U.S.NRC
United States Nuclear Regulatory Commission
*Protecting People and the Environment*

NUREG-0713
Vol. 35

# Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities 2013

## Forty-Sixth Annual Report

Office of Nuclear Regulatory Research

# AVAILABILITY OF REFERENCE MATERIALS IN NRC PUBLICATIONS

**NRC Reference Material**

As of November 1999, you may electronically access NUREG-series publications and other NRC records at NRC's Library at www.nrc.gov/reading-rm.html. Publicly released records include, to name a few, NUREG-series publications; *Federal Register* notices; applicant, licensee, and vendor documents and correspondence; NRC correspondence and internal memoranda; bulletins and information notices; inspection and investigative reports; licensee event reports; and Commission papers and their attachments.

NRC publications in the NUREG series, NRC regulations, and Title 10, "Energy," in the *Code of Federal Regulations* may also be purchased from one of these two sources.

1. **The Superintendent of Documents**
   U.S. Government Publishing Office
   Mail Stop IDCC
   Washington, DC 20402-0001
   Internet: bookstore.gpo.gov
   Telephone: (202) 512-1800
   Fax: (202) 512-2104

2. **The National Technical Information Service**
   5301 Shawnee Rd., Alexandria, VA 22312-0002
   www.ntis.gov
   1-800-553-6847 or, locally, (703) 605-6000

A single copy of each NRC draft report for comment is available free, to the extent of supply, upon written request as follows:

Address: **U.S. Nuclear Regulatory Commission**
Office of Administration
Publications Branch
Washington, DC 20555-0001
E-mail: distribution.resource@nrc.gov
Facsimile: (301) 415-2289

Some publications in the NUREG series that are posted at NRC's Web site address www.nrc.gov/reading-rm/doc-collections/nuregs are updated periodically and may differ from the last printed version. Although references to material found on a Web site bear the date the material was accessed, the material available on the date cited may subsequently be removed from the site.

**Non-NRC Reference Material**

Documents available from public and special technical libraries include all open literature items, such as books, journal articles, transactions, *Federal Register* notices, Federal and State legislation, and congressional reports. Such documents as theses, dissertations, foreign reports and translations, and non-NRC conference proceedings may be purchased from their sponsoring organization.

Copies of industry codes and standards used in a substantive manner in the NRC regulatory process are maintained at—

**The NRC Technical Library**
Two White Flint North
11545 Rockville Pike
Rockville, MD 20852-2738

These standards are available in the library for reference use by the public. Codes and standards are usually copyrighted and may be purchased from the originating organization or, if they are American National Standards, from—

**American National Standards Institute**
11 West 42nd Street
New York, NY 10036-8002
www.ansi.org
(212) 642-4900

Legally binding regulatory requirements are stated only in laws; NRC regulations; licenses, including technical specifications; or orders, not in NUREG-series publications. The views expressed in contractorprepared publications in this series are not necessarily those of the NRC.

The NUREG series comprises (1) technical and administrative reports and books prepared by the staff (NUREG–XXXX) or agency contractors (NUREG/CR–XXXX), (2) proceedings of conferences (NUREG/CP–XXXX), (3) reports resulting from international agreements (NUREG/IA–XXXX), (4) brochures (NUREG/BR–XXXX), and (5) compilations of legal decisions and orders of the Commission and Atomic and Safety Licensing Boards and of Directors' decisions under Section 2.206 of NRC's regulations (NUREG–0750).

U.S.NRC
United States Nuclear Regulatory Commission
*Protecting People and the Environment*

NUREG-0713
Vol. 35

# Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities 2013

## Forty-Sixth Annual Report

Manuscript Completed: April 2015
Date Published: December 2015

Prepared by
L.A. Benevides
T.A. Brock
D.A. Hagemeyer*
Y.U. McCormick*

*ORAU
1299 Bethel Valley Road, SC-200, MS-21
Oak Ridge, TN 37830

Office of Nuclear Regulatory Research

# PREVIOUS REPORTS IN THIS SERIES

WASH-1311 A Compilation of Occupational Radiation Exposure from Light Water Cooled Nuclear Power Plants, 1969–1973, U.S. Atomic Energy Commission, May 1974.
NUREG-75/032 Occupational Radiation Exposure at Light Water Cooled Power Reactors, 1969–1974, U.S. Nuclear Regulatory Commission, June 1975.
NUREG-0109 Occupational Radiation Exposure at Light Water Cooled Power Reactors, 1969–1975, U.S. Nuclear Regulatory Commission, August 1976.
NUREG-0323 Occupational Radiation Exposure at Light Water Cooled Power Reactors, 1969–1976, U.S. Nuclear Regulatory Commission, March 1978.
NUREG-0482 Occupational Radiation Exposure at Light Water Cooled Power Reactors, 1977, U.S. Nuclear Regulatory Commission, May 1979.
NUREG-0594 Occupational Radiation Exposure at Commercial Nuclear Power Reactors, 1978, U.S. Nuclear Regulatory Commission, November 1979.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors, 1979, Vol. 1, U.S. Nuclear Regulatory Commission, March 1981.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors, 1980, Vol. 2, U.S. Nuclear Regulatory Commission, December 1981.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors, 1981, Vol. 3, U.S. Nuclear Regulatory Commission, November 1982.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors, 1982, Vol. 4, U.S. Nuclear Regulatory Commission, December 1983.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors, 1983, Vol. 5, U.S. Nuclear Regulatory Commission, March 1985.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 1984, Vol. 6, U.S. Nuclear Regulatory Commission, October 1986.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 1985, Vol. 7, U.S. Nuclear Regulatory Commission, April 1988.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 1986, Vol. 8, U.S. Nuclear Regulatory Commission, August 1989.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 1987, Vol. 9, U.S. Nuclear Regulatory Commission, November 1990.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 1988, Vol. 10, U.S. Nuclear Regulatory Commission, July 1991.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 1989, Vol. 11, U.S. Nuclear Regulatory Commission, April 1992.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 1990, Vol. 12, U.S. Nuclear Regulatory Commission, January 1993.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 1991, Vol. 13, U.S. Nuclear Regulatory Commission, July 1993.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 1992, Vol. 14, U.S. Nuclear Regulatory Commission, December 1993.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 1993, Vol. 15, U.S. Nuclear Regulatory Commission, January 1995.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 1994, Vol. 16, U.S. Nuclear Regulatory Commission, January 1996.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 1995, Vol. 17, U.S. Nuclear Regulatory Commission, January 1997.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 1996, Vol. 18, U.S. Nuclear Regulatory Commission, February 1998.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 1997, Vol. 19, U.S. Nuclear Regulatory Commission, November 1998.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 1998, Vol. 20, U.S. Nuclear Regulatory Commission, November 1999.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 1999, Vol. 21, U.S. Nuclear Regulatory Commission, October 2000.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 2000, Vol. 22, U.S. Nuclear Regulatory Commission, September 2001.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 2001, Vol. 23, U.S. Nuclear Regulatory Commission, September 2002.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 2002, Vol. 24, U.S. Nuclear Regulatory Commission, October 2003.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 2003, Vol. 25, U.S. Nuclear Regulatory Commission, October 2004.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 2004, Vol. 26, U.S. Nuclear Regulatory Commission, December 2005.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 2005, Vol. 27, U.S. Nuclear Regulatory Commission, December 2006.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 2006, Vol. 28, U.S. Nuclear Regulatory Commission, November 2007.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 2007, Vol. 29, U.S. Nuclear Regulatory Commission, December 2008.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 2008, Vol. 30, U.S. Nuclear Regulatory Commission, December 2009.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 2009, Vol. 31, U.S. Nuclear Regulatory Commission, April 2011.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 2010, Vol. 32, U.S. Nuclear Regulatory Commission, May 2012.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 2011, Vol. 33, U.S. Nuclear Regulatory Commission, April 2013.
NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities, 2012, Vol. 34, U.S. Nuclear Regulatory Commission, April 2014.

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

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

# ABSTRACT

This report summarizes the occupational exposure data that are maintained in the U.S. Nuclear Regulatory Commission (NRC) Radiation Exposure Information and Reporting System (REIRS) database. The bulk of the information contained in this report was compiled from the 2013 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 2013 were received from a total of **189** NRC licensees from the five categories described above. The summation of reports submitted by the **189** licensees indicated that **184,907** individuals were monitored, **74,054** of whom received a measurable dose (Table 3.1). When adjusted for transient individuals, there were actually **135,681** unique individuals that were monitored, **57,115** of whom received a measurable dose (see Section 5).

The collective dose incurred by these individuals was **8,747** person-rems (87,470 person-millisieverts [mSv]), which represents a **13 percent decrease** from the 2012 value. This decrease was primarily due to a **16 percent decrease** in the collective dose for commercial nuclear power reactor licensees (operating commercial nuclear power reactors decreased from 104 to 100) and a decrease in the collective dose for fuel fabrication licensees (fuel fabrication licensees decreased from 9 to 8). The number of individuals receiving a measurable dose decreased by **14 percent** from the 2012 value. When adjusted for transients, the average measurable dose of 0.15 rem (1.5 mSv) for 2013 is a 6 percent decrease from the 2012 value. The average measurable dose is defined as the total effective dose equivalent (TEDE) divided by the number of individuals receiving a measurable dose.

In calendar year 2013, the average annual collective dose per reactor for light-water reactor (LWR) licensees was **68** person-rems (**680** person-mSv). This represents a **12 percent decrease** from the value reported for 2012 (77 person-rems) (770 person-mSv). The total outage hours at commercial nuclear power plants decreased by 15 percent from 2012 to 2013 [Ref. 1], and there was a significant decrease in collective dose for this licensee category. It is important to note that, for the first time in 15 years, there were fewer than 104 operating commercial nuclear power plants reporting. Four pressurized-water reactor nuclear plants shut down during 2013 (Crystal River, Kewaunee, and San Onofre 2 and 3) and are not included in this analysis. The average annual collective dose per reactor was **127** person-rems (**1,270** person-mSv) for **35** for boiling-water reactors and **35** person-rems (**350** person-mSv) for **65** pressurized-water reactors.

There were **29,683** 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.

[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.

# EDITOR'S NOTE

Staff in the Offices of Nuclear Reactor Regulation, Nuclear Material Safety and Safeguards, New Reactors, and Nuclear Regulatory Research assisted in the preparation of this NUREG, serving as technical reviewers. The NRC welcomes responses from readers.

Comments should be directed to:

Terry Brock
REIRS Project Manager
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, DC 20555
Phone: 301-415-1793
E-mail Address: Terry.Brock@nrc.gov

Luis Benevides
REIRS Point of Contact
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, DC 20555
Phone: 301-415-2457
E-mail Address: Luis.Benevides@nrc.gov

**Paperwork Reduction Act Statement**

This NUREG contains and references information collection requirements that are subject to the Paperwork Reduction Act of 1995 (44 U.S.C. 3501 et seq.). Existing requirements were approved by the Office of Management and Budget, approval numbers 3150-0014 and 3150-0006.

**Public Protection Notification**

The NRC may not conduct or sponsor, and a person is not required to respond to, a request for information or an information collection requirement unless the requesting document displays a currently valid OMB control number.

# 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 35, summarizes the 2013 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; 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 189 licensees.

The data submitted by licensees consist of radiation exposure records for each monitored individual. In 2013, 135,681 individuals were monitored and 57,115 received a measurable dose when adjusted for transient individuals who worked at two or more facilities during the year. This report analyzes and presents these records in terms of collective dose and the distribution of dose among the monitored individuals. During 2013, these individuals incurred a collective dose of 8,747 person-rems (87,470 person-millisieverts (mSv)), which represents a 13 percent decrease from the 2012 value of 10,103 person-rems (101,030 person-mSv). This decrease was primarily due to a 16 percent decrease in the collective dose for commercial nuclear power reactor licensees (operating commercial nuclear power reactors decreased from 104 to 100) and a decrease in the collective dose for fuel fabrication licensees (fuel fabrication licensees decreased from 9 to 8). The average measurable dose is the total collective dose divided by the number of individuals receiving a measurable dose. Both the collective dose and the number of individuals receiving a measurable dose decreased from 2012 to 2013, resulting in the average measurable dose decreasing to 0.15 rem (1.5 mSv) in 2013 when adjusted for transient workers. This value can be compared with the 0.31 rem (3.1 mSv) [Ref. 2] that the average person in the United States receives annually from natural background radiation. Worldwide annual exposures to natural background radiation are generally expected to be in the range of 0.1 rem (1 mSv) to 1.3 rems (13 mSv), with 0.24 rem (2.4 mSv) [Ref. 3] being the current average worldwide value.

# 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. 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 as one of the metrics of the NRC Reactor Oversight Program to evaluate the effectiveness of the licensees' ALARA programs and also for inspection planning purposes.

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.

9. The data are also used in the evaluation of the NRC radiation protection standards with respect to adopting the recommendations described in ICRP Publication 103 of the International Commission on Radiological Protection [Ref. 4].

# CONTENTS

Page

# LIST OF FIGURES

# LIST OF TABLES

# ABBREVIATIONS

| | |
|---|---|
| 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 |
| 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-yr | megawatt-year |
| NEA | Nuclear Energy Agency |
| NMSS | Office of Nuclear Material Safety and Safeguards |
| NRC | U.S. Nuclear Regulatory Commission |
| 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 maximum extremity |
| SDE-WB | shallow dose equivalent whole body |
| SG | steam generator |
| SI | international system of units |
| Sv | sieverts |
| TEDE | total effective dose equivalent |
| TMI | Three Mile Island |
| TODE | total organ dose equivalent |
| $UF_6$ | uranium hexafluoride |

# *Section 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 Analysis within the Office of Environment, Health, Safety and Security in Germantown, MD.

[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.

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 (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 at 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. 5–13]. These documents are available for viewing at all NRC public document rooms, as well as on the NRC public Web site (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. The Radiation Exposure Monitoring and Information Transmittal System, a software application designed to maintain licensee dose records, and REIRView, a software package designed to validate a licensee’s annual data submittal, are also 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

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

The NRC radiation exposure information Web URL is

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

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

**Terry Brock**
**REIRS Project Manager**
**Office of Nuclear Regulatory Research**
**U.S. Nuclear Regulatory Commission**
**Washington, DC 20555**
**Phone: 301-415-1793**
**E-mail Address: Terry.Brock@nrc.gov**

**Luis Benevides**
**REIRS Point of Contact**
**Office of Nuclear Regulatory Research**
**U.S. Nuclear Regulatory Commission**
**Washington, DC 20555**
**Phone: 301-415-2457**
**E-mail Address: Luis.Benevides@nrc.gov**

# *Section 2*
# Limitations of the Data

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, is sufficient to characterize the radiation exposure incident to individuals' work and is used in evaluating the radiation protection program.

Monitoring requirements are specified in 10 CFR 20.1502, which requires licensees to monitor individuals who receive or are likely to receive, in 1 year, a dose in excess of 10 percent of the applicable limits and all individuals entering a high or very high radiation area. For occupational individuals, the annual limit for the whole body is 5 rems, so 0.5 rem per year is the level above which monitoring is required. 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 clerical 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 Section 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 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 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.

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

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 Facilities, 1997–2010,"* provides information regarding occupational radiation exposures at Agreement State-licensed facilities.

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

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, 2013."

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 = $3.7 \times 10^{10}$ becquerel

# Section 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 for each of the seven[1] categories that are required to report pursuant to 10 CFR 20.2206. The third column in Table 3.1 shows the number of licensees that have filed such reports during the 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 manufacturing and distribution 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 manufacturing and distribution 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 2013.

### 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, as well as visitors, service representatives, contract individuals, and clerical 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; 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 2003–2013

| 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** | 2003 | 118 | 3,115 | 2,651 | 1,584.249 | 0.51 | 0.60 |
| | 2004 | 113 | 3,568 | 3,014 | 1,603.591 | 0.45 | 0.53 |
| | 2005 | 90 | 3,009 | 2,623 | 1,504.575 | 0.50 | 0.57 |
| **03310** | 2006 | 79 | 2,395 | 1,985 | 1,109.466 | 0.46 | 0.56 |
| **03320** | 2007 | 75 | 2,615 | 2,228 | 1,315.590 | 0.50 | 0.59 |
| | 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 | 59 | 2,848 | 2,440 | 1,521.881 | 0.53 | 0.62 |
| **Manufacturing and Distribution** | 2003 | 33 | 2,372 | 1,796 | 436.660 | 0.18 | 0.24 |
| | 2004 | 28 | 2,539 | 1,787 | 347.258 | 0.14 | 0.19 |
| | 2005 | 23 | 2,566 | 1,557 | 388.547 | 0.15 | 0.25 |
| | 2006 | 22 | 1,256 | 795 | 273.028 | 0.22 | 0.34 |
| **02500** | 2007 | 23 | 2,106 | 1,463 | 291.326 | 0.14 | 0.20 |
| **03211** | 2008 | 18 | 1,934 | 1,341 | 222.123 | 0.11 | 0.17 |
| **03212** | 2009 | 17 | 1,939 | 1,388 | 179.539 | 0.09 | 0.13 |
| **03214** | 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 |
| **Independent Spent Fuel Storage** | 2003 | 2 | 55 | 46 | 2.791 | 0.05 | 0.06 |
| | 2004 | 1 | 37 | 27 | 1.257 | 0.03 | 0.05 |
| | 2005 | 2 | 59 | 30 | 0.769 | 0.01 | 0.03 |
| | 2006 | 2 | 59 | 26 | 2.108 | 0.04 | 0.08 |
| **23100** | 2007 | 2 | 57 | 26 | 1.697 | 0.03 | 0.07 |
| **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 |
| **Fuel Cycle Licenses - Fabrication Processing and Uranium Enrichment and $UF_6$ Production Plants** | 2003 | 9 | 8,103 | 3,986 | 676.082 | 0.08 | 0.17 |
| | 2004 | 9 | 8,060 | 4,283 | 657.799 | 0.08 | 0.15 |
| | 2005 | 10 | 8,215 | 3,839 | 643.631 | 0.08 | 0.17 |
| | 2006 | 10 | 8,097 | 4,017 | 677.025 | 0.08 | 0.17 |
| | 2007 | 10 | 8,402 | 4,007 | 588.837 | 0.07 | 0.15 |
| **11400** | 2008 | 10 | 7,807 | 3,424 | 538.201 | 0.07 | 0.16 |
| | 2009 | 11 | 8,918 | 3,738 | 533.721 | 0.06 | 0.14 |
| **21200** | 2010 | 11 | 9,362 | 4,212 | 541.876 | 0.06 | 0.13 |
| **21210** | 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 |
| **Commercial Light-Water Reactors (LWRs) **** | 2003 | 104 | 152,702 | 74,813 | 11,955.570 | 0.08 | 0.16 |
| | 2004 | 104 | 150,322 | 69,849 | 10,367.897 | 0.07 | 0.15 |
| | 2005 | 104 | 160,701 | 78,127 | 11,455.807 | 0.07 | 0.15 |
| | 2006 | 104 | 164,823 | 80,265 | 11,021.186 | 0.07 | 0.14 |
| **41111** | 2007 | 104 | 164,081 | 79,530 | 10,120.013 | 0.06 | 0.13 |
| | 2008 | 104 | 169,324 | 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 | 173,536 | 67,027 | 6,752.129 | 0.04 | 0.10 |
| **Grand Totals and Averages** | 2003 | 266 | 166,347 | 83,292 | 14,655.352 | 0.09 | 0.18 |
| | 2004 | 255 | 164,526 | 78,960 | 12,977.802 | 0.08 | 0.16 |
| | 2005 | 229 | 174,550 | 86,176 | 13,993.329 | 0.08 | 0.16 |
| | 2006 | 217 | 176,630 | 87,088 | 13,082.813 | 0.07 | 0.15 |
| | 2007 | 214 | 177,261 | 87,254 | 12,317.463 | 0.07 | 0.14 |
| | 2008 | 196 | 182,094 | 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 | 189 | 184,907 | 74,054 | 8,747.160 | 0.05 | 0.12 |

* 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. Reactor data have not been corrected to account for the multiple counting of transient reactor workers (see Section 5).

### 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 2013 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 three individuals exceeded 4 rems in 2013. Ninety-one percent of the reported individuals with measurable doses (shown in Table 3.2) were monitored by commercial nuclear power reactors in 2013, where they received 77 percent of the total collective dose.

## 3.3 Summary of Occupational Dose Data by License Category

### 3.3.1 Industrial Radiography Licensees—Fixed Locations 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 59 radiography licensees in 2013. Table 3.3 summarizes the reported data for the two types of industrial radiography licensees for 2011, 2012, and 2013 for comparison purposes.

The average measurable dose for individuals performing radiography at a fixed location ranged from 11 percent to 13 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. Although these licensed activities usually result in average measurable doses that are higher than those received by other licensees, they involve a relatively small number of exposed individuals.

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 2013. From 2012 to 2013, there was a 7 percent increase in the number of individuals with measurable TEDE and a slight 1 percent increase in the collective TEDE with a 6 percent decrease in the average measurable TEDE. As shown in Table 3.3, the total number of licensees reporting for fixed location and temporary job site radiography licensees decreased by 12 percent in 2013.

## Table 3.2 Distribution of Annual Collective TEDE by License Category 2013

| License Category (Number of sites reporting) | Number of Individuals with TEDE in the Ranges (rem) * | | | | | | | | | | | | | Total Number Monitored | Number with Meas. Dose | Total Collective Dose (TEDE) (person-rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No meas. | Meas. <0.1 | 0.10-0.25 | 0.25-0.50 | 0.50-0.75 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.00-5.00 | 5.00-6.00 | 6.00-12.00 | >12 | | | |
| **INDUSTRIAL RADIOGRAPHY** | | | | | | | | | | | | | | | | |
| Fixed Locations (4) | 6 | 11 | 8 | - | - | - | - | - | - | - | | | | 25 | 19 | 1.541 |
| Temporary Job Sites (55) | 402 | 542 | 330 | 440 | 367 | 209 | 415 | 97 | 18 | 3 | - | | | 2,823 | 2,421 | 1,520.340 |
| **Total (59)** | **408** | **553** | **338** | **440** | **367** | **209** | **415** | **97** | **18** | **3** | **-** | **-** | **-** | **2,848** | **2,440** | **1,521.881** |
| **MANUFACTURING AND DISTRIBUTION** | | | | | | | | | | | | | | | | |
| Type "A" Broad (2) | 98 | 128 | 56 | 48 | 33 | 11 | 17 | - | | | | | | 391 | 293 | 84.152 |
| Type "B" Broad and Other (3) | 28 | 14 | 1 | 2 | 1 | - | - | - | - | | | | | 46 | 18 | 1.747 |
| Nuclear Pharmacies (15) | 241 | 253 | 34 | 16 | 8 | 1 | 4 | - | - | - | | | | 557 | 316 | 28.651 |
| **Total (20)** | **367** | **395** | **91** | **66** | **42** | **12** | **21** | **-** | **-** | **-** | **-** | **-** | **-** | **994** | **627** | **114.550** |
| **INDEPENDENT SPENT FUEL STORAGE** | | | | | | | | | | | | | | | | |
| **Total (2)** | **35** | **12** | **3** | **3** | | | | | | | | | | **53** | **18** | **1.533** |
| **FUEL CYCLE **** | | | | | | | | | | | | | | | | |
| **Total (8)** | **3,534** | **2,918** | **577** | **338** | **90** | **18** | **1** | **-** | **-** | **-** | **-** | **-** | **-** | **7,476** | **3,942** | **357.067** |
| **COMMERCIAL POWER REACTORS ***** | | | | | | | | | | | | | | | | |
| Boiling Water (35) | 33,931 | 23,359 | 7,682 | 3,711 | 1,032 | 355 | 165 | - | | | | | | 70,235 | 36,304 | 4,451.852 |
| Pressurized Water (65) | 72,578 | 23,622 | 5,476 | 1,377 | 195 | 25 | 26 | 2 | | | | | | 103,301 | 30,723 | 2,300.277 |
| **Total (100)** | 106,509 | 46,981 | 13,158 | 5,088 | 1,227 | 380 | 191 | 2 | - | - | - | - | - | 173,536 | 67,027 | 6,752.129 |
| **GRAND TOTALS** | **110,853** | **50,859** | **14,167** | **5,935** | **1,726** | **619** | **628** | **99** | **18** | **3** | **-** | **-** | **-** | **184,907** | **74,054** | **8,747.160** |

* 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 2013. Although Brown's Ferry 1 was placed on administrative hold in 1985, it remains in the count of operating reactors and has resumed operation as of June 2007. These values have not been adjusted for the multiple counting of transient reactor workers (see Section 5).

**Table 3.3 Annual Exposure Information for Industrial Radiography Licensees 2011–2013**

| Year | Type of License | Number of Licensees | Number of Monitored Individuals | Individuals with Measurable Dose | Collective Dose (person-rem) | Average Measurable Dose (rem) |
|---|---|---|---|---|---|---|
| 2011 | Fixed Location | 4 | 88 | 19 | 1.435 | 0.08 |
| | Temporary Job Sites | 60 | 2,457 | 2,191 | 1,607.386 | 0.73 |
| | **Total** | **64** | **2,545** | **2,210** | **1,608.821** | **0.73** |
| 2012 | Fixed Location | 3 | 16 | 13 | 1.117 | 0.09 |
| | Temporary Job Sites | 64 | 2,654 | 2,262 | 1,507.675 | 0.67 |
| | **Total** | **67** | **2,670** | **2,275** | **1,508.792** | **0.66** |
| 2013 | Fixed Location | 4 | 25 | 19 | 1.541 | 0.08 |
| | Temporary Job Sites | 55 | 2,823 | 2,421 | 1,520.340 | 0.63 |
| | **Total** | **59** | **2,848** | **2,440** | **1,521.881** | **0.62** |

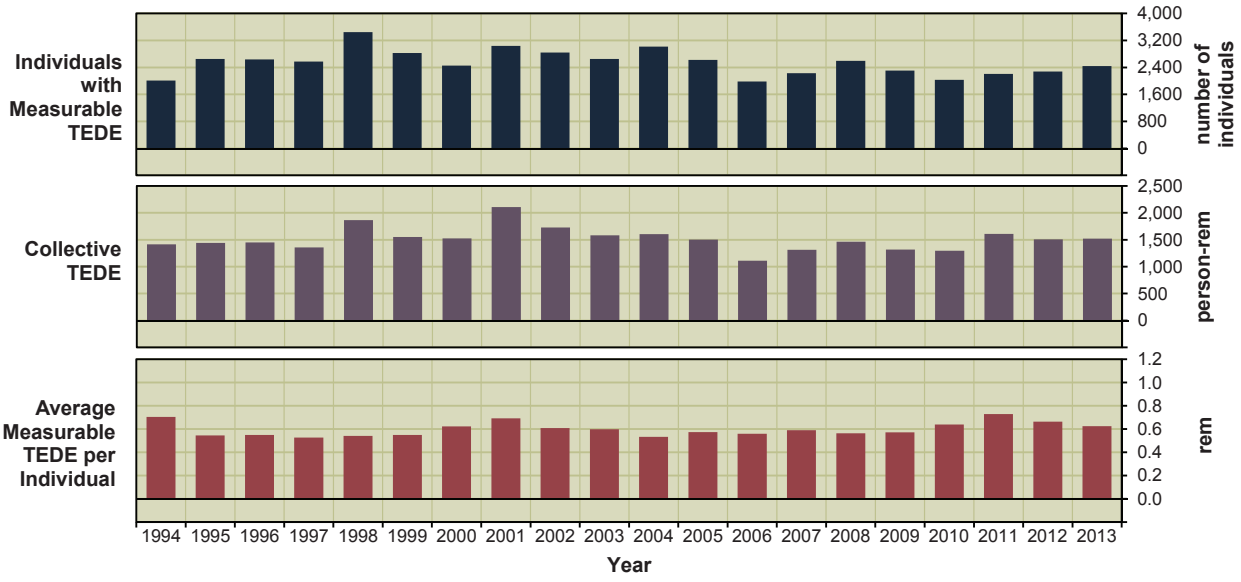



**Figure 3.1 Average annual values for industrial radiography licensees 1994–2013**

### 3.3.2 Manufacturing and Distribution Licensees—Type "A" Broad, Type "B" Broad and Other, and Nuclear Pharmacies

Manufacturing and distribution (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. Type "A" Broad licenses are issued to larger organizations that may use many different radionuclides in many different ways and that have a comprehensive radiation protection program. Some Type "A"

Broad 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. Type "B" Broad and Other firms are suppliers of industrial radionuclides and are involved in the processing, encapsulation, packaging, and distribution of the radionuclides that they have purchased in bulk quantities from production reactors and cyclotrons. Major products include gamma radiography sources, cobalt irradiation sources, well-logging sources, sealed sources for gauges and smoke detectors, and radiochemicals for nonmedical research. 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 2011, 2012, and 2013. It can be seen that the average measurable dose is generally higher for the Type "A" Broad licensees. Only two Type "A" Broad licensees and three Type "B" Broad and Other licensees reported in 2013.

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 Type "A" Broad, Type "B" Broad and Other, and Nuclear Pharmacy licensees. The number of individuals with a measurable dose decreased by 12 percent because fewer Nuclear Pharmacies reported in 2013. The collective TEDE decreased 4 percent in 2013. In turn, the average measurable dose increased by 6 percent from 0.17 rem to 0.18 rem, due to the moderate decrease in the number of individuals with a measurable dose.

The values for Type "A" Broad licensees are attributed to Mallinckrodt, Inc. and International Isotopes Idaho, Inc., which accounted for 73 percent of the total collective dose in 2013 for this licensee category.

**Table 3.4 Annual Exposure Information for Manufacturing and Distribution Licensees 2011–2013**

| Year | Type of License | Number of Licensees | Number of Monitored Individuals | Individuals with Measurable Dose | Collective Dose (person-rem) | Average Measurable Dose (rem) |
|---|---|---|---|---|---|---|
| 2011 | M & D - Type "A" Broad | 2 | 403 | 359 | 83.563 | 0.23 |
| | M & D - Type "B" Broad and Other | 1 | 18 | 4 | 1.328 | 0.33 |
| | M & D - Nuclear Pharmacies | 13 | 482 | 339 | 27.132 | 0.08 |
| | **Total – Combined Categories** | **16** | **903** | **702** | **112.023** | **0.16** |
| 2012 | M & D - Type "A" Broad | 2 | 417 | 344 | 85.119 | 0.25 |
| | M & D - Type "B" Broad and Other | 2 | 47 | 24 | 2.570 | 0.11 |
| | M & D - Nuclear Pharmacies | 18 | 593 | 345 | 31.020 | 0.09 |
| | **Total – Combined Categories** | **22** | **1,057** | **713** | **118.709** | **0.17** |
| 2013 | M & D - Type "A" Broad | 2 | 391 | 293 | 84.152 | 0.29 |
| | M & D - Type "B" Broad and Other | 3 | 46 | 18 | 1.747 | 0.10 |
| | M & D - Nuclear Pharmacies | 15 | 557 | 316 | 28.651 | 0.09 |
| | **Total – Combined Categories** | **20** | **994** | **627** | **114.550** | **0.18** |

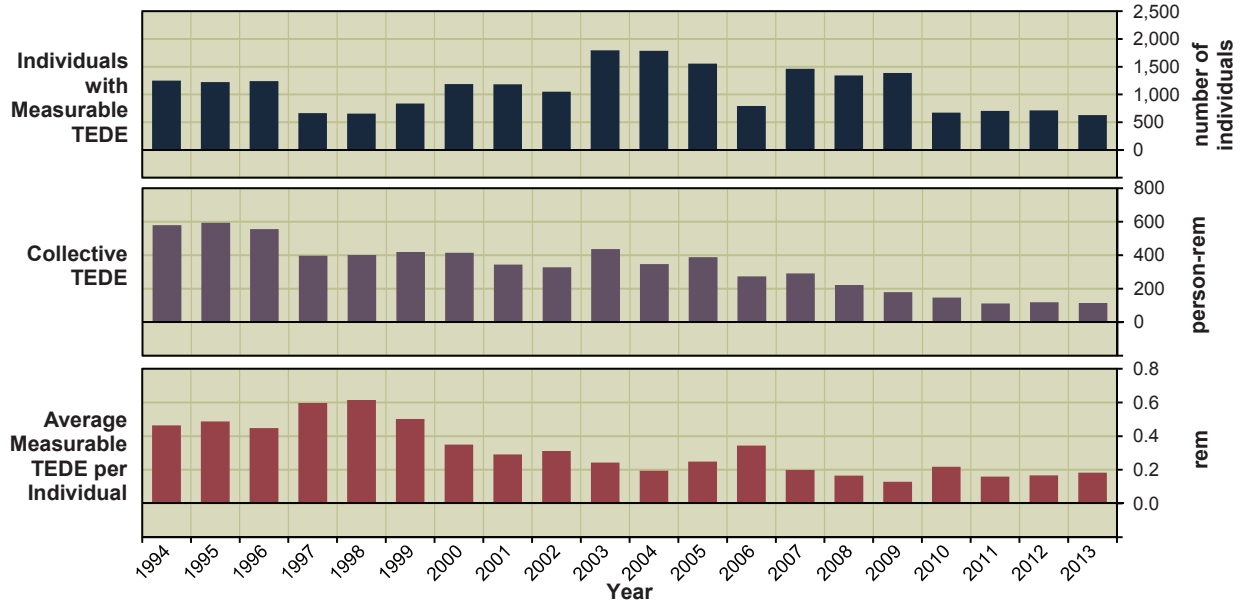



**Figure 3.2 Average annual values for manufacturing and distribution licensees 1994–*2013***

### 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 such places 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's 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. In 2013, 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 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 increased by 20 percent, while the collective TEDE increased by 39 percent, from 2012 to 2013. The effect of more individuals with a measurable dose and a moderate increase in collective TEDE caused the average measurable dose to increase by 29 percent from 0.07 rem to 0.09 rem.

### 3.3.5 Fuel Cycle Licensees

Fuel cycle licenses are issued to allow the processing, enrichment, and fabrication of reactor fuels. In most uranium facilities where light-water reactor (LWR) fuels are fabricated, enriched uranium hexafluoride ($UF_6$) is converted to solid uranium dioxide pellets and inserted into zirconium alloy tubes. The tubes are fabricated into fuel assemblies that are shipped to commercial nuclear

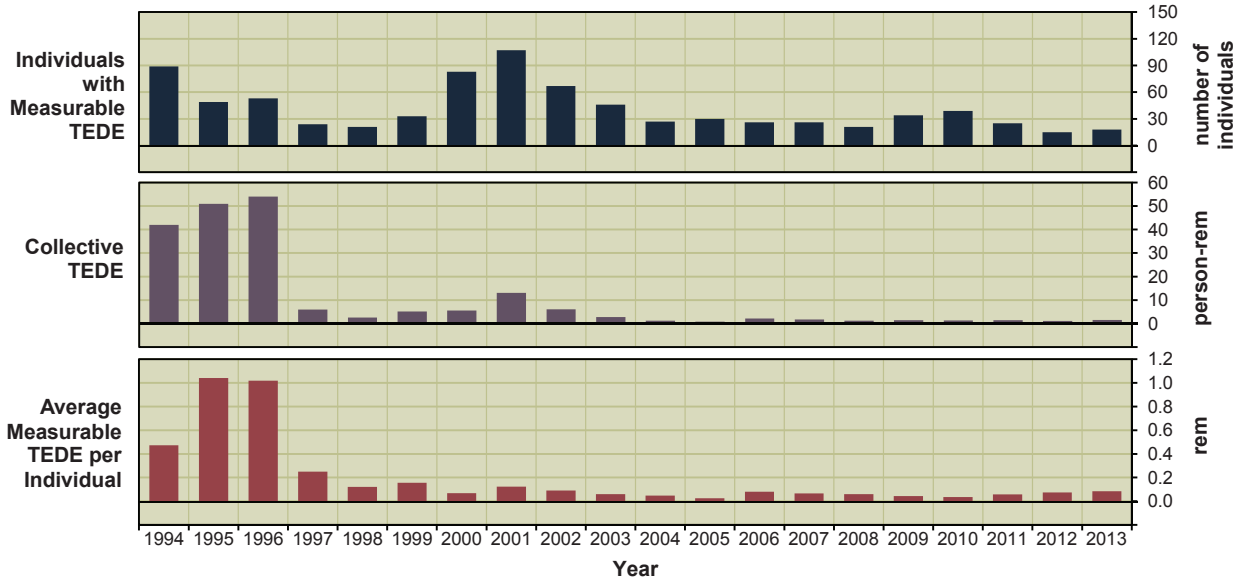



**Figure 3.3 Average annual values for independent spent fuel storage installation licensees 1994–2013**

power reactors. Some facilities also perform chemical operations to recover the uranium from scrap and other off-specification materials before the disposal of these materials. In the fourth quarter of 2011, AREVA NP's license number was terminated, and this facility now reports to the Commonwealth of Virginia under the Agreement States requirements. In 2012, the regulatory oversight for the uranium enrichment facility at Portsmouth, OH, was returned to DOE and is no longer included in this report. And in 2013, the Louisiana Energy Services, LLC, facility stated that it is no longer required to report.

For the 2010 report, the NRC decided to add Honeywell International, Inc., a $UF_6$ production plant, to the analysis of fuel cycle licensees. The data for Honeywell from 2000 through 2013 have been added to the tables and figures in this report. Honeywell has reported under its license for $UF_6$ production since 1994, but this activity was not included under the fuel cycle category until 2010, so the addition of this licensee does not represent any change other than the inclusion in the fuel cycle category in this report.

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 are a significant contribution to the TEDE for fuel fabrication facilities.

As shown in Table 3.5, the collective TEDE, DDE, and CEDE each decreased by 19 percent, 7 percent, and 29 percent, respectively, from 2012. Table 3.5 shows that there were eight licensed fuel cycle (fabrication processing, uranium enrichment, and $UF_6$ production) facilities reporting in 2013.

### 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, and average dose per individual for reactor facilities that were in commercial operation for at least 1 full year for each of the years 2003 through 2013. 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 2013 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.

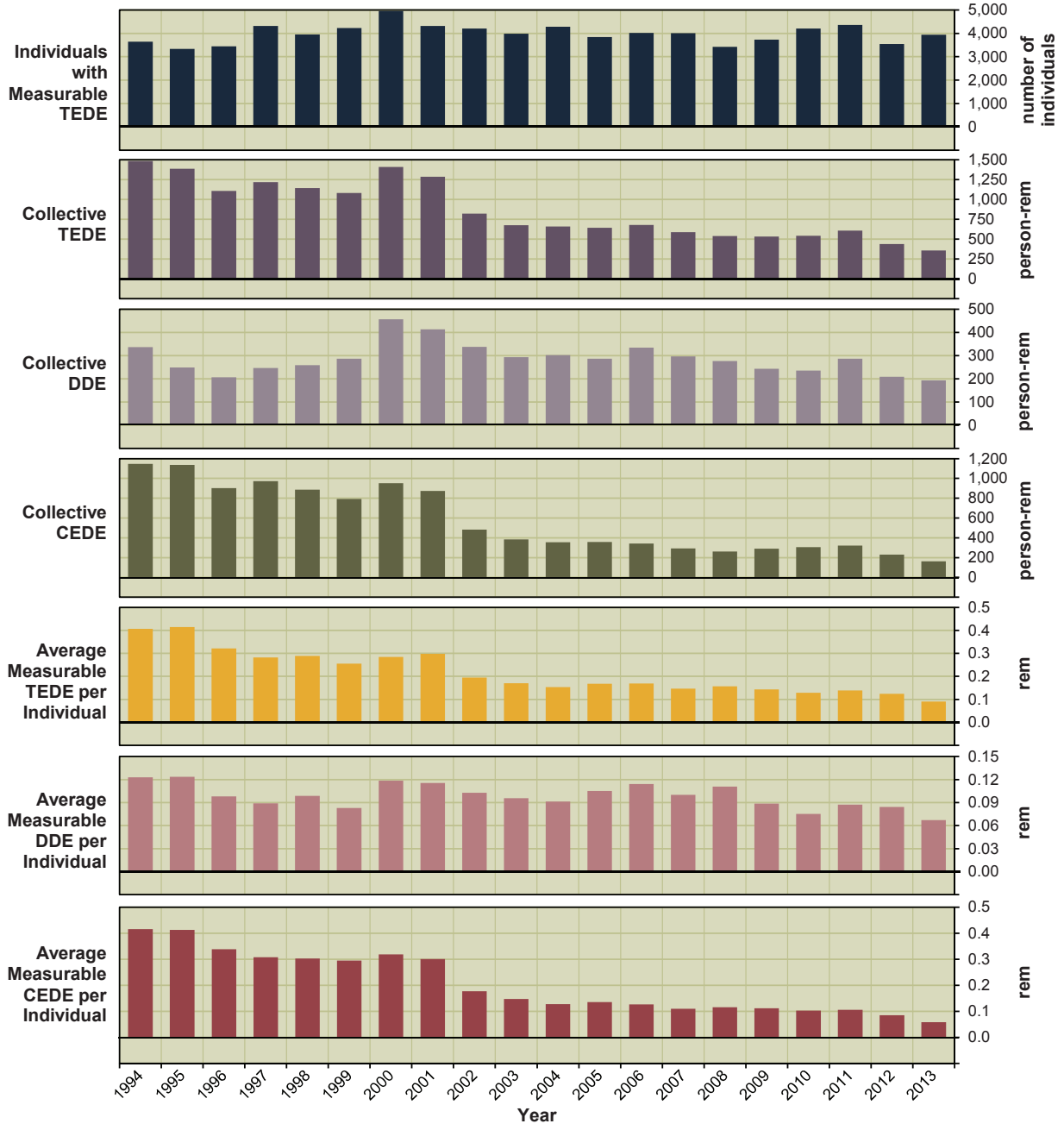



**Figure 3.4 Average annual values for fuel cycle licensees 1994–2013**

**Table 3.5 Annual Exposure Information for Fuel Cycle Licensees* 2011–2013**

| 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) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2011 | Fuel Cycle | 11 | 9,535 | 4,361 | 607.202 | 0.14 | 3,282 | 286.500 | 0.09 | 3,022 | 320.700 | 0.11 |
| 2012 | Fuel Cycle | 9 | 7,388 | 3,541 | 438.729 | 0.12 | 2,471 | 208.246 | 0.08 | 2,709 | 230.481 | 0.09 |
| 2013 | Fuel Cycle | 8 | 7,476 | 3,942 | 357.067 | 0.09 | 2,883 | 193.436 | 0.07 | 2,793 | 163.630 | 0.06 |

* All data for this table include program code 11400 for $UF_6$ Production Plants that have not been included in previous years for this table.

### 3.3.7 Other Facilities Reporting to NRC

Appendix A, Table A2, contains additional facilities that provided occupational radiation dose reports to the NRC in 2013. These facilities are not among the seven categories of licensees required to report under 10 CFR 20.2206 and are not included in the analysis 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 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 2013. 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 and injection through a puncture or wound.

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. 16], which is described in 10 CFR Part 20, or

**Table 3.6 Intake by Licensee Category and Radionuclide Mode of Intake—Ingestion and Other 2013**

| Mode | Licensee Category | Program Code | Radionuclide | Number of Intake Records | Collective Intake in Microcuries (sci. notation) |
|---|---|---|---|---|---|
| Ingestion | Nuclear Power Reactor | 41111 | Am-241 | 1 | 1.51E-06 |
| | | 41111 | Cm-243 | 1 | 2.37E-06 |
| | | 41111 | Co-60 | **3** | **6.03E-01** |
| | | 41111 | Fe-55 | 1 | 4.60E-02 |
| | | 41111 | Pu-238 | 1 | 5.28E-06 |
| | | 41111 | Pu-239 | 1 | 2.21E-06 |

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

ICRP Publication 68 (F, M, S) [Ref. 17]. Licensees that use the methodology described in ICRP Publication 30 use D, W, and Y pulmonary 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. Fuel fabrication facilities and the $UF_6$ production facility had the majority of internal doses (99 percent) in 2013. The highest $UF_6$ production facility had a collective dose of 24.214 person-rems with an average of 25 mrems per individual. The highest fuel fabrication licensee had a collective dose of 52.688 person-rems and an average of 153 mrems per individual. This is due to the exposure of individuals to uranium during the processing and fabrication of the uranium fuel.

Table 3.9 shows the distribution of internal doses (CEDE) from 1994 to 2013 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 2013, the collective CEDE decreased by 29 percent from 2012; however, the number of individuals with a measurable CEDE increased by a slight 1 percent. The majority of the decrease in collective CEDE in the past year is due to the significant (72 percent) decrease in collective CEDE at the Honeywell $UF_6$ production facility.

