |
| Docket 50-482; | 1987 | 778.8 | 71.1 | 675 | 138 | 0.20 | 0.18 |
| NPF-42 | 1988 | 794.7 | 70.7 | 1,010 | 297 | 0.29 | 0.37 |
| 1st commercial operation 9/85 | 1989 | 1,108.4 | 99.5 | 186 | 18 | 0.10 | 0.02 |
| Type - PWR | 1990 | 940.2 | 81.0 | 798 | 195 | 0.24 | 0.21 |
| Capacity - 1,164 MWe | 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 | 10.382 | 0.06 | 0.01 |
| | 1999 | 1,045.3 | 90.1 | 812 | 147.704 | 0.18 | 0.14 |
| | 2000 | 1,032.7 | 89.5 | 861 | 143.417 | 0.17 | 0.14 |
| | 2001 | 1,177.9 | 100.0 | 105 | 5.176 | 0.05 | 0.00 |
| | 2002 | 1,029.0 | 88.7 | 816 | 99.987 | 0.12 | 0.10 |
| | 2003 | 1,013.5 | 87.2 | 820 | 88.941 | 0.11 | 0.09 |
| | 2004 | 1,153.5 | 98.8 | 93 | 3.388 | 0.04 | 0.00 |
| | 2005 | 1,004.2 | 86.7 | 856 | 106.870 | 0.12 | 0.11 |
| | 2006 | 1,067.4 | 91.0 | 789 | 96.788 | 0.12 | 0.09 |
| | 2007 | 1,183.7 | 100.0 | 91 | 4.307 | 0.05 | 0.00 |
| | 2008 | 968.3 | 83.1 | 911 | 94.997 | 0.10 | 0.10 |
| | 2009 | 1,001.0 | 86.9 | 1,504 | 73.637 | 0.05 | 0.07 |
| | 2010 | 1,090.8 | 94.2 | 463 | 10.516 | 0.02 | 0.01 |
| | 2011 | 839.1 | 73.0 | 1,266 | 133.960 | 0.11 | 0.16 |
| | 2012 | 944.4 | 80.0 | 306 | 7.888 | 0.03 | 0.01 |
| | 2013 | 819.2 | 72.5 | 1,452 | 111.257 | 0.08 | 0.14 |
| | 2014 | 978.2 | 81.9 | 709 | 27.500 | 0.04 | 0.03 |
| | 2015 | 987.9 | 82.5 | 1,190 | 74.804 | 0.06 | 0.08 |
| | 2016 | 942.0 | 78.5 | 1,267 | 90.631 | 0.07 | 0.10 |
| | 2017 | 1,215.5 | 100.0 | 238 | 3.437 | 0.01 | 0.00 |
| | 2018 | 1,047.5 | 86.9 | 1,153 | 72.882 | 0.06 | 0.07 |
| **YANKEE ROWE**[23] | 1969 | 138.3 | --- | 193 | 215 | 1.11 | 1.55 |
| Docket 50-29; | 1970 | 146.1 | --- | 355 | 255 | 0.72 | 1.75 |
| DPR-3 | 1971 | 173.5 | --- | 155 | 90 | 0.58 | 0.52 |
| 1st commercial operation 7/61 | 1972 | 78.7 | --- | 282 | 255 | 0.90 | 3.24 |
| Type - PWR | 1973 | 127.1 | --- | 133 | 99 | 0.74 | 0.78 |
| Capacity - (175) MWe | 1974 | 111.3 | --- | 243 | 205 | 0.84 | 1.84 |

[23] Yankee Rowe ceased operations as of October 1991 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 per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **YANKEE ROWE**[23] | 1975 | 145.1 | 82.4 | 249 | 116 | 0.47 | 0.80 |
| (continued) | 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 | 0.13 | 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 | 4.603 | 0.04 | --- |
| | 1999 | 0.0 | 0.0 | 83 | 2.291 | 0.02 | --- |
| | 2000 | 0.0 | 0.0 | 38 | 2.406 | 0.06 | --- |
| | 2001 | 0.0 | 0.0 | 48 | 3.969 | 0.08 | --- |
| | 2002 | 0.0 | 0.0 | 128 | 20.024 | 0.16 | --- |
| | 2003 | 0.0 | 0.0 | 136 | 30.934 | 0.23 | --- |
| | 2004 | 0.0 | 0.0 | 70 | 6.502 | 0.09 | --- |
| | 2005 | 0.0 | 0.0 | 63 | 1.456 | 0.02 | --- |
| | 2006 | 0.0 | 0.0 | 45 | 0.975 | 0.02 | --- |
| | 2007 | 0.0 | 0.0 | 0 | 0.000 | --- | --- |
| | 2008 | 0.0 | 0.0 | 1 | 0.019 | 0.02 | --- |
| | 2009 | 0.0 | 0.0 | 5 | 0.114 | 0.02 | --- |
| | 2010 | 0.0 | 0.0 | 3 | 0.083 | 0.03 | --- |
| | 2011 | 0.0 | 0.0 | 8 | 0.113 | 0.01 | --- |
| | 2012 | 0.0 | 0.0 | 1 | 0.013 | 0.01 | --- |
| | 2013 | 0.0 | 0.0 | 2 | 0.043 | 0.02 | --- |
| | 2014 | 0.0 | 0.0 | 10 | 0.145 | 0.01 | --- |
| | 2015 | 0.0 | 0.0 | 25 | 0.463 | 0.02 | --- |
| | 2016 | 0.0 | 0.0 | 5 | 0.073 | 0.01 | --- |
| | 2017 | 0.0 | 0.0 | 7 | 0.112 | 0.02 | --- |
| | 2018 | 0.0 | 0.0 | 4 | 0.045 | 0.01 | --- |
| **ZION 1, 2**[24] | 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, DPR-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 - (1,040), (1,040) 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 |

[23] Yankee Rowe ceased operations as of October 1991 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.

[24] Zion 1, 2 ceased operations in 1997 and 1996, respectively, and are 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 per Site (person-rem) | Average Measurable Dose (rem) | Collective Dose/ MW-yr |
|---|---|---|---|---|---|---|---|
| **ZION 1, 2**[24] (continued) | 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 | 12.417 | 0.05 | --- |
| | 1999 | 0.0 | 0.0 | 67 | 4.194 | 0.06 | --- |
| | 2000 | 0.0 | 0.0 | 26 | 3.015 | 0.12 | --- |
| | 2001 | 0.0 | 0.0 | 6 | 0.274 | 0.05 | --- |
| | 2002 | 0.0 | 0.0 | 12 | 0.276 | 0.02 | --- |
| | 2003 | 0.0 | 0.0 | 2 | 0.049 | 0.02 | --- |
| | 2004 | 0.0 | 0.0 | 6 | 0.167 | 0.03 | --- |
| | 2005 | 0.0 | 0.0 | 5 | 0.109 | 0.02 | --- |
| | 2006 | 0.0 | 0.0 | 7 | 0.109 | 0.02 | --- |
| | 2007 | 0.0 | 0.0 | 8 | 0.224 | 0.03 | --- |
| | 2008 | 0.0 | 0.0 | 7 | 0.147 | 0.02 | --- |
| | 2009 | 0.0 | 0.0 | 0 | 0.000 | --- | --- |
| | 2010 | 0.0 | 0.0 | 17 | 0.562 | 0.03 | --- |
| | 2011 | 0.0 | 0.0 | 128 | 28.794 | 0.22 | --- |
| | 2012 | 0.0 | 0.0 | 183 | 75.801 | 0.41 | --- |
| | 2013 | 0.0 | 0.0 | 218 | 44.689 | 0.20 | --- |
| | 2014 | 0.0 | 0.0 | 358 | 78.730 | 0.22 | --- |
| | 2015 | 0.0 | 0.0 | 340 | 142.605 | 0.42 | --- |
| | 2016 | 0.0 | 0.0 | 194 | 45.788 | 0.24 | --- |
| | 2017 | 0.0 | 0.0 | 75 | 4.542 | 0.06 | --- |
| | 2018 | 0.0 | 0.0 | 7 | 0.085 | 0.01 | --- |

[24] Zion 1, 2 ceased operations in 1997 and 1996, respectively, and are no longer included in the count of operating reactors. Parentheses indicate plant capacity when plant was operational.

# APPENDIX D

# DOSE PERFORMANCE TRENDS BY REACTOR SITE

# 1973–2018

Appendix D only contains data on plants still operating in 2018.

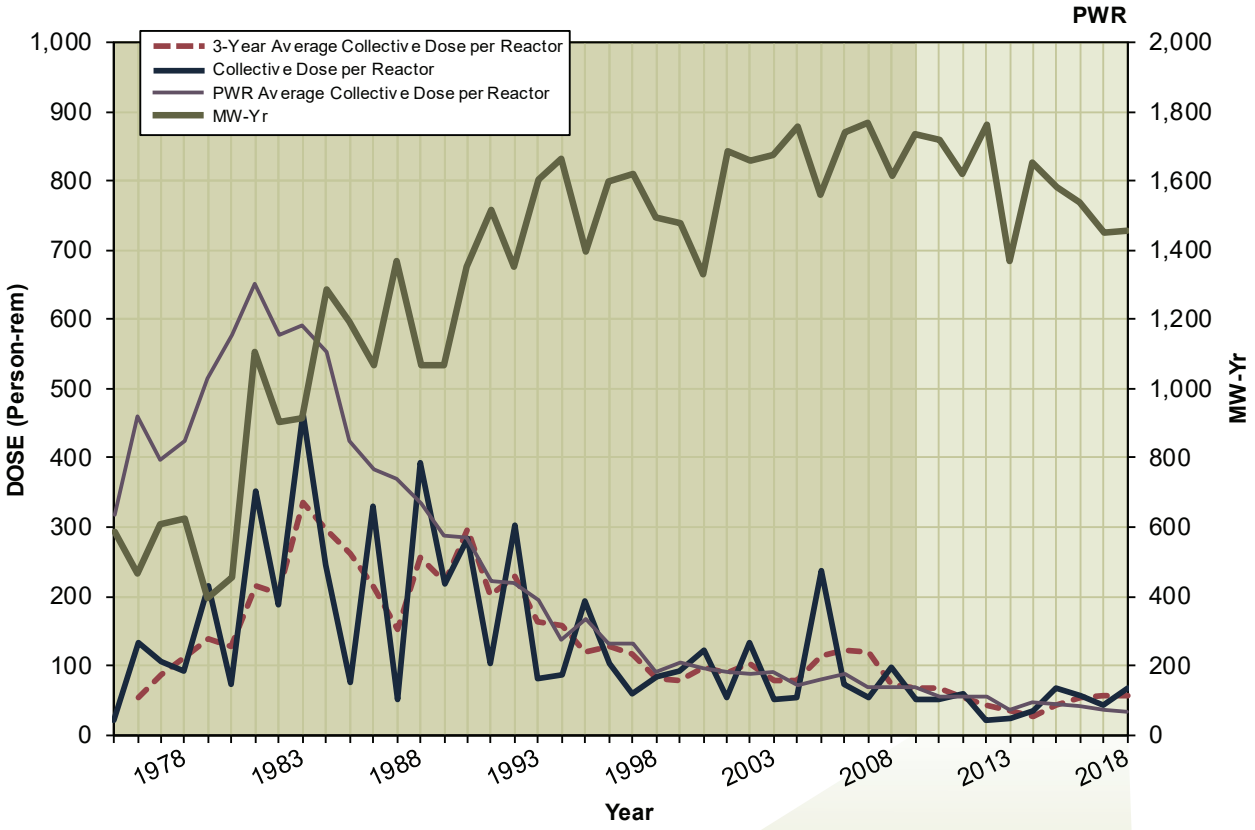
# DOSE PERFORMANCE TRENDS BY REACTOR SITE
# 1973– 2018

## GRAPHICAL REPRESENTATION OF DOSE TRENDS IN APPENDIX D

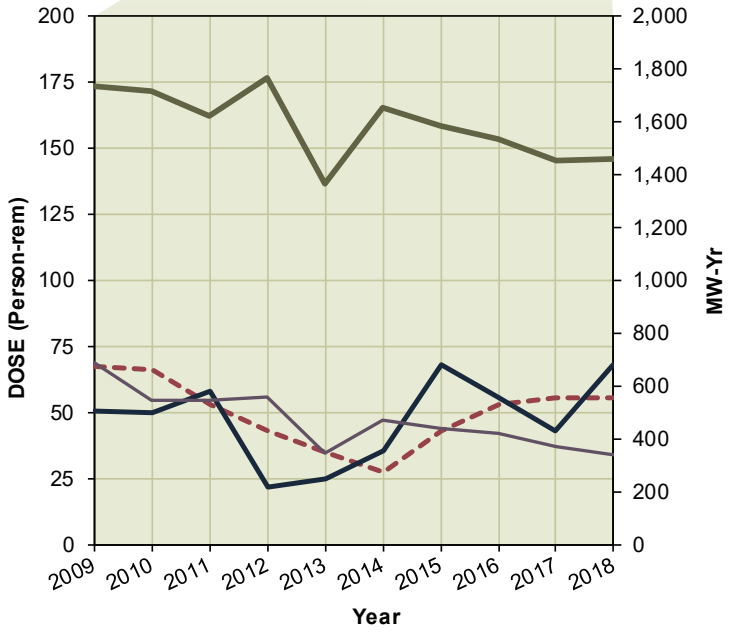
Each page of Appendix D presents a graph of selected dose performance trends from 1973 through 2018. The graphs illustrate the history of the collective dose per reactor for the site, the rolling 3-year average collective dose per reactor, and the electricity generated at the site. These data are plotted, beginning with each plant's first full year of commercial operation and continuing through 2018. Data for years when a plant was not in commercial operation have been included when available; however, any data reported before 1973 are not included. The 3-year average collective dose per reactor data are included because the data provide overall indication of each 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 Reactor Oversight Program to evaluate a licensee's as low as is reasonably achievable program. This average is determined by summing the collective dose per reactor for the current year and the previous 2 years and then dividing this sum by 3, which is the number of years considered. Depicting dose trends by using a 3-year average reduces the sporadic effects on annual doses of refueling operations (usually an 18- to 24-month cycle) and occasional high-dose maintenance activities and provides a more representative depiction of collective dose trends over the life of a plant. The annual average collective dose per reactor for all reactors of the same type is also shown on the graph.

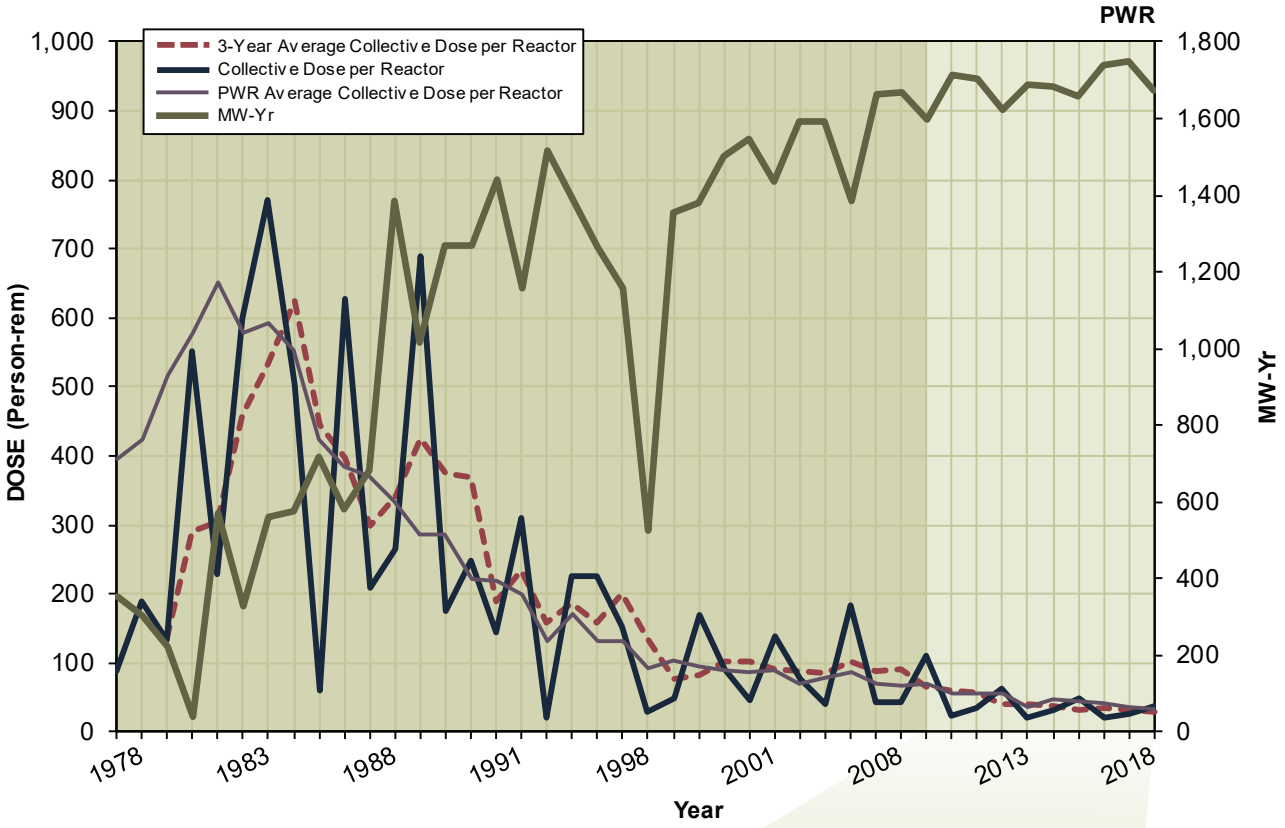
# ARKANSAS 1, 2
## Dose Performance Trends



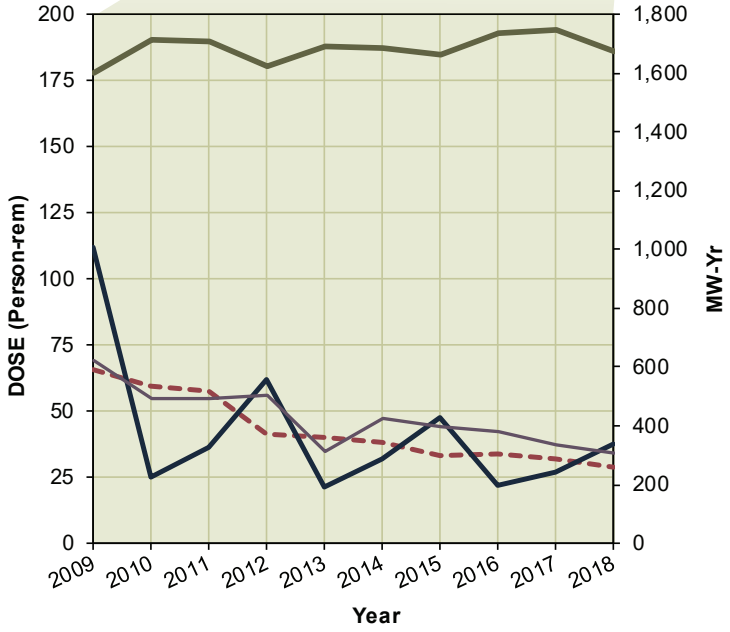

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 67.355 | 51.000 | 1,733.7 |
| 2010 | 66.351 | 50.000 | 1,716.6 |
| 2011 | 53.165 | 58.000 | 1,621.9 |
| 2012 | 43.361 | 22.000 | 1,764.5 |
| 2013 | 35.139 | 25.000 | 1,366.6 |
| 2014 | 27.585 | 36.000 | 1,654.6 |
| 2015 | 43.055 | 68.000 | 1,582.0 |
| 2016 | 53.232 | 55.553 | 1,535.7 |
| 2017 | 55.723 | 43.250 | 1,451.4 |
| 2018 | 55.664 | 68.187 | 1,456.8 |



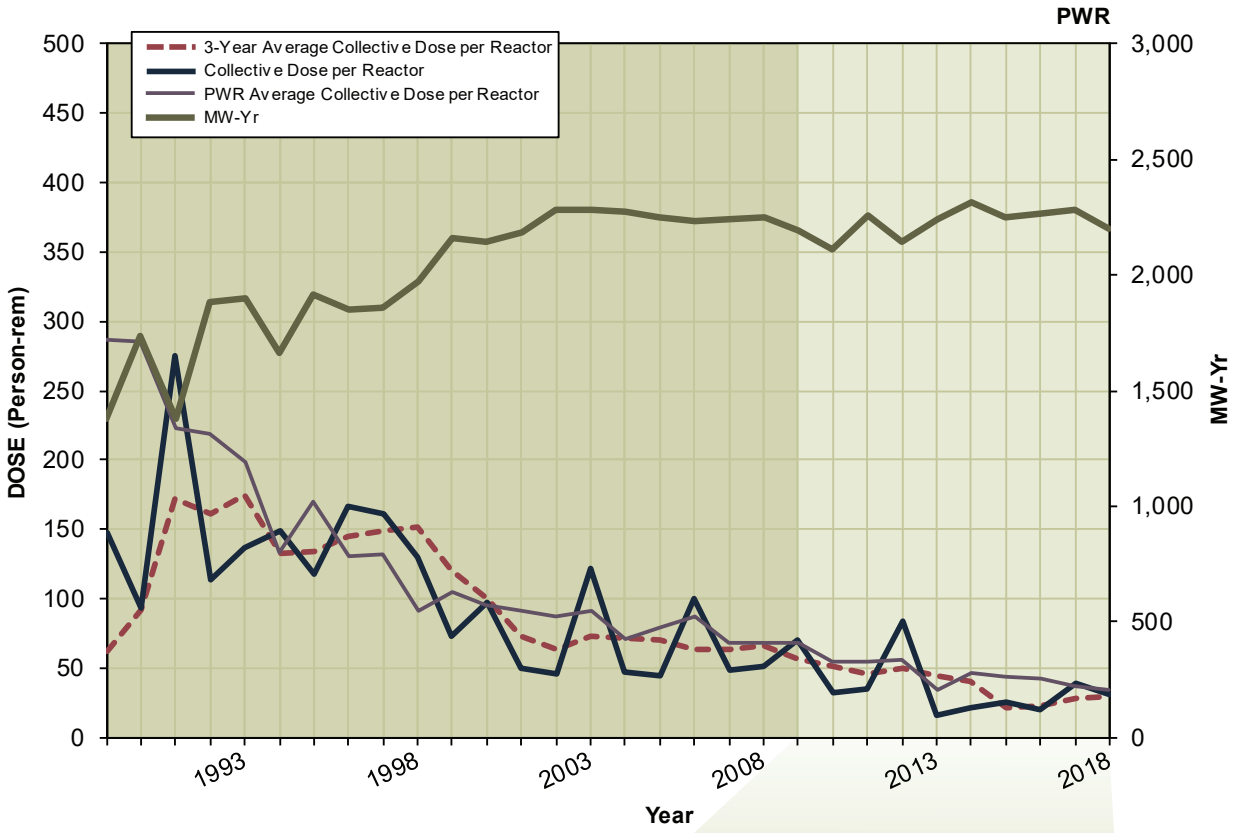
# BEAVER VALLEY 1, 2
## Dose Performance Trends



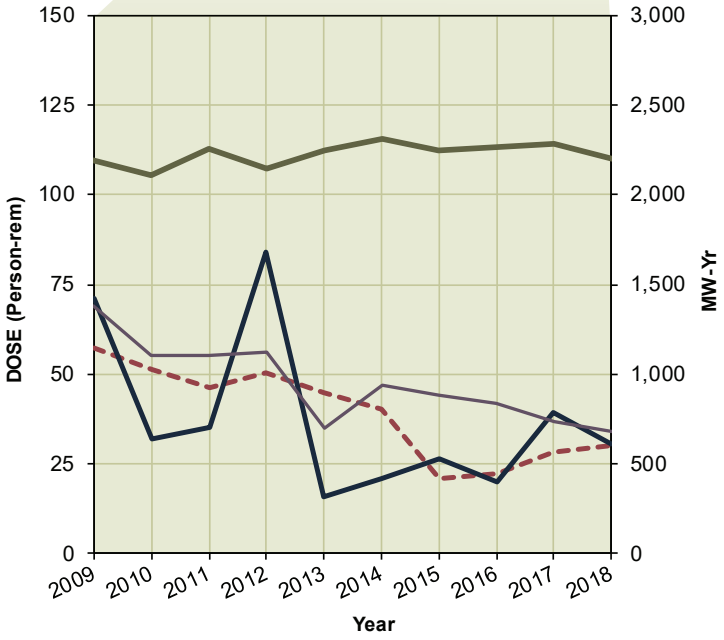

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 65.753 | 112.000 | 1,599.3 |
| 2010 | 59.650 | 25.000 | 1,714.2 |
| 2011 | 57.784 | 36.000 | 1,705.5 |
| 2012 | 41.226 | 62.000 | 1,622.6 |
| 2013 | 39.847 | 21.000 | 1,687.4 |
| 2014 | 38.305 | 32.000 | 1,684.6 |
| 2015 | 33.312 | 47.604 | 1,659.6 |
| 2016 | 33.718 | 22.073 | 1,737.4 |
| 2017 | 32.177 | 26.853 | 1,747.9 |
| 2018 | 28.776 | 37.401 | 1,672.8 |



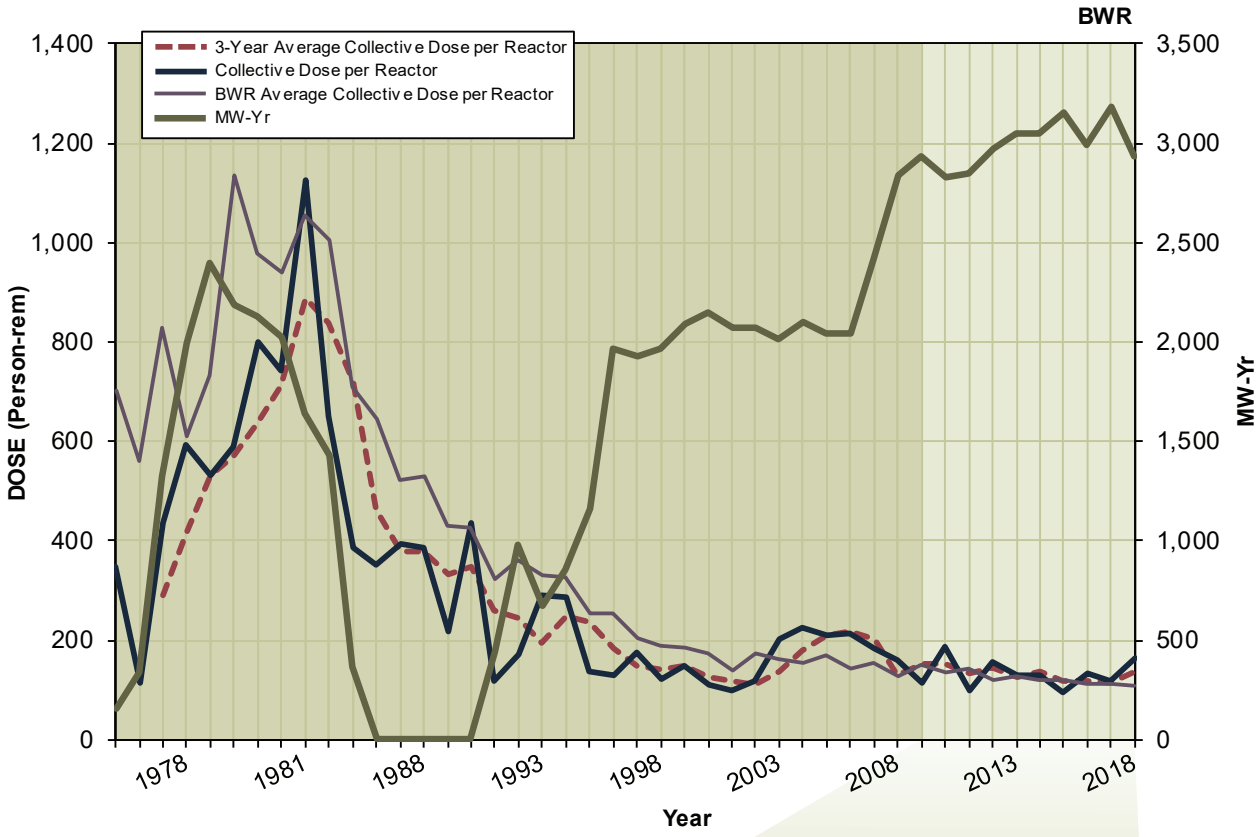
# BRAIDWOOD 1, 2
## Dose Performance Trends



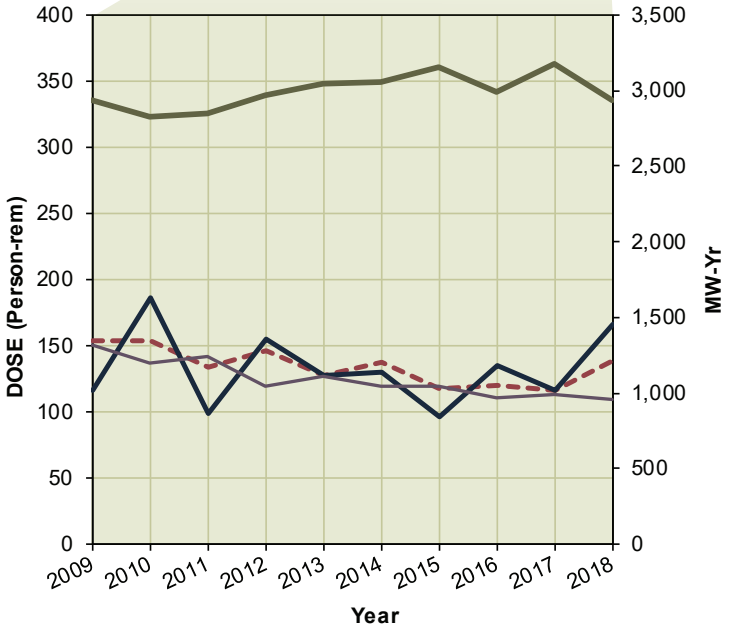

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 57.211 | 71.000 | 2,195.0 |
| 2010 | 51.520 | 32.000 | 2,111.9 |
| 2011 | 46.014 | 35.000 | 2,257.5 |
| 2012 | 50.279 | 84.000 | 2,141.0 |
| 2013 | 44.944 | 16.000 | 2,244.2 |
| 2014 | 40.333 | 21.000 | 2,313.9 |
| 2015 | 21.135 | 26.234 | 2,250.0 |
| 2016 | 22.443 | 19.848 | 2,265.9 |
| 2017 | 28.472 | 39.334 | 2,281.4 |
| 2018 | 29.911 | 30.550 | 2,201.3 |



# BROWNS FERRY 1, 2, 3*
## Dose Performance Trends

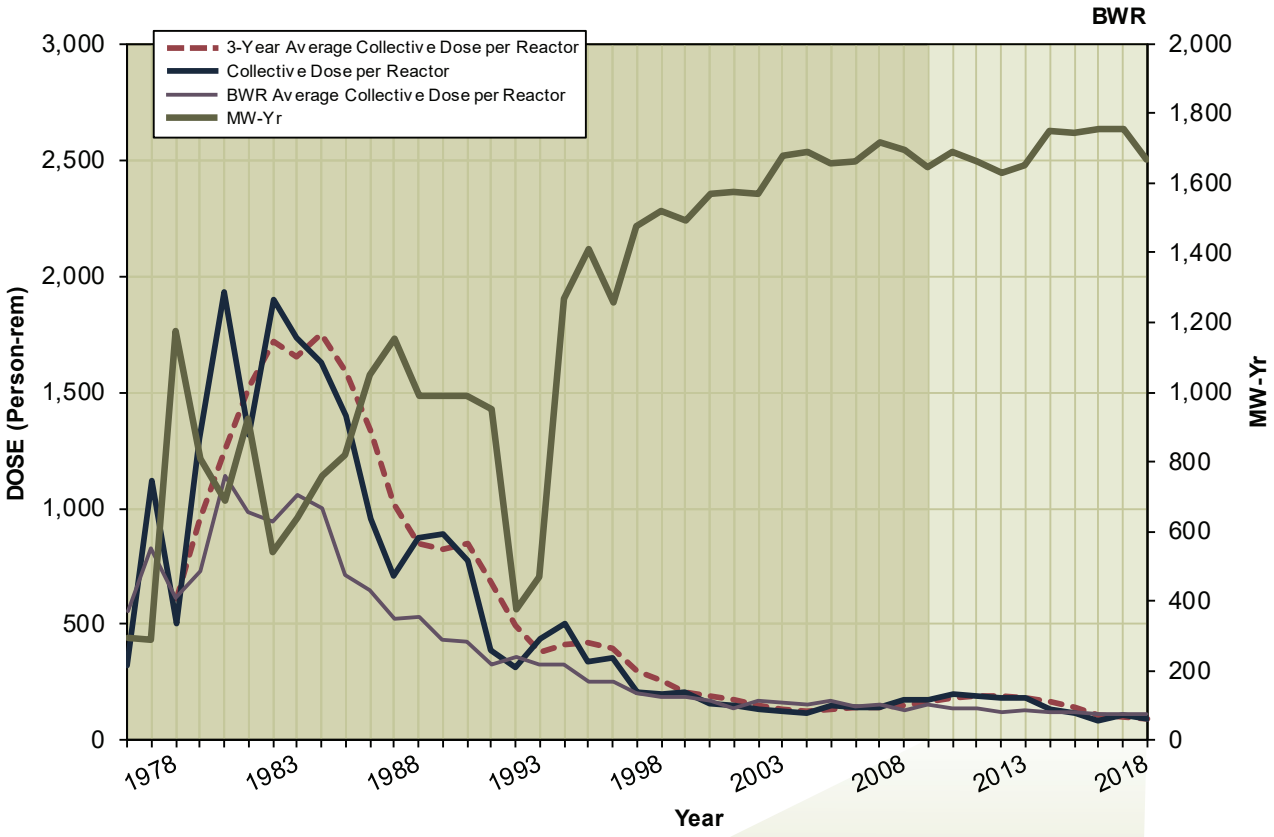



| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 153.862 | 116.000 | 2,933.1 |
| 2010 | 154.123 | 186.000 | 2,828.0 |
| 2011 | 133.516 | 99.000 | 2,845.8 |
| 2012 | 146.413 | 155.000 | 2,969.2 |
| 2013 | 127.064 | 128.000 | 3,050.0 |
| 2014 | 137.421 | 130.000 | 3,052.3 |
| 2015 | 117.836 | 96.021 | 3,158.6 |
| 2016 | 120.278 | 134.862 | 2,992.6 |
| 2017 | 115.857 | 116.687 | 3,179.0 |
| 2018 | 139.255 | 166.217 | 2,930.8 |

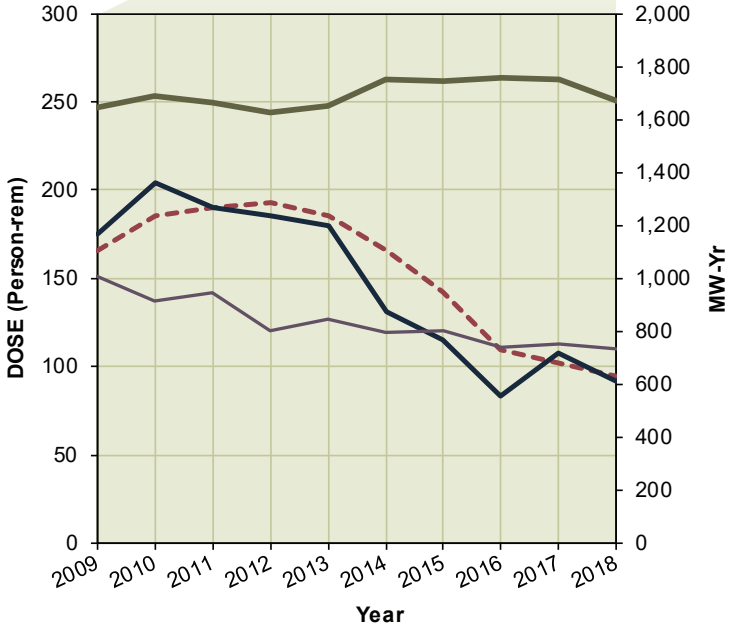



*Browns Ferry Unit 1 resumed power generation in 2007.

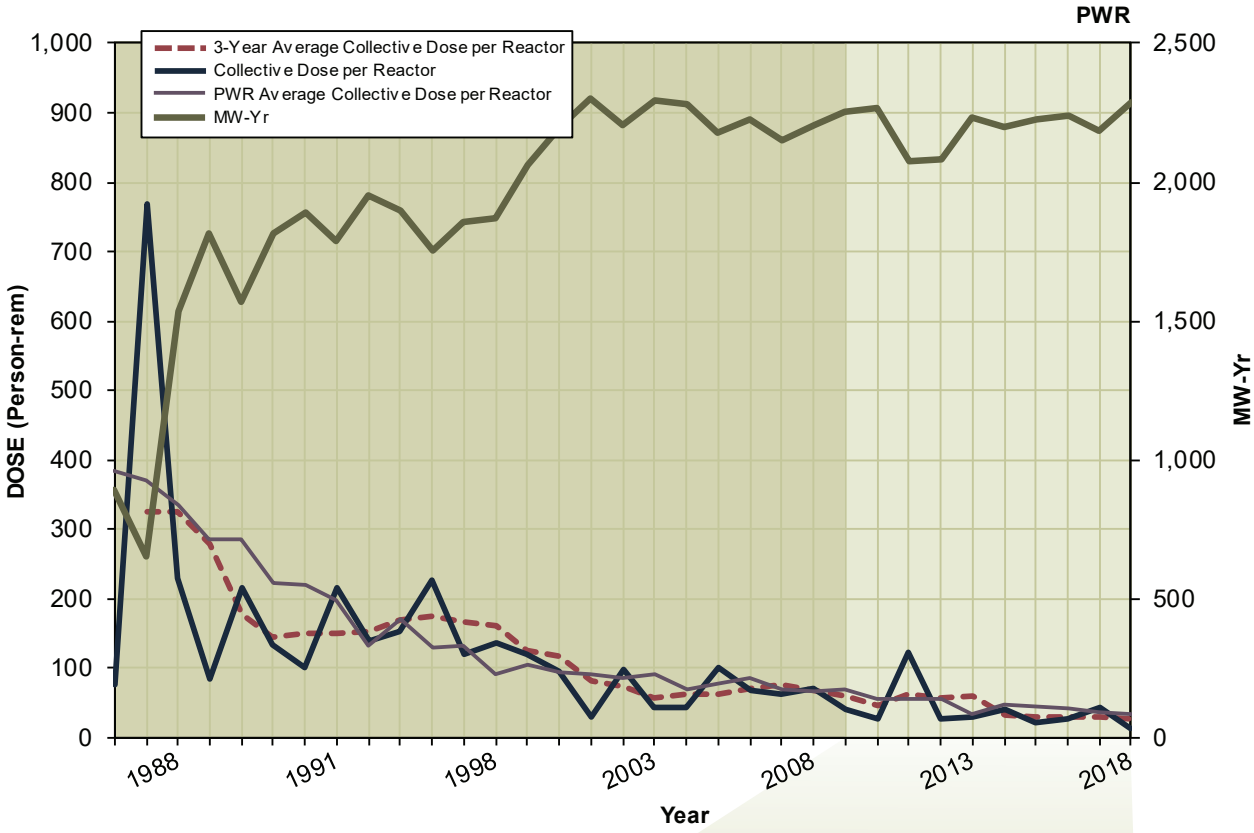
# BRUNSWICK 1, 2
## Dose Performance Trends



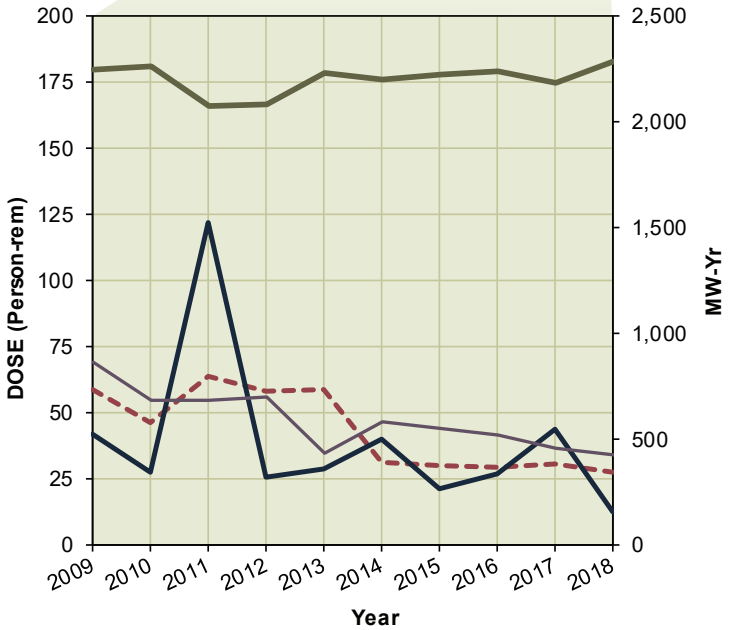

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 165.758 | 175.000 | 1,647.9 |
| 2010 | 185.329 | 204.000 | 1,690.7 |
| 2011 | 189.805 | 190.000 | 1,662.7 |
| 2012 | 193.059 | 185.000 | 1,629.3 |
| 2013 | 185.346 | 180.000 | 1,650.6 |
| 2014 | 165.487 | 130.952 | 1,750.6 |
| 2015 | 142.270 | 115.285 | 1,745.6 |
| 2016 | 109.952 | 83.618 | 1,756.7 |
| 2017 | 102.303 | 108.007 | 1,754.6 |
| 2018 | 94.421 | 91.638 | 1,669.7 |



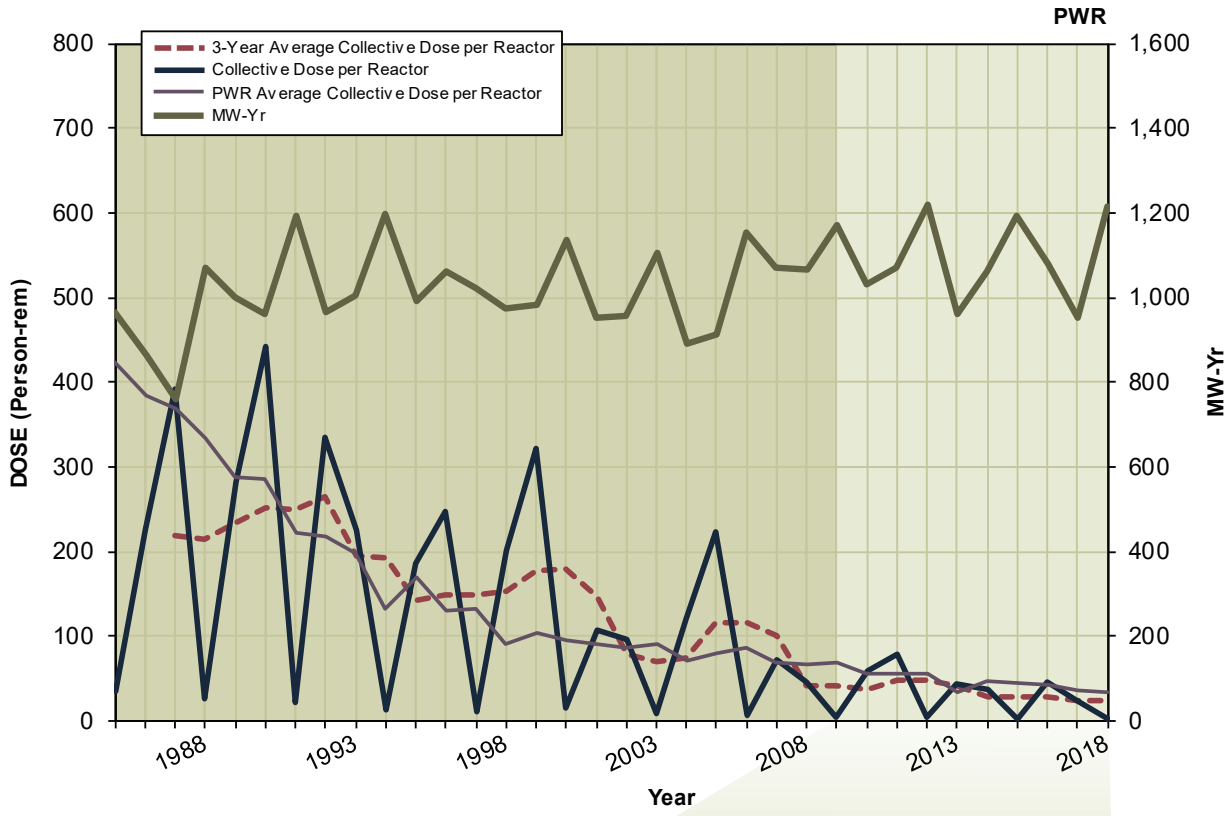
# BYRON 1, 2
## Dose Performance Trends



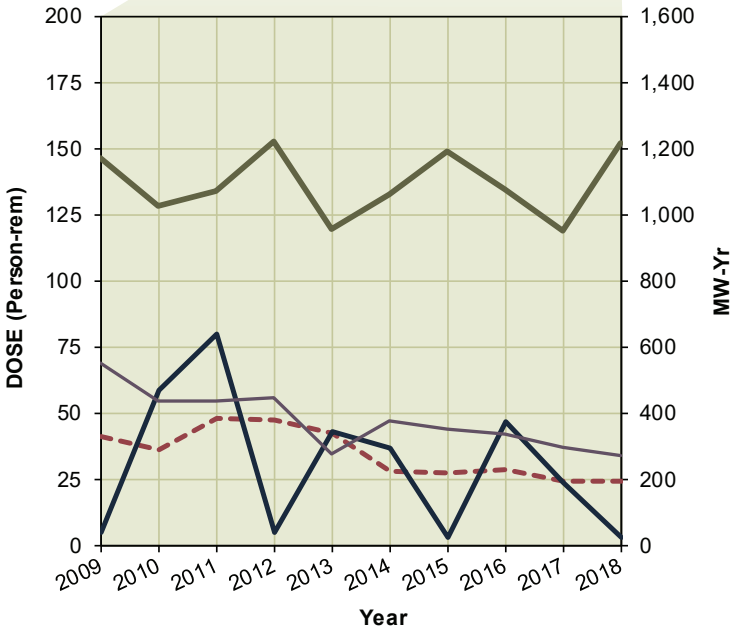

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 58.841 | 42.000 | 2,250.9 |
| 2010 | 46.778 | 28.000 | 2,266.6 |
| 2011 | 63.996 | 122.000 | 2,077.9 |
| 2012 | 58.584 | 26.000 | 2,085.4 |
| 2013 | 58.798 | 29.000 | 2,231.4 |
| 2014 | 31.567 | 40.000 | 2,197.8 |
| 2015 | 30.236 | 21.468 | 2,222.8 |
| 2016 | 29.620 | 27.006 | 2,237.5 |
| 2017 | 30.799 | 43.923 | 2,186.4 |
| 2018 | 27.836 | 12.578 | 2,288.9 |