## Table 3.7 Intake by Licensee Category and Radionuclide Mode of Intake—Inhalation 2013

| 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-131 | D | 4 | 2.32E-01 |
| | 02500 | I-131 | W | **41** | **9.80E+00** |
| Manufacturing and Distribution | 03211 | I-131 | D | **4** | 6.69E-01 |
| | 03211 | Mo-99 | D | 1 | 8.00E+00 |
| | 03211 | Tc-99m | D | 1 | **1.40E+01** |
| Uranium Hexafluoride ($UF_6$) Production Plants | 11400 | Ac-227 | M | 437 | 7.22E-04 |
| | 11400 | Pa-231 | M | 437 | 7.22E-04 |
| | 11400 | Pb-210 | M | 361 | 5.47E-04 |
| | 11400 | Po-210 | M | 310 | 4.28E-04 |
| | 11400 | Ra-226 | F | 2 | 2.00E-06 |
| | 11400 | Ra-226 | M | 655 | 1.77E-03 |
| | 11400 | Ra-228 | M | 288 | 3.94E-04 |
| | 11400 | Th-228 | M | 288 | 3.94E-04 |
| | 11400 | Th-230 | F | 9 | 2.80E-05 |
| | 11400 | Th-230 | M | 949 | 1.82E-02 |
| | 11400 | Th-232 | M | 288 | 3.94E-04 |
| | 11400 | U-234 | F | 11 | 2.77E-03 |
| | 11400 | U-234 | M | **989** | **1.68E+00** |
| | 11400 | U-235 | F | 11 | 1.28E-04 |
| | 11400 | U-235 | M | 980 | 7.83E-02 |
| | 11400 | U-238 | F | 11 | 2.31E-03 |
| | 11400 | U-238 | M | 987 | 1.40E+00 |
| Uranium Enrichment | 21200 | U-234 | D | **16** | **1.02E-02** |
| Fuel Fabrication | 21210 | Am-241 | M | 38 | 1.32E-04 |
| | 21210 | Pu-239 | M | 56 | 5.15E-04 |
| | 21210 | Sr-90 | S | 175 | 3.72E-01 |
| | 21210 | Th-228 | M | 39 | 8.79E-05 |
| | 21210 | Th-232 | M | 2 | 2.50E-08 |
| | 21210 | Th-232 | S | 5 | 1.66E-04 |
| | 21210 | U-234 | F | 534 | 6.74E-02 |
| | 21210 | U-234 | M | 521 | 4.19E-03 |
| | 21210 | U-234 | S | **1,595** | **2.31E+00** |
| | 21210 | U-234 | Y | 656 | 8.61E-01 |
| | 21210 | U-235 | M | 1 | 1.10E-08 |
| | 21210 | U-235 | S | 344 | 7.08E-02 |
| | 21210 | U-236 | F | 483 | 6.57E-03 |
| | 21210 | U-236 | M | 1 | 1.39E-07 |
| | 21210 | U-236 | S | 89 | 1.45E-03 |
| | 21210 | U-238 | F | 7 | 6.65E-06 |
| | 21210 | U-238 | M | 480 | 4.74E-04 |
| | 21210 | U-238 | S | 346 | 2.49E-01 |
| | 21210 | U-238 | Y | 656 | 1.43E-01 |
| Commercial Light-Water Reactors | 41111 | Co-58 | Y | **3** | **1.59E-01** |
| | 41111 | Co-60 | Y | 2 | 1.38E-01 |
| | 41111 | Co-60m | Y | 1 | 4.30E-02 |

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 2013

| Licensee Category | Licensee Name | License Number | Number with Meas. CEDE | Collective CEDE (person-rem) | Average Meas. CEDE (rem) |
|---|---|---|---|---|---|
| **MANUFACTURING AND DISTRIBUTION** | | | | | |
| 02500 | CARDINAL HEALTH | 04-26507-01MD | 3 | 0.027 | 0.009 |
| 02500 | CARDINAL HEALTH | 34-29200-01MD | **27** | **0.220** | 0.008 |
| 02500 | GE HEALTHCARE - KENTWOOD | 21-26707-01MD | 2 | 0.004 | 0.002 |
| 02500 | GE HEALTHCARE - ST. LOUIS/OVERLAND | 24-32462-01MD | 2 | 0.002 | 0.001 |
| 03211 | INTERNATIONAL ISOTOPES IDAHO INC. | 11-27680-01 | 2 | 0.011 | 0.006 |
| 03211 | MALLINCKRODT, INC. | 24-04206-01 | 3 | 0.041 | **0.014** |
| | **Totals and Averages** | | **39** | **0.305** | **0.008** |
| **$UF_6$ PRODUCTION** | | | | | |
| 11400 | HONEYWELL INTERNATIONAL, INC. | SUB-0526 | **962** | **24.214** | **0.025** |
| | **Totals and Averages** | | **962** | **24.214** | **0.025** |
| **URANIUM ENRICHMENT** | | | | | |
| 21200 | U. S. ENRICHMENT CORP. - PADUCAH | GDP-1 | **4** | **0.026** | **0.007** |
| | **Totals and Averages** | | **4** | **0.026** | **0.007** |
| **FUEL FABRICATION** | | | | | |
| 21210 | AREVA NP, INC. - RICHLAND | SNM-1227 | 234 | 47.803 | **0.204** |
| 21210 | B & W NUCLEAR OPERATIONS GROUP | SNM-0042 | 173 | 8.074 | 0.047 |
| 21210 | GLOBAL NUCLEAR FUEL - AMERICAS, LLC | SNM-1097 | 513 | 26.330 | 0.051 |
| 21210 | NUCLEAR FUEL SERVICES, INC. | SNM-0124 | **563** | 4.495 | 0.008 |
| 21210 | WESTINGHOUSE ELECTRIC COMPANY LLC | SNM-1107 | 344 | **52.688** | 0.153 |
| | **Totals and Averages** | | **1,827** | **139.390** | **0.076** |
| **COMMERCIAL LIGHT WATER REACTORS** | | | | | |
| 41111 | BROWNS FERRY | DPR-33 | 2 | 0.043 | 0.022 |
| 41111 | HUMBOLDT BAY | DPR-07 | 9 | 0.036 | 0.004 |
| 41111 | LA CROSSE | DPR-45 | 2 | 0.012 | 0.006 |
| 41111 | NINE MILE POINT | DPR-63 | 1 | 0.015 | 0.015 |
| 41111 | NORTH ANNA | NPF-04 | 1 | 0.004 | 0.004 |
| 41111 | PALO VERDE | NPF-41 | 1 | 0.006 | 0.006 |
| 41111 | PILGRIM | DPR-35 | 1 | 0.011 | 0.011 |
| 41111 | SEQUOYAH | DPR-77 | **28** | **0.704** | **0.025** |
| 41111 | SOUTH TEXAS | NPF-76 | 2 | 0.009 | 0.005 |
| 41111 | TURKEY POINT | DPR-31 | 1 | 0.007 | 0.007 |
| 41111 | WATTS BAR | NPF-90 | 3 | 0.004 | 0.001 |
| 41111 | WOLF CREEK | NPF-42 | 11 | 0.012 | 0.001 |
| 41111 | ZION | DPR-39 | 1 | 0.004 | 0.004 |
| | **Totals and Averages** | | **63** | **0.867** | **0.111** |
| **Grand Totals and Averages** | | | **2,895** | **164.802** | **0.057** |

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

## Table 3.9 Internal Dose (CEDE) Distribution 1994–2013

| Year | Number of Individuals with CEDE in the Ranges (rem) * | | | | | | | | | | Total with Meas. CEDE | Collective CEDE (person-rem) | Average Meas. CEDE (rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Meas. 0.020 | 0.020-0.100 | 0.100-0.250 | 0.250-0.500 | 0.500-0.750 | 0.750-1.000 | 1-2 | 2-3 | 3-4 | 4-5 | | | |
| 1994 | 3,425 | 577 | 287 | 683 | 237 | 141 | 293 | 69 | 2 | - | 5,714 | 1170.453 | 0.205 |
| 1995 | 2,869 | 691 | 338 | 730 | 254 | 147 | 290 | 49 | 2 | - | 5,370 | 1167.105 | 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 | 1001 | 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 | 979 | 758 | 526 | 303 | 41 | 8 | 4 | - | - | - | 2,619 | 267.510 | 0.102 |
| 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 | 1,614 | 758 | 353 | 149 | 20 | 1 | - | - | - | - | 2,895 | 164.802 | 0.057 |

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

# Section 4
# Commercial Light-Water 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, Status Summary Report* [Ref. 1].

Three Mile Island (TMI) Unit 2 was included in the compilation of data for commercially operating reactors from 1975 through 1988 and has not been included in the data analyses since 1988. TMI Unit 1 and TMI Unit 2 reported data separately beginning in 1986, but since 2001, the dose breakdowns for TMI Unit 2 have been reported with those for TMI Unit 1, as there is very little dose from activities at TMI Unit 2.

For the first time in 15 years, there was a change to the count of operating reactors in 2013. The number of operating BWRs remained the same at 35, but the number of operating PWRs decreased to 65 (from 69). Crystal River shut down in February 2013, Kewaunee closed in May 2013, and San Onofre 2 and 3 followed in June 2013. The dose information for these 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.

### 4.2.2 Electric Energy Generated

The electric energy generated in megawatt years (MW-yr) each year by each reactor is graphically represented in Appendix D. This number was obtained by dividing the megawatt hours of electricity annually produced by each facility by 8,760, the number of hours in the year, except for leap years, when the number was 8,784 hours. The number of megawatt hours of electricity produced each year was obtained from Reference 1.

## Table 4.1 Summary of Information Reported by Commercial Boiling-Water Reactors 1994–2013

| 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 | 36,304 | 4,451.852 | 0.12 | 127 | 1,037 | 31,221.1 | 0.14 | 892 | 967 | 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 electricty generated.

## Table 4.2 Summary of Information Reported by Commercial Pressurized-Water Reactors 1994–2013

| 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% |

* 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 electricty generated.

## Table 4.3 Summary of Information Reported by Commercial Light-Water Reactors 1994–2013

| 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 | 8,772.104 | 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 | 67,027 | 6,752.129 | 0.10 | 68 | 670 | 90,006.6 | 0.08 | 900 | 980 | 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 electricty generated.

For the years 1973 to 1996, the electricity generated is the gross electricity output of the reactor. For 1997 to 2013, 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 2013, there was a 3 percent increase in the net electricity generated at LWRs. Twenty-one reactor sites had decreased power production and 41 reactor sites had increased power production from 2012 to 2013. From 2012 to 2013, Monticello had the largest percentage decrease in power production because the plant was shut down for refueling for nearly 20 weeks. From 2012 to 2013, Fort Calhoun had the largest increase in power production because the plant was shut down throughout 2012 due to flooding in April 2011.

### 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 2013, 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 a value of 0.08 rem/MW-yr in 2013 from a value of 0.09 rem/MW-yr in 2012, due to the combination of a 16-percent decrease in the collective dose and a 3-percent increase in power production.

### 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 Reference 1.

### 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.

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 increased to 92 percent in 2013 from 87 percent in 2012. This increase in capacity was due to a 21-percent decrease in refueling outage hours and a 17-percent decrease in equipment failure outages in 2013, thereby increasing the number of hours of power generation.

## 4.3 Annual TEDE Distributions

Table 4.4a summarizes the distribution of the annual TEDE doses received by individuals at all commercial LWRs during each of the years 1994 through 2013. 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 2013. Table 4.4a includes only those reactors that have been in operation for at least a full year. In 2013, the total collective dose decreased by 16 percent to a value of 6,752 person-rems.

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 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, the Waterford nuclear plant had the largest decrease in collective dose since it did not have a refueling outage in 2013. From 2012 to 2013, the outage hours for Waterford decreased by 70 percent, and it reported a collective dose of 3.129 person-rem. Wolf Creek was the PWR with the largest increase in collective dose from 2012 to 2013. In 2012, Wolf Creek had few outage hours and reported a collective dose of 7.888 person-rem. In 2013, Wolf Creek had over 100 outage days, primarily due to refueling, and reported an increase in the collective dose to 111.257 person-rems as a result of the refueling activities.

From 2012 to 2013, Duane Arnold was the BWR that had the largest decrease in collective dose. In 2012, Duane Arnold had over 58 outage days and reported a collective dose of

134.515 person-rem, while in 2013, Duane Arnold had no outages and reported a collective dose of 8.996 person-rem. Clinton was the BWR site with the largest increase in collective dose from 2012 to 2013. In 2012, Clinton had no outages and reported a collective dose of 14.250 person-rem, while in 2013, Clinton had 899 total outage hours (62 percent for refueling and 38 percent for equipment failure) and reported a collective dose of 128.781 person-rem.

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 2013. 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 in 2013.

## 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 the 20 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. Between 1994 and 2013, the annual collective dose per LWR dropped by 69 percent. Over the past 10 years (since 2004), BWR collective doses have decreased by approximately 18 percent and PWR collective doses have decreased by approximately 53 percent. The majority of this decrease in the collective dose at PWRs occurred between 2012 and 2013 and is primarily attributable to the shutdown of four reactors that are no longer included in the collective dose for operating reactors.

In 2013, the average collective dose per reactor for BWRs was 127 person-rems and the average collective dose per reactor for PWRs was 35 person-rems. In comparison with the 2012 values, the collective dose per reactor for BWRs increased by 6 percent, and the average collective dose per reactor for PWRs decreased by 38 percent. The average collective dose per reactor for LWRs decreased by 12 percent from 77 person-rems in 2012 to 68 person-rems in 2013. This is the seventh year since tracking began in 1973 that the average collective dose per reactor for LWRs has been below 100 person-rems and the first year that the average collective dose per reactor for LWRs has been below 70 person-rems. 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. In 2013, the number of individuals with a measurable dose per reactor decreased to 1,037 for BWRs and decreased to 473 for PWRs.

## Table 4.4a Summary of Distribution of Annual Doses* at Commercial Light-Water Reactors** 1994–2013

| Year | Number of Individuals with Annual Doses* in the Ranges (rem) *** Note: Number of individuals shown have not been adjusted for the muliple reporting of transient individuals (see Section 5). | | | | | | | | | | | | | | | | | Total Number Monitored | Number with Measurable Exposure | Collective Dose (person-rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No Measurable Exposure | Mesurable <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 | 6.0-7.0 | 7.0-8.0 | 8.0-9.0 | 9.0-10.0 | 10.0-12.0 | >12 | | | |
| 1994 | 85,145 | 36,528 | 18,633 | 14,246 | 6,800 | 3,502 | 3,323 | 215 | 6 | - | - | - | - | - | - | - | - | 168,398 | 83,253 | 21,534.000 |
| 1995 | 81,032 | 38,575 | 20,245 | 15,279 | 6,884 | 3,336 | 3,077 | 125 | 5 | - | - | - | - | - | - | - | - | 168,558 | 87,526 | 21,674.000 |
| 1996 | 78,197 | 39,426 | 19,955 | 14,201 | 5,809 | 2,648 | 2,342 | 68 | - | - | - | - | - | - | - | - | - | 162,646 | 84,449 | 18,874.000 |
| 1997 | 80,163 | 41,759 | 19,951 | 13,396 | 5,394 | 2,240 | 1,671 | 59 | 3 | - | - | - | - | - | - | - | - | 164,636 | 84,473 | 17,136.000 |
| 1998 | 77,080 | 37,039 | 17,189 | 10,467 | 3,930 | 1,562 | 1,129 | 35 | - | - | - | - | - | - | - | - | - | 148,431 | 71,351 | 13,169.366 |
| 1999 | 74,867 | 39,663 | 18,063 | 10,964 | 3,994 | 1,569 | 1,141 | 24 | 2 | - | - | - | - | - | - | - | - | 150,287 | 75,420 | 13,665.711 |
| 2000 | 73,793 | 40,301 | 17,598 | 10,310 | 3,525 | 1,375 | 976 | 23 | - | - | - | - | - | - | - | - | - | 147,901 | 74,108 | 12,651.682 |
| 2001 | 73,206 | 37,461 | 16,078 | 9,231 | 2,930 | 1,060 | 747 | 63 | - | - | - | - | - | - | - | - | - | 140,776 | 67,570 | 11,108.552 |
| 2002 | 76,270 | 41,588 | 16,752 | 9,426 | 3,121 | 1,245 | 1,003 | 105 | 2 | - | - | - | - | - | - | - | - | 149,512 | 73,242 | 12,126.190 |
| 2003 | 77,889 | 42,720 | 17,231 | 9,589 | 3,139 | 1,233 | 864 | 37 | - | - | - | - | - | - | - | - | - | 152,702 | 74,813 | 11,955.570 |
| 2004 | 80,473 | 41,583 | 15,626 | 8,245 | 2,733 | 978 | 668 | 16 | - | - | - | - | - | - | - | - | - | 150,322 | 69,849 | 10,367.897 |
| 2005 | 82,574 | 46,444 | 17,754 | 9,191 | 2,934 | 1,104 | 683 | 17 | - | - | - | - | - | - | - | - | - | 160,701 | 78,127 | 11,455.807 |
| 2006 | 84,558 | 48,571 | 18,269 | 9,312 | 2,675 | 904 | 532 | 2 | - | - | - | - | - | - | - | - | - | 164,823 | 80,265 | 11,021.186 |
| 2007 | 84,551 | 49,998 | 17,672 | 8,294 | 2,329 | 824 | 402 | 11 | - | - | - | - | - | - | - | - | - | 164,081 | 79,530 | 10,120.013 |
| 2008 | 89,874 | 51,831 | 17,337 | 7,578 | 1,847 | 583 | 269 | 5 | - | - | - | - | - | - | - | - | - | 169,324 | 79,450 | 9,195.940 |
| 2009 | 94,627 | 52,670 | 17,417 | 8,352 | 2,161 | 741 | 413 | - | - | - | - | - | - | - | - | - | - | 176,381 | 81,754 | 10,024.804 |
| 2010 | 104,638 | 49,571 | 16,042 | 6,656 | 1,801 | 602 | 333 | 5 | - | - | - | - | - | - | - | - | - | 179,648 | 75,010 | 8,631.384 |
| 2011 | 110,217 | 55,407 | 16,651 | 6,753 | 1,675 | 559 | 276 | - | - | - | - | - | - | - | - | - | - | 191,538 | 81,321 | 8,772.104 |
| 2012 | 114,428 | 55,735 | 15,593 | 6,072 | 1,509 | 385 | 242 | 13 | - | - | - | - | - | - | - | - | - | 193,977 | 79,549 | 8,035.393 |
| 2013 | 106,509 | 46,981 | 13,158 | 5,088 | 1,227 | 380 | 191 | 2 | - | - | - | - | - | - | - | - | - | 173,536 | 67,027 | 6,752.129 |

* 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 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 1994–2013

| Year | Number of Individuals with Annual Doses* in the Ranges (rem) *** Note: Number of individuals shown have been adjusted for the muliple reporting of transient individuals (see Section 5). | | | | | | | | | | | | | | | | | Total Number Monitored | Number with Measurable Exposure | Collective Dose (person-rem) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | No Measurable Exposure | Mesurable <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 | 6.0-7.0 | 7.0-8.0 | 8.0-9.0 | 9.0-10.0 | 10.0-12.0 | >12 | | | |
| 1994 | 67,700 | 29,847 | 14,841 | 11,716 | 6,124 | 3,586 | 4,222 | 508 | 40 | - | - | - | - | - | - | - | - | 138,584 | 70,884 | 21,534.000 |
| 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 |
| 1996 | 58,292 | 30,021 | 14,831 | 11,340 | 5,418 | 2,831 | 3,194 | 408 | 67 | - | - | - | - | - | - | - | - | 126,402 | 68,110 | 18,874.000 |
| 1997 | 58,647 | 31,751 | 14,881 | 10,902 | 5,228 | 2,447 | 2,598 | 286 | 41 | - | - | - | - | - | - | - | - | 126,781 | 68,134 | 17,136.000 |
| 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 |
| 1999 | 55,121 | 29,271 | 13,278 | 9,017 | 3,806 | 1,908 | 1,898 | 245 | 18 | - | - | - | - | - | - | - | - | 114,562 | 59,441 | 13,665.711 |
| 2000 | 53,324 | 28,480 | 12,921 | 8,679 | 3,571 | 1,644 | 1,734 | 186 | 18 | - | - | - | - | - | - | - | - | 110,557 | 57,233 | 12,651.682 |
| 2001 | 52,636 | 27,246 | 11,491 | 7,659 | 2,907 | 1,323 | 1,392 | 221 | 53 | - | - | - | - | - | - | - | - | 104,928 | 52,292 | 11,108.552 |
| 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 |
| 2003 | 54,028 | 29,161 | 11,971 | 8,190 | 3,253 | 1,527 | 1,651 | 184 | 18 | - | - | - | - | - | - | - | - | 109,983 | 55,955 | 11,955.570 |
| 2004 | 57,420 | 28,863 | 11,178 | 7,335 | 2,873 | 1,233 | 1,190 | 188 | 13 | - | - | - | - | - | - | - | - | 110,293 | 52,873 | 10,367.897 |
| 2005 | 56,709 | 31,035 | 12,422 | 7,813 | 3,106 | 1,537 | 1,490 | 147 | 3 | - | - | - | - | - | - | - | - | 114,262 | 57,553 | 11,455.807 |
| 2006 | 57,546 | 32,439 | 12,687 | 7,802 | 2,971 | 1,415 | 1,407 | 82 | 2 | - | - | - | - | - | - | - | - | 116,351 | 58,805 | 11,021.186 |
| 2007 | 57,314 | 32,706 | 11,961 | 7,396 | 2,714 | 1,284 | 1,100 | 97 | 9 | - | - | - | - | - | - | - | - | 114,581 | 57,267 | 10,120.013 |
| 2008 | 61,336 | 33,832 | 12,322 | 6,786 | 2,430 | 1,026 | 922 | 38 | - | - | - | - | - | - | - | - | - | 118,692 | 57,356 | 9,195.940 |
| 2009 | 66,310 | 35,877 | 12,318 | 7,317 | 2,562 | 1,174 | 1,144 | 68 | 4 | - | - | - | - | - | - | - | - | 126,774 | 60,464 | 10,024.804 |
| 2010 | 74,218 | 33,873 | 11,670 | 6,356 | 2,231 | 946 | 832 | 42 | 3 | - | - | - | - | - | - | - | - | 130,171 | 55,953 | 8,631.384 |
| 2011 | 78,090 | 36,745 | 12,119 | 6,307 | 2,226 | 1,008 | 837 | 23 | - | - | - | - | - | - | - | - | - | 137,355 | 59,265 | 8,772.104 |
| 2012 | 79,222 | 36,990 | 11,943 | 5,904 | 1,962 | 774 | 672 | 37 | - | - | - | - | - | - | - | - | - | 137,504 | 58,282 | 8,035.393 |
| 2013 | 75,738 | 32,122 | 10,275 | 5,262 | 1,684 | 677 | 430 | 18 | - | - | - | - | - | - | - | - | - | 126,206 | 50,468 | 6,752.129 |

* 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 been adjusted for the multiple reporting of transient individuals (see Section 5).

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

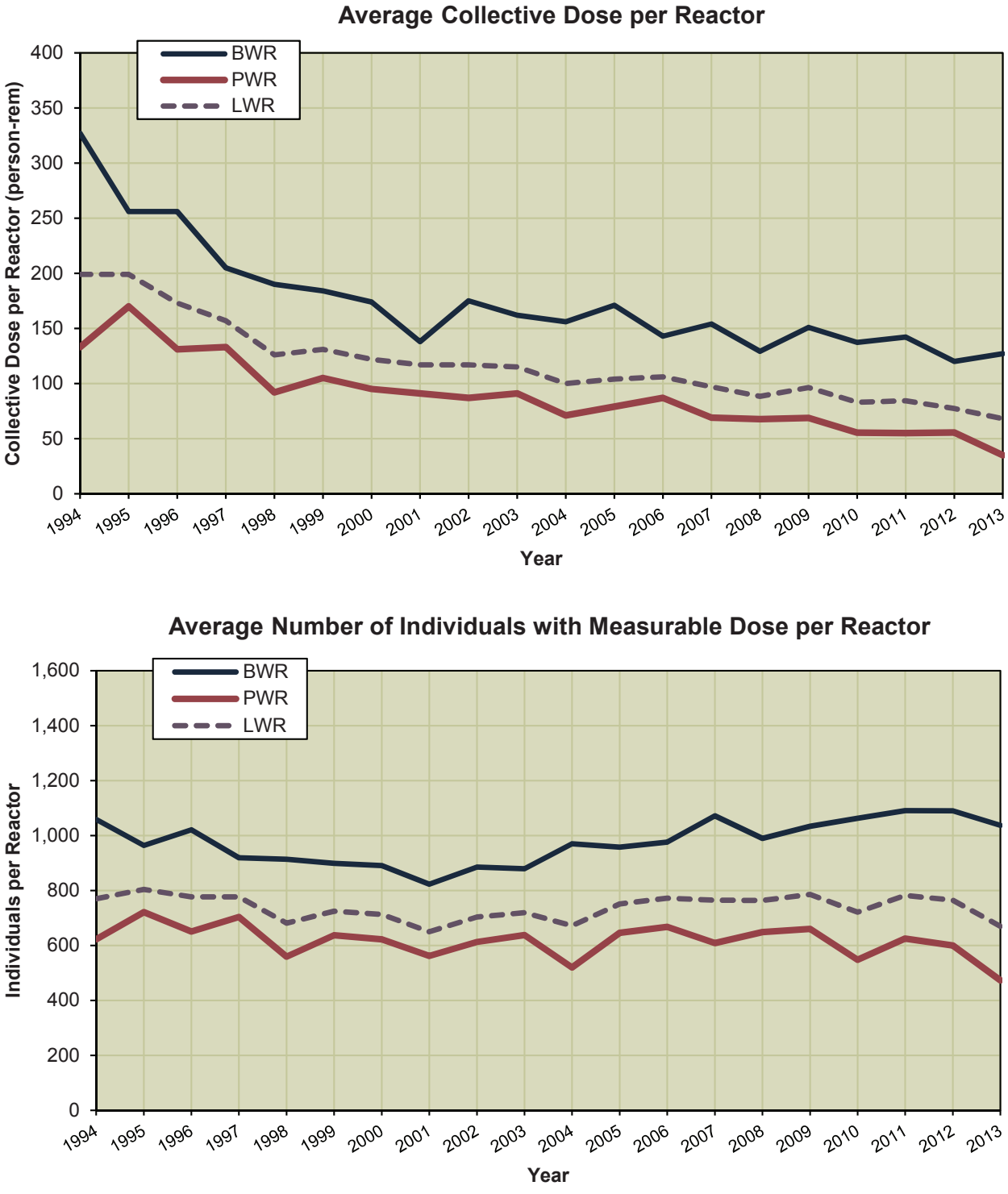


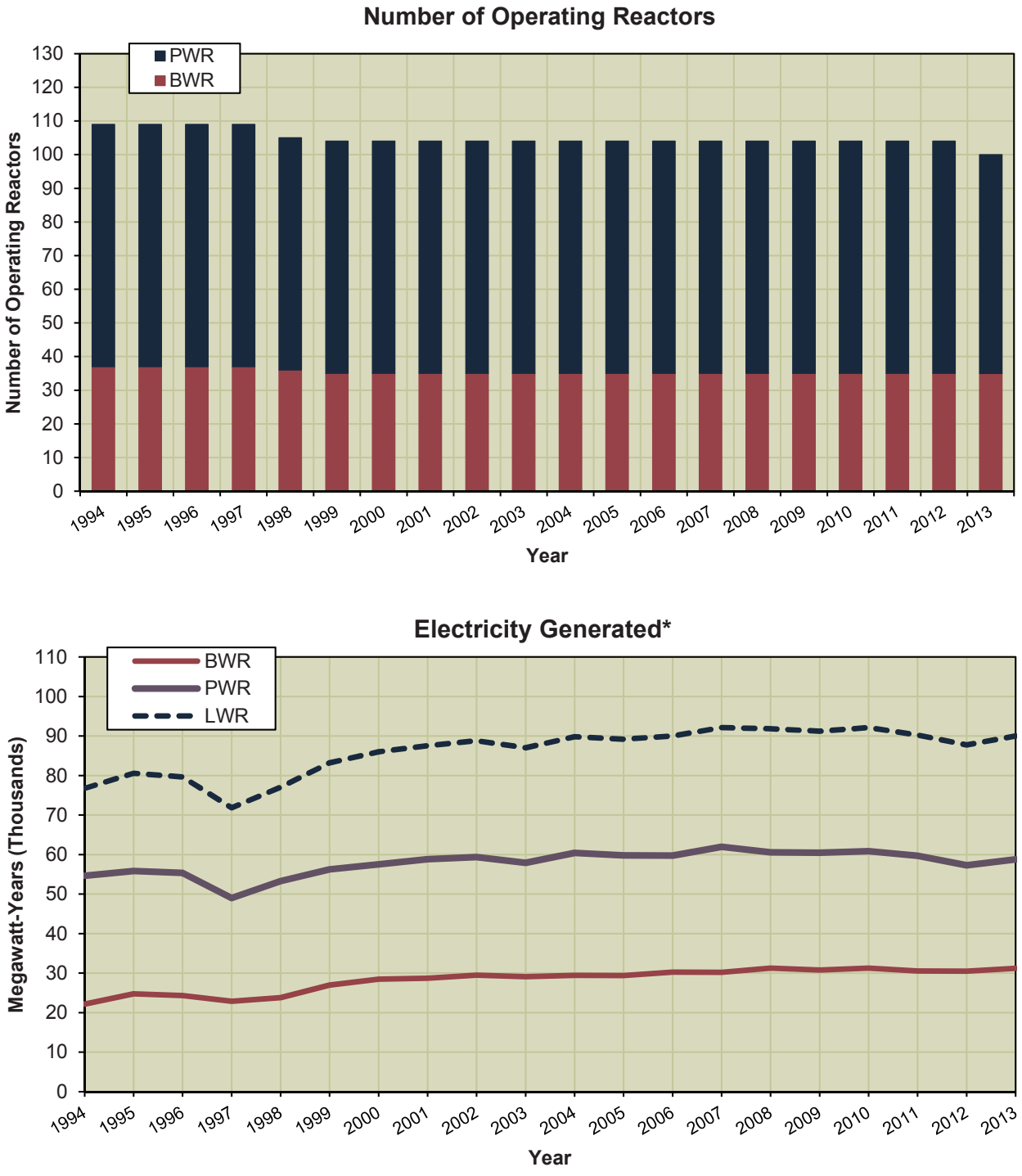

**Figure 4.1 Average collective dose per reactor and average number of individuals with measurable dose per reactor 1994–2013**

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 increased by 3 percent from 87,758 MW-yr in 2012 to 90,007 MW-yr in 2013, while the number of operating reactors decreased from 104 in 2012 to 100 in 2013. Table 4.3 also shows that the value for the total collective dose for all LWRs decreased by 16 percent to 6,752 person-rems in 2013 from a value of 8,035 person-rems in 2012. Figure 4.3 shows that the average measurable dose per individual remained the same at 0.10 rem in 2013 (not adjusted for transient individuals).

The decrease seen in dose trends since 1994 may be attributed to several factors. 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.

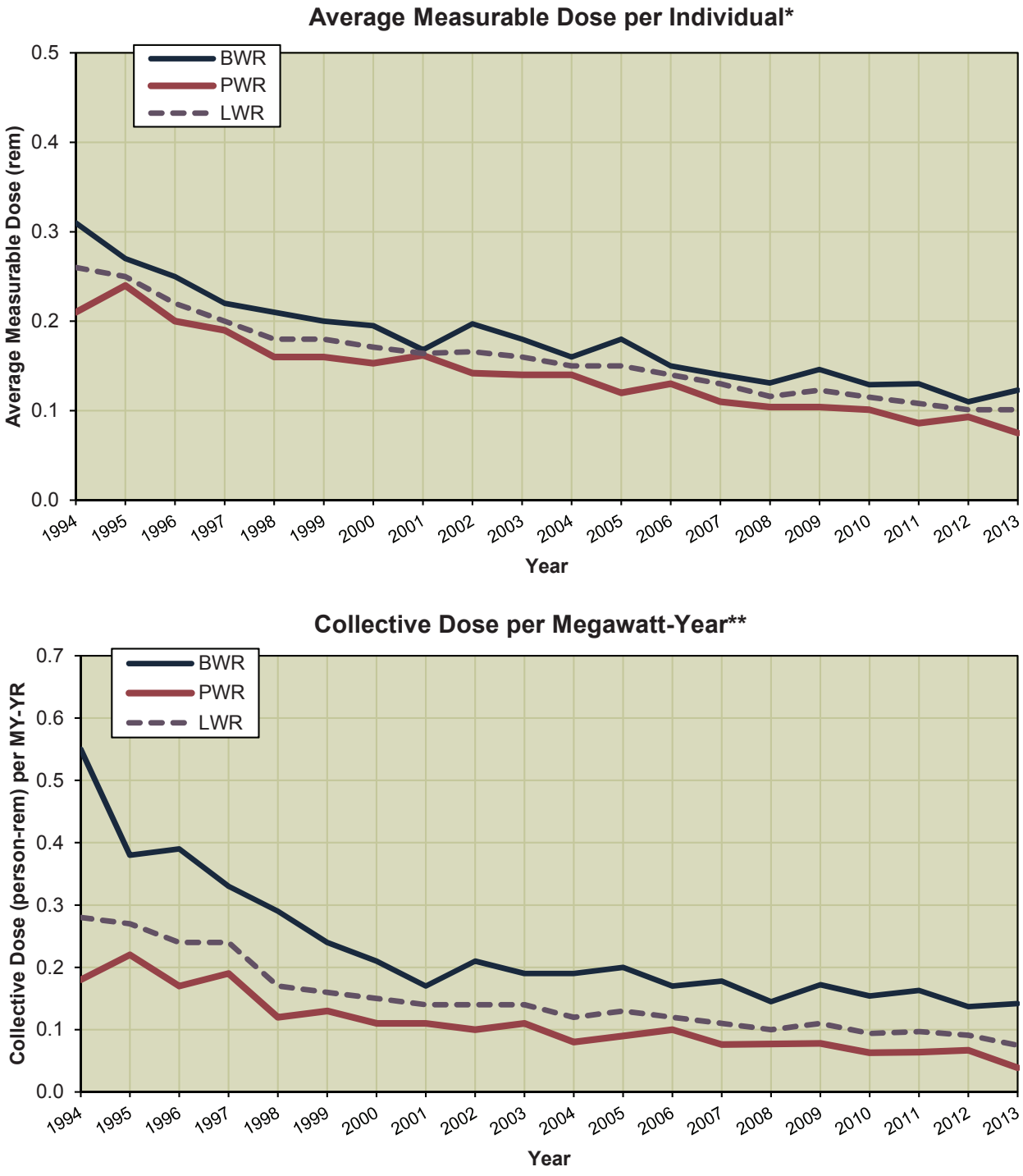
To further assist in the identification of any trends that might exist, Figure 4.4 displays the average and median[1] values of the collective dose per reactor for BWRs and for PWRs for the years 1994 through 2013. The median values are included here for statistical completeness and are not used in other 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. The rectangles indicate the range of values of the collective dose exhibited by those plants ranked in the 25th through the 75th percentiles. The median collective dose for PWRs decreased from 44 person-rems in 2012 to 35 person-rems in 2013. The median collective dose for BWRs increased from 112 person-rems in 2012 to 117 person-rems in 2013. Figure 4.4 also shows that, in 2013, 50 percent of the PWRs reported collective doses between 25 and 55 person-rems, while 50 percent of the BWRs reported collective doses between 67 and 176 person-rems. The middle 50 percent of BWRs and PWRs in Figure 4.4 are the reactors between the 25 percent and 75 percent dose range. 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.

[1] The median is the value at which 50% of the reactors reported greater collective doses and the other 50% reported smaller collective doses.




* Gross electricity is shown for 1994–1996, net electricity is shown for 1997–2013.

**Figure 4.2 Number of operating reactors and electricity generated 1994–2013**




* Not adjusted for transient workers. See Section 5.
** Gross electricity is shown for 1994–1996, net electricity is shown for 1997–2013.

**Figure 4.3 Average measurable dose per individual and collective dose per megawatt-year 1994–2013**

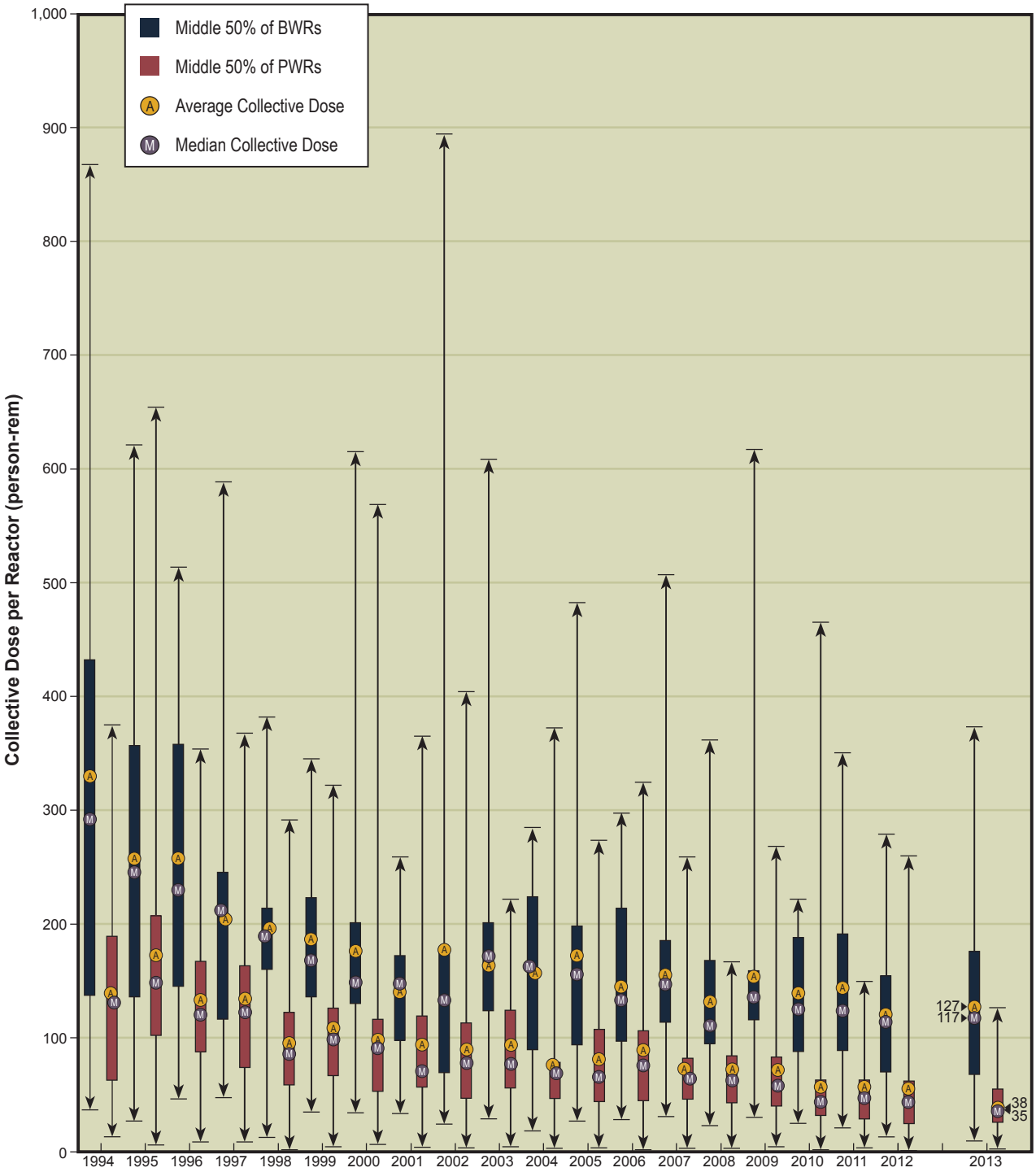



**Figure 4.4 Average, median, and extreme values of the collective dose per reactor 1994–2013**

## 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 Program to evaluate the effectiveness of the licensee's ALARA program. Tables 4.5 and 4.6 list the sites that had been in commercial operation for at least 3 years as of December 31, 2013, 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 105 reactor-years of operation accumulated over a 3-year period by the 35 BWRs listed, the average 3-year collective TEDE per reactor was found to be 130 person-rems, the average measurable TEDE per individual was 0.12 rem, and the average collective TEDE per MW-yr was 0.15 person-rem. For BWRs, all values decreased slightly or remained the same from 2012 to 2013.

Based on the 195 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 49 person-rems, 0.09 rem, and 0.06 person-rem, respectively. For PWRs, all values either decreased slightly or remained the same from 2012 to 2013.

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 have been included in the 2013 annual report for BWRs and PWRs, respectively. These tables show the plant name, 3-year collective TEDE per reactor, 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 2011–2013

| Plant Name* | Reactor Years | Three-year Collective TEDE per Reactor Year 2011-2013 (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) |
|---|---|---|---|---|---|---|---|
| DUANE ARNOLD | 3 | 57.725 | 173.174 | 1,622 | 0.107 | 1,697.6 | 0.10 |
| FERMI 2 | 3 | 65.077 | 195.232 | 2,511 | 0.078 | 2,361.7 | 0.08 |
| LIMERICK 1,2 | 6 | 79.626 | 477.758 | 5,867 | 0.081 | 6,419.8 | 0.07 |
| OYSTER CREEK | 3 | 80.710 | 242.129 | 2,169 | 0.112 | 1,726.0 | 0.14 |
| FITZPATRICK | 3 | 81.498 | 244.495 | 2,684 | 0.091 | 2,298.8 | 0.11 |
| HATCH 1,2 | 6 | 84.860 | 509.159 | 4,621 | 0.110 | 4,766.0 | 0.11 |
| DRESDEN 2,3 | 6 | 85.497 | 512.984 | 6,289 | 0.082 | 5,125.1 | 0.10 |
| SUSQUEHANNA 1,2 | 6 | 96.397 | 578.381 | 6,010 | 0.096 | 6,094.7 | 0.09 |
| HOPE CREEK 1 | 3 | 109.704 | 329.111 | 4,652 | 0.071 | 3,330.9 | 0.10 |
| GRAND GULF | 3 | 110.970 | 332.911 | 3,446 | 0.097 | 3,246.3 | 0.10 |
| QUAD CITIES 1,2 | 6 | 112.498 | 674.988 | 6,836 | 0.099 | 5,276.6 | 0.13 |
| CLINTON | 3 | 123.826 | 371.478 | 3,080 | 0.121 | 3,007.2 | 0.12 |
| BROWNS FERRY 1,2,3 | 9 | 127.064 | 1,143.576 | 7,761 | 0.147 | 8,865.0 | 0.13 |
| VERMONT YANKEE | 3 | 130.650 | 391.949 | 2,368 | 0.166 | 1,688.7 | 0.23 |
| RIVER BEND 1 | 3 | 144.574 | 433.721 | 4,474 | 0.097 | 2,636.4 | 0.16 |
| NINE MILE POINT 1,2 | 6 | 144.892 | 869.351 | 4,537 | 0.192 | 4,926.3 | 0.18 |
| PILGRIM | 3 | 146.345 | 439.034 | 2,731 | 0.161 | 1,743.4 | 0.25 |
| LASALLE 1,2 | 6 | 158.144 | 948.862 | 6,738 | 0.141 | 6,570.6 | 0.14 |
| MONTICELLO | 3 | 158.250 | 474.751 | 3,678 | 0.129 | 1,282.4 | 0.37 |
| BRUNSWICK 1,2 | 6 | 185.346 | 1,112.078 | 10,124 | 0.110 | 4,942.6 | 0.22 |
| PEACH BOTTOM 2,3 | 6 | 196.530 | 1,179.181 | 8,264 | 0.143 | 6,438.0 | 0.18 |
| COLUMBIA GENERATING | 3 | 201.643 | 604.928 | 5,251 | 0.115 | 2,577.2 | 0.23 |
| COOPER STATION | 3 | 221.473 | 664.418 | 4,150 | 0.160 | 2,097.9 | 0.32 |
| PERRY | 3 | 241.675 | 725.026 | 3,678 | 0.197 | 3,137.0 | 0.23 |
| **Totals and Averages** | **105** | **-** | **13,628.675** | **113,541** | **0.120** | **92,256.2** | **0.15** |
| **Average per Reactor-Year** | **-** | **129.797** | **-** | **1,081** | **-** | **878.6** | **-** |

* Sites where not all reactors had completed 3 full years of commercial operations as of December 31, 2013, are not included.
** Although Brown's Ferry 1 was placed on administrative hold in 1985, it remains in the count of operating reactors and has resumed operation as of June 2007.

## Table 4.6 Three-Year Totals and Averages Listed in Ascending Order of Collective TEDE per PWR 2011–2013

| Plant Name* | Reactor Years | Three-year Collective TEDE per Reactor Year 2011-2013 (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) |
|---|---|---|---|---|---|---|---|
| DIABLO CANYON 1,2 | 6 | 17.321 | 103.923 | 2,437 | 0.043 | 6,218.2 | 0.02 |
| FARLEY 1,2 | 6 | 20.090 | 120.539 | 2,062 | 0.058 | 4,937.5 | 0.02 |
| PALO VERDE 1,2,3 | 9 | 23.853 | 214.680 | 3,740 | 0.057 | 10,794.0 | 0.02 |
| COOK 1,2 | 6 | 35.009 | 210.053 | 2,802 | 0.075 | 5,857.5 | 0.04 |
| ARKANSAS 1,2 | 6 | 35.139 | 210.833 | 3,871 | 0.054 | 4,753.0 | 0.04 |
| CATAWBA 1,2 | 6 | 38.327 | 229.961 | 3,171 | 0.073 | 6,361.8 | 0.04 |
| WATTS BAR 1 | 3 | 38.805 | 116.416 | 1,987 | 0.059 | 3,047.0 | 0.04 |
| SALEM 1,2 | 6 | 38.858 | 233.149 | 4,145 | 0.056 | 6,391.5 | 0.04 |
| SUMMER 1 | 3 | 39.651 | 118.954 | 1,578 | 0.075 | 2,632.2 | 0.05 |
| DAVIS-BESSE | 3 | 39.663 | 118.989 | 1,933 | 0.062 | 2,408.8 | 0.05 |
| BEAVER VALLEY 1,2 | 6 | 39.847 | 239.084 | 2,849 | 0.084 | 5,015.5 | 0.05 |
| SEABROOK | 3 | 40.557 | 121.671 | 2,539 | 0.048 | 3,134.0 | 0.04 |
| INDIAN POINT 2,3 | 6 | 40.950 | 245.700 | 3,798 | 0.065 | 5,806.4 | 0.04 |
| SOUTH TEXAS 1,2 | 6 | 41.352 | 248.114 | 2,596 | 0.096 | 6,518.1 | 0.04 |
| CALLAWAY 1 | 3 | 42.621 | 127.863 | 1,687 | 0.076 | 3,251.8 | 0.04 |
| VOGTLE 1,2 | 6 | 42.758 | 256.546 | 2,812 | 0.091 | 6,543.0 | 0.04 |
| COMANCHE PEAK 1,2 | 6 | 44.449 | 266.695 | 3,555 | 0.075 | 6,850.2 | 0.04 |
| BRAIDWOOD 1,2 | 6 | 44.945 | 269.667 | 3,522 | 0.077 | 6,642.7 | 0.04 |
| CALVERT CLIFFS 1,2 | 6 | 45.306 | 271.837 | 2,008 | 0.135 | 4,814.1 | 0.06 |
| HARRIS | 3 | 46.481 | 139.443 | 2,084 | 0.067 | 2,523.1 | 0.06 |
| OCONEE 1,2,3 | 9 | 46.680 | 420.117 | 5,468 | 0.077 | 7,072.7 | 0.06 |
| MCGUIRE 1,2 | 6 | 48.625 | 291.750 | 4,317 | 0.068 | 6,241.2 | 0.05 |
| POINT BEACH 1,2 | 6 | 48.764 | 292.585 | 2,155 | 0.136 | 3,045.8 | 0.10 |
| ROBINSON 2 | 3 | 49.828 | 149.483 | 2,280 | 0.066 | 1,990.2 | 0.08 |
| MILLSTONE 2,3 | 6 | 51.153 | 306.919 | 2,517 | 0.122 | 5,726.1 | 0.05 |
| PRAIRIE ISLAND 1,2 | 6 | 51.197 | 307.184 | 2,970 | 0.103 | 2,668.0 | 0.12 |
| GINNA | 3 | 52.927 | 158.781 | 1,689 | 0.094 | 1,586.0 | 0.10 |
| NORTH ANNA 1,2 | 6 | 53.181 | 319.084 | 2,502 | 0.128 | 4,887.6 | 0.07 |
| SURRY 1,2 | 6 | 58.334 | 350.001 | 3,096 | 0.113 | 4,681.7 | 0.07 |
| BYRON 1,2 | 6 | 58.798 | 352.785 | 3,775 | 0.093 | 6,394.7 | 0.06 |
| FORT CALHOUN | 3 | 60.819 | 182.456 | 2,214 | 0.082 | 145.3 | 1.26 |
| TURKEY POINT 3,4 | 6 | 64.282 | 385.692 | 3,827 | 0.101 | 3,369.6 | 0.11 |
| SEQUOYAH 1,2 | 6 | 74.123 | 444.735 | 4,575 | 0.097 | 6,129.6 | 0.07 |
| WOLF CREEK 1 | 3 | 84.368 | 253.105 | 3,085 | 0.082 | 2,602.7 | 0.10 |
| THREE MILE ISLAND 1 | 3 | 89.550 | 268.651 | 2,802 | 0.096 | 2,327.4 | 0.12 |
| ST. LUCIE 1,2 | 6 | 92.597 | 555.580 | 4,764 | 0.117 | 4,123.8 | 0.13 |
| PALISADES | 3 | 94.204 | 282.613 | 1,897 | 0.149 | 2,037.3 | 0.14 |
| WATERFORD 3 | 3 | 121.128 | 363.384 | 3,233 | 0.112 | 2,989.5 | 0.12 |
| **Totals and Avgs** | **195** | **-** | **9,549.022** | **112,342** | **0.085** | **172,519.6** | **0.06** |
| **Avg per Reactor-Year** | **-** | **48.969** | **-** | **576** | **-** | **884.7** | **-** |

* Sites where not all reactors had completed 3 full years of commercial operation as of December 31, 2013, are not included.