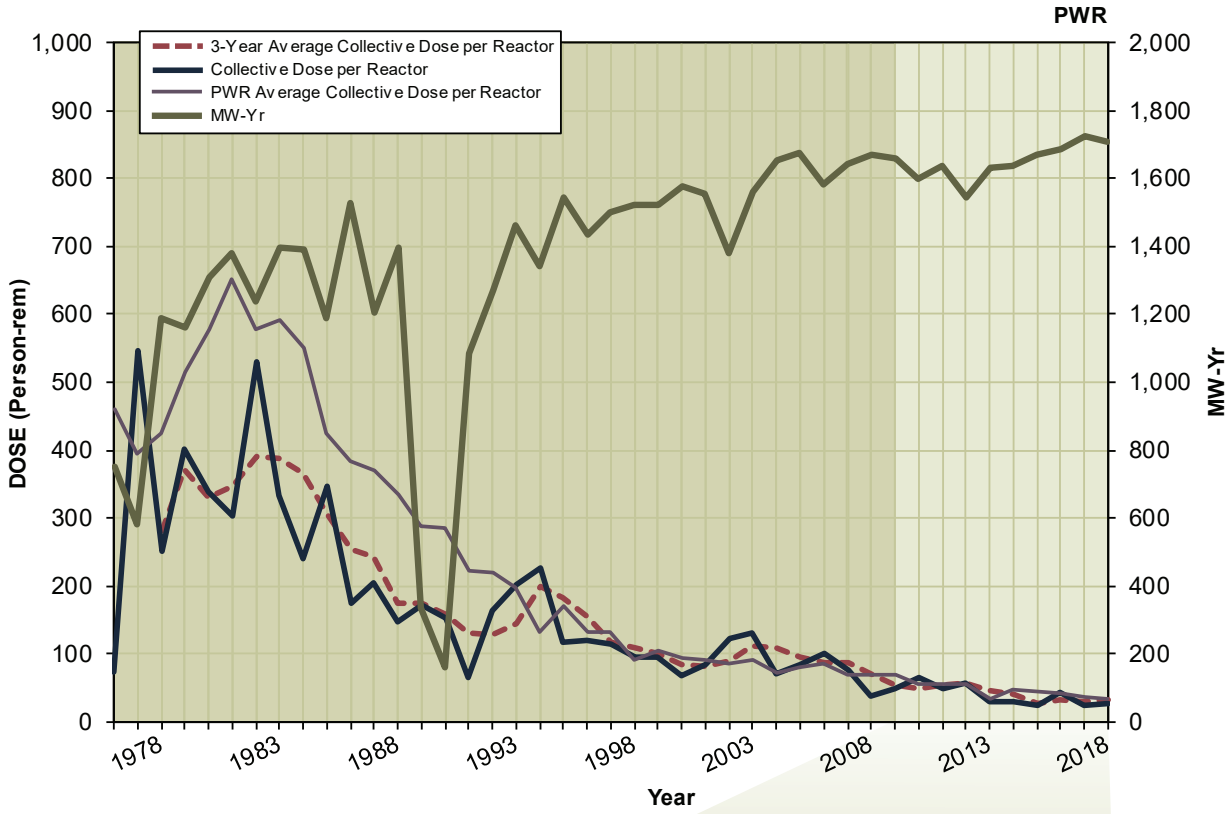
## CALLAWAY 1
Dose Performance Trends



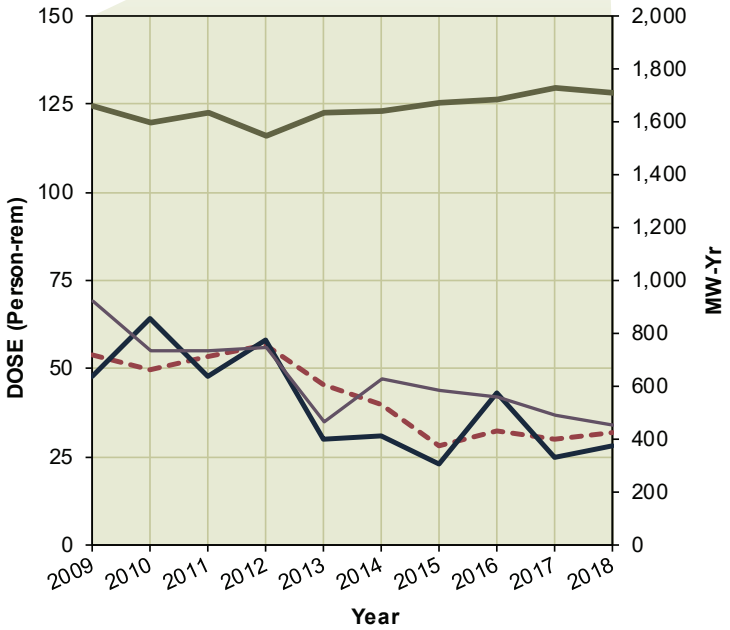

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 41.252 | 5.000 | 1,170.3 |
| 2010 | 36.419 | 59.000 | 1,029.9 |
| 2011 | 47.927 | 80.000 | 1,071.7 |
| 2012 | 47.829 | 5.000 | 1,220.2 |
| 2013 | 42.621 | 43.000 | 959.9 |
| 2014 | 28.274 | 37.000 | 1,061.3 |
| 2015 | 27.808 | 3.128 | 1,192.2 |
| 2016 | 29.024 | 46.770 | 1,078.3 |
| 2017 | 24.537 | 23.713 | 951.9 |
| 2018 | 24.565 | 3.211 | 1,216.6 |



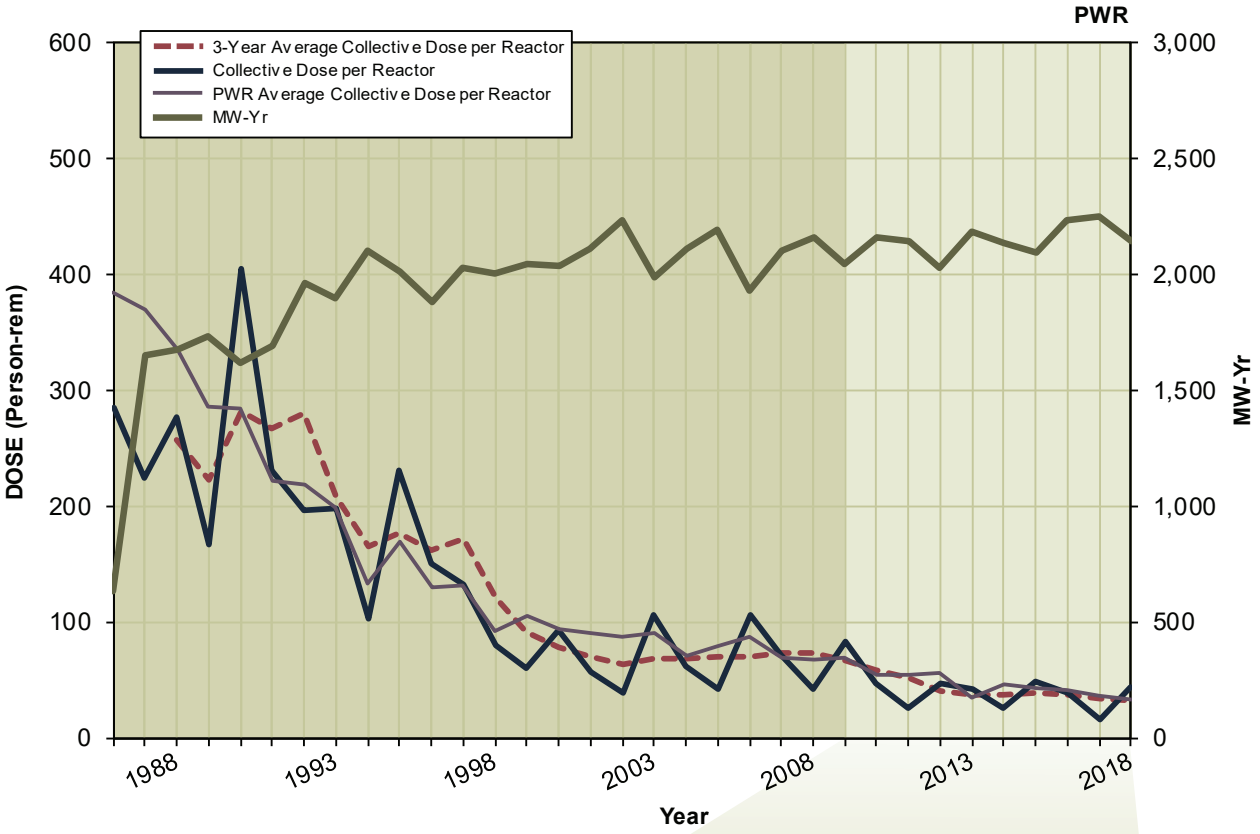
# CALVERT CLIFFS 1, 2
## Dose Performance Trends



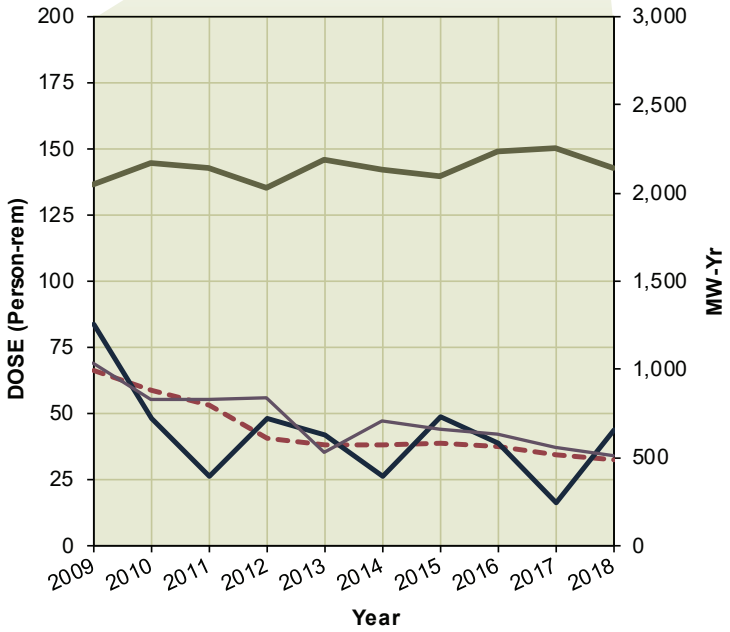

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 53.893 | 48.000 | 1,660.9 |
| 2010 | 49.756 | 64.000 | 1,597.3 |
| 2011 | 53.262 | 48.000 | 1,635.9 |
| 2012 | 56.557 | 58.000 | 1,545.6 |
| 2013 | 45.306 | 30.000 | 1,632.6 |
| 2014 | 39.778 | 31.000 | 1,638.3 |
| 2015 | 28.128 | 22.812 | 1,672.4 |
| 2016 | 32.263 | 42.946 | 1,685.6 |
| 2017 | 30.133 | 24.642 | 1,725.0 |
| 2018 | 31.945 | 28.247 | 1,711.0 |



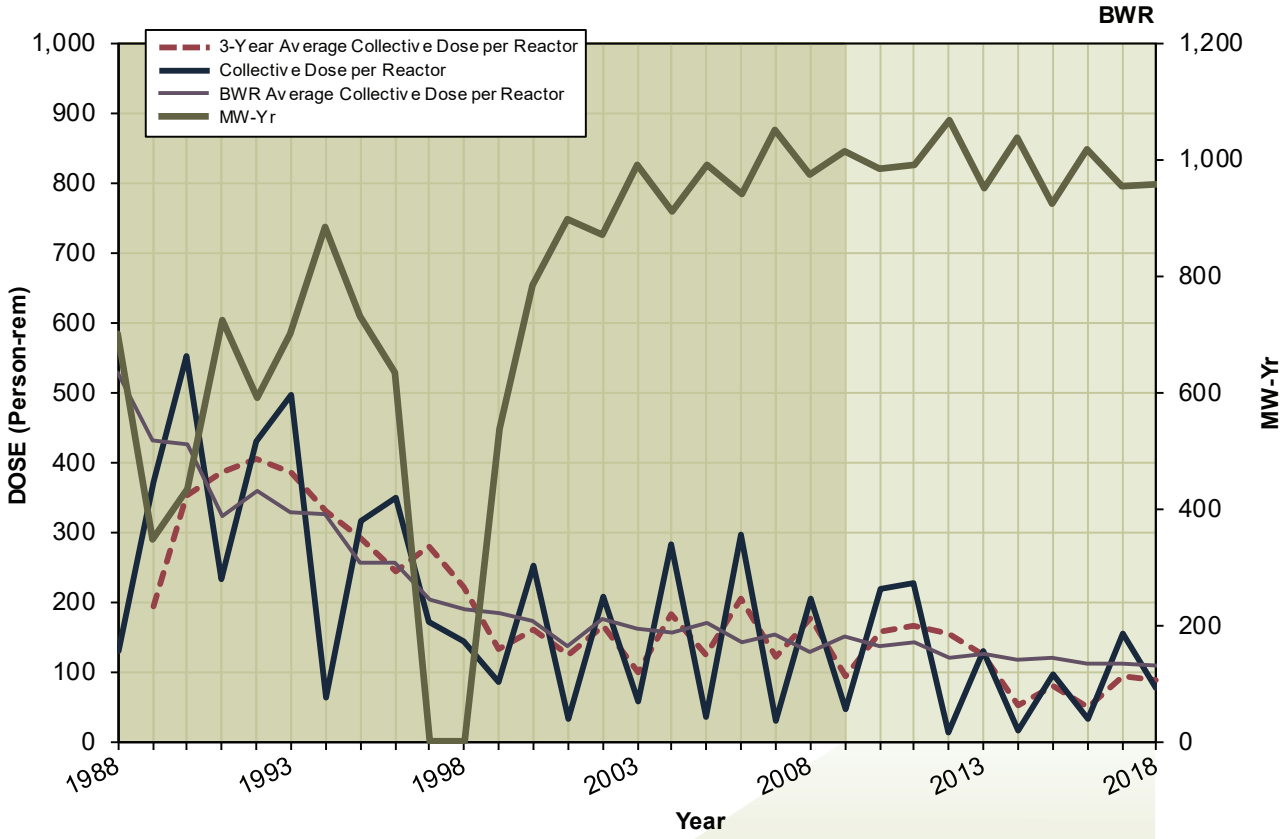
## CATAWBA 1, 2
Dose Performance Trends



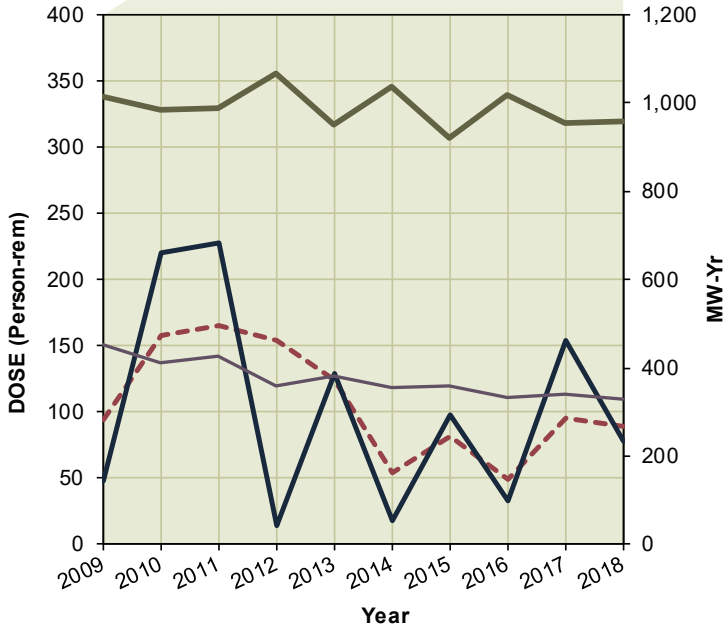

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 66.435 | 84.000 | 2,044.8 |
| 2010 | 58.570 | 48.000 | 2,164.8 |
| 2011 | 53.124 | 26.000 | 2,144.2 |
| 2012 | 40.678 | 48.000 | 2,029.7 |
| 2013 | 38.327 | 42.000 | 2,187.9 |
| 2014 | 38.070 | 26.000 | 2,136.0 |
| 2015 | 38.560 | 48.839 | 2,098.6 |
| 2016 | 37.592 | 38.549 | 2,232.7 |
| 2017 | 34.502 | 16.118 | 2,249.6 |
| 2018 | 32.773 | 43.651 | 2,143.8 |



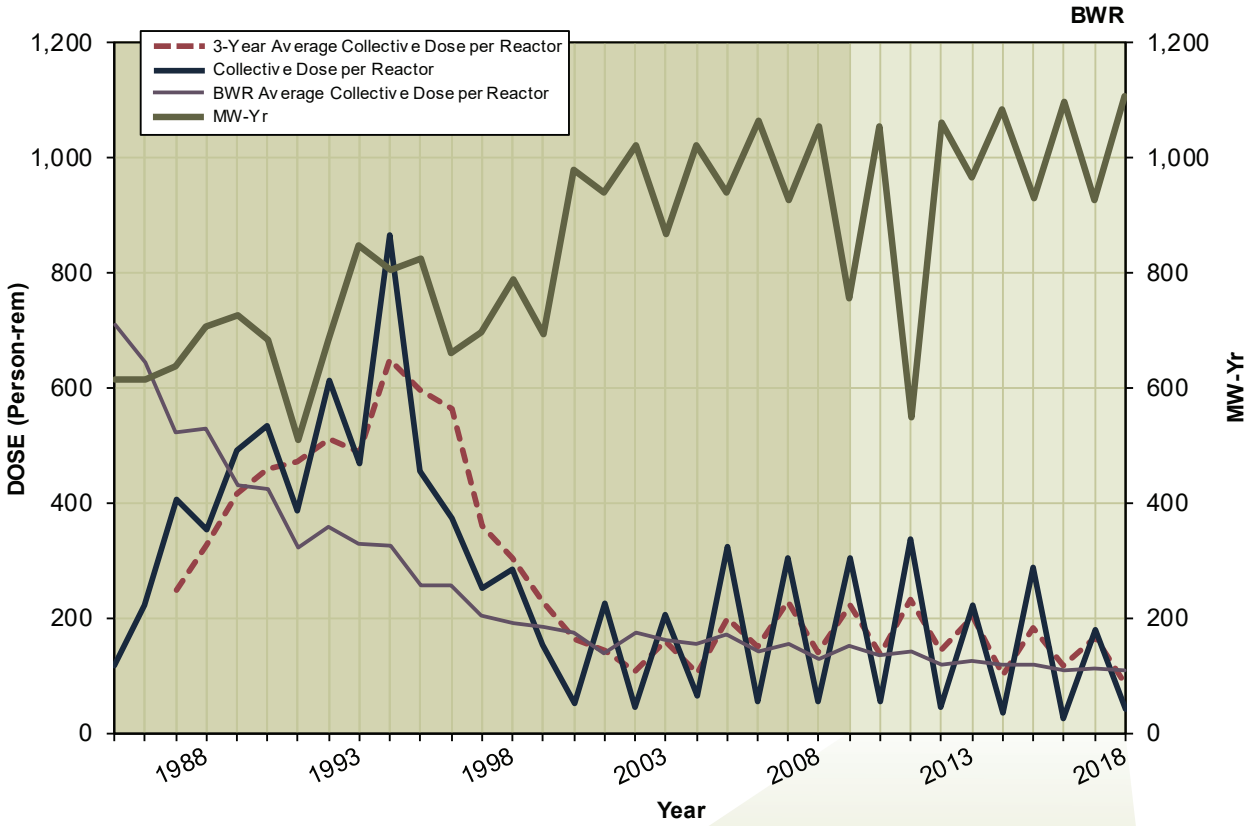
# CLINTON
## Dose Performance Trends



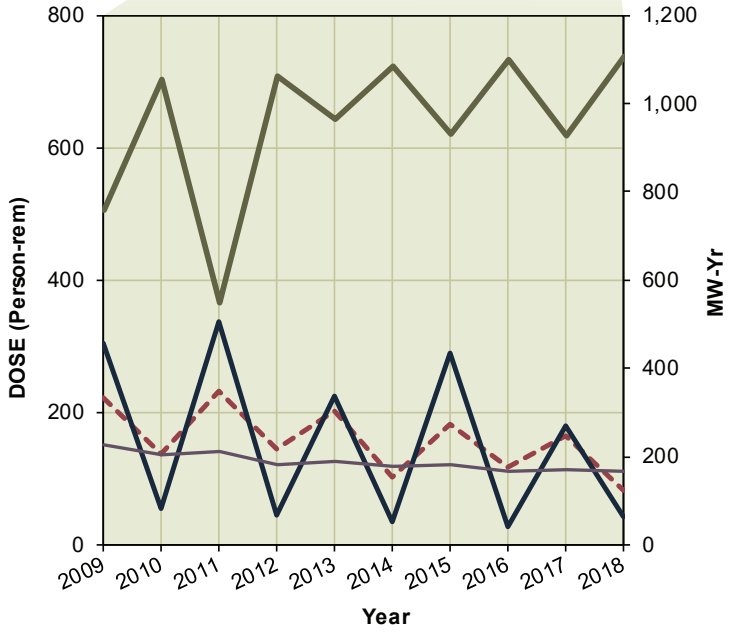

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 94.576 | 48.000 | 1,014.6 |
| 2010 | 157.688 | 220.000 | 983.1 |
| 2011 | 165.470 | 228.000 | 989.9 |
| 2012 | 154.217 | 14.000 | 1,067.1 |
| 2013 | 123.826 | 129.000 | 950.2 |
| 2014 | 53.632 | 18.000 | 1,038.6 |
| 2015 | 81.427 | 97.634 | 922.9 |
| 2016 | 49.573 | 33.218 | 1,017.8 |
| 2017 | 95.144 | 154.579 | 954.1 |
| 2018 | 88.537 | 77.813 | 958.7 |



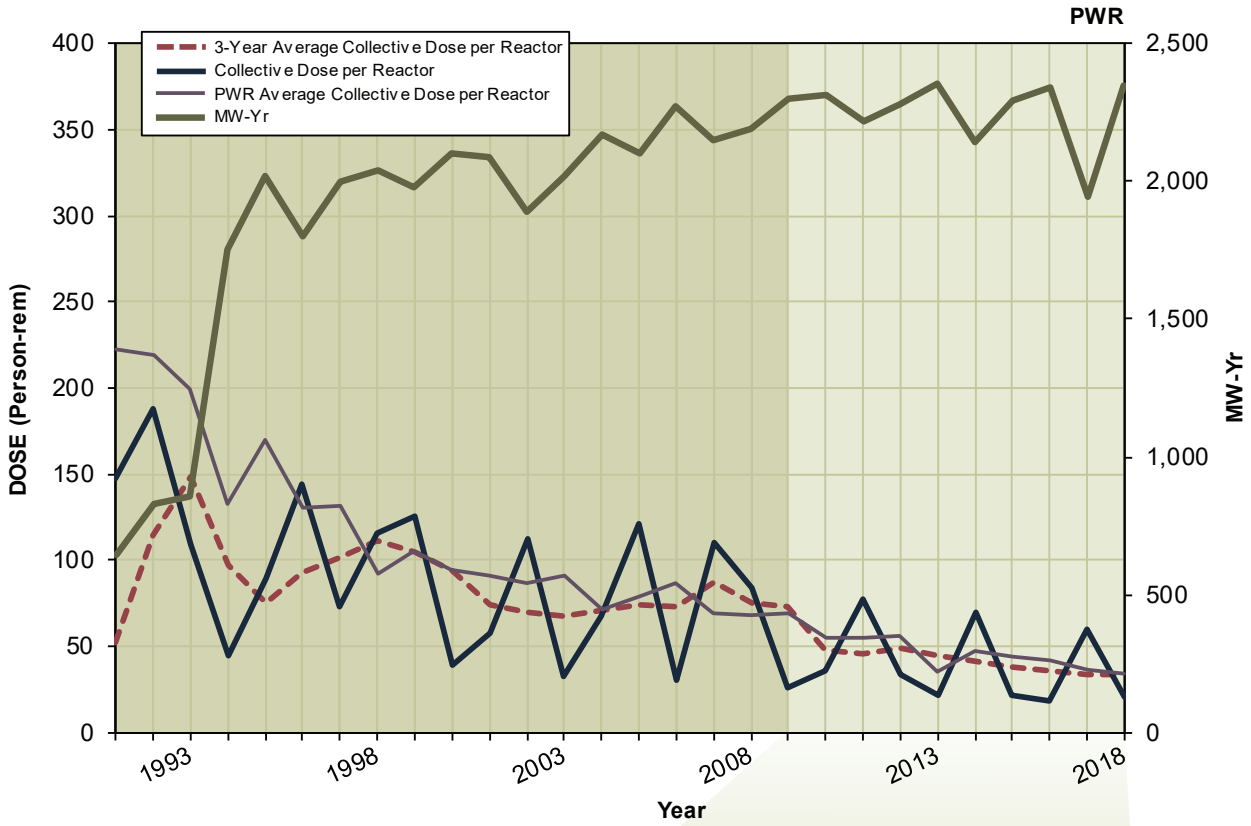
## COLUMBIA GENERATING
Dose Performance Trends



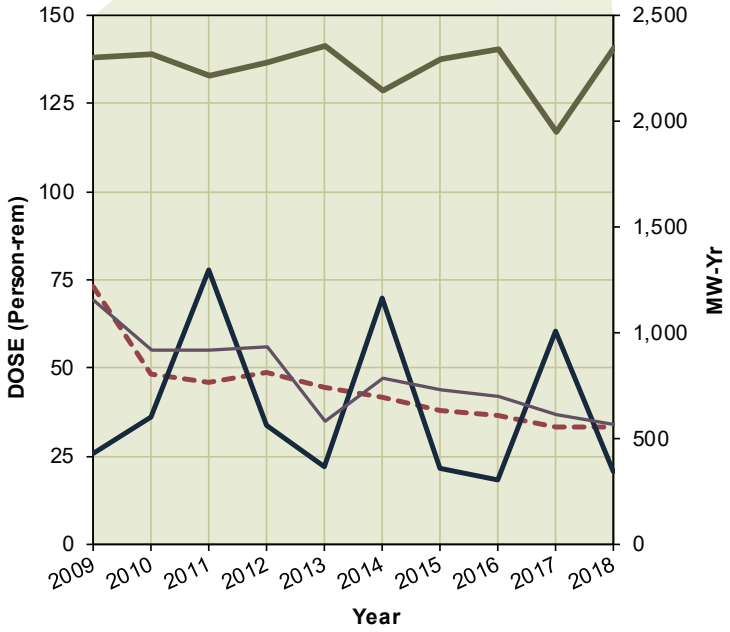

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 222.202 | 305.000 | 757.2 |
| 2010 | 138.292 | 55.000 | 1,054.9 |
| 2011 | 231.844 | 336.000 | 548.7 |
| 2012 | 145.277 | 45.000 | 1,062.6 |
| 2013 | 201.662 | 224.000 | 965.9 |
| 2014 | 101.033 | 34.000 | 1,084.2 |
| 2015 | 182.257 | 289.135 | 931.6 |
| 2016 | 116.577 | 26.825 | 1,098.8 |
| 2017 | 165.405 | 180.255 | 927.9 |
| 2018 | 83.386 | 43.078 | 1,108.3 |



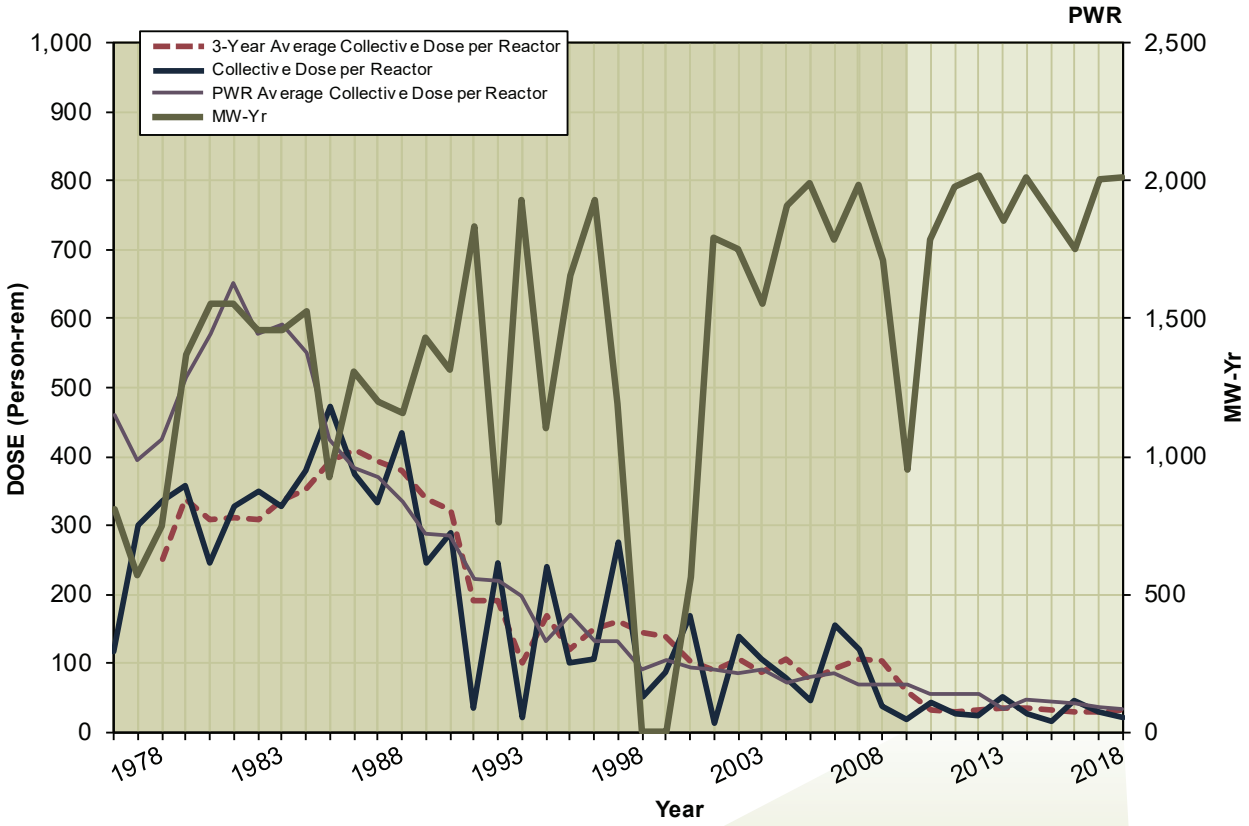
# COMANCHE PEAK 1, 2
## Dose Performance Trends



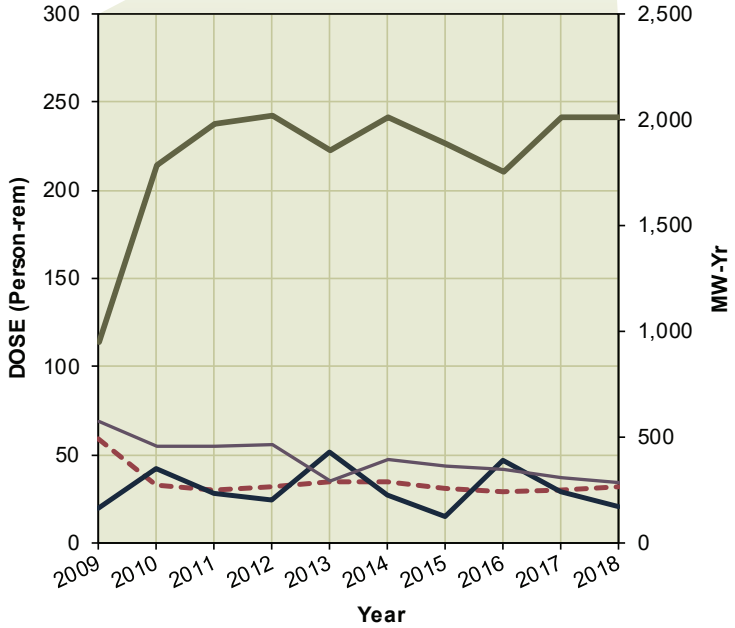

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 73.337 | 26.000 | 2,299.3 |
| 2010 | 48.505 | 36.000 | 2,316.8 |
| 2011 | 46.157 | 78.000 | 2,216.8 |
| 2012 | 48.711 | 34.000 | 2,279.9 |
| 2013 | 44.449 | 22.000 | 2,353.5 |
| 2014 | 41.871 | 70.000 | 2,141.7 |
| 2015 | 37.895 | 21.445 | 2,294.6 |
| 2016 | 36.464 | 18.324 | 2,340.7 |
| 2017 | 33.422 | 60.498 | 1,947.3 |
| 2018 | 33.220 | 20.839 | 2,346.3 |



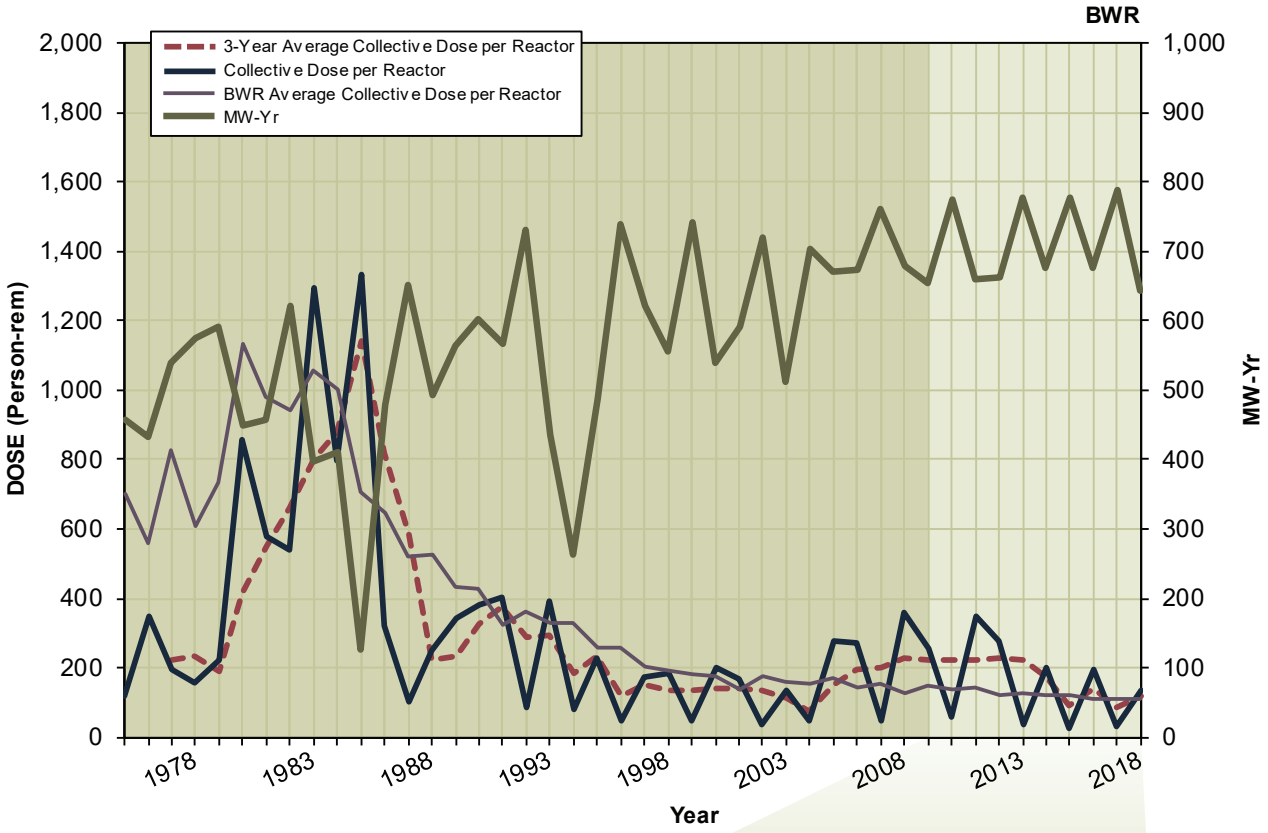
## COOK 1, 2
Dose Performance Trends



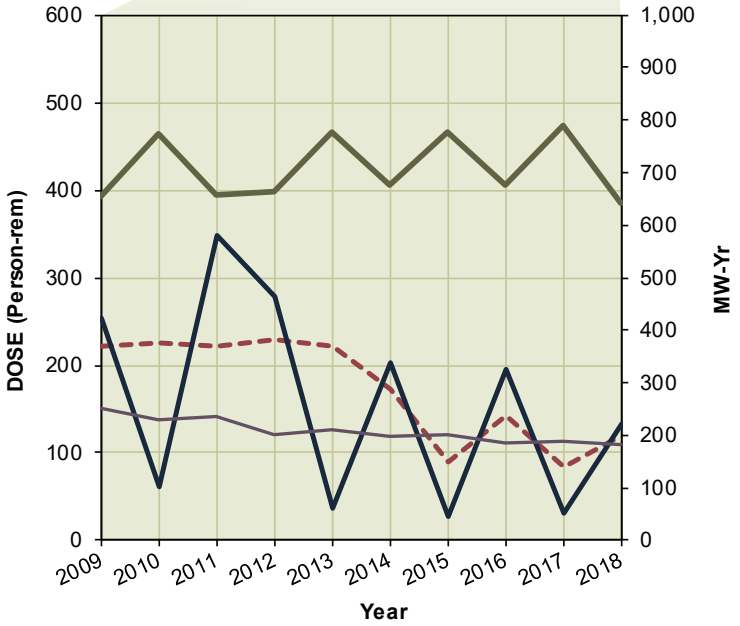

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 59.201 | 20.000 | 950.5 |
| 2010 | 33.281 | 42.000 | 1,786.1 |
| 2011 | 30.075 | 28.000 | 1,981.5 |
| 2012 | 31.593 | 24.000 | 2,017.5 |
| 2013 | 35.009 | 52.000 | 1,858.5 |
| 2014 | 34.447 | 27.000 | 2,012.7 |
| 2015 | 31.233 | 14.914 | 1,885.7 |
| 2016 | 29.557 | 46.858 | 1,753.5 |
| 2017 | 30.257 | 29.000 | 2,008.2 |
| 2018 | 32.038 | 20.256 | 2,010.4 |



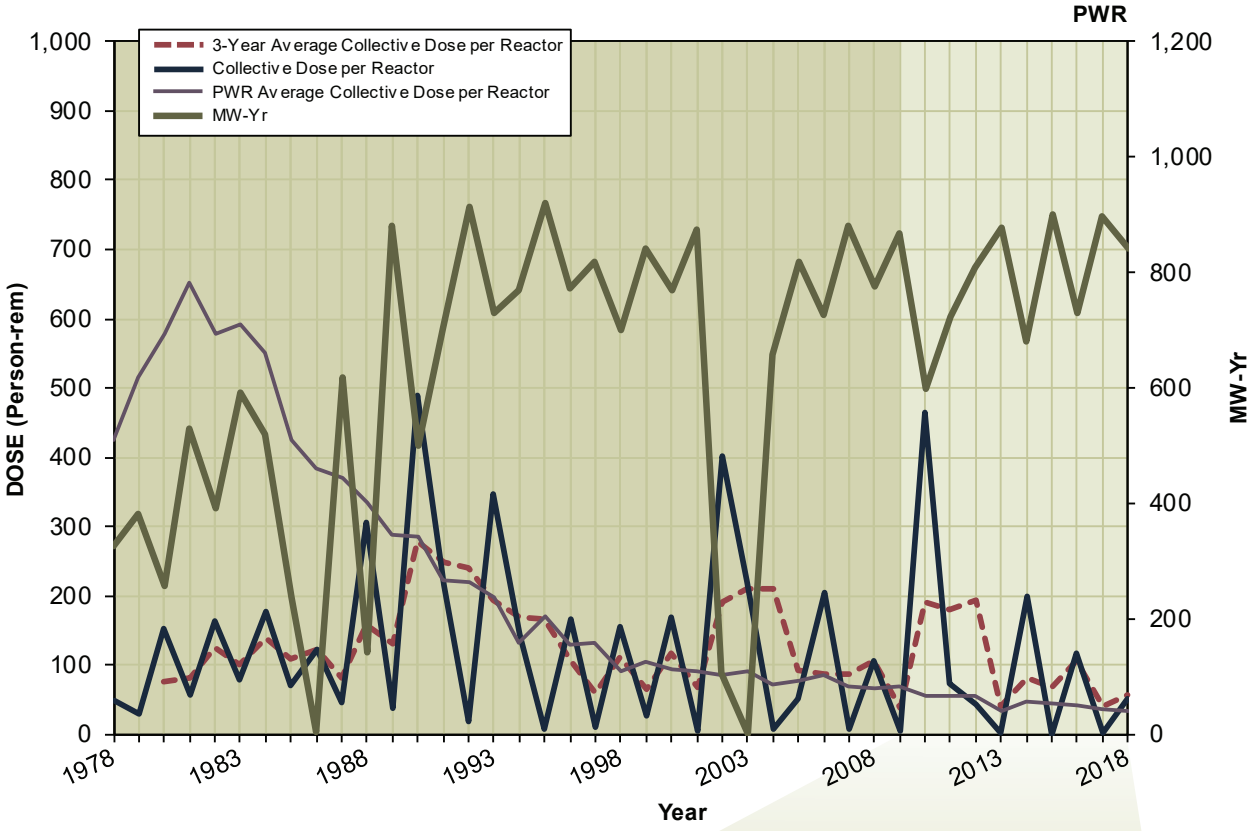
# COOPER STATION
## Dose Performance Trends



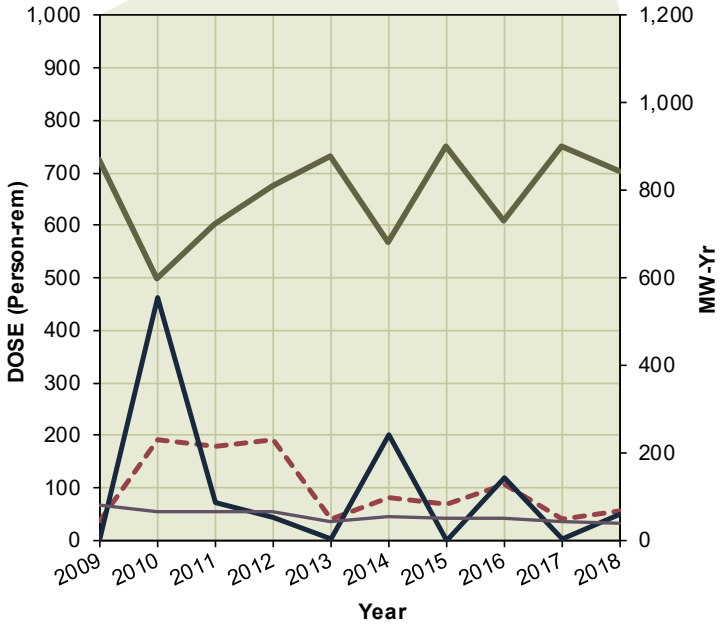

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 221.278 | 254.000 | 654.6 |
| 2010 | 225.078 | 61.000 | 775.4 |
| 2011 | 221.527 | 349.000 | 658.5 |
| 2012 | 229.950 | 279.000 | 662.9 |
| 2013 | 221.473 | 36.000 | 776.5 |
| 2014 | 172.614 | 203.000 | 675.3 |
| 2015 | 88.725 | 27.634 | 776.1 |
| 2016 | 141.941 | 195.518 | 676.1 |
| 2017 | 84.448 | 30.193 | 789.1 |
| 2018 | 119.565 | 132.984 | 642.9 |



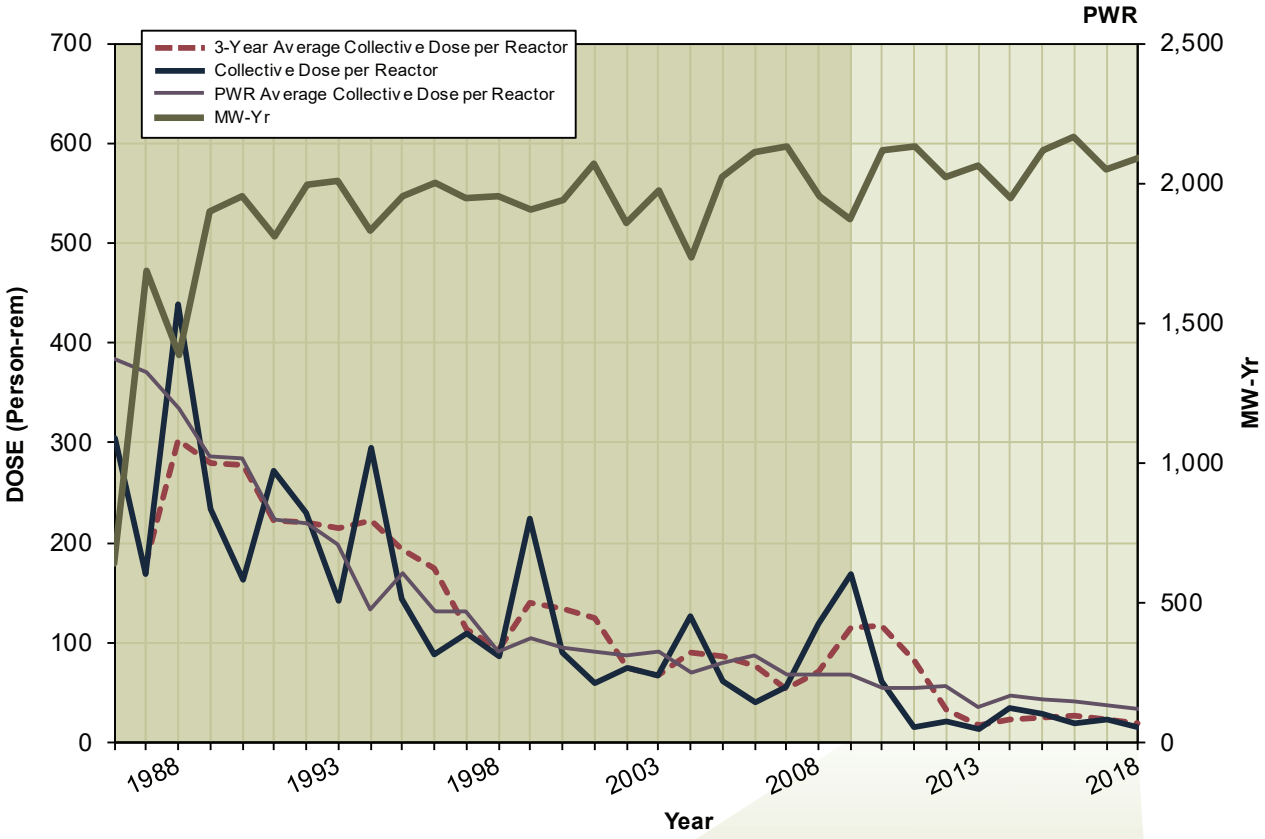
## DAVIS-BESSE 1
Dose Performance Trends



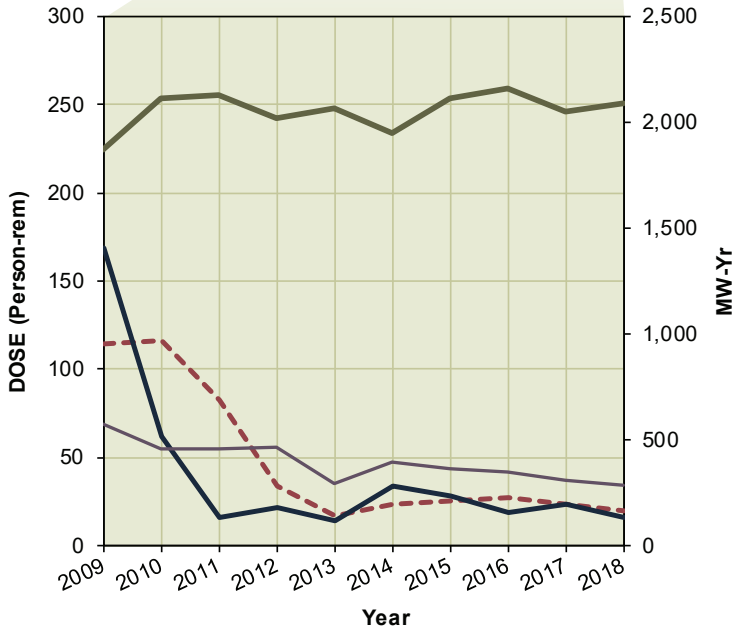

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 39.103 | 4.000 | 868.7 |
| 2010 | 191.439 | 464.000 | 598.0 |
| 2011 | 180.359 | 73.000 | 723.7 |
| 2012 | 193.509 | 43.000 | 808.5 |
| 2013 | 39.663 | 3.000 | 876.6 |
| 2014 | 82.032 | 200.000 | 681.8 |
| 2015 | 68.006 | 0.995 | 901.1 |
| 2016 | 106.644 | 118.472 | 730.0 |
| 2017 | 40.363 | 1.621 | 899.1 |
| 2018 | 57.032 | 51.003 | 842.5 |



# DIABLO CANYON 1, 2
## Dose Performance Trends

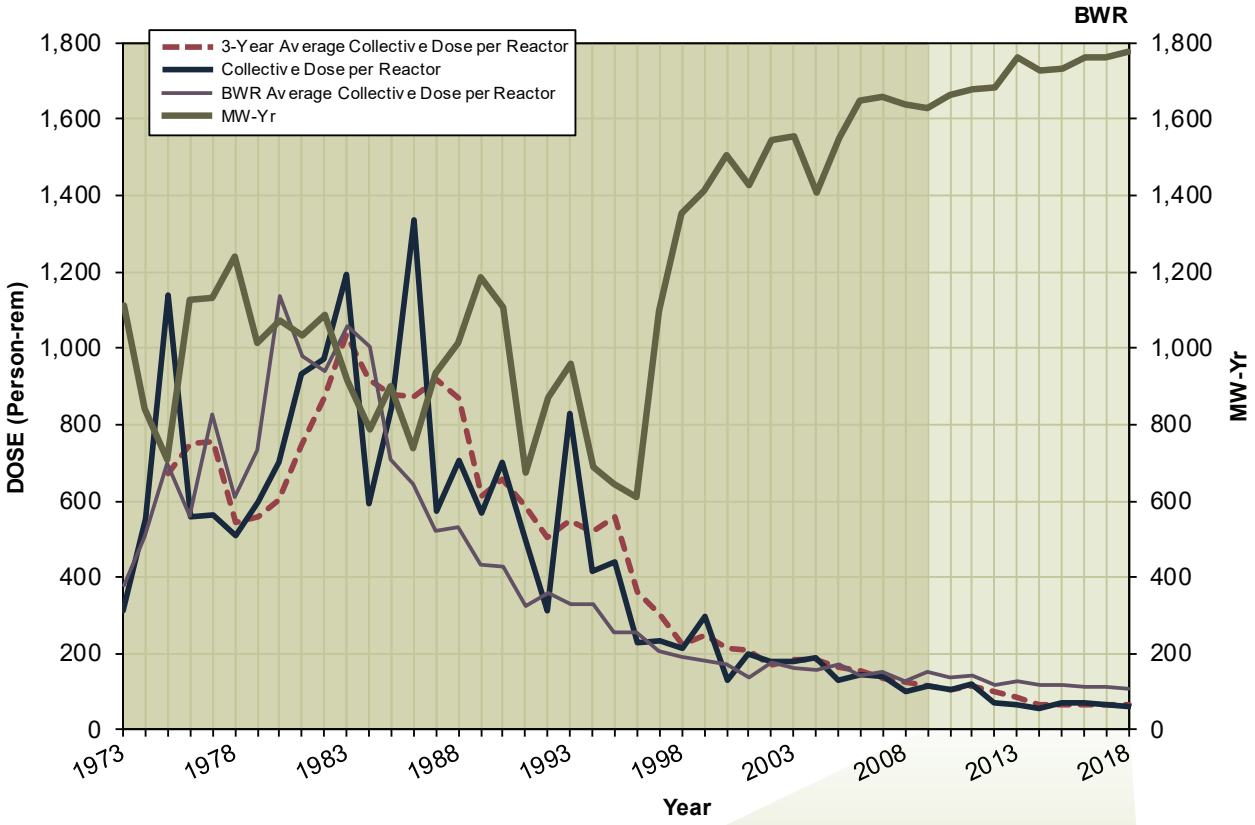



| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 114.105 | 169.000 | 1,873.0 |
| 2010 | 116.382 | 62.000 | 2,115.2 |
| 2011 | 82.486 | 16.000 | 2,131.1 |
| 2012 | 33.436 | 22.000 | 2,023.0 |
| 2013 | 17.321 | 14.000 | 2,064.1 |
| 2014 | 23.316 | 34.000 | 1,947.1 |
| 2015 | 25.602 | 28.622 | 2,116.8 |
| 2016 | 27.096 | 18.867 | 2,162.2 |
| 2017 | 23.815 | 23.955 | 2,051.4 |
| 2018 | 19.610 | 16.007 | 2,088.4 |

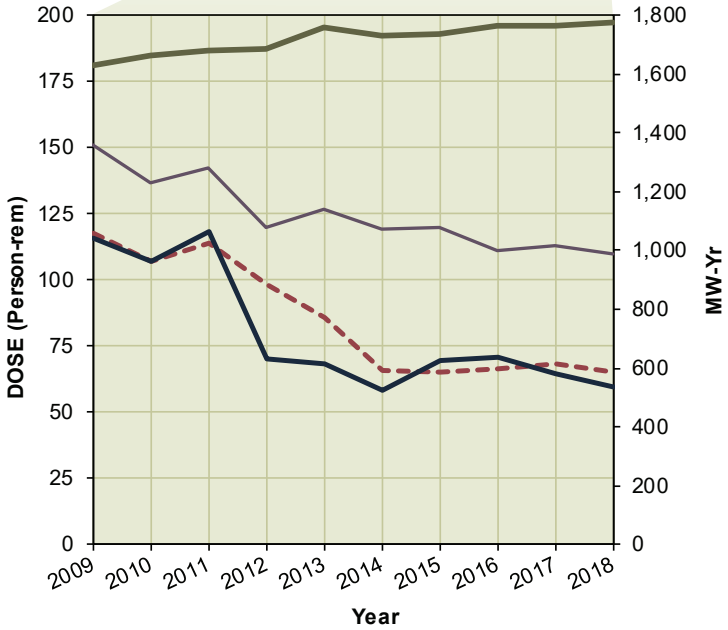


# DRESDEN 2, 3

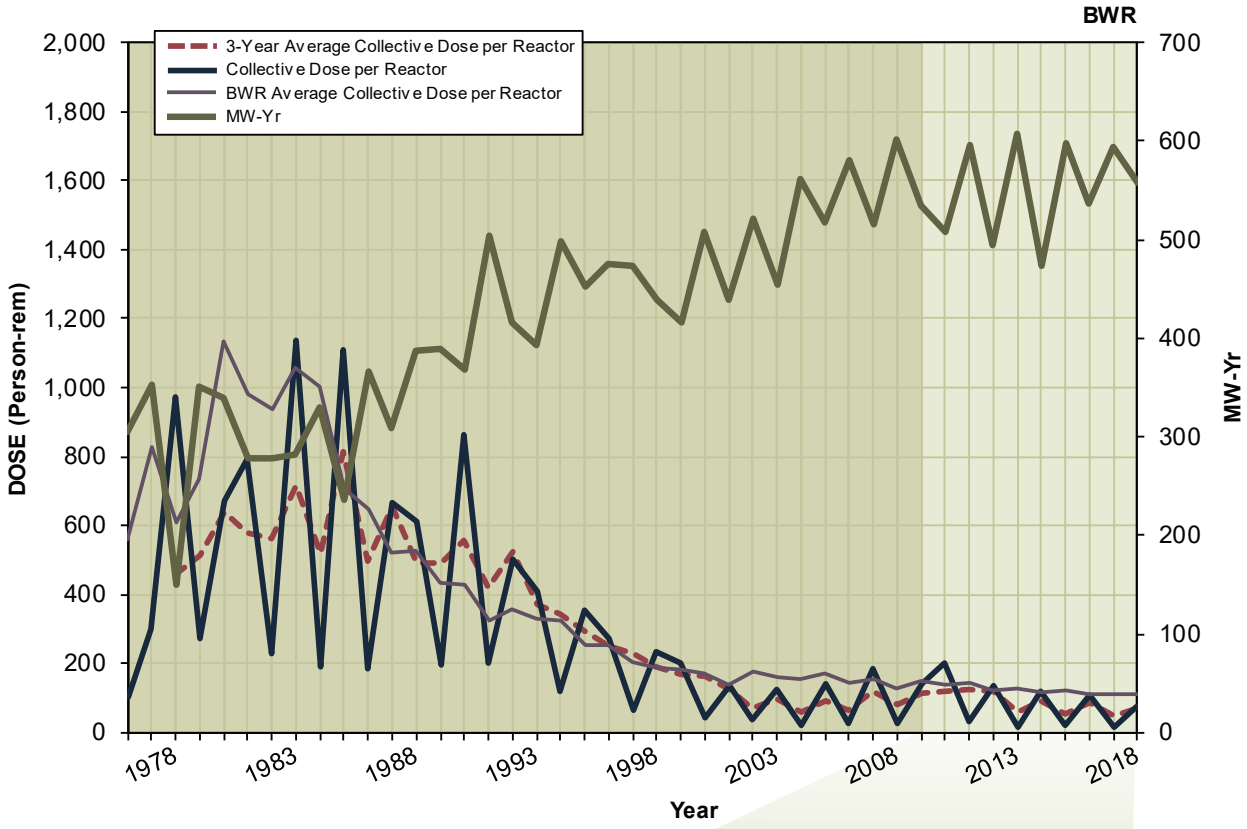
## Dose Performance Trends



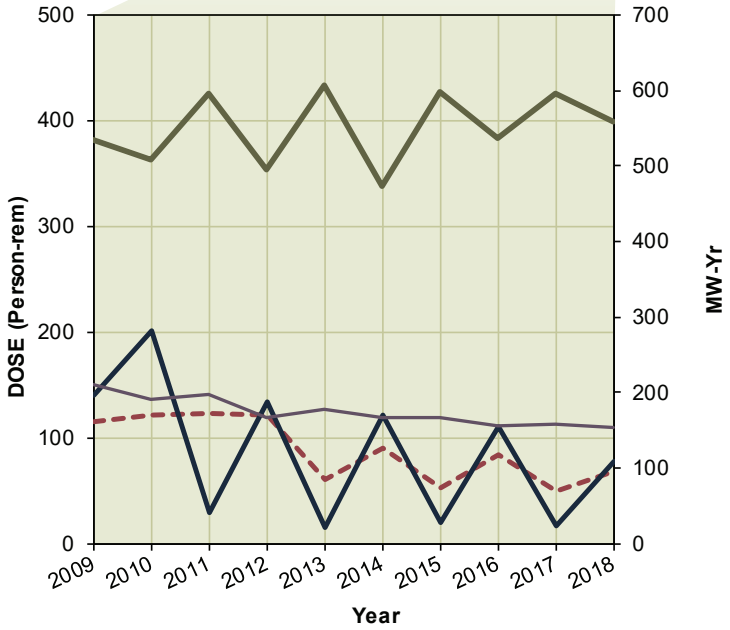

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 117.581 | 116.000 | 1,628.7 |
| 2010 | 107.286 | 107.000 | 1,665.9 |
| 2011 | 113.657 | 118.000 | 1,679.7 |
| 2012 | 98.311 | 70.000 | 1,685.5 |
| 2013 | 85.497 | 68.000 | 1,759.9 |
| 2014 | 65.582 | 58.000 | 1,727.8 |
| 2015 | 65.457 | 69.432 | 1,734.4 |
| 2016 | 66.271 | 70.914 | 1,763.2 |
| 2017 | 68.326 | 64.633 | 1,763.3 |
| 2018 | 64.987 | 59.416 | 1,776.9 |



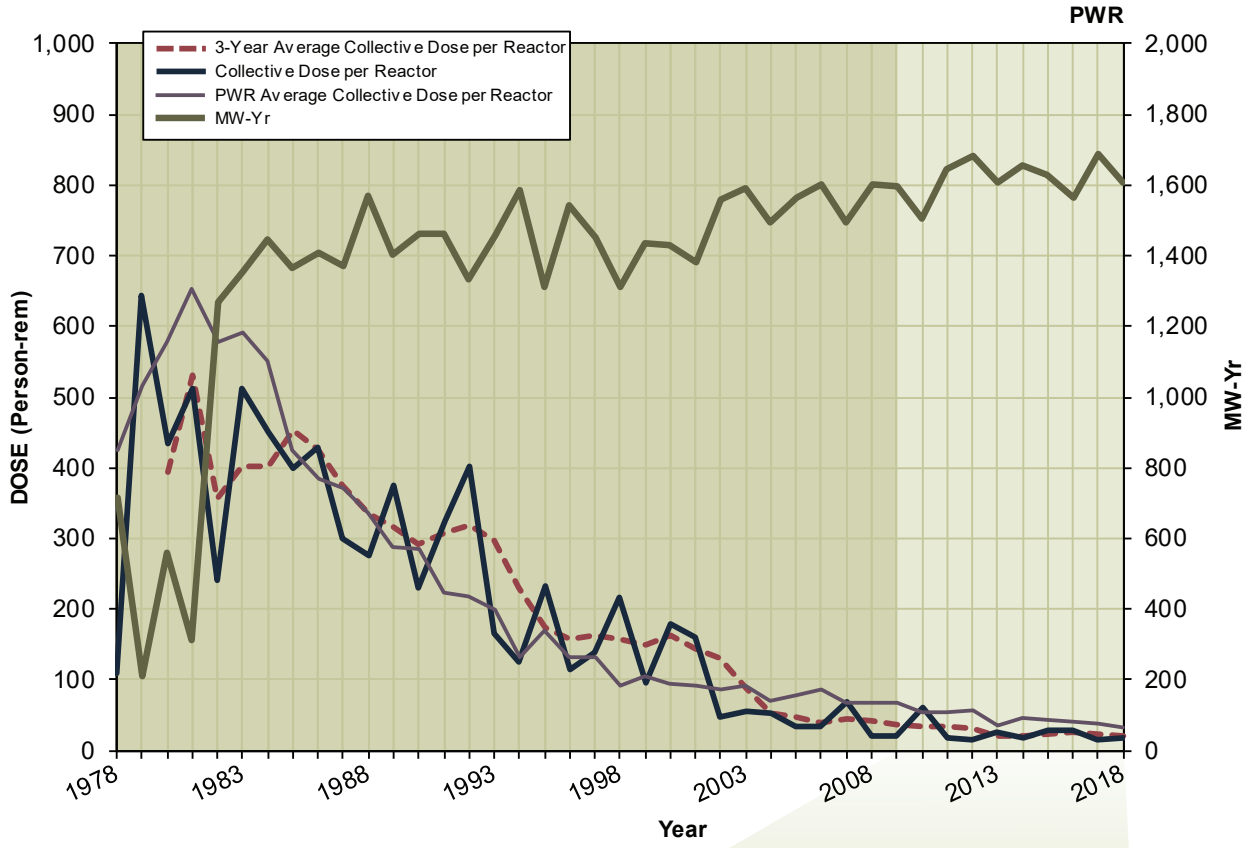
# DUANE ARNOLD
## Dose Performance Trends



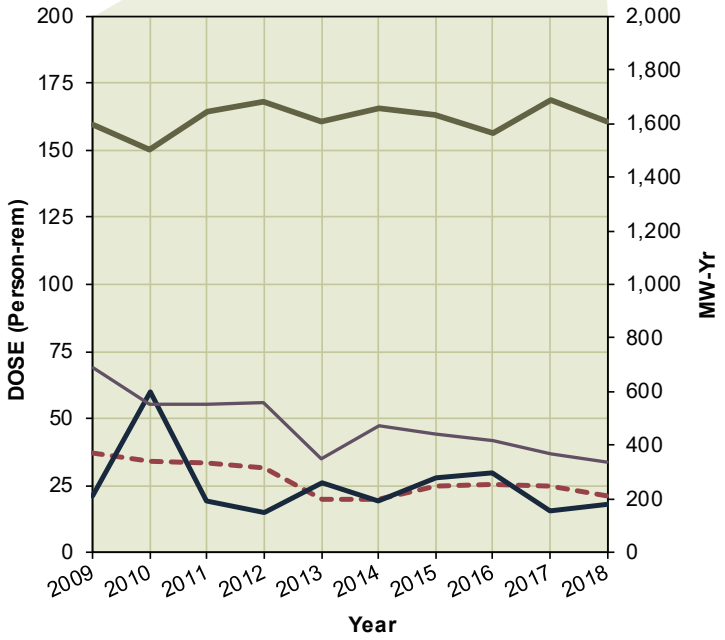

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 116.005 | 140.000 | 534.1 |
| 2010 | 121.669 | 201.000 | 508.1 |
| 2011 | 123.460 | 30.000 | 595.3 |
| 2012 | 121.593 | 135.000 | 494.9 |
| 2013 | 60.197 | 16.000 | 607.4 |
| 2014 | 90.972 | 122.000 | 474.0 |
| 2015 | 52.947 | 20.441 | 598.6 |
| 2016 | 84.347 | 110.613 | 536.8 |
| 2017 | 49.463 | 17.336 | 595.2 |
| 2018 | 68.644 | 77.984 | 558.8 |



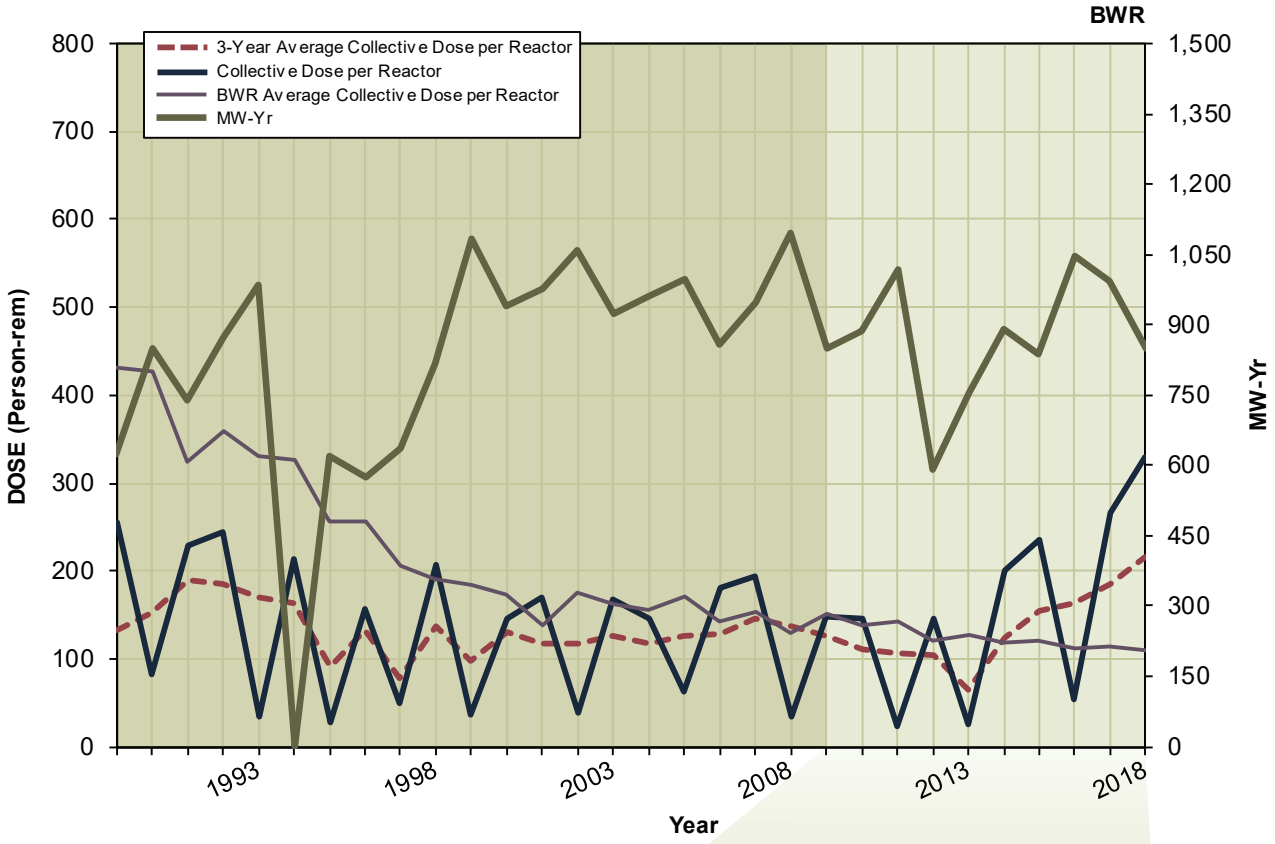
# FARLEY 1, 2
## Dose Performance Trends



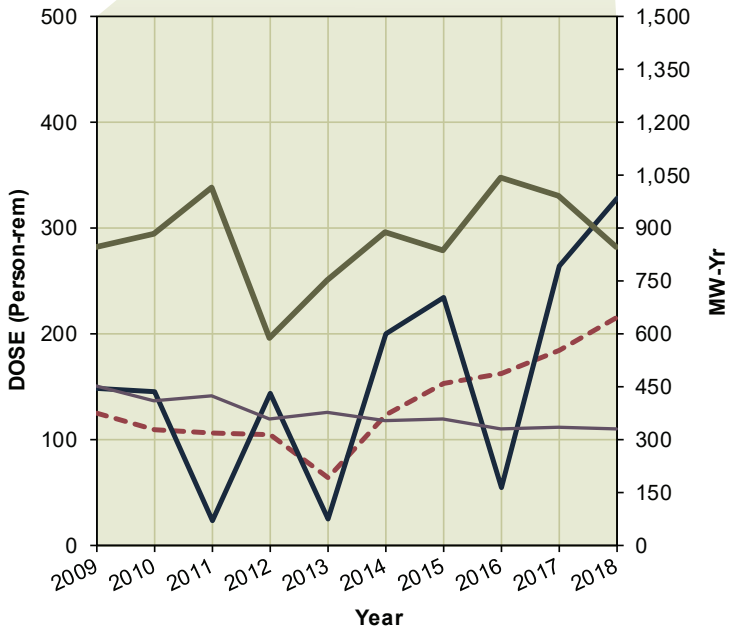

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 37.075 | 21.000 | 1,595.2 |
| 2010 | 33.994 | 60.000 | 1,503.4 |
| 2011 | 33.446 | 19.000 | 1,647.4 |
| 2012 | 31.440 | 15.000 | 1,680.7 |
| 2013 | 20.090 | 26.000 | 1,609.4 |
| 2014 | 20.122 | 19.000 | 1,655.9 |
| 2015 | 24.476 | 27.971 | 1,631.0 |
| 2016 | 25.581 | 29.920 | 1,563.7 |
| 2017 | 24.522 | 15.676 | 1,690.0 |
| 2018 | 21.258 | 18.178 | 1,605.6 |



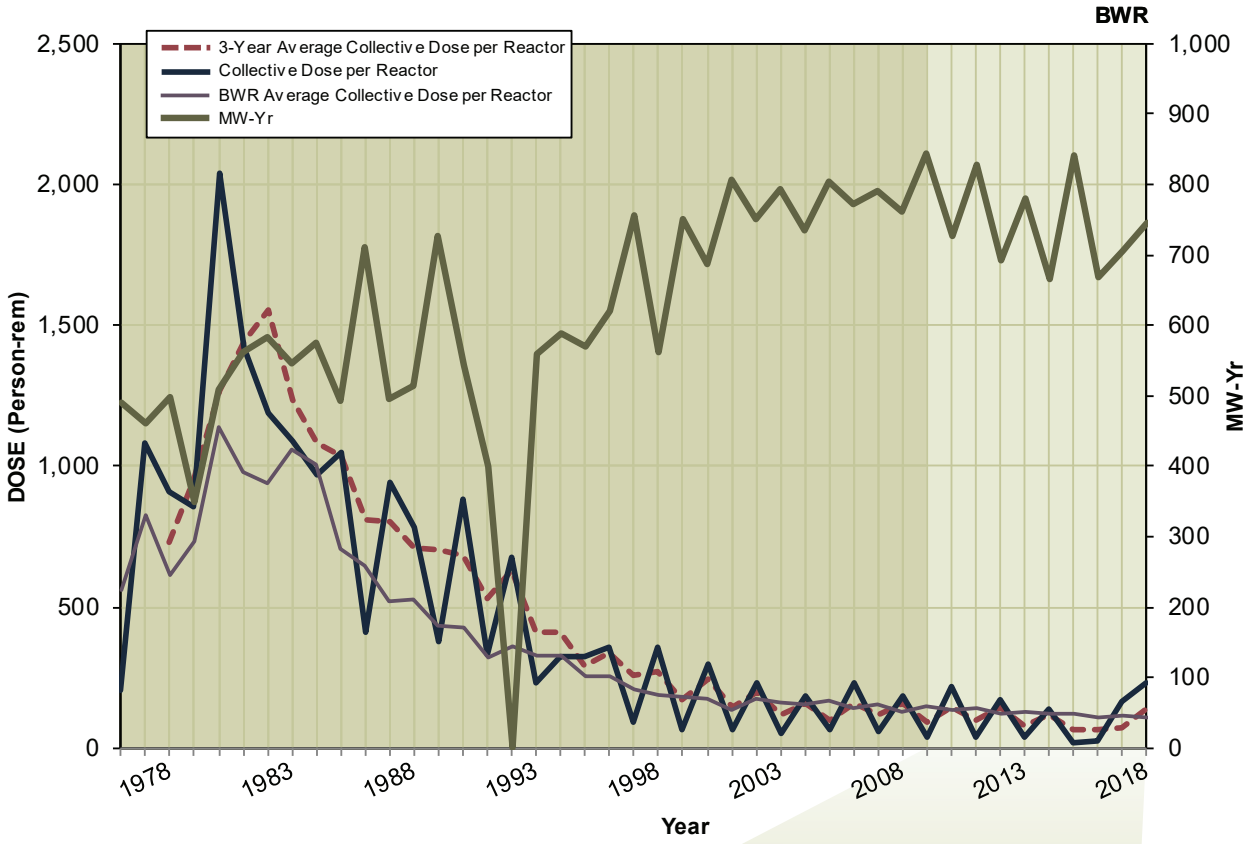
# FERMI 2
## Dose Performance Trends



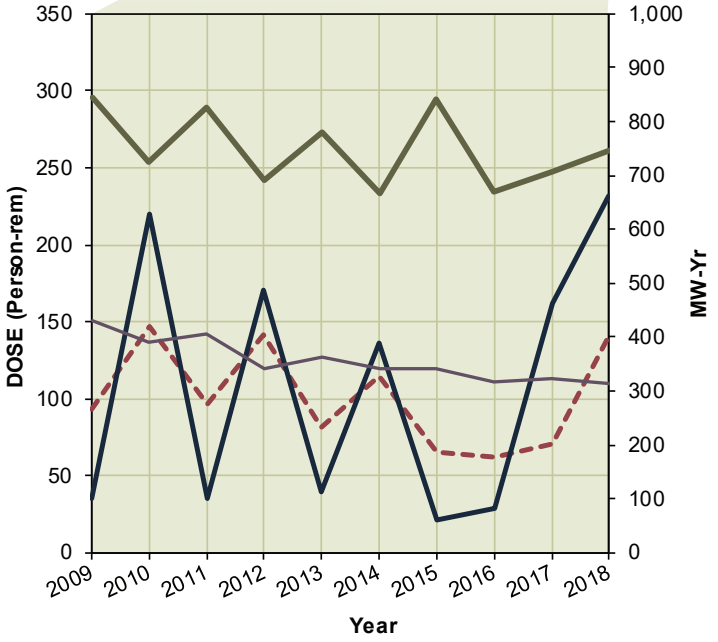

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 126.028 | 149.000 | 847.8 |
| 2010 | 110.179 | 146.000 | 885.0 |
| 2011 | 106.472 | 24.000 | 1,017.9 |
| 2012 | 105.181 | 145.000 | 589.3 |
| 2013 | 65.077 | 26.000 | 754.5 |
| 2014 | 123.617 | 200.000 | 891.5 |
| 2015 | 153.577 | 234.853 | 838.6 |
| 2016 | 163.104 | 54.761 | 1,045.0 |
| 2017 | 184.899 | 265.082 | 993.0 |
| 2018 | 216.286 | 329.015 | 849.2 |



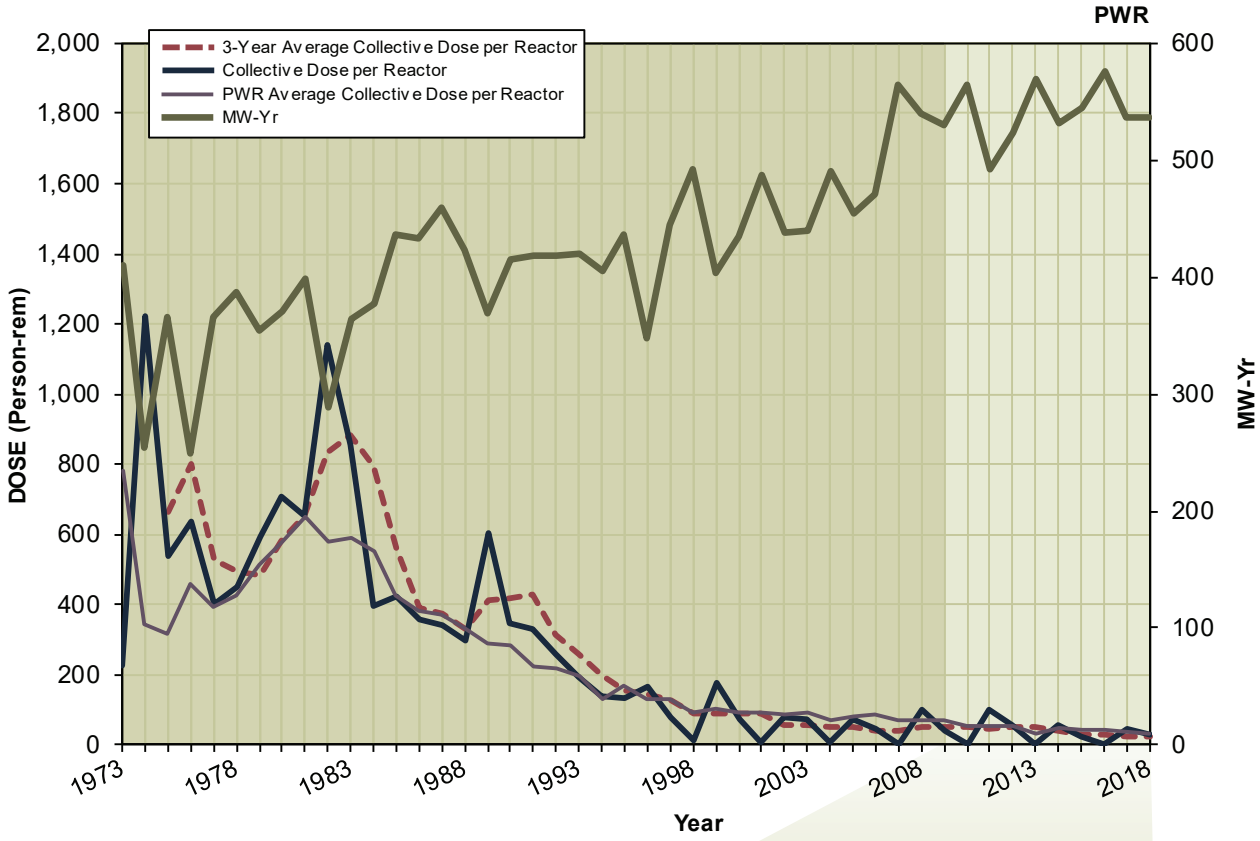
## FITZPATRICK
Dose Performance Trends



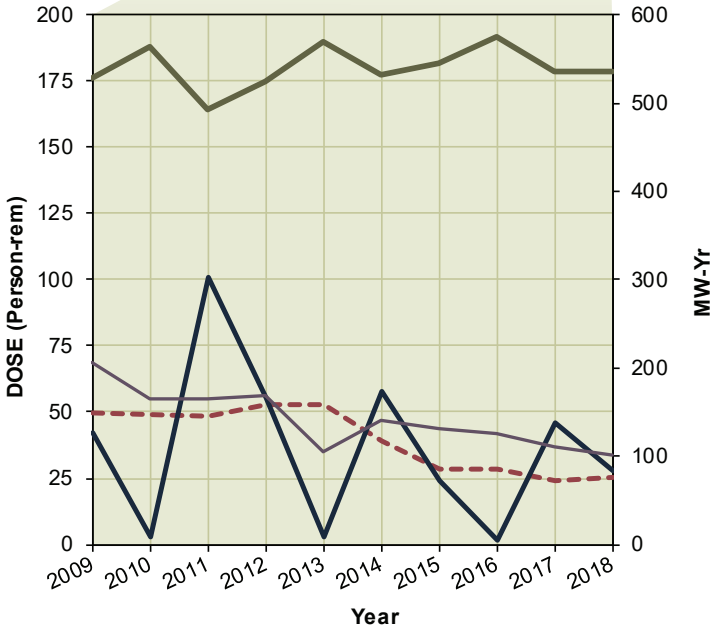

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 92.887 | 35.000 | 844.5 |
| 2010 | 146.602 | 220.000 | 726.2 |
| 2011 | 96.741 | 35.000 | 826.9 |
| 2012 | 141.663 | 170.000 | 691.1 |
| 2013 | 81.498 | 39.000 | 780.8 |
| 2014 | 115.056 | 136.000 | 665.4 |
| 2015 | 65.356 | 20.785 | 842.7 |
| 2016 | 61.660 | 28.304 | 668.7 |
| 2017 | 70.428 | 162.196 | 705.8 |
| 2018 | 140.683 | 231.548 | 745.2 |



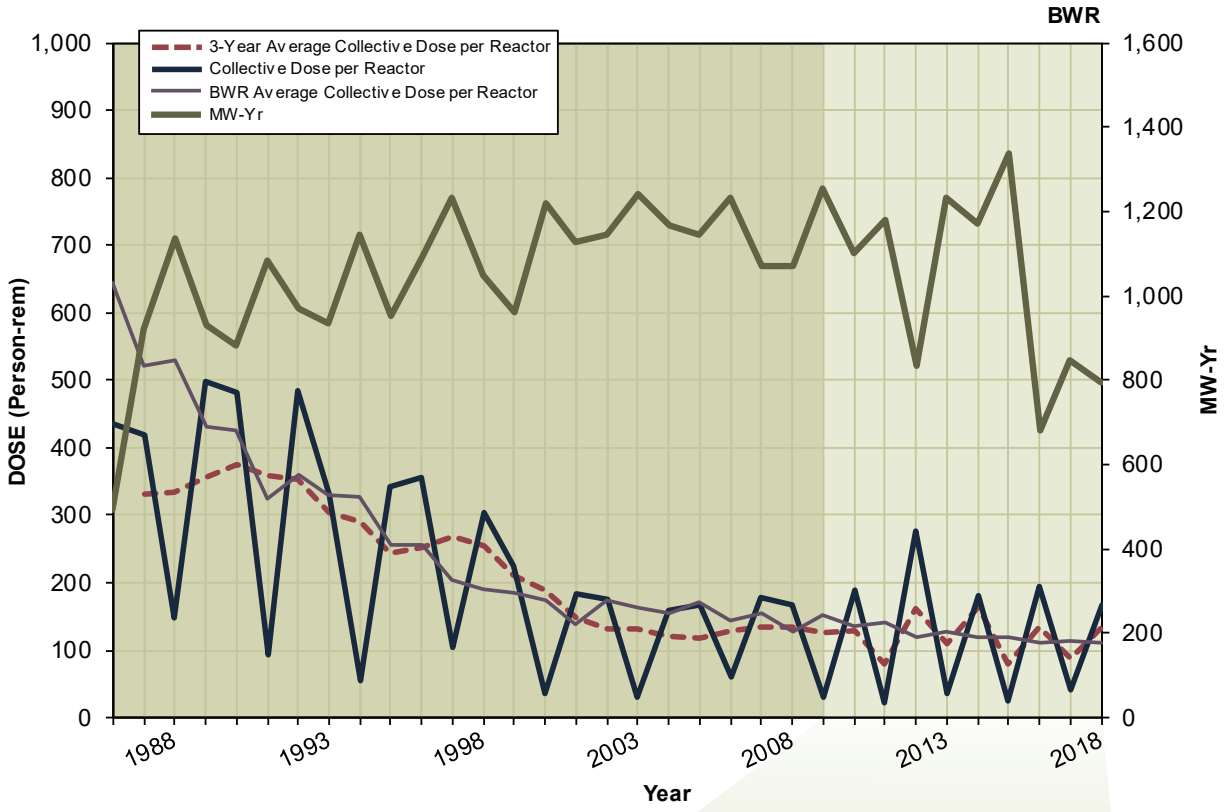
# GINNA
## Dose Performance Trends



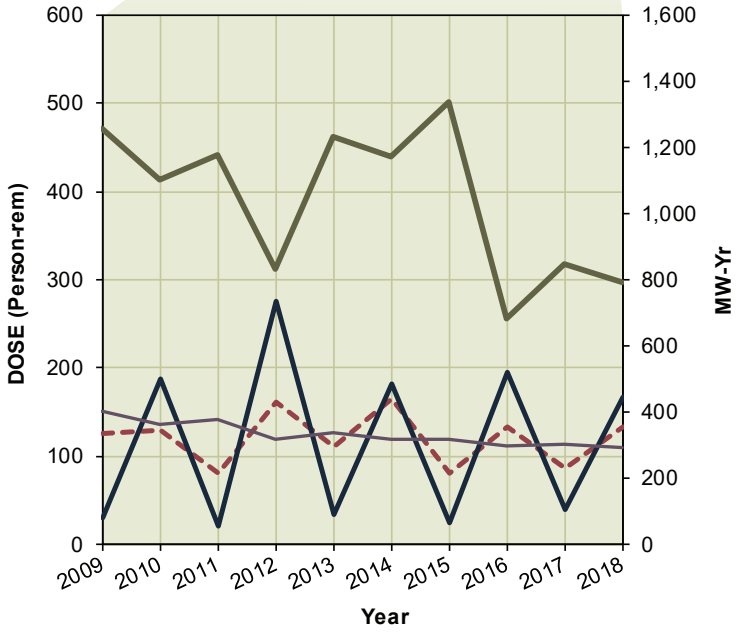

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 49.407 | 42.000 | 529.2 |
| 2010 | 48.992 | 3.000 | 564.9 |
| 2011 | 48.563 | 101.000 | 492.1 |
| 2012 | 52.838 | 55.000 | 523.9 |
| 2013 | 52.927 | 3.000 | 570.0 |
| 2014 | 38.817 | 58.000 | 532.2 |
| 2015 | 28.659 | 24.163 | 544.5 |
| 2016 | 28.142 | 1.882 | 575.6 |
| 2017 | 24.073 | 46.173 | 536.3 |
| 2018 | 25.329 | 27.931 | 536.4 |



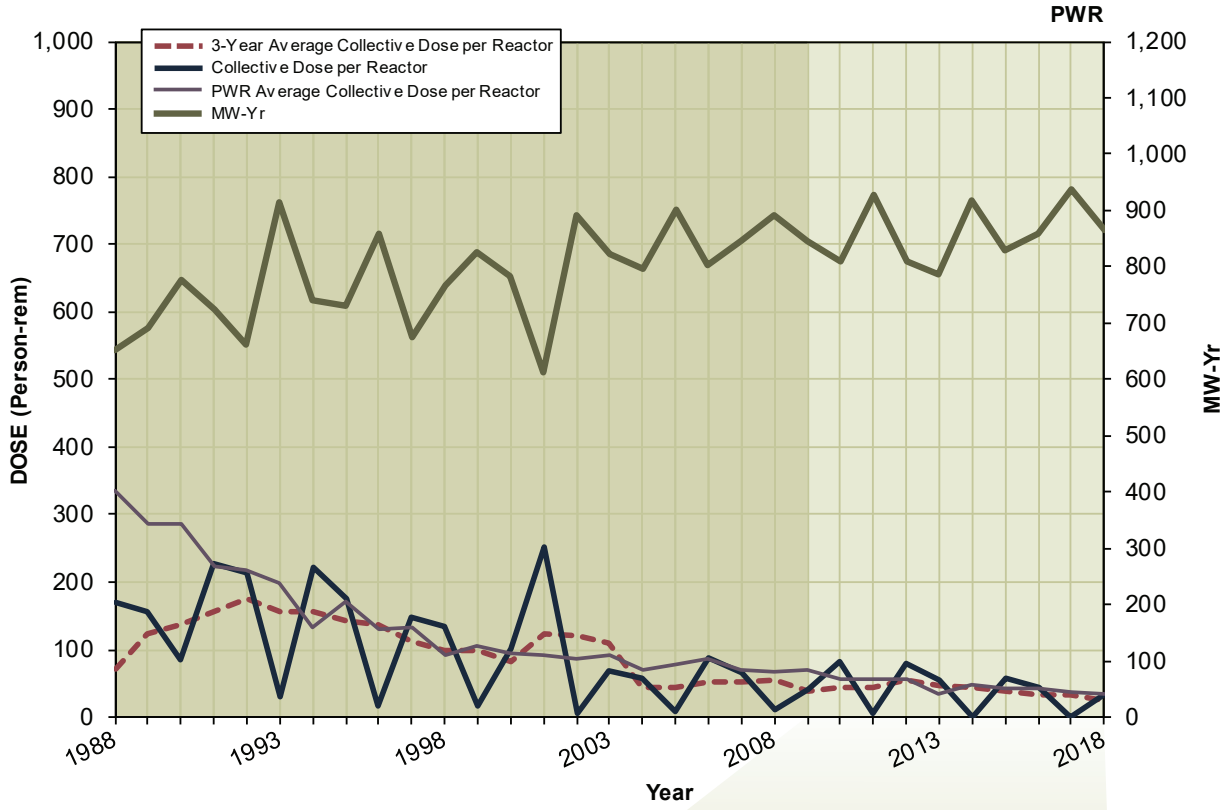
# GRAND GULF
## Dose Performance Trends



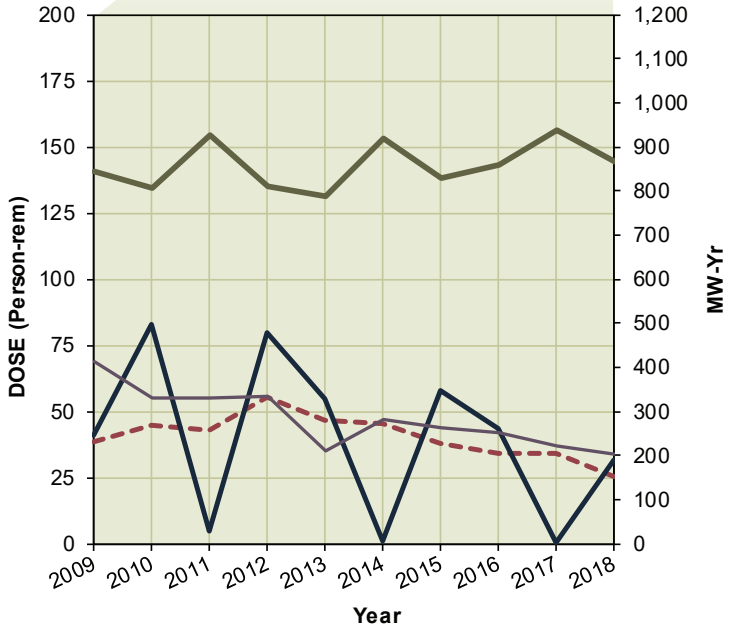

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 125.502 | 31.000 | 1,255.5 |
| 2010 | 128.997 | 188.000 | 1,102.0 |
| 2011 | 80.058 | 21.000 | 1,180.0 |
| 2012 | 161.944 | 276.000 | 835.2 |
| 2013 | 110.970 | 35.000 | 1,231.1 |
| 2014 | 164.524 | 182.000 | 1,173.5 |
| 2015 | 80.812 | 25.241 | 1,337.8 |
| 2016 | 133.914 | 194.755 | 682.8 |
| 2017 | 86.749 | 40.251 | 849.1 |
| 2018 | 133.971 | 166.908 | 794.3 |



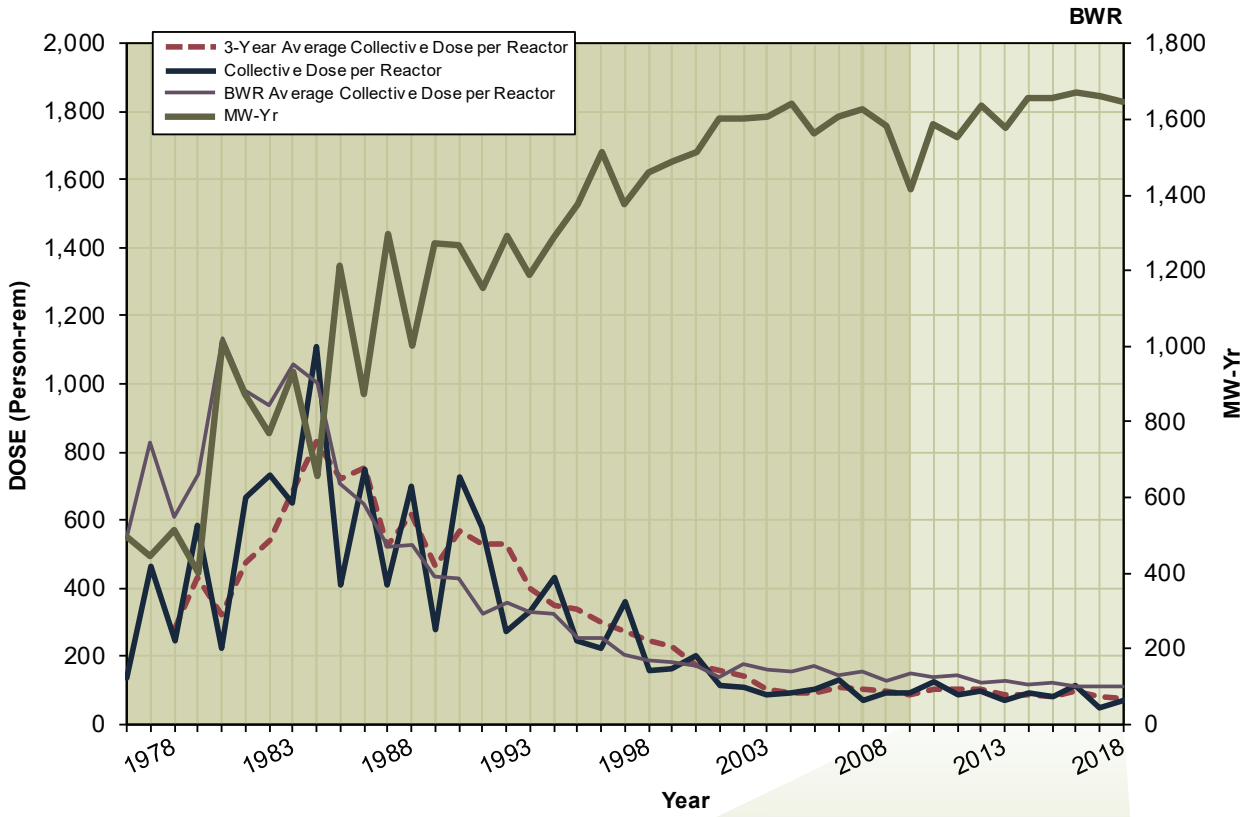
# HARRIS 1
## Dose Performance Trends



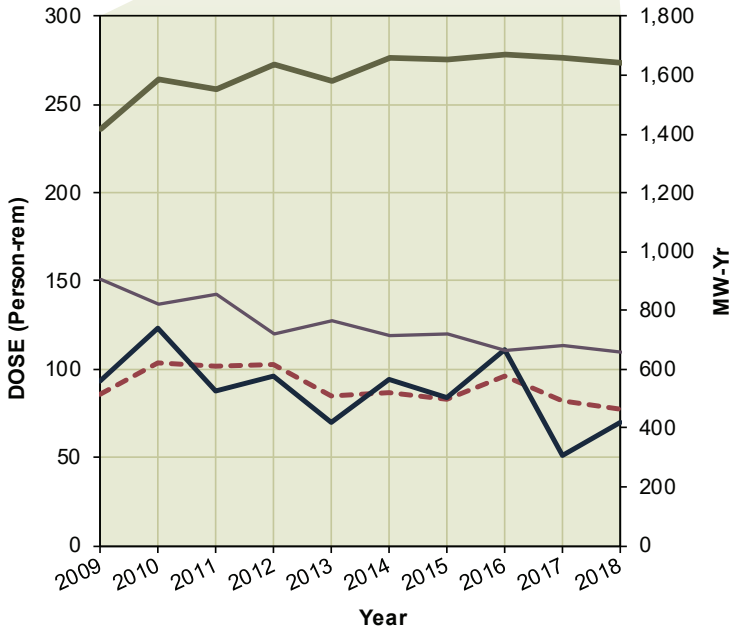

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 38.870 | 41.000 | 845.1 |
| 2010 | 44.793 | 83.000 | 808.3 |
| 2011 | 42.901 | 5.000 | 926.0 |
| 2012 | 55.716 | 80.000 | 810.8 |
| 2013 | 46.481 | 55.000 | 786.3 |
| 2014 | 45.336 | 1.289 | 918.8 |
| 2015 | 38.047 | 57.978 | 830.2 |
| 2016 | 34.381 | 43.876 | 857.7 |
| 2017 | 34.024 | 0.217 | 937.1 |
| 2018 | 25.276 | 31.736 | 866.2 |



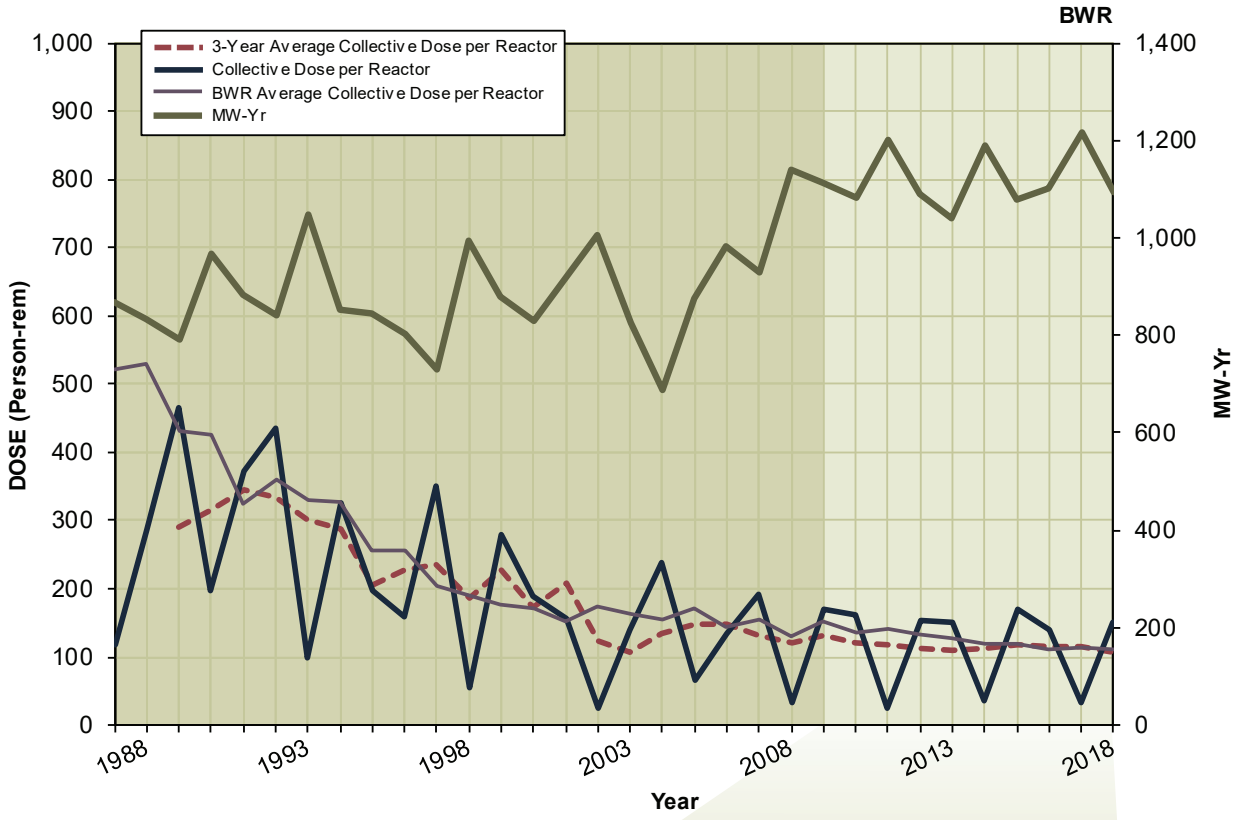
## HATCH 1, 2
Dose Performance Trends



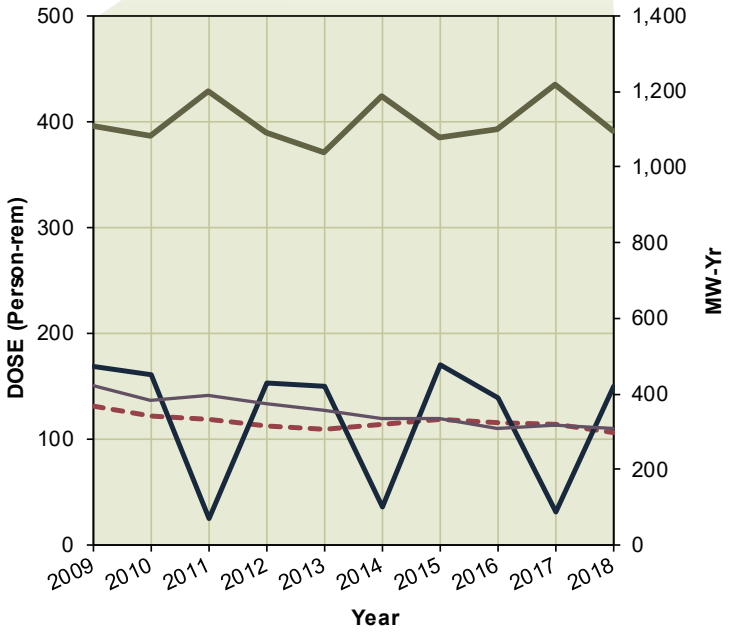

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 85.436 | 93.000 | 1,416.5 |
| 2010 | 103.535 | 123.000 | 1,586.9 |
| 2011 | 101.464 | 88.000 | 1,550.4 |
| 2012 | 102.327 | 96.000 | 1,637.5 |
| 2013 | 84.860 | 70.000 | 1,578.1 |
| 2014 | 86.935 | 94.000 | 1,656.4 |
| 2015 | 82.877 | 83.500 | 1,654.9 |
| 2016 | 96.522 | 111.433 | 1,672.1 |
| 2017 | 81.854 | 50.711 | 1,658.8 |
| 2018 | 77.276 | 69.684 | 1,644.2 |