## Table 4.7 Three-Year Collective TEDE per Reactor-Year for BWRs 2011–2013

| | Plant Name | Three Year Coll. TEDE per Reactor Year 2011-2013 (person-rem) | Percent Change From 2010-2012 | 2010-2012 Quartile (if changed) |
|---|---|---|---|---|
| 1st Quartile | DUANE ARNOLD | 57.725 | -53% ▼ | 2 |
| | FERMI 2 | 65.077 | -38% ▼ | 2 |
| | LIMERICK 1,2 | 79.626 | -7% ▼ | - |
| | OYSTER CREEK | 80.710 | -42% ▼ | 2 |
| | FITZPATRICK | 81.498 | -42% ▼ | 3 |
| | HATCH 1,2 | 84.860 | -17% ▼ | - |
| | DRESDEN 2,3 | 85.497 | -13% ▼ | - |
| 2nd Quartile | SUSQUEHANNA 1,2 | 96.397 | 11% ▲ | 1 |
| | HOPE CREEK 1 | 109.704 | -3% ▼ | - |
| | GRAND GULF | 110.970 | -31% ▼ | 4 |
| | QUAD CITIES 1,2 | 112.498 | -7% ▼ | - |
| | CLINTON | 123.826 | -20% ▼ | 4 |
| | BROWNS FERRY 1,2,3 | 127.064 | -13% ▼ | 3 |
| | | | | < *Average 129.797* |
| 3rd Quartile | VERMONT YANKEE | 130.650 | -8% ▼ | - |
| | RIVER BEND 1 | 144.574 | 52% ▲ | 1 |
| | NINE MILE POINT 1,2 | 144.892 | -15% ▼ | 4 |
| | PILGRIM | 146.345 | 52% ▲ | 1 |
| | LASALLE 1,2 | 158.144 | 0% ▼ | 4 |
| 4th Quartile | MONTICELLO | 158.250 | 43% ▲ | 2 |
| | BRUNSWICK 1,2 | 185.346 | -4% ▼ | - |
| | PEACH BOTTOM 2,3 | 196.530 | 29% ▲ | 3 |
| | COLUMBIA GENERATING | 201.643 | 39% ▲ | 3 |
| | COOPER STATION | 221.473 | -4% ▼ | - |
| | PERRY | 241.675 | 89% ▲ | 2 |
| | **Average per Reactor-Year** | **129.797** | **-3% ▼** | |

## Table 4.8 Three-Year Collective TEDE per Reactor-Year for PWRs 2011–2013

| | Plant Name | Three-Year Coll. TEDE per Reactor Year 2011-2013 (person-rem) | Percent Change From 2010-2012 | 2010-2012 Quartile (if changed) |
|---|---|---|---|---|
| 1st Quartile | DIABLO CANYON 1,2 | 17.321 | -48% ▼ | - |
| | FARLEY 1,2 | 20.090 | -36% ▼ | - |
| | PALO VERDE 1,2,3 | 23.853 | -8% ▼ | - |
| | COOK 1,2 | 35.009 | 11% ▲ | - |
| | ARKANSAS 1,2 | 35.139 | -19% ▼ | 2 |
| | CATAWBA 1,2 | 38.327 | -6% ▼ | - |
| | WATTS BAR 1 | 38.805 | -3% ▼ | - |
| | SALEM 1,2 | 38.858 | -7% ▼ | 2 |
| | SUMMER 1 | 39.651 | 3% ▲ | - |
| 2nd Quartile | DAVIS-BESSE | 39.663 | -80% ▼ | 4 |
| | BEAVER VALLEY 1,2 | 39.847 | -3% ▼ | 1 |
| | SEABROOK | 40.557 | -2% ▼ | - |
| | INDIAN POINT 2,3 | 40.950 | -34% ▼ | 4 |
| | SOUTH TEXAS 1,2 | 41.352 | -7% ▼ | - |
| | CALLAWAY 1 | 42.621 | -11% ▼ | - |
| | VOGTLE 1,2 | 42.758 | -4% ▼ | - |
| | COMANCHE PEAK 1,2 | 44.449 | -9% ▼ | - |
| | BRAIDWOOD 1,2 | 44.945 | -11% ▼ | - |
| | CALVERT CLIFFS 1,2 | 45.306 | -20% ▼ | 3 |
| 3rd Quartile | HARRIS | 46.481 | -17% ▼ | - |
| | OCONEE 1,2,3 | 46.680 | -17% ▼ | - |
| | MCGUIRE 1,2 | 48.625 | 11% ▲ | 2 |
| | POINT BEACH 1,2 | 48.764 | -10% ▼ | - |
| | ROBINSON 2 | 49.828 | -3% ▼ | - |
| | MILLSTONE 2,3 | 51.153 | -5% ▼ | - |
| | PRAIRIE ISLAND 1,2 | 51.197 | 32% ▲ | 1 |
| | GINNA | 52.927 | 0% ▲ | - |
| | NORTH ANNA 1,2 | 53.181 | -16% ▼ | 4 |
| 4th Quartile | SURRY 1,2 | 58.334 | -11% ▼ | - |
| | BYRON 1,2 | 58.798 | 0% ▲ | 3 |
| | FORT CALHOUN | 60.819 | 42% ▲ | 2 |
| | TURKEY POINT 3,4 | 64.282 | -1% ▼ | - |
| | SEQUOYAH 1,2 | 74.123 | -3% ▼ | - |
| | WOLF CREEK 1 | 84.368 | 66% ▲ | 3 |
| | THREE MILE ISLAND 1 | 89.550 | 48% ▲ | 3 |
| | ST. LUCIE 1,2 | 92.597 | -18% ▼ | - |
| | PALISADES | 94.204 | -42% ▼ | - |
| | WATERFORD 3 | 121.128 | 0% ▼ | - |
| | **Average per Reactor-Year** | **48.969** | **-17%** ▼ | |

*Average 48.969*

## 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 401 operating units and 81 units in cold shutdown or some stage of decommissioning in 29 countries, covering about 91 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 to 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. The international average collective dose per unit for BWRs and PWRs decreased significantly in 2012 and was lower than the 2012 U.S. average collective dose for both BWRs and PWRs. For PWRs, the international average collective dose per unit increased in 2013 while the U.S. average decreased. The decrease in the international average for BWRs continued to decrease and is at a value that is about one third of the U.S. value in 2013.

It should be noted that the information from reactor sites in Japan has been affected by the Fukushima Daiichi event that occurred in 2011. Most of the Japanese reactors were immediately shut down after the Fukushima event for safety purposes, but the 2012 and 2013 information in the ISOE database includes the units in the count of operational plants.

Also note that the 2012 and 2013 information for Germany in the ISOE database includes reactors that were shut down following the event. The status of the reactor sites in Japan and Germany in 2012 resulted in a significant reduction in the international average collective dose per reactor in 2012 and a continued reduction for BWR reactors in 2013.

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.

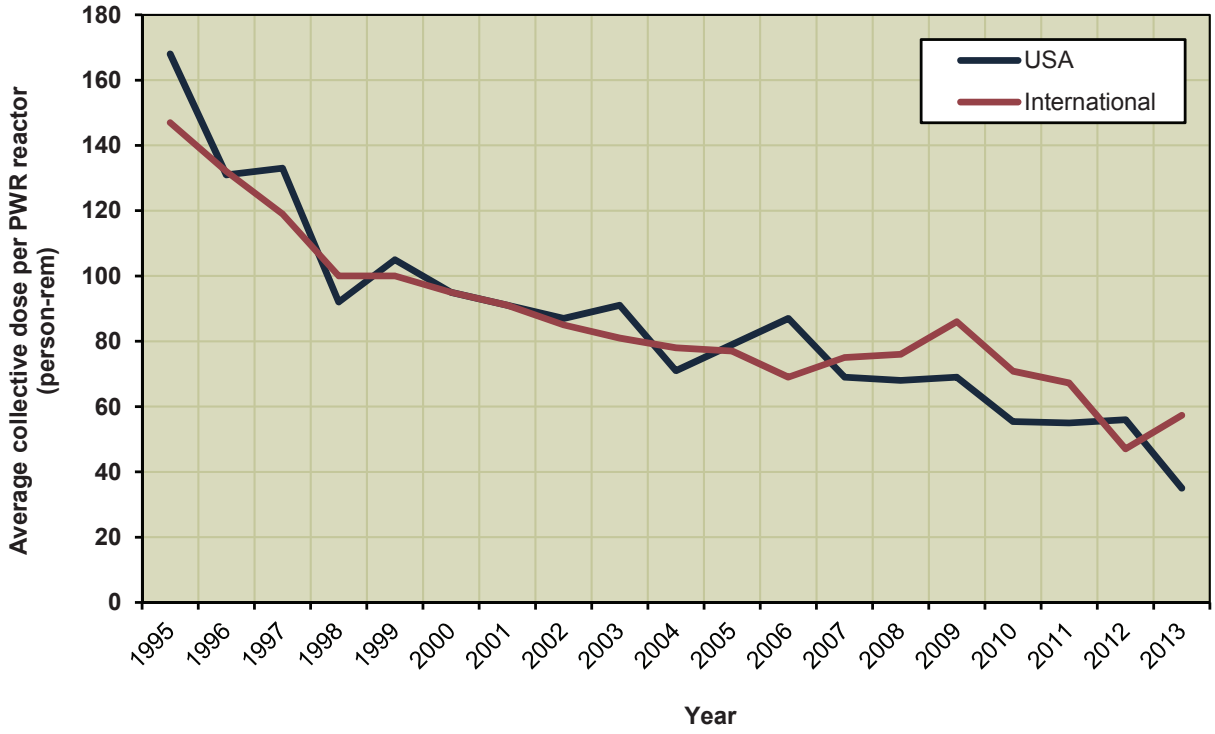



**Figure 4.5 Average collective dose per PWR reactor 1995–2013**

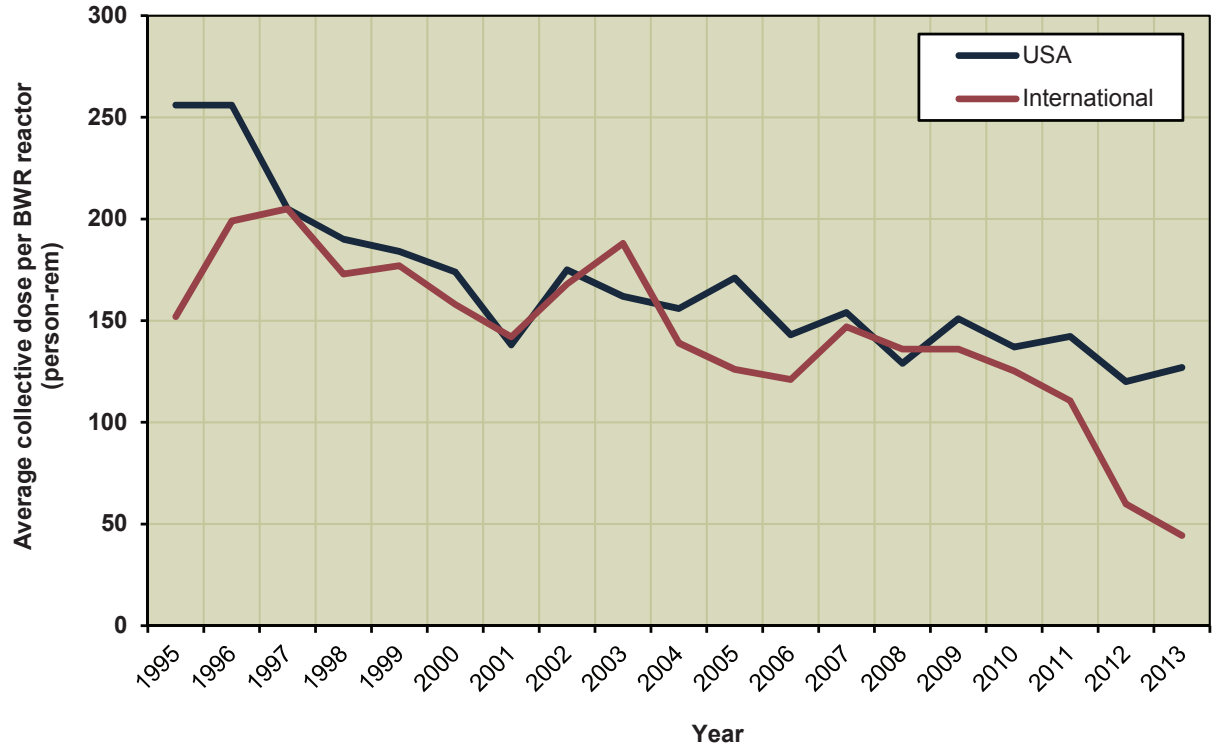



**Figure 4.6 Average collective dose per BWR reactor 1995–2013**

## 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. 19].

### 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.

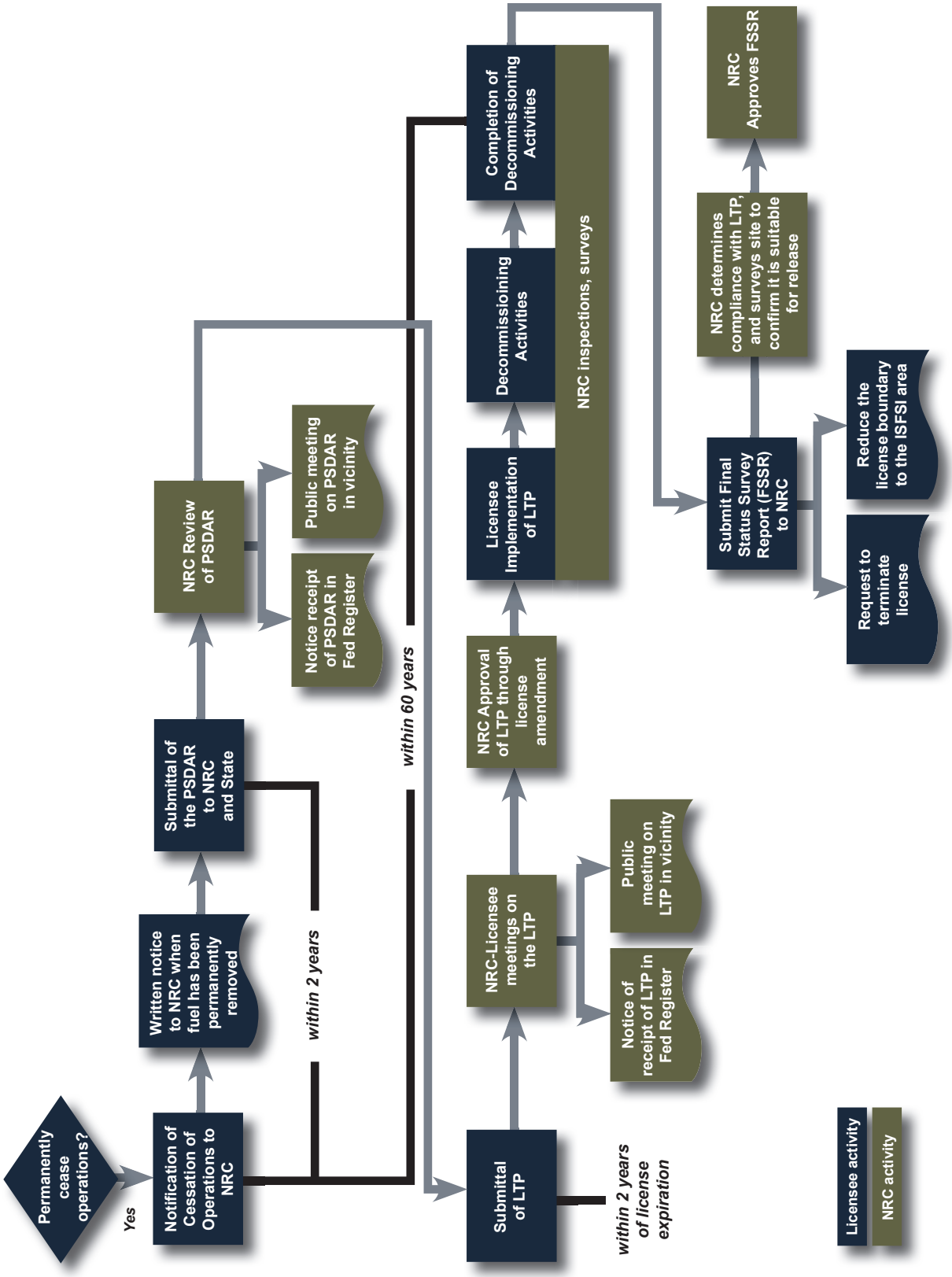



**Figure 4.7 D&D process flowchart**

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 presubmittal 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 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.

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

While 100 commercial nuclear power reactors are currently in operation, several shutdown power reactors have undergone the D&D process. As more commercial nuclear power reactors reach the end of their operating license, 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. 18], and the four PWR plants that shut down in 2013 are bolded. 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 2013.

## Table 4.9 Plants No Longer in Operation 2013

| Plant Name | Date of First Commercial Operation | Ceased Operations | License Termination Plan Approved by NRC | Plant Status | Completion of Decommissioning |
|---|---|---|---|---|---|
| BIG ROCK POINT | 3/29/1963 | 8/1997 | TBD | ISFSI only | 2007 |
| **CRYSTAL RIVER** | 12/1/1976 | **2/2013** | TBD | SAFSTOR | 2074 |
| DRESDEN 1 | 8/1/1960 | 10/1978 | TBD | SAFSTOR | 2036 |
| FERMI 1 | 5/10/1963 | 9/1972 | TBD | DECON | 2032 |
| HADDAM NECK | 12/27/1974 | 12/1996 | TBD | ISFSI only | 2007 |
| HUMBOLDT BAY 3 | 8/1/1963 | 7/1976 | 2012 | DECON | 2016 |
| INDIAN POINT 1 | 3/26/1962 | 10/1974 | TBD | SAFSTOR | 2026 |
| **KEWAUNEE** | 12/1/1973 | **5/2013** | TBD | SAFSTOR | 2073 |
| LACROSSE | 11/1/1969 | 4/1987 | TBD | DECON | 2026 |
| MAINE YANKEE | 6/29/1973 | 12/1996 | TBD | ISFSI only | 2005 |
| MILLSTONE 1 | 12/28/1970 | 7/1988 | TBD | SAFSTOR | TBD |
| PEACH BOTTOM 1 | 1/24/1966 | 10/1974 | TBD | SAFSTOR | 2034 |
| RANCHO SECO | 4/17/1975 | 6/1989 | TBD | ISFSI only | 2009 |
| SAN ONOFRE 1 | 1/1/1968 | 11/1992 | TBD | DECON | 2030 |
| **SAN ONOFRE 2** | 1/1/1983 | **6/2013** | TBD | SAFSTOR | TBD |
| **SAN ONOFRE 3** | 1/1/1984 | **6/2013** | TBD | SAFSTOR | TBD |
| THREE MILE ISLAND 2 | 12/30/1978 | 3/1979 | TBD | "Post-Defueling Monitored Storage" | 2036 |
| TROJAN | 5/20/1976 | 11/1992 | 2/2001 | ISFSI only | 2004 |
| YANKEE ROWE | 12/24/1963 | 10/1991 | TBD | ISFSI only | 2007 |
| ZION 1 | 12/31/1973 | 2/1997 | TBD | DECON | 2020 |
| ZION 2 | 9/17/1974 | 9/1996 | TBD | DECON | 2020 |

Note: Information regarding the latest decommissioning status of plants listed in this table can be found in Status of the Decommissioning Program: 2013 Annual Report from the NRC's public library under ADAMS Accession No. ML13311A526.
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.

# Section 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 2013, over 96 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 2013. 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.

## Table 5.1 Effects of Transient Individuals on Annual Statistical Compilations 2013

| 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 | | | | |
| **COMMERCIAL LIGHT-WATER REACTORS** | | | | | | | | | | | | | | | | |
| (1) Form 5 Summation | 106,509 | 46,981 | 13,158 | 5,088 | 1,227 | 380 | 191 | 2 | - | - | - | - | 173,536 | 67,027 | 6,752.129 | 0.10 |
| (2) Transients, As Reported | 40,633 | 23,964 | 7,519 | 2,850 | 696 | 211 | 111 | 1 | - | - | - | - | 75,985 | 35,352 | 3,819.370 | 0.11 |
| (3) Transients, Actual | 9,862 | 9,105 | 4,636 | 3,024 | 1,153 | 508 | 350 | 17 | - | - | - | - | 28,655 | 18,793 | 3,819.370 | 0.20 |
| **Corrected Distribution (1-[2-3]) **** | **75,738** | **32,122** | **10,275** | **5,262** | **1,684** | **677** | **430** | **18** | **-** | **-** | **-** | **-** | **126,206** | **50,468** | **6,752.129** | **0.13** |
| **ALL LICENSEES** | | | | | | | | | | | | | | | | |
| (1) Form 5 Summation | 110,853 | 50,859 | 14,167 | 5,935 | 1,726 | 619 | 628 | 99 | 18 | 3 | | | 184,907 | 74,054 | 8,747.160 | 0.12 |
| (2) Transients, As Reported | 42,710 | 24,411 | 7,747 | 2,943 | 743 | 228 | 123 | 4 | | | | | 78,909 | 36,199 | 3,934.077 | 0.11 |
| (3) Transients, Actual | 10,423 | 9,368 | 4,711 | 3,084 | 1,172 | 529 | 374 | 21 | 1 | | | | 29,683 | 19,260 | 3,934.077 | 0.20 |
| **Corrected Distribution (1-[2-3]) **** | **78,566** | **35,816** | **11,131** | **6,076** | **2,155** | **920** | **879** | **116** | **19** | **3** | **-** | **-** | **135,681** | **57,115** | **8,747.160** | **0.15** |

* 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.

For example, in 2013, Table 5.1 shows that the initial summation (see line [2] Transients, As Reported) of the Form 5 reports for reactor licensees indicated that one individual received a dose greater than 2.0 rems. After accounting for those individuals who were reported more than once, the corrected distribution indicated that there were 18 transient individuals who received doses between 2.0 rems and 3.0 rems. 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 nearly twice as high as the value calculated by the summation of the Form 5 records. The transient individuals represent 34 percent of the workforce that receives a measurable dose. The correction for the transient individuals increases the average measurable dose by a factor of nearly 2 from 0.11 rem to 0.20 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 rems per year regulatory limit (TEDE) would be identified in Table 5.1 in one of the dose ranges greater than 5 rems. In 2013, there were 116 unique individuals receiving doses between 2–3 rems, 19 individuals receiving between 3–4 rems, 3 individuals receiving between 4–5 rems, and no individuals exceeding 5 rems, as reported by NRC licensees to the REIRS data base.

# Section 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 rems or more, a lens dose equivalent of 75 rems or more, or a shallow-dose equivalent to the skin or extremities of 250 rads 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 rems, a lens dose equivalent exceeding 15 rems, or a shallow-dose equivalent to the skin or extremities exceeding 50 rems.

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 2003 through 2013. 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 only
- occupational radiation doses in excess of the annual 5 rems regulatory limit,
- events at NRC-licensed facilities, and
- the final 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 2013, there were no Category A, B, or C occurrences reported under the licensed activities included in this report.

## 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 rems has been greater than 99 percent. No individual monitored at any of the five NRC licensee categories included in this report received a dose above the 5-rem annual regulatory limit (TEDE) during the past 10 years.

**Table 6.1 Summary of Annual Dose Distributions for Certain* NRC Licensees 2003–2013**

| Year | Total Number of Monitored Individuals | | Individuals with Dose (TEDE) *** | | | | Individuals with Dose >12 rem TEDE *** |
|---|---|---|---|---|---|---|---|
| | | | < 2 rem | > 2 rem | < 5 rem | > 5 rem | |
| | Reported Number | Corrected Number ** | % | Number | % | Number | |
| 2003 | 166,347 | 122,421 | 99.7% | 422 | 100% | - | - |
| 2004 | 164,526 | 123,345 | 99.7% | 371 | 100% | - | - |
| 2005 | 174,550 | 126,805 | 99.7% | 347 | 100% | - | - |
| 2006 | 176,630 | 127,306 | 99.8% | 211 | 100% | - | - |
| 2007 | 177,261 | 126,738 | 99.8% | 246 | 100% | - | - |
| 2008 | 182,094 | 130,439 | 99.9% | 168 | 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 | 184,907 | 135,681 | 99.8% | 138 | 100% | - | - |

* 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 2003–2013 are based on the distribution of individual doses after adjusting for the multiple counting of transient individuals (see Section 5).

## 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 for 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, few doses exceed half of the NRC occupational annual limits. In 2013, eight individuals exceeded 75 percent of the TEDE dose limit and no individuals exceeded 95 percent of the TEDE dose limit. In addition, no individual exceeded any of the annual occupational dose limits.

## Table 6.2 Maximum Occupational Doses for Each Exposure Category* 2013

| 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 | 38.500 | 77% | 52,003 | 45 | 4 | 1 | - | - |
| SDE-WB | 50 rem | 4.161 | 8% | 57,254 | - | - | - | - | - |
| LDE | 15 rem | 4.161 | 28% | 56,220 | 8 | - | - | - | - |
| CEDE | | 0.754 | | 2,923 | | | | | |
| CDE | | 6.279 | | 2,126 | | | | | |
| DDE | | 4.120 | | 56,870 | | | | | |
| TEDE | 5 rem | 4.120 | 82% | 57,115 | 602 | 52 | 8 | - | - |
| TODE | 50 rem | 6.463 | 13% | 56,961 | - | - | - | - | - |

* 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.

# Section 7
# References


1. *Monthly Operating Report Data,* provided by the Institute of Nuclear Power Operations (INPO) and compiled by Idaho National Laboratory's Risk Assessment and Management Services Department under contract to the NRC.

2. National Council on Radiation Protection and Measurements, *Ionizing Radiation Exposure of the Population of the United States*, Report No. 160, 2009.

3. United Nations, *Sources and Effects of Ionizing Radiation, United Nations Scientific Committee on the Effects of Atomic Radiation UNSCEAR 2008 Report to the General Assembly, Volume I,* General Assembly of Official Records, United Nations, New York, 2010.

4. International Commission on Radiological Protection Publication 103, *The 2007 Recommendations of the International Commission on Radiological Protection*, Annals of the ICRP 37 (2–4), 2007.

5. U.S. Atomic Energy Commission, *Nuclear Power Plant Operating Experience During 1973*, USAEC Report 00E-ES-004, December 1974.*

6. U.S. Nuclear Regulatory Commission, *Nuclear Power Plant Operating Experience—1974–1975,* USNRC Report NUREG-0227, April 1977.*

7. U.S. Nuclear Regulatory Commission, *Nuclear Power Plant Operating Experience—1976*, USNRC Report NUREG-0366, December 1977.*

8. U.S. Nuclear Regulatory Commission, *Nuclear Power Plant Operating Experience—1977*, USNRC Report NUREG-0483, February 1979.*

9. U.S. Nuclear Regulatory Commission, *Nuclear Power Plant Operating Experience—1978*, USNRC Report NUREG-0618, December 1979.*

10. U.S. Nuclear Regulatory Commission, *Nuclear Power Plant Operating Experience—1979*, USNRC Report NUREG/CR-1496, May 1981.*

11. U.S. Nuclear Regulatory Commission, *Nuclear Power Plant Operating Experience—1980*, USNRC Report NUREG/CR-2378, ORNL/NSIC-191, October 1982.*

12. U.S. Nuclear Regulatory Commission, *Nuclear Power Plant Operating Experience—1981*, USNRC Report NUREG/CR-3430, ORNL/NSIC-215, Vol. 1, December 1983.*


* 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.

13. U.S. Nuclear Regulatory Commission, *Nuclear Power Plant Operating Experience—1982*, USNRC Report NUREG/CR-3430, ORNL/NSIC-215, Vol. 2, January 1985.*

14. U.S. Nuclear Regulatory Commission, *Instructions for Recording and Reporting Occupational Radiation Exposure Data*, USNRC Regulatory Guide 8.7, Rev. 2, November 2005.

15. 10 CFR Part 72, *Licensing Requirements for the Independent Storage of Spent Nuclear Fuel, High-Level Radioactive Waste, and Reactor-Related Greater than Class C Waste*. July 18, 1990.

16. International Commission on Radiological Protection Publication 30, *Limits for Intakes of Radionuclides by Workers*, Annals of the ICRP, Volume 2 No 3/4, 1972.

17. International Commission on Radiological Protection Publication 68, *Dose Coefficients for Intakes of Radionuclides by Workers*, Annals of the ICRP, Volume 24/4, December 1994.

18. U.S. Nuclear Regulatory Commission, *2013–2014 Information Digest*, USNRC Report NUREG-1350, Volume 25, August 2013.

19. U.S. Nuclear Regulatory Commission, Division of Waste Management and Environmental Protection, Office of Federal and State Materials and Environmental Management Programs, *Status of the Decommissioning Program, 2013 Annual Report*, ADAMS Accession No. ML13311A526.

20. U.S. Nuclear Regulatory Commission, *Locations of Power Reactor Sites Undergoing Decommissioning*. Available at: http://www.nrc.gov/info-finder/decommissioning/power-reactor/—last accessed July 2013.

21. http://www.nrc.gov/reading-rm/basic-ref/glossary.html—last accessed July 2013.

22. B. Shleien, L. A. Slaback Jr, B. Birky, editors, *Handbook of Health Physics and Radiological Health, 3rd ed*. Lippincott Williams & Wilkins, 1998.

* 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.

Appendix A

# ANNUAL TEDE FOR NONREACTOR NRC LICENSEES AND OTHER FACILITIES REPORTING TO THE NRC

## 2013

# APPENDIX A

## Table A1 Annual TEDE for Nonreactor NRC Licensees 2013

| 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 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.00-5.00 | 5.00-6.00 | 6.00-12.00 | >12.0 | | | | |
| ***INDUSTRIAL RADIOGRAPHY – FIXED LOCATION – 03310*** | | | | | | | | | | | | | | | | | | |
| AMERICAN CASTINGS | 35-18099-01 | 1 | 2 | - | - | - | - | - | - | - | - | - | - | - | 3 | 2 | 0.039 | 0.020 |
| DURALOY TECHNOLOGIES, INC. | 37-02279-02 | 1 | 4 | 2 | - | - | - | - | - | - | - | - | - | - | 7 | 6 | 0.565 | **0.094** |
| HARRISON STEEL CASTINGS CO. | 13-02141-01 | 3 | 2 | 1 | - | | | | | | | | | | 6 | 3 | 0.215 | 0.072 |
| METALTEK INTERNATIONAL | 24-26136-01 | 1 | 3 | 5 | - | - | - | - | - | - | - | - | - | - | **9** | **8** | **0.722** | 0.090 |
| **Total** | **4** | **6** | **11** | **8** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **25** | **19** | **1.541** | **0.081** |
| ***INDUSTRIAL RADIOGRAPHY – TEMPORARY JOB SITE – 03320*** | | | | | | | | | | | | | | | | | | |
| ACUREN INSPECTION, INC. | 42-27593-01 | 5 | 6 | 7 | 7 | 3 | - | 9 | - | - | - | - | - | - | 37 | 32 | 18.937 | 0.592 |
| ACUREN USA, INC. | 50-32443-01 | 6 | 67 | 31 | 33 | 29 | 9 | 10 | | - | - | - | - | - | 185 | 179 | 58.079 | 0.324 |
| ADVEX CORPORATION | 45-16452-01 | - | 2 | 1 | 2 | - | 1 | - | - | - | - | - | - | - | 6 | 6 | 1.792 | 0.299 |
| ALASKA INDUSTRIAL X-RAY | 50-16084-01 | - | 5 | 4 | 1 | - | 1 | - | - | - | - | - | - | - | 11 | 11 | 2.249 | 0.204 |
| ALLIED INSPECTION SERVICES, INC. | 21-18428-01 | 1 | - | 1 | - | - | - | 1 | - | - | - | - | - | - | 3 | 2 | 1.668 | 0.834 |
| ALONSO & CARUS IRON WORKS, INC. | 52-21350-01 | - | 1 | 2 | - | - | - | - | - | - | - | - | - | - | 3 | 3 | 0.361 | 0.120 |
| AMERICAN ENGINEERING TESTING, INC. | 22-20271-02 | - | 1 | 1 | 2 | 1 | 1 | 2 | 1 | - | - | - | - | - | 9 | 9 | 7.943 | 0.883 |
| BAKER INSPECTION GROUP, LLC | 34-32570-01 | 4 | 10 | 1 | - | - | - | 2 | - | - | - | - | - | - | 17 | 13 | 2.736 | 0.210 |
| CALUMET TESTING SERVICES, INC. | 13-16347-01 | 4 | 6 | 1 | - | 1 | - | 6 | 1 | - | - | - | - | - | 19 | 15 | 11.319 | 0.755 |
| CANYON STATE INSPECTION | 02-29359-01 | 4 | 11 | 1 | 1 | - | 1 | - | - | - | - | - | - | - | 18 | 14 | 1.707 | 0.122 |
| CENTURY INSPECTION, INC. | 42-08456-02 | 20 | 21 | 10 | 10 | 2 | 3 | 1 | - | - | - | - | - | - | 67 | 47 | 11.413 | 0.243 |
| CLEARWATER ENVIRONMENTAL | 11-27746-01 | 3 | 2 | - | - | - | - | - | - | - | - | - | - | - | 5 | 2 | 0.074 | 0.037 |
| COMO TECH INSPECTION | 15-26978-01 | - | 1 | 1 | 2 | - | - | - | - | - | - | - | - | - | 4 | 4 | 1.237 | 0.309 |
| CONCRETE IMAGING, INC. | 47-31316-01 | 1 | 2 | - | 1 | 1 | 1 | - | - | - | - | - | - | - | 6 | 5 | 1.967 | 0.393 |
| CONSUMERS POWER COMPANY | 21-08606-03 | 17 | 6 | 5 | 7 | 1 | 1 | - | - | - | - | - | - | - | 37 | 20 | 5.078 | 0.254 |
| DBI, INC. | 26-29301-01 | 1 | 8 | 9 | 11 | 11 | 6 | 9 | 7 | 2 | - | - | - | - | 64 | 63 | 54.105 | 0.859 |
| DIAMOND TECHNICAL SERVICES, INC. | 37-31259-01 | 6 | 9 | 8 | 9 | 5 | 1 | 1 | - | - | - | - | - | - | 39 | 33 | 9.710 | 0.294 |
| DOMINION NDT SERVICES | 45-35118-01 | 1 | 2 | 1 | 2 | - | 1 | 1 | - | - | - | - | - | - | 8 | 7 | 3.057 | 0.437 |
| ENGINEERING & INSPECTIONS - HAWAII | 53-27731-01 | 1 | 1 | - | - | - | - | 2 | - | - | - | - | - | - | 4 | 3 | 2.046 | 0.682 |

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.

## APPENDIX A

## Table A1 Annual TEDE for Nonreactor NRC Licensees 2013 (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 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.00-5.00 | 5.00-6.00 | 6.00-12.00 | >12.0 | | | | |
| ***INDUSTRIAL RADIOGRAPHY – TEMPORARY JOB SITE – 03320 (Continued)*** | | | | | | | | | | | | | | | | | | |
| GENERAL DYNAMICS CORP - ELEC BOAT | 06-01781-08 | 4 | 13 | - | - | - | - | - | - | - | - | - | - | - | 17 | 13 | 0.463 | 0.036 |
| GENERAL TESTING & INSPECTION CO. | 47-32191-01 | - | 1 | - | 1 | - | - | - | - | - | - | - | - | - | 2 | 2 | 0.346 | 0.173 |
| GLOBAL X-RAY & TESTING CORP. | 17-29308-01 | 8 | 53 | 10 | 25 | 9 | 3 | 13 | 3 | 2 | - | - | - | - | 126 | 118 | 56.162 | 0.476 |
| H & H X-RAY SERVICES, INC. | 17-19236-01 | - | 13 | 15 | 17 | 25 | 17 | 44 | 19 | - | - | - | - | - | 150 | 150 | 145.156 | 0.968 |
| HIGH COUNTRY FABRICATION | 49-29300-01 | 2 | 7 | - | 1 | - | - | - | - | - | - | - | - | - | 10 | 8 | 0.766 | 0.096 |
| HIGH MOUNTAIN INSPECTION SERVICES | 49-26808-02 | 1 | 10 | 4 | 9 | 5 | 3 | 29 | 9 | 5 | 1 | - | - | - | 76 | 75 | 96.922 | 1.292 |
| HUNTINGTON TESTING & TECHNOLOGY | 47-23076-01 | 7 | 9 | 5 | 4 | 1 | 3 | 8 | 2 | - | - | - | - | - | 39 | 32 | 22.124 | 0.691 |
| INTEGRITY TESTLAB | 07-30791-01 | 4 | 7 | 6 | 7 | 9 | 6 | 2 | - | - | - | - | - | - | 41 | 37 | 17.730 | 0.479 |
| JANX INTEGRITY GROUP | 21-16560-01 | 154 | 62 | 59 | 123 | 119 | 77 | 123 | 33 | 4 | - | - | - | - | **754** | **600** | **455.398** | 0.759 |
| KAKIVIK ASSET MANAGEMENT | 50-27667-01 | 35 | 34 | 20 | 36 | 16 | 7 | 4 | - | - | - | - | - | - | 152 | 117 | 38.755 | 0.331 |
| LEHIGH TESTING LABORATORIES, INC. | 07-01173-03 | 1 | 2 | - | - | - | - | - | - | - | - | - | - | - | 3 | 2 | 0.013 | 0.007 |
| LKS INSPECTION SERVICES, LLC | 53-27795-01 | 1 | - | 1 | 1 | 1 | - | 1 | - | - | - | - | - | - | 5 | 4 | 2.510 | 0.628 |
| MARYLAND Q.C. LABORATORIES, INC. | 19-28683-01 | 5 | 8 | 3 | - | 2 | - | - | - | - | - | - | - | - | 18 | 13 | 1.980 | 0.152 |
| MATERIALS INTEGRITY, INC. | 50-27722-01 | - | 3 | 1 | - | - | - | - | - | - | - | - | - | - | 4 | 4 | 0.250 | 0.063 |
| MET-CHEM TESTING LABS OF UTAH, INC. | 43-27362-01 | - | 8 | 1 | 1 | - | 1 | - | - | - | - | - | - | - | 11 | 11 | 1.694 | 0.154 |
| METALS TESTING SERVICES, INC. | 25-29406-01 | 1 | 1 | 2 | 1 | - | - | 7 | 3 | - | - | - | - | - | 15 | 14 | 19.458 | 1.390 |
| NONDESTRUCTIVE & VISUAL INSPECTION | 17-29410-01 | - | 7 | 7 | 6 | 15 | 8 | 26 | 1 | 1 | - | - | - | - | 71 | 71 | 61.519 | 0.866 |
| POLE BROTHERS IMAGING COMPANY | 45-25383-01 | - | - | 2 | - | 1 | - | - | - | - | 1 | - | - | - | 4 | 4 | 5.123 | 1.281 |
| PRIME NDT SERVICES, INC. | 37-23370-01 | 6 | 12 | 9 | 13 | 15 | 4 | 20 | 6 | 3 | 1 | - | - | - | 89 | 83 | 74.661 | 0.900 |
| PROFESSIONAL SERVICES IND., INC. | 12-16941-01 | - | - | - | - | - | - | - | - | 1 | - | - | - | - | 1 | 1 | 3.100 | **3.100** |
| QUALITY CONTROL INSPECTION & TESTING LABORATORIES | 11-29245-01 | - | - | 1 | 1 | - | 1 | 3 | - | - | - | - | - | - | 6 | 6 | 5.282 | 0.880 |
| QUALITY INSPECTION & TESTING | 50-29038-01 | - | 1 | - | 1 | 1 | 2 | 1 | - | - | - | - | - | - | 6 | 6 | 4.018 | 0.670 |
| QUALITY INSPECTION SERVICES, INC. | 31-30187-01 | 2 | 8 | 1 | 2 | 1 | - | - | - | - | - | - | - | - | 14 | 12 | 1.523 | 0.127 |
| SCIENTIFIC TECHNICAL, INC. | 45-24882-01 | 4 | 2 | 1 | - | 1 | - | - | - | - | - | - | - | - | 8 | 4 | 0.775 | 0.194 |

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.

## APPENDIX A
## Table A1 Annual TEDE for Nonreactor NRC Licensees 2013 (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 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.00-5.00 | 5.00-6.00 | 6.00-12.00 | >12.0 | | | | |
| ***INDUSTRIAL RADIOGRAPHY – TEMPORARY JOB SITE – 03320 (Continued)*** | | | | | | | | | | | | | | | | | | |
| SHAW PIPELINE SERVICES, INC. | 35-23193-03 | 58 | 47 | 56 | 52 | 58 | 22 | 36 | 2 | - | - | - | - | - | 331 | 273 | 136.849 | 0.501 |
| SOUTHWEST X-RAY CORP | 49-29277-01 | - | - | - | 1 | 2 | 1 | - | - | - | - | - | - | - | 4 | 4 | 2.411 | 0.603 |
| SYSTEM ONE SERVICES, INC | 37-27891-02 | - | 4 | 4 | 4 | 1 | 3 | 7 | - | - | - | - | - | - | 23 | 23 | 15.169 | 0.660 |
| T & K INSPECTION, INC. | 33-27678-01 | - | - | 2 | 6 | 1 | 3 | 7 | 7 | - | - | - | - | - | 26 | 26 | 32.503 | 1.250 |
| TECH CORR USA, LLC | 42-29261-01 | - | 5 | 2 | 5 | - | 1 | 2 | - | - | - | - | - | - | 15 | 15 | 5.725 | 0.382 |
| TEI ANALYTICAL SERVICES, INC. | 37-28004-01 | 3 | 11 | 10 | 15 | 14 | 15 | 33 | 3 | - | - | - | - | - | 104 | 101 | 82.245 | 0.814 |
| TESTING TECHNOLOGIES, INC. | 45-25007-01 | 2 | 8 | 4 | 3 | 4 | 1 | 1 | - | - | - | - | - | - | 23 | 21 | 6.701 | 0.319 |
| TUV RHEINLAND INDUSTRIAL SOLUTIONS | 37-32340-02 | - | 3 | 2 | 2 | - | - | - | - | - | - | - | - | - | 7 | 7 | 1.128 | 0.161 |
| TVA - INSPECTION SERVICES ORG | 41-06832-06 | 15 | 3 | - | - | - | - | - | - | - | - | - | - | - | 18 | 3 | 0.042 | 0.014 |
| URS ENERGY AND CONSTRUCTION | 12-31469-01 | 13 | 28 | 6 | 4 | - | - | - | - | - | - | - | - | - | 51 | 38 | 3.102 | 0.082 |
| WELDSONIX, INC. | 42-29354-01 | 1 | 7 | 11 | 11 | 12 | 5 | 4 | - | - | - | - | - | - | 51 | 50 | 22.996 | 0.460 |
| WR NON DESTRUCTIVE TESTING, INC. | 52-25538-01 | 1 | 4 | 1 | - | - | - | - | - | - | - | - | - | - | 6 | 5 | 0.263 | 0.053 |
| **Total** | **55** | **402** | **542** | **330** | **440** | **367** | **209** | **415** | **97** | **18** | **3** | **-** | **-** | **-** | **2,823** | **2,421** | **1,520.34** | **0.628** |
| ***MANUFACTURING AND DISTRIBUTION – NUCLEAR PHARMACIES – 02500*** | | | | | | | | | | | | | | | | | | |
| ADVANCED ISOTOPES OF IDAHO | 11-29216-01MD | 2 | 18 | 3 | 1 | - | 1 | - | - | - | - | - | - | - | 25 | 23 | 2.573 | 0.112 |
| CARDINAL HEALTH | 04-26507-01MD | 9 | 13 | - | - | - | - | - | - | - | - | - | - | - | 22 | 13 | 0.298 | 0.023 |
| CARDINAL HEALTH | 11-27664-01MD | 6 | 13 | 3 | 1 | - | - | - | - | - | - | - | - | - | 23 | 17 | 1.230 | 0.072 |
| CARDINAL HEALTH | 34-29200-01MD | 124 | 153 | 17 | 7 | 5 | - | 2 | - | - | - | - | - | - | **308** | **184** | **14.051** | 0.076 |
| CARDINAL HEALTH | 34-34473-02MD | - | 8 | - | - | - | - | - | - | - | - | - | - | - | 8 | 8 | 0.123 | 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.