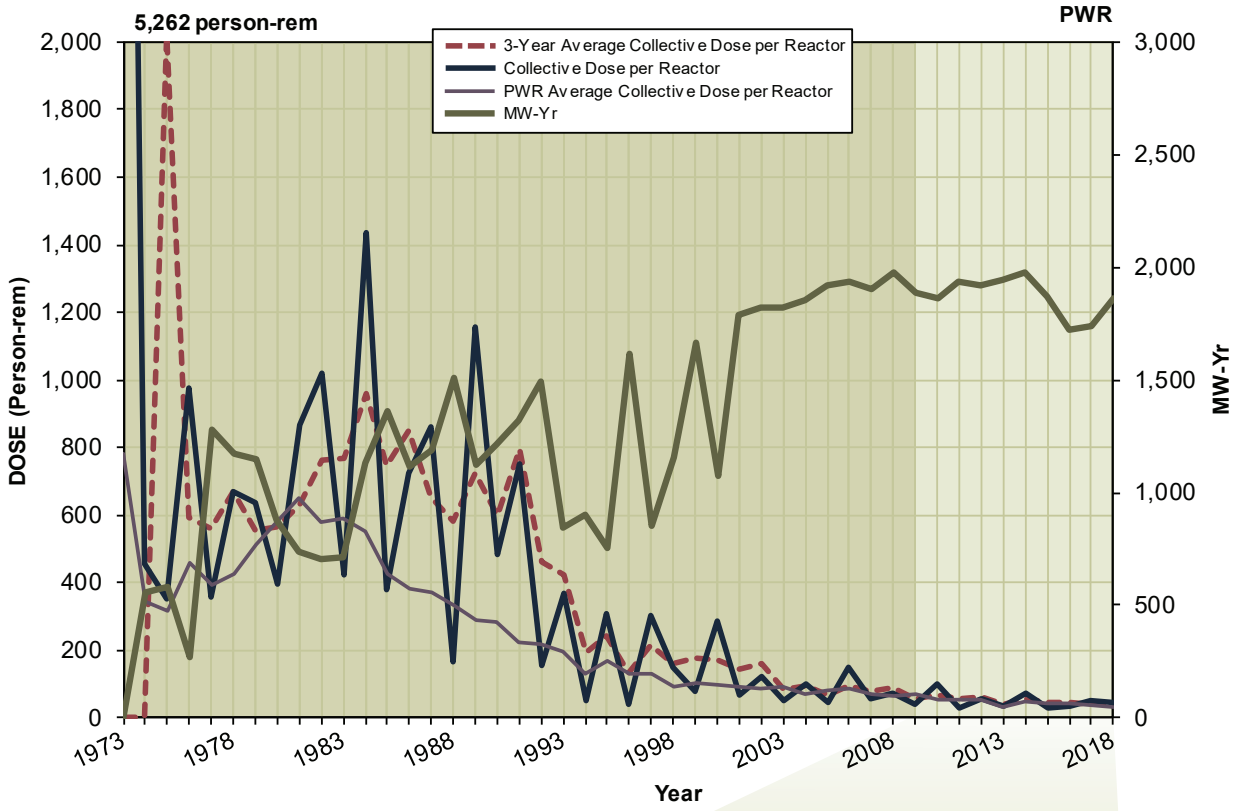
# HOPE CREEK 1
## Dose Performance Trends



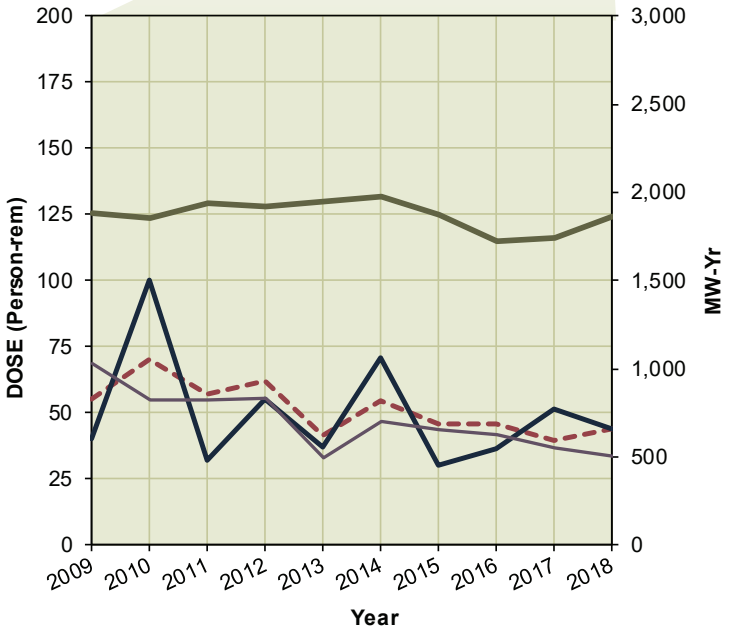

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 131.643 | 169.362 | 1,111.4 |
| 2010 | 121.591 | 160.910 | 1,082.0 |
| 2011 | 118.316 | 24.677 | 1,199.3 |
| 2012 | 113.151 | 153.866 | 1,091.3 |
| 2013 | 109.704 | 150.568 | 1,040.3 |
| 2014 | 113.659 | 36.543 | 1,187.9 |
| 2015 | 118.991 | 169.862 | 1,078.9 |
| 2016 | 115.429 | 139.883 | 1,100.4 |
| 2017 | 113.888 | 31.919 | 1,216.7 |
| 2018 | 107.282 | 150.044 | 1,094.0 |



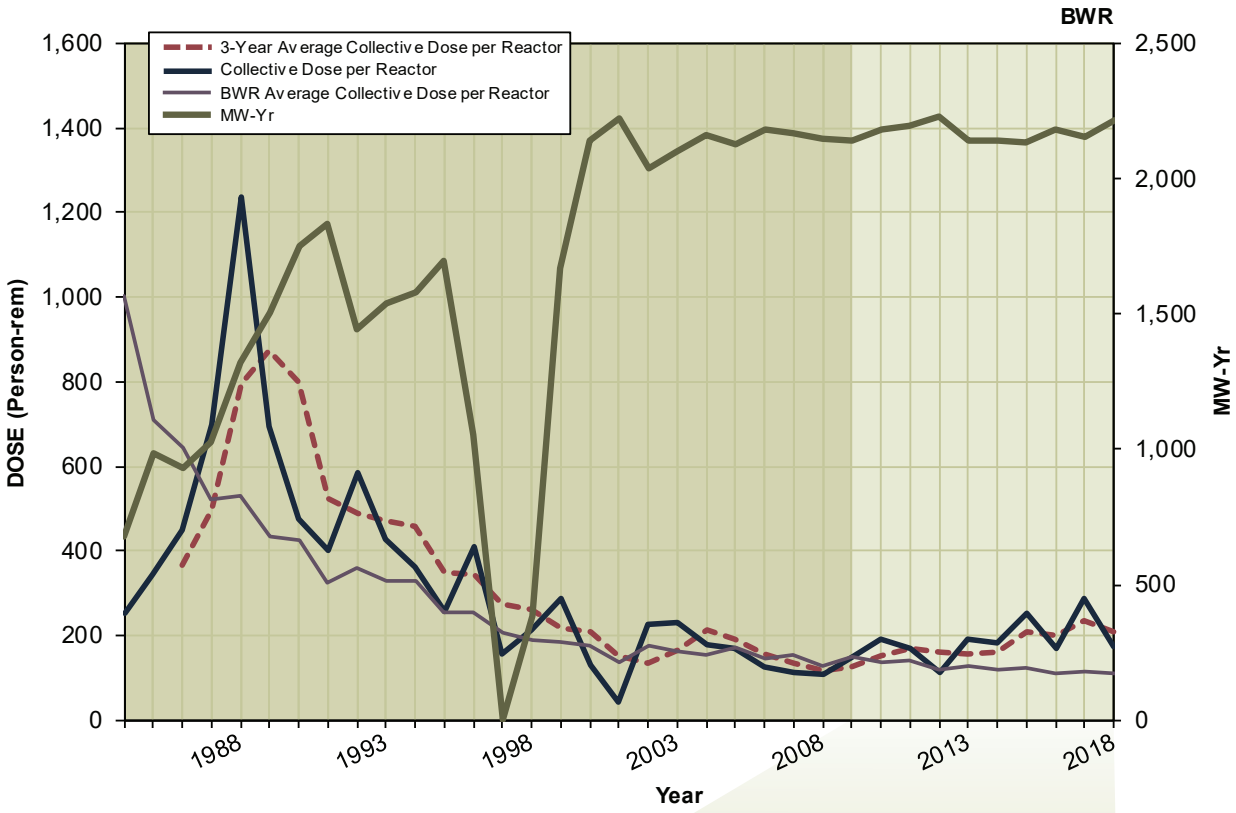
# INDIAN POINT 2,3
## Dose Performance Trends



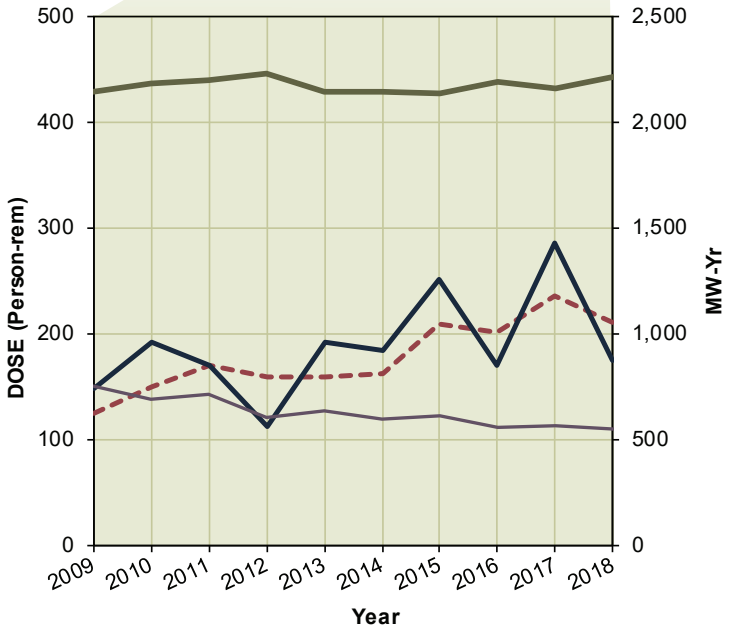

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 55.292 | 40.000 | 1,884.2 |
| 2010 | 70.361 | 100.000 | 1,859.2 |
| 2011 | 57.326 | 32.000 | 1,938.8 |
| 2012 | 62.379 | 55.000 | 1,921.0 |
| 2013 | 41.230 | 37.000 | 1,946.6 |
| 2014 | 54.387 | 71.000 | 1,973.1 |
| 2015 | 46.165 | 30.238 | 1,870.1 |
| 2016 | 45.931 | 36.458 | 1,723.7 |
| 2017 | 39.354 | 51.368 | 1,740.7 |
| 2018 | 43.977 | 44.106 | 1,863.6 |



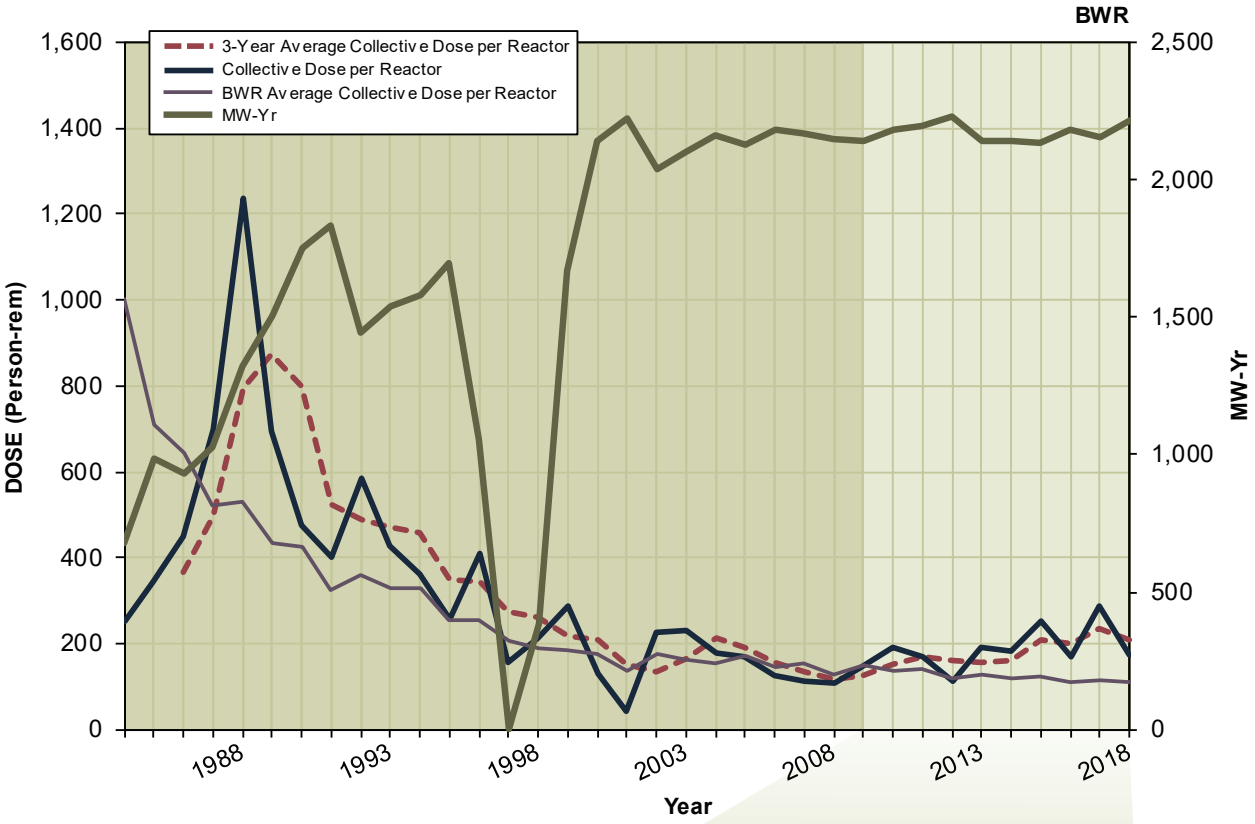
# LASALLE 1, 2
## Dose Performance Trends



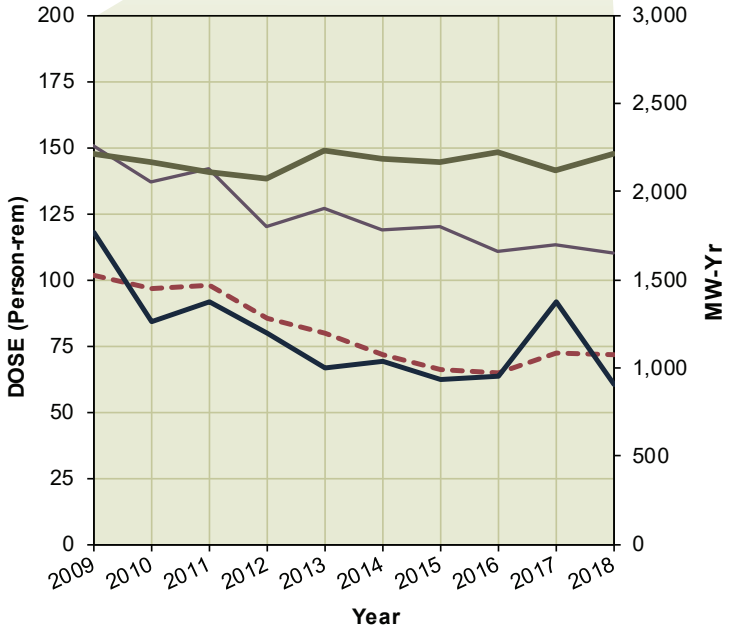

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 123.777 | 148.000 | 2,141.0 |
| 2010 | 149.782 | 192.000 | 2,184.1 |
| 2011 | 170.270 | 170.000 | 2,198.2 |
| 2012 | 158.279 | 112.000 | 2,230.8 |
| 2013 | 158.144 | 192.000 | 2,141.6 |
| 2014 | 162.476 | 184.000 | 2,141.0 |
| 2015 | 208.635 | 250.833 | 2,132.9 |
| 2016 | 201.196 | 169.493 | 2,185.5 |
| 2017 | 235.173 | 285.195 | 2,158.5 |
| 2018 | 209.774 | 174.634 | 2,214.7 |



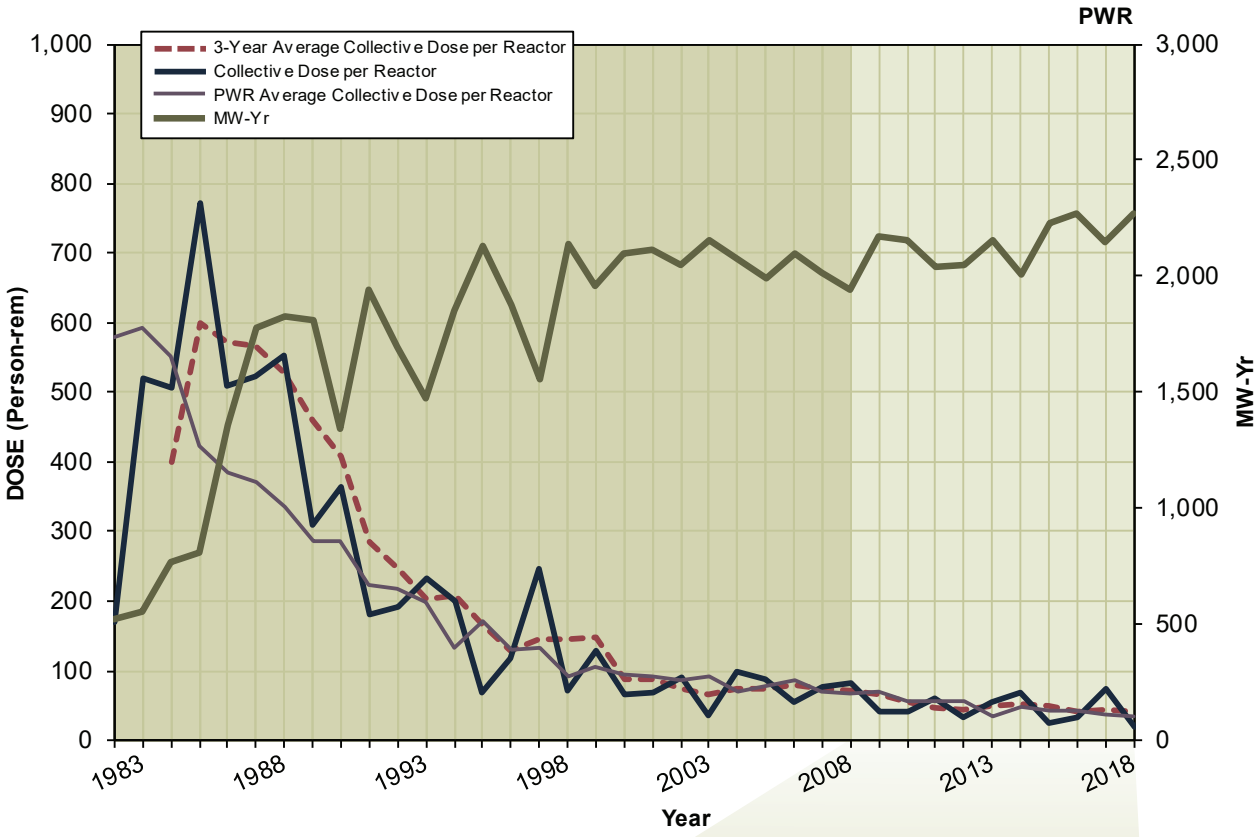
## LIMERICK 1, 2
Dose Performance Trends



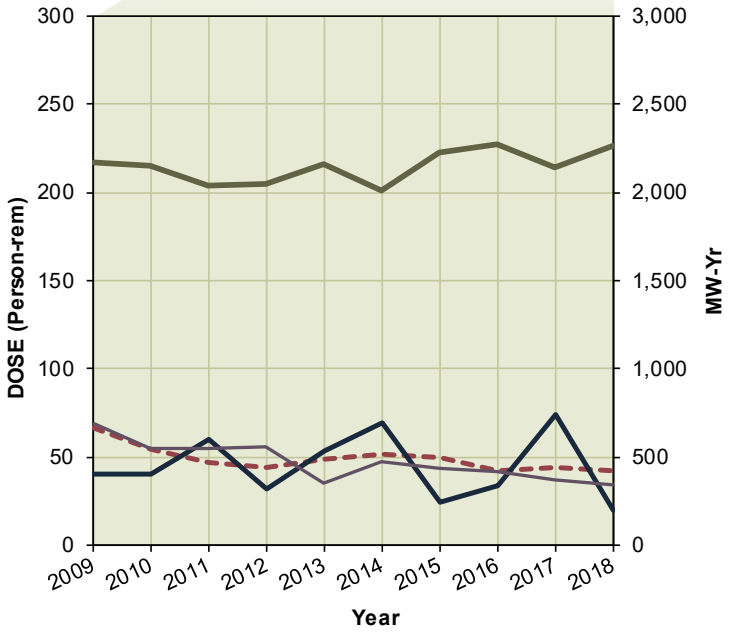

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 123.777 | 148.000 | 2,141.0 |
| 2010 | 149.782 | 192.000 | 2,184.1 |
| 2011 | 170.270 | 170.000 | 2,198.2 |
| 2012 | 158.279 | 112.000 | 2,230.8 |
| 2013 | 158.144 | 192.000 | 2,141.6 |
| 2014 | 162.476 | 184.000 | 2,141.0 |
| 2015 | 208.635 | 250.833 | 2,132.9 |
| 2016 | 201.196 | 169.493 | 2,185.5 |
| 2017 | 235.173 | 285.195 | 2,158.5 |
| 2018 | 71.931 | 60.527 | 2,214.9 |



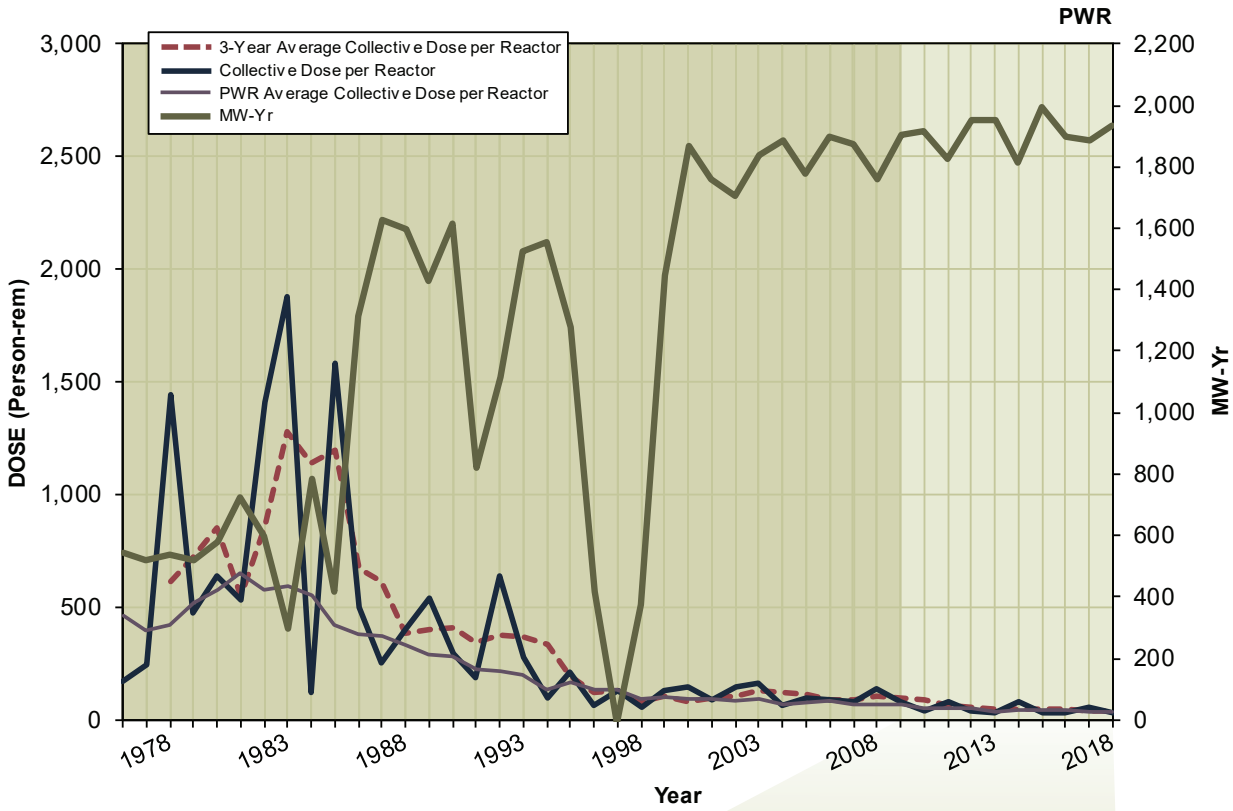
## MCGUIRE 1, 2
Dose Performance Trends



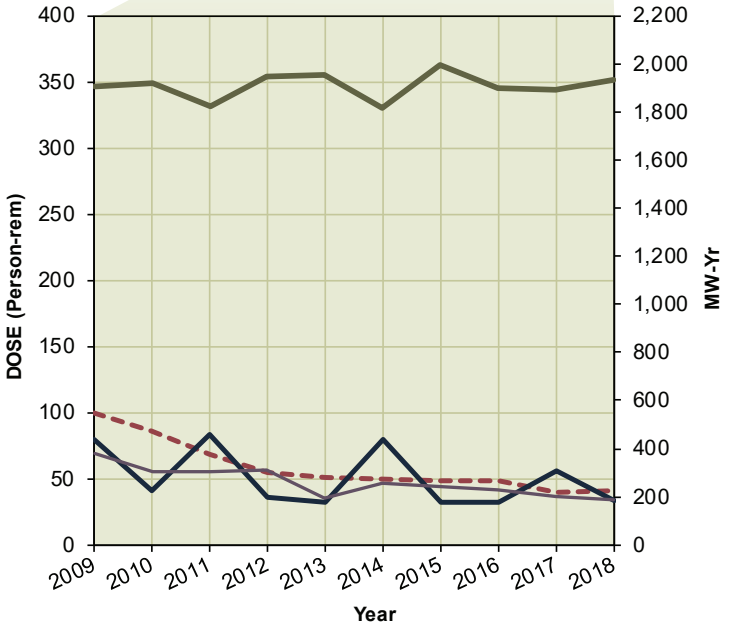

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 66.929 | 40.000 | 2,170.6 |
| 2010 | 54.483 | 40.000 | 2,151.9 |
| 2011 | 46.789 | 60.000 | 2,038.3 |
| 2012 | 43.941 | 32.000 | 2,045.6 |
| 2013 | 48.625 | 54.000 | 2,157.3 |
| 2014 | 51.728 | 69.000 | 2,008.0 |
| 2015 | 49.513 | 24.700 | 2,230.1 |
| 2016 | 42.552 | 33.827 | 2,269.9 |
| 2017 | 44.107 | 73.795 | 2,145.6 |
| 2018 | 42.541 | 20.003 | 2,267.4 |



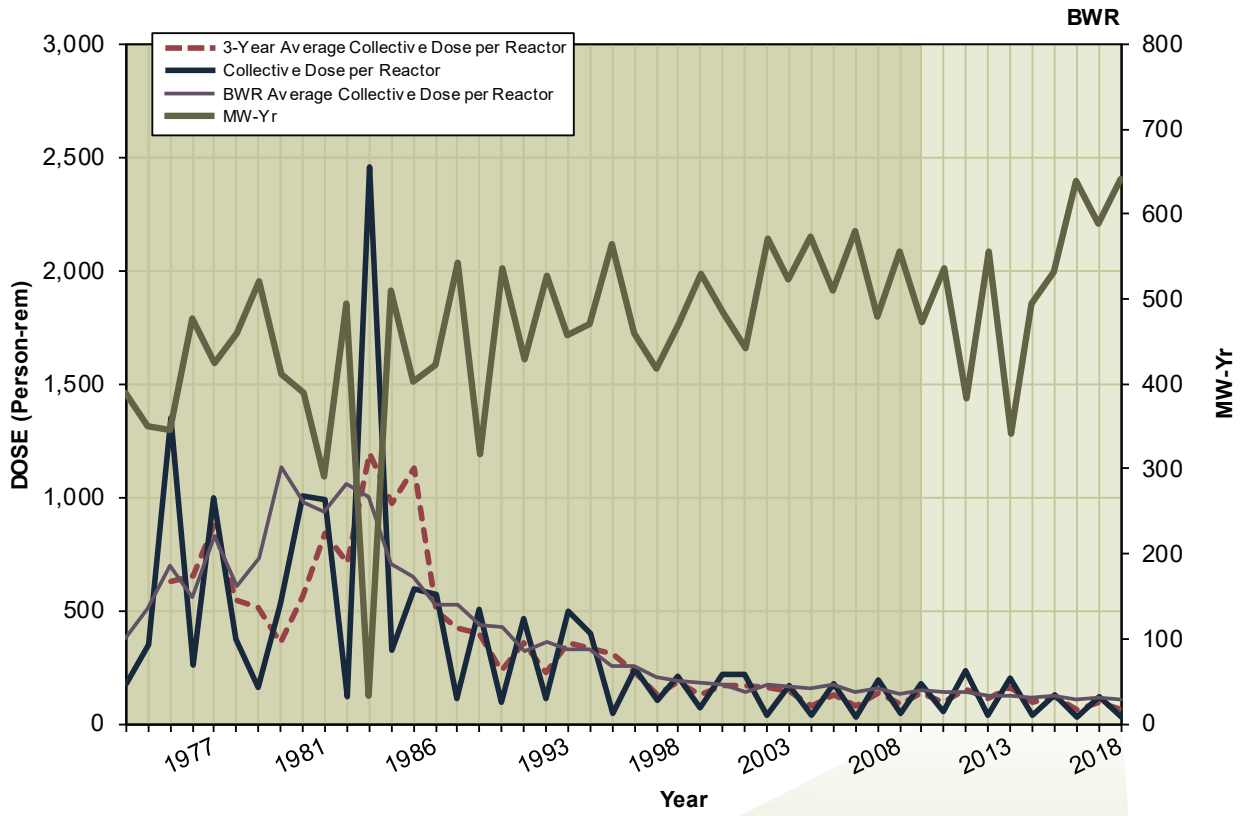
## MILLSTONE 2, 3
Dose Performance Trends



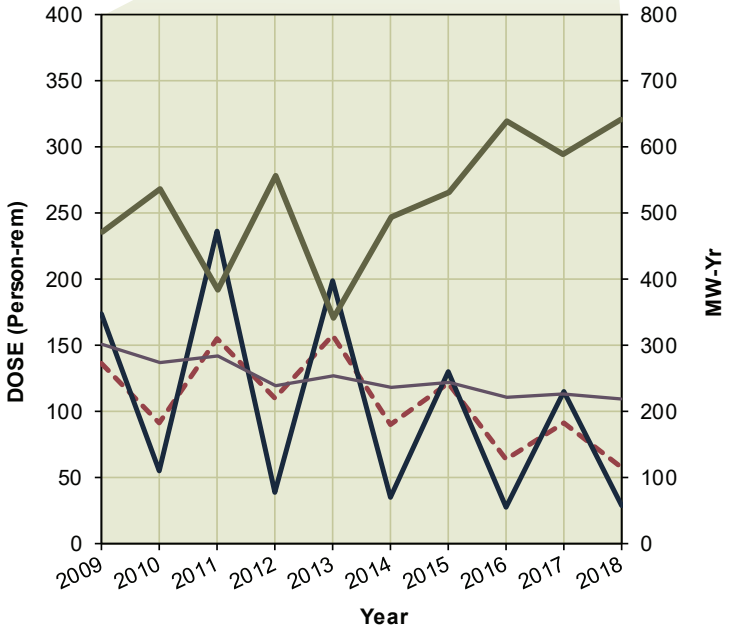

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 99.301 | 80.000 | 1,906.1 |
| 2010 | 85.599 | 41.000 | 1,916.8 |
| 2011 | 68.368 | 84.000 | 1,822.7 |
| 2012 | 54.046 | 36.000 | 1,948.9 |
| 2013 | 51.153 | 32.000 | 1,954.5 |
| 2014 | 49.667 | 80.000 | 1,812.7 |
| 2015 | 48.112 | 31.970 | 1,992.4 |
| 2016 | 48.095 | 32.063 | 1,896.1 |
| 2017 | 40.111 | 56.299 | 1,888.0 |
| 2018 | 40.472 | 33.055 | 1,931.7 |



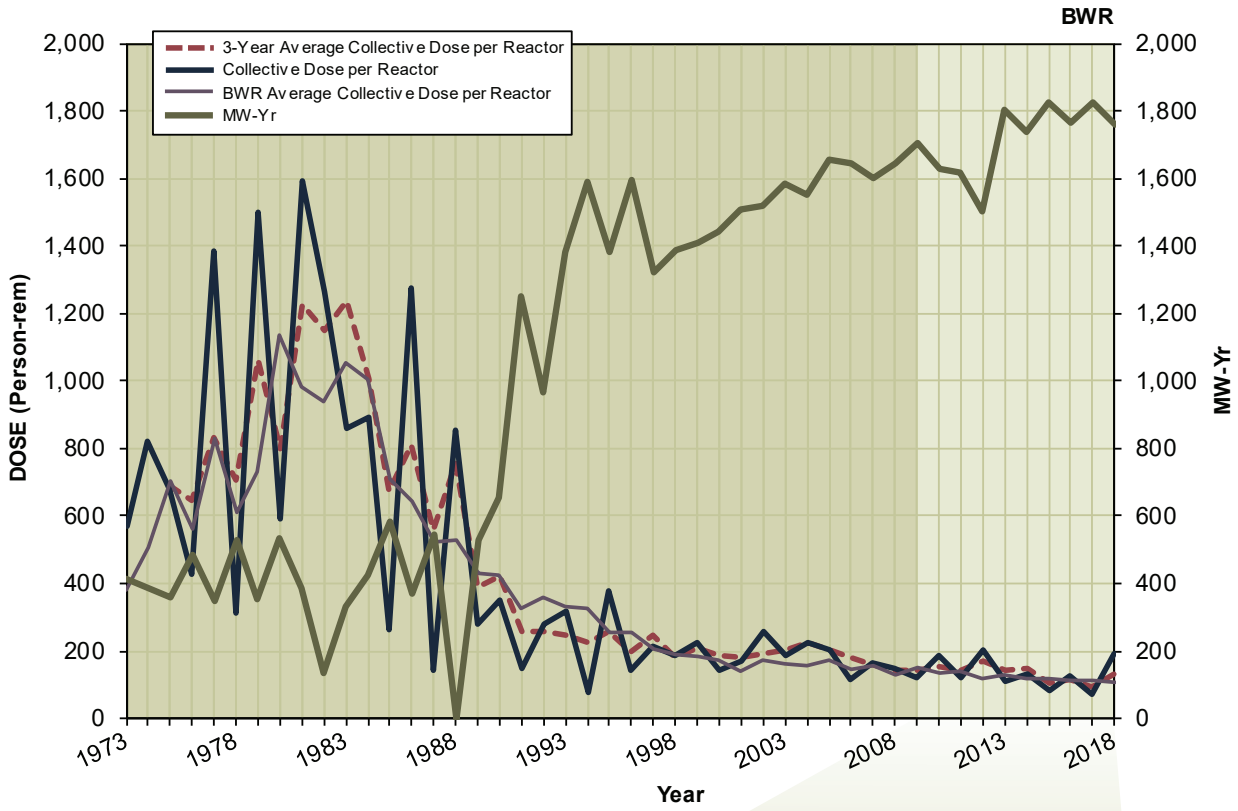
## MONTICELLO
Dose Performance Trends



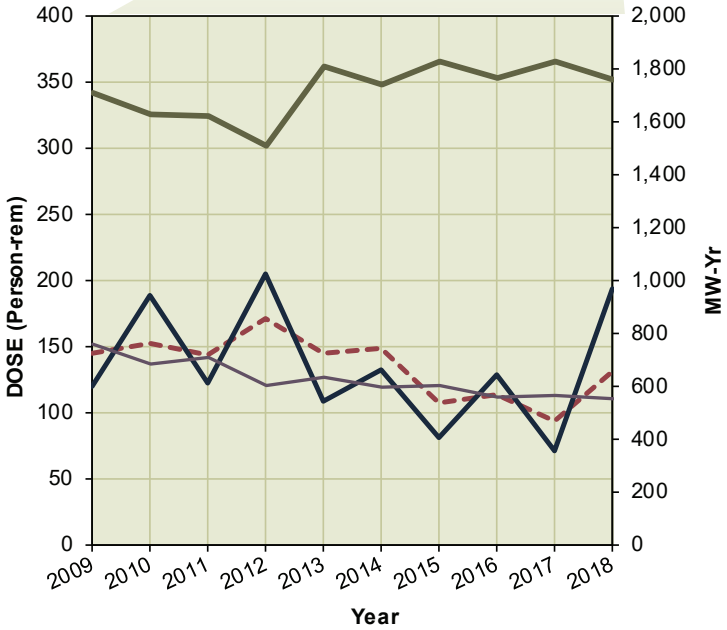

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 136.274 | 174.000 | 473.1 |
| 2010 | 91.180 | 56.000 | 536.0 |
| 2011 | 155.579 | 237.000 | 383.4 |
| 2012 | 110.633 | 39.000 | 556.7 |
| 2013 | 158.250 | 199.000 | 342.3 |
| 2014 | 91.020 | 35.000 | 493.6 |
| 2015 | 121.444 | 130.057 | 532.4 |
| 2016 | 64.637 | 28.547 | 639.0 |
| 2017 | 91.473 | 115.814 | 589.0 |
| 2018 | 57.866 | 29.238 | 641.3 |



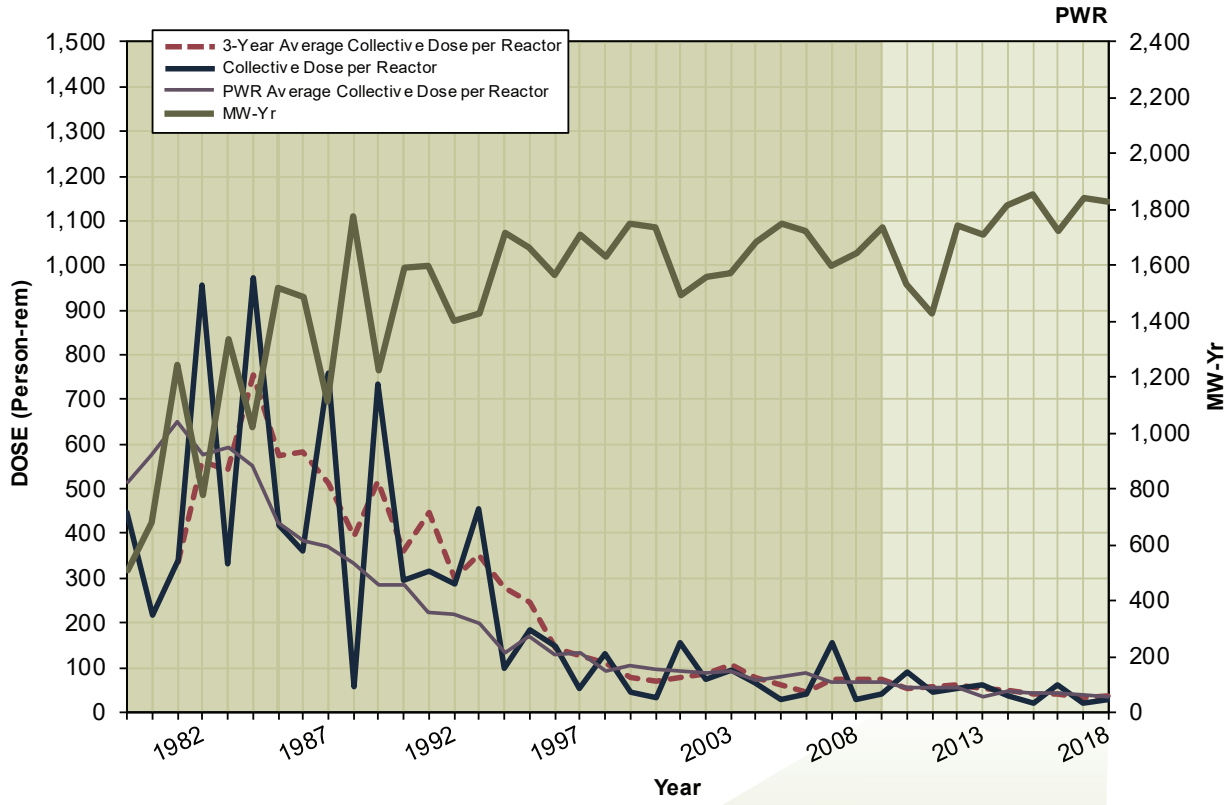
## NINE MILE POINT 1, 2
Dose Performance Trends



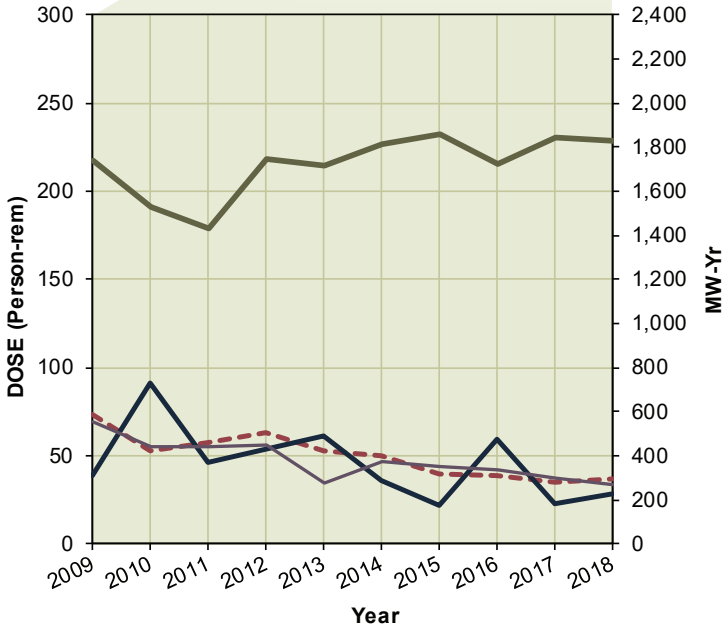

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 144.792 | 119.000 | 1,642.1 |
| 2010 | 152.463 | 188.000 | 1,706.2 |
| 2011 | 142.895 | 122.000 | 1,627.1 |
| 2012 | 171.287 | 204.000 | 1,616.8 |
| 2013 | 144.892 | 108.000 | 1,504.6 |
| 2014 | 148.111 | 132.000 | 1,804.9 |
| 2015 | 106.858 | 80.190 | 1,737.8 |
| 2016 | 113.481 | 128.397 | 1,823.7 |
| 2017 | 93.054 | 70.575 | 1,765.5 |
| 2018 | 130.573 | 192.746 | 1,758.9 |



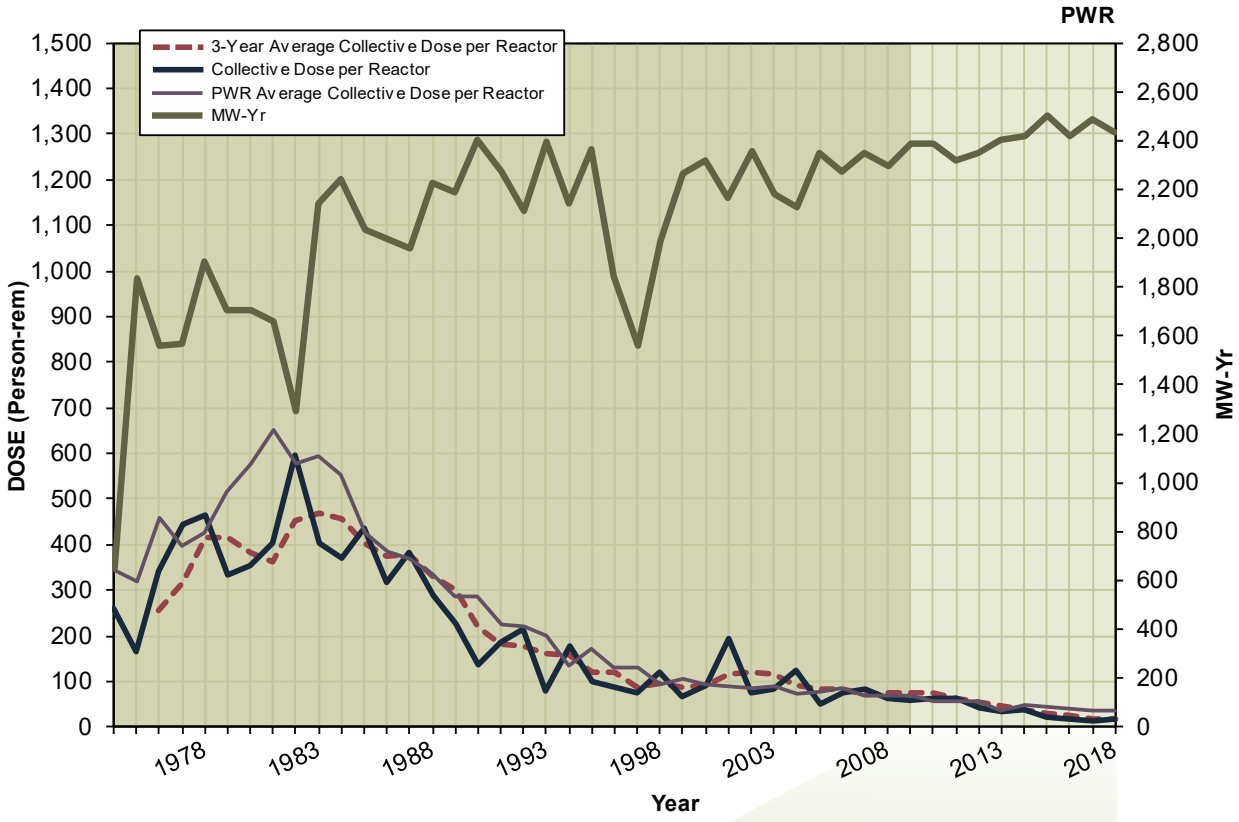
## NORTH ANNA 1, 2
Dose Performance Trends



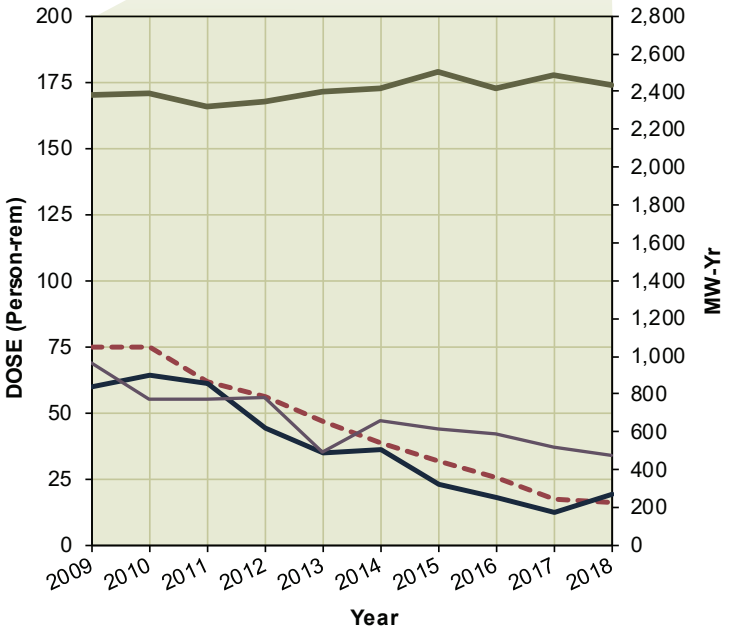

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 73.721 | 39.000 | 1,735.5 |
| 2010 | 52.569 | 91.000 | 1,529.6 |
| 2011 | 57.530 | 46.000 | 1,429.1 |
| 2012 | 63.262 | 54.000 | 1,745.6 |
| 2013 | 53.181 | 61.000 | 1,712.9 |
| 2014 | 50.039 | 36.000 | 1,813.8 |
| 2015 | 39.593 | 21.919 | 1,857.4 |
| 2016 | 39.182 | 59.670 | 1,726.2 |
| 2017 | 34.677 | 22.442 | 1,840.9 |
| 2018 | 36.845 | 28.423 | 1,826.2 |