## APPENDIX A

## Table A1 Annual TEDE for Nonreactor NRC Licensees 2013 (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 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.00-5.00 | 5.00-6.00 | 6.00-12.00 | >12.0 | | | | |
| ***MANUFACTURING AND DISTRIBUTION – NUCLEAR PHARMACIES – 02500 (Continued)*** | | | | | | | | | | | | | | | | | | |
| CARDINAL HEALTH | 47-25322-01MD | 7 | 2 | 2 | - | - | - | - | - | - | - | - | - | - | 11 | 4 | 0.325 | 0.081 |
| GE HEALTHCARE - KENTWOOD | 21-26707-01MD | 1 | 5 | 2 | - | - | - | - | - | - | - | - | - | - | 8 | 7 | 0.464 | 0.066 |
| GE HEALTHCARE - LIVONIA | 21-24828-01MD | 10 | 8 | 1 | - | - | - | - | - | - | - | - | - | - | 19 | 9 | 0.479 | 0.053 |
| GE HEALTHCARE - ST. LOUIS/OVERLAND | 24-32462-01MD | 6 | 3 | - | - | - | - | - | - | - | - | - | - | - | 9 | 3 | 0.104 | 0.035 |
| MID-AMERICA ISOTOPES, INC. | 24-26241-01MD | 19 | 3 | 2 | 3 | - | - | 1 | - | - | - | - | - | - | 28 | 9 | 2.632 | 0.292 |
| RADIOPHARMACY, INC. | 13-26246-01MD | 22 | 3 | 2 | - | - | - | - | - | - | - | - | - | - | 27 | 5 | 0.344 | 0.069 |
| RADIOPHARMACY OF INDIANAPOLIS | 13-32637-01MD | 14 | 1 | - | 3 | 1 | - | - | - | - | - | - | - | - | 19 | 5 | 1.527 | 0.305 |
| SPECTRON MRC, LLC | 13-32726-01MD | 8 | 2 | 1 | 1 | 2 | - | 1 | - | - | - | - | - | - | 15 | 7 | 3.565 | **0.509** |
| TRIAD ISOTOPES | 09-32781-01MD | 6 | 7 | 1 | - | - | - | - | - | - | - | - | - | - | 14 | 8 | 0.519 | 0.065 |
| TRIAD ISOTOPES | 09-32781-04MD | 7 | 14 | - | - | - | - | - | - | - | - | - | - | - | 21 | 14 | 0.417 | 0.030 |
| **Total** | **15** | **241** | **253** | **34** | **16** | **8** | **1** | **4** | **-** | **-** | **-** | **-** | **-** | **-** | **557** | **316** | **28.651** | **0.091** |
| ***MANUFACTURING AND DISTRIBUTION – TYPE "A" BROAD – 03211*** | | | | | | | | | | | | | | | | | | |
| INTERNATIONAL ISOTOPES IDAHO, INC. | 11-27680-01 | - | - | 3 | 4 | 5 | 1 | 4 | - | - | - | - | - | - | 17 | 17 | 12.558 | **0.739** |
| MALLINCKRODT, LLC | 24-04206-01 | 98 | 128 | 53 | 44 | 28 | 10 | 13 | - | - | - | - | - | - | **374** | **276** | **71.594** | 0.259 |
| **Total** | **2** | **98** | **128** | **56** | **48** | **33** | **11** | **17** | **-** | **-** | **-** | **-** | **-** | **-** | **391** | **293** | **84.152** | **0.287** |
| ***MANUFACTURING AND DISTRIBUTION – OTHER – 03214*** | | | | | | | | | | | | | | | | | | |
| BEST THERATRONICS | 45-31299-01 | - | 1 | - | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 0.033 | 0.033 |
| I2S, LLC | 06-21253-01 | 15 | 1 | 1 | - | - | - | - | - | - | - | - | - | - | 17 | 2 | 0.263 | **0.132** |
| RONAN ENGINEERING COMPANY | AS-NMMSS-31 | 13 | 12 | - | 2 | 1 | - | - | - | - | - | - | - | - | **28** | **15** | **1.451** | 0.097 |
| **Total** | **3** | **28** | **14** | **1** | **2** | **1** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **46** | **18** | **1.747** | **0.097** |

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.

## APPENDIX A

### Table A1 Annual TEDE for Nonreactor NRC Licensees 2013 (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 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.00-5.00 | 5.00-6.00 | 6.00-12.00 | >12.0 | | | | |
| ***INDEPENDENT SPENT FUEL STORAGE INSTALLATION – 23200*** | | | | | | | | | | | | | | | | | | |
| GENERAL ELECTRIC - MORRIS ISFSI | SNM-2500 | 2 | 12 | 3 | 3 | - | - | - | - | - | - | - | - | - | 20 | **18** | **1.533** | **0.085** |
| TROJAN - ISFSI | SNM-2509 | 33 | - | - | - | - | - | - | - | - | - | - | - | - | **33** | - | - | - |
| **Total** | **2** | **35** | **12** | **3** | **3** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **53** | **18** | **1.533** | **0.085** |
| ***URANIUM HEXAFLUORIDE ($UF_6$) PRODUCTION PLANTS – 11400*** | | | | | | | | | | | | | | | | | | |
| HONEYWELL INTERNATIONAL, INC. | SUB-0526 | 51 | 877 | 140 | 26 | 7 | 4 | - | - | - | - | - | - | - | **1,105** | **1,054** | **63.197** | **0.060** |
| **Total** | **1** | **51** | **877** | **140** | **26** | **7** | **4** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **1,105** | **1,054** | **63.197** | **0.060** |
| ***FUEL CYCLE URANIUM ENRICHMENT PLANTS – 21200*** | | | | | | | | | | | | | | | | | | |
| USEC, INC. | SNM-7003 | 676 | 4 | - | - | - | - | - | - | - | - | - | - | - | 680 | 4 | 0.097 | 0.024 |
| USEC - PADUCAH GDP | GDP-1 | 1,361 | 94 | 13 | - | - | - | - | - | - | - | - | - | - | **1,468** | **107** | **4.576** | **0.043** |
| **Total** | **2** | **2,037** | **98** | **13** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **2,148** | **111** | **4.673** | **0.042** |
| ***FUEL CYCLE FUEL FABRICATION FACILITIES – 21210*** | | | | | | | | | | | | | | | | | | |
| AREVA NP, INC. - RICHLAND | SNM-1227 | 312 | 684 | 50 | 84 | 43 | 13 | - | - | - | - | - | - | - | 1,186 | **874** | 92.675 | 0.106 |
| B & W NUCLEAR OPERATIONS GROUP | SNM-0042 | 39 | 155 | 28 | 1 | 2 | - | 1 | - | - | - | - | - | - | 226 | 187 | 11.624 | 0.062 |
| GLOBAL NUCLEAR FUEL - AMERICAS, LLC | SNM-1097 | 301 | 394 | 152 | 60 | 5 | - | - | - | - | - | - | - | - | 912 | 611 | 57.324 | 0.094 |
| NUCLEAR FUEL SERVICES, INC. | SNM-0124 | 597 | 561 | 46 | - | - | - | - | - | - | - | - | - | - | **1,204** | 607 | 16.054 | 0.026 |
| WESTINGHOUSE ELECTRIC COMPANY | SNM-1107 | 197 | 149 | 148 | 167 | 33 | 1 | - | - | - | - | - | - | - | 695 | 498 | **111.520** | **0.224** |
| **Total** | **5** | **1,446** | **1,943** | **424** | **312** | **83** | **14** | **1** | **-** | **-** | **-** | **-** | **-** | **-** | **4,223** | **2,777** | **289.197** | **0.104** |

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.

## APPENDIX A

## Table A2 Other Facilities Reporting to the NRC 2013

| 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 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.00-5.00 | 5.00-6.00 | 6.00-12.00 | >12.0 | | | | |
| ***MEASURING SYSTEMS FIXED GAUGES – 03120*** | | | | | | | | | | | | | | | | | | |
| ANR PIPELINE COMPANY | 21-29258-01 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | **1** | - | - | - |
| **Total** | **1** | **1** | - | - | - | - | - | - | - | - | - | - | - | - | **1** | - | - | - |
| ***INSTRUMENT CALIBRATION SERVICE ONLY – SOURCE > 100 CURIES – 03222*** | | | | | | | | | | | | | | | | | | |
| GENERAL DYNAMICS CORP - ELEC BOAT | 06-01781-03 | 2 | 3 | - | - | - | - | - | - | - | - | - | - | - | **5** | **3** | **0.014** | **0.005** |
| **Total** | **1** | **2** | **3** | - | - | - | - | - | - | - | - | - | - | - | **5** | **3** | **0.014** | **0.005** |
| ***IRRADIATORS OTHER GREATER THAN 10,000 CURIES - 03521*** | | | | | | | | | | | | | | | | | | |
| ARMED FORCES RADIOBIOLOGY RESEARCH INSTITUTE | 19-08330-02 | 40 | 31 | - | - | - | | | - | - | - | - | - | - | **71** | **31** | **0.420** | **0.014** |
| **Total** | **1** | **40** | **31** | - | - | - | - | - | - | - | - | - | - | - | **71** | **31** | **0.420** | **0.014** |
| ***MASTER MATERIALS - ISSUED TO GOVERNMENT AGENCIES - 03614*** | | | | | | | | | | | | | | | | | | |
| NAVY, DEPARTMENT OF THE | 10-44466-A1NP | 7 | 13 | 1 | - | - | - | - | - | - | - | - | - | - | 21 | 14 | 0.342 | 0.024 |
| NAVY, DEPARTMENT OF THE | 12-3203A-A1NP | 8 | 1 | - | - | - | - | - | - | - | - | - | - | - | 9 | 1 | 0.005 | 0.005 |
| NAVY, DEPARTMENT OF THE | 19-42794-A1NP | 1 | 1 | - | - | - | - | - | - | - | - | - | - | - | 2 | 1 | 0.005 | 0.005 |
| NAVY, DEPARTMENT OF THE | 28-39040-A1NP | 9 | 24 | - | - | - | - | - | - | - | - | - | - | - | 33 | 24 | 0.346 | 0.014 |
| NAVY, DEPARTMENT OF THE | 45-42158-A1NP | 34 | 28 | 6 | - | - | - | - | - | - | - | - | - | - | **68** | 34 | 1.481 | **0.044** |
| NAVY, DEPARTMENT OF THE | 46-4523A-A2NP | 15 | 39 | 5 | - | - | - | - | - | - | - | - | - | - | 59 | **44** | **1.626** | 0.037 |
| NAVY, DEPARTMENT OF THE | 53-32253-A1NP | 6 | 16 | 3 | - | - | - | - | - | - | - | - | - | - | 25 | 19 | 0.574 | 0.030 |
| NAVY, DEPARTMENT OF THE | 59-45255-A1NP | 10 | - | - | - | - | - | - | - | - | - | - | - | - | 10 | - | - | - |
| **Total** | **8** | **90** | **122** | **15** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **227** | **137** | **4.379** | **0.032** |
| ***CRITICAL MASS MATERIAL - OTHER THAN UNIVERSITIES – 21320*** | | | | | | | | | | | | | | | | | | |
| G.E. - HITACHI (VALLECITOS NUCLEAR CENTER) | SNM-0960 | 137 | 91 | 10 | 4 | 9 | 2 | - | - | - | - | - | - | - | **253** | **116** | **11.619** | **0.100** |
| **Total** | **1** | **137** | **91** | **10** | **4** | **9** | **2** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **253** | **116** | **11.619** | **0.100** |

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.

## APPENDIX A

### Table A2 Other Facilities Reporting to the NRC 2013 (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 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.00-5.00 | 5.00-6.00 | 6.00-12.00 | >12.0 | | | | |
| ***TEST REACTOR FACILITIES – 42140*** | | | | | | | | | | | | | | | | | | |
| NAT'L INSTITUTE OF STANDARDS & TECH | TR-5 | 20 | 90 | 20 | 3 | - | 1 | - | - | - | - | - | - | - | **134** | **114** | **7.292** | **0.064** |
| **Total** | **1** | **20** | **90** | **20** | **3** | **-** | **1** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **134** | **114** | **7.292** | **0.064** |
| ***PROGRAM CODE – 42150*** | | | | | | | | | | | | | | | | | | |
| AEROTEST OPERATIONS, INC. | R-98 | 4 | 2 | - | - | - | - | - | - | - | - | - | - | - | **6** | **2** | **0.064** | **0.032** |
| **Total** | **1** | **4** | **2** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **6** | **2** | **0.064** | **0.032** |

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

## 2013

# APPENDIX B
## Annual Doses* at Licensed Nuclear Power Facilities
## 2013

| 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 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.00-5.00 | 5.00-6.00 | 6.00-7.00 | 7.00-12.00 | >12.0 | | | |
| ARKANSAS 1, 2 | PWR | 1,587 | 965 | 116 | 17 | - | - | - | - | - | - | - | - | - | - | 2,685 | 1,098 | 50.041 |
| BEAVER VALLEY 1, 2 | PWR | 2,022 | 633 | 104 | 9 | - | - | - | - | - | - | - | - | - | - | 2,768 | 746 | 41.712 |
| BRAIDWOOD 1, 2 | PWR | 2,016 | 557 | 62 | 12 | 2 | - | - | - | - | - | - | - | - | - | 2,649 | 633 | 31.847 |
| BROWNS FERRY 1, 2, 3 | BWR | 2,015 | 1,366 | 687 | 357 | 106 | 17 | 10 | - | - | - | - | - | - | - | 4,558 | 2,543 | 382.609 |
| BRUNSWICK 1, 2 | BWR | 2,296 | 2,919 | 710 | 273 | 56 | 18 | 2 | - | - | - | - | - | - | - | 6,274 | 3,978 | 361.148 |
| BYRON 1, 2 | PWR | 1,766 | 836 | 155 | 10 | 1 | - | - | - | - | - | - | - | - | - | 2,768 | 1,002 | 57.708 |
| CALLAWAY 1 | PWR | 1,056 | 542 | 121 | 17 | - | - | - | - | - | - | - | - | - | - | 1,736 | 680 | 43.123 |
| CALVERT CLIFFS 1, 2 | PWR | 1,603 | 374 | 141 | 54 | 10 | 1 | - | - | - | - | - | - | - | - | 2,183 | 580 | 61.079 |
| CATAWBA 1, 2 | PWR | 2,494 | 784 | 215 | 49 | 5 | - | - | - | - | - | - | - | - | - | 3,547 | 1,053 | 82.906 |
| CLINTON | BWR | 1,940 | 744 | 323 | 87 | 24 | 2 | 2 | - | - | - | - | - | - | - | 3,122 | 1,182 | 128.781 |
| COLUMBIA GENERATING | BWR | 940 | 1,182 | 319 | 180 | 76 | 23 | 7 | - | - | - | - | - | - | - | 2,727 | 1,787 | 223.809 |
| COMANCHE PEAK 1, 2 | PWR | 1,664 | 613 | 118 | 14 | - | - | - | - | - | - | - | - | - | - | 2,409 | 745 | 45.237 |
| COOK 1, 2 | PWR | 2,607 | 878 | 215 | 78 | 15 | 1 | - | - | - | - | - | - | - | - | 3,794 | 1,187 | 103.772 |
| COOPER STATION | BWR | 578 | 421 | 108 | 19 | - | - | - | - | - | - | - | - | - | - | 1,126 | 548 | 35.870 |
| DAVIS-BESSE | PWR | 1,634 | 91 | 1 | - | - | - | - | - | - | - | - | - | - | - | 1,726 | 92 | 2.558 |
| DIABLO CANYON 1, 2 | PWR | 1,916 | 698 | 56 | 6 | - | - | - | - | - | - | - | - | - | - | 2,676 | 760 | 28.767 |
| DRESDEN 2, 3 | BWR | 1,709 | 1,420 | 297 | 99 | 7 | - | - | - | - | - | - | - | - | - | 3,532 | 1,823 | 136.942 |
| DUANE ARNOLD | BWR | 0 | - | 44 | 9 | - | - | - | - | - | - | - | - | - | - | 53 | 53 | 8.996 |
| FARLEY 1, 2 | PWR | 1,842 | 624 | 124 | 25 | 2 | - | - | - | - | - | - | - | - | - | 2,617 | 775 | 53.212 |
| FERMI 2 | BWR | 1,393 | 630 | 67 | 7 | - | - | - | - | - | - | - | - | - | - | 2,097 | 704 | 26.179 |
| FITZPATRICK | BWR | 414 | 474 | 86 | 39 | 3 | 1 | - | - | - | - | - | - | - | - | 1,017 | 603 | 39.392 |
| FT CALHOUN | PWR | 1,204 | 491 | 111 | 56 | 20 | - | - | - | - | - | - | - | - | - | 1,882 | 678 | 63.853 |
| GINNA | PWR | 994 | 96 | 8 | - | - | - | - | - | - | - | - | - | - | - | 1,098 | 104 | 3.434 |
| GRAND GULF | BWR | 1,038 | 267 | 98 | 25 | 5 | 1 | - | - | - | - | - | - | - | - | 1,434 | 396 | 35.449 |
| HARRIS | PWR | 2,198 | 700 | 126 | 31 | 3 | 1 | - | - | - | - | - | - | - | - | 3,059 | 861 | 54.874 |
| HATCH 1, 2 | BWR | 1,832 | 913 | 290 | 113 | 21 | 6 | 5 | - | - | - | - | - | - | - | 3,180 | 1,348 | 140.994 |
| HOPE CREEK 1 | BWR | 1,253 | 1,544 | 302 | 135 | 25 | 11 | 2 | - | - | - | - | - | - | - | 3,272 | 2,019 | 150.568 |
| INDIAN POINT 2, 3 | PWR | 1,220 | 1,070 | 165 | 57 | 5 | - | - | - | - | - | - | - | - | - | 2,517 | 1,297 | 74.038 |
| LASALLE 1, 2 | BWR | 1,533 | 1,039 | 397 | 309 | 105 | 63 | 47 | - | - | - | - | - | - | - | 3,493 | 1,960 | 383.622 |
| LIMERICK 1, 2 | BWR | 2,151 | 1,222 | 342 | 87 | 12 | - | - | - | - | - | - | - | - | - | 3,814 | 1,663 | 133.531 |
| MCGUIRE 1, 2 | PWR | 2,163 | 1,082 | 317 | 44 | 4 | - | - | - | - | - | - | - | - | - | 3,610 | 1,447 | 109.423 |
| MILLSTONE 2, 3 | PWR | 1,992 | 504 | 193 | 48 | 2 | - | - | - | - | - | - | - | - | - | 2,739 | 747 | 64.232 |
| MONTICELLO | BWR | 2,511 | 777 | 222 | 143 | 56 | 28 | 21 | - | - | - | - | - | - | - | 3,758 | 1,247 | 198.968 |
| NINE MILE POINT 1, 2 | BWR | 1,821 | 824 | 293 | 206 | 64 | 12 | 12 | - | - | - | - | - | - | - | 3,232 | 1,411 | 217.056 |
| NORTH ANNA 1, 2 | PWR | 2,752 | 575 | 256 | 72 | 28 | 12 | 5 | - | - | - | - | - | - | - | 3,700 | 948 | 121.803 |

NOTE: 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.

## APPENDIX B
## Annual Doses* at Licensed Nuclear Power Facilities
## 2013 (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 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.00-5.00 | 5.00-6.00 | 6.00-7.00 | 7.00-12.00 | >12.0 | | | |
| OCONEE 1, 2, 3 | PWR | 3,071 | 1,257 | 244 | 37 | 8 | 2 | 1 | - | - | - | - | - | - | - | 4,620 | 1,549 | 106.414 |
| OYSTER CREEK | BWR | 895 | 194 | 75 | 29 | 1 | - | - | - | - | - | - | - | - | - | 1,194 | 299 | 29.981 |
| PALISADES | PWR | 934 | 307 | 27 | 4 | 1 | - | - | - | - | - | - | - | - | - | 1,273 | 339 | 15.830 |
| PALO VERDE 1, 2, 3 | PWR | 2,584 | 911 | 149 | 79 | 23 | 2 | - | - | - | - | - | - | - | - | 3,748 | 1,164 | 93.713 |
| PEACH BOTTOM 2, 3 | BWR | 1,743 | 1,439 | 836 | 441 | 116 | 53 | 17 | - | - | - | - | - | - | - | 4,645 | 2,902 | 483.936 |
| PERRY | BWR | 1,272 | 720 | 354 | 305 | 171 | 65 | 15 | - | - | - | - | - | - | - | 2,902 | 1,630 | 373.747 |
| PILGRIM 1 | BWR | 1,150 | 694 | 273 | 154 | 43 | 12 | 12 | - | - | - | - | - | - | - | 2,338 | 1,188 | 176.012 |
| POINT BEACH 1, 2 | PWR | 1,012 | 304 | 179 | 56 | 8 | - | - | - | - | - | - | - | - | - | 1,559 | 547 | 63.146 |
| PRAIRIE ISLAND 1, 2 | PWR | 1,732 | 911 | 374 | 95 | 3 | - | - | - | - | - | - | - | - | - | 3,115 | 1,383 | 129.989 |
| QUAD CITIES 1, 2 | BWR | 1,573 | 1,570 | 492 | 131 | 15 | 2 | - | - | - | - | - | - | - | - | 3,783 | 2,210 | 192.059 |
| RIVER BEND 1 | BWR | 808 | 1,332 | 364 | 163 | 43 | 7 | 6 | - | - | - | - | - | - | - | 2,723 | 1,915 | 188.331 |
| ROBINSON 2 | PWR | 2,091 | 832 | 244 | 37 | 3 | - | - | - | - | - | - | - | - | - | 3,207 | 1,116 | 80.595 |
| SALEM 1, 2 | PWR | 494 | 610 | 119 | 53 | 10 | 4 | 1 | - | - | - | - | - | - | - | 1,291 | 797 | 59.430 |
| SEABROOK | PWR | 845 | 291 | - | - | - | - | - | - | - | - | - | - | - | - | 1,136 | 291 | 2.442 |
| SEQUOYAH 1, 2 | PWR | 2,479 | 524 | 115 | 26 | 1 | - | - | - | - | - | - | - | - | - | 3,145 | 666 | 44.478 |
| SOUTH TEXAS 1, 2 | PWR | 1,781 | 623 | 179 | 30 | - | - | - | - | - | - | - | - | - | - | 2,613 | 832 | 59.736 |
| ST LUCIE 1, 2 | PWR | 1,859 | 716 | 212 | 31 | 5 | - | - | - | - | - | - | - | - | - | 2,823 | 964 | 74.926 |
| SUMMER 1 | PWR | 1,440 | 169 | 3 | - | - | - | - | - | - | - | - | - | - | - | 1,612 | 172 | 5.113 |
| SURRY 1, 2 | PWR | 2,691 | 546 | 169 | 51 | 3 | 1 | - | - | - | - | - | - | - | - | 3,461 | 770 | 67.528 |
| SUSQUEHANNA 1, 2 | BWR | 2,109 | 1,126 | 465 | 212 | 38 | 16 | 4 | - | - | - | - | - | - | - | 3,970 | 1,861 | 233.532 |
| THREE MILE ISLAND 1 | PWR | 1,824 | 841 | 350 | 100 | 3 | - | - | - | - | - | - | - | - | - | 3,118 | 1,294 | 125.803 |
| TURKEY POINT 3, 4 | PWR | 3,211 | 739 | 87 | 28 | 6 | 1 | 19 | 2 | - | - | - | - | - | - | 4,093 | 882 | 82.215 |
| VERMONT YANKEE | BWR | 957 | 542 | 238 | 188 | 45 | 18 | 3 | - | - | - | - | - | - | - | 1,991 | 1,034 | 170.340 |
| VOGTLE 1, 2 | PWR | 1,950 | 606 | 186 | 57 | 8 | - | - | - | - | - | - | - | - | - | 2,807 | 857 | 78.298 |
| WATERFORD 3 | PWR | 1,227 | 126 | 4 | - | - | - | - | - | - | - | - | - | - | - | 1,357 | 130 | 3.129 |
| WATTS BAR 1 | PWR | 5,282 | 83 | 2 | - | - | - | - | - | - | - | - | - | - | - | 5,367 | 85 | 2.616 |
| WOLF CREEK 1 | PWR | 1,341 | 1,113 | 229 | 94 | 16 | - | - | - | - | - | - | - | - | - | 2,793 | 1,452 | 111.257 |
| **Totals BWRs** | **BWR** | **33,931** | **23,359** | **7,682** | **3,711** | **1,032** | **355** | **165** | **-** | **-** | **-** | **-** | **-** | **-** | **-** | **70,235** | **36,304** | **4,451.852** |
| **Totals PWRs** | **PWR** | **72,578** | **23,622** | **5,476** | **1,377** | **195** | **25** | **26** | **2** | **-** | **-** | **-** | **-** | **-** | **-** | **103,301** | **30,723** | **2,300.277** |
| **Total LWRs** | **LWRs** | **106,509** | **46,981** | **13,158** | **5,088** | **1,227** | **380** | **191** | **2** | **-** | **-** | **-** | **-** | **-** | **-** | **173,536** | **67,027** | **6,752.129** |
| **Corrected for Transients†** | **LWRs** | **75,235** | **32,039** | **10,152** | **5,236** | **1,679** | **677** | **431** | **18** | **-** | **-** | **-** | **-** | **-** | **-** | **125,467** | **50,232** | **6,752.129** |

* 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 on page B-2.

## APPENDIX B
## Annual Doses* at Licensed Nuclear Power Facilities
## 2013 (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 | 0.75-1.00 | 1.00-2.00 | 2.00-3.00 | 3.00-4.00 | 4.00-5.00 | 5.00-6.00 | 6.00-7.00 | 7.00-12.00 | >12.0 | | | |
| **REACTORS NOT YET IN COMMERCIAL OPERATION** | | | | | | | | | | | | | | | | | | |
| WATTS BAR 2 | PWR | Reported with Watts Bar 1 | | | | | | | | | | | | | | | | |
| **REACTORS NO LONGER IN COMMERCIAL OPERATION** | | | | | | | | | | | | | | | | | | |
| BIG ROCK POINT | BWR | 22 | - | - | - | - | - | - | - | - | - | - | - | - | - | 22 | - | - |
| CRYSTAL RIVER 3 | PWR | 1,150 | 40 | - | - | - | - | - | - | - | - | - | - | - | - | 1,190 | 40 | 0.794 |
| FERMI 1 | FBR | 0 | 1 | - | - | - | - | - | - | - | - | - | - | - | - | 1 | 1 | 0.007 |
| HADDAM NECK | PWR | 37 | 9 | - | - | - | - | - | - | - | - | - | - | - | - | 46 | 9 | 0.182 |
| HUMBOLDT BAY | BWR | 355 | 91 | 48 | 28 | 4 | 1 | - | - | - | - | - | - | - | - | 527 | 172 | 24.121 |
| KEWAUNEE | PWR | 667 | 104 | 10 | - | - | - | - | - | - | - | - | - | - | - | 781 | 114 | 4.915 |
| LACROSSE | BWR | 50 | 38 | 11 | 2 | - | - | - | - | - | - | - | - | - | - | 101 | 51 | 3.411 |
| MAINE YANKEE | PWR | 26 | 4 | - | - | - | - | - | - | - | - | - | - | - | - | 30 | 4 | 0.186 |
| SAN ONOFRE 2, 3 | PWR | 1,803 | 202 | 7 | 1 | - | - | - | - | - | - | - | - | - | - | 2,013 | 210 | 5.701 |
| YANKEE-ROWE | PWR | 30 | 2 | - | - | - | - | - | - | - | - | - | - | - | - | 32 | 2 | 0.043 |
| ZION 1, 2 | PWR | 525 | 110 | 53 | 27 | 13 | 9 | 6 | - | - | - | - | - | - | - | 743 | 218 | 44.689 |
| **Total Reporting*** ** | **11** | **4,665** | **601** | **129** | **58** | **17** | **10** | **6** | **-** | **-** | - | - | - | - | - | **5,486** | **821** | **84.049** |
| **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 Units 2 and 3. | | | | | | | | | | | | | | | | |
| MILLSTONE 1 | BWR | Reported with Millstone Units 2 & 3, estimated dose from Unit 1 is 0.313 person-rem. | | | | | | | | | | | | | | | | |
| SAN ONOFRE 1 | PWR | Reported with San Onofre 2, 3 | | | | | | | | | | | | | | | | |
| THREE MILE ISLAND 2 | PWR | Reported with Three Mile Island 1; estimated dose from Unit 2 is 0.229 person-rem. | | | | | | | | | | | | | | | | |
| **REACTORS NO LONGER IN COMMERCIAL OPERATION, DECOMMISSIONED** | | | | | | | | | | | | | | | | | | |
| PEACH BOTTOM 1 | HTGR | | | | | | | | | | | | | | | | | |
| RANCHO SECO | PWR | | | | | | | | | | | | | | | | | |
| TROJAN | PWR | Reported as ISFSI (See Appendix A) | | | | | | | | | | | | | | | | |

Note: 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.

*** 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

## 1969–2013

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.

| 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 |
| **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 - 892, 885 MWe | 1983 | 561.2 | 68.2 | 1,485 | 772 | 0.52 | 1.38 |
| | 1984 | 576.7 | 71.8 | 1,393 | 504 | 0.36 | 0.87 |
| | 1985 | 717.7 | 91.9 | 619 | 60 | 0.10 | 0.08 |
| | 1986 | 581.3 | 70.7 | 1,575 | 627 | 0.40 | 1.08 |
| | 1987 | 684.1 | 83.8 | 1,282 | 210 | 0.16 | 0.31 |
| | 1988 | 1,386.1 | 87.4 | 1,764 | 530 | 0.30 | 0.38 |
| | 1989 | 1,017.4 | 69.6 | 2,349 | 1,378 | 0.59 | 1.35 |
| | 1990 | 1,271.0 | 85.3 | 1,675 | 348 | 0.21 | 0.27 |
| | 1991 | 1,267.5 | 78.6 | 1,689 | 495 | 0.29 | 0.39 |
| | 1992 | 1,441.9 | 89.1 | 1,414 | 289 | 0.20 | 0.20 |
| | 1993 | 1,157.9 | 73.1 | 2,087 | 621 | 0.30 | 0.54 |
| | 1994 | 1,514.6 | 88.6 | 487 | 44 | 0.09 | 0.03 |
| | 1995 | 1,389.2 | 83.1 | 1,536 | 453 | 0.29 | 0.33 |
| | 1996 | 1,269.0 | 76.5 | 1,688 | 449 | 0.27 | 0.35 |
| | 1997 | 1,159.3 | 72.1 | 1,391 | 306 | 0.22 | 0.26 |
| | 1998 | 523.1 | 33.5 | 700 | 59.311 | 0.08 | 0.11 |
| | 1999 | 1,353.7 | 85.9 | 841 | 99.461 | 0.12 | 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 |
|---|---|---|---|---|---|---|---|
| **BEAVER VALLEY 1, 2** (continued) | 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 |
| **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 | 1,265.6 | 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 | --- |
| | 2005 | 0.0 | 0.0 | 223 | 20.227 | 0.09 | --- |
| | 2006 | 0.0 | 0.0 | 27 | 0.382 | 0.01 | --- |
| | 2007 | 0.0 | 0.0 | 0 | 0.000 | --- | --- |
| | 2008 | 0.0 | 0.0 | 0 | 0.000 | --- | --- |
| | 2009 | 0.0 | 0.0 | 0 | 0.000 | --- | --- |
| | 2010 | 0.0 | 0.0 | 0 | 0.000 | --- | --- |
| | 2011 | 0.0 | 0.0 | --- | --- | --- | --- |
| | 2012 | 0.0 | 0.0 | --- | --- | --- | --- |
| | 2013 | 0.0 | 0.0 | --- | 0.000 | --- | --- |

[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 |
|---|---|---|---|---|---|---|---|
| **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 - 1,151, 1,125 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 |
| **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 |
| | 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 |

[2] All three Brown's Ferry units were placed on administrative hold in 1985. Units 2 & 3 were restarted in 1991 and 1995, respectively. Brown's 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** | 2010 | 2,828.0 | 92.3 | 2,825 | 556.749 | 0.20 | 0.20 |
| (continued) | 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 |
| **BRUNSWICK 1, 2** | 1976 | 297.2 | 56.0 | 1,265 | 326 | 0.26 | 1.10 |
| Docket 50-324, 50-325; | 1977 | 291.1 | 55.7 | 1,512 | 1,120 | 0.74 | 3.85 |
| DPR-62, DPR-71 | 1978 | 1,173.1 | 83.7 | 1,458 | 1,004 | 0.69 | 0.86 |
| 1st commercial operation | 1979 | 810.0 | 60.1 | 2,891 | 2,602 | 0.90 | 3.21 |
| 3/77, 11/75 | 1980 | 687.2 | 52.2 | 3,788 | 3,870 | 1.02 | 5.63 |
| Type - BWRs | 1981 | 925.2 | 56.9 | 3,854 | 2,638 | 0.68 | 2.85 |
| Capacity - 938, 920 MWe | 1982 | 540.3 | 50.3 | 4,957 | 3,792 | 0.76 | 7.02 |
| | 1983 | 636.7 | 44.3 | 5,602 | 3,475 | 0.62 | 5.46 |
| | 1984 | 761.3 | 51.5 | 5,046 | 3,260 | 0.65 | 4.28 |
| | 1985 | 822.2 | 58.4 | 4,057 | 2,804 | 0.69 | 3.41 |
| | 1986 | 1,051.3 | 69.1 | 3,370 | 1,909 | 0.57 | 1.82 |
| | 1987 | 1,152.4 | 80.6 | 3,052 | 1,419 | 0.46 | 1.23 |
| | 1988 | 990.8 | 70.1 | 2,648 | 1,747 | 0.66 | 1.76 |
| | 1989 | 990.9 | 65.8 | 3,844 | 1,786 | 0.46 | 1.80 |
| | 1990 | 991.6 | 67.8 | 3,182 | 1,548 | 0.49 | 1.56 |
| | 1991 | 952.8 | 64.5 | 2,586 | 778 | 0.30 | 0.82 |
| | 1992 | 375.9 | 27.9 | 2,690 | 623 | 0.23 | 1.66 |
| | 1993 | 470.0 | 33.8 | 2,921 | 872 | 0.30 | 1.86 |
| | 1994 | 1,268.4 | 83.0 | 3,049 | 999 | 0.33 | 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 |
| **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 - 1,138, 1,120 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 |

[2] All three Brown's Ferry units were placed on administrative hold in 1985. Units 2 & 3 were restarted in 1991 and 1995, respectively. Brown's 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** | 2004 | 2,277.4 | 97.7 | 906 | 89.147 | 0.10 | 0.04 |
| (continued) | 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 |
| **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 |
| **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 - 866, 850 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 |

| 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 |
|---|---|---|---|---|---|---|---|
| **CALVERT CLIFFS 1, 2** (continued) | 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 |
| **CATAWBA 1, 2** Docket 50-413, 50-414; NPF-35, NPF-52 1st commercial operation 6/85, 8/86 Type - PWRs Capacity - 1,129, 1,129 MWe | 1986 | 638.9 | 49.9 | 1,724 | 286 | 0.17 | 0.45 |
| | 1987 | 1,651.2 | 75.9 | 1,865 | 449 | 0.24 | 0.27 |
| | 1988 | 1,675.2 | 77.2 | 2,009 | 556 | 0.28 | 0.33 |
| | 1989 | 1,733.6 | 79.5 | 1,660 | 334 | 0.20 | 0.19 |
| | 1990 | 1,616.3 | 70.8 | 2,174 | 809 | 0.37 | 0.50 |
| | 1991 | 1,691.5 | 74.6 | 1,871 | 462 | 0.25 | 0.27 |
| | 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 |
| | 2003 | 1,991.8 | 89.2 | 1,409 | 210.617 | 0.15 | 0.11 |
| | 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 |
| **CLINTON** Docket 50-461; NPF-62 1st commercial operation 11/87 Type - BWR Capacity - 1,022 MWe | 1988 | 701.3 | 84.2 | 769 | 130 | 0.17 | 0.19 |
| | 1989 | 348.3 | 48.5 | 1,196 | 372 | 0.31 | 1.07 |
| | 1990 | 435.8 | 55.1 | 1,390 | 553 | 0.40 | 1.27 |
| | 1991 | 722.7 | 80.8 | 1,010 | 233 | 0.23 | 0.32 |
| | 1992 | 589.7 | 68.6 | 1,195 | 431 | 0.36 | 0.73 |
| | 1993 | 701.5 | 79.6 | 1,253 | 498 | 0.40 | 0.71 |
| | 1994 | 883.3 | 94.8 | 409 | 63 | 0.15 | 0.07 |
| | 1995 | 731.1 | 83.0 | 1,182 | 316 | 0.27 | 0.43 |
| | 1996 | 634.7 | 66.7 | 1,154 | 350 | 0.30 | 0.55 |
| | 1997 | 0.0 | 0.0 | 738 | 172 | 0.23 | --- |
| | 1998 | 0.0 | 0.0 | 866 | 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 |

| 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 |
|---|---|---|---|---|---|---|---|
| **CLINTON** | 2007 | 1,049.2 | 100.0 | 310 | 30.618 | 0.10 | 0.03 |
| (continued) | 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 |
| **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 - 1,107 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 |
| | 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 |
| **COMANCHE PEAK 1, 2** | 1991 | 644.4 | 82.2 | 985 | 148 | 0.15 | 0.23 |
| Docket 50-445, 50-446; | 1992 | 830.8 | 84.0 | 1,128 | 188 | 0.17 | 0.23 |
| NPF-87, NPF-89 | 1993 | 853.8 | 81.2 | 945 | 109 | 0.12 | 0.13 |
| 1st commercial operation | 1994 | 1,750.0 | 93.7 | 970 | 90 | 0.09 | 0.05 |
| 8/90, 8/93 | 1995 | 2,022.6 | 92.5 | 951 | 179 | 0.19 | 0.09 |
| Type - PWR | 1996 | 1,804.8 | 81.4 | 1,462 | 288 | 0.20 | 0.16 |
| Capacity - 1,205, 1,195 MWe | 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 |

[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** | 1976 | 807.4 | 83.1 | 395 | 116 | 0.29 | 0.14 |
| Docket 50-315, 50-316; | 1977 | 573.0 | 76.1 | 802 | 300 | 0.37 | 0.52 |
| DPR-58, DPR-74 | 1978 | 744.8 | 73.6 | 778 | 336 | 0.43 | 0.45 |
| 1st commercial operation | 1979 | 1,373.0 | 65.3 | 1,445 | 718 | 0.50 | 0.52 |
| 8/75, 7/78 | 1980 | 1,552.4 | 74.1 | 1,345 | 493 | 0.37 | 0.32 |
| Type - PWRs | 1981 | 1,557.3 | 73.4 | 1,341 | 656 | 0.49 | 0.42 |
| Capacity - 1,030, 1,077 MWe | 1982 | 1,461.6 | 69.8 | 1,527 | 699 | 0.46 | 0.48 |
| | 1983 | 1,456.5 | 71.2 | 1,418 | 658 | 0.46 | 0.45 |
| | 1984 | 1,526.0 | 75.3 | 1,559 | 762 | 0.49 | 0.50 |
| | 1985 | 925.4 | 47.6 | 1,984 | 945 | 0.48 | 1.02 |
| | 1986 | 1,307.1 | 73.4 | 1,774 | 745 | 0.42 | 0.57 |
| | 1987 | 1,199.5 | 70.2 | 1,696 | 666 | 0.39 | 0.56 |
| | 1988 | 1,160.4 | 63.5 | 2,266 | 867 | 0.38 | 0.75 |
| | 1989 | 1,433.1 | 72.8 | 1,575 | 493 | 0.31 | 0.34 |
| | 1990 | 1,318.5 | 67.9 | 1,851 | 580 | 0.31 | 0.44 |
| | 1991 | 1,837.4 | 90.2 | 815 | 69 | 0.08 | 0.04 |
| | 1992 | 760.9 | 50.8 | 1,954 | 492 | 0.25 | 0.65 |
| | 1993 | 1,927.7 | 98.5 | 587 | 44 | 0.07 | 0.02 |
| | 1994 | 1,105.2 | 65.2 | 1,748 | 479 | 0.27 | 0.43 |
| | 1995 | 1,656.0 | 82.1 | 1,310 | 203 | 0.15 | 0.12 |
| | 1996 | 1,938.9 | 92.7 | 1,114 | 214 | 0.19 | 0.11 |
| | 1997 | 1,189.7 | 59.7 | 1,864 | 550 | 0.30 | 0.46 |
| | 1998 | 0.0 | 0.0 | 1,155 | 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 |
| **COOPER STATION** | 1975 | 456.4 | 83.6 | 579 | 117 | 0.20 | 0.26 |
| Docket 50-298; | 1976 | 433.3 | 75.5 | 763 | 350 | 0.46 | 0.81 |
| DPR-46 | 1977 | 538.2 | 86.2 | 315 | 198 | 0.63 | 0.37 |
| 1st commercial operation 7/74 | 1978 | 576.0 | 91.0 | 297 | 158 | 0.53 | 0.27 |
| Type - BWR | 1979 | 591.0 | 87.6 | 426 | 221 | 0.52 | 0.37 |
| Capacity - 769 MWe | 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 |

| 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** (continued) | 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 |
| | 2010 | 775.4 | 100.0 | 773 | 61.303 | 0.08 | 0.08 |
| | 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 |
| **CRYSTAL RIVER 3**[4] Docket 50-302; DPR-72 1st commercial operation 3/77 Type - PWR Capacity - (860) MWe | 1978 | 311.5 | 41.4 | 643 | 321 | 0.50 | 1.03 |
| | 1979 | 453.0 | 58.9 | 1,150 | 495 | 0.43 | 1.09 |
| | 1980 | 404.1 | 53.2 | 1,053 | 625 | 0.59 | 1.55 |
| | 1981 | 490.4 | 62.2 | 1,120 | 408 | 0.36 | 0.83 |
| | 1982 | 589.8 | 76.0 | 780 | 177 | 0.23 | 0.30 |
| | 1983 | 452.1 | 58.8 | 1,720 | 552 | 0.32 | 1.22 |
| | 1984 | 774.2 | 94.5 | 549 | 49 | 0.09 | 0.06 |
| | 1985 | 344.2 | 47.6 | 1,976 | 689 | 0.35 | 2.00 |
| | 1986 | 319.5 | 41.8 | 1,057 | 472 | 0.45 | 1.48 |
| | 1987 | 436.0 | 60.9 | 1,384 | 488 | 0.35 | 1.12 |
| | 1988 | 690.2 | 84.0 | 569 | 64 | 0.11 | 0.09 |
| | 1989 | 352.8 | 48.8 | 880 | 234 | 0.27 | 0.66 |
| | 1990 | 497.8 | 63.8 | 1,441 | 476 | 0.33 | 0.96 |
| | 1991 | 654.6 | 82.0 | 821 | 116 | 0.14 | 0.18 |
| | 1992 | 632.1 | 76.1 | 1,403 | 424 | 0.30 | 0.67 |
| | 1993 | 722.4 | 85.0 | 683 | 60 | 0.09 | 0.08 |
| | 1994 | 711.9 | 84.3 | 1,079 | 228 | 0.21 | 0.32 |
| | 1995 | 866.3 | 100.0 | 209 | 8 | 0.04 | 0.01 |
| | 1996 | 290.8 | 37.7 | 1,192 | 353 | 0.30 | 1.21 |
| | 1997 | 0.0 | 0.0 | 973 | 179 | 0.18 | --- |
| | 1998 | 739.9 | 90.3 | 313 | 19.298 | 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 | 666 | 31.922 | 0.05 | --- |
| | 2011 | --- | --- | 251 | 8.292 | 0.03 | --- |
| | 2012 | --- | 0.0 | 94 | 1.876 | 0.02 | --- |
| | 2013 | 0.0 | 0.0 | 40 | 0.794 | 0.02 | --- |
| **DAVIS-BESSE 1** Docket 50-346; NPF-3 1st commercial operation 7/78 Type - PWR Capacity - 894 MWe | 1978 | 326.4 | 48.7 | 421 | 48 | 0.11 | 0.15 |
| | 1979 | 381.0 | 67.0 | 304 | 30 | 0.10 | 0.08 |
| | 1980 | 256.4 | 36.2 | 1,283 | 154 | 0.12 | 0.60 |
| | 1981 | 531.4 | 67.4 | 578 | 58 | 0.10 | 0.11 |
| | 1982 | 390.8 | 51.5 | 1,350 | 164 | 0.12 | 0.42 |
| | 1983 | 592.1 | 73.0 | 718 | 80 | 0.11 | 0.14 |
| | 1984 | 518.5 | 62.5 | 1,088 | 177 | 0.16 | 0.34 |

[4] Crystal River ceased power generation in 2010 due to problems associated with containment 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** (continued) | 1985 | 238.3 | 31.2 | 718 | 71 | 0.10 | 0.30 |
| | 1986 | 3.3 | 1.3 | 981 | 124 | 0.13 | 37.58 |
| | 1987 | 618.0 | 89.6 | 625 | 47 | 0.08 | 0.08 |
| | 1988 | 144.1 | 27.1 | 1,183 | 307 | 0.26 | 2.13 |
| | 1989 | 880.0 | 98.6 | 404 | 38 | 0.09 | 0.04 |
| | 1990 | 500.0 | 56.7 | 1,377 | 489 | 0.36 | 0.98 |
| | 1991 | 703.6 | 81.8 | 1,000 | 216 | 0.22 | 0.31 |
| | 1992 | 915.2 | 100.0 | 287 | 19 | 0.07 | 0.02 |
| | 1993 | 729.5 | 83.4 | 1,244 | 348 | 0.28 | 0.48 |
| | 1994 | 768.4 | 88.0 | 861 | 144 | 0.17 | 0.19 |
| | 1995 | 920.4 | 100.0 | 256 | 7 | 0.03 | 0.01 |
| | 1996 | 775.8 | 85.3 | 949 | 167 | 0.18 | 0.22 |
| | 1997 | 820.0 | 94.0 | 213 | 10 | 0.05 | 0.01 |
| | 1998 | 699.8 | 83.2 | 980 | 155.269 | 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 |
| **DIABLO CANYON 1, 2** Docket 50-275, 50-323; DPR-80, DPR-82 1st commercial operation 5/85, 3/86 Type - PWRs Capacity - 1,122, 1,118 MWe | 1986 | 641.5 | 80.6 | 1,260 | 304 | 0.24 | 0.47 |
| | 1987 | 1,688.6 | 83.0 | 1,170 | 336 | 0.29 | 0.20 |
| | 1988 | 1,386.1 | 67.6 | 1,826 | 877 | 0.48 | 0.63 |
| | 1989 | 1,899.0 | 87.5 | 1,646 | 465 | 0.28 | 0.24 |
| | 1990 | 1,952.6 | 91.0 | 1,441 | 323 | 0.22 | 0.17 |
| | 1991 | 1,809.6 | 83.8 | 2,040 | 546 | 0.27 | 0.30 |
| | 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 |

| 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 7/60, | 1972 | 1,243.7 | --- | --- | 728 | --- | 0.59 |
| 6/70, 11/71 | 1973 | 1,112.2 | --- | 1,341 | 939 | 0.70 | 0.84 |
| Type - BWRs | 1974 | 842.5 | 54.9 | 1,594 | 1,662 | 1.04 | 1.97 |
| Capacity - (197), 870, 850 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 |
| **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 |
| | 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 |

[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) | 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 | 607.4 | 100.0 | 53 | 8.996 | 0.17 | 0.01 |
| **FARLEY 1, 2** Docket 50-348, 50-364; NPF-2, NPF-8 1st commercial operation 12/77, 7/81 Type - PWRs 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 |
| | 2009 | 1,595.2 | 94.1 | 657 | 41.851 | 0.06 | 0.03 |
| | 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 |

| 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 |
|---|---|---|---|---|---|---|---|
| **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 - 1,037 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 |
| **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 |
| | 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 |

| 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** | 1975 | 252.3 | 67.4 | 469 | 294 | 0.63 | 1.17 |
| Docket 50-285; | 1976 | 265.9 | 69.5 | 516 | 313 | 0.61 | 1.18 |
| DPR-40 | 1977 | 351.8 | 79.4 | 535 | 297 | 0.56 | 0.84 |
| 1st commercial operation 6/74 | 1978 | 342.3 | 75.1 | 596 | 410 | 0.69 | 1.20 |
| Type - PWR | 1979 | 440.0 | 95.7 | 451 | 126 | 0.28 | 0.29 |
| Capacity - 482 MWe | 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 | 494 | 39.377 | 0.08 | --- |
| | 2013 | 10.9 | 3.6 | 678 | 63.853 | 0.09 | 5.86 |
| **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 |

| 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 |
|---|---|---|---|---|---|---|---|
| **GINNA** | 1994 | 405.3 | 83.2 | 679 | 138 | 0.20 | 0.34 |
| (continued) | 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 |
| **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 - 1,266 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 |
| | 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 |
| **HADDAM NECK**[6] | 1969 | 438.5 | --- | 138 | 106 | 0.77 | 0.24 |
| Docket 50-213; | 1970 | 424.7 | --- | 734 | 689 | 0.94 | 1.62 |
| DPR-61 | 1971 | 502.2 | --- | 289 | 342 | 1.18 | 0.68 |
| 1st commercial operation 1/68 | 1972 | 515.6 | --- | 355 | 325 | 0.92 | 0.63 |
| Type - PWR | 1973 | 293.1 | --- | 951 | 697 | 0.73 | 2.38 |
| Capacity - (560) MWe | 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 |

[6] 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**[6] (continued) | 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 | --- |
| | 2007 | 0.0 | 0.0 | 0 | 0.000 | --- | --- |
| | 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 | --- |
| **HARRIS 1** Docket 50-400; NPF-63 1st commercial operation 5/87 Type - PWR Capacity - 928 MWe | 1988 | 652.9 | 75.0 | 721 | 169 | 0.23 | 0.26 |
| | 1989 | 690.6 | 79.5 | 929 | 156 | 0.17 | 0.23 |
| | 1990 | 776.4 | 89.6 | 453 | 85 | 0.19 | 0.11 |
| | 1991 | 724.8 | 81.5 | 872 | 226 | 0.26 | 0.31 |
| | 1992 | 661.8 | 74.9 | 930 | 213 | 0.23 | 0.32 |
| | 1993 | 913.0 | 99.7 | 327 | 31 | 0.09 | 0.03 |
| | 1994 | 740.8 | 82.7 | 1,089 | 222 | 0.20 | 0.30 |
| | 1995 | 731.1 | 83.8 | 1,068 | 174 | 0.16 | 0.24 |
| | 1996 | 860.6 | 95.4 | 444 | 17 | 0.04 | 0.02 |
| | 1997 | 673.6 | 80.4 | 1,131 | 149 | 0.13 | 0.22 |
| | 1998 | 766.2 | 90.4 | 931 | 133.497 | 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 |

[6] 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** | 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 |
| | 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 |
| **HOPE CREEK 1** | 1987 | 869.2 | 86.4 | 589 | 117 | 0.20 | 0.13 |
| Docket 50-354; | 1988 | 832.7 | 80.7 | 1,734 | 287 | 0.17 | 0.34 |
| NPF-57 | 1989 | 791.1 | 77.8 | 1,873 | 465 | 0.25 | 0.59 |
| 1st commercial operation 12/86 | 1990 | 966.4 | 91.6 | 1,394 | 196 | 0.14 | 0.20 |
| Type - BWR | 1991 | 882.5 | 84.2 | 1,700 | 373 | 0.22 | 0.42 |
| Capacity - 1,172 MWe | 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 |

| 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 |
|---|---|---|---|---|---|---|---|
| **HOPE CREEK 1** | 2008 | 1,139.1 | 100.0 | 999 | 34.510 | 0.03 | 0.03 |
| (continued) | 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 |
| **HUMBOLDT BAY**[7] | 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 | --- |

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

| 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[8], 2, 3[9]** | 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 |
| 10/62, 8/74, 8/76 | 1973 | 0.0 | --- | 2,998 | 5,262 | 1.76 | --- |
| Type - PWRs | 1974 | 556.1 | 59.4 | 1,019 | 910 | 0.89 | 1.64 |
| Capacity - (265), 998, 1,030 MWe | 1975 | 584.4 | 74.8 | 891 | 705 | 0.79 | 1.21 |
| | 1976 | 273.9 | 34.8 | 1,590 | 1,950 | 1.23 | 7.12 |
| | 1977 | 1,278.3 | 75.3 | 1,391 | 1,070 | 0.77 | 0.84 |
| | 1978 | 1,172.3 | 67.8 | 1,909 | 2,006 | 1.05 | 1.71 |
| **INDIAN POINT 1[8], 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 |
| **INDIAN POINT 1[8]** | 2004 | 0.0 | 0.0 | 156 | 3 | 0.02 | --- |
| Docket 50-3; | 2005 | 0.0 | 0.0 | 151 | 6.692 | 0.04 | --- |
| DPR-05 | 2006 | 0.0 | 0.0 | 193 | 7.670 | 0.04 | --- |
| 1st commercial operation 10/62 | 2007 | 0.0 | 0.0 | 210 | 2.554 | 0.01 | --- |
| Type - PWR | 2008 | 0.0 | 0.0 | 234 | 4.322 | 0.02 | --- |
| Capacity - (265) MWe | 2009 | 0.0 | 0.0 | 140 | 0.404 | 0.00 | --- |
| | 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[9]** | 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 |

[8] 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.

[9] 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**[9] | 1991 | 862.8 | 87.5 | 299 | 40 | 0.13 | 0.05 |
| (continued) | 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 |
| | 1999 | 829.8 | 88.3 | 893 | 116.920 | 0.13 | 0.14 |
| | 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**[9] | 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 |
| **KEWAUNEE**[10] | 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 |

[9] 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.

[10] 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**[10] | 2009 | 515.4 | 92.0 | 595 | 56.215 | 0.09 | 0.11 |
| (continued) | 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 | --- |
| **LA CROSSE**[11] | 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 | --- |
| **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 |
| | 1991 | 1,837.0 | 86.7 | 1,985 | 806 | 0.41 | 0.44 |

[10] 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.

[11] 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** | 1992 | 1,447.4 | 72.0 | 2,418 | 1,167 | 0.48 | 0.81 |
| (continued) | 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 |
| **LIMERICK 1, 2** | 1987 | 636.1 | 70.2 | 2,156 | 174 | 0.08 | 0.27 |
| Docket 50-352, 50-353; | 1988 | 794.9 | 96.5 | 950 | 52 | 0.05 | 0.07 |
| NPF-39, NPF-85 | 1989 | 628.4 | 66.0 | 1,818 | 266 | 0.15 | 0.42 |
| 1st commercial operation | 1990 | 1,527.7 | 78.2 | 1,422 | 175 | 0.12 | 0.11 |
| 2/86, 1/90 | 1991 | 1,810.9 | 86.8 | 1,151 | 106 | 0.09 | 0.06 |
| Type - BWRs | 1992 | 1,741.4 | 84.8 | 1,559 | 330 | 0.21 | 0.19 |
| Capacity - 1,099, 1,108 MWe | 1993 | 1,913.2 | 91.6 | 1,287 | 217 | 0.17 | 0.11 |
| | 1994 | 1,944.4 | 94.9 | 1,543 | 275 | 0.18 | 0.14 |
| | 1995 | 1,957.1 | 93.0 | 1,581 | 260 | 0.16 | 0.13 |
| | 1996 | 2,026.2 | 93.3 | 1,654 | 234 | 0.14 | 0.12 |
| | 1997 | 2,001.7 | 95.8 | 1,463 | 234 | 0.16 | 0.12 |
| | 1998 | 1,907.2 | 89.5 | 1,854 | 357.139 | 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 |
| **MAINE YANKEE**[12] | 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 |

[12] 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 |
|---|---|---|---|---|---|---|---|
| **MAINE YANKEE**[12] (continued) | 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 | --- |
| **MCGUIRE 1, 2** Docket 50-369, 50-370; NPF-9, NPF-17 1st commercial operation 12/81, 3/84 Type - PWRs Capacity - 1,129, 1,129 MWe | 1982 | 524.9 | 80.4 | 1,560 | 169 | 0.11 | 0.32 |
| | 1983 | 558.3 | 55.4 | 1,751 | 521 | 0.30 | 0.93 |
| | 1984 | 764.1 | 68.5 | 1,663 | 507 | 0.30 | 0.66 |
| | 1985 | 808.4 | 77.0 | 2,217 | 771 | 0.35 | 0.95 |
| | 1986 | 1,360.0 | 60.1 | 2,326 | 1,015 | 0.44 | 0.75 |
| | 1987 | 1,774.7 | 79.2 | 2,865 | 1,043 | 0.36 | 0.59 |
| | 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 |
| | 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 |

[12] 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** | 2010 | 2,151.9 | 94.8 | 1,225 | 81.321 | 0.07 | 0.04 |
| (continued) | 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 |
| **MILLSTONE 1**[13] | 1972 | 377.6 | --- | 612 | 596 | 0.97 | 1.58 |
| Docket 50-245; | 1973 | 225.1 | --- | 1,184 | 663 | 0.56 | 2.95 |
| DPR-21 | 1974 | 430.3 | 79.1 | 2,477 | 1,430 | 0.58 | 3.32 |
| 1st commercial operation 3/71 | 1975 | 465.4 | 75.6 | 2,587 | 2,022 | 0.78 | 4.34 |
| Type - BWR | 1976 | 449.8 | 76.1 | 1,387 | 1,194 | 0.86 | 2.65 |
| Capacity - (641) MWe | 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 | --- |
| | 2007 | 0.0 | 0.0 | 33 | 0.901 | 0.03 | --- |
| | 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 | --- | --- |
| **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 - 878, 1,218 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 |

[13] 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. Since 2008, Millstone 1 has 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 2, 3** (continued) | 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 |
| **MONTICELLO** Docket 50-263; DPR-22 1st commercial operation 6/71 Type - BWR Capacity - 578 MWe | 1972 | 424.4 | --- | 99 | 61 | 0.62 | 0.14 |
| | 1973 | 389.5 | --- | 401 | 176 | 0.44 | 0.45 |
| | 1974 | 349.3 | 74.9 | 842 | 349 | 0.41 | 1.00 |
| | 1975 | 344.8 | 72.2 | 1,353 | 1,353 | 1.00 | 3.92 |
| | 1976 | 476.4 | 91.5 | 325 | 263 | 0.81 | 0.55 |
| | 1977 | 425.6 | 79.9 | 860 | 1,000 | 1.16 | 2.35 |
| | 1978 | 459.4 | 87.2 | 679 | 375 | 0.55 | 0.82 |
| | 1979 | 522.0 | 97.6 | 372 | 157 | 0.42 | 0.30 |
| | 1980 | 411.8 | 78.2 | 1,114 | 531 | 0.48 | 1.29 |
| | 1981 | 389.3 | 72.6 | 1,446 | 1,004 | 0.69 | 2.58 |
| | 1982 | 291.1 | 63.3 | 1,307 | 993 | 0.76 | 3.41 |
| | 1983 | 494.6 | 96.3 | 416 | 121 | 0.29 | 0.24 |
| | 1984 | 33.7 | 9.2 | 1,872 | 2,462 | 1.32 | 73.06 |
| | 1985 | 509.8 | 91.7 | 586 | 327 | 0.56 | 0.64 |
| | 1986 | 402.7 | 79.1 | 895 | 596 | 0.67 | 1.48 |
| | 1987 | 422.5 | 81.9 | 941 | 568 | 0.60 | 1.34 |
| | 1988 | 542.5 | 99.8 | 375 | 110 | 0.29 | 0.20 |
| | 1989 | 318.2 | 76.2 | 1,102 | 507 | 0.46 | 1.59 |
| | 1990 | 536.0 | 96.9 | 336 | 94 | 0.28 | 0.18 |
| | 1991 | 429.4 | 80.8 | 964 | 465 | 0.48 | 1.08 |
| | 1992 | 528.3 | 97.5 | 454 | 114 | 0.25 | 0.22 |
| | 1993 | 458.1 | 84.4 | 954 | 494 | 0.52 | 1.08 |
| | 1994 | 471.3 | 87.0 | 788 | 395 | 0.50 | 0.84 |
| | 1995 | 564.7 | 100.0 | 200 | 44 | 0.22 | 0.08 |
| | 1996 | 461.6 | 86.9 | 757 | 240 | 0.32 | 0.52 |
| | 1997 | 417.4 | 75.9 | 399 | 106 | 0.27 | 0.25 |
| | 1998 | 470.2 | 88.1 | 674 | 209.137 | 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 |

| 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** | 2010 | 536.0 | 98.5 | 534 | 56.116 | 0.11 | 0.10 |
| (continued) | 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 |
| **NINE MILE POINT 1, 2** | 1970 | 227.0 | --- | 821 | 44 | 0.05 | 0.19 |
| Docket 50-220, 50-410; | 1971 | 346.5 | --- | 1,006 | 195 | 0.19 | 0.56 |
| DPR-63; NPF-69 | 1972 | 381.8 | --- | 735 | 285 | 0.39 | 0.75 |
| 1st commercial operation | 1973 | 411.0 | --- | 550 | 567 | 1.03 | 1.38 |
| 12/69, 4/88 | 1974 | 385.9 | 70.5 | 740 | 824 | 1.11 | 2.14 |
| Type - BWRs | 1975 | 359.0 | 72.1 | 649 | 681 | 1.05 | 1.90 |
| Capacity - 565, 1,277 MWe | 1976 | 484.6 | 88.2 | 392 | 428 | 1.09 | 0.88 |
| | 1977 | 347.4 | 59.2 | 1,093 | 1,383 | 1.27 | 3.98 |
| | 1978 | 527.7 | 95.1 | 561 | 314 | 0.56 | 0.60 |
| | 1979 | 354.0 | 66.1 | 1,326 | 1,497 | 1.13 | 4.23 |
| | 1980 | 533.9 | 92.3 | 1,174 | 591 | 0.50 | 1.11 |
| | 1981 | 385.2 | 66.0 | 2,029 | 1,592 | 0.78 | 4.13 |
| | 1982 | 133.5 | 21.4 | 1,352 | 1,264 | 0.93 | 9.47 |
| | 1983 | 329.8 | 56.2 | 1,405 | 860 | 0.61 | 2.61 |
| | 1984 | 426.8 | 71.9 | 1,530 | 890 | 0.58 | 2.09 |
| | 1985 | 580.9 | 96.4 | 1,007 | 265 | 0.26 | 0.46 |
| | 1986 | 371.0 | 65.3 | 1,878 | 1,275 | 0.68 | 3.44 |
| | 1987 | 542.6 | 93.3 | 1,190 | 141 | 0.12 | 0.26 |
| | 1988 | 0.0 | 0.0 | 2,626 | 854 | 0.33 | --- |
| | 1989 | 527.5 | 29.7 | 2,737 | 564 | 0.21 | 1.07 |
| | 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 |
| | 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 |
| **NORTH ANNA 1, 2** | 1979 | 507.0 | 61.7 | 2,025 | 449 | 0.22 | 0.89 |
| Docket 50-338, 50-339; | 1980 | 681.8 | 86.5 | 2,086 | 218 | 0.10 | 0.32 |
| NPF-4, NPF-7 | 1981 | 1,241.9 | 71.5 | 2,416 | 680 | 0.28 | 0.55 |
| 1st commercial operation | 1982 | 777.7 | 45.8 | 2,872 | 1,915 | 0.67 | 2.46 |
| 6/78, 12/80 | 1983 | 1,338.4 | 76.1 | 2,228 | 665 | 0.30 | 0.50 |
| Type - PWRs | 1984 | 1,021.3 | 58.8 | 3,062 | 1,945 | 0.64 | 1.90 |
| Capacity - 943, 943 MWe | 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 |

| 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** (continued) | 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 |
| **OCONEE 1, 2, 3** Docket 50-269, 50-270, 50-287; DPR-38, DPR-47, DPR-55 1st commercial operation 7/73, 9/74, 12/74 Type - PWRs Capacity - 846, 846, 846 MWe | 1974 | 650.6 | 60.1 | 844 | 517 | 0.61 | 0.79 |
| | 1975 | 1,838.3 | 75.5 | 829 | 497 | 0.60 | 0.27 |
| | 1976 | 1,561.4 | 63.0 | 1,215 | 1,026 | 0.84 | 0.66 |
| | 1977 | 1,566.4 | 65.9 | 1,595 | 1,329 | 0.83 | 0.85 |
| | 1978 | 1,909.0 | 75.8 | 1,636 | 1,393 | 0.85 | 0.73 |
| | 1979 | 1,708.0 | 67.7 | 2,100 | 1,001 | 0.48 | 0.59 |
| | 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 |

| 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** | 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 |
| | 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 |
| **PALISADES** | 1972 | 216.8 | --- | --- | 78 | --- | 0.36 |
| Docket 50-255; | 1973 | 286.8 | --- | 975 | 1,133 | 1.16 | 3.95 |
| DPR-20 | 1974 | 10.7 | 5.5 | 774 | 627 | 0.81 | 58.60 |
| 1st commercial operation 12/71 | 1975 | 302.0 | 64.5 | 495 | 306 | 0.62 | 1.01 |
| Type - PWR | 1976 | 346.9 | 55.2 | 742 | 696 | 0.94 | 2.01 |
| Capacity - 744 MWe | 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 |

| 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** (continued) | 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 |
| | 1995 | 583.5 | 75.8 | 1,230 | 462 | 0.38 | 0.79 |
| | 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 |
| **PALO VERDE 1, 2, 3** Docket 50-528, 50-529, 50-530; NPF-41, NPF-51, NPF-74 1st commercial operation 1/86, 9/86, 1/88 Type - PWRs Capacity - 1,311, 1,314, 1,312 MWe | 1987 | 1,638.1 | 66.1 | 1,792 | 669 | 0.37 | 0.41 |
| | 1988 | 1,700.9 | 65.5 | 2,173 | 688 | 0.32 | 0.40 |
| | 1989 | 965.3 | 26.5 | 2,615 | 720 | 0.28 | 0.75 |
| | 1990 | 2,500.9 | 67.5 | 2,236 | 499 | 0.22 | 0.20 |
| | 1991 | 3,043.9 | 78.9 | 2,242 | 605 | 0.27 | 0.20 |
| | 1992 | 3,102.3 | 82.0 | 1,981 | 541 | 0.27 | 0.17 |
| | 1993 | 2,677.1 | 74.3 | 2,124 | 592 | 0.28 | 0.22 |
| | 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 |
| **PEACH BOTTOM 2, 3** Docket 50-277, 50-278; DPR-44, DPR-56 1st commercial operation 7/74, 12/74 Type - BWRs Capacity - 1,083, 1,095 MWe | 1975 | 1,234.3 | 80.9 | 971 | 228 | 0.23 | 0.18 |
| | 1976 | 1,379.2 | 73.0 | 2,136 | 840 | 0.39 | 0.61 |
| | 1977 | 1,052.4 | 58.7 | 2,827 | 2,036 | 0.72 | 1.93 |
| | 1978 | 1,636.3 | 84.0 | 2,244 | 1,317 | 0.59 | 0.80 |
| | 1979 | 1,740.0 | 84.5 | 2,276 | 1,388 | 0.61 | 0.80 |
| | 1980 | 1,374.2 | 66.3 | 2,774 | 2,302 | 0.83 | 1.68 |
| | 1981 | 1,161.8 | 58.0 | 2,857 | 2,506 | 0.88 | 2.16 |
| | 1982 | 1,583.3 | 76.9 | 2,734 | 1,977 | 0.72 | 1.25 |
| | 1983 | 824.7 | 41.0 | 3,107 | 2,963 | 0.95 | 3.59 |
| | 1984 | 1,165.8 | 57.5 | 3,313 | 2,450 | 0.74 | 2.10 |
| | 1985 | 682.7 | 37.5 | 4,209 | 3,354 | 0.80 | 4.91 |

| 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** | 1986 | 1,395.0 | 71.7 | 2,454 | 1,080 | 0.44 | 0.77 |
| (continued) | 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 |
| **PERRY** | 1988 | 869.3 | 79.0 | 782 | 105 | 0.13 | 0.12 |
| Docket 50-440; | 1989 | 642.2 | 57.0 | 1,883 | 767 | 0.41 | 1.19 |
| NPF-58 | 1990 | 792.7 | 67.1 | 1,537 | 638 | 0.42 | 0.80 |
| 1st commercial operation 11/87 | 1991 | 1,074.2 | 91.9 | 600 | 146 | 0.24 | 0.14 |
| Type - BWR | 1992 | 856.2 | 75.5 | 1,487 | 571 | 0.38 | 0.67 |
| Capacity - 1,240 MWe | 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 |
| **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 |

| 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 |
|---|---|---|---|---|---|---|---|
| **PILGRIM 1** (continued) | 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 |
| **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 |
| | 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 |

| 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) | 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 |
| **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 |
| | 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 |
| **QUAD CITIES 1, 2** Docket 50-254, 50-265; DPR-29, DPR-30 1st commercial operation 2/73, 3/73 Type - BWRs Capacity - 866, 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 |

| 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 |
|---|---|---|---|---|---|---|---|
| **QUAD CITIES 1, 2** (continued) | 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 |
| **RANCHO SECO**[14] Docket 50-312; DPR-54 1st commercial operation 4/75 Type - PWR Capacity - (873) MWe | 1976 | 268.1 | 30.4 | 297 | 58 | 0.20 | 0.22 |
| | 1977 | 706.4 | 77.1 | 515 | 391 | 0.76 | 0.55 |
| | 1978 | 607.7 | 80.5 | 508 | 323 | 0.64 | 0.53 |
| | 1979 | 687.0 | 91.1 | 287 | 126 | 0.44 | 0.18 |
| | 1980 | 530.9 | 60.4 | 890 | 412 | 0.46 | 0.78 |
| | 1981 | 321.2 | 40.2 | 772 | 402 | 0.52 | 1.25 |
| | 1982 | 409.5 | 53.3 | 766 | 337 | 0.44 | 0.82 |
| | 1983 | 347.9 | 46.8 | 1,338 | 787 | 0.59 | 2.26 |
| | 1984 | 460.0 | 58.3 | 802 | 222 | 0.28 | 0.48 |
| | 1985 | 238.7 | 30.8 | 1,764 | 756 | 0.43 | 3.17 |
| | 1986 | 0.0 | 0.0 | 1,513 | 402 | 0.27 | --- |
| | 1987 | 0.0 | 0.0 | 1,533 | 300 | 0.20 | --- |
| | 1988 | 355.8 | 63.1 | 693 | 78 | 0.11 | 0.22 |
| | 1989 | 179.9 | 54.7 | 603 | 81 | 0.13 | 0.45 |
| | 1990 | 0.0 | 0.0 | 111 | 13 | 0.12 | --- |
| | 1991 | 0.0 | 0.0 | 101 | 9 | 0.09 | --- |
| | 1992 | 0.0 | 0.0 | 70 | 7 | 0.10 | --- |
| | 1993 | 0.0 | 0.0 | 35 | 4 | 0.11 | --- |
| | 1994 | 0.0 | 0.0 | 18 | 1 | 0.06 | --- |
| | 1995 | 0.0 | 0.0 | 16 | 1 | 0.06 | --- |
| | 1996 | 0.0 | 0.0 | 16 | 1 | 0.06 | --- |
| | 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 | --- |

[14] 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 |
|---|---|---|---|---|---|---|---|
| **RANCHO SECO**[14] (continued) | 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 |
| **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 |

[14] 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 |
|---|---|---|---|---|---|---|---|
| **ROBINSON 2** | 1997 | 707.5 | 99.0 | 304 | 13 | 0.04 | 0.02 |
| (continued) | 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 |
| **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 |
| | 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 |

| 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[15], 2, 3** | 1969 | 314.1 | --- | 123 | 42 | 0.34 | 0.13 |
| Docket 50-206, 50-361, 50-362; | 1970 | 365.9 | --- | 251 | 155 | 0.62 | 0.42 |
| DPR-13; NPF-10, NPF-15 | 1971 | 362.1 | --- | 121 | 50 | 0.41 | 0.14 |
| 1st commercial operation | 1972 | 338.5 | --- | 326 | 256 | 0.79 | 0.76 |
| 1/68, 8/83, 4/84 | 1973 | 273.7 | --- | 570 | 353 | 0.62 | 1.29 |
| Type - PWRs | 1974 | 377.8 | 86.1 | 219 | 71 | 0.32 | 0.19 |
| Capacity - (436), 1,070, | 1975 | 389.0 | 87.4 | 424 | 292 | 0.69 | 0.75 |
| 1,080 MWe | 1976 | 297.9 | 70.2 | 1,330 | 880 | 0.66 | 2.95 |
| | 1977 | 281.2 | 63.7 | 985 | 847 | 0.86 | 3.01 |
| | 1978 | 323.2 | 80.2 | 764 | 401 | 0.52 | 1.24 |
| | 1979 | 401.0 | 90.2 | 521 | 139 | 0.27 | 0.35 |
| | 1980 | 97.3 | 22.3 | 3,063 | 2,386 | 0.78 | 24.52 |
| | 1981 | 95.9 | 26.7 | 2,902 | 3,223 | 1.11 | 33.61 |
| | 1982 | 61.6 | 15.7 | 3,055 | 832 | 0.27 | 13.51 |
| | 1983 | 0.0 | 0.0 | 1,701 | 155 | 0.09 | --- |
| | 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 |
| | 1996 | 2,089.3 | 93.2 | 1,272 | 129 | 0.10 | 0.06 |
| | 1997 | 1,533.9 | 72.9 | 1,652 | 341 | 0.21 | 0.22 |
| | 1998 | 1,996.4 | 92.0 | 1,091 | 195.600 | 0.18 | 0.10 |
| **SAN ONOFRE 1[15]** | 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[16]** | 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 |
| | 2009 | 1,774.5 | 79.9 | 1,575 | 178.131 | 0.11 | 0.10 |
| | 2010 | 1,578.9 | 75.3 | 1,642 | 199.399 | 0.12 | 0.13 |
| | 2011 | 2,067.1 | 93.0 | 641 | 29.658 | 0.05 | 0.01 |
| | 2012 | 115.2 | 5.4 | 2,150 | 221.463 | 0.10 | 1.92 |
| | 2013 | 0.0 | 0.0 | 210 | 5.701 | 0.03 | --- |

[15] 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.

[16] San Onofre 2, 3 ceased power generation in January 2012, and in June 2013 it was decided that they would not be put in commerical 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** | 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 |
| **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 |
| **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 |

| 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** (continued) | 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 |
| | 2010 | 2,418.7 | 91.5 | 867 | 79.159 | 0.09 | 0.03 |
| | 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 |
| **ST. LUCIE 1, 2** Docket 50-335, 50-389; DPR-67; NPF-16 1st commercial operation 12/76, 8/83 Type - PWRs Capacity - 981, 987 MWe | 1977 | 649.1 | 84.7 | 445 | 152 | 0.34 | 0.23 |
| | 1978 | 606.4 | 76.5 | 797 | 337 | 0.42 | 0.56 |
| | 1979 | 592.0 | 74.0 | 907 | 438 | 0.48 | 0.74 |
| | 1980 | 627.9 | 77.5 | 1,074 | 532 | 0.50 | 0.85 |
| | 1981 | 599.1 | 72.7 | 1,473 | 929 | 0.63 | 1.55 |
| | 1982 | 816.8 | 94.0 | 1,045 | 272 | 0.26 | 0.33 |
| | 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 |
| **SUMMER 1** Docket 50-395; NPF-12 1st commercial operation 1/84 Type - PWR Capacity - 966 MWe | 1984 | 504.6 | 61.1 | 1,120 | 295 | 0.26 | 0.58 |
| | 1985 | 627.7 | 71.6 | 1,201 | 379 | 0.32 | 0.60 |
| | 1986 | 853.7 | 95.3 | 392 | 23 | 0.06 | 0.03 |
| | 1987 | 618.7 | 71.0 | 1,075 | 560 | 0.52 | 0.91 |
| | 1988 | 605.3 | 69.1 | 1,127 | 511 | 0.45 | 0.84 |
| | 1989 | 652.4 | 83.1 | 374 | 52 | 0.14 | 0.08 |

| 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) | 1990 | 730.0 | 83.9 | 1,090 | 376 | 0.34 | 0.52 |
| | 1991 | 642.5 | 82.9 | 984 | 291 | 0.30 | 0.45 |
| | 1992 | 892.6 | 97.4 | 249 | 27 | 0.11 | 0.03 |
| | 1993 | 728.3 | 84.0 | 1,121 | 297 | 0.26 | 0.41 |
| | 1994 | 536.7 | 69.5 | 1,549 | 374 | 0.24 | 0.70 |
| | 1995 | 899.8 | 97.2 | 257 | 13 | 0.05 | 0.01 |
| | 1996 | 850.4 | 90.3 | 701 | 97 | 0.14 | 0.11 |
| | 1997 | 829.7 | 89.8 | 820 | 163 | 0.20 | 0.20 |
| | 1998 | 934.8 | 98.8 | 285 | 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 |
| **SURRY 1, 2** Docket 50-280, 50-281; DPR-32, DPR-37 1st commercial operation 12/72, 5/73 Type - PWRs Capacity - 838, 838 MWe | 1973 | 420.6 | --- | 936 | 152 | 0.16 | 0.36 |
| | 1974 | 717.4 | 49.8 | 1,715 | 884 | 0.52 | 1.23 |
| | 1975 | 1,079.0 | 70.8 | 1,948 | 1,649 | 0.85 | 1.53 |
| | 1976 | 930.7 | 60.4 | 2,753 | 3,165 | 1.15 | 3.40 |
| | 1977 | 1,139.0 | 72.2 | 1,860 | 2,307 | 1.24 | 2.03 |
| | 1978 | 1,210.6 | 77.2 | 2,203 | 1,837 | 0.83 | 1.52 |
| | 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 |

| 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** | 2011 | 1,487.4 | 88.1 | 1,121 | 113.718 | 0.10 | 0.08 |
| (continued) | 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 |
| **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 |
| **THREE MILE ISLAND 1[17], 2[18]** | 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[17]** | 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 |
| | 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 |

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

[18] 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. Since 2001, TMI has 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**[17] | 1997 | 675.7 | 84.3 | 1,049 | 204 | 0.19 | 0.30 |
| (continued) | 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 |
| **THREE MILE ISLAND 2**[18] | 1986 | 0.0 | 0.0 | 1,497 | 915 | 0.61 | --- |
| Docket 50-320; | 1987 | 0.0 | 0.0 | 1,378 | 977 | 0.71 | --- |
| DPR-73 | 1988 | 0.0 | 0.0 | 1,247 | 917 | 0.74 | --- |
| 1st commercial operation 12/78 | 1989 | 0.0 | 0.0 | 1,014 | 639 | 0.63 | --- |
| Type - PWR | 1990 | 0.0 | 0.0 | 484 | 136 | 0.28 | --- |
| Capacity - (880) MWe | 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 | --- | --- |
| **TROJAN**[19] | 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 |

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

[18] 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. Since 2001, TMI has voluntarily provided an estimate of the collective dose for Unit 2 but not the number of individuals with measurable dose.

[19] 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 |
|---|---|---|---|---|---|---|---|
| **TROJAN**[19] (continued) | 1984 | 567.0 | 54.4 | 1,042 | 433 | 0.42 | 0.76 |
| | 1985 | 829.1 | 76.7 | 852 | 363 | 0.43 | 0.44 |
| | 1986 | 852.4 | 79.7 | 1,321 | 381 | 0.29 | 0.45 |
| | 1987 | 525.5 | 54.0 | 1,209 | 363 | 0.30 | 0.69 |
| | 1988 | 758.6 | 67.5 | 1,408 | 401 | 0.28 | 0.53 |
| | 1989 | 666.8 | 61.9 | 1,360 | 421 | 0.31 | 0.63 |
| | 1990 | 732.4 | 66.3 | 1,169 | 258 | 0.22 | 0.35 |
| | 1991 | 181.6 | 16.1 | 1,496 | 567 | 0.38 | 3.12 |
| | 1992 | 553.9 | 68.4 | 567 | 84 | 0.15 | 0.15 |
| | 1993 | 0.0 | 68.4 | 54 | 21 | 0.39 | --- |
| | 1994 | 0.0 | 0.0 | 51 | 9 | 0.18 | --- |
| | 1995 | 0.0 | 0.0 | 141 | 44 | 0.31 | --- |
| | 1996 | 0.0 | 0.0 | 112 | 41 | 0.37 | --- |
| | 1997 | 0.0 | 0.0 | 227 | 41 | 0.18 | --- |
| | 1998 | 0.0 | 0.0 | 283 | 46.417 | 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** Docket 50-250, 50-251; DPR-31, DPR-41 1st commercial operation 12/72, 9/73 Type - PWRs Capacity - 811, 821 MWe | 1973 | 401.9 | --- | 444 | 78 | 0.18 | 0.19 |
| | 1974 | 953.6 | --- | 794 | 454 | 0.57 | 0.48 |
| | 1975 | 1,003.7 | 74.9 | 1,176 | 876 | 0.74 | 0.87 |
| | 1976 | 974.2 | 71.2 | 1,647 | 1,184 | 0.72 | 1.22 |
| | 1977 | 979.5 | 72.1 | 1,319 | 1,036 | 0.79 | 1.06 |
| | 1978 | 1,000.2 | 78.8 | 1,336 | 1,032 | 0.77 | 1.03 |
| | 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 |
| | 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 |

| 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 |
|---|---|---|---|---|---|---|---|
| **VERMONT YANKEE** | 1973 | 222.1 | --- | 244 | 85 | 0.35 | 0.38 |
| Docket 50-271; | 1974 | 303.5 | --- | 357 | 216 | 0.61 | 0.71 |
| DPR-28 | 1975 | 429.0 | 87.8 | 282 | 153 | 0.54 | 0.36 |
| 1st commercial operation 11/72 | 1976 | 389.6 | 77.1 | 815 | 411 | 0.50 | 1.05 |
| Type - BWR | 1977 | 423.5 | 85.1 | 641 | 258 | 0.40 | 0.61 |
| Capacity - 605 MWe | 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 |
| | 2012 | 571.1 | 100.0 | 275 | 45.480 | 0.17 | 0.08 |
| | 2013 | 555.5 | 92.9 | 1,034 | 170.340 | 0.16 | 0.31 |
| **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 |

| 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** | 2009 | 2,201.6 | 95.7 | 931 | 79.681 | 0.09 | 0.04 |
| (continued) | 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 |
| **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 |
| **WATTS BAR 1** | 1997 | 867.6 | 83.8 | 1,103 | 113 | 0.10 | 0.13 |
| Docket 50-390; | 1998 | 1,105.1 | 99.1 | 96 | 3.106 | 0.03 | 0.00 |
| NPF-90 | 1999 | 943.1 | 87.2 | 975 | 98.946 | 0.10 | 0.10 |
| 1st commercial operation 5/96 | 2000 | 1,033.3 | 92.8 | 1,053 | 122.453 | 0.12 | 0.12 |
| Type - PWR | 2001 | 1,095.9 | 96.5 | 197 | 5.912 | 0.03 | 0.01 |
| Capacity - 1,123 MWe | 2002 | 1,034.0 | 92.1 | 909 | 93.598 | 0.10 | 0.09 |
| | 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 |
| **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 |

| 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 |
|---|---|---|---|---|---|---|---|
| **WOLF CREEK 1** | 1997 | 964.3 | 83.8 | 989 | 265 | 0.27 | 0.27 |
| (continued) | 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 |
| **YANKEE ROWE**[20] | 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 |
| | 1975 | 145.1 | 82.4 | 249 | 116 | 0.47 | 0.80 |
| | 1976 | 152.2 | 89.8 | 152 | 59 | 0.39 | 0.39 |
| | 1977 | 124.6 | 73.9 | 725 | 356 | 0.49 | 2.86 |
| | 1978 | 145.0 | 81.0 | 565 | 282 | 0.50 | 1.94 |
| | 1979 | 149.0 | 81.6 | 441 | 127 | 0.29 | 0.85 |
| | 1980 | 35.6 | 22.0 | 502 | 213 | 0.42 | 5.98 |
| | 1981 | 109.0 | 74.4 | 515 | 302 | 0.59 | 2.77 |
| | 1982 | 108.6 | 73.4 | 814 | 474 | 0.58 | 4.36 |
| | 1983 | 163.5 | 91.4 | 395 | 68 | 0.17 | 0.42 |
| | 1984 | 124.8 | 71.4 | 654 | 348 | 0.53 | 2.79 |
| | 1985 | 144.3 | 85.3 | 653 | 211 | 0.32 | 1.46 |
| | 1986 | 169.7 | 95.0 | 384 | 45 | 0.12 | 0.27 |
| | 1987 | 138.7 | 82.7 | 593 | 217 | 0.37 | 1.56 |
| | 1988 | 136.4 | 85.2 | 738 | 227 | 0.31 | 1.66 |
| | 1989 | 159.4 | 92.9 | 496 | 62 | 0.13 | 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 | --- |

[20] 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**[20] | 2010 | 0.0 | 0.0 | 3 | 0.083 | 0.03 | --- |
| (continued) | 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 | --- |
| **ZION 1**[21]**, 2** | 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 |
| | 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 | --- |

[20] 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.

[21] 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

## 1973–2013

Appendix D only contains data on plants still operating in 2013.

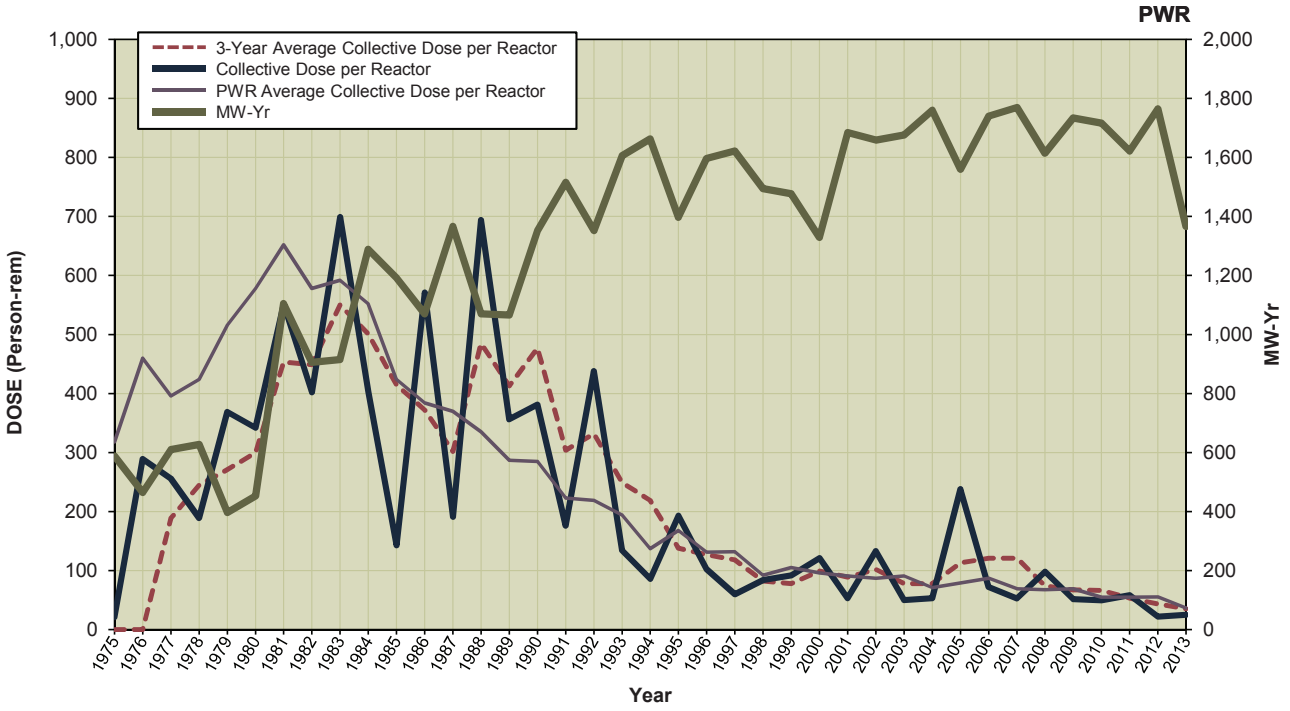
# GRAPHICAL REPRESENTATION OF DOSE TRENDS IN APPENDIX D

Each page of Appendix D presents a graph of selected dose performance trends from 1973 through 2013. 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 2013. 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 an overall indication of each plant's general trend in collective dose.

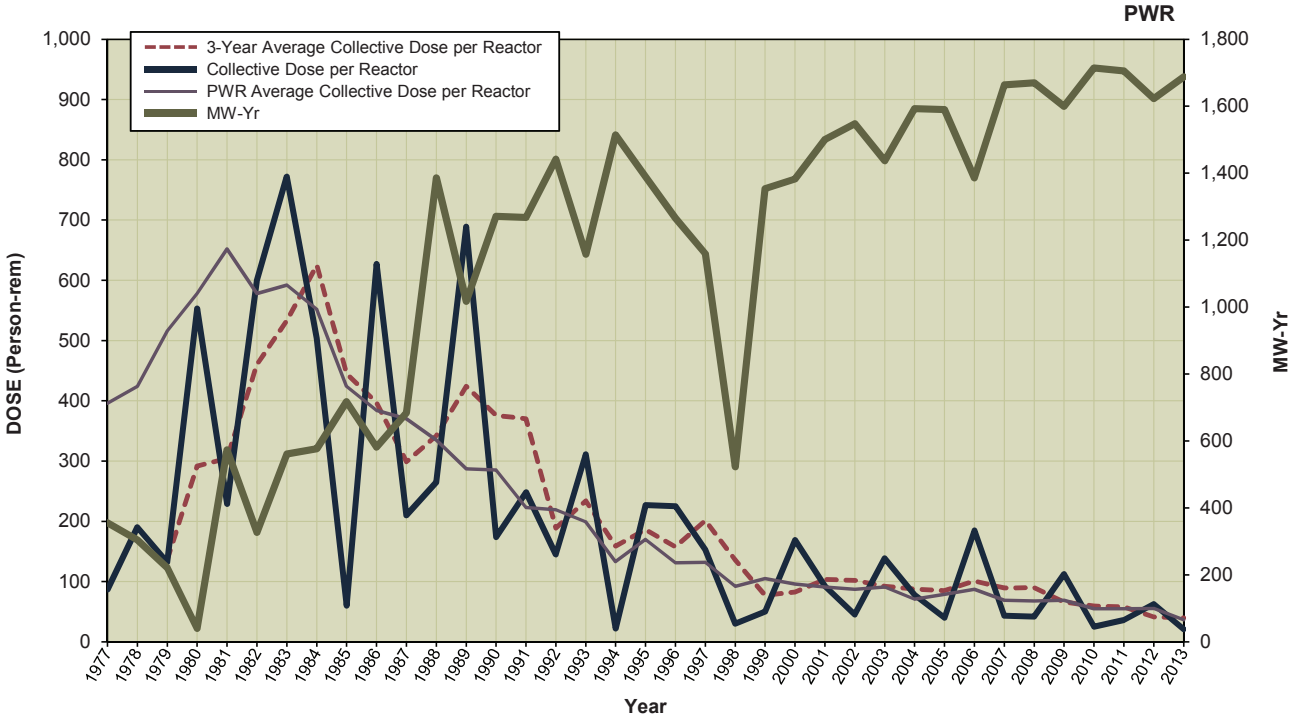
The 3-year average collective dose per reactor is also one of the metrics used by the NRC in the Reactor Oversight Program to evaluate a licensee's as low as is reasonably achievable program. This average is determined by summing the collective dose for the current year and the previous 2 years and then dividing this sum by the number of reactors reporting during those years. Depicting dose trends 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.

Although four PWRs shut down in 2013 (Crystal River, Kewaunee, and San Onofre 2,3), their respective performance graphs for 2013 are included in Appendix D for completeness.