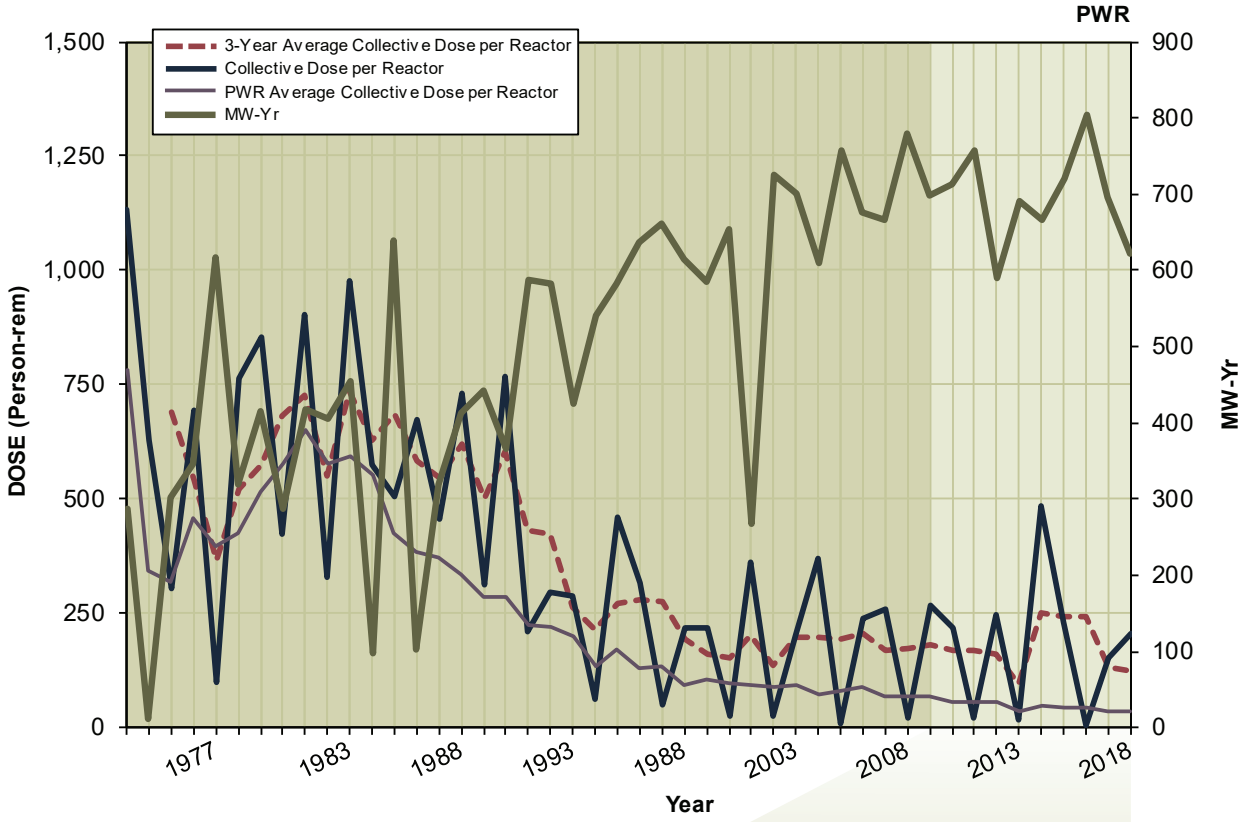
## OCONEE 1, 2, 3
Dose Performance Trends



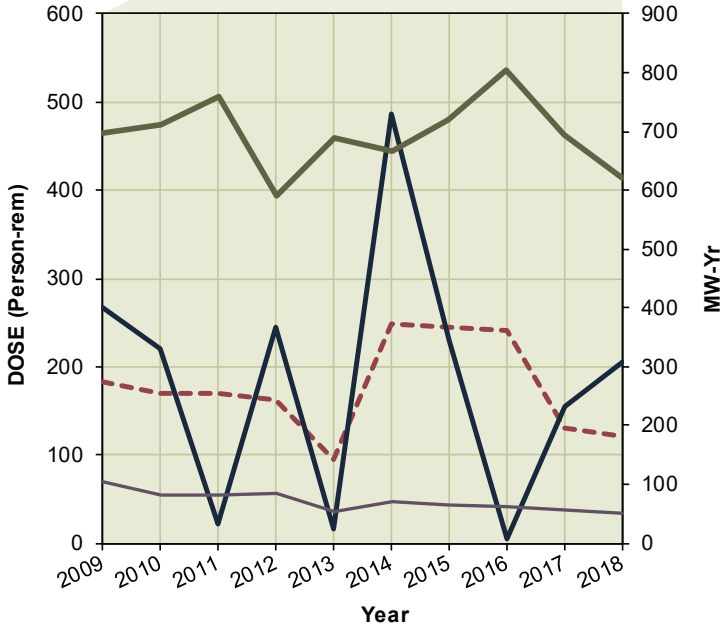

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 74.970 | 60.000 | 2,385.7 |
| 2010 | 74.979 | 64.000 | 2,391.1 |
| 2011 | 61.667 | 61.000 | 2,321.6 |
| 2012 | 56.310 | 44.000 | 2,351.0 |
| 2013 | 46.680 | 35.000 | 2,400.1 |
| 2014 | 38.541 | 36.000 | 2,419.3 |
| 2015 | 31.608 | 23.017 | 2,504.5 |
| 2016 | 25.718 | 17.799 | 2,417.5 |
| 2017 | 17.750 | 12.434 | 2,488.4 |
| 2018 | 16.433 | 19.067 | 2,430.8 |



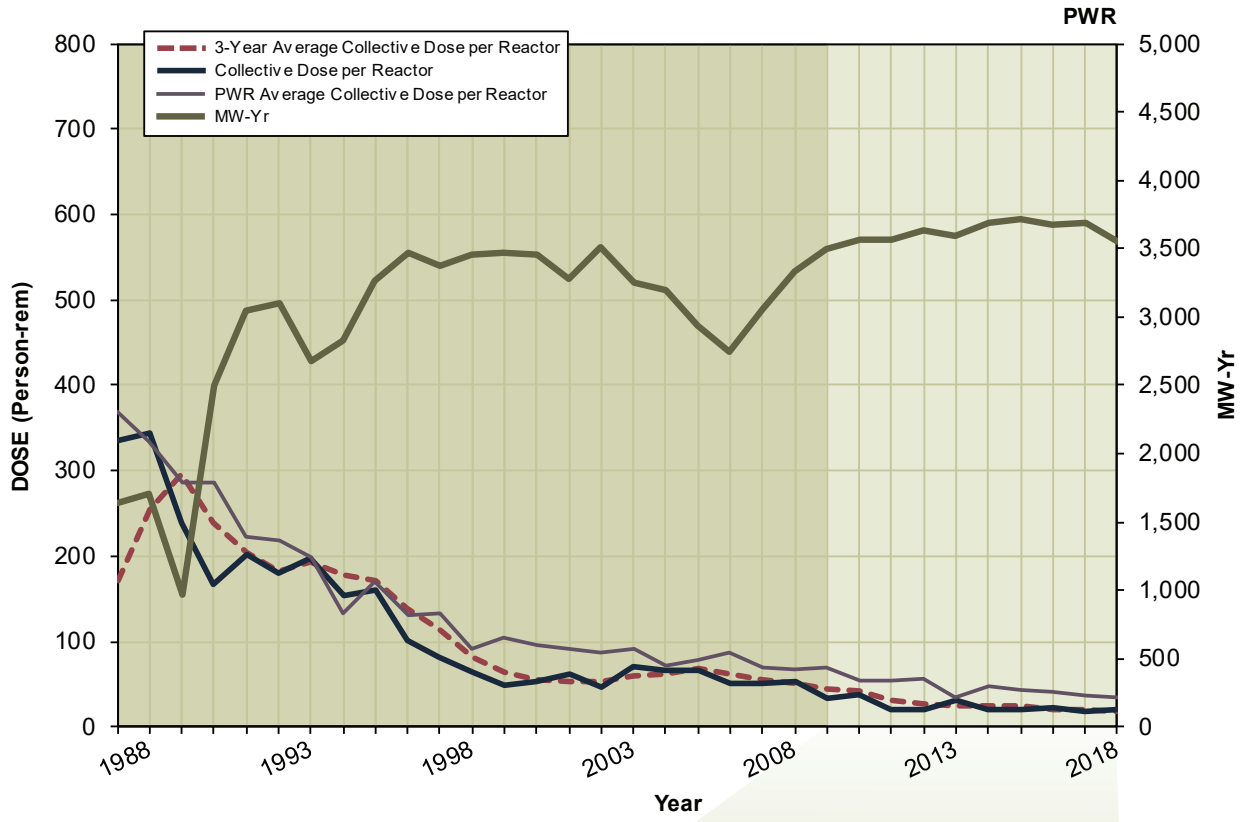
# PALISADES
## Dose Performance Trends



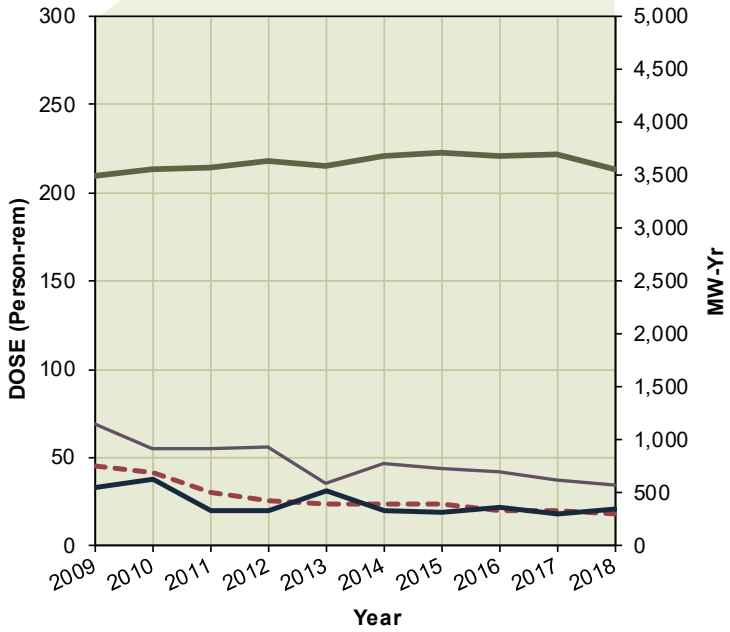

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 182.476 | 267.000 | 698.5 |
| 2010 | 170.223 | 220.000 | 712.5 |
| 2011 | 169.607 | 22.000 | 758.1 |
| 2012 | 162.219 | 245.000 | 589.5 |
| 2013 | 94.204 | 16.000 | 689.7 |
| 2014 | 249.007 | 486.000 | 665.6 |
| 2015 | 244.193 | 230.687 | 721.3 |
| 2016 | 240.805 | 5.667 | 803.8 |
| 2017 | 130.165 | 154.142 | 696.1 |
| 2018 | 122.031 | 206.284 | 622.8 |



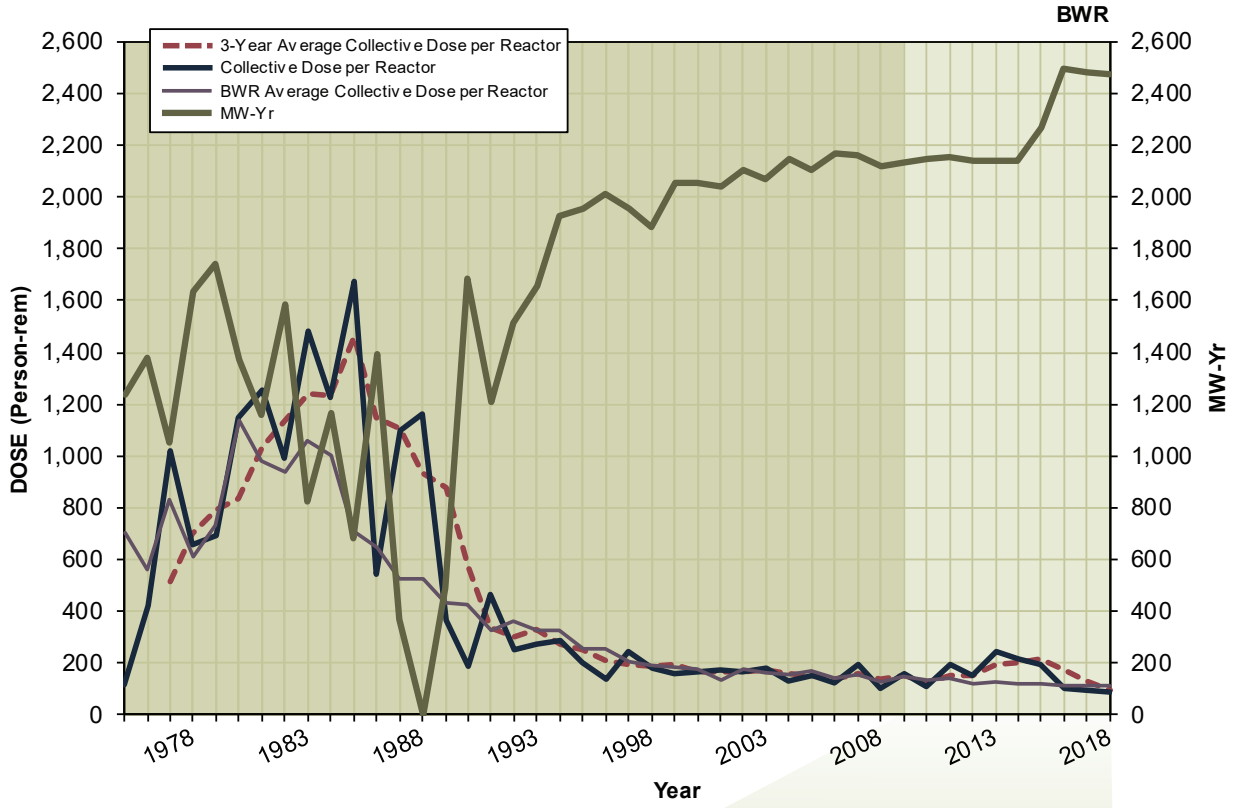
# PALO VERDE 1, 2, 3
## Dose Performance Trends



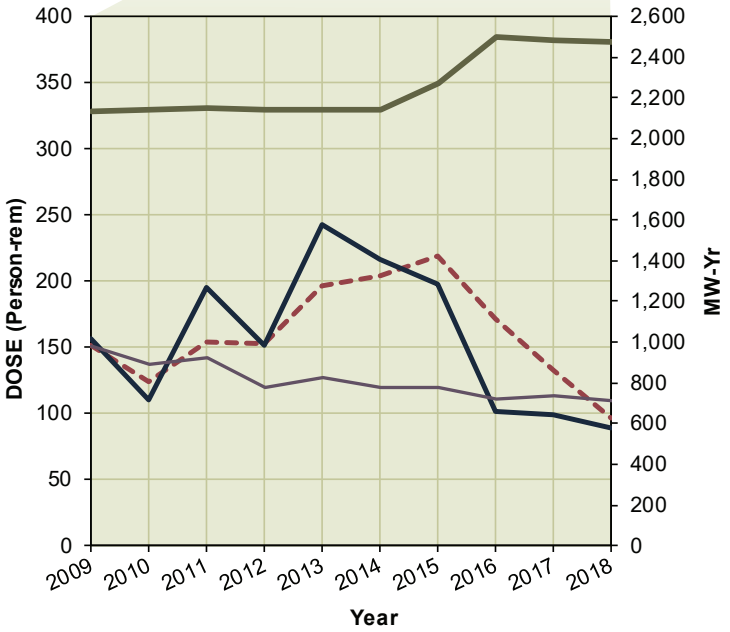

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 45.178 | 33.000 | 3,500.2 |
| 2010 | 41.157 | 38.000 | 3,561.6 |
| 2011 | 30.210 | 20.000 | 3,570.5 |
| 2012 | 25.953 | 20.000 | 3,635.5 |
| 2013 | 23.583 | 31.000 | 3,588.0 |
| 2014 | 23.701 | 20.000 | 3,689.9 |
| 2015 | 23.523 | 19.332 | 3,711.7 |
| 2016 | 20.310 | 21.599 | 3,680.7 |
| 2017 | 19.631 | 17.963 | 3,691.8 |
| 2018 | 17.754 | 13.701 | 3,551.0 |



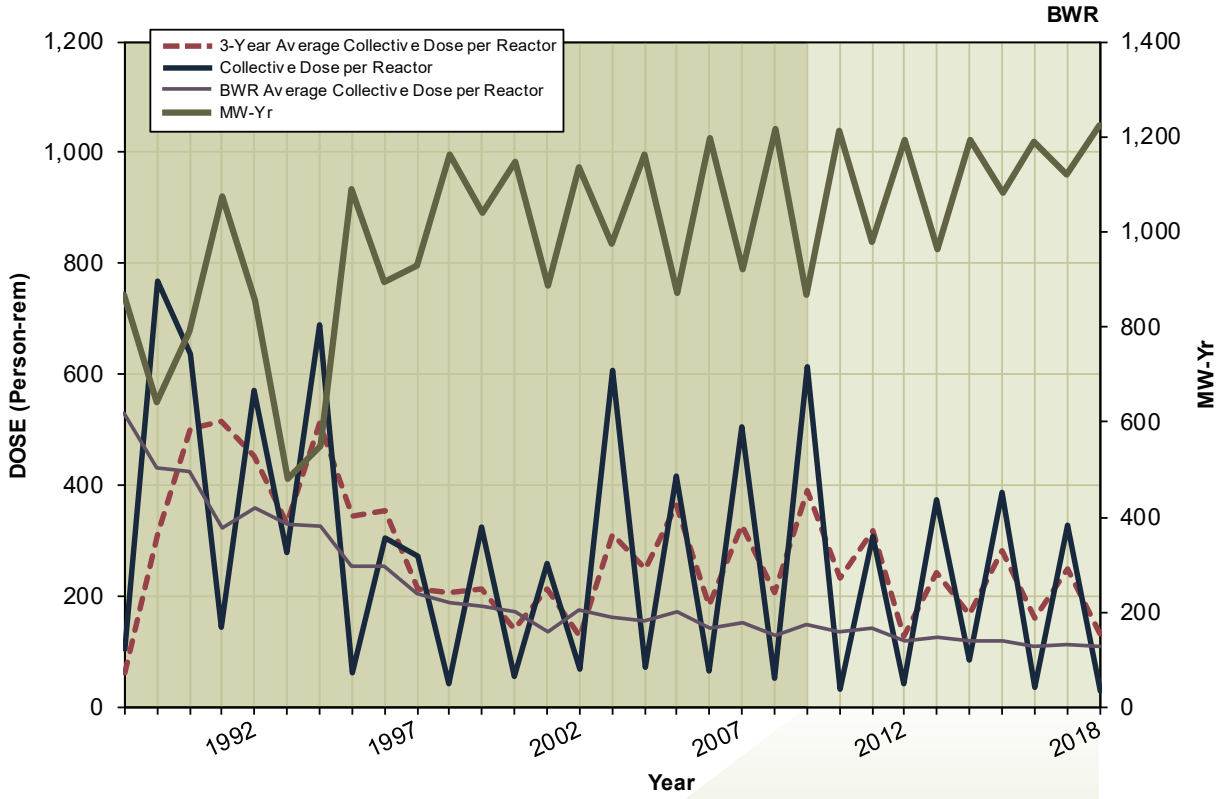
# PEACH BOTTOM 2, 3
## Dose Performance Trends



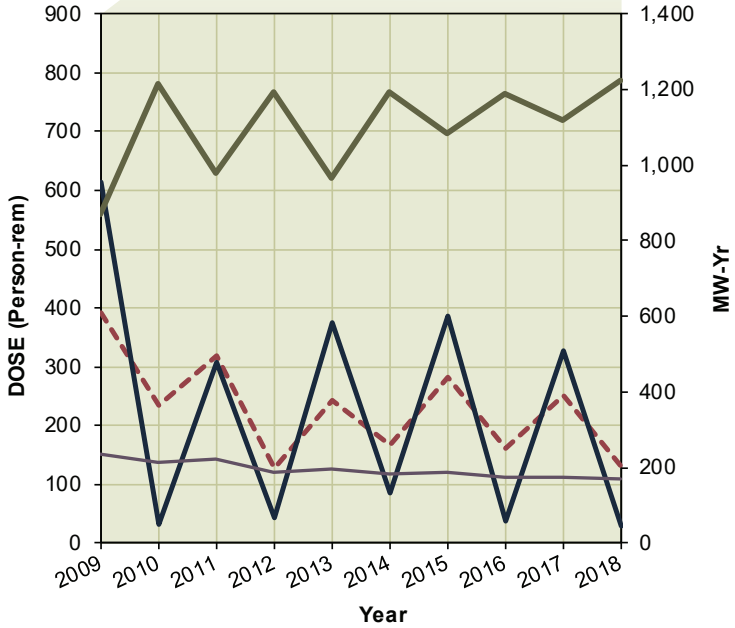

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 151.353 | 156.000 | 2,130.4 |
| 2010 | 123.782 | 110.000 | 2,145.3 |
| 2011 | 153.284 | 195.000 | 2,152.0 |
| 2012 | 152.436 | 152.000 | 2,142.5 |
| 2013 | 196.530 | 242.000 | 2,143.5 |
| 2014 | 203.385 | 216.000 | 2,142.3 |
| 2015 | 218.412 | 197.799 | 2,267.6 |
| 2016 | 171.460 | 101.111 | 2,498.1 |
| 2017 | 132.605 | 98.907 | 2,481.1 |
| 2018 | 96.229 | 88.669 | 2,474.9 |



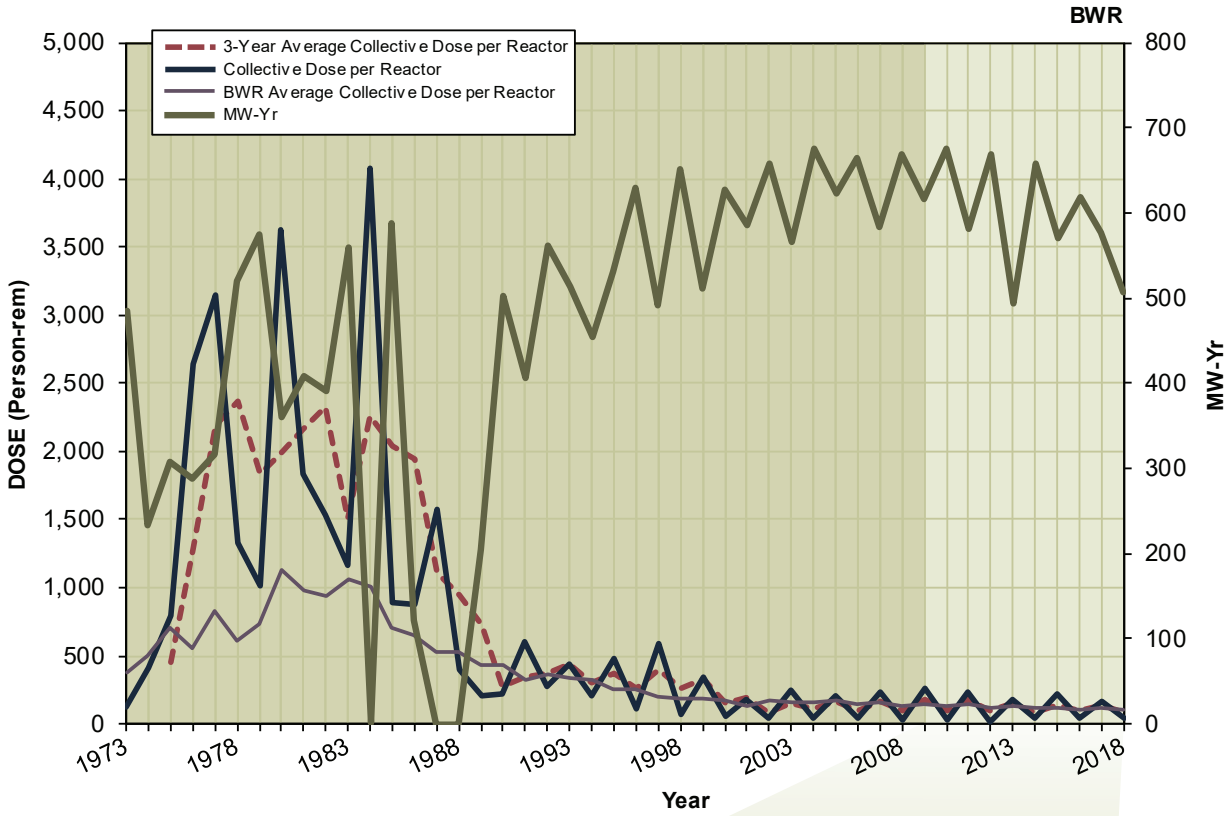
# PERRY
## Dose Performance Trends



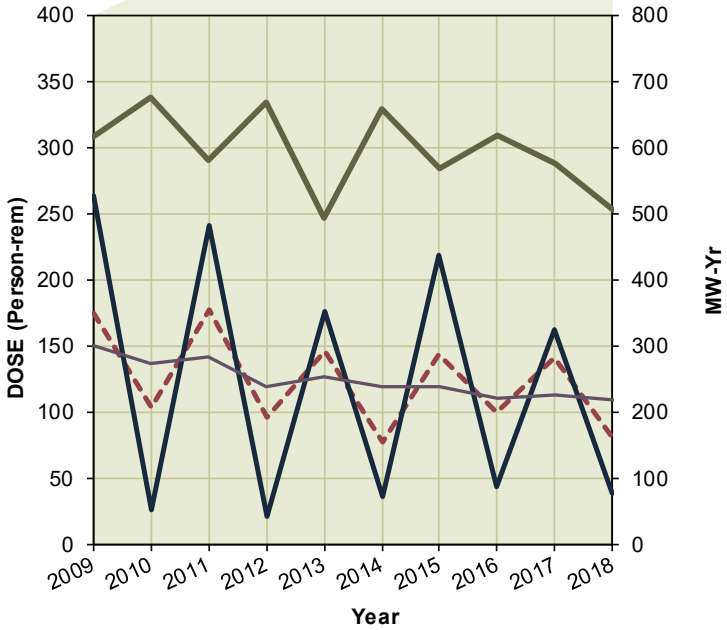

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 390.727 | 615.000 | 869.2 |
| 2010 | 233.082 | 32.000 | 1,213.3 |
| 2011 | 318.350 | 308.000 | 978.2 |
| 2012 | 127.822 | 43.000 | 1,194.3 |
| 2013 | 241.675 | 374.000 | 964.5 |
| 2014 | 167.246 | 84.617 | 1,193.5 |
| 2015 | 281.714 | 386.778 | 1,082.5 |
| 2016 | 162.261 | 36.389 | 1,189.5 |
| 2017 | 250.295 | 327.717 | 1,120.1 |
| 2018 | 131.318 | 29.848 | 1,223.6 |



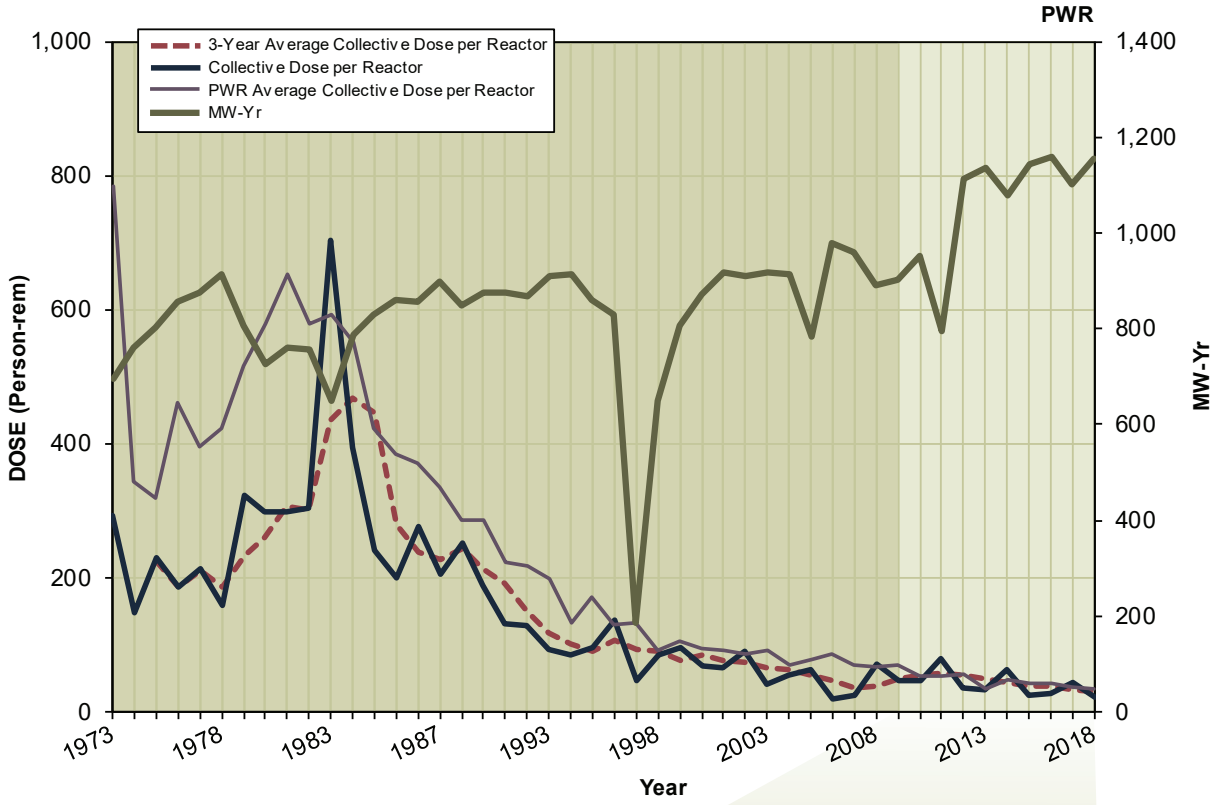
# PILGRIM 1
## Dose Performance Trends



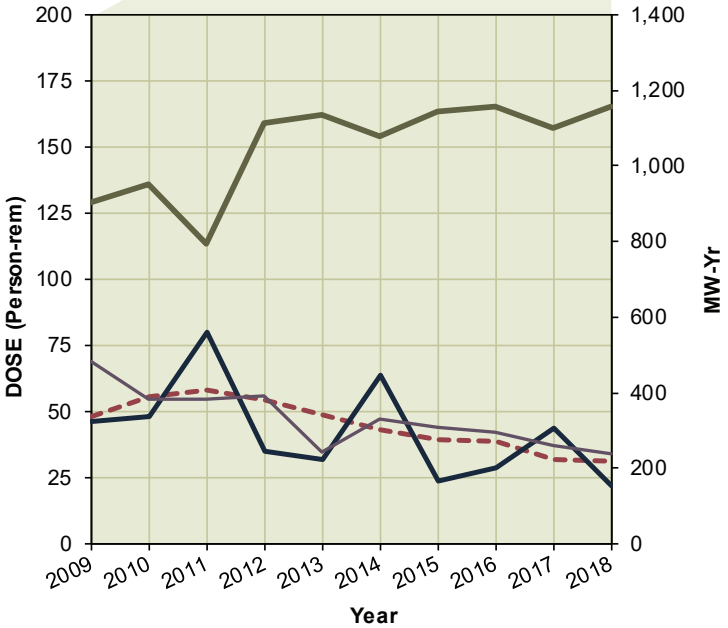

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 175.780 | 264.000 | 616.0 |
| 2010 | 104.185 | 26.000 | 675.5 |
| 2011 | 177.119 | 241.000 | 580.5 |
| 2012 | 96.254 | 22.000 | 669.0 |
| 2013 | 146.345 | 176.000 | 493.9 |
| 2014 | 78.116 | 37.000 | 658.6 |
| 2015 | 143.779 | 218.609 | 570.0 |
| 2016 | 99.856 | 44.242 | 617.9 |
| 2017 | 141.950 | 162.998 | 576.1 |
| 2018 | 82.006 | 38.777 | 507.0 |



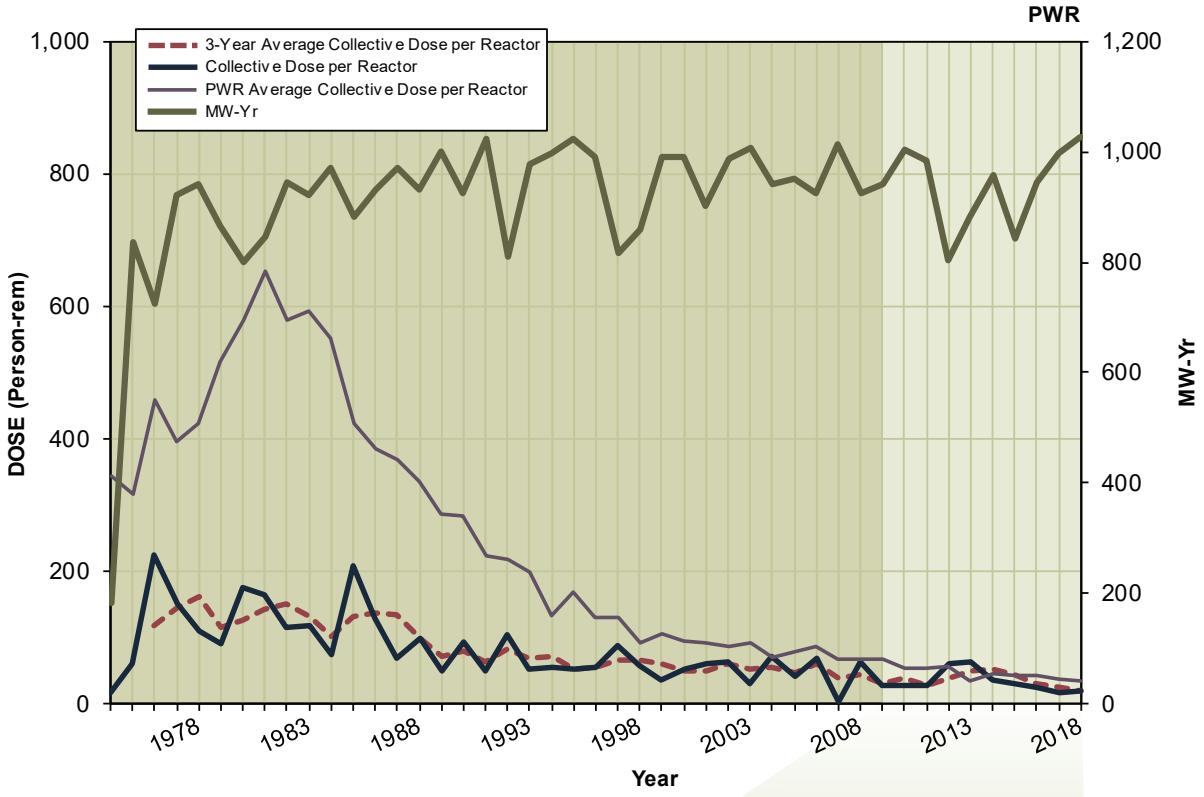
## POINT BEACH 1, 2
Dose Performance Trends



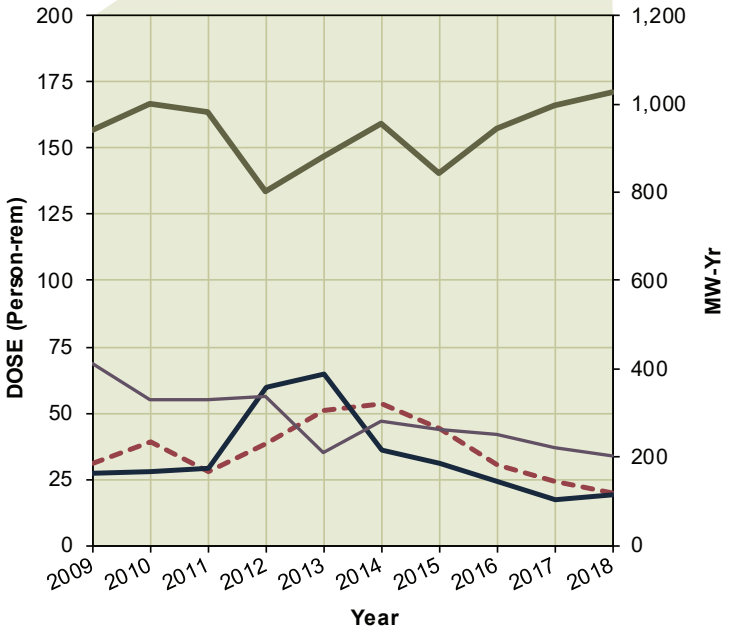

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 48.212 | 46.000 | 902.3 |
| 2010 | 55.494 | 48.000 | 952.8 |
| 2011 | 58.108 | 80.000 | 796.2 |
| 2012 | 54.189 | 35.000 | 1,114.3 |
| 2013 | 48.764 | 32.000 | 1,135.3 |
| 2014 | 43.404 | 64.000 | 1,079.4 |
| 2015 | 39.690 | 23.737 | 1,142.9 |
| 2016 | 38.715 | 28.647 | 1,159.0 |
| 2017 | 32.041 | 43.740 | 1,102.0 |
| 2018 | 31.334 | 21.614 | 1,156.7 |



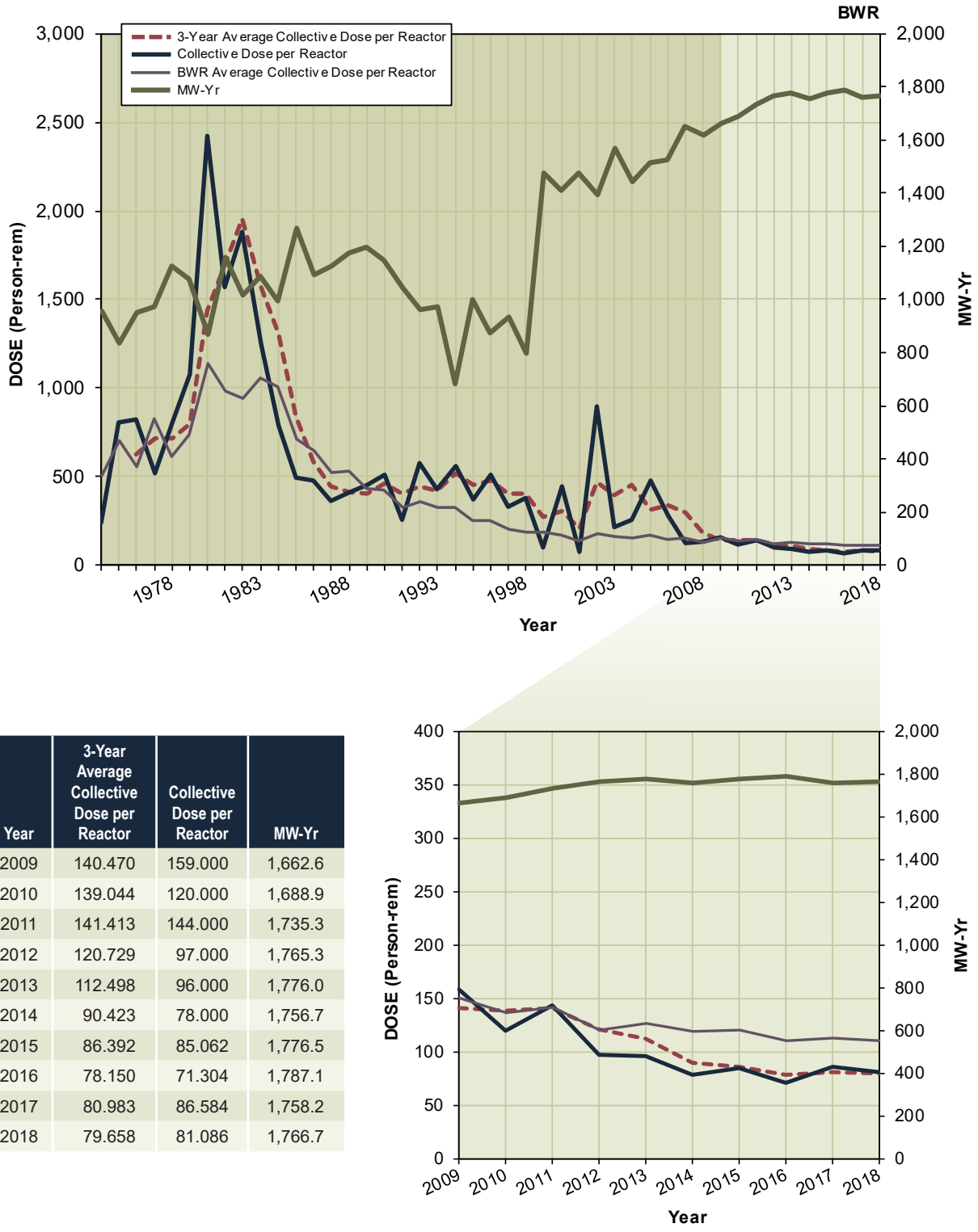
# PRAIRIE ISLAND 1, 2
## Dose Performance Trends




| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 31.098 | 27.000 | 942.2 |
| 2010 | 39.221 | 28.000 | 1,002.6 |
| 2011 | 27.759 | 29.000 | 982.4 |
| 2012 | 38.688 | 60.000 | 803.8 |
| 2013 | 51.197 | 65.000 | 881.8 |
| 2014 | 53.336 | 36.000 | 957.0 |
| 2015 | 43.882 | 31.221 | 842.2 |
| 2016 | 30.230 | 24.039 | 944.5 |
| 2017 | 24.140 | 17.161 | 998.3 |
| 2018 | 20.022 | 18.866 | 1,025.5 |

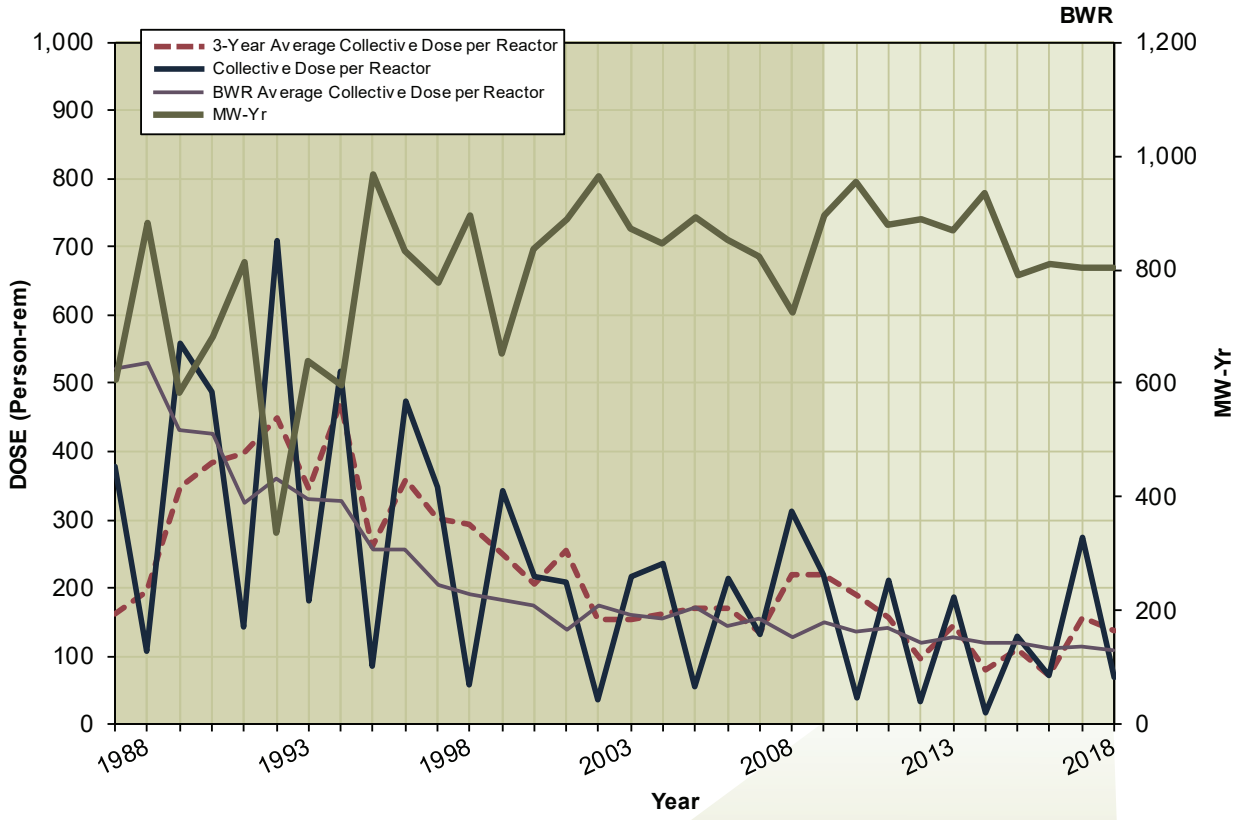


## QUAD CITIES 1, 2
Dose Performance Trends

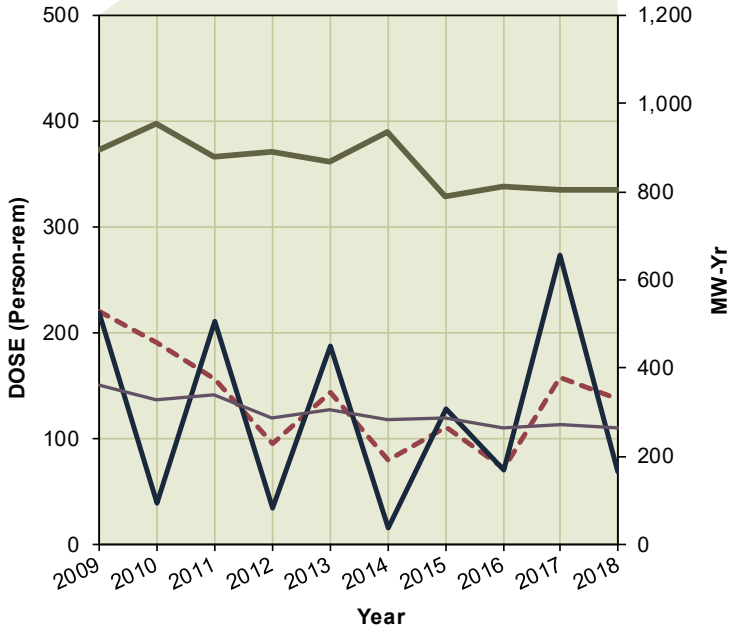



| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 140.470 | 159.000 | 1,662.6 |
| 2010 | 139.044 | 120.000 | 1,688.9 |
| 2011 | 141.413 | 144.000 | 1,735.3 |
| 2012 | 120.729 | 97.000 | 1,765.3 |
| 2013 | 112.498 | 96.000 | 1,776.0 |
| 2014 | 90.423 | 78.000 | 1,756.7 |
| 2015 | 86.392 | 85.062 | 1,776.5 |
| 2016 | 78.150 | 71.304 | 1,787.1 |
| 2017 | 80.983 | 86.584 | 1,758.2 |
| 2018 | 79.658 | 81.086 | 1,766.7 |