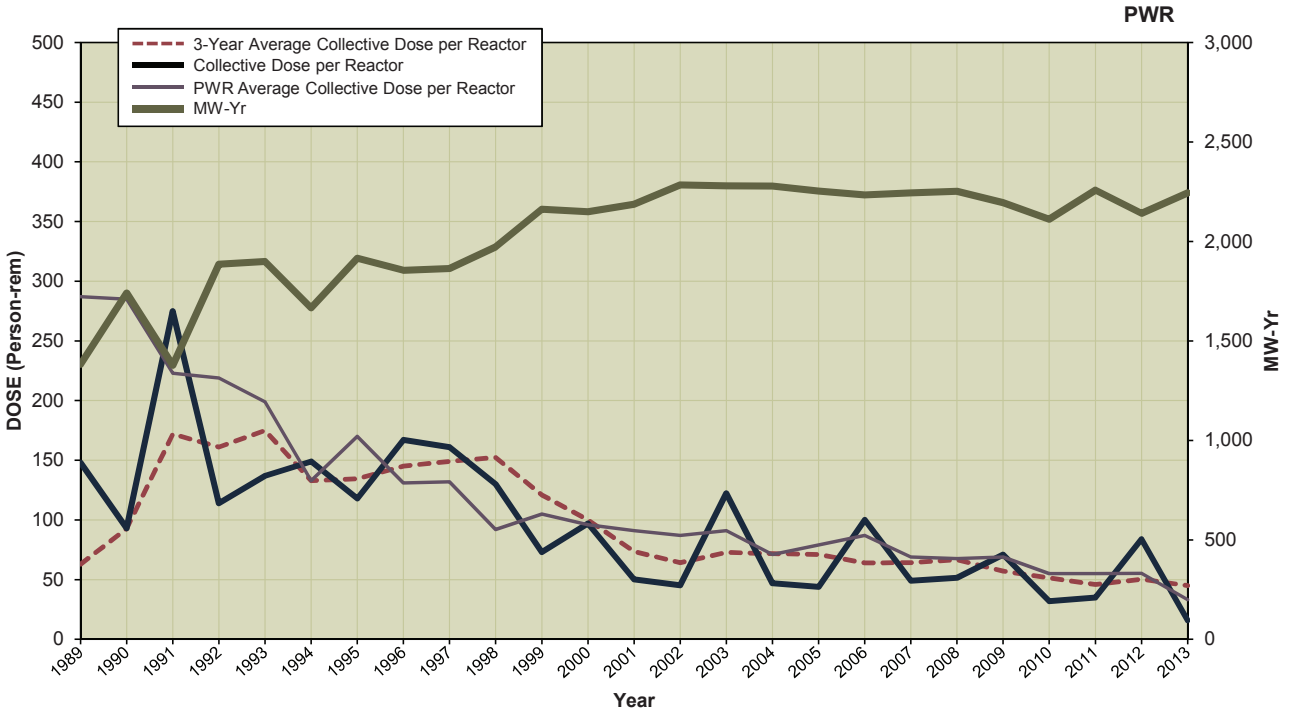
## ARKANSAS 1, 2
Dose Performance Trends



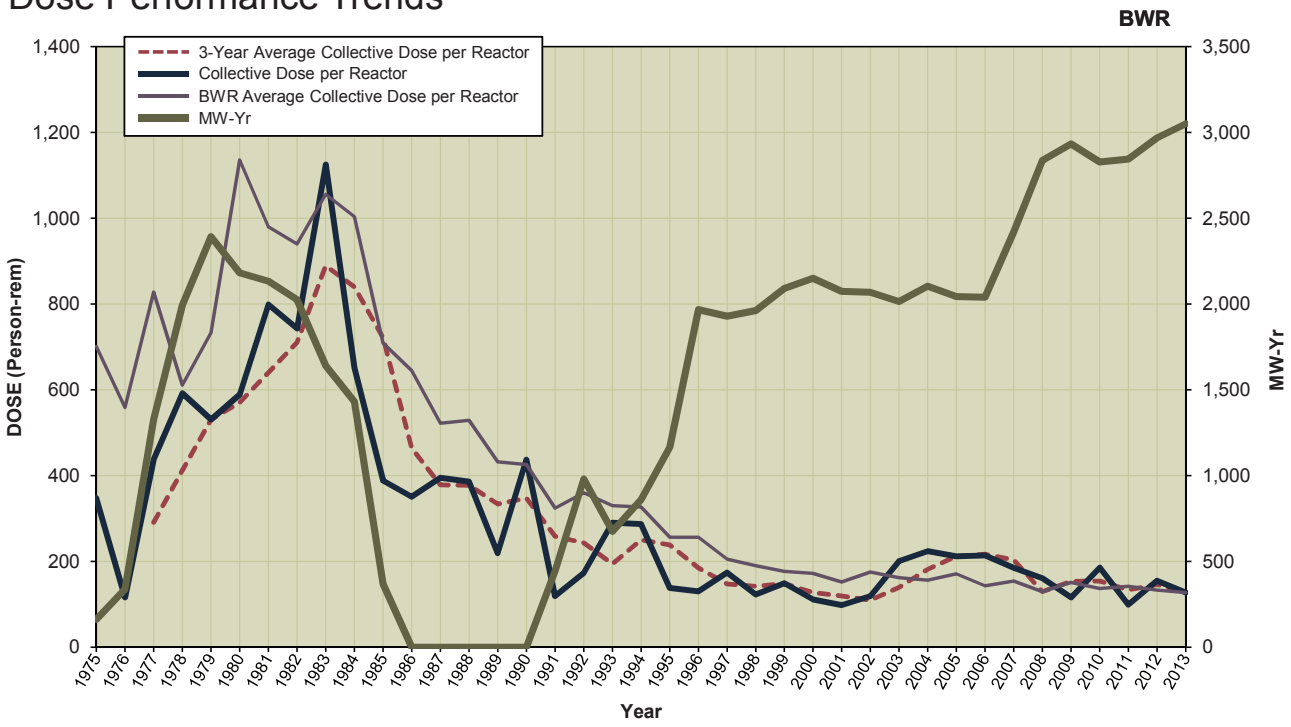

## BEAVER VALLEY 1, 2
Dose Performance Trends



## BRAIDWOOD 1, 2
Dose Performance Trends

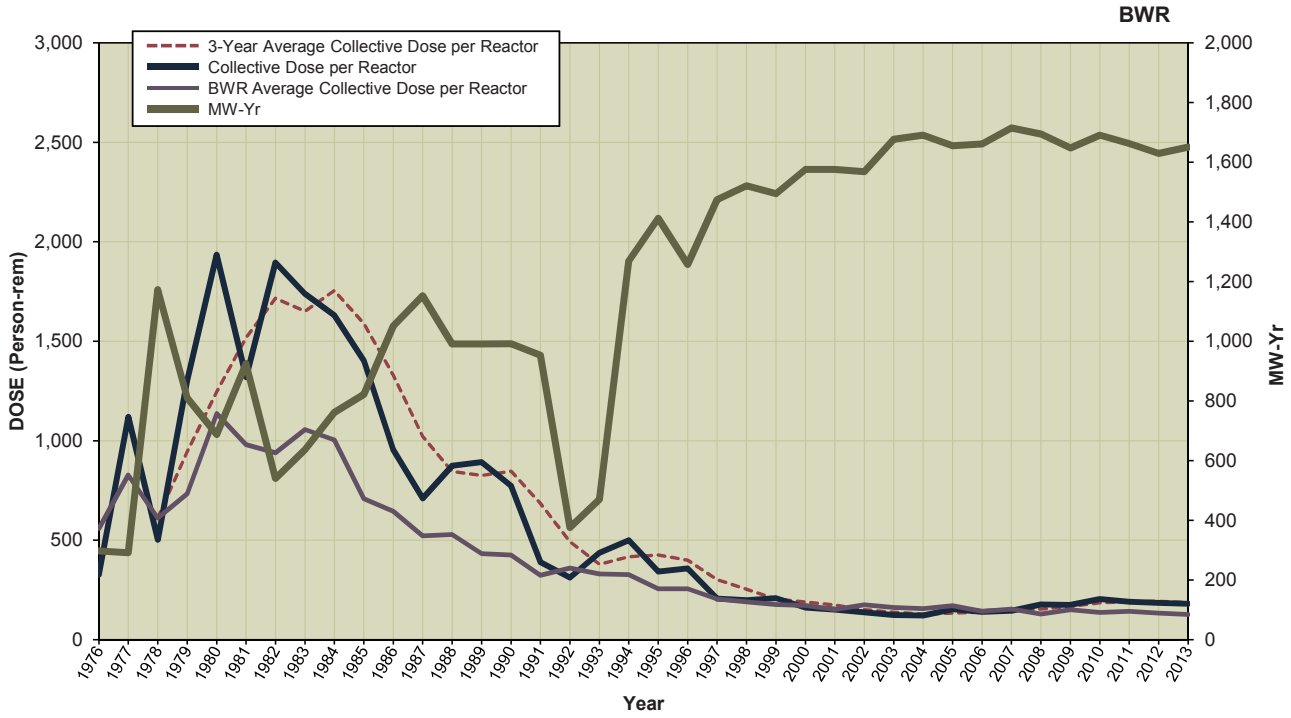



## BROWNS FERRY 1, 2, 3
Dose Performance Trends

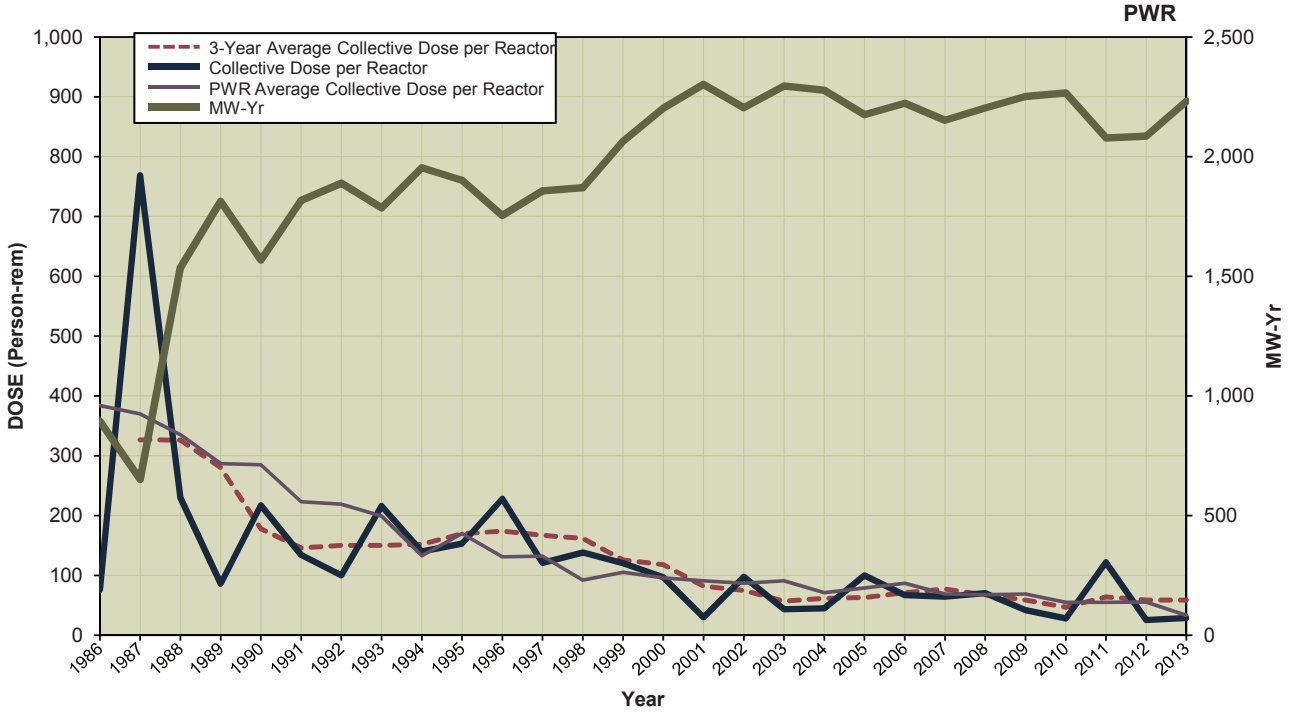



NOTE: Browns Ferry Unit 1 resumed power generation in 2007.

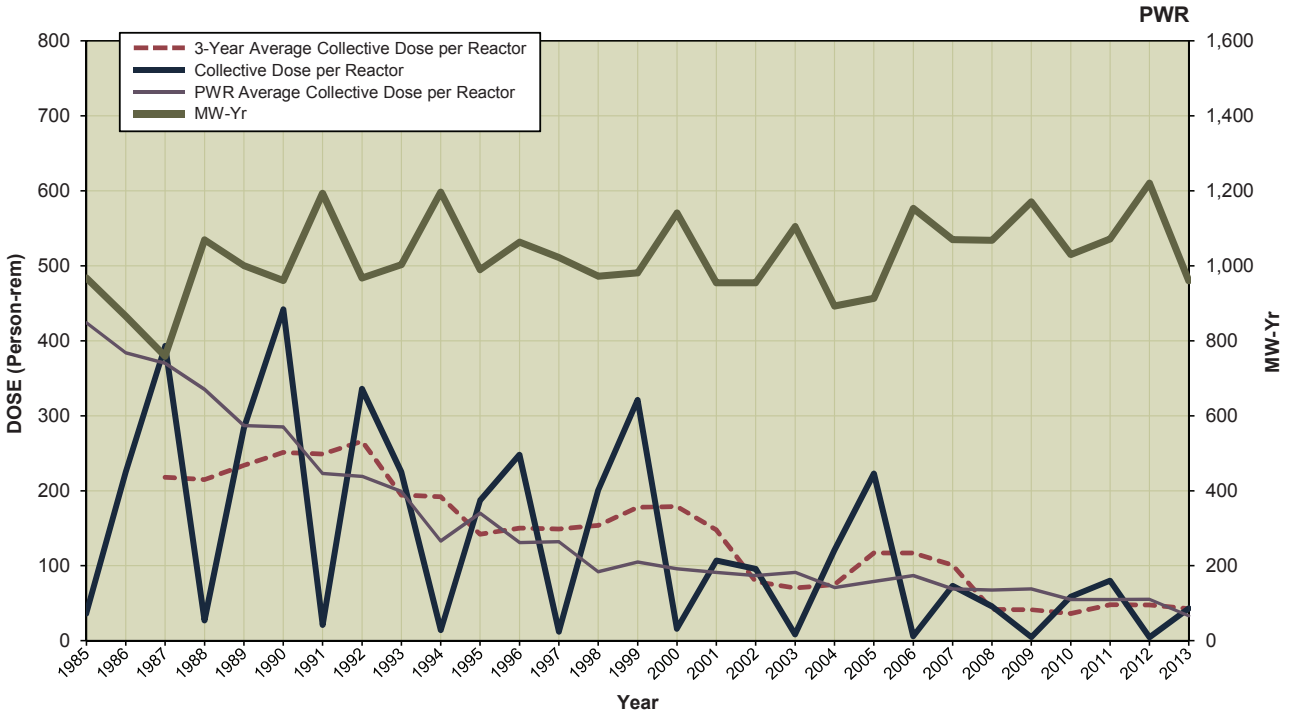
## BRUNSWICK 1, 2
Dose Performance Trends



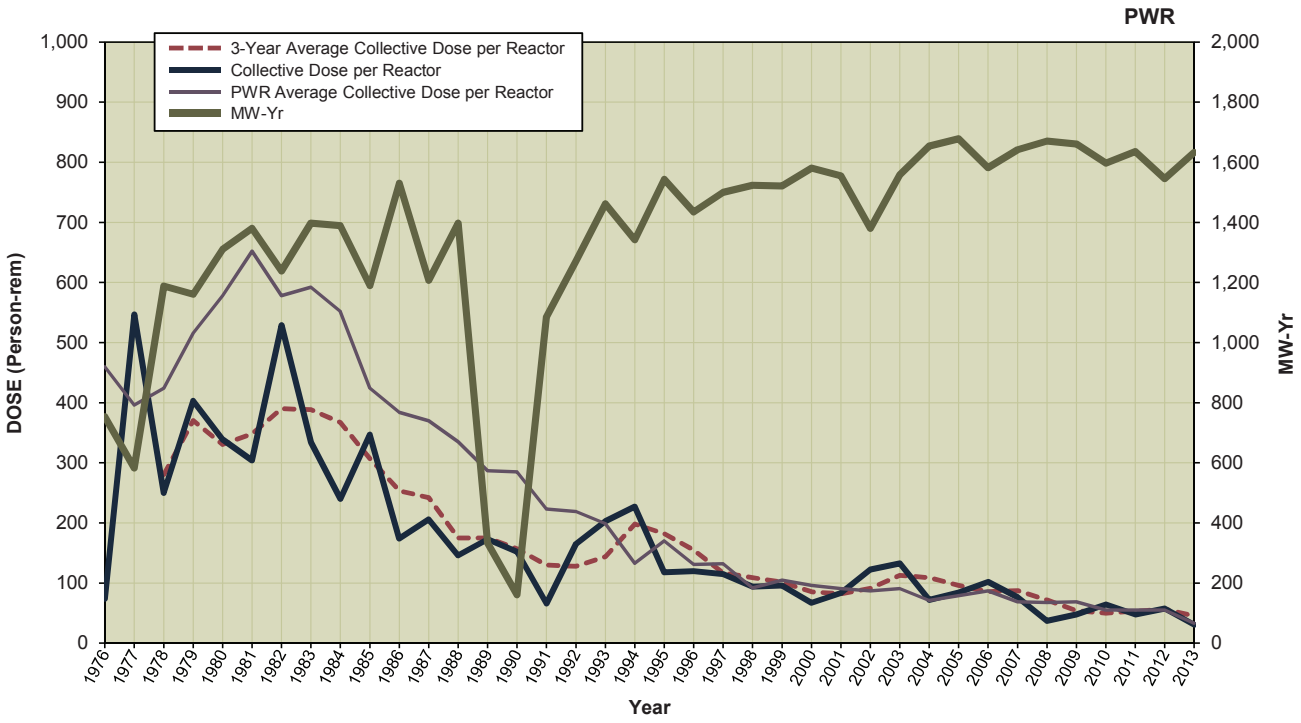

## BYRON 1, 2
Dose Performance Trends



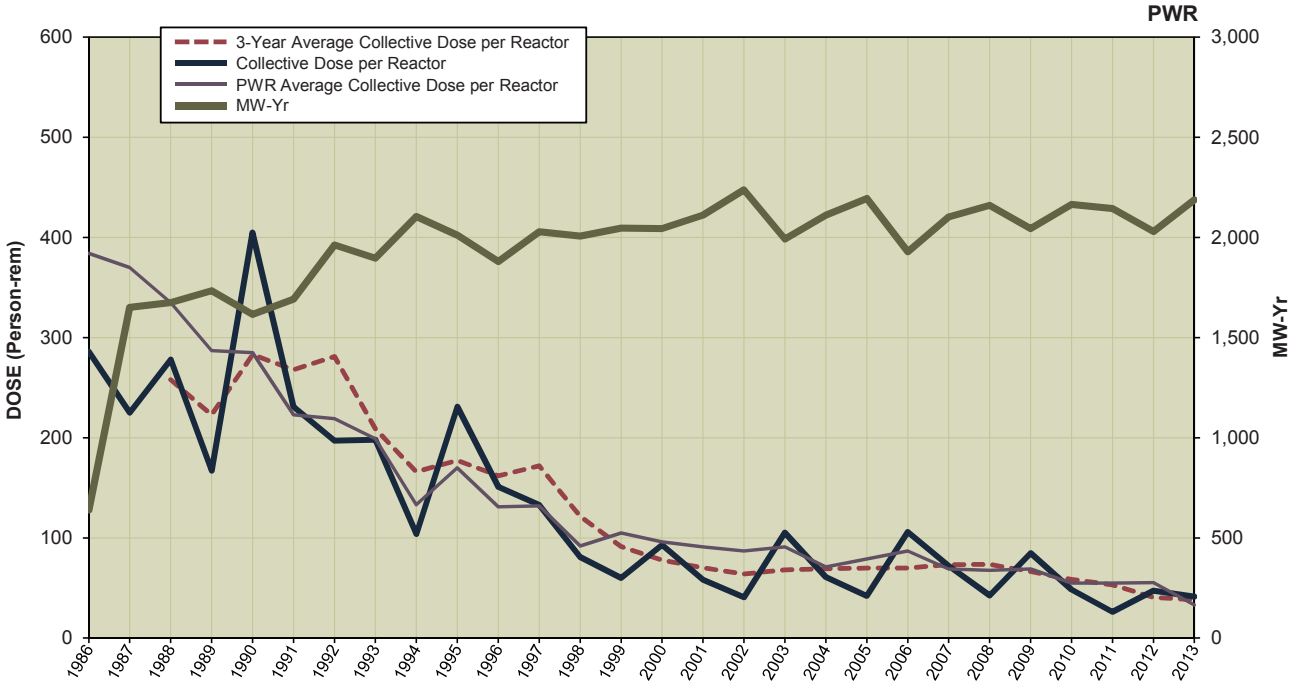
## CALLAWAY 1
Dose Performance Trends



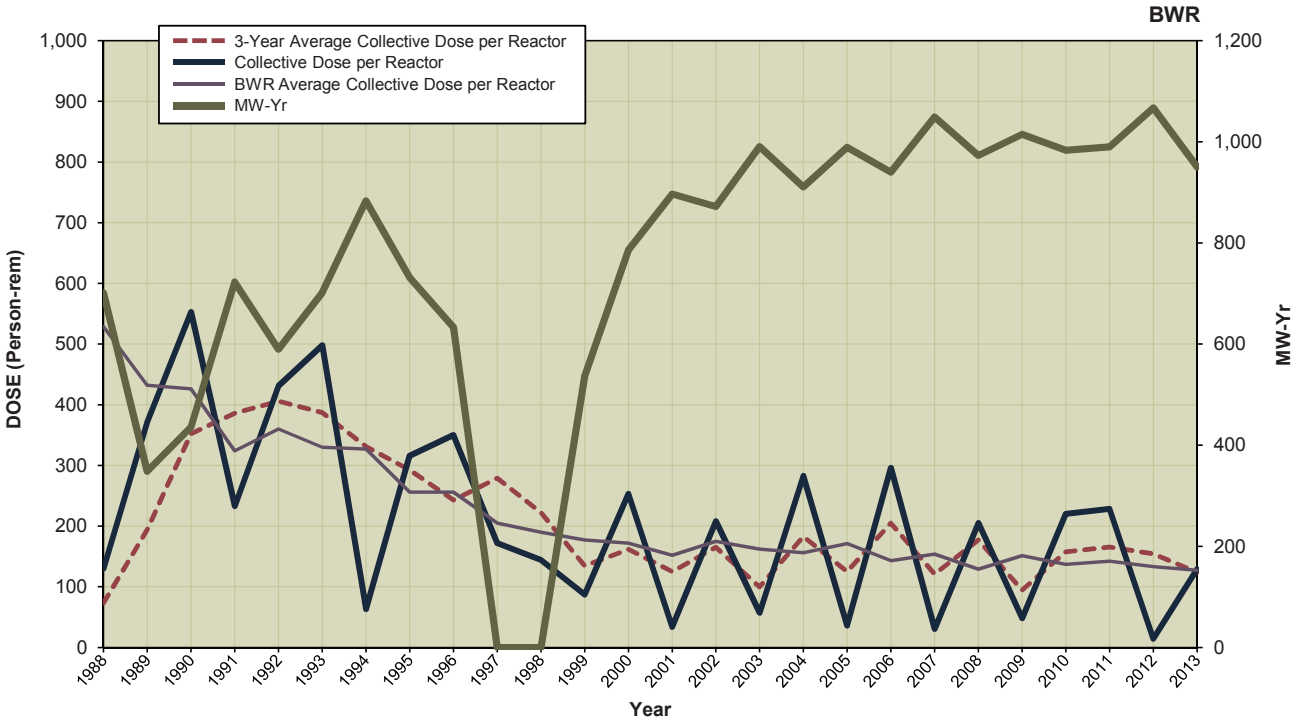

## CALVERT CLIFFS 1, 2
Dose Performance Trends



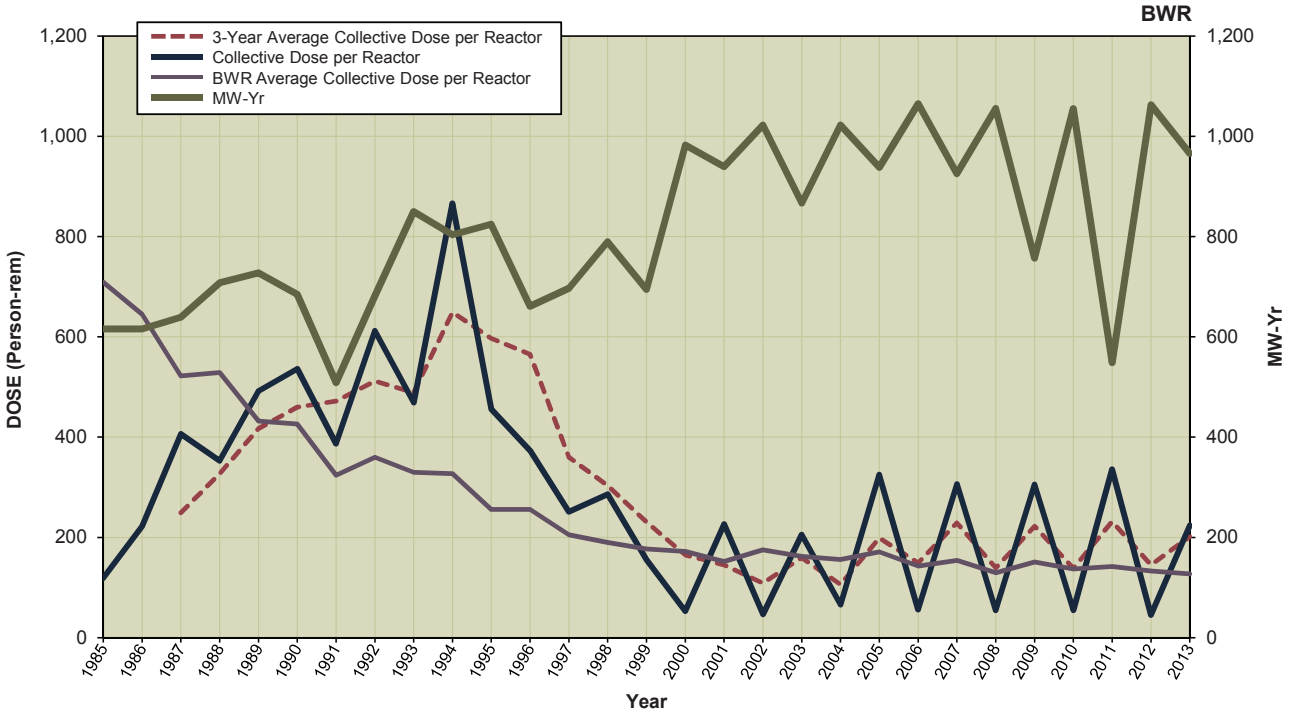
## CATAWBA 1, 2
Dose Performance Trends



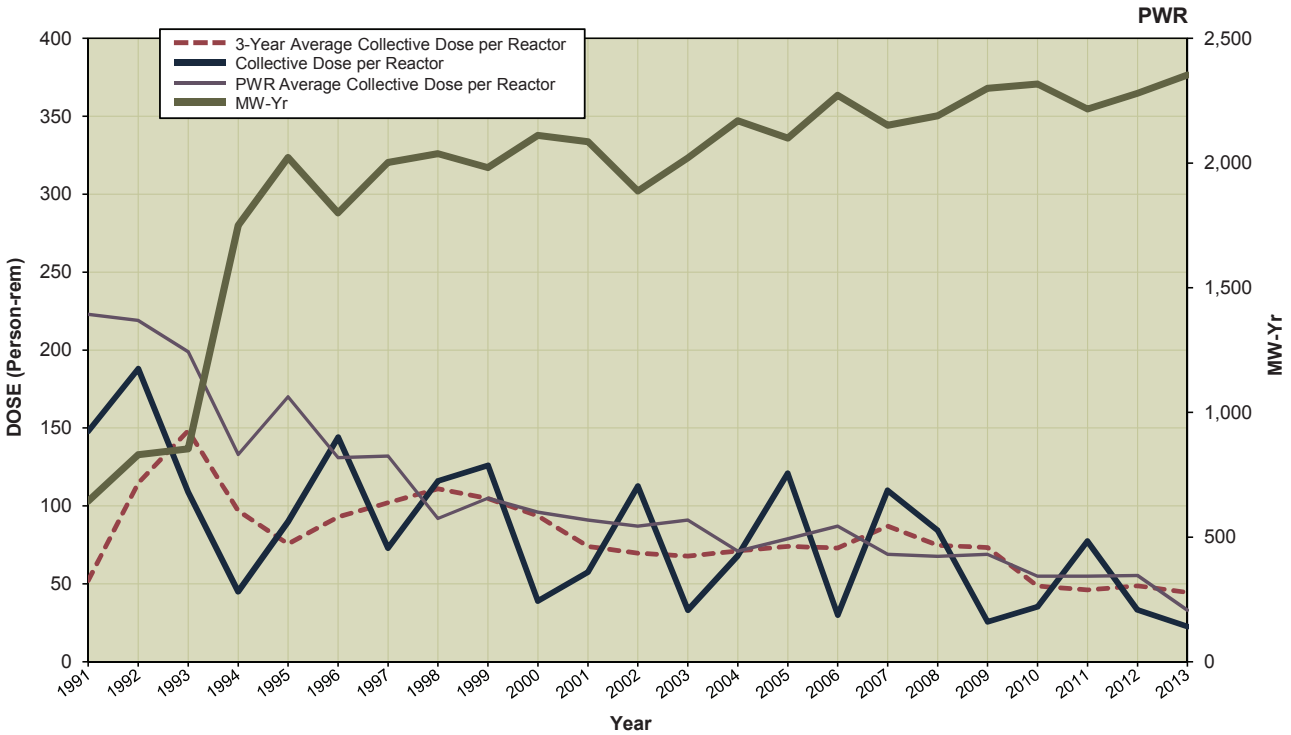

## CLINTON
Dose Performance Trends



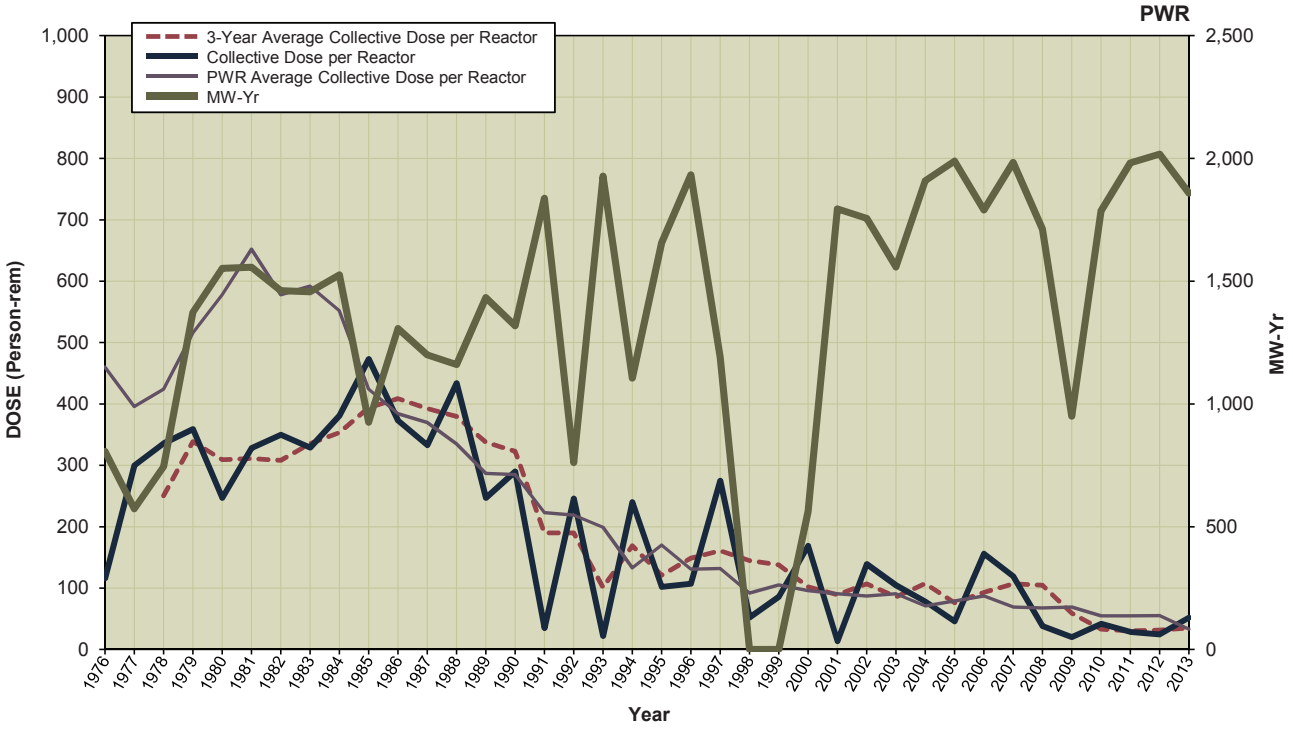
## COLUMBIA GENERATING
Dose Performance Trends



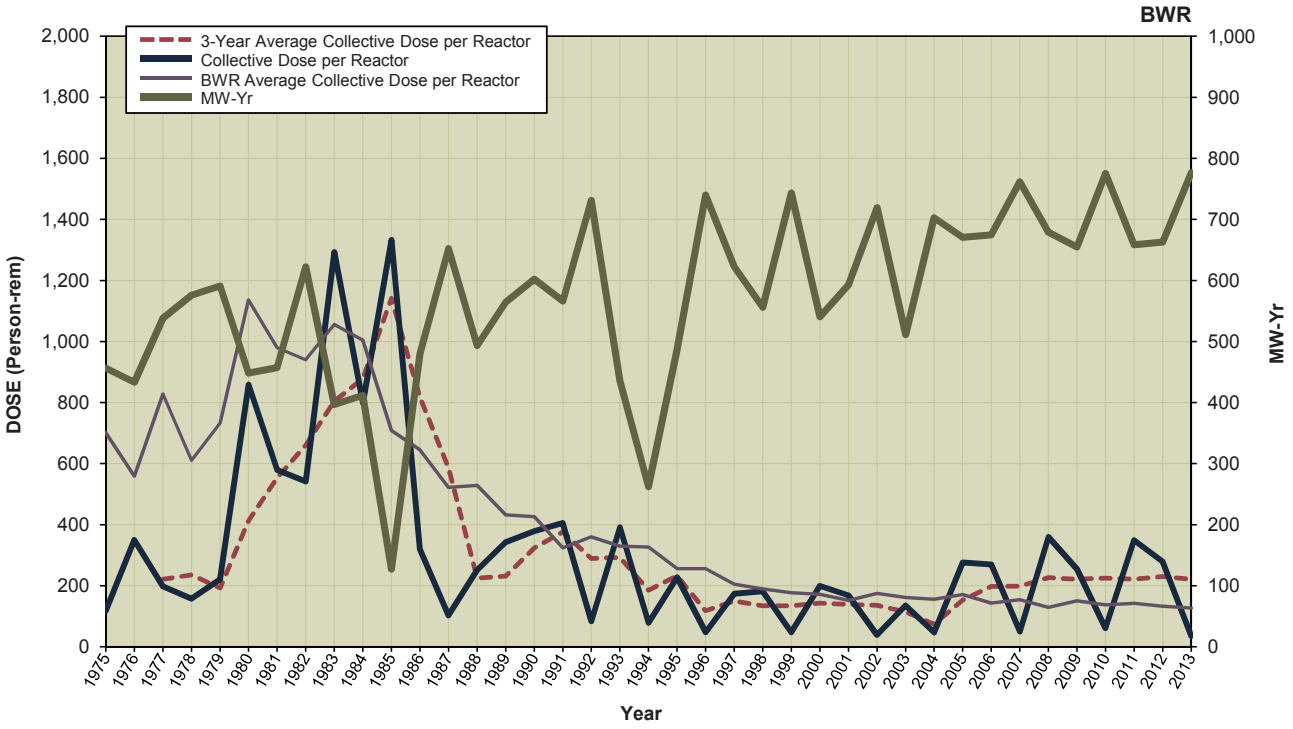

## COMANCHE PEAK 1, 2
Dose Performance Trends



## COOK 1, 2
Dose Performance Trends

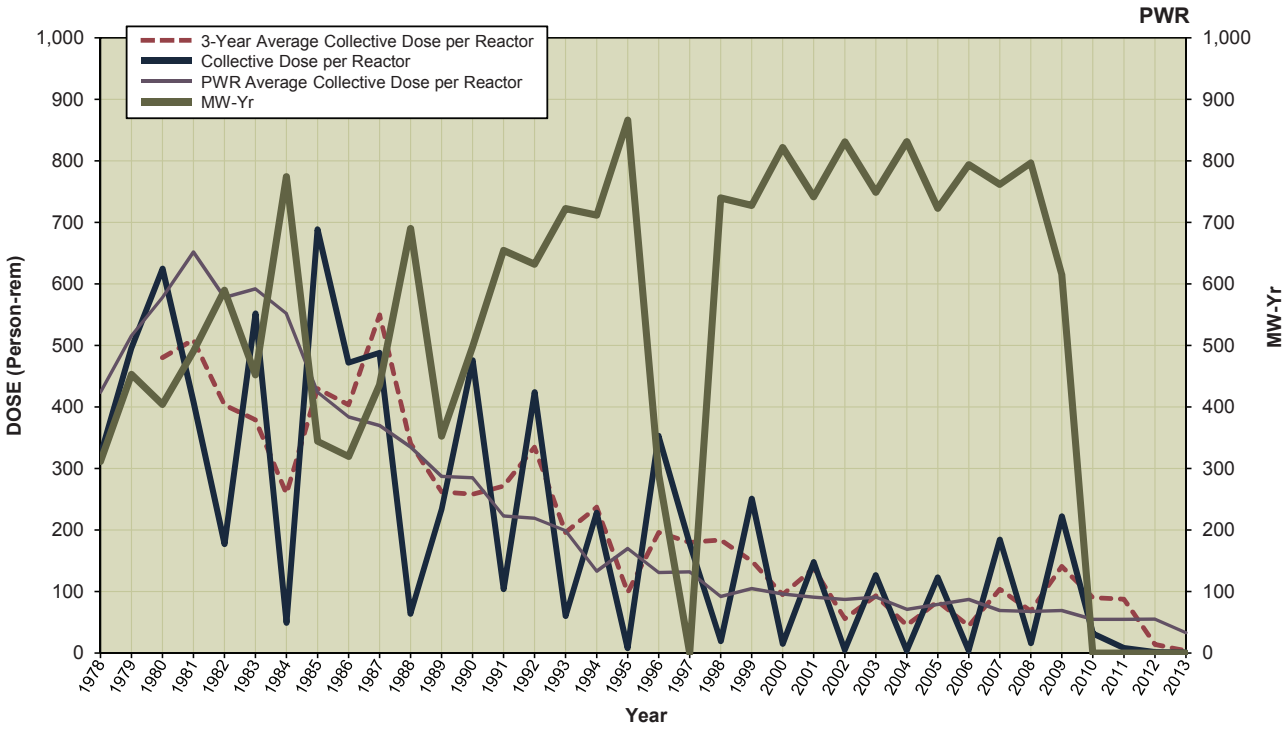



## COOPER STATION
Dose Performance Trends



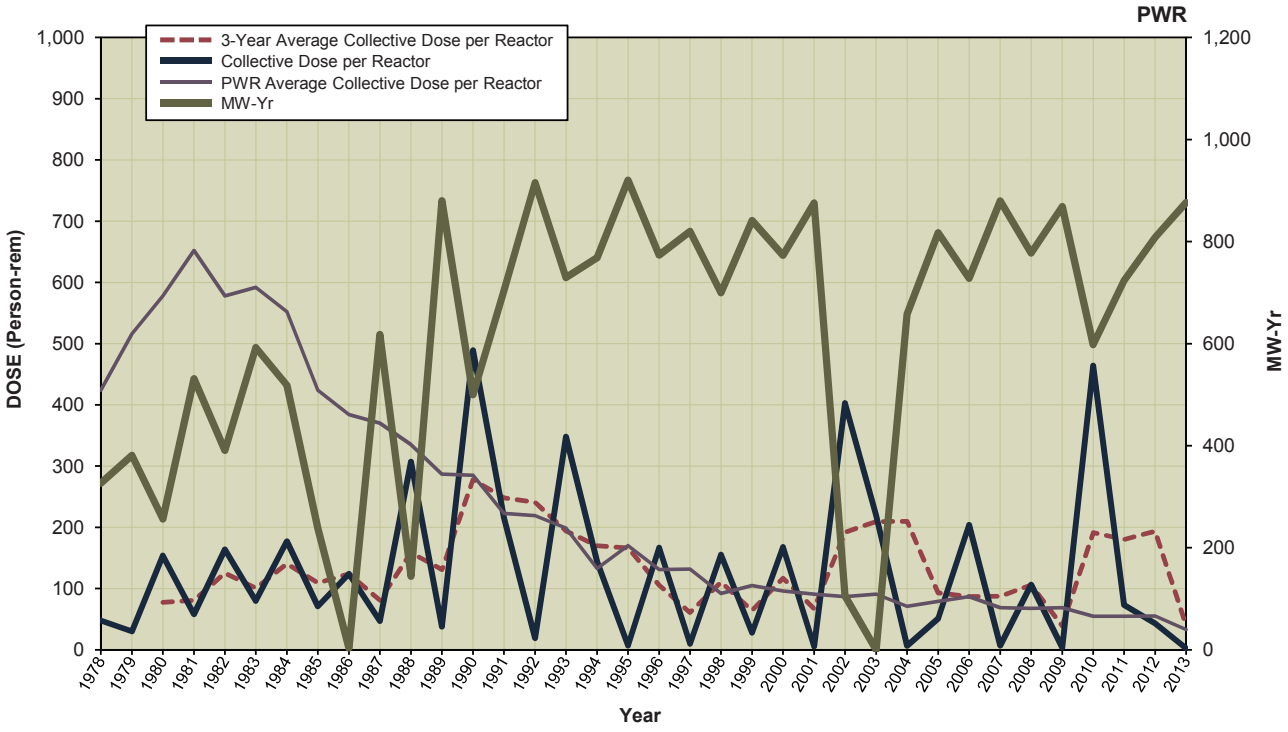
## CRYSTAL RIVER 3

Dose Performance Trends

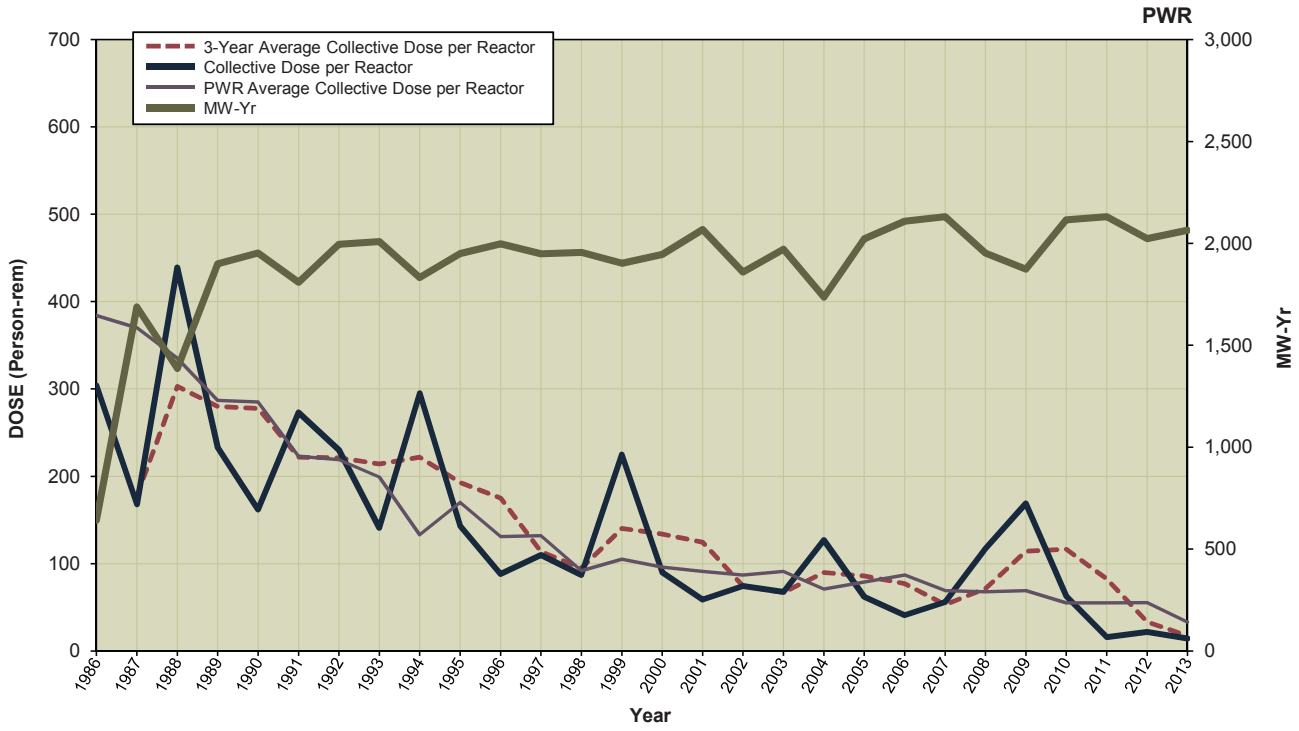



## DAVIS-BESSE 1

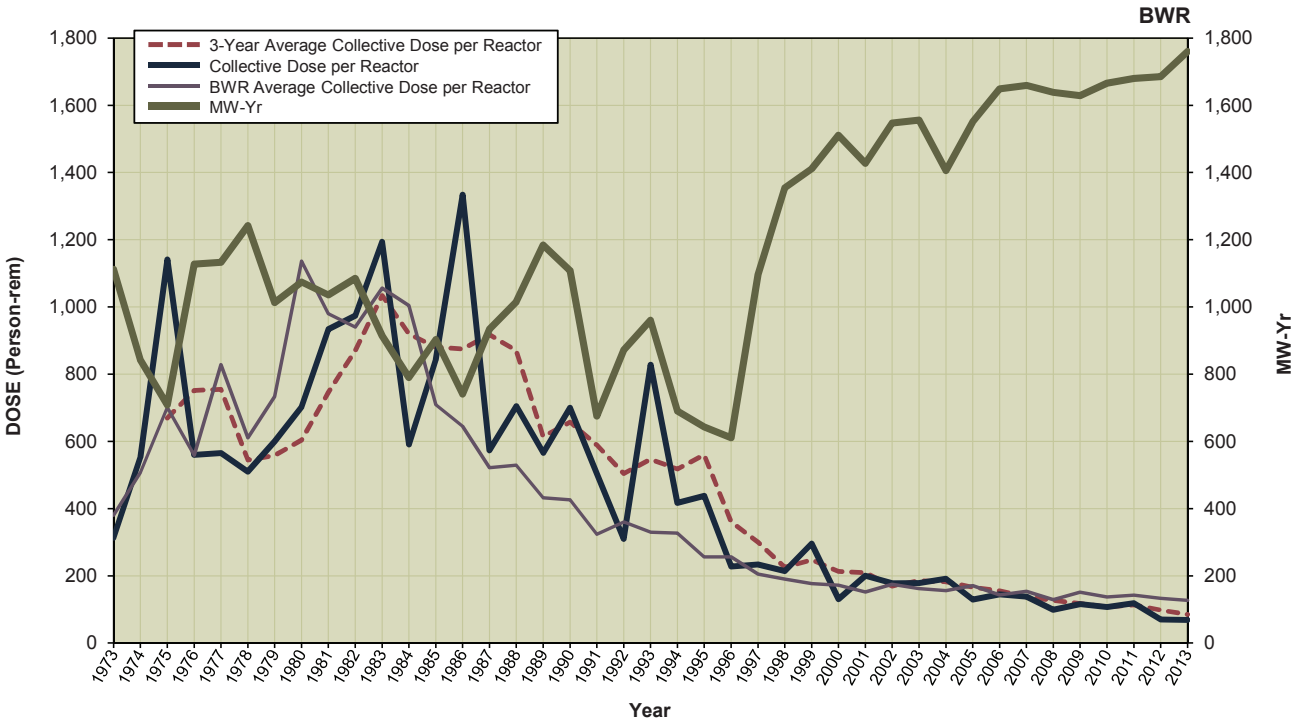
Dose Performance Trends



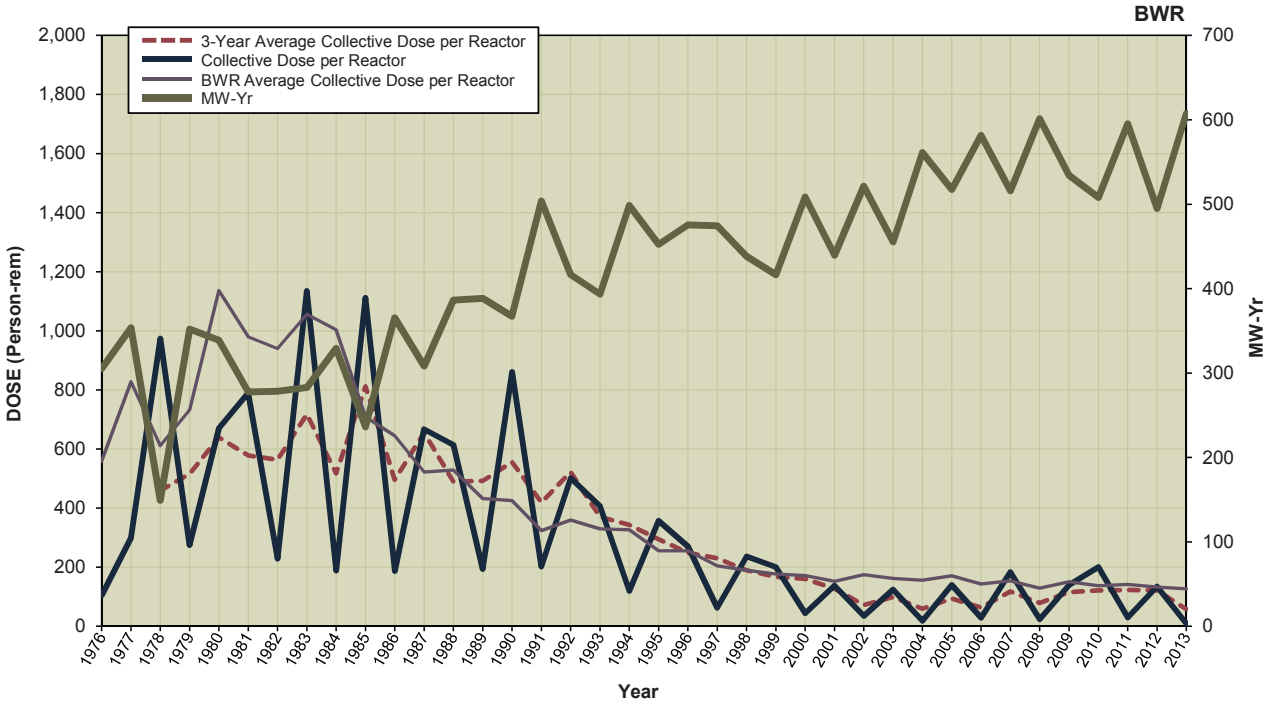
## DIABLO CANYON 1, 2
Dose Performance Trends