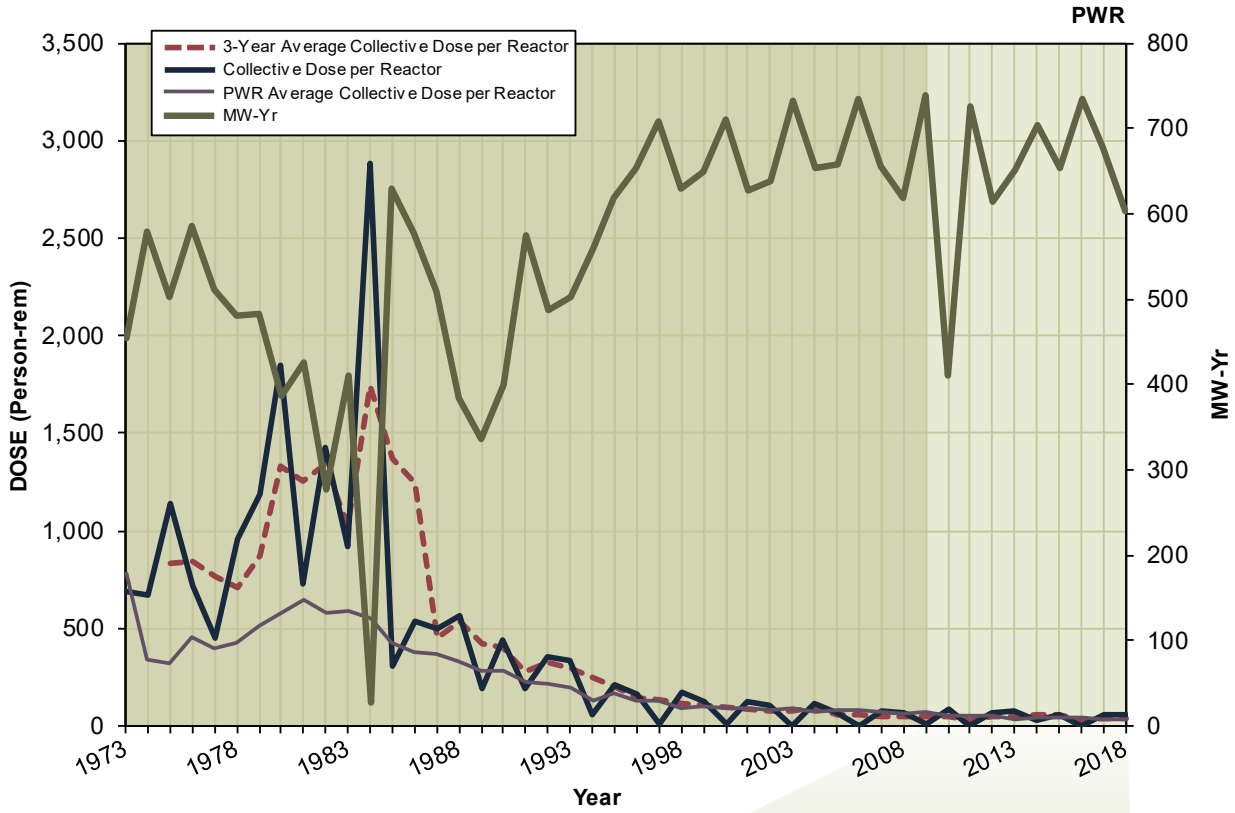
## RIVER BEND 1
Dose Performance Trends



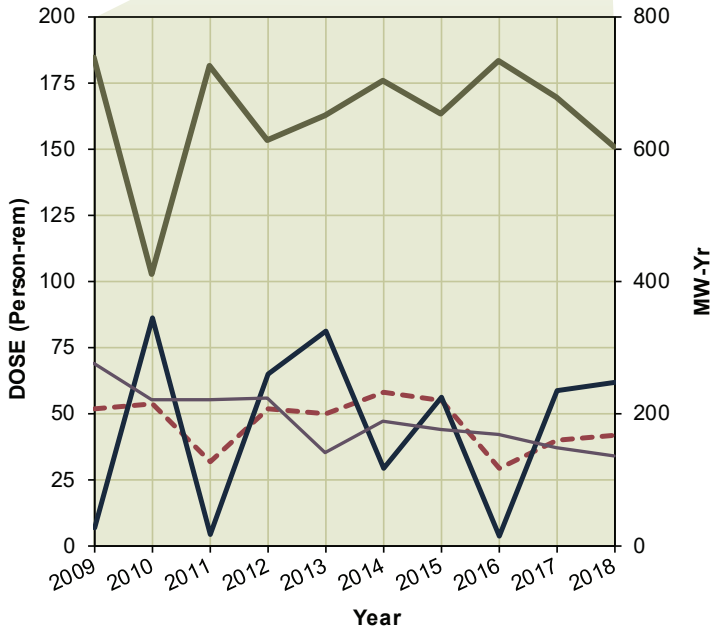

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 220.840 | 219.000 | 895.6 |
| 2010 | 190.501 | 40.000 | 955.1 |
| 2011 | 157.005 | 211.000 | 878.6 |
| 2012 | 95.249 | 34.000 | 890.2 |
| 2013 | 144.574 | 188.000 | 867.6 |
| 2014 | 79.549 | 16.000 | 935.8 |
| 2015 | 110.99 | 128.492 | 791.6 |
| 2016 | 71.924 | 71.142 | 811.5 |
| 2017 | 157.546 | 273.004 | 804.5 |
| 2018 | 137.909 | 69.580 | 804.3 |



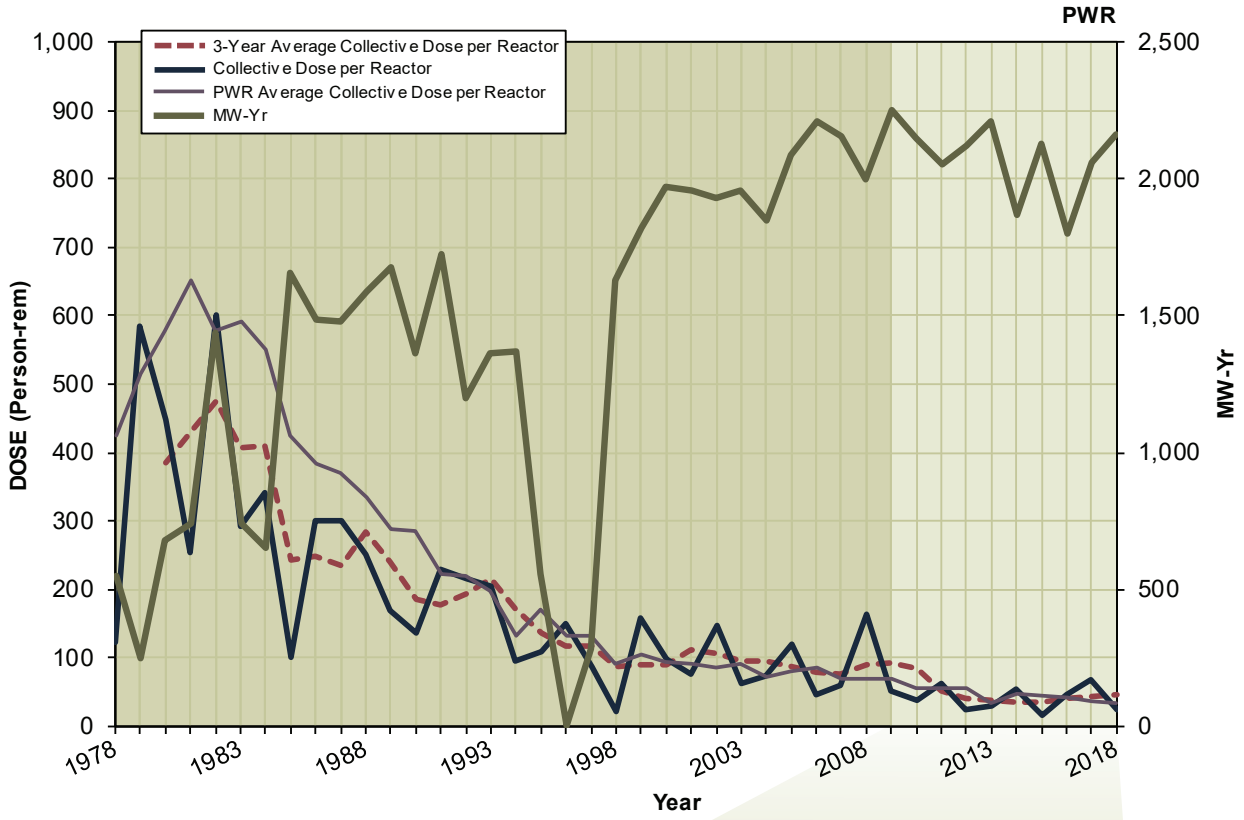
## ROBINSON 2
Dose Performance Trends



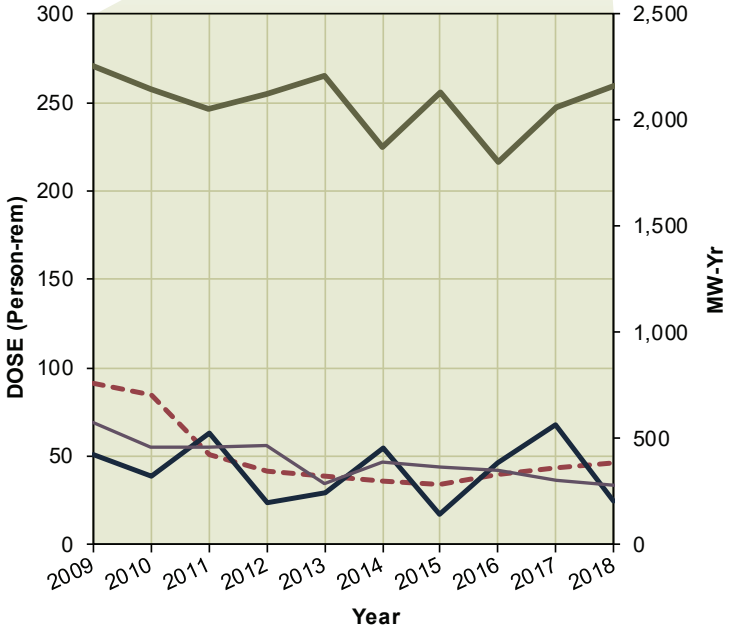

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 51.932 | 7.000 | 738.9 |
| 2010 | 53.653 | 86.000 | 410.8 |
| 2011 | 32.063 | 4.000 | 726.5 |
| 2012 | 51.602 | 65.000 | 613.4 |
| 2013 | 49.828 | 81.000 | 650.3 |
| 2014 | 58.173 | 29.000 | 703.1 |
| 2015 | 55.211 | 56.373 | 653.4 |
| 2016 | 29.581 | 3.704 | 734.3 |
| 2017 | 39.605 | 58.739 | 676.9 |
| 2018 | 46.256 | 24.543 | 2,165.1 |



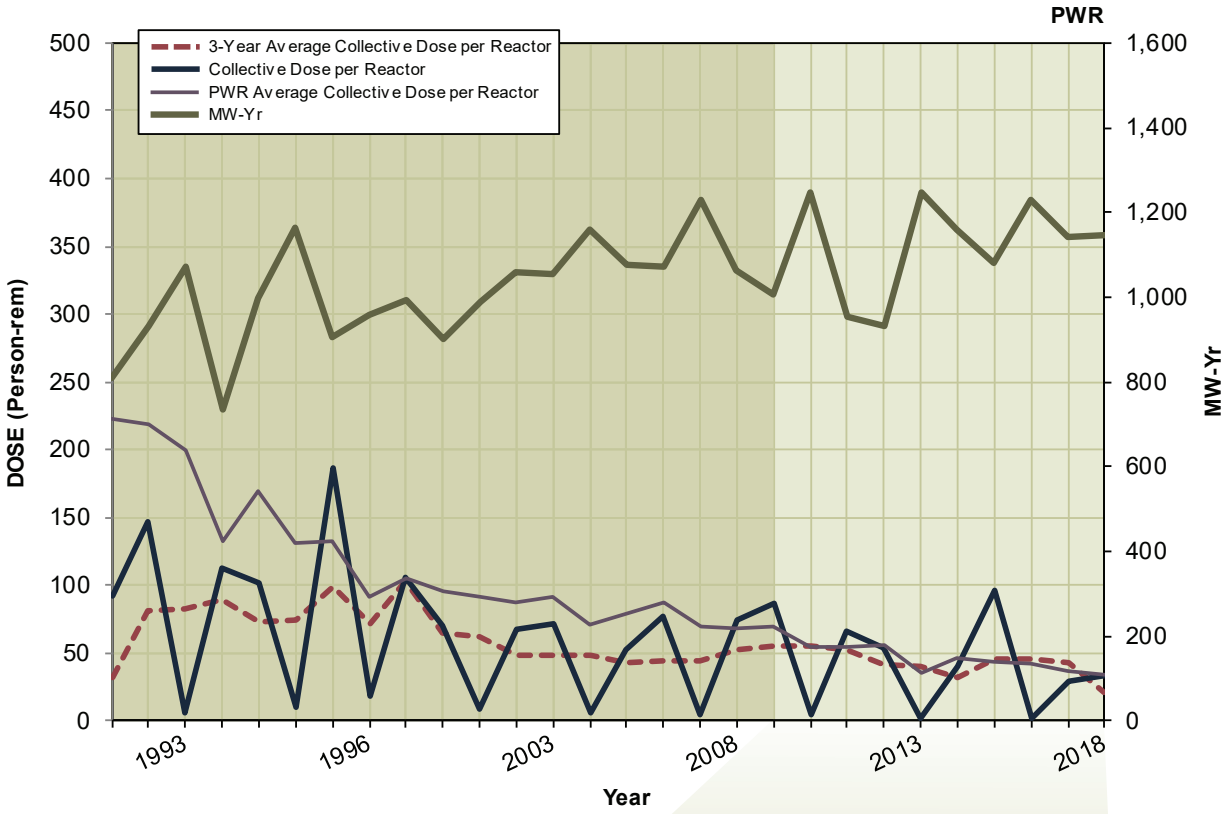
## SALEM 1, 2
Dose Performance Trends



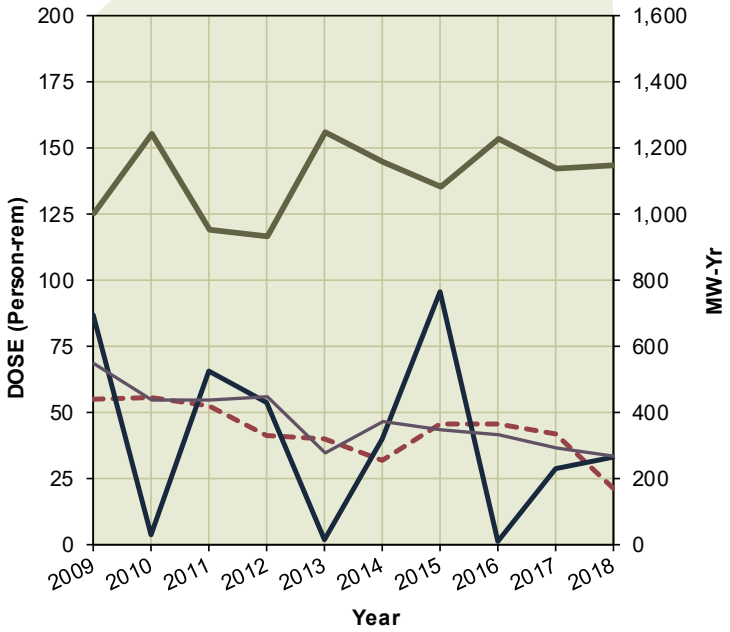

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 91.264 | 50.593 | 2,252.9 |
| 2010 | 84.636 | 38.914 | 2,147.3 |
| 2011 | 50.955 | 63.358 | 2,054.6 |
| 2012 | 41.925 | 23.502 | 2,123.8 |
| 2013 | 38.858 | 29.715 | 2,213.1 |
| 2014 | 36.011 | 54.817 | 1,870.1 |
| 2015 | 33.812 | 16.905 | 2,131.3 |
| 2016 | 39.450 | 46.628 | 1,800.9 |
| 2017 | 43.710 | 67.599 | 2,060.5 |
| 2018 | 46.256 | 24.543 | 2,165.1 |



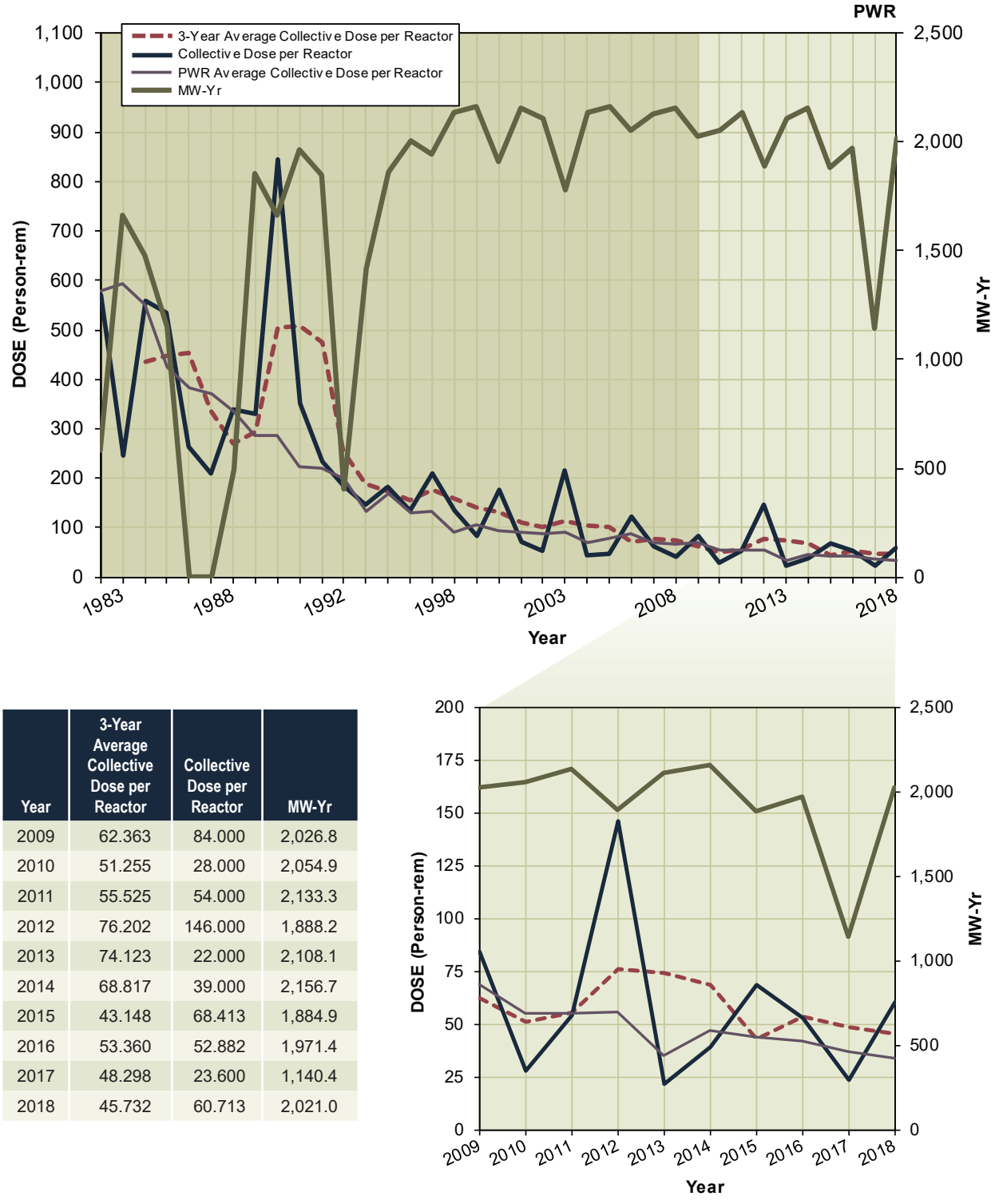
## SEABROOK
Dose Performance Trends




| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 55.568 | 87.000 | 1,006.4 |
| 2010 | 55.620 | 4.000 | 1,245.4 |
| 2011 | 52.484 | 66.000 | 954.5 |
| 2012 | 41.239 | 54.000 | 932.2 |
| 2013 | 40.557 | 2.000 | 1,247.3 |
| 2014 | 32.020 | 40.000 | 1,160.7 |
| 2015 | 46.159 | 96.053 | 1,082.6 |
| 2016 | 45.903 | 1.672 | 1,228.4 |
| 2017 | 42.305 | 29.191 | 1,140.4 |
| 2018 | 21.427 | 33.418 | 1,148.5 |

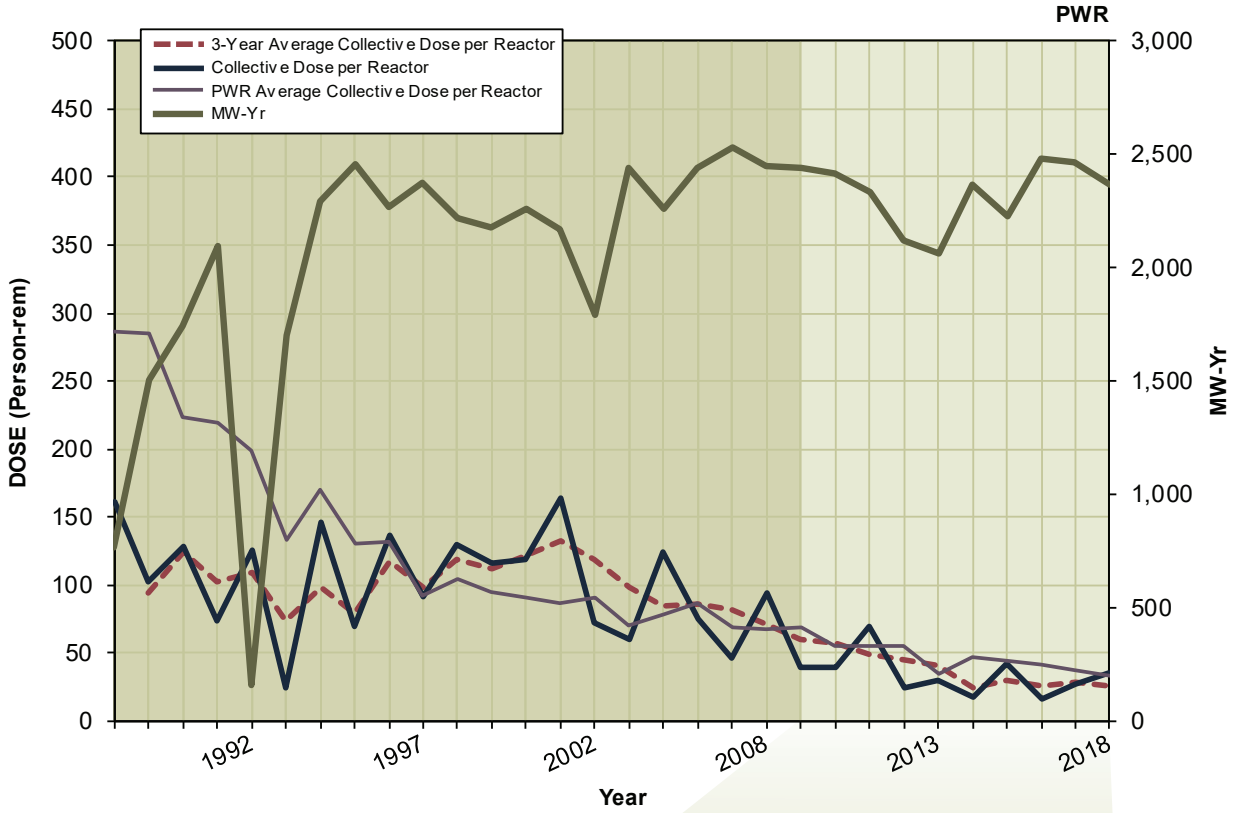


## SEQUOYAH 1, 2
Dose Performance Trends

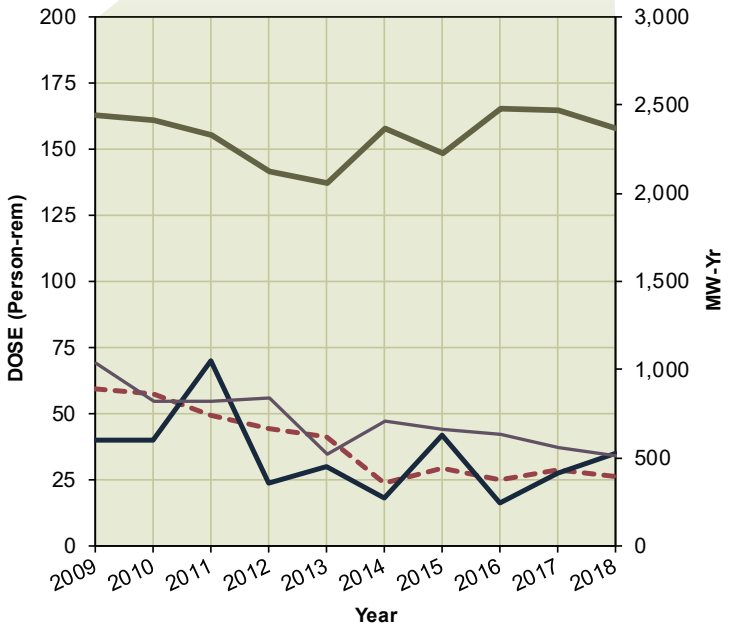



| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 62.363 | 84.000 | 2,026.8 |
| 2010 | 51.255 | 28.000 | 2,054.9 |
| 2011 | 55.525 | 54.000 | 2,133.3 |
| 2012 | 76.202 | 146.000 | 1,888.2 |
| 2013 | 74.123 | 22.000 | 2,108.1 |
| 2014 | 68.817 | 39.000 | 2,156.7 |
| 2015 | 43.148 | 68.413 | 1,884.9 |
| 2016 | 53.360 | 52.882 | 1,971.4 |
| 2017 | 48.298 | 23.600 | 1,140.4 |
| 2018 | 45.732 | 60.713 | 2,021.0 |

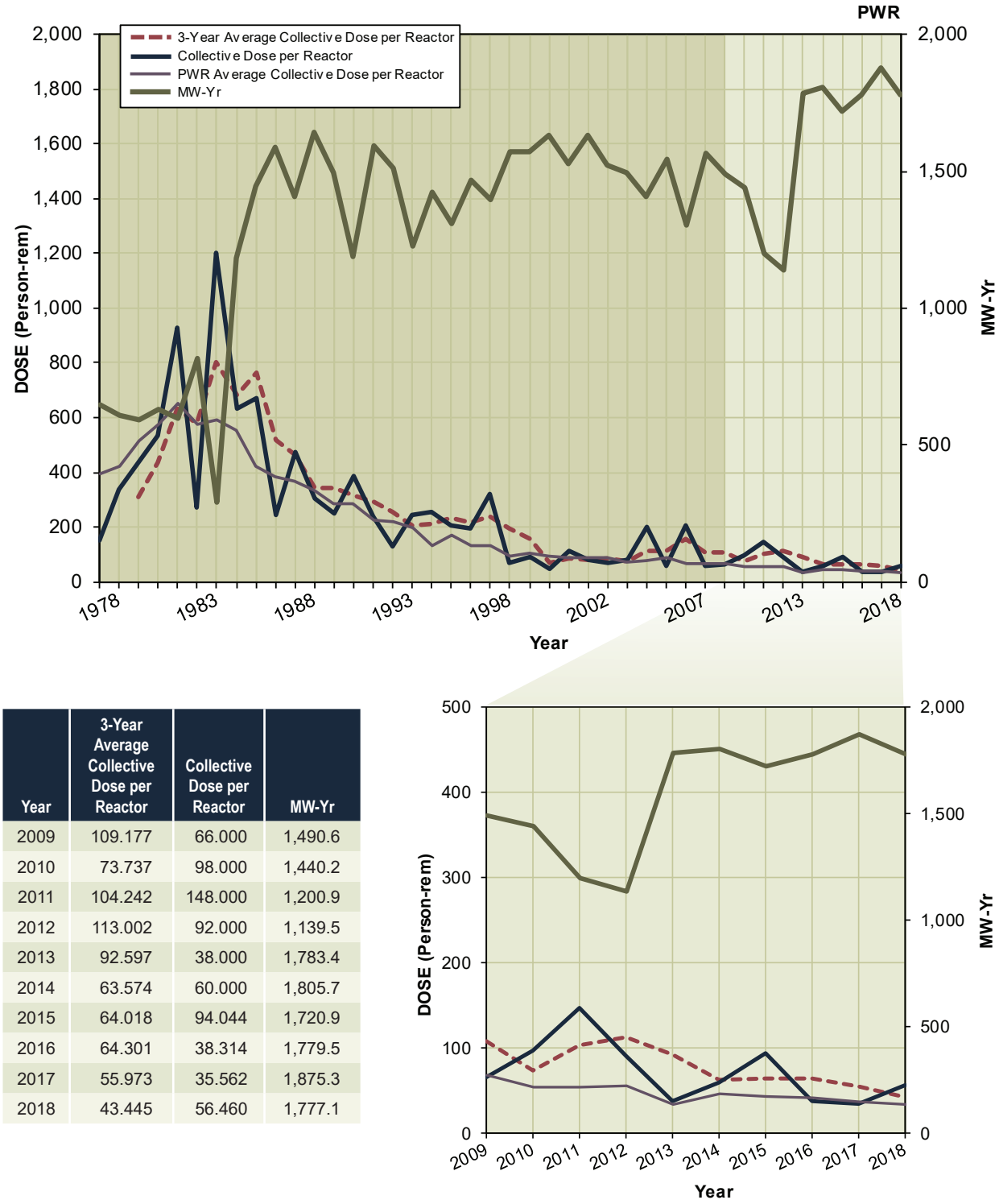
## SOUTH TEXAS 1, 2
Dose Performance Trends




| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 59.748 | 40.000 | 2,444.5 |
| 2010 | 57.675 | 40.000 | 2,418.7 |
| 2011 | 49.687 | 70.000 | 2,333.3 |
| 2012 | 44.590 | 24.000 | 2,122.4 |
| 2013 | 41.352 | 30.000 | 2,062.4 |
| 2014 | 23.903 | 18.000 | 2,363.4 |
| 2015 | 29.718 | 41.997 | 2,224.5 |
| 2016 | 25.234 | 16.419 | 2,481.9 |
| 2017 | 28.643 | 27.513 | 2,467.1 |
| 2018 | 26.319 | 35.025 | 2,367.7 |

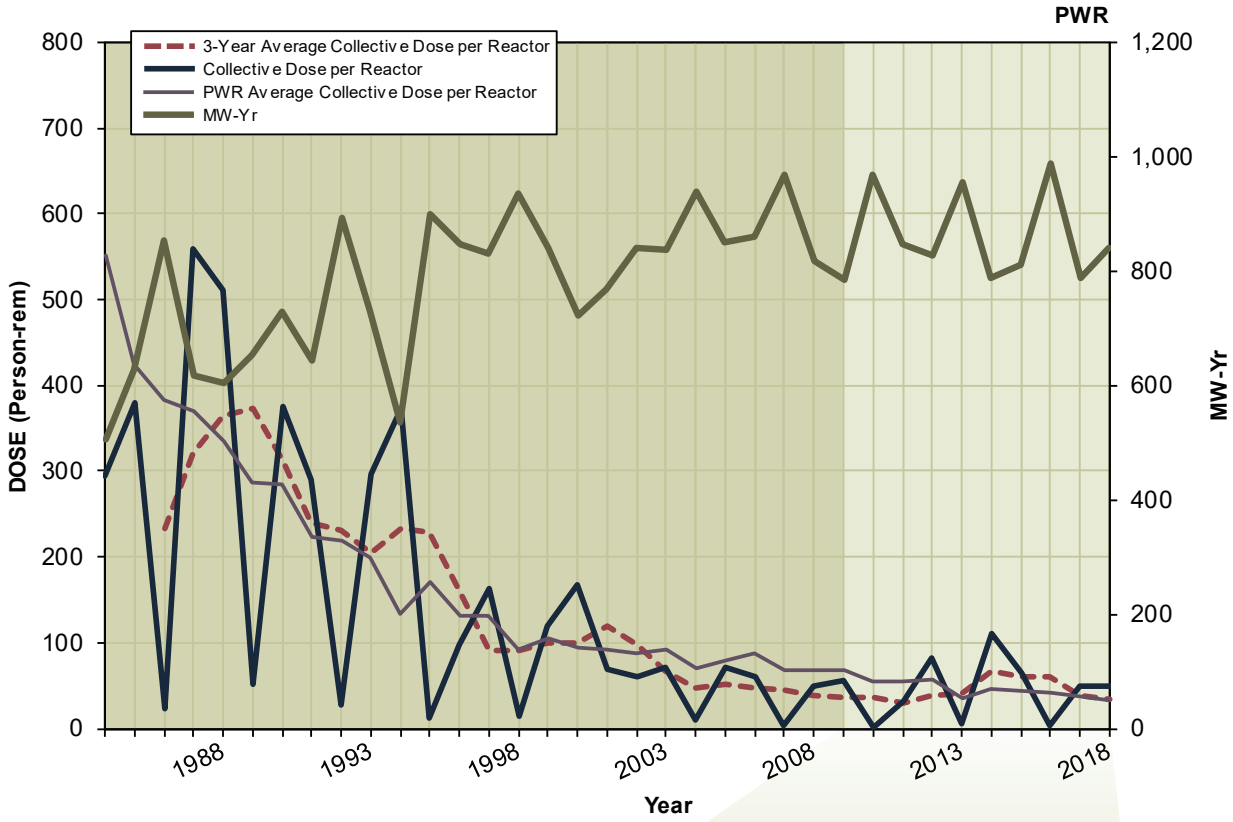


## ST. LUCIE 1, 2
Dose Performance Trends

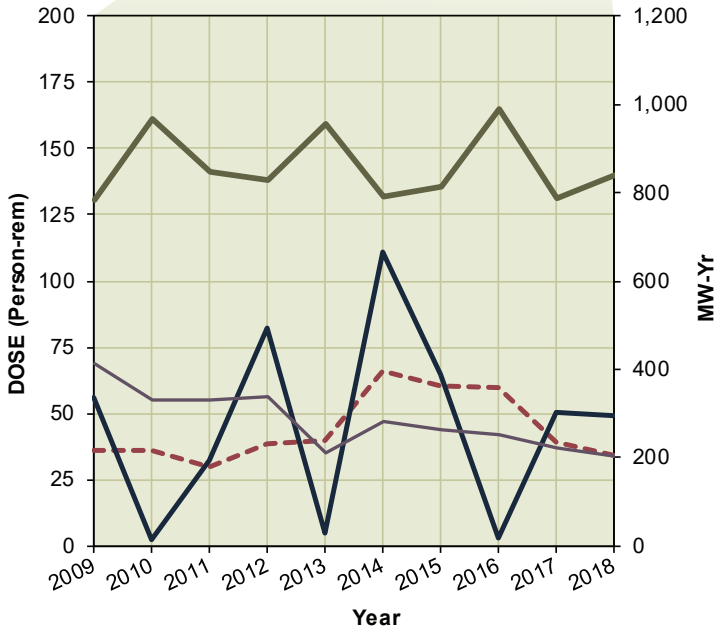



| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 109.177 | 66.000 | 1,490.6 |
| 2010 | 73.737 | 98.000 | 1,440.2 |
| 2011 | 104.242 | 148.000 | 1,200.9 |
| 2012 | 113.002 | 92.000 | 1,139.5 |
| 2013 | 92.597 | 38.000 | 1,783.4 |
| 2014 | 63.574 | 60.000 | 1,805.7 |
| 2015 | 64.018 | 94.044 | 1,720.9 |
| 2016 | 64.301 | 38.314 | 1,779.5 |
| 2017 | 55.973 | 35.562 | 1,875.3 |
| 2018 | 43.445 | 56.460 | 1,777.1 |

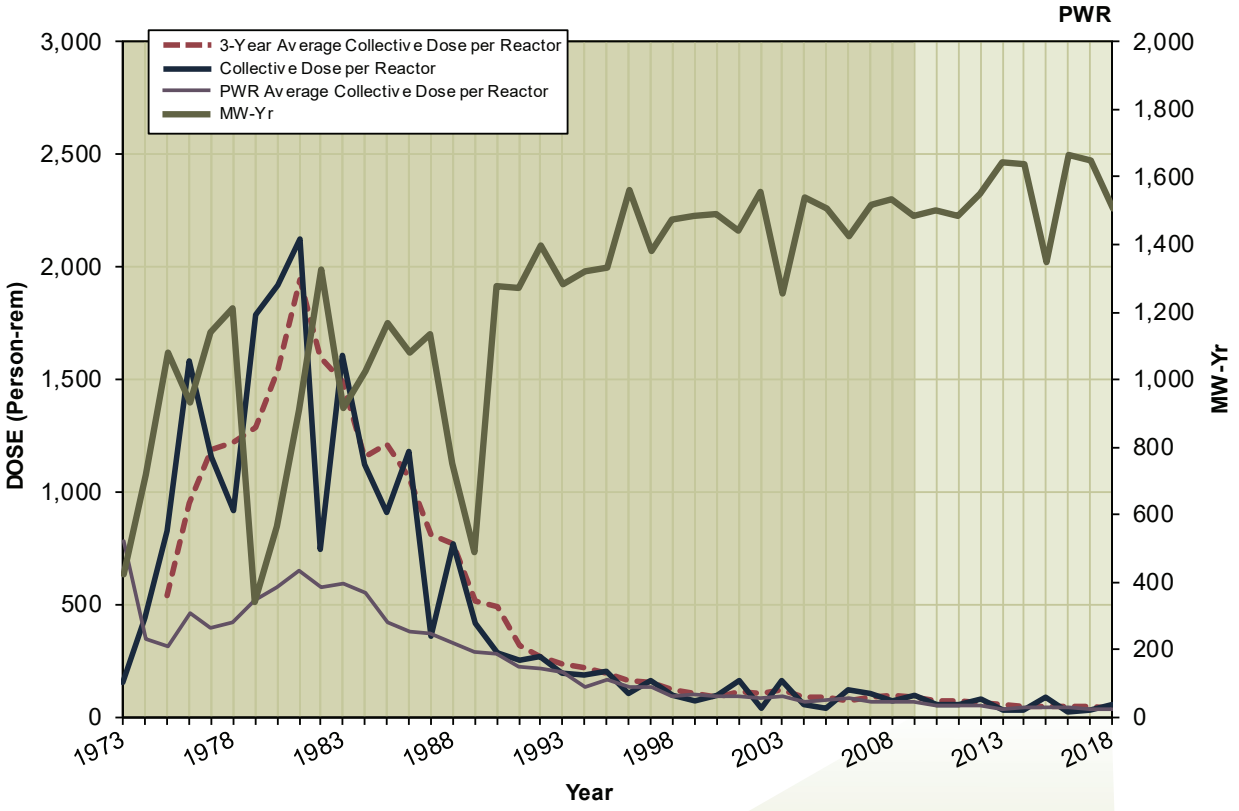
## SUMMER 1
Dose Performance Trends



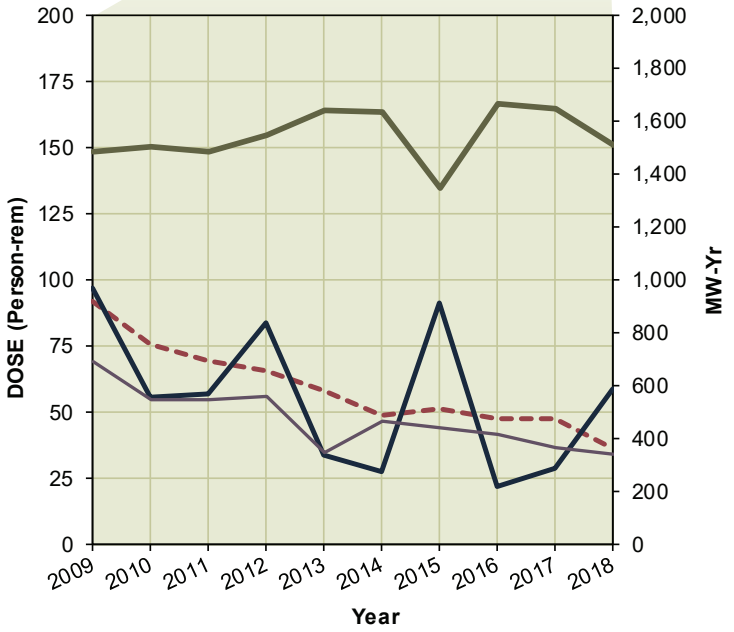

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 35.947 | 56.000 | 784.5 |
| 2010 | 35.760 | 2.000 | 968.8 |
| 2011 | 29.920 | 32.000 | 847.7 |
| 2012 | 38.657 | 82.000 | 829.0 |
| 2013 | 39.651 | 5.000 | 955.5 |
| 2014 | 66.101 | 111.000 | 789.4 |
| 2015 | 60.333 | 64.958 | 812.3 |
| 2016 | 59.583 | 2.862 | 988.4 |
| 2017 | 39.376 | 50.308 | 789.2 |
| 2018 | 34.140 | 49.251 | 840.9 |



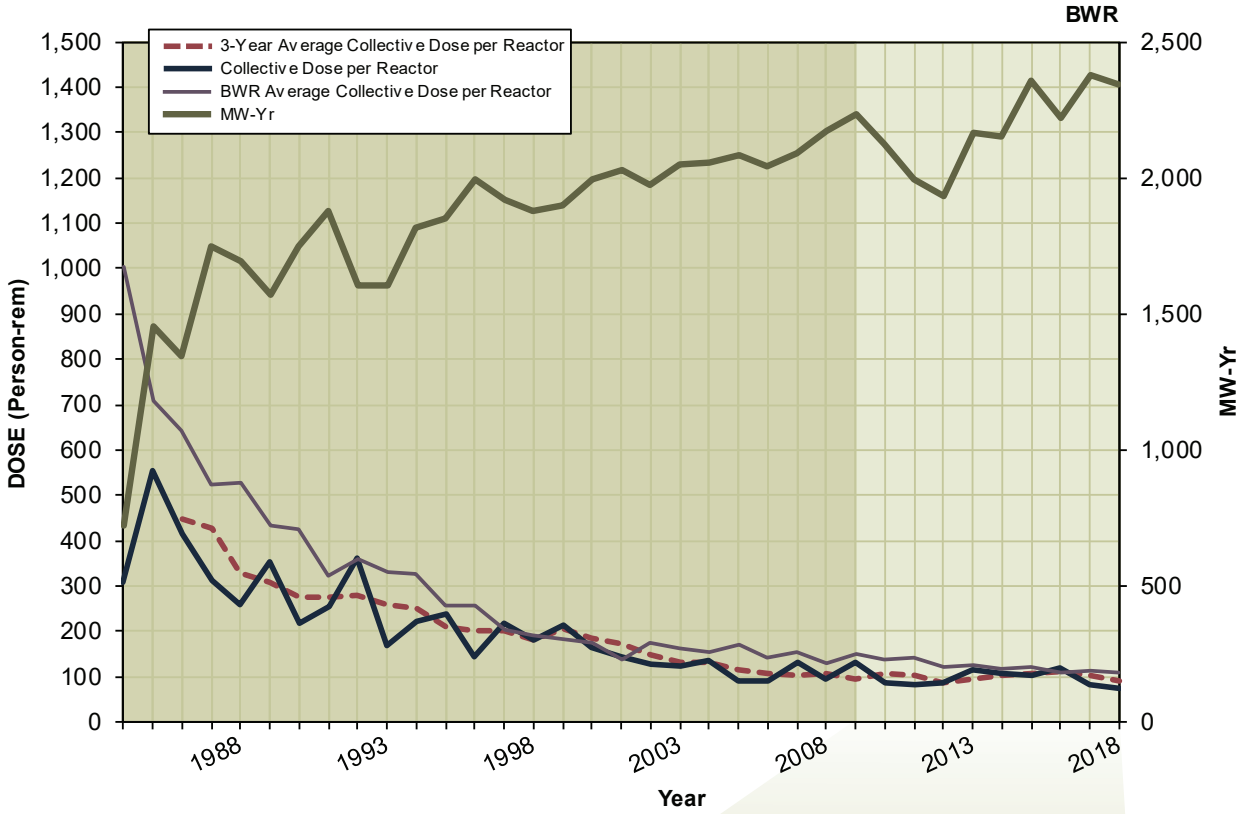
## SURRY 1, 2
Dose Performance Trends



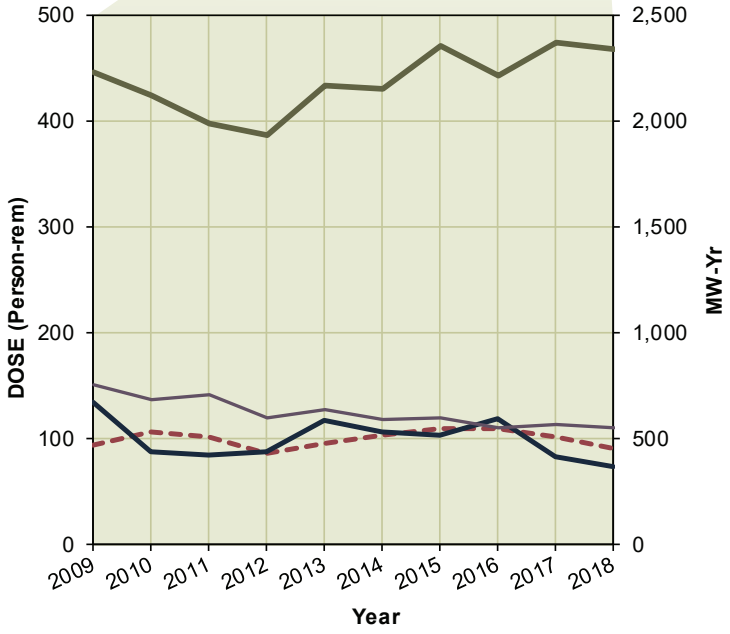

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 91.851 | 97.000 | 1,485.1 |
| 2010 | 75.839 | 56.000 | 1,503.7 |
| 2011 | 69.759 | 57.000 | 1,487.4 |
| 2012 | 65.600 | 84.000 | 1,549.9 |
| 2013 | 58.334 | 34.000 | 1,644.4 |
| 2014 | 48.962 | 28.000 | 1,636.1 |
| 2015 | 51.333 | 91.490 | 1,345.9 |
| 2016 | 47.484 | 22.216 | 1,667.9 |
| 2017 | 47.571 | 29.006 | 1,647.0 |
| 2018 | 36.714 | 58.919 | 1,509.0 |



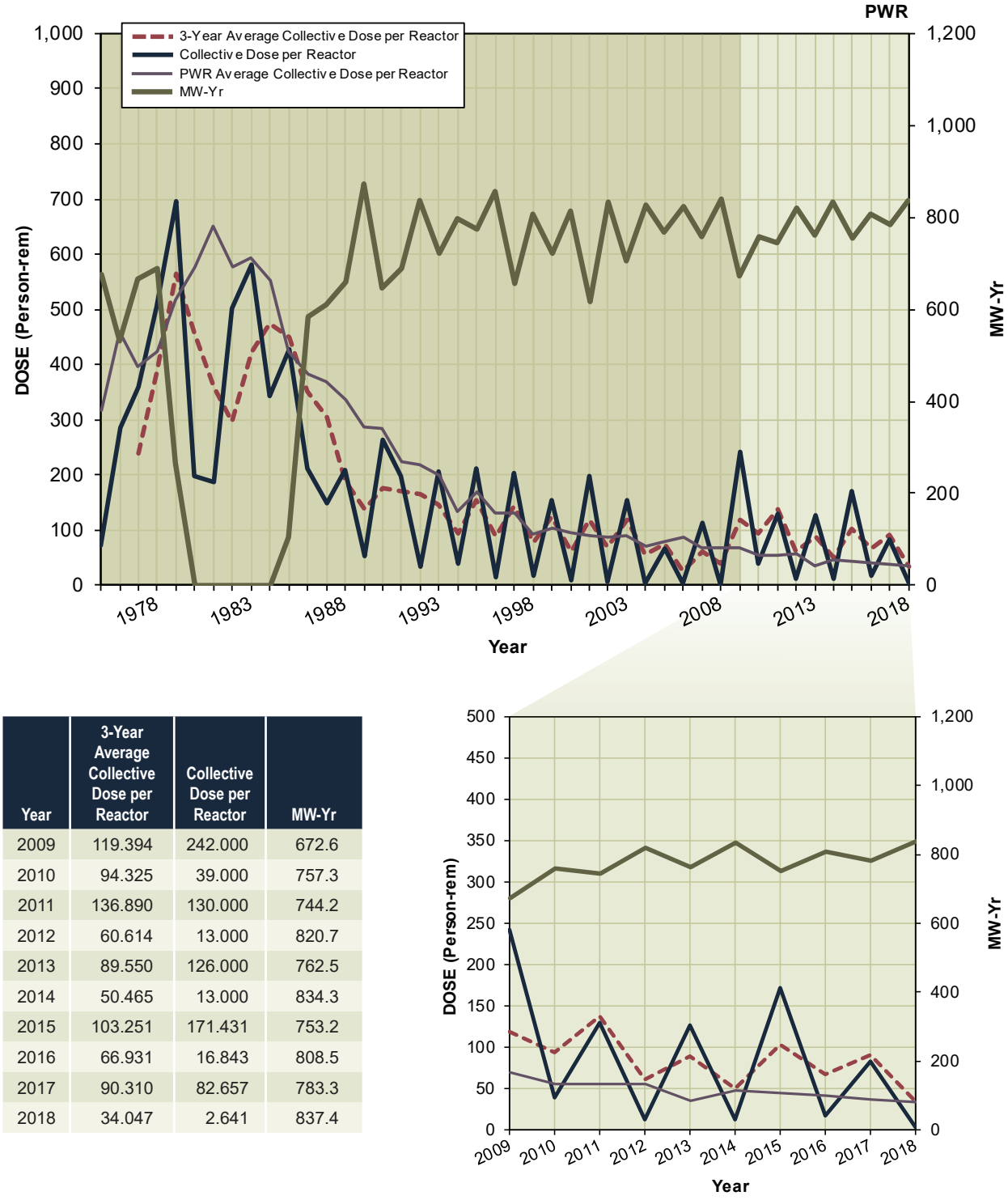
## SUSQUEHANNA 1, 2
Dose Performance Trends




| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 94.500 | 134.000 | 2,231.1 |
| 2010 | 105.927 | 88.000 | 2,121.6 |
| 2011 | 101.954 | 84.000 | 1,992.0 |
| 2012 | 86.835 | 88.000 | 1,936.5 |
| 2013 | 96.397 | 117.000 | 2,166.2 |
| 2014 | 103.980 | 107.000 | 2,153.1 |
| 2015 | 109.026 | 103.077 | 2,354.3 |
| 2016 | 109.660 | 118.668 | 2,217.2 |
| 2017 | 101.493 | 82.734 | 2,375.6 |
| 2018 | 91.689 | 73.664 | 2,343.4 |



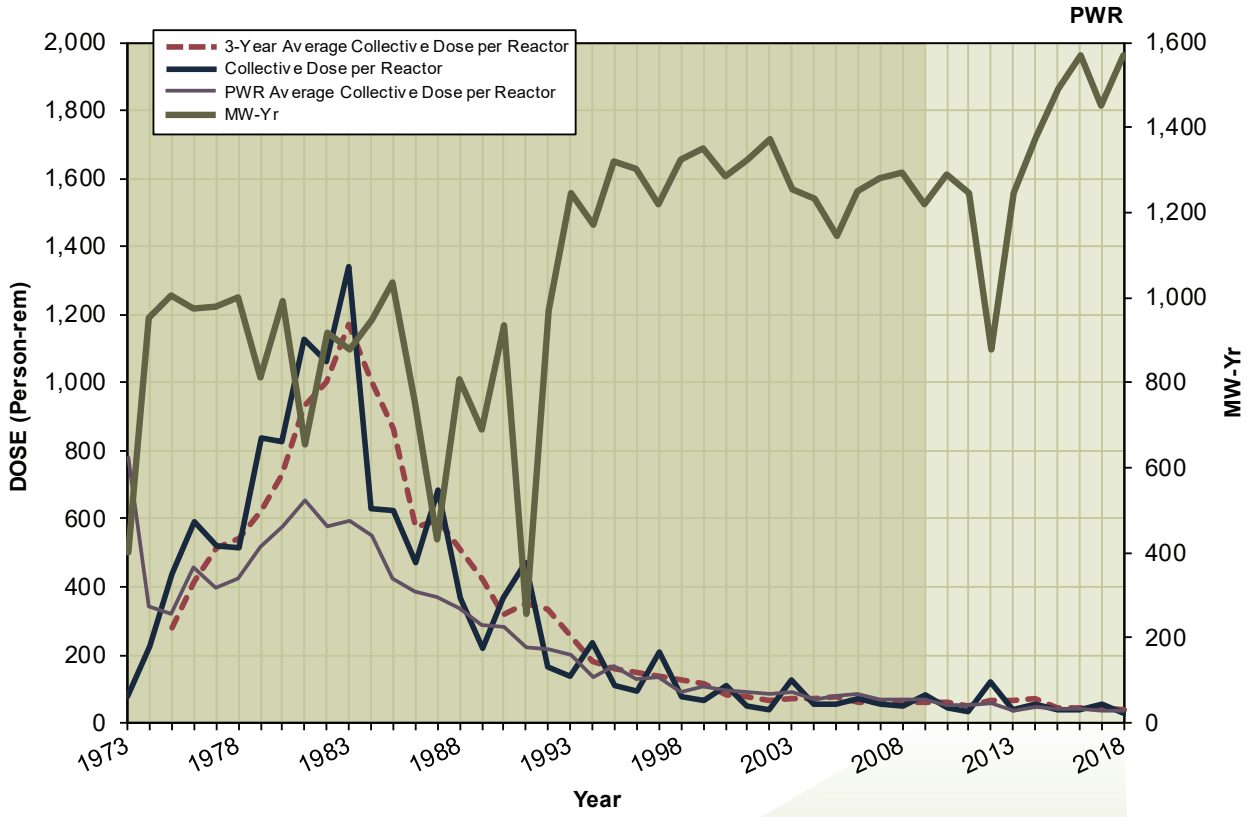
## THREE MILE ISLAND 1*
Dose Performance Trends



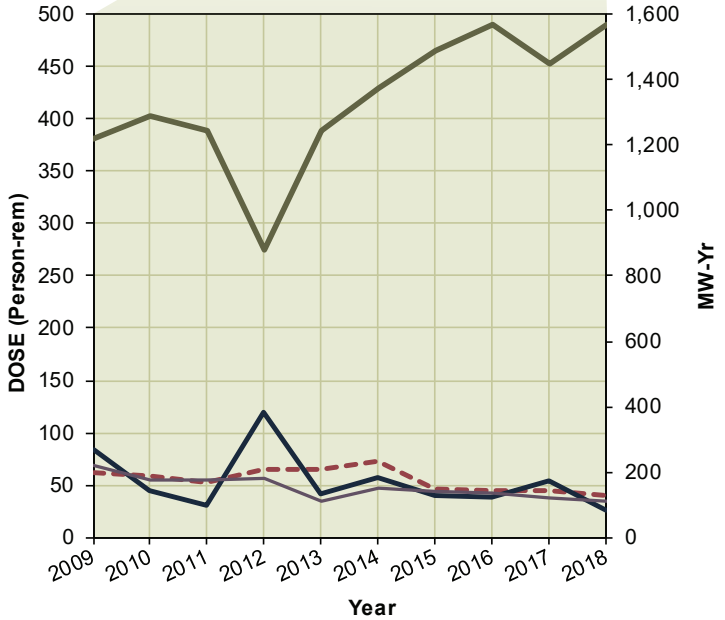

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 119.394 | 242.000 | 672.6 |
| 2010 | 94.325 | 39.000 | 757.3 |
| 2011 | 136.890 | 130.000 | 744.2 |
| 2012 | 60.614 | 13.000 | 820.7 |
| 2013 | 89.550 | 126.000 | 762.5 |
| 2014 | 50.465 | 13.000 | 834.3 |
| 2015 | 103.251 | 171.431 | 753.2 |
| 2016 | 66.931 | 16.843 | 808.5 |
| 2017 | 90.310 | 82.657 | 783.3 |
| 2018 | 34.047 | 2.641 | 837.4 |

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

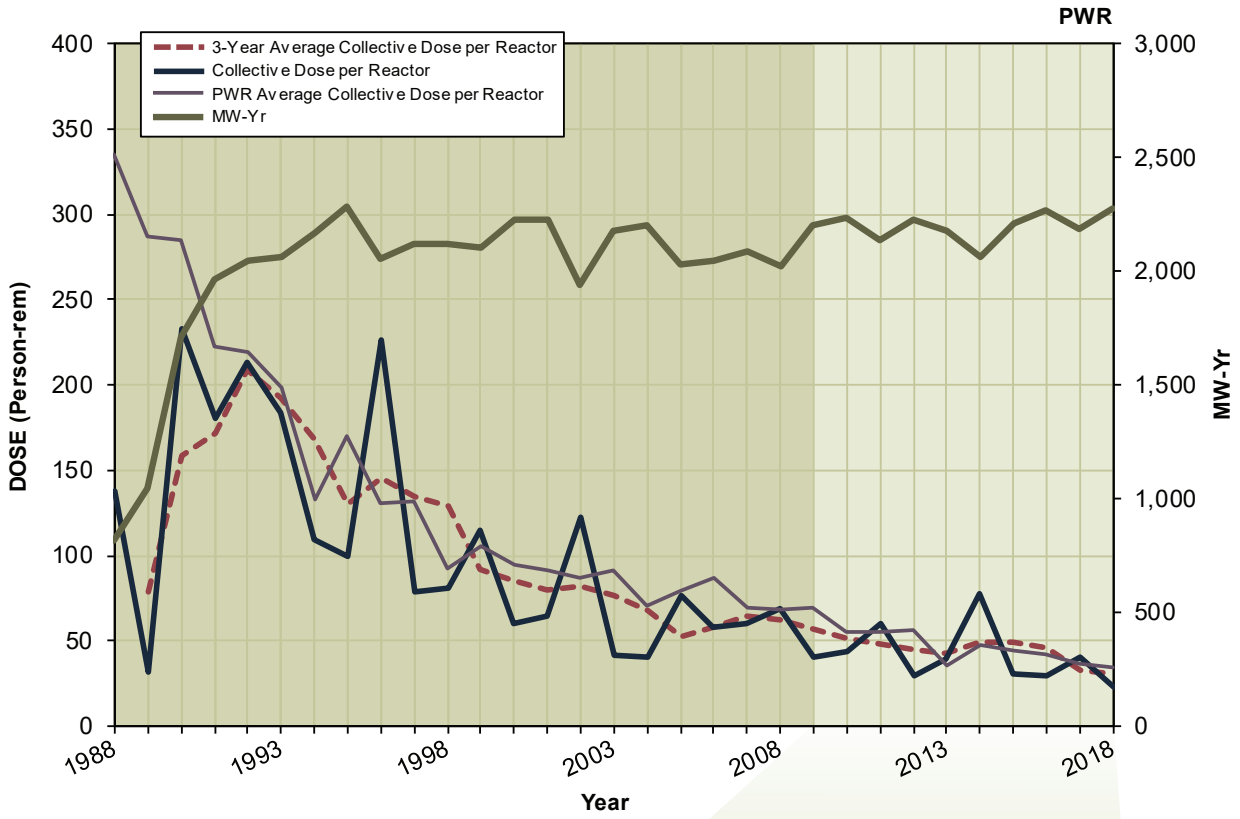
# TURKEY POINT 3, 4
## Dose Performance Trends



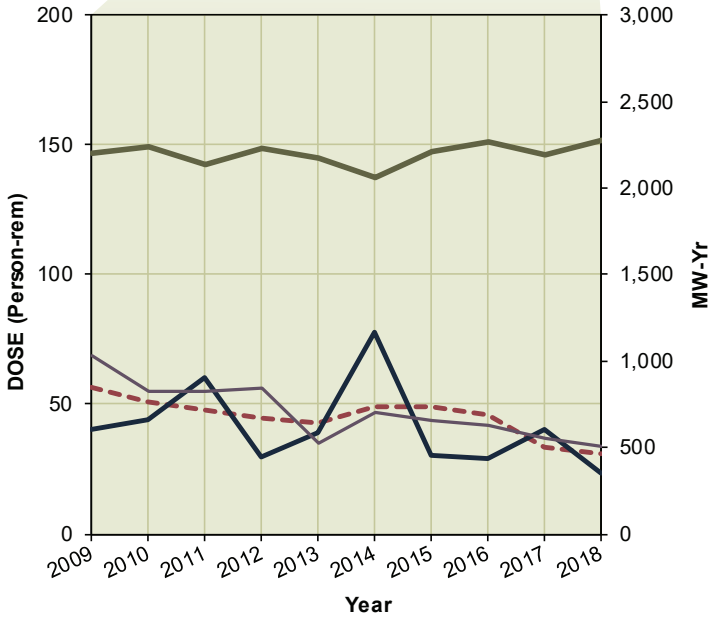

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 61.870 | 83.000 | 1,294.9 |
| 2010 | 58.395 | 44.000 | 1,219.7 |
| 2011 | 52.549 | 31.000 | 1,290.9 |
| 2012 | 65.038 | 120.000 | 1,245.7 |
| 2013 | 64.282 | 41.000 | 878.0 |
| 2014 | 72.949 | 57.000 | 1,245.9 |
| 2015 | 45.944 | 39.562 | 1,375.7 |
| 2016 | 44.953 | 38.135 | 1,489.7 |
| 2017 | 43.932 | 54.100 | 1,567.7 |
| 2018 | 39.260 | 25.544 | 1,451.9 |



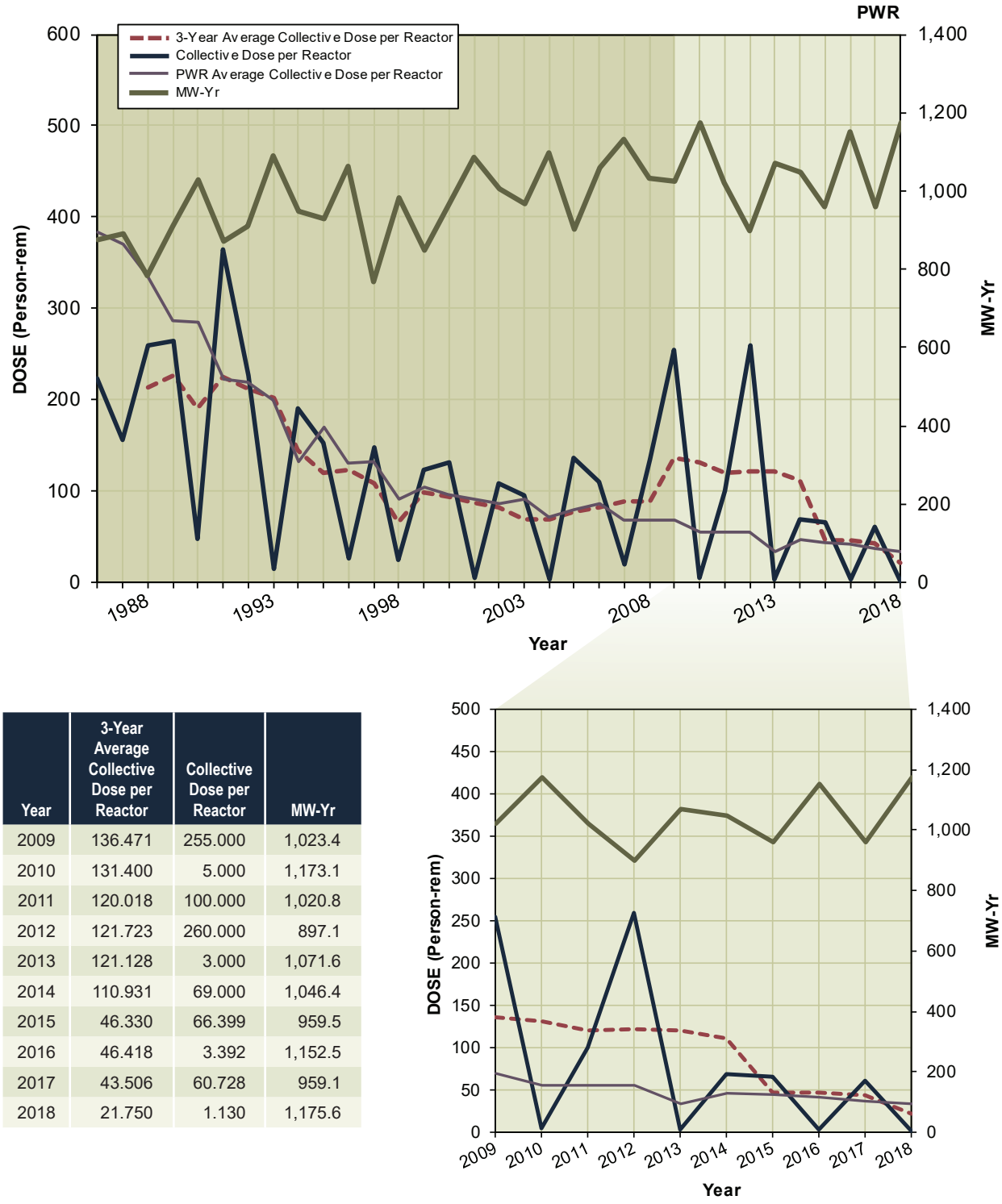
# VOGTLE 1, 2
## Dose Performance Trends




| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 56.314 | 40.000 | 2,201.6 |
| 2010 | 51.077 | 44.000 | 2,238.6 |
| 2011 | 47.966 | 60.000 | 2,138.0 |
| 2012 | 44.572 | 30.000 | 2,226.6 |
| 2013 | 42.758 | 39.000 | 2,178.4 |
| 2014 | 49.060 | 78.000 | 2,065.8 |
| 2015 | 49.268 | 30.283 | 2,210.0 |
| 2016 | 45.964 | 29.236 | 2,267.1 |
| 2017 | 33.266 | 40.278 | 2,189.0 |
| 2018 | 30.981 | 23.428 | 2,278.4 |

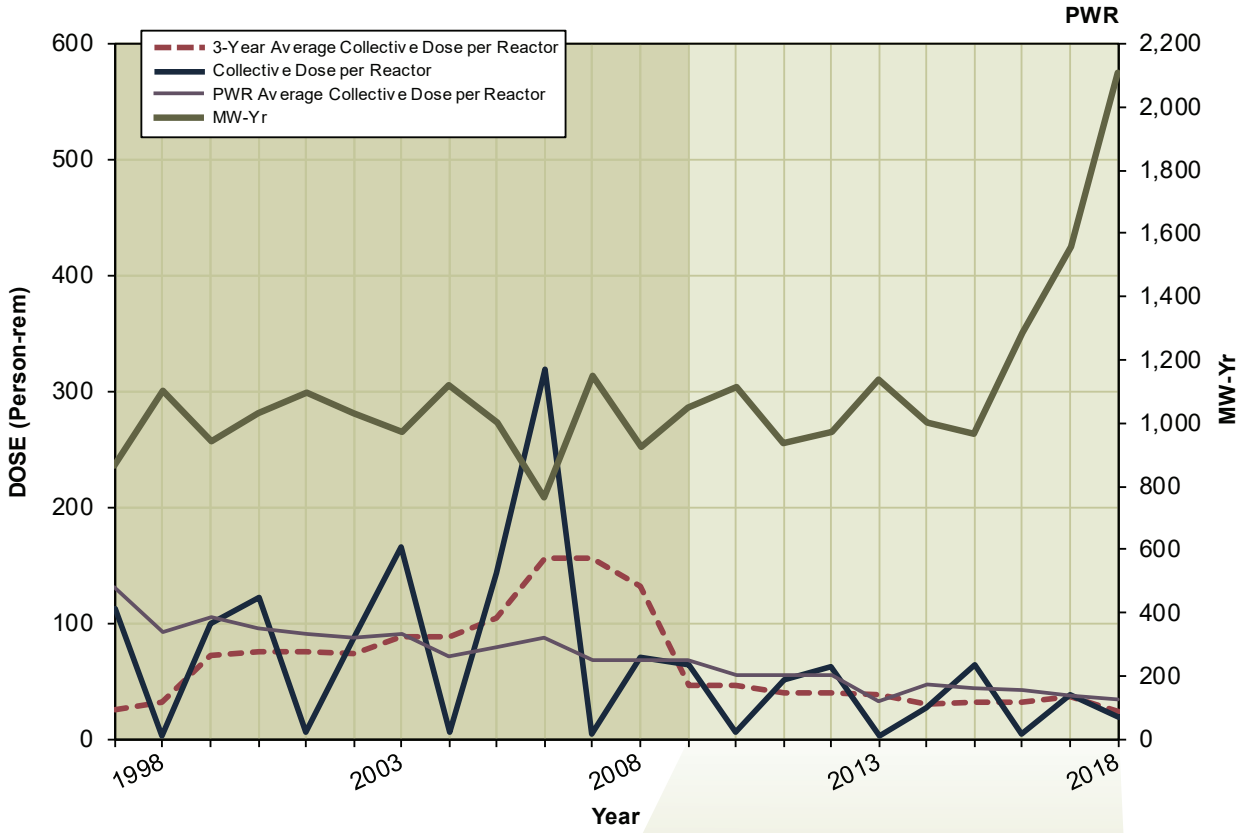


# WATERFORD 3
## Dose Performance Trends

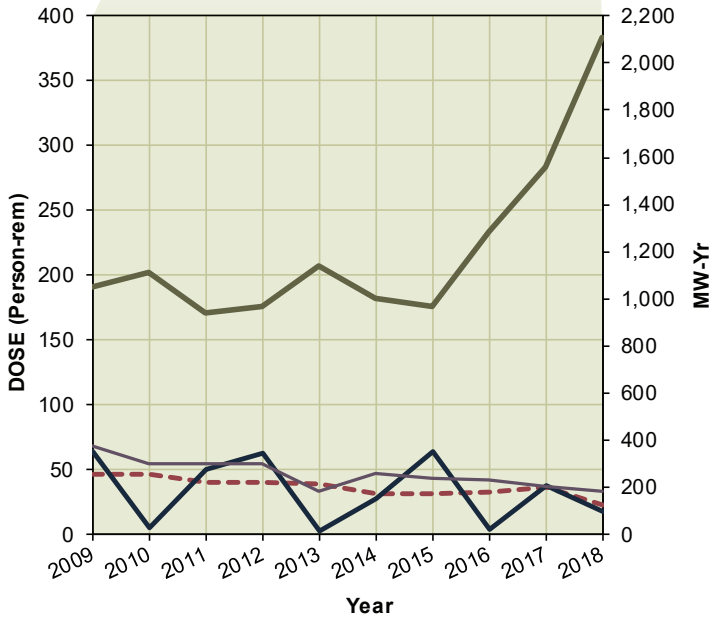



| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 136.471 | 255.000 | 1,023.4 |
| 2010 | 131.400 | 5.000 | 1,173.1 |
| 2011 | 120.018 | 100.000 | 1,020.8 |
| 2012 | 121.723 | 260.000 | 897.1 |
| 2013 | 121.128 | 3.000 | 1,071.6 |
| 2014 | 110.931 | 69.000 | 1,046.4 |
| 2015 | 46.330 | 66.399 | 959.5 |
| 2016 | 46.418 | 3.392 | 1,152.5 |
| 2017 | 43.506 | 60.728 | 959.1 |
| 2018 | 21.750 | 1.130 | 1,175.6 |

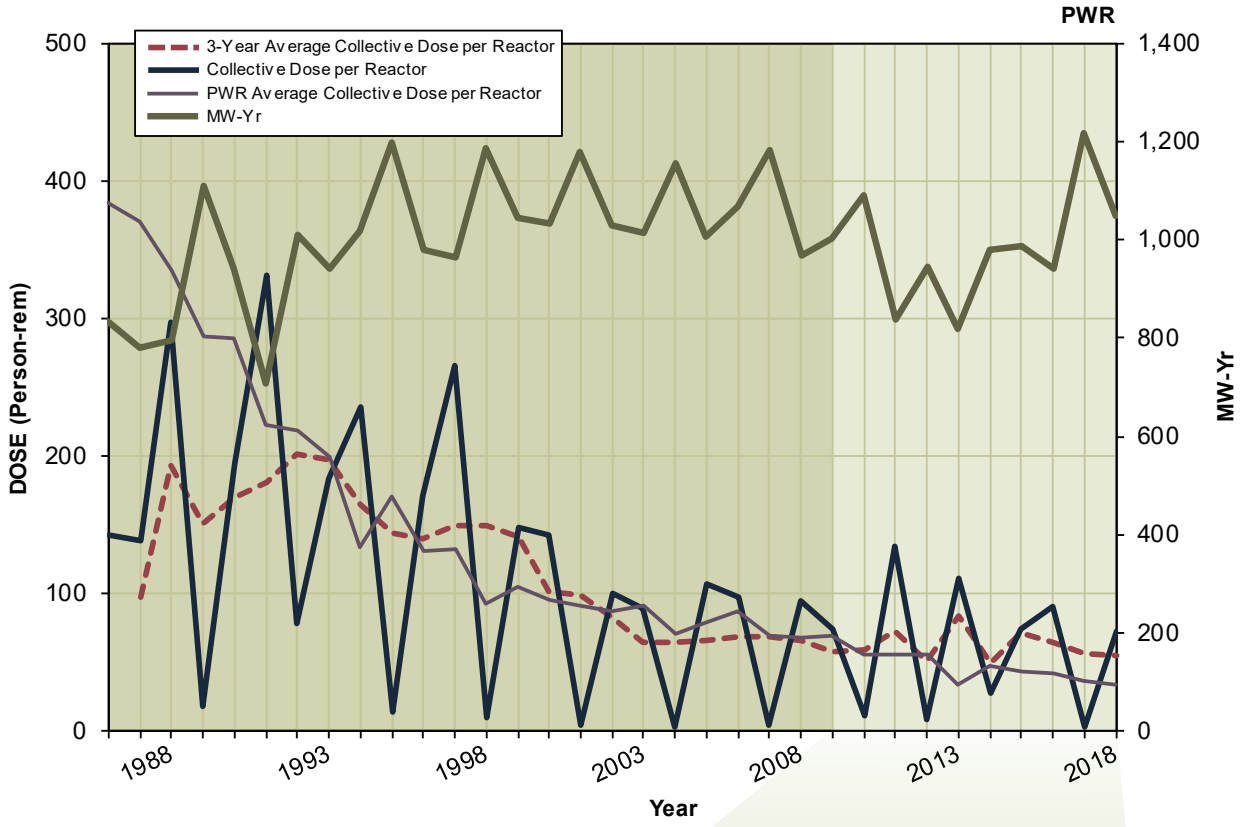
## WATTS BAR 1, 2
Dose Performance Trends



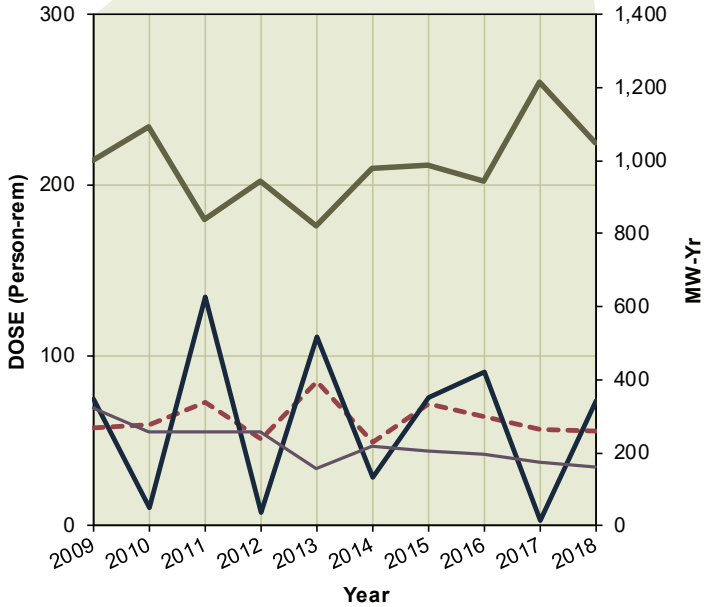

| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 46.287 | 64.000 | 1,051.1 |
| 2010 | 46.880 | 6.000 | 1,111.7 |
| 2011 | 40.353 | 51.000 | 939.6 |
| 2012 | 39.998 | 63.000 | 969.5 |
| 2013 | 38.805 | 3.000 | 1,137.9 |
| 2014 | 31.221 | 28.000 | 1,003.4 |
| 2015 | 31.735 | 64.320 | 964.5 |
| 2016 | 32.359 | 4.489 | 1,284.1 |
| 2017 | 36.120 | 37.836 | 1,558.2 |
| 2018 | 23.416 | 18.460 | 2,110.1 |



## WOLF CREEK 1
Dose Performance Trends




| Year | 3-Year Average Collective Dose per Reactor | Collective Dose per Reactor | MW-Yr |
|---|---|---|---|
| 2009 | 57.648 | 74.000 | 1,001.0 |
| 2010 | 59.718 | 11.000 | 1,090.8 |
| 2011 | 72.704 | 134.000 | 839.1 |
| 2012 | 50.788 | 8.000 | 944.4 |
| 2013 | 84.368 | 111.000 | 819.2 |
| 2014 | 48.882 | 28.000 | 978.2 |
| 2015 | 71.187 | 74.804 | 987.9 |
| 2016 | 64.312 | 90.631 | 942.0 |
| 2017 | 56.291 | 3.437 | 1,215.5 |
| 2018 | 55.650 | 72.882 | 1,047.5 |



# APPENDIX E

# PLANTS NO LONGER IN OPERATION

# 2018

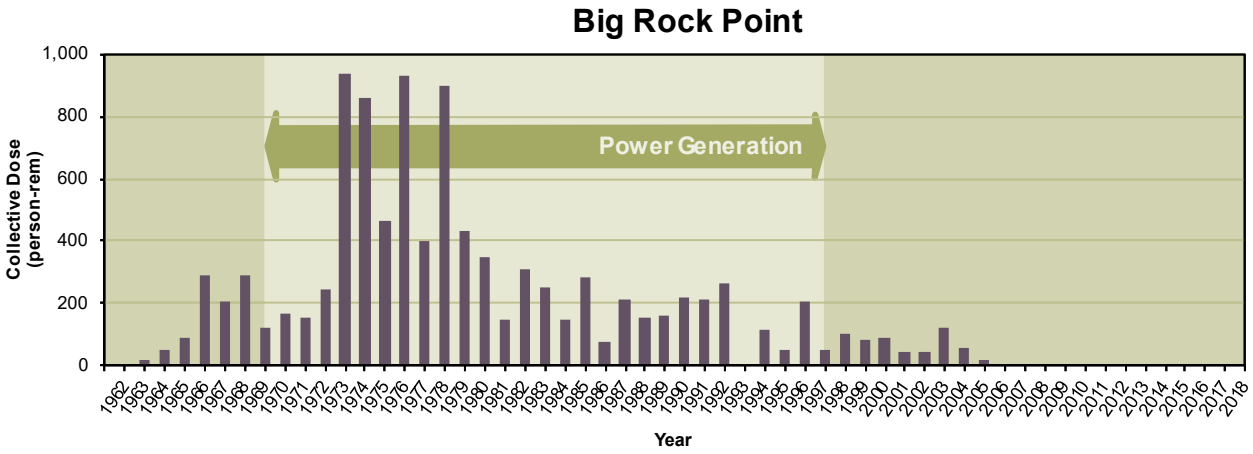
Information in this appendix was obtained from References 22, 23, and 24.

# PLANTS NO LONGER IN OPERATION 2018

## Big Rock Point

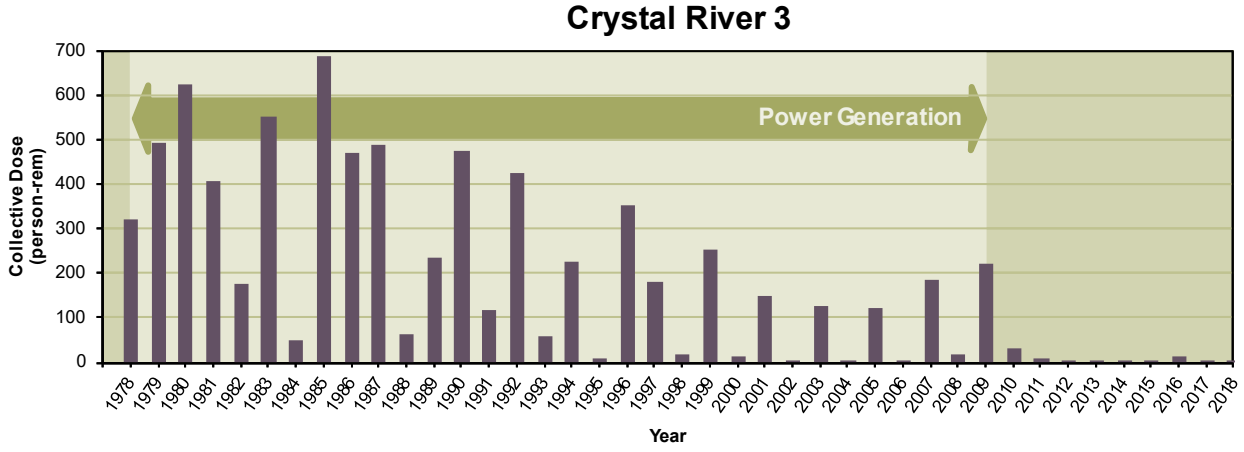
Big Rock Point (BRP) was a boiling-water reactor rated at 75 megawatt (MW) electric (MWe), designed by General Electric Company, and owned by Consumers Energy Company (CE). BRP was permanently shut down on August 29, 1997, and fuel was transferred to the spent fuel pool by September 20, 1997. The site completed decommissioning to a “green field” status. Big Rock Point will retain its 10 CFR Part 50 license until the fuel is removed from the ISFSI.

All fuel was transferred to the independent spent fuel storage installation (ISFSI) by March 2003. After fuel is removed from the site to a U.S. Department of Energy (DOE) facility, the ISFSI will be decommissioned and the 10 CFR Part 50 license terminated.




## Crystal River 3

Crystal River Nuclear Generating Plant Unit 3 (CR-3) was a 2,609 MW thermal (MWt), pressurized-water reactor that was licensed to operate from December 1976 to February 20, 2013, and is located on approximately 4,700 acres in Crystal River, FL. During a refueling outage that started on September 26, 2009, CR-3 replaced the steam generators (SGs), requiring a large hole to be made in the containment building structure. When attempting to restore the containment structure following the SG replacement, damage to the containment structure was observed. The licensee attempted to repair the damage, but later decided to decommission the reactor.



The facility is currently transitioning to a SAFSTOR condition, with an estimated date for license termination of 2074. The licensee submitted the CR-3 post-shutdown decommissioning activities report (PSDAR), including the site-specific cost estimate, on December 2, 2013. The plant began construction of an ISFSI in 2016 and began loading fuel in the summer of 2017. Fuel transfer to the ISFSI was completed in January 2018. Crystal River will retain its 10 CFR Part 50 license until the fuel is removed from the ISFSI. The licensee has proposed a license transfer to begin active decommissioning immediately, with an estimated completion date of 2030.

## Dresden Unit 1

Dresden Unit 1 (Dresden 1) produced power commercially from August 1, 1960, to October 31, 1978, and is now designated a Nuclear Historic Landmark by the American Nuclear Society. Dresden 1 was shut down on October 31, 1978, and is currently in SAFSTOR. The NRC approved the Decommissioning Plan in September 1993.

During the SAFSTOR period, through 2027, the Dresden 1 facility will be subjected to periodic inspection and monitoring. The licensee plans that decontamination and dismantlement of Dresden 1 will take place from 2029 through 2031. A 4-year site restoration delay will follow the major decontamination and dismantlement of Dresden 1 to allow for the decontamination and dismantlement of Units 2 and 3, with completion of these activities tentatively planned for 2035. Site restoration will be conducted in 2035 and 2036, concluding with a final site survey in late 2036. The licensee will monitor the Dresden ISFSI complex with site security and periodic inspections until final transfer of the spent fuel to DOE.

## Fermi Unit 1

The Enrico Fermi Atomic Power Plant Unit 1 (Fermi 1) was a fast breeder reactor power plant cooled by sodium and operated at essentially atmospheric pressure. The reactor plant was designed for a maximum capacity of 430 MW; however, the maximum reactor power was 200 MW. The primary system was filled with sodium in December 1960 and criticality was achieved in August 1963. The reactor was tested at low power in the first couple of years of operation. Power ascension testing above 1 MW began in December 1965, immediately following receipt of the high-power operating license. In October 1966, during power ascension, a zirconium plate at the bottom of the reactor vessel became loose and blocked sodium coolant flow to some fuel subassemblies. Two subassemblies started to melt. Radiation monitors alarmed and the operators manually shut down the reactor. No abnormal releases to the environment occurred. Three years and nine months later, the cause had been determined, cleanup was completed, and fuel was replaced; Fermi 1 was restarted. In 1972, the core was approaching the burnup limit. In November 1972, the Power Reactor Development Company made the decision to decommission Fermi 1.

The fuel and blanket subassemblies were shipped off site in 1973. The nonradioactive secondary sodium system was drained and the sodium was sent to Fike Chemical Company. The radioactive primary sodium was stored in storage tanks and in 55-gallon drums until the sodium was shipped off site in 1984. Decommissioning of the Fermi 1 plant was originally completed in December 1975. The license for Fermi 1 expires in 2025. The licensee submitted a revised license termination plan (LTP) in March 2010, and the NRC staff completed an expanded acceptance review of the revised LTP for Fermi Unit 1. The NRC LTP review was

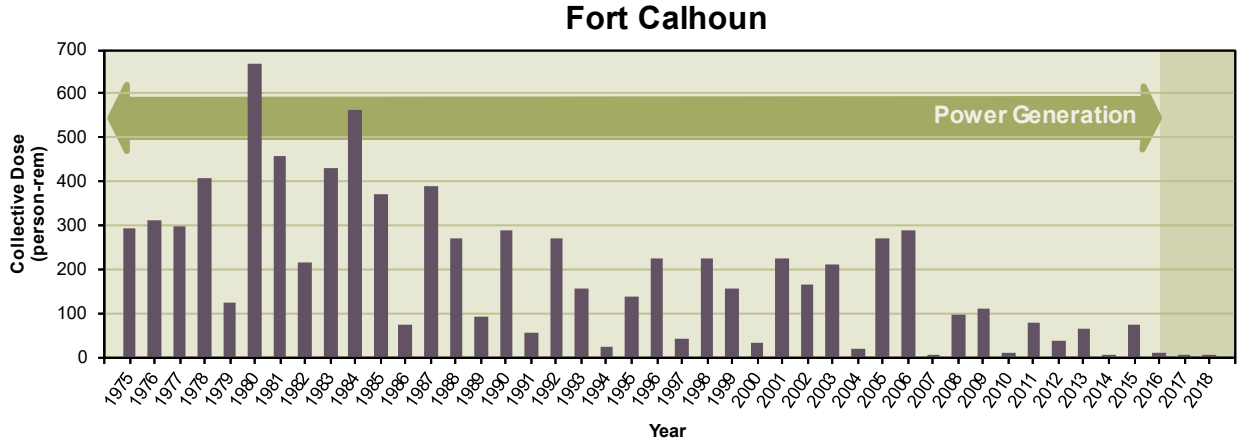
deferred at the request of the licensee in 2012.The license expires in 2025 and the estimated date for closure is 2032.

## Fort Calhoun

Fort Calhoun Station (FCS) was a 1,500 Mwt, pressurized-water reactor that began operation in 1973 and is owned by the Omaha Public Power District (OPPD). The reactor was permanently shut down on October 24, 2016. By letter dated November 13, 2016, OPPD certified that all fuel had been removed from the reactor.

OPPD submitted the FCS Post-Shutdown Decommissioning Activities Report (PSDAR) to the NRC on March 30, 2017. In the PSDAR, OPPD stated its intention to move all of the spent nuclear fuel into dry cask storage by the end of 2022 and put the plant into SAFSTOR until it is ready to fully decommission the facility starting in 2060.

As the licensee moves to place all spent fuel remaining in the spent fuel pool into onsite dry storage, licensing activities will begin adapting the regulations to the dry storage only condition. In June and November 2018, the licensee requested to release non-impacted parts of their site from their 10 CFR Part 50 license to allow unrestricted use. As of the end of 2018, the request is under review. License termination is scheduled to take place by 2065.




## GE ESADA Vallecitos Experimental Superheat Reactor (EVESR)

On April 15, 1970, NRC authorized the licensee to possess, but not operate the reactor. The license was renewed on June 11, 1976, and remains in effect under the provisions of 10 CFR 50.51(b). The facility has been maintained in SAFSTOR condition. The facility is next to the Vallecitos Boiling-Water Reactor which is also in SAFSTOR. The licensee plans to maintain the facility in SAFSTOR until other ongoing nuclear and radioactive activities are also to be decommissioned to provide an integrated site decommissioning. In 2015, the licensee began the process of requesting an exemption to the 60-year decommissioning schedule limit of 10 CFR 50.82(a)(3) so that the entire site can be decommissioned in an integrated fashion. If the exemption request is approved, the date for closure would move from 2025 to 2041.

## GE Vallecitos Boiling-Water Reactor (VBWR)

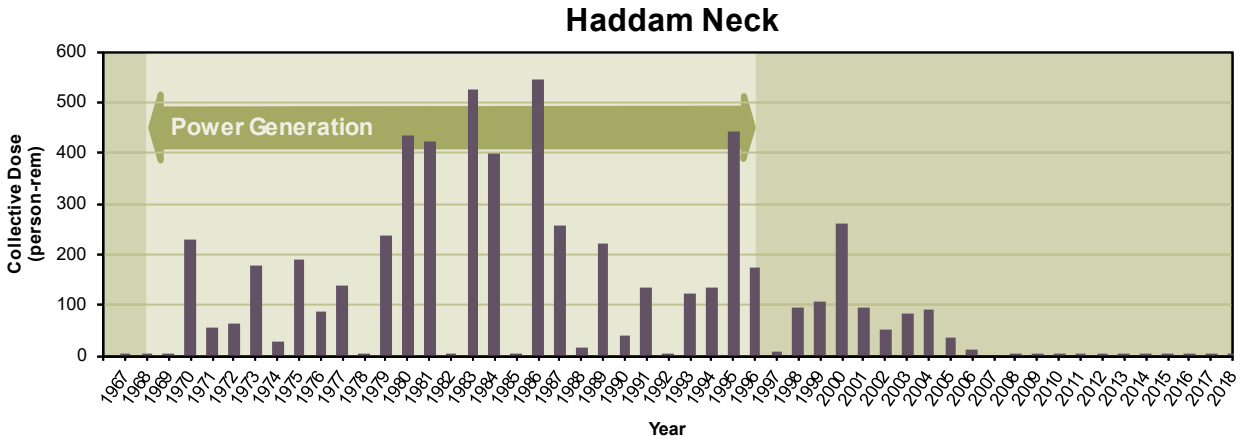
The VBWR was shut down in 1963 and NRC issued a possession only license in 1965. The license was renewed in 1973 and the license has remained effective under the provisions of

10 CFR 50.51(b). The facility has been maintained in SAFSTOR condition with a limit of 60 years under 10 CFR 50.82(a)(3). The licensee has requested to maintain the facility in SAFSTOR past 60 years until other ongoing nuclear activities are terminated so that the entire site can be decommissioned in an integrated fashion. The spent fuel has been removed from the site.

## Haddam Neck – Connecticut Yankee

Haddam Neck was a 619 MWe (1,825 MWt) pressurized-water reactor that began commercial operation in January 1968, and ceased power operations in 1996. Decommissioning activities began in May 1998. Steam generators, reactor coolant pumps, the pressurizer, the reactor vessel, and shield wall blocks from the reactor building were disposed of off site and demolition of the administration and turbine buildings began in spring 2004. As of March 30, 2005, all spent fuel and greater-than-Class-C waste had been transferred to the ISFSI, which is currently operational.

Decommissioning at Haddam Neck was completed in 2007 and the applicable NRC reactor license under Title 10 of the Code of Federal Regulations (10 CFR) was terminated.

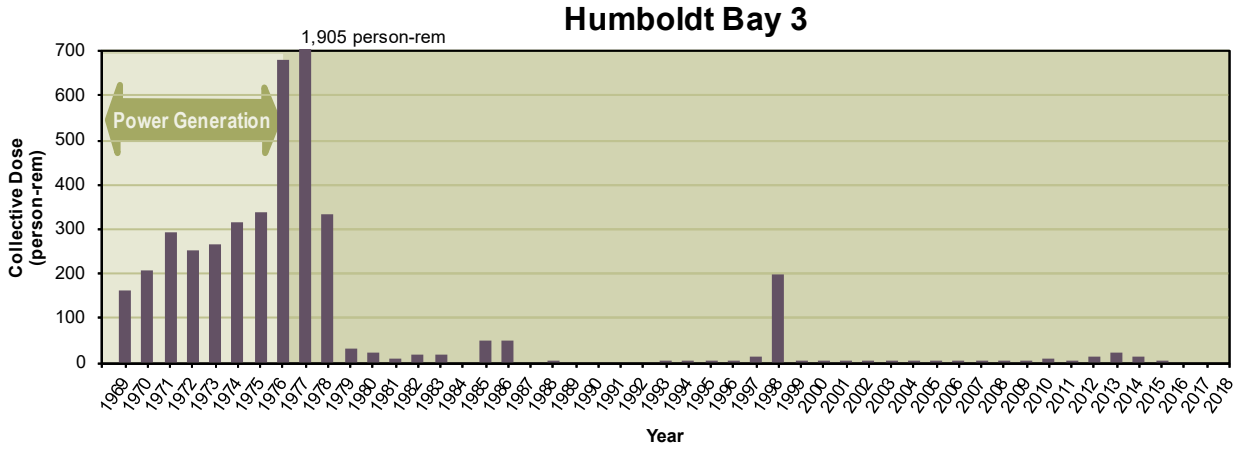



## Humboldt Bay Unit 3

Humboldt Bay Power Plant (HBPP) Unit 3 produced power commercially from August 1, 1963, to July 1976. In July 1976, Unit 3 was shut down for annual refueling and to conduct seismic modifications. In 1983, with the plant still shut down, Pacific Gas & Electric, the owner of the facility, determined that required seismic modifications and the requirements imposed as a result of the accident at Three Mile Island made continued operations no longer economically feasible and decided to decommission the plant. The NRC approved the licensee's Decommissioning Plan in July 1988.

The licensee submitted a PSDAR in February 1998 and has begun incremental decommissioning activities. In December 2003, the licensee submitted an ISFSI application to the NRC. Humboldt Bay was to have unique dry cask storage because of the short length of its fuel assemblies. Moreover, the casks were to be stored below-grade to accommodate regional seismicity issues, security concerns, and site boundary dose limits. The NRC issued the

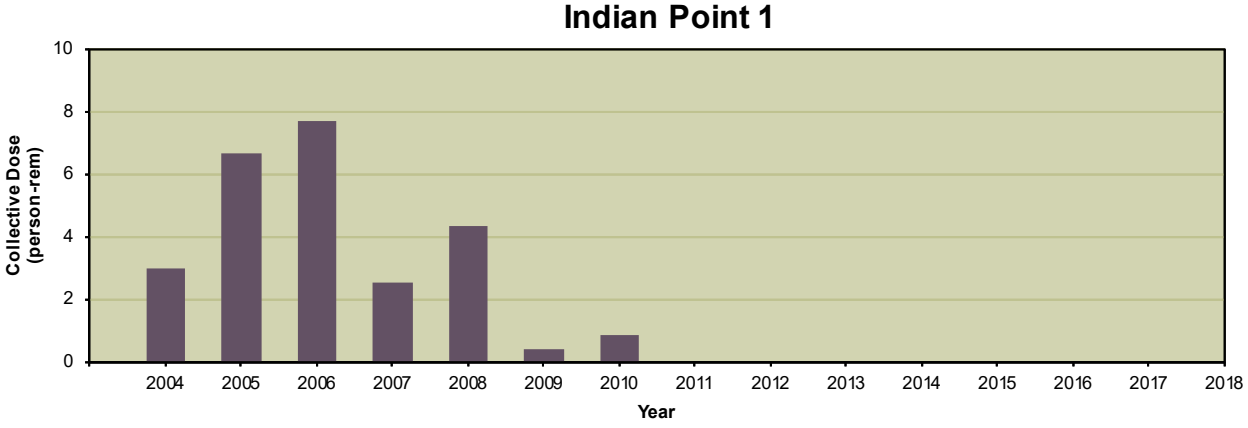
ISFSI license on November 18, 2005, and the licensee began constructing the ISFSI in 2007. Following fuel loading into the ISFSI in 2008, the licensee began constructing new combustion units in 2008 and 2009 to replace the old Humboldt Bay fossil Units 1 and 2. Decommissioning activities at the old fossil Units 1 and 2 were completed in 2013. During this period, decommissioning of Unit 3 commenced and HBPP successfully completed removal of the reactor vessel internals in September 2013. The Humboldt Bay Unit 3 decommissioning status is DECON. The only remaining activities are radiological final status surveys. It is estimated that all decommissioning activities will be completed by September 30, 2020. The ISFSI remains under a separate NRC license.




## Indian Point Unit 1

Indian Point Unit 1 (IP-1) produced power commercially from August 1962 to October 1974. IP-1 was shut down on October 31, 1974, because the emergency core cooling system did not meet regulatory requirements. Some decommissioning work associated with spent fuel storage was performed from 1974 through 1978. By January 1976, all spent fuel had been removed from the reactor vessel. The NRC order approving SAFSTOR was issued in January 1996.

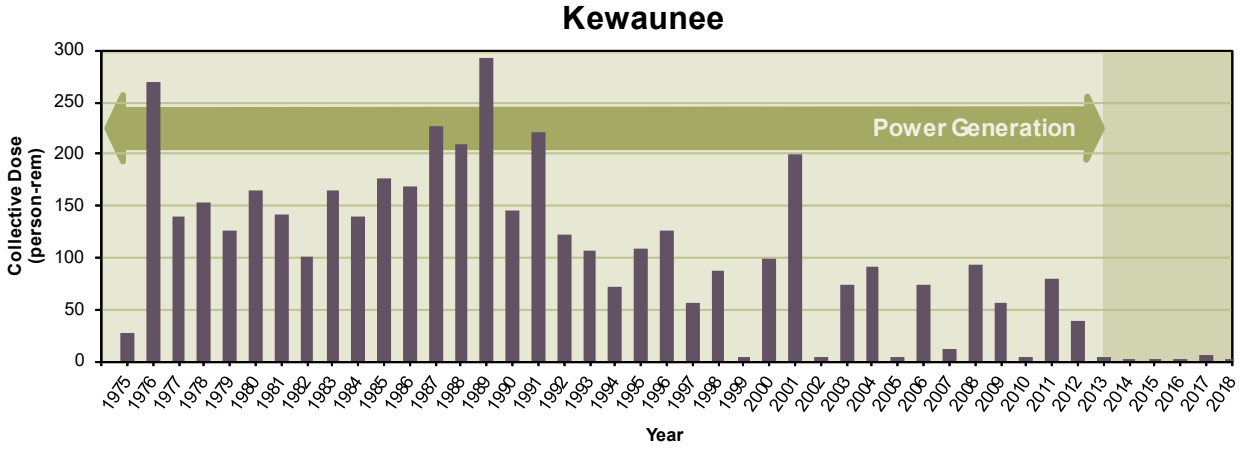
A PSDAR public meeting was held on January 20, 1999. The licensee plans to decommission IP-1 with Indian Point Unit 2 (IP-2), which is currently in operation. The licensee does not plan to begin active decontamination and decommissioning of IP-1 until IP-2 ceases operation. In February 2017, the licensee notified the NRC that IP-2 will be shutdown by April 30, 2020.



## Kewaunee

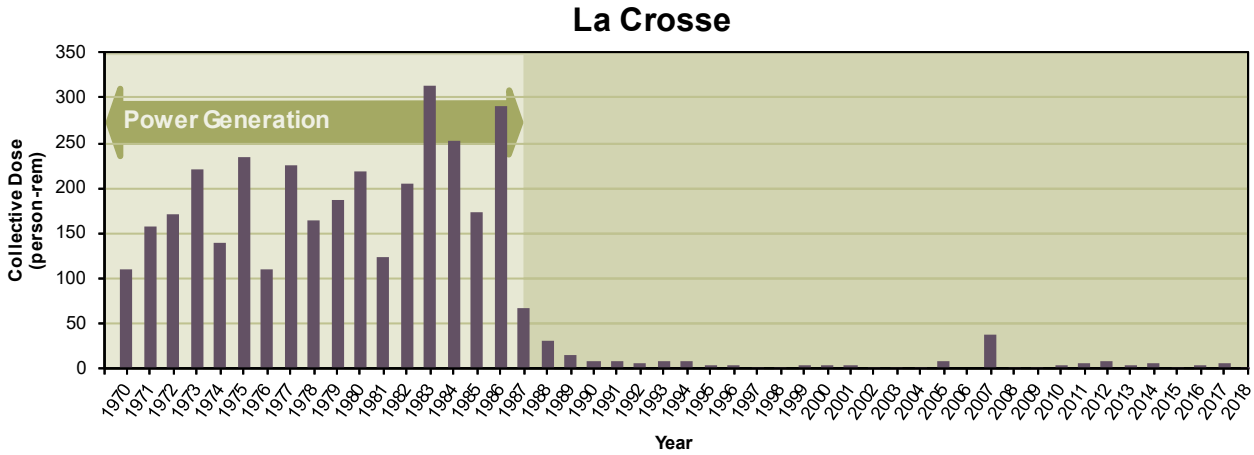
Kewaunee Power Station was a 1,772 MWt, pressurized-water reactor that was licensed to operate from December 1973 to May 2013. Kewaunee is located in Carlton, WI, on Lake Michigan about 35 miles southeast of Green Bay.