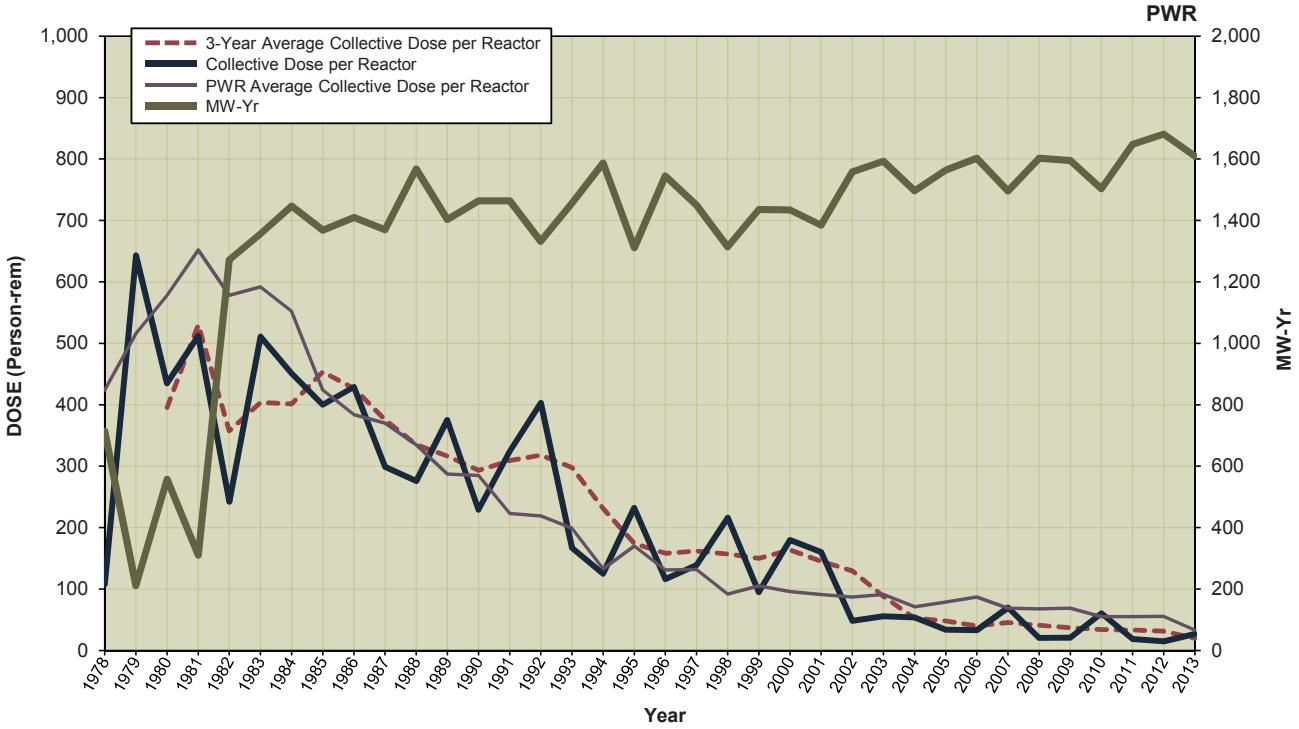

## DRESDEN 2, 3
Dose Performance Trends



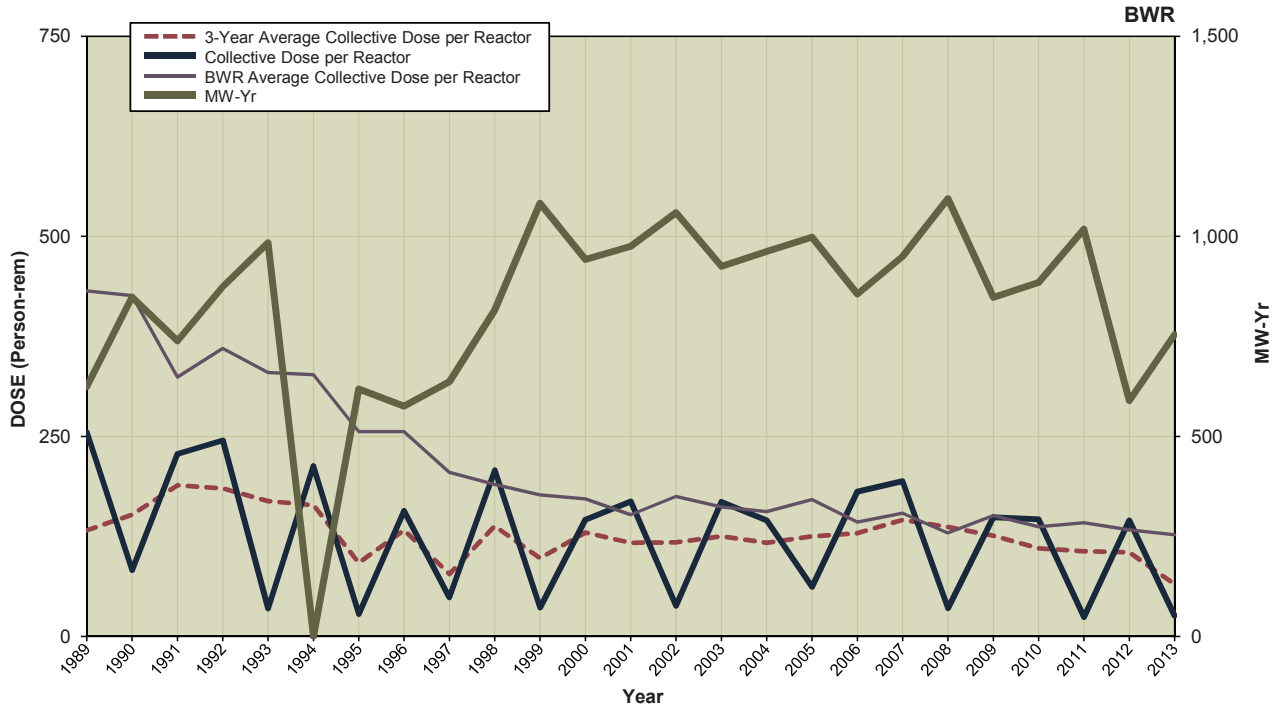
## DUANE ARNOLD
Dose Performance Trends



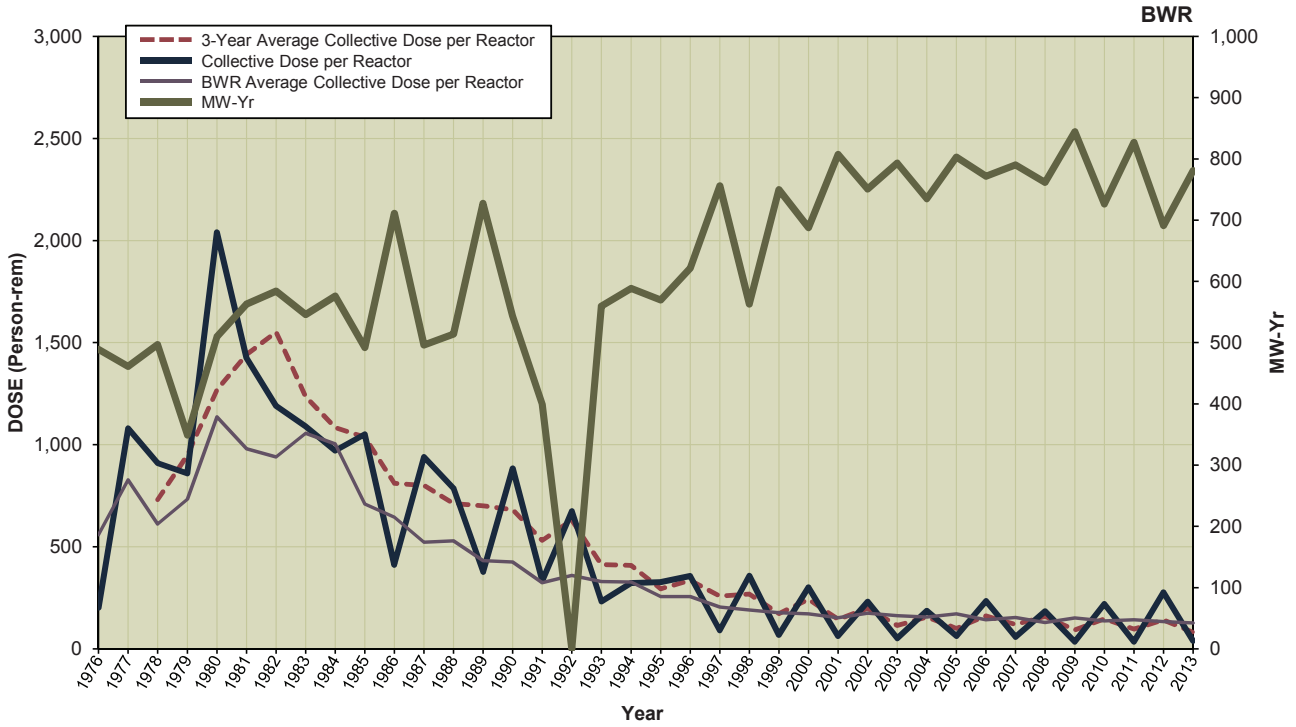

## FARLEY 1, 2
Dose Performance Trends



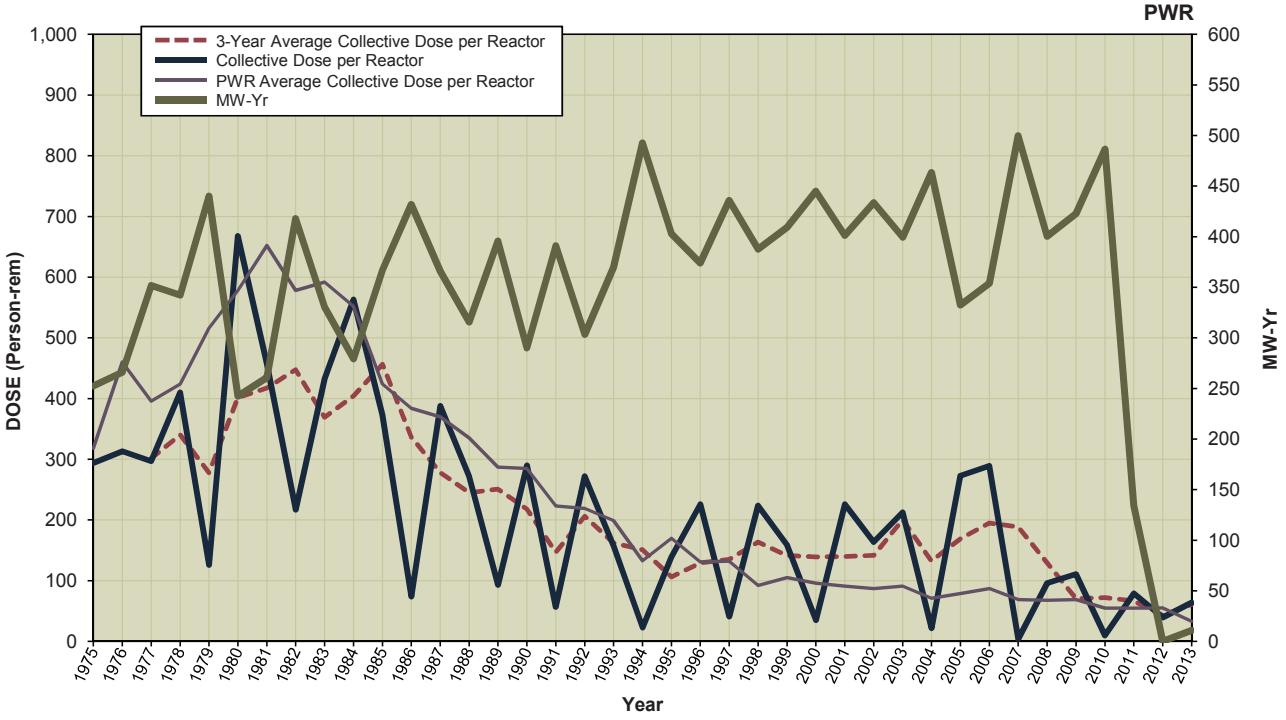
## FERMI 2
Dose Performance Trends



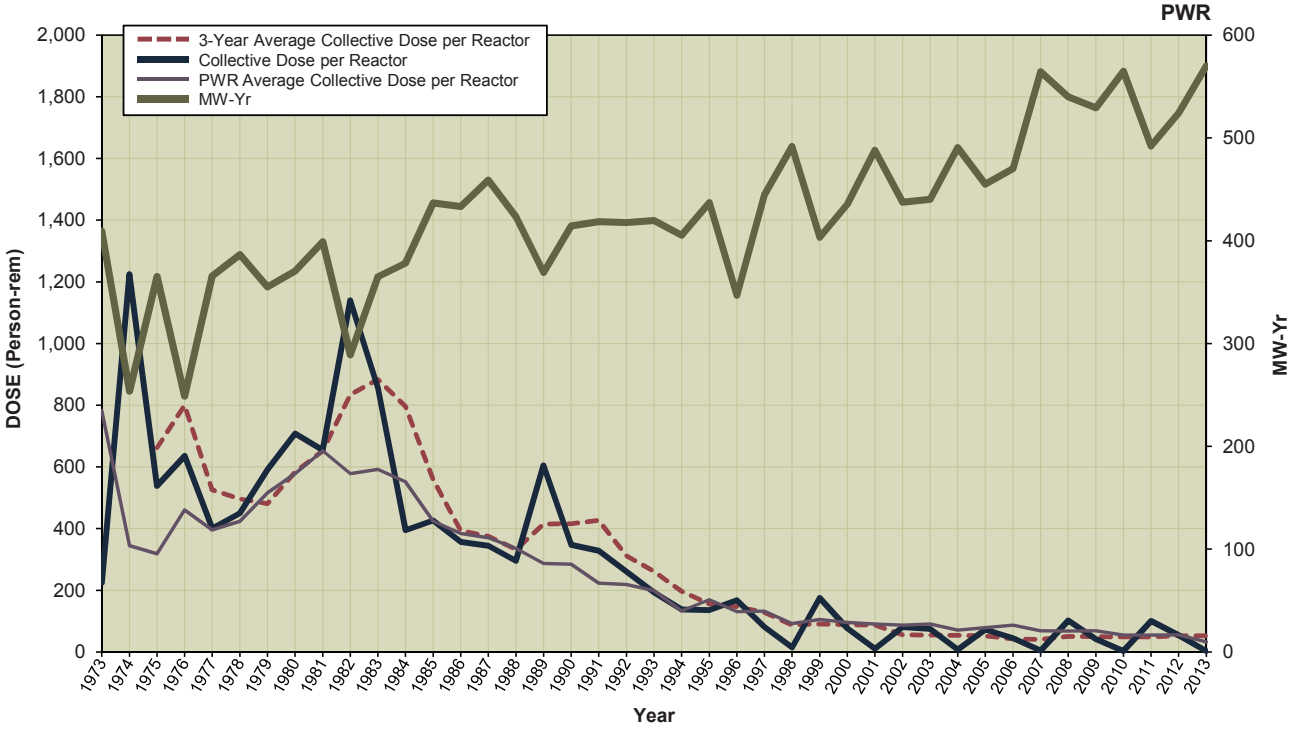

## FITZPATRICK
Dose Performance Trends



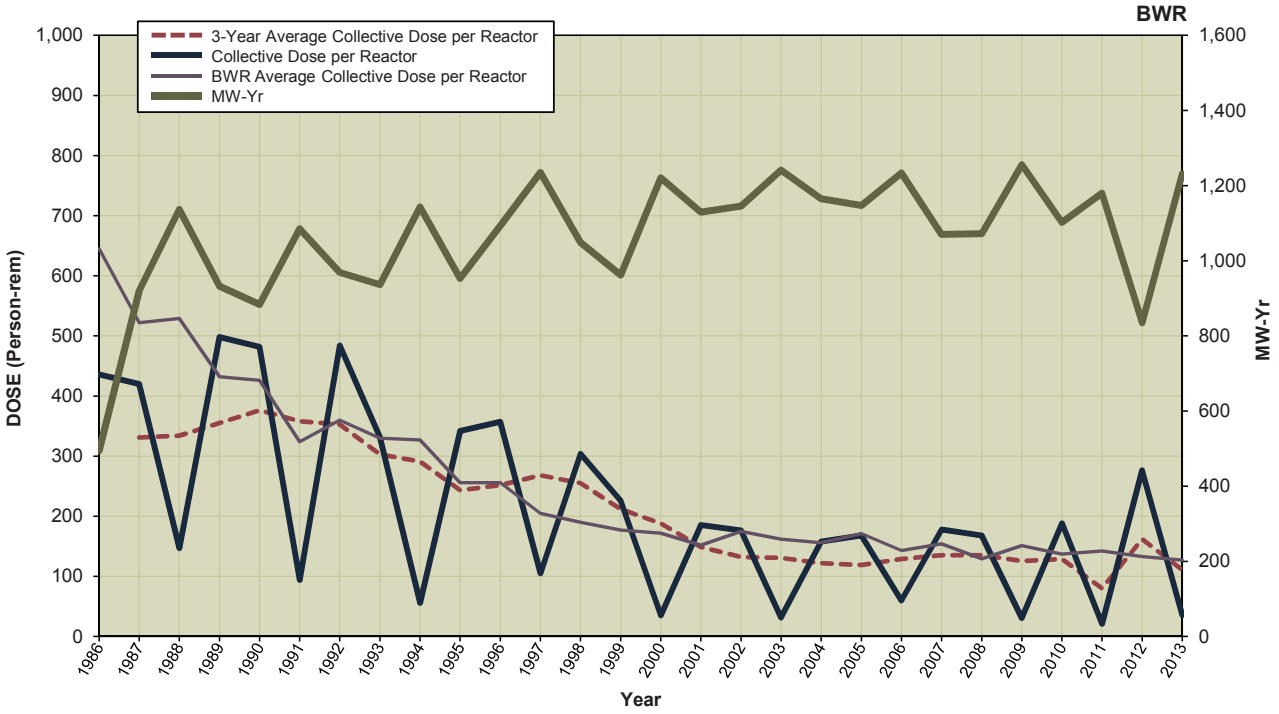
## FORT CALHOUN
Dose Performance Trends



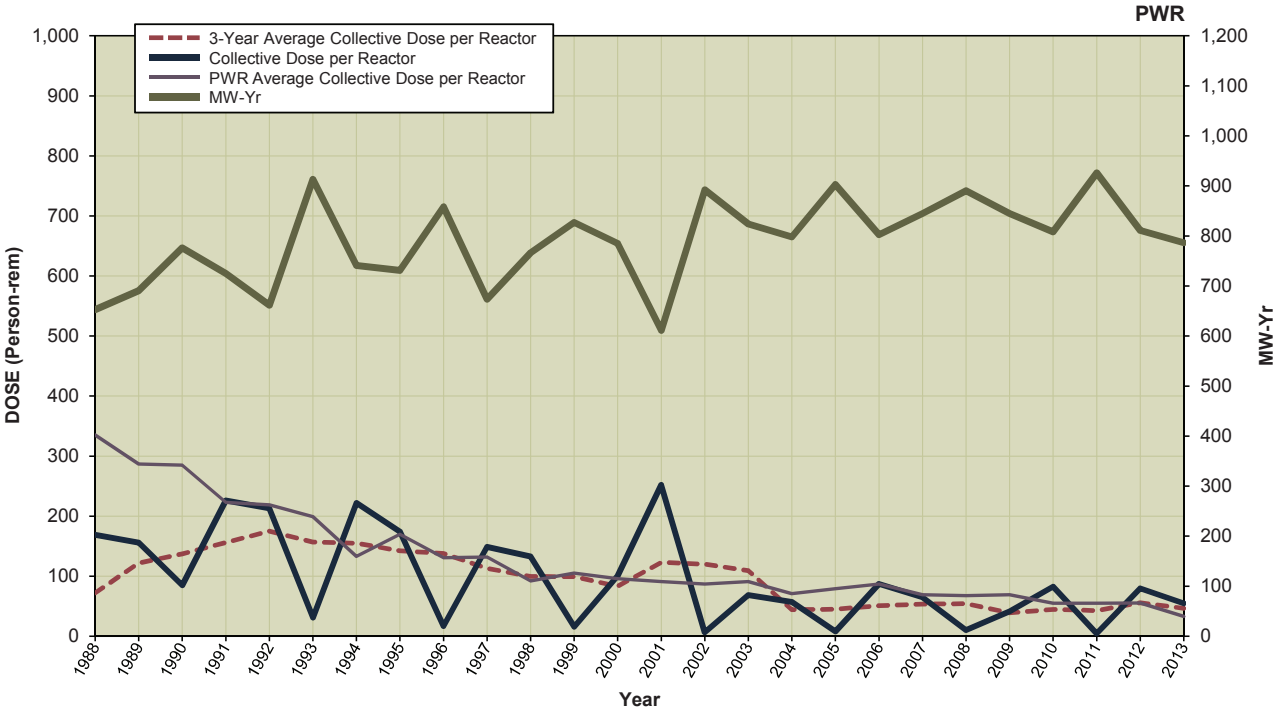

## GINNA
Dose Performance Trends



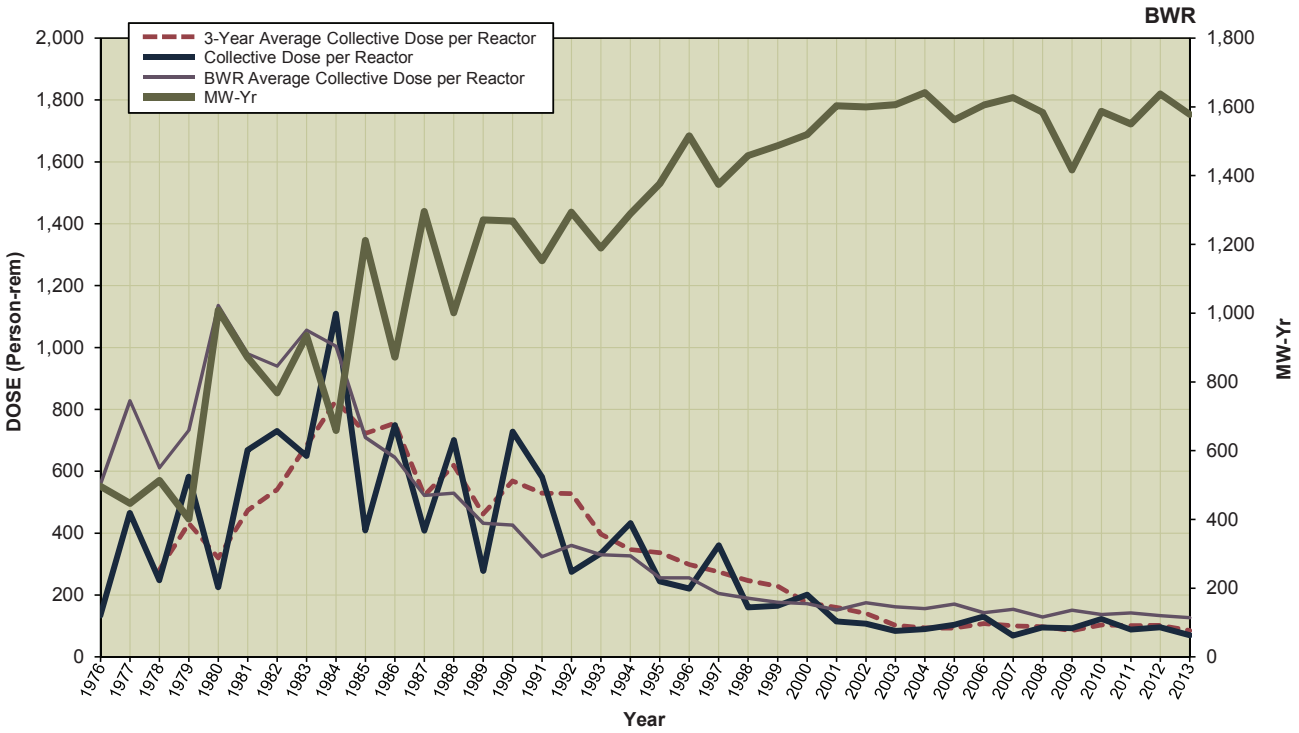
## GRAND GULF
Dose Performance Trends



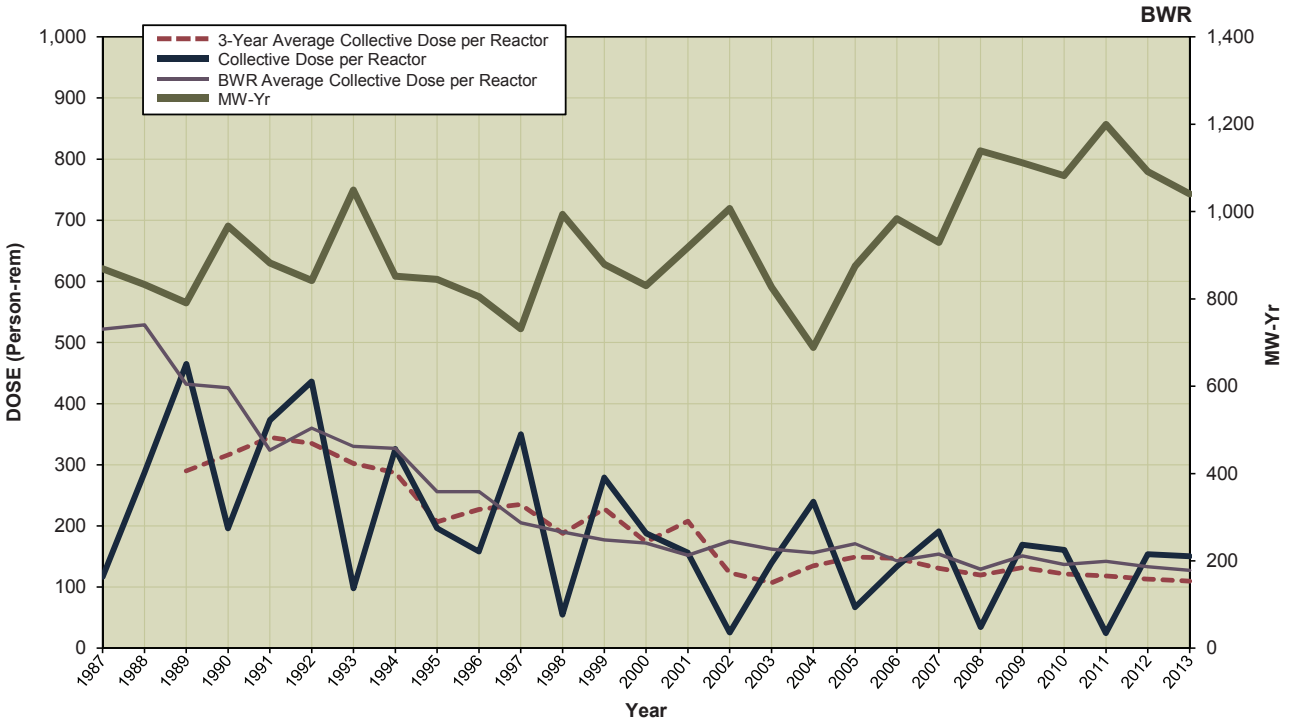

## HARRIS 1
Dose Performance Trends



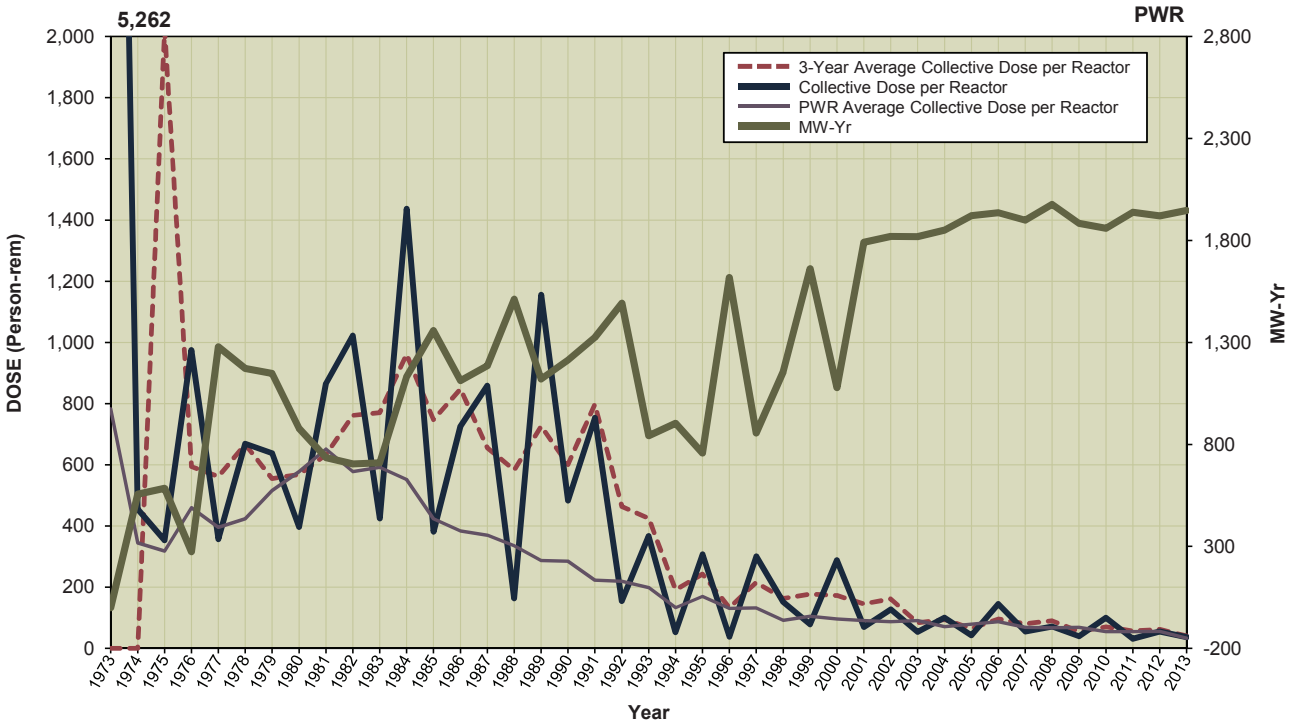
## HATCH 1, 2
Dose Performance Trends



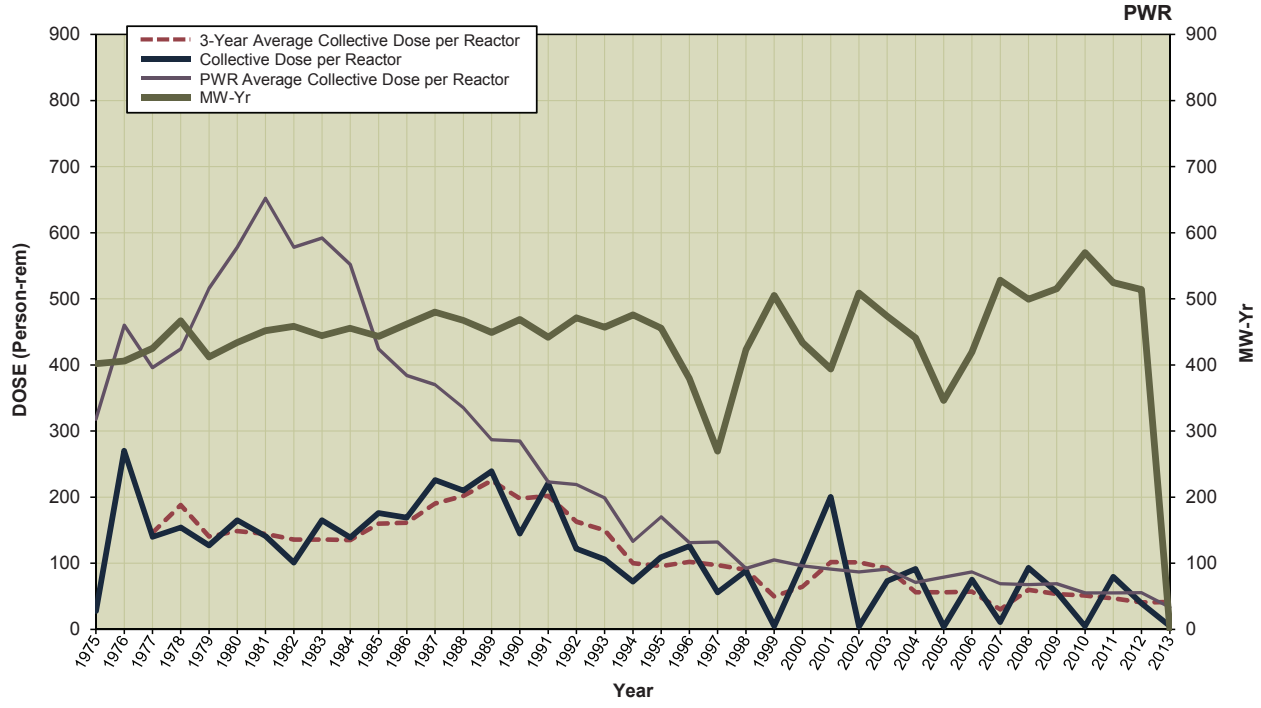

## HOPE CREEK 1
Dose Performance Trends



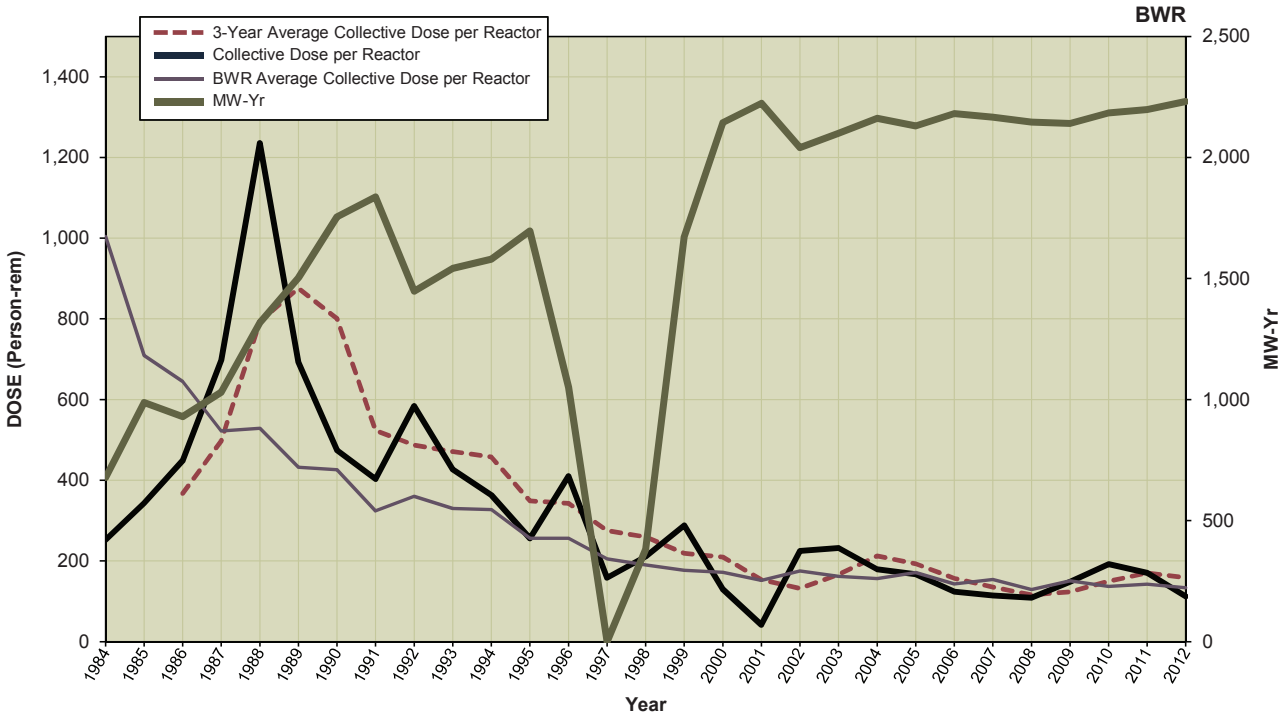
## INDIAN POINT 2,3
Dose Performance Trends