At present, the facility has transitioned to a SAFSTOR condition. Kewaunee submitted a PSDAR and conducted a public meeting near the site in April 2013. The facility retains its Part 50 license but is no longer authorized to operate or emplace fuel in the reactor vessel. The transfer of spent fuel from the spent fuel pool to the ISFSI was completed in June 2017. Major decommissioning and dismantlement activities are scheduled to begin in 2069 with license termination following in 2073.




## La Crosse

The La Crosse Boiling-Water Reactor (LACBWR) produced power commercially starting on November 1, 1969. The plant was one of a series of demonstration plants funded, in part, by the U.S. Atomic Energy Commission (AEC). The nuclear steam supply system and its auxiliaries were funded by the AEC, and the balance-of-plant equipment was funded by the Allis-Chalmers Company. The AEC later sold the plant to Dairyland Power Cooperative (DPC) and provided it with a provisional operating license. LACBWR was shut down on April 30, 1987, and the NRC approved its Decommissioning Plan on August 7, 1991.



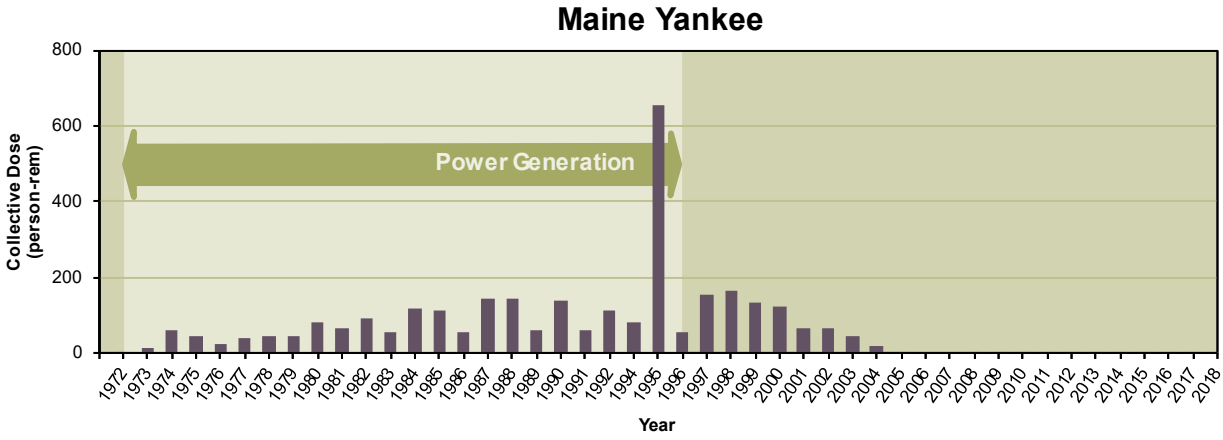
Because the NRC approved DPC's Decommissioning Plan (DP) before August 28, 1996 (the effective date of an NRC final rule concerning reactor decommissioning (61 FR 39278; July 29, 1996)), the DP is considered the Post Shutdown Decommissioning Activities Report (PSDAR) for LACBWR (see 10 CFR 50.82). The PSDAR public meeting was held on May 13, 1998, and subsequent updates to the LACBWR decommissioning report have combined the DP and PSDAR into the "LACBWR Decommissioning Plan and Post-Shutdown Decommissioning Activities Report" (D Plan/PSDAR). DPC constructed an onsite ISFSI and completed the movement of all 333 spent nuclear fuel elements from the Fuel Element Storage Well to dry cask storage at the ISFSI by September 19, 2012.

By order dated May 20, 2016, the NRC approved the direct transfer of Possession Only License No. DPR-45 for LACBWR from DPC to LaCrosse Solutions, LLC (LS), a wholly owned subsidiary of EnergySolutions, LLC. The order was published in the Federal Register on June 2, 2016 (81 FR 35383). The transfer assigns DPC's licensed possession, maintenance, and decommissioning authorities for LACBWR to LS in order to implement expedited decommissioning at the LACBWR site. On September 24, 2019, the NRC approved an order that allows the LACBWR license to be transferred back to DPC upon completion of decommissioning at the site and termination of the Part 50 license outside of the ISFSI. Final decommissioning activities at LACBWR are currently underway and are scheduled to be completed in 2020, with the license transfer to DPC to be executed soon after.

By letter dated June 27, 2016, as supplemented by letter dated December 1, 2016, May 31, 2018, and November 15, 2018, LaCrosse Solutions submitted the License Termination Plan (LTP) for LACBWR in accordance with 10 CFR 50.82(a)(9).

## Maine Yankee

Maine Yankee was an 860 MWe pressurized-water reactor located on Bailey Point in Wiscasset, ME, that started commercial power operations in 1972. The Maine Yankee plant was shut down on December 6, 1996. Certification of permanent cessation of operations was submitted on August 7, 1997. The PSDAR was submitted on August 27, 1997, and the NRC approved the LTP on February 28, 2003.

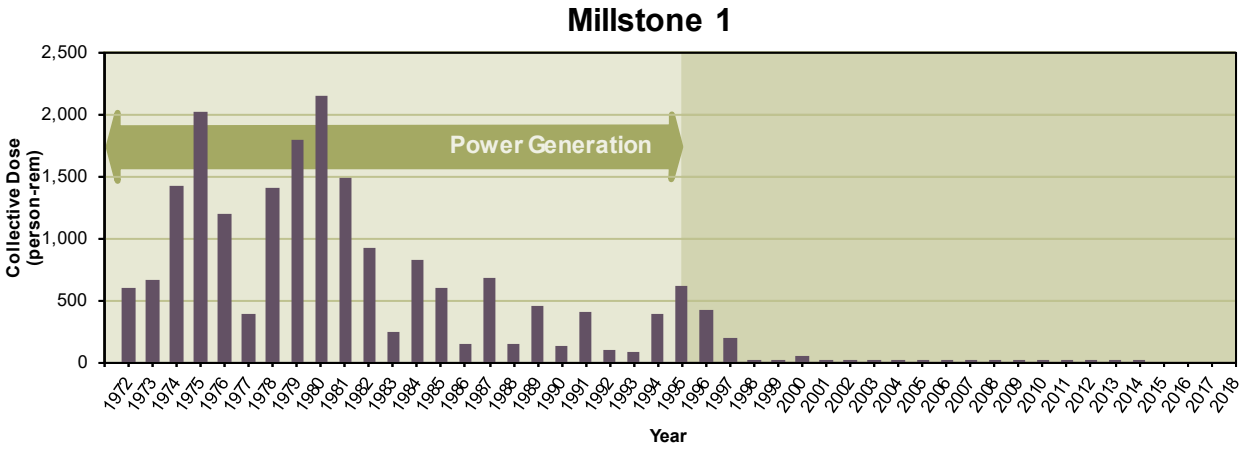


In 2003, the reactor pressure vessel was shipped to Barnwell, SC via barge. Spent nuclear fuel and greater-than-Class-C waste were transferred to the onsite ISFSI between August 2002 and February 2004. Decommissioning was completed in June 2005, and Maine Yankee will retain its 10 CFR Part 50 license until the fuel is removed from the ISFSI. The NRC LTP approval date is to be determined.

## Millstone Unit 1

Millstone Unit 1 produced power commercially from December 28, 1970, to November 4, 1995. Millstone Unit 1 was a single-cycle, boiling-water reactor with a reactor thermal output of 2011 MW and a net electrical output of 652.1 MW. The unit was shut down on November 4, 1995. On July 21, 1998, pursuant to 10 CFR 50.82(a)(1)(i) and 10 CFR 50.82(a)(1)(ii), the licensee certified to the NRC that, as of July 17, 1998, Millstone Unit 1 had permanently ceased operations and that fuel had been permanently removed from the reactor vessel. The owner of the facility submitted its PSDAR to the NRC on June 14, 1999, which included a combination of DECON and SAFSTOR options. After a formal assessment of spent fuel storage options in 2007, the licensee concluded that they would keep the Millstone Unit 1 fuel in the spent fuel pool, in a SAFSTOR status, until 2048 rather than move the fuel to an ISFSI.

Safety-related structures, systems, and components and those important to safety remaining at Millstone Unit 1 are associated with the spent fuel pool island where the spent fuel is stored. Besides nonessential systems that support the balance-of-plant facilities, the remaining plant equipment has been de-energized, disabled, or removed from the unit and can no longer be used for power generation. Irradiated reactor vessel components have been removed. The reactor cavity and vessel have been drained, and a radiation shield has been installed to limit occupational radiation doses to workers. Currently, the licensee has estimated 2056 for completion of all decommissioning activities and the estimated closure date of this site.



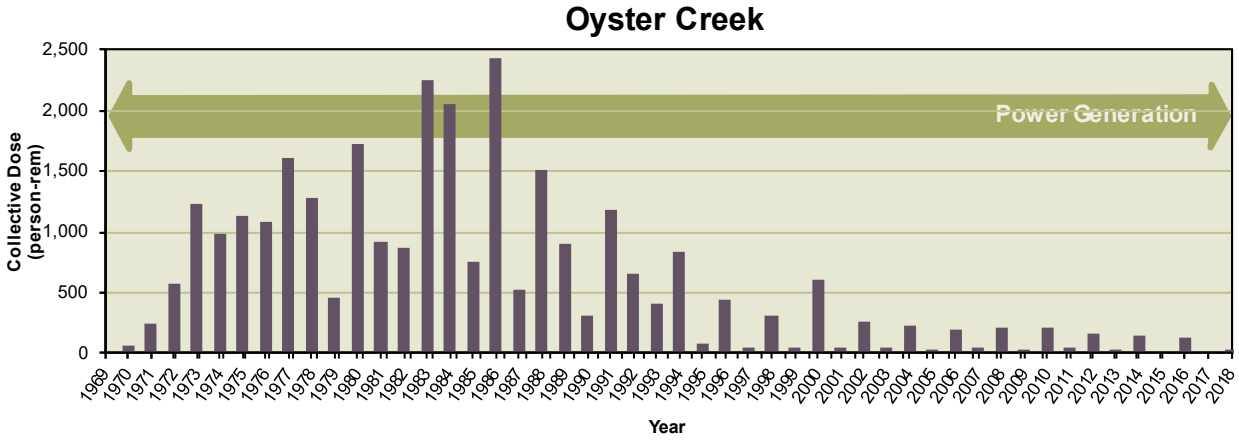

## Oyster Creek

Oyster Creek produced power commercially from December 1969, to September 17, 2018. Oyster Creek was a 1,930 MWt single-cycle, boiling-water reactor with a net electrical output of 619 MW. The unit was shut down on September 17, 2018. By letter dated September 25, 2018, Exelon Generation Company (Exelon), prior owner of the facility, certified that all fuel had been removed from the reactor. In the PSDAR that was submitted to the NRC on May 21, 2018, Exelon stated its intention to move all of the spent nuclear fuel into dry cask storage by the

end of 2024 and put the plant into SAFSTOR until it is ready to fully decommission the facility starting in 2075. License termination is scheduled to take place by 2078 and site restoration by 2080.

On August 31, 2018, Exelon Generation and Holtec submitted a License Transfer Application (LTA) requesting NRC approval to transfer the Oyster Creek Renewed Facility Operating License and the General License for the Oyster Creek ISFSI to Oyster Creek Environmental Protection, LLC (OCEP), as the licensed owner and to Holtec Decommissioning International (HDI), as the licensed operator. The NRC staff is currently reviewing the revised PSDAR submitted by HDI on September 28, 2018, which includes a revised Site-Specific Decommissioning Cost Estimate and notifies the NRC of changes to accelerate the schedule for the prompt decommissioning of Oyster Creek. License termination would take place by 2035. The NRC staff is currently reviewing this application.

There are no major technical issues at this time.

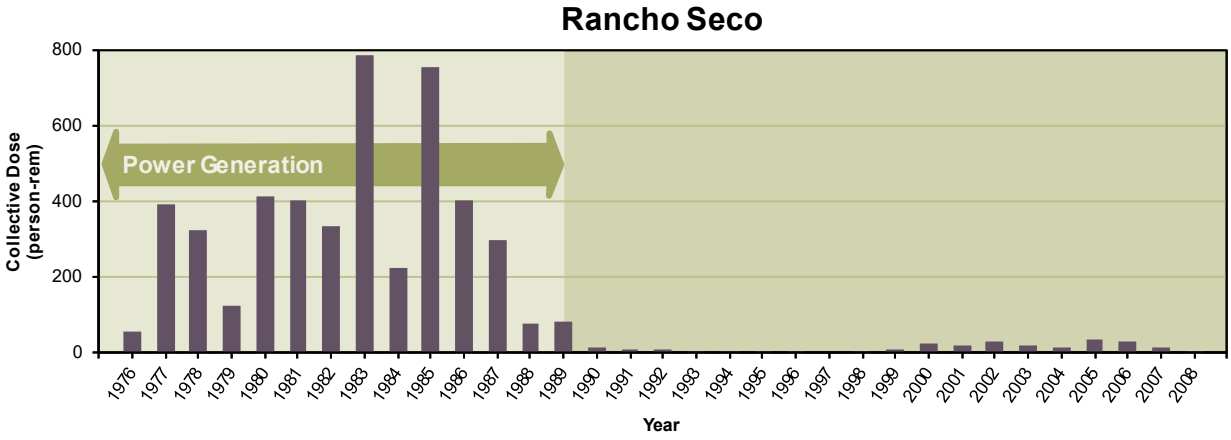



## Peach Bottom 1

Peach Bottom Atomic Power Station Unit 1 was a 200 Mwt, high temperature, gas cooled reactor that was operated from June of 1967 to its final shutdown on October 31, 1974. All spent fuel has been removed from the site, and the spent fuel pool is drained and decontaminated. The reactor vessel, primary system piping, and steam generators remain in place. The facility is currently in a SAFSTOR condition. Final decommissioning is not expected until 2034 when Units 2 and 3 are scheduled to shut down.

## Rancho Seco

Rancho Seco Nuclear Generating Station was a 913 MW pressurized-water reactor owned by the Sacramento Municipal Utility District (SMUD). Rancho Seco permanently shut down in June 1989, after approximately 15 years of operation. The licensee was granted a site-specific 10 CFR Part 72 license for an onsite ISFSI on June 30, 2000. SMUD completed transfer of all the spent nuclear fuel to the Rancho Seco ISFSI in August 2002. Rancho Seco completed decommissioning of the former reactor site in 2009 and the site was released with the exception of a 6-acre ISFSI site and a class B and C waste storage building. The B/C waste building was decommissioned in 2017, and the 10 CFR Part 50 license was terminated on August 31, 2018. The ISFSI is still in operation.

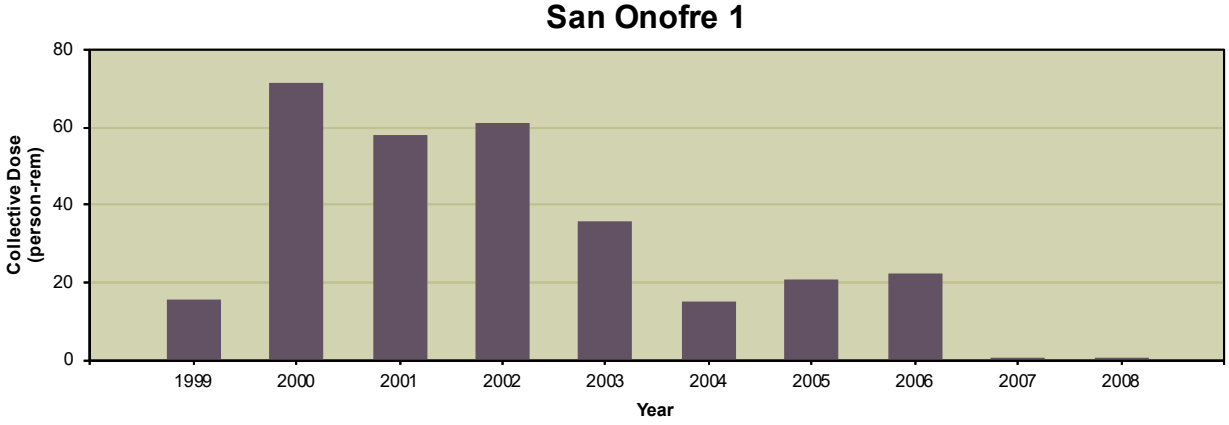



## San Onofre Unit 1

The San Onofre Nuclear Generating Station Unit 1 (SONGS-1), operated by Southern California Edison (SCE), produced power commercially from January 1, 1968, to November 30, 1992. Unit 1 was a Westinghouse three-loop pressurized-water reactor with a reactor thermal output of 1,347 MW.

Defueling of SONGS-1 was completed on March 6, 1993, and the NRC approved the Permanently Defueled Technical Specifications on December 28, 1993. On November 3, 1994, SCE submitted a Proposed Decommissioning Plan to place SONGS-1 in SAFSTOR until the shutdown of SONGS-2 and SONGS-3. However, on December 15, 1998, SCE submitted the PSDAR for SONGS-1 to begin decontamination in 2000. Since that time, SCE has been actively decommissioning the facility, which has been almost entirely dismantled. SCE has removed and disposed of most of the structures and equipment. The SONGS-1 turbine building was removed and the licensee completed internal segmentation and cutup of the reactor pressure vessel. The licensee plans to store the reactor vessel on site for the foreseeable future, as long as licensed activities are ongoing. In addition, the licensee transferred SONGS-1 spent fuel to an onsite generally licensed ISFSI. Starting in 2015, the ISFSI began expanding into the area previously occupied by SONGS-1 to store the spent fuel from SONGS-2 and SONGS-3.

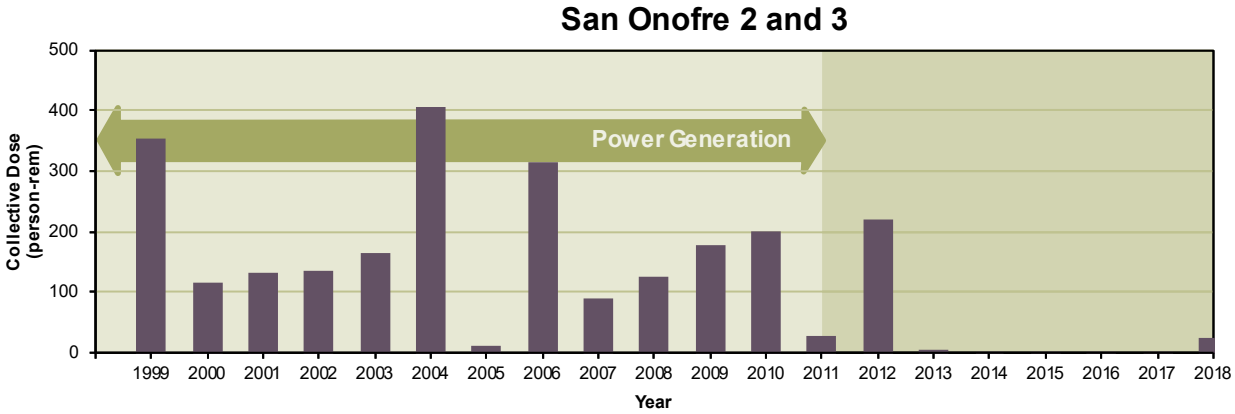
In February 2010, the NRC staff issued a license amendment to release offshore portions of the SONGS-1 cooling intake and outlet pipes for unrestricted use. It is estimated that all decommissioning activities for SONGS-1 will be completed in 2030.



## San Onofre Units 2 and 3

The San Onofre Nuclear Generating Station, Units 2 and 3 (SONGS), operated by the Southern California Edison Company (SCE) is located approximately 4 miles south of San Clemente, California. SONGS, Units 2 and 3, are Combustion Engineering 1,127 MWe pressurized-water reactors, which were granted Facility Operating Licenses NPF 10 on February 16, 1982, and NPF-15 on November 15, 1982, respectively. SONGS 2 and 3 generated power commercially from 1984 to 2012. In June 2013, pursuant to 10 CFR 50.82(a)(1)(i), the licensee certified to the NRC that as of June 7, 2013, operations had ceased at SONGS, Units 2 and 3. The licensee subsequently certified, pursuant to 10 CFR 50.82(a)(1)(ii), that all fuel had been removed from the reactor vessels of both units, and committed to maintaining the units in a permanently defueled status. Therefore, pursuant to 10 CFR 50.82(a)(2), SCE's 10 CFR Part 50 licenses no longer authorize operation of SONGS or emplacement or retention of fuel into the reactor vessels. The licensee is still authorized to possess and store irradiated nuclear fuel. Irradiated fuel is currently being stored onsite in spent fuel pools and in dry casks at an ISFSI.

The PSDAR for SONGS, Units 2 and 3, was submitted on September 23, 2014, and the associated public meeting was held on October 27, 2014, in Carlsbad, California. The NRC confirmed its review of the SONGS, Units 2 and 3, PSDAR and addressed public comments in a letter dated August 20, 2015. On July 17, 2015, the NRC approved the Permanently Defueled Technical Specifications for SONGS, Units 2 and 3. It is estimated that all decommissioning activities for SONGS, Units 2 and 3, will be completed in 2035. San Onofre Units 2 and 3 will retain its 10 CFR Part 50 license until the fuel is removed from the ISFSI.




## Savannah, Nuclear Ship

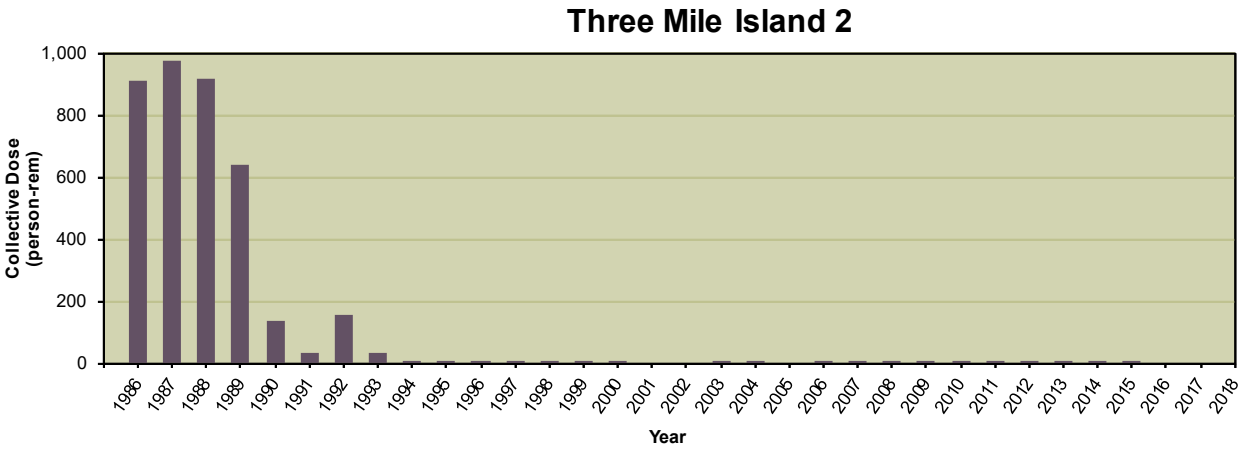
The Nuclear Ship (NS) Savannah was removed from service in 1970 and the fuel was removed from the ship in October 1971. The ship has been designated a national historic landmark by the American Nuclear Society. The Savannah is berthed in Baltimore, Maryland and is transitioning from SAFSTOR to DECON.

## Three Mile Island Unit 2

Three Mile Island Unit 2 (TMI-2) produced power commercially from December 30, 1978, to March 28, 1979. On March 28, 1979, the unit experienced an accident that resulted in severe damage to the reactor core. TMI-2 has been in a non-operating status since that time. The licensee conducted a substantial program to defuel the reactor vessel and decontaminate the

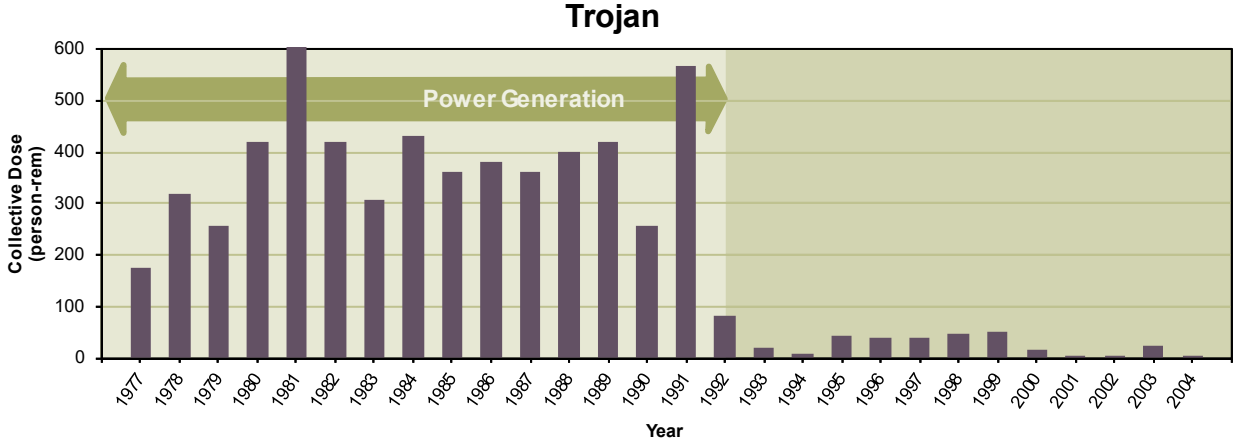
facility. The plant defueling was completed in April 1990. All spent fuel has been removed except for some debris in the reactor coolant system. The removed fuel is currently in storage at Idaho National Laboratory, and the DOE has taken title and possession of the fuel.

TMI-2 has been defueled and decontaminated to the extent the plant is in a safe, inherently stable condition suitable for long-term management. This long-term management condition is termed post-defueling monitored storage, which was approved in 1993. It is estimated that decommissioning activities for TMI-2 will be completed in 2036. The NRC LTP approval date is to be determined. There is no significant dismantlement underway. The plant shares equipment with the operating Three Mile Island Unit 1 (TMI-1). TMI-1 was sold to AmerGen (now Exelon) in 1999. GPU Nuclear retains the license for TMI-2 and is owned by FirstEnergy Corp. GPU Nuclear contracts with Exelon for maintenance and surveillance activities. The licensee plans to decommission TMI-2 independently of TMI-1, but may coordinate some TMI-2 decommissioning activities to support TMI-1 decommissioning. TMI-2 will retain its 10 CFR Part 50 license until the fuel is removed from the ISFSI.




## Trojan

The Trojan plant was shut down in November 1992, and the SGs and reactor vessel were shipped to the Hanford site. The licensee was granted a site-specific 10 CFR Part 72 license for an onsite ISFSI in March 1999 that is still in operation. The licensee began spent fuel transfer to the ISFSI in December 2002 and finished fuel transfer in August 2003.



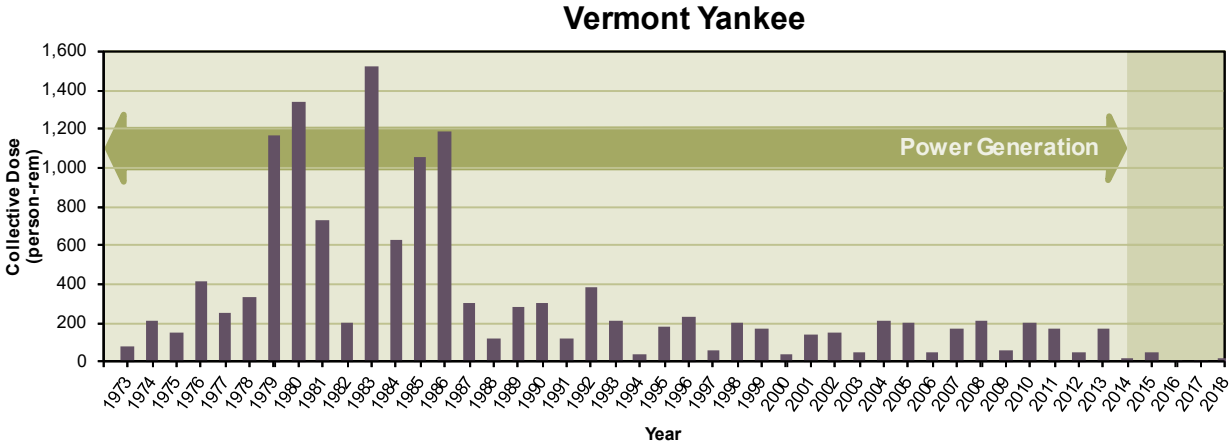
In December 2004, the Trojan Nuclear Plant completed decommissioning activities. The NRC terminated Trojan's 10 CFR Part 50 operating license on May 23, 2005.

## Vermont Yankee

Vermont Yankee Nuclear Power Station was a 1,912 Mwt, boiling-water reactor that began operation in 1972. The reactor was permanently shut down on December 29, 2014, and the fuel was removed from the reactor on January 12, 2015.

Entergy, which owns the facility, submitted the Vermont Yankee PSDAR to the NRC on Dec. 19, 2014. In the report, Entergy stated its intention to keep the plant in SAFSTOR until it is ready to fully decommission the facility in 2073. Entergy completed movement of the spent nuclear fuel to dry cask storage in August 2018.

On February 9, 2017, Entergy and NorthStar Group Services, Inc. (NorthStar) submitted a request to transfer the Vermont Yankee Nuclear Power Station license from Entergy to NorthStar. On October 12, 2018, NRC issued a first-of-a-kind order approving the permanent transfer of the Vermont Yankee Operating license and associated spent fuel in onsite storage from Entergy to Northstar for the purpose of decommissioning the reactor. With the completion of the transfer to Entergy on January 11, 2019, the new estimated date for closure is 2030.

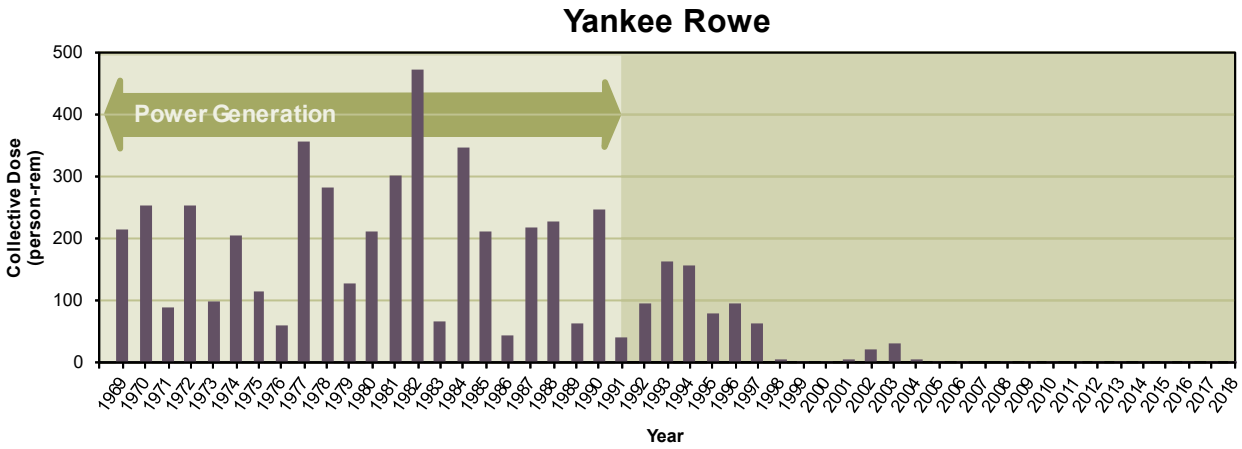



## Yankee Rowe

The Yankee Rowe plant was permanently shut down on October 1, 1991, and the SGs were shipped to the Barnwell Low-Level Radioactive Waste Disposal Facility in North Carolina, in November 1993. The reactor vessel was shipped to Barnwell in April 1997.

The owner completed construction of an onsite ISFSI and all the fuel from the spent fuel pool was transferred to it.

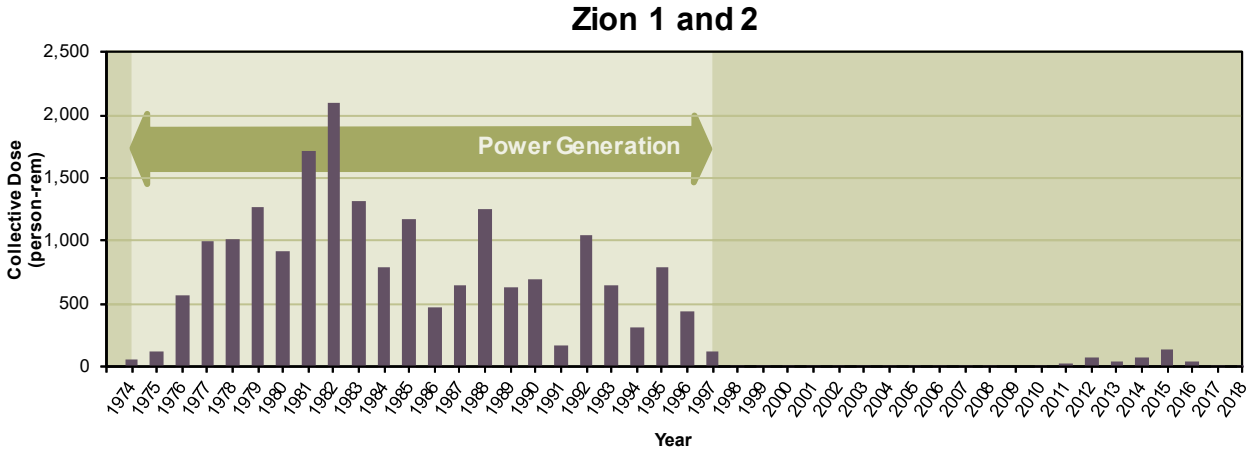
Yankee Rowe completed decommissioning in 2007. The license for the site was reduced to the two acres surrounding the ISFSI, which is still in operation.




## Zion Units 1 and 2

Zion Nuclear Power Station (ZNPS) received a construction permit in December 1968 to begin building two nuclear power reactors. Unit 1 produced power commercially from December 31, 1973, to February 21, 1997, and Unit 2 produced power commercially from September 17, 1974, to September 19, 1996. On April 27, 1997, all fuel from Unit 1 was removed and on February 25, 1998, all fuel from Unit 2 was removed and placed in the spent fuel pool. On January 14, 1998, the Unicom Corporation and ComEd Boards of Directors, the joint owners of the facility, authorized the permanent cessation of operations at ZNPS for economic reasons. ComEd certified, in a letter dated February 13, 1998, to the NRC that operations had ceased at ZNPS. On March 9, 1998, ComEd informed the NRC that all fuel had been removed from the ZNPS reactor vessels and committed to maintain them permanently defueled.

The NRC acknowledged the certification of permanent cessation of power operation and permanent removal of fuel from the reactor vessels in a letter dated May 4, 1998, and ZNPS was placed in SAFSTOR. The owner submitted the PSDAR, site-specific cost estimate, and fuel management plan on February 14, 2000. The SAFSTOR approach is the intended decommissioning method to be used for ZNPS, which involves removal of all radioactive material from the site following a period of dormancy. In 2010, the NRC staff finalized the transfer of the possession license for Zion Units 1 and 2 from Exelon Generating Company, LLC to Zion Solutions, LLC to facilitate decommissioning. At Zion Units 1 and 2, decommissioning planning activities for the removal of large components were performed during 2011. The NRC staff held a public meeting in April 2015 regarding the LTP for Zion Units 1 and 2, which was submitted in December 2014. All of the above-grade plant structures have been removed. Final site survey and license reduction to the ISFSI is currently planned for 2019-2020. It is estimated that license termination will occur in September 2020.


Zion 1 and 2
Collective Dose (person-rem)
2,500
2,000
1,500
1,000
500
0
Power Generation
1974
1975
1976
1977
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1979
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2013
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# APPENDIX F

# GLOSSARY

# 2018

Information in this appendix was obtained from Reference 25.

# GLOSSARY 2018

***Agreement State:*** as defined in Title 10 of the *Code of Federal Regulations* (10 CFR) 30.4, means any State with which the Atomic Energy Commission or the U.S. Nuclear Regulatory Commission has entered into an effective agreement under subsection 274b. of the [Atomic Energy] Act [of 1954, including any amendments thereto]. To simplify subsection 274b., an Agreement State is a State that has signed an agreement with the NRC under which the State regulates the use of certain byproduct, source, and small quantities of special nuclear material in that State.

***As low as is reasonably achievable (ALARA):*** as defined in 10 CFR 20.1003, means making every reasonable effort to maintain exposures to radiation as far below the dose limits in 10 CFR Part 20 as is practical, consistent with the purpose for which the licensed activity is undertaken, taking into account the state of technology, the economics of improvements in relation to the state of technology, the economics of improvements in relation to benefits to the public health and safety, and other societal and socioeconomic considerations, and in relation to utilization of nuclear energy and licensed materials in the public interest.

***Average measurable dose:*** the dose obtained by dividing the collective dose by the number of individuals 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, because it excludes those individuals receiving a less-than-measurable dose.

***Boiling-water reactor (BWR):*** a reactor in which the water, used as both coolant and moderator, is allowed to boil in the core. The resulting steam can be used directly to drive a turbine and electrical generator, thereby producing electricity.

***Byproduct material:*** as partially defined in 10 CFR 20.1003, means any radioactive material (except special nuclear material) yielded in, or made radioactive by, exposure to the radiation incident to the process of producing or using special nuclear material; and the tailings or wastes produced by the extraction or concentration of uranium or thorium from ore processed primarily for its source material content.

***Breeder:*** a reactor that produces more nuclear fuel than it consumes. A fertile material, such as uranium-238, when bombarded by neutrons, is transformed into a fissile material, such as plutonium-239, which can be used as fuel. [Ref. 23]

***Ceased operations:*** the date of plant shutdown notification to the NRC.

***Ceased power generation:*** the date the plant ceased to generate electricity.

***Class (or lung class or inhalation class):*** as defined in 10 CFR 20.1003, means a classification scheme for inhaled material according to its rate of clearance from the pulmonary region of the lung. Materials are classified as D, W, or Y, which applies to a range of clearance half-times: for Class D (Days) of less than 10 days, for Class W (Weeks) from 10 to 100 days, and for Y (Years) of greater than 100 days.

***Collective dose:*** as defined in 10 CFR 20.1003, is the sum of the individual doses received in a given period of time by a specified population from exposure to a specified source of radiation.

***Committed dose equivalent ($H_{T,50}$):*** as defined in 10 CFR 20.1003, means the dose equivalent to organs or tissues of reference that will be received from an intake of radioactive material by an individual during the 50-year period following the intake (CDE [$H_{T,50}$]). The acronym CDE is an NRC acronym used for this term.

***Committed effective dose equivalent ($H_{E,50}$):*** as defined in 10 CFR 20.1003, is the sum of the products of the weighting factors applicable to each of the body organs or tissues that are irradiated and the committed dose equivalent to these organs or tissues (CEDE [$H_{E,50}$] = $\Sigma W_T H_{T.50}$). The acronym CEDE is an NRC acronym used for this term.

***Criticality:*** the normal operating condition of a reactor, in which nuclear fuel sustains a fission chain reaction. A reactor achieves criticality (and is said to be critical) when each fission event releases a sufficient number of neutrons to sustain an ongoing series of reactions. [Ref. 21]

***DECON (immediate dismantlement):*** soon after the nuclear facility closes, equipment, structures, and portions of the facility containing radioactive contaminants are removed or decontaminated to a level that permits release of the property and termination of the NRC license.

***Deep-dose equivalent ($H_d$):*** as defined in 10 CFR 20.1003, which applies to external whole-body exposure, is the dose equivalent at a tissue depth of 1 cm (1000 mg/cm$^2$). The acronym DDE is an NRC acronym used for this term.

***Effective dose equivalent ($H_E$):*** as defined in 10 CFR 20.1003, is the sum of the products of the dose equivalent to the organ or tissue ($H_T$) and the weighting factors ($W_T$) applicable to each of the body organs or tissues that are irradiated (EDE [$H_E$] = $\Sigma W_T H_T$). The acronym EDE is an NRC acronym used for this term.

***ENTOMB:*** radioactive contaminants that are permanently encased on site in a structurally sound material such as concrete and appropriately maintained and monitored until the radioactivity decays to a level permitting restr icted release of the property.

***Exposure:*** as defined in 10 CFR 20.1003, means being exposed to ionizing radiation or to radioactive material.

***FBR:*** a fast breeder reactor is a nuclear reactor that generates more fissile material than it consumes. These devices achieve this because their neutron economy is high enough to breed more fissile fuel than they use from fertile material, such as uranium-238 or thorium-232.

***Independent Spent Fuel Storage Installation (ISFSI):*** as defined in 10 CFR 72.3, means a complex designed and constructed for the interim storage of spent nuclear fuel, solid reactor-related greater-than-Class-C (GTCC) waste, and other radioactive materials associated with spent

fuel and reactor-related GTCC waste storage. An ISFSI which is located on the site of another facility licensed under 10 CFR Part 72 or a facility licensed under 10 CFR Part 50 of [Title 10 of the *Code of Federal Regulations*] and which shares common utilities and services with that facility or is physically connected with that other facility may still be considered independent.

***Lens dose equivalent (LDE):*** as defined in 10 CFR 20.1003, applies to the external exposure of the lens of the eye and is taken as the dose equivalent at a tissue depth of 0.3 centimeters (300 mg/cm2).

***License:*** as defined in 10 CFR 20.1003, means a license issued under the regulations in 10 CFR Parts 30 through 36, 39, 40, 50, 60, 61, 63, 70, or 72 of [Title 10 of the *Code of Federal Regulations*].

***Licensee:*** as defined in 10 CFR 20.1003, means the holder of the NRC license.

***Licensed material:*** as defined in 10 CFR 20.1003, means source material, special nuclear material, or byproduct material received, possessed, used, transferred, or disposed of under a general or specific license issued by the [Nuclear Regulatory] Commission.

***Light-water reactor (LWR):*** the term used in this report to describe commercial nuclear reactors that use ordinary water as a coolant and are operated for the purposes of generating electricity. Light water reactors include boiling-water reactors (BWRs) and pressurized-water reactors (PWRs).

***Measurable dose:*** a dose greater than zero rem (not including doses reported as "not detectable").

***Megawatt-year:*** unit of electric energy, equal to the energy from a power of 1,000,000 watts over a period of 1 year.

***Mode of Intake:*** the manner of intake into the body: inhalation (H), absorption through the skin (B), oral ingestion (G), and injection (J).

***Monitoring year:*** interval during which the radiation exposure monitoring was performed.

***Nonreactor licensees:*** NRC licensees that are not commercial nuclear power reactors. These licensees are industrial radiographers, fuel processors, fabricators, and reprocessors; manufacturers and distributors of byproduct material; ISFSIs; facilities for land disposal of low-level waste; and geologic repositories for high-level waste.

***Number of individuals with measurable dose:*** the count of unique individuals who received a measurable dose during the monitoring year. In some instances in this report, the number of individuals with a measurable dose may include individuals who are counted more than once,

since they may be monitored at more than one licensee during the year. (See Section 5 on the effect of transient individuals.) Tables that have been adjusted for transient workers are noted in the appropriate footnotes to the tables.

***Occupational dose:*** as defined in 10 CFR 20.1003, means the dose received by an individual in the course of employment in which the individual's assigned duties involve exposure to radiation or to radioactive material from licensed and unlicensed sources of radiation, whether in the possession of the licensee or other person. Occupational dose does not include doses received from background radiation, from any medical administration the individual has received, from exposure to individuals administered radioactive material and released under [10 CFR] 35.75, from voluntary participation in medical research programs, or as a member of the public.

***Pressurized-water reactor (PWR):*** a power reactor in which heat is transferred from the core to an exchanger by high-temperature water kept under high pressure in the primary system. Steam used to turn a turbine and electrical generator is generated in a secondary circuit. The majority of reactors producing electric power in the United States are pressurized-water reactors.

***Radiation Safety Officer (RSO):*** as defined in 10 CFR 33, a person appointed who is qualified by training and experience in radiation protection, and who is available for advice and assistance on radiological safety matters.

***Radionuclide:*** a radioisotope. A radioisotope is an unstable isotope that undergoes spontaneous transformation, emitting radiation. [Ref. 20]

***REM:*** as defined in 10 CFR 20.1004, is the special unit of any of the quantities expressed as dose equivalent. The dose equivalent in rems is equal to the absorbed dose in rads multiplied by the quality factor (1 rem = 0.01 sievert).

***SAFSTOR (often considered 'delayed DECON'):*** a nuclear facility that is maintained and monitored in a condition that allows the radioactivity to decay; afterwards, it is dismantled.

***Shallow-dose equivalent for both maximum extremity (SDE-ME) and whole body (SDE-WB):*** the external exposure of an extremity, taken as the dose equivalent at a tissue depth of 0.007 centimeters.

***Sievert:*** as defined in 10 CFR 20.1004, is the International System of Units (SI) of any of the quantities expressed as dose equivalent. The dose equivalent in sieverts is equal to the absorbed dose in grays multiplied by the quality factor (1 Sv = 100 rem).

***Special nuclear material:*** as defined in 10 CFR 20.1003, means plutonium, uranium-233, uranium enriched in the isotope 233 or in the isotope 235, and any other material that the [Nuclear Regulatory] Commission, pursuant to the provisions of section 51 of the [Atomic Energy] Act [of 1954, as amended], determines to be special nuclear material, but does not include source material, or any material artificially enriched by any of the foregoing.

***Statistical comparisons:*** For statistical comparisons of averages, a two-sided one-sample t test with a 0.05 significance level (i.e., 95 percent confidence) is used to determine whether the difference between the two averages is significantly different. For values that are not averages, such as total collective dose, a 5-year average from the previous five years (not including the current year under consideration) is calculated with 95 percent confidence interval based on the normal distribution. If the value for the current year falls within the 5-year 95 percent confidence interval, then it is not significantly different; whereas, if the value falls outside (i.e., below the lower limit or above the upper limit), there is an indication of a statistical significant change.

Two-sided one-sample t test formula:

$$t = \frac{\overline{X} - \mu}{\frac{s}{\sqrt{N}}}$$

Where:

t = calculated t statistic
= sample mean
μ = population mean
S = sample standard deviation
N = sample number

Example:

We wish to determine if the average measurable dose for a type of nuclear reactor differs from the previous five years. The five year mean for the average measurable dose is 0.080. The population mean is the current year's average measurable dose, 0.060. The sample standard deviation is 0.01, and the sample number is 5. Using the formula,

$$t = \frac{0.080 - 0.060}{\frac{0.01}{2.236}} = 4.472$$

The two-tailed probability value (as obtained from a Student's t distribution table) given a t-value of 4.472 is 0.006 which is statistically significant at a 0.05 significance level.

***Total effective dose equivalent (TEDE):*** as defined in 10 CFR 20.1003, means the sum of the effective dose equivalent (for external exposures) and the committed effective dose equivalent (for internal exposures) (TEDE = DDE + CEDE).

***Total organ dose equivalent (TODE):*** as defined in the NRC Regulatory Guide 8.7, the sum of the deep dose equivalent and the committed dose equivalent to the organ receiving the highest dose as described in 10 CFR 20.2106(a)(6).

***Transient individual:*** one who is monitored at more than one licensed site during the calendar year.

***Unit availability factor:*** the unit available hours (the total clock hours in the report period during which the unit operated on line or was capable of such operation) times 100 divided by the period hours.

***Weighting factor ($W_T$):*** as defined in 10 CFR 20.1003, the weighting factor for an organ or tissue (T) is the proportion of the risk of stochastic effects resulting from irradiation of that organ or tissue to the total risk of stochastic effects when the whole body is irradiated uniformly.

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(12-2010)
NRCMD 3.7

U.S. NUCLEAR REGULATORY COMMISSION

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*(See instructions on the reverse)*

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Fifty-First Annual Report

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10. SUPPLEMENTARY NOTES

11. ABSTRACT (200 words or less)

This report summarizes the occupational exposure data that are maintained in the U.S. Nuclear Regulatory Commission (NRC) Radiation Exposure Information and Reporting System (REIRS) database. The bulk of the information contained in this report was compiled from the 2018 annual reports submitted by five of the seven categories of NRC licensees subject to the reporting requirements of Title 10 of the Code of Federal Regulations (10 CFR) 20.2206, “Reports of Individual Monitoring.” Because there are no geologic repositories for high-level waste currently licensed and no NRC-licensed low-level waste disposal facilities currently in operation, only five categories are considered in this report. 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. Annual reports for 2018 were received from a total of 182 NRC licensees from the five categories included in this report. The summation of reports submitted by the 182 licensees indicated that 159,988 individuals were monitored, 67,835 of whom received a measurable dose.

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

occupational exposure
nuclear power reactor
fuel facility
collective dose
measurable dose

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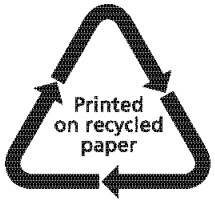


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WASHINGTON, DC 20555-0001

OFFICIAL BUSINESS

NUREG-0713
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# Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities 2018

March 2020