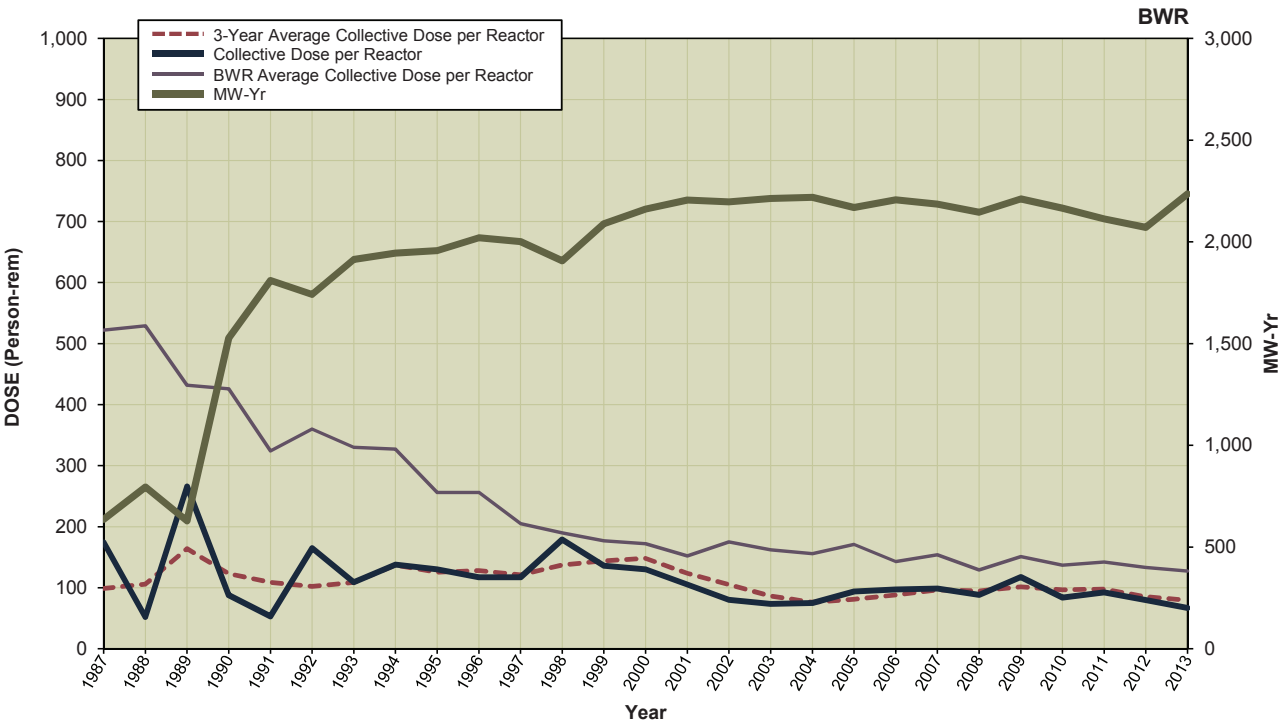

## KEWAUNEE
Dose Performance Trends



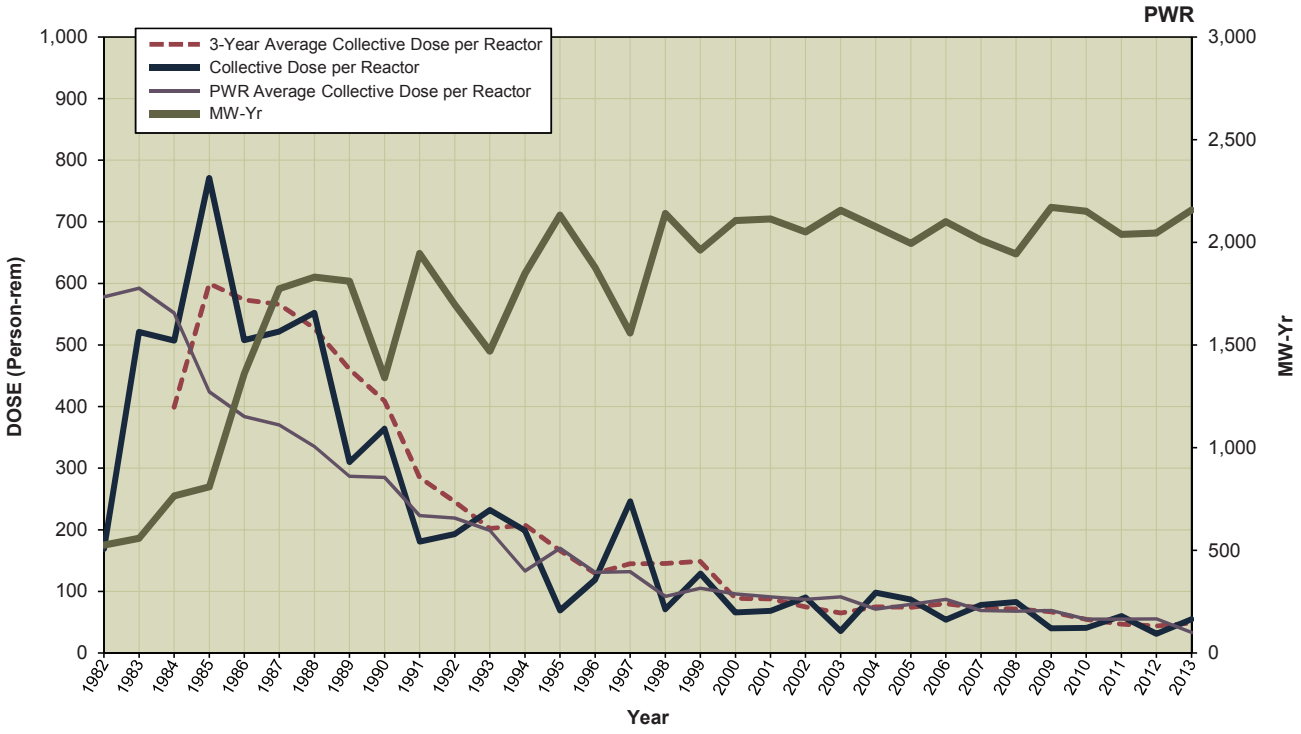
## LASALLE 1, 2
Dose Performance Trends



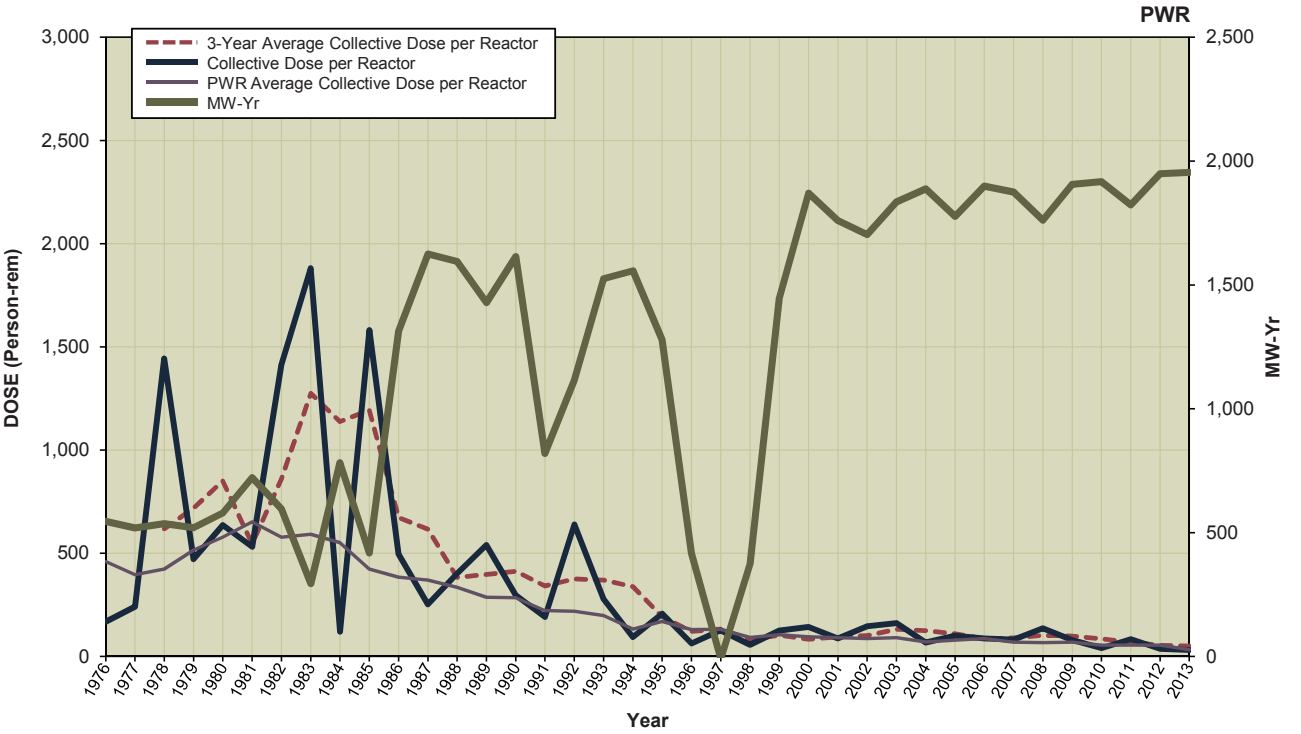

## LIMERICK 1, 2
Dose Performance Trends



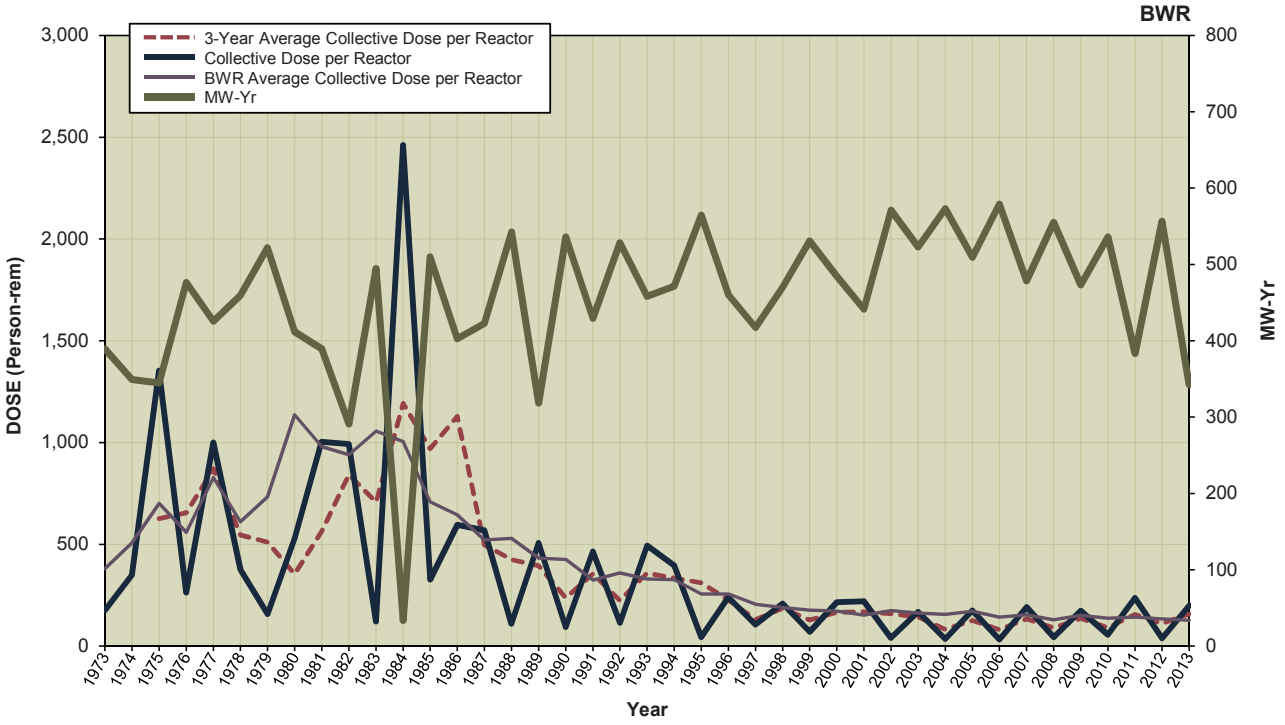
## MCGUIRE 1, 2
Dose Performance Trends



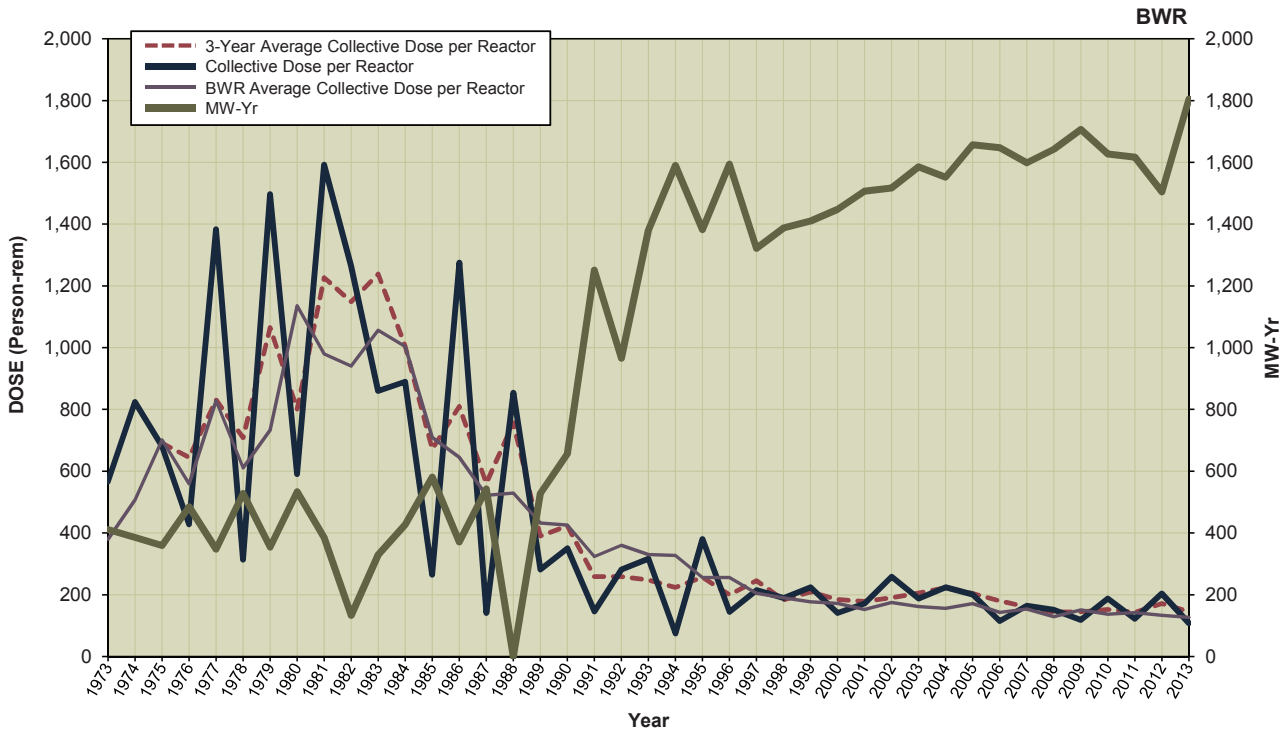

## MILLSTONE 2, 3
Dose Performance Trends



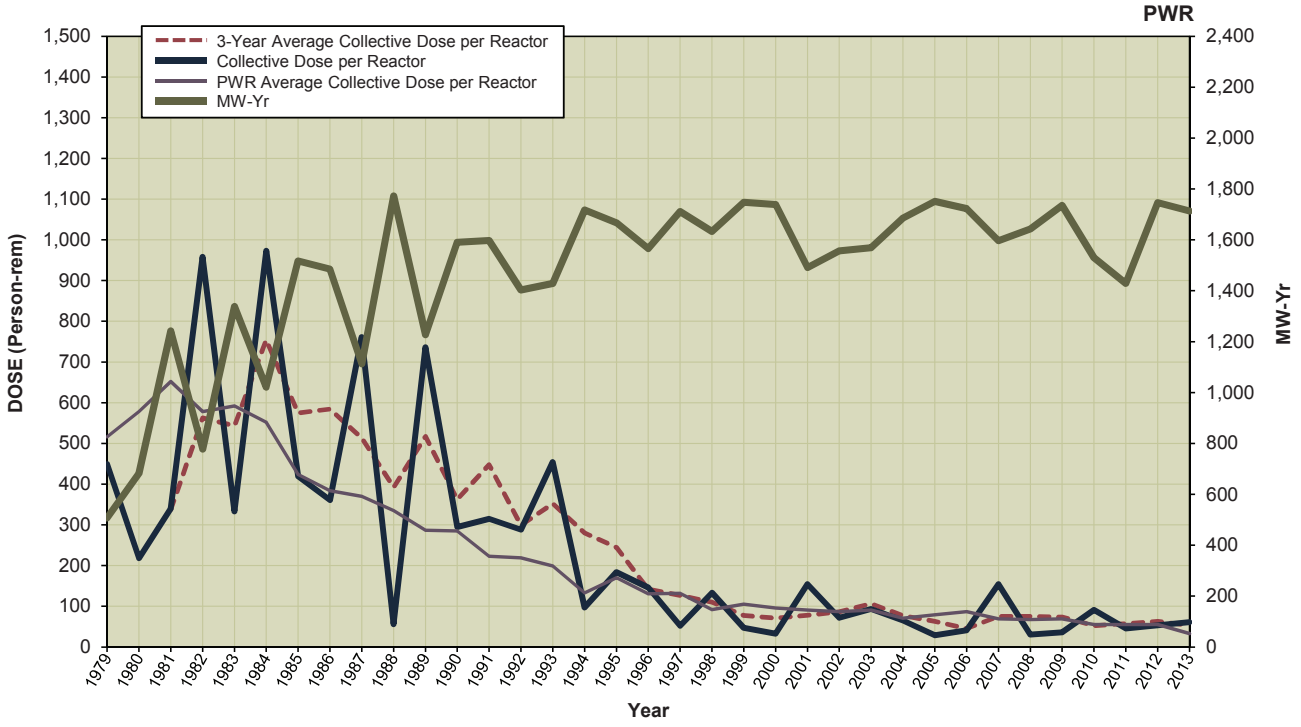
## MONTICELLO
Dose Performance Trends



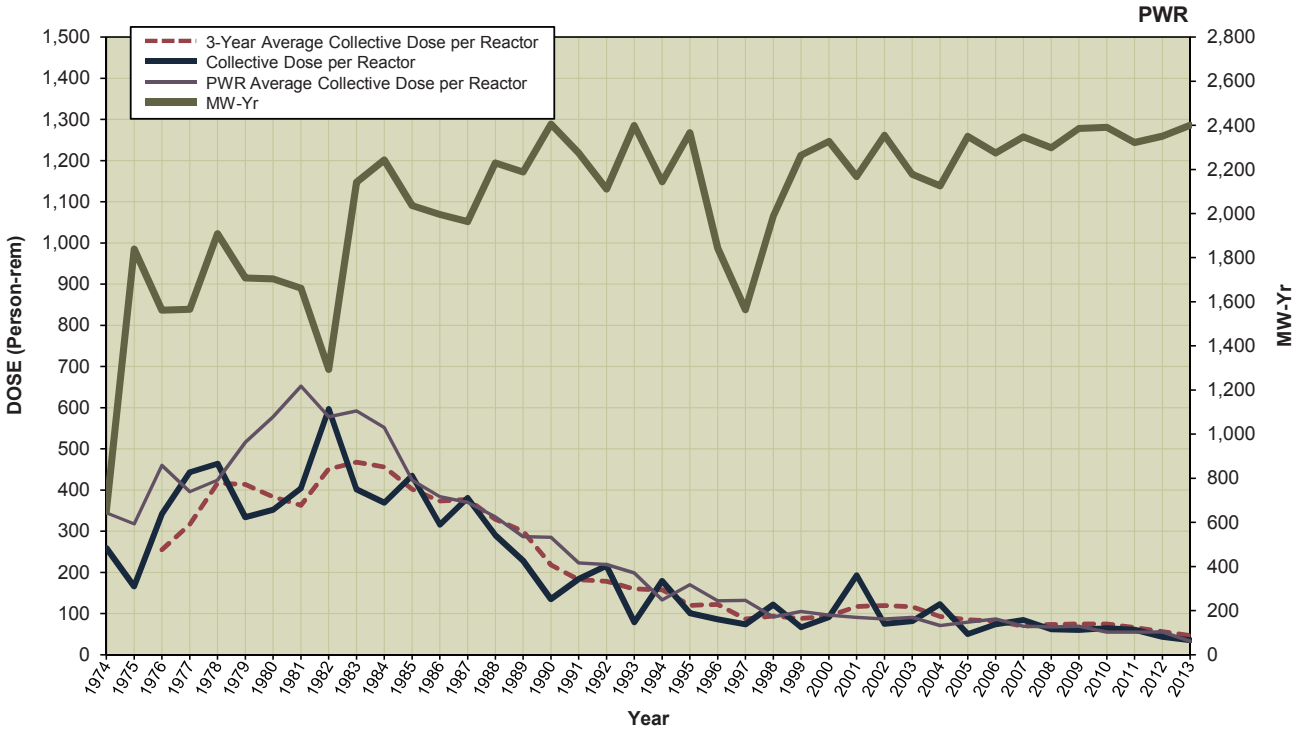

## NINE MILE POINT 1, 2
Dose Performance Trends



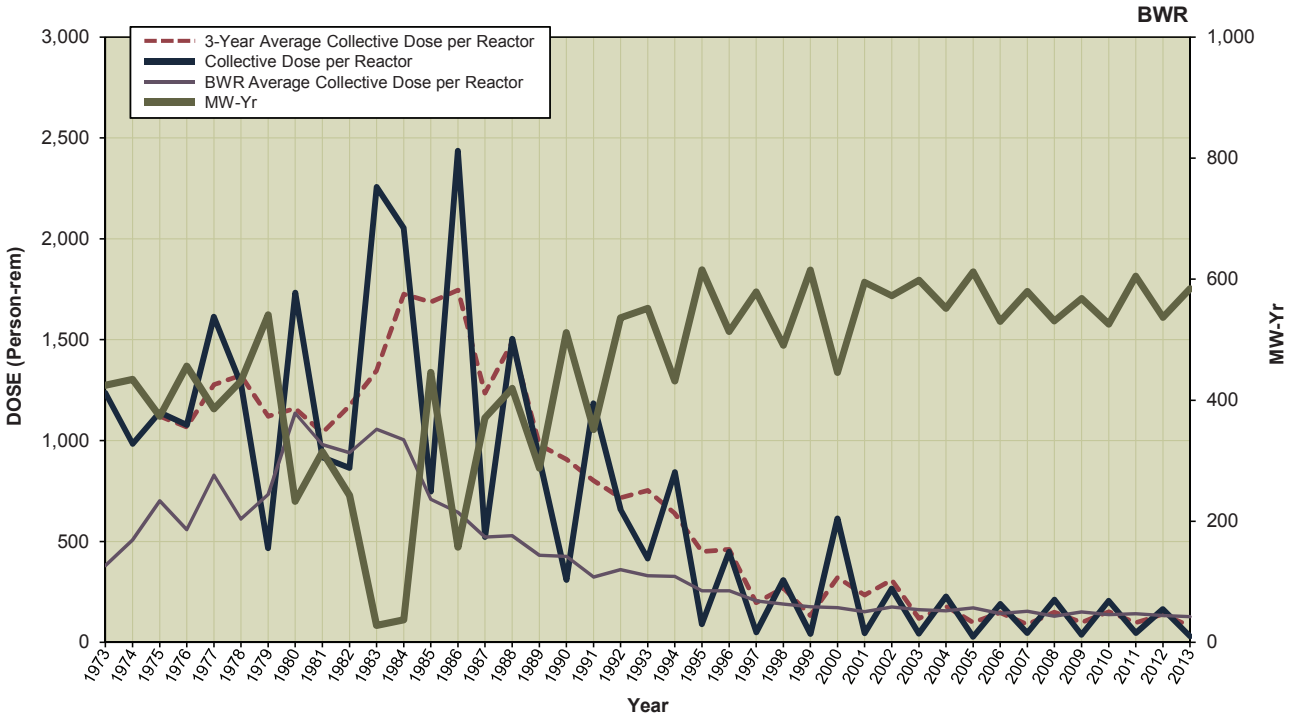
## NORTH ANNA 1, 2
Dose Performance Trends



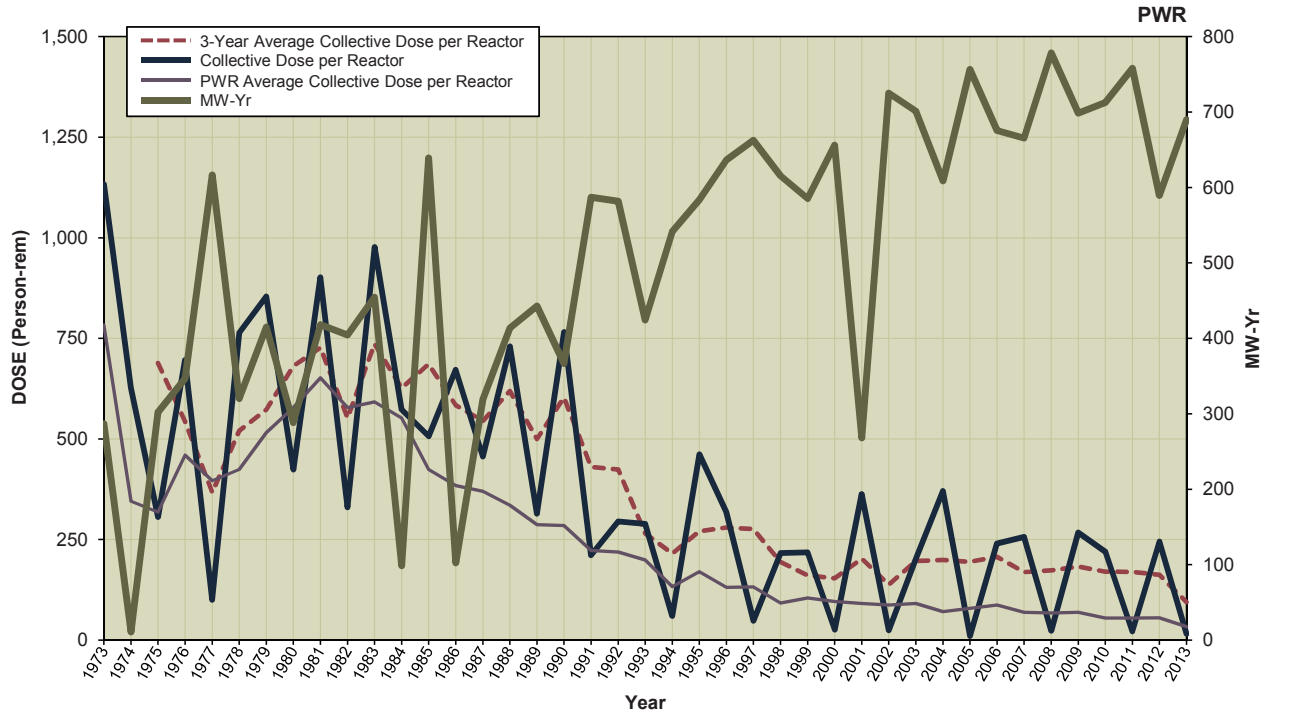

## OCONEE 1, 2, 3
Dose Performance Trends



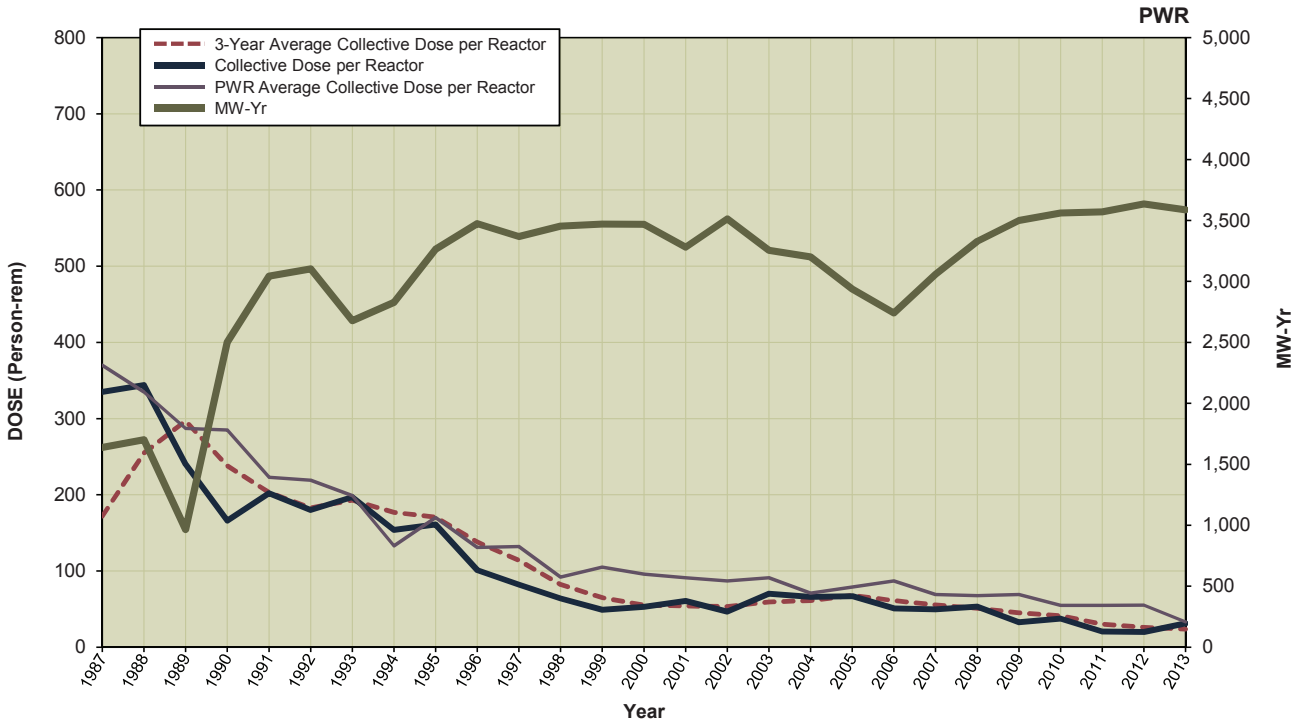
## OYSTER CREEK
Dose Performance Trends



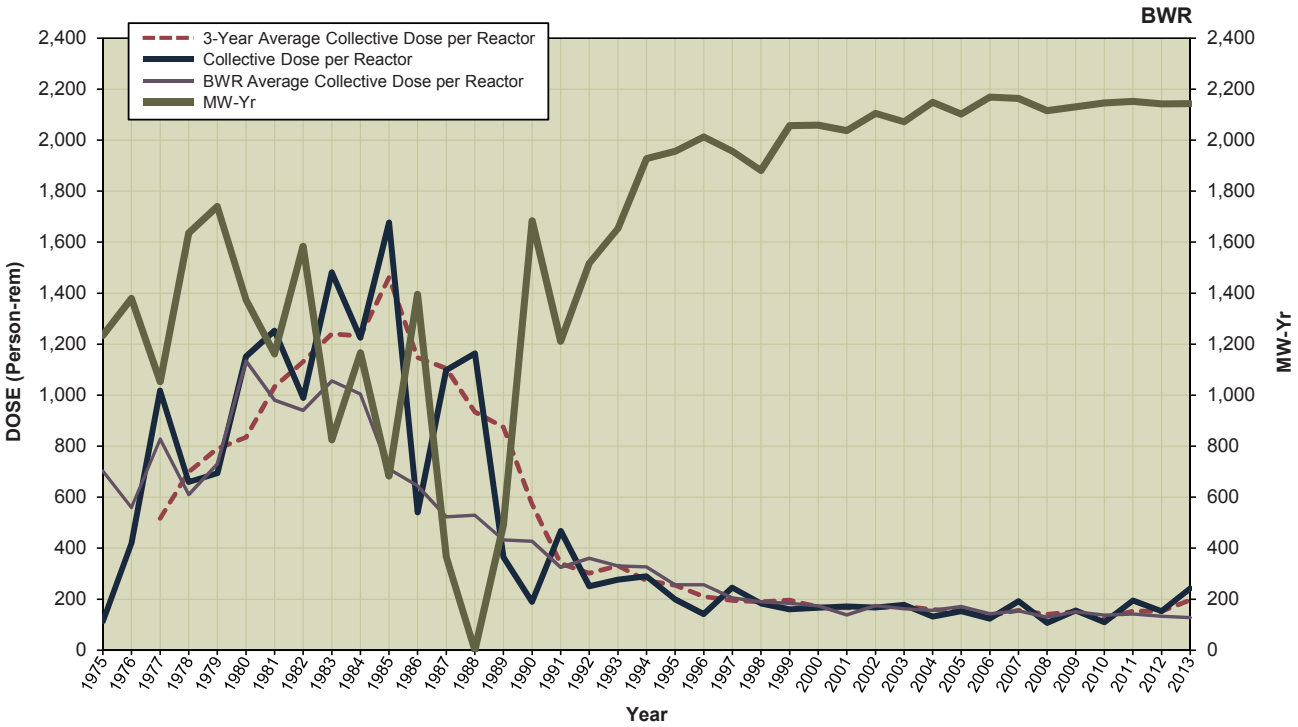

## PALISADES
Dose Performance Trends



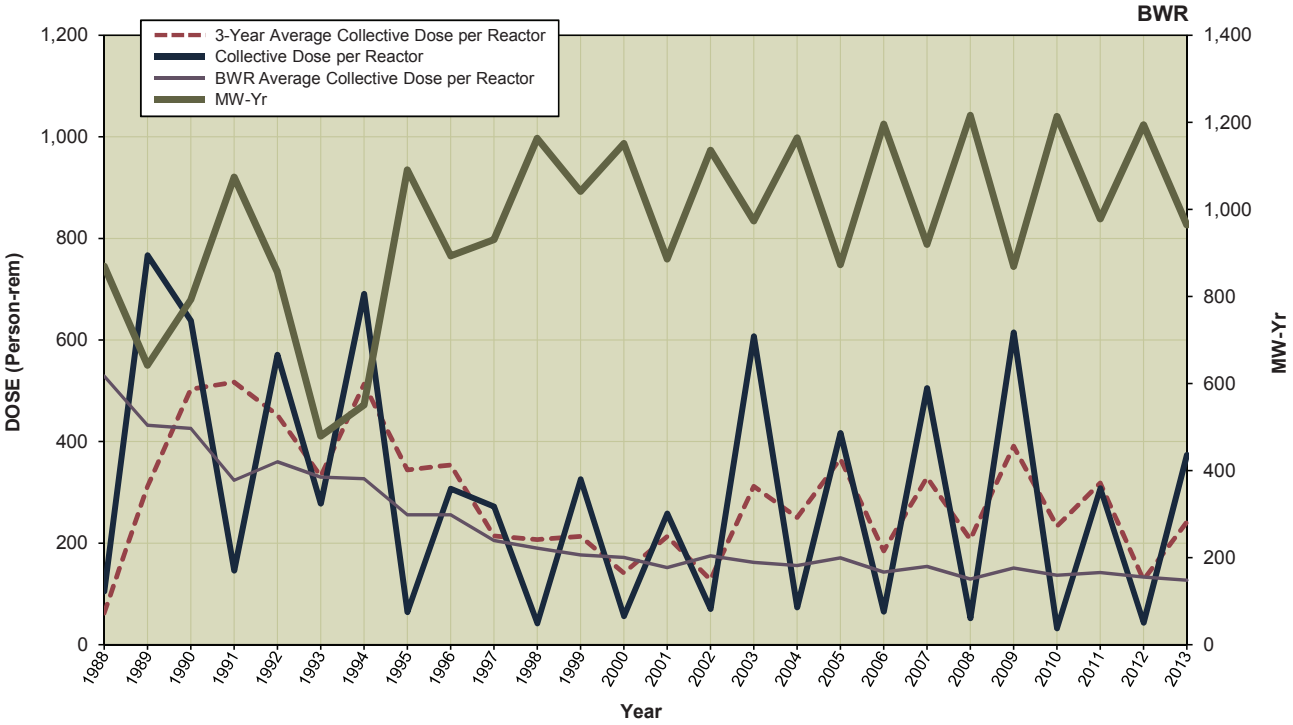
## PALO VERDE 1, 2, 3
Dose Performance Trends



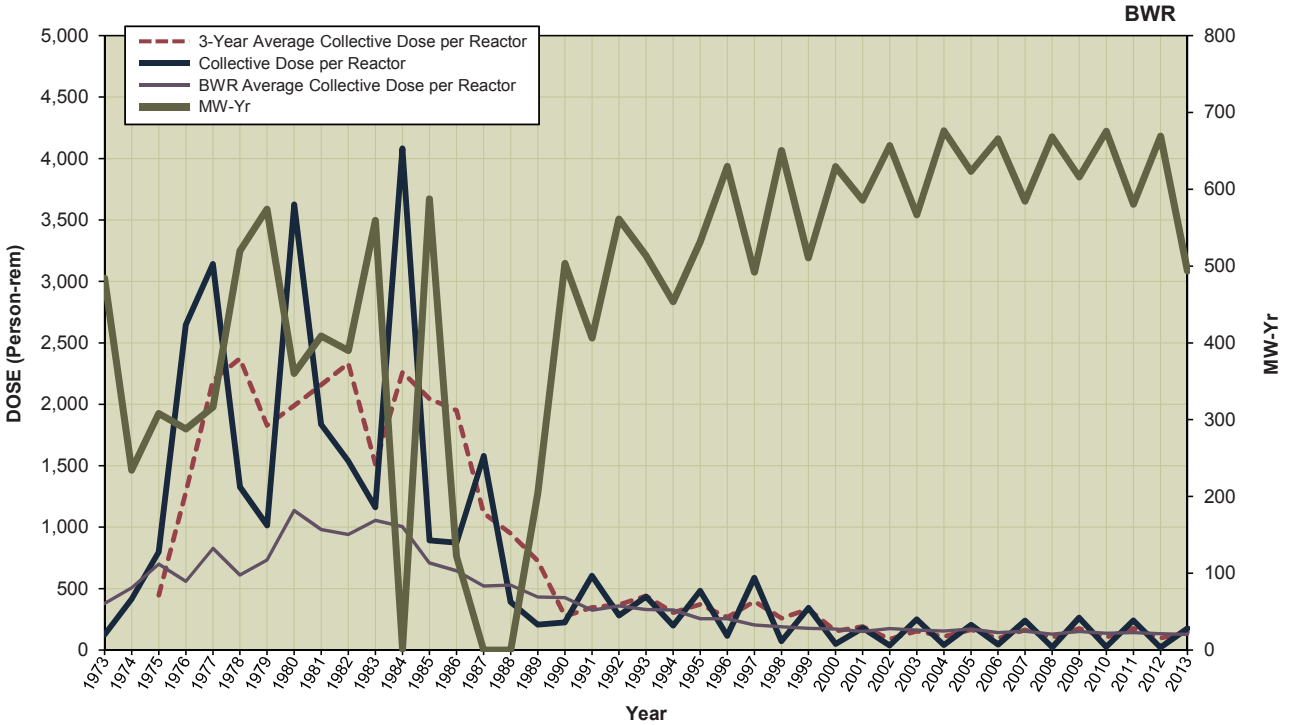

## PEACH BOTTOM 2, 3
Dose Performance Trends



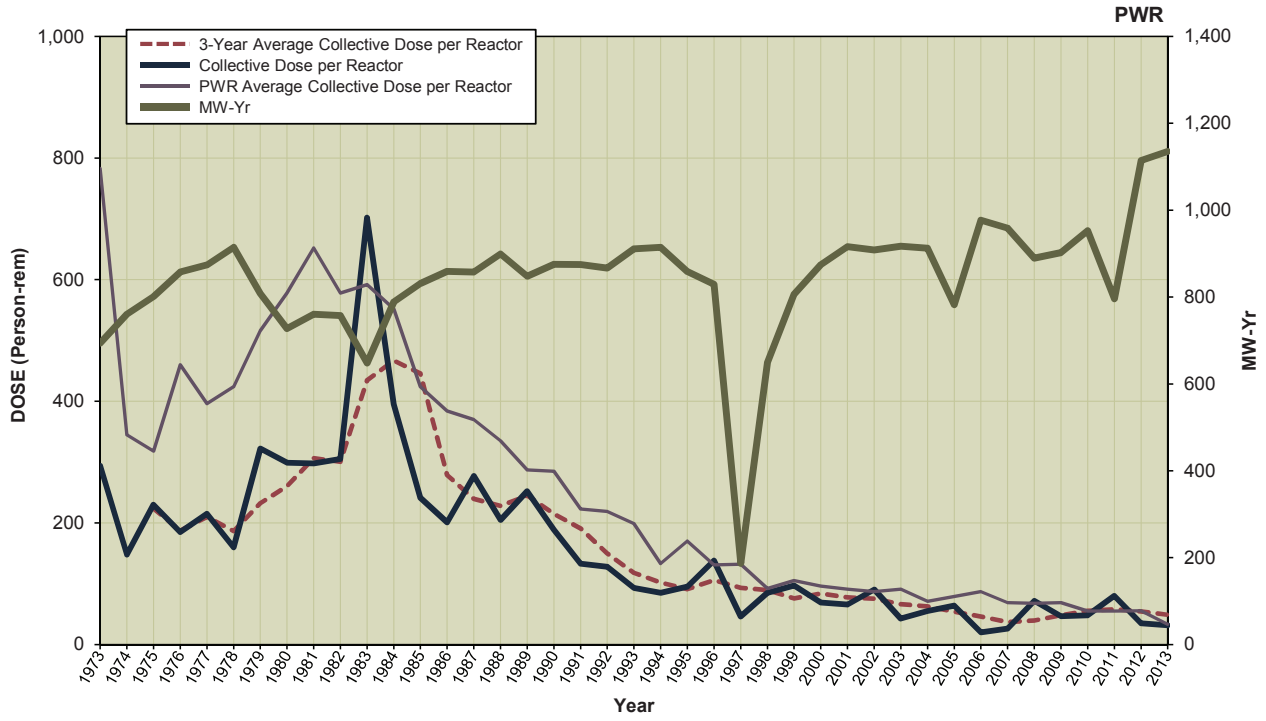
## PERRY 1
Dose Performance Trends



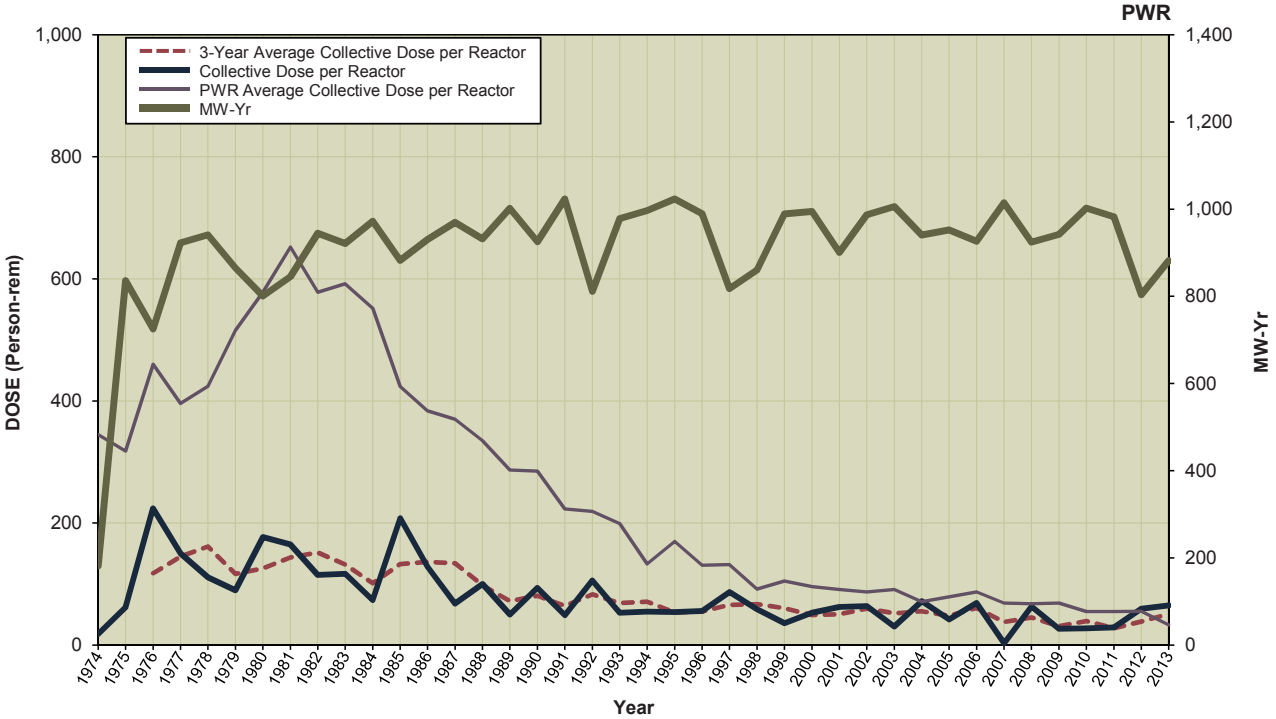

## PILGRIM 1
Dose Performance Trends



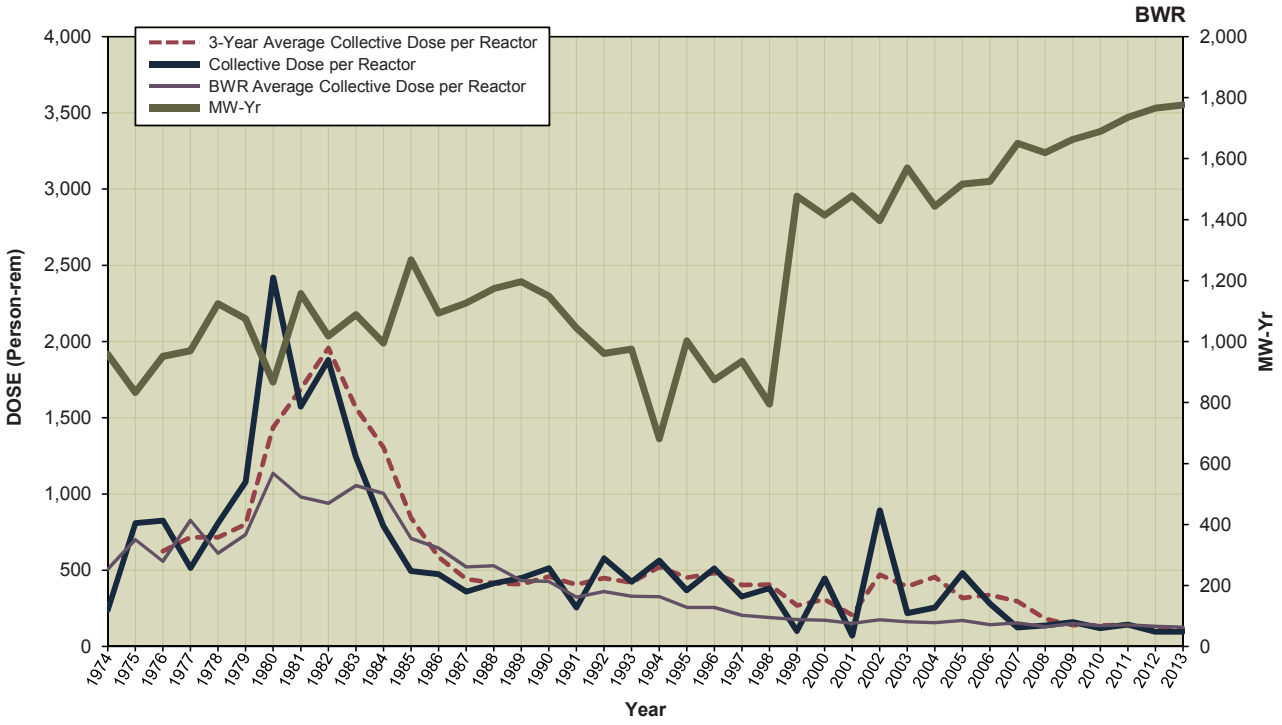
## POINT BEACH 1, 2
Dose Performance Trends



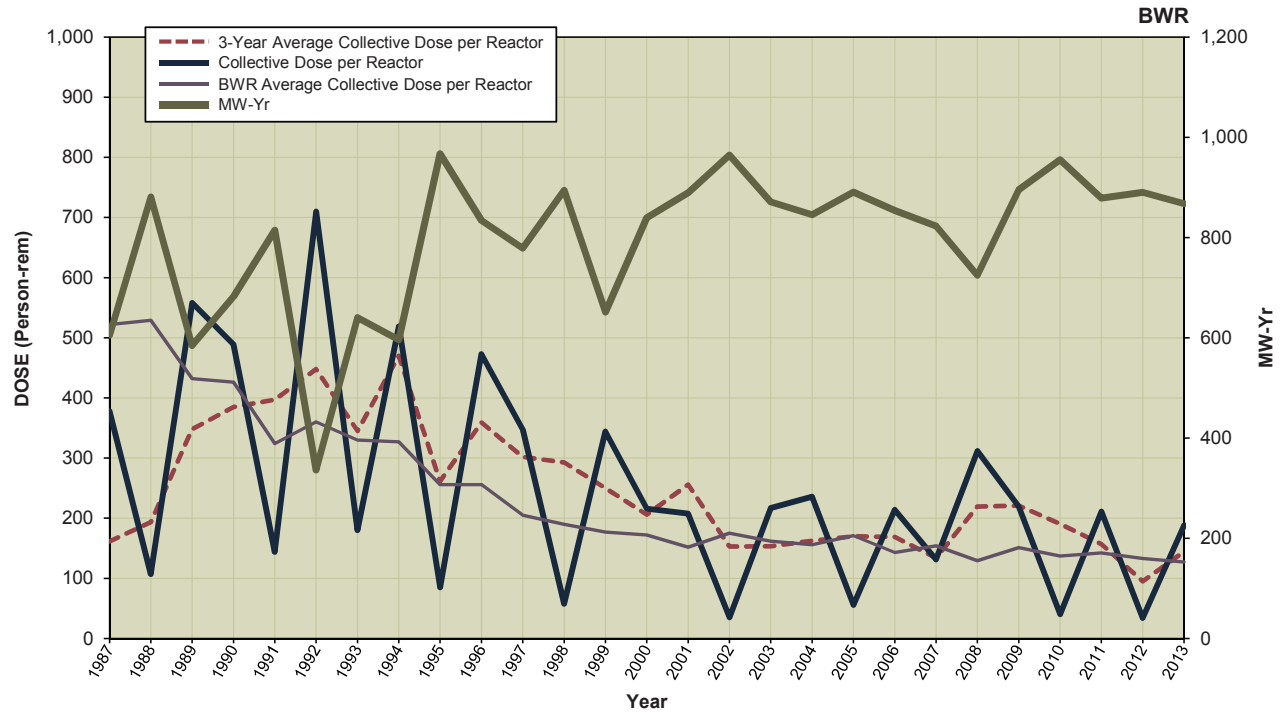

## PRAIRIE ISLAND 1, 2
Dose Performance Trends



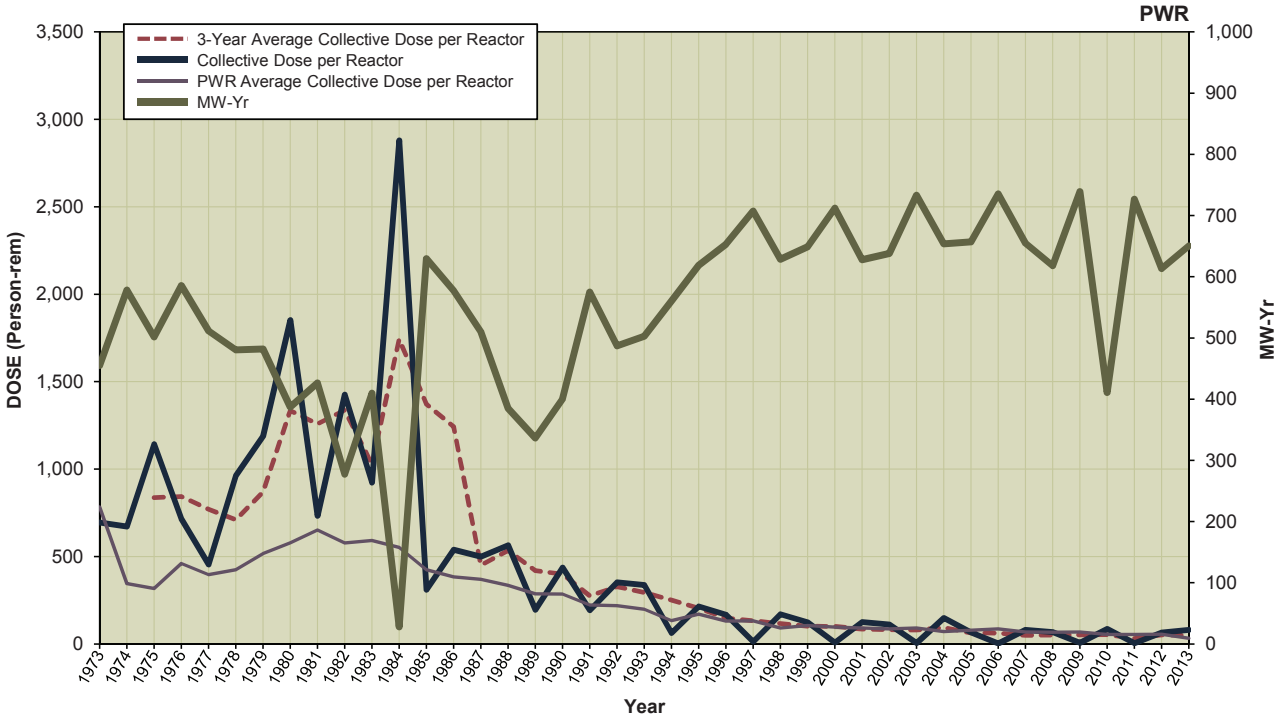
## QUAD CITIES 1, 2
Dose Performance Trends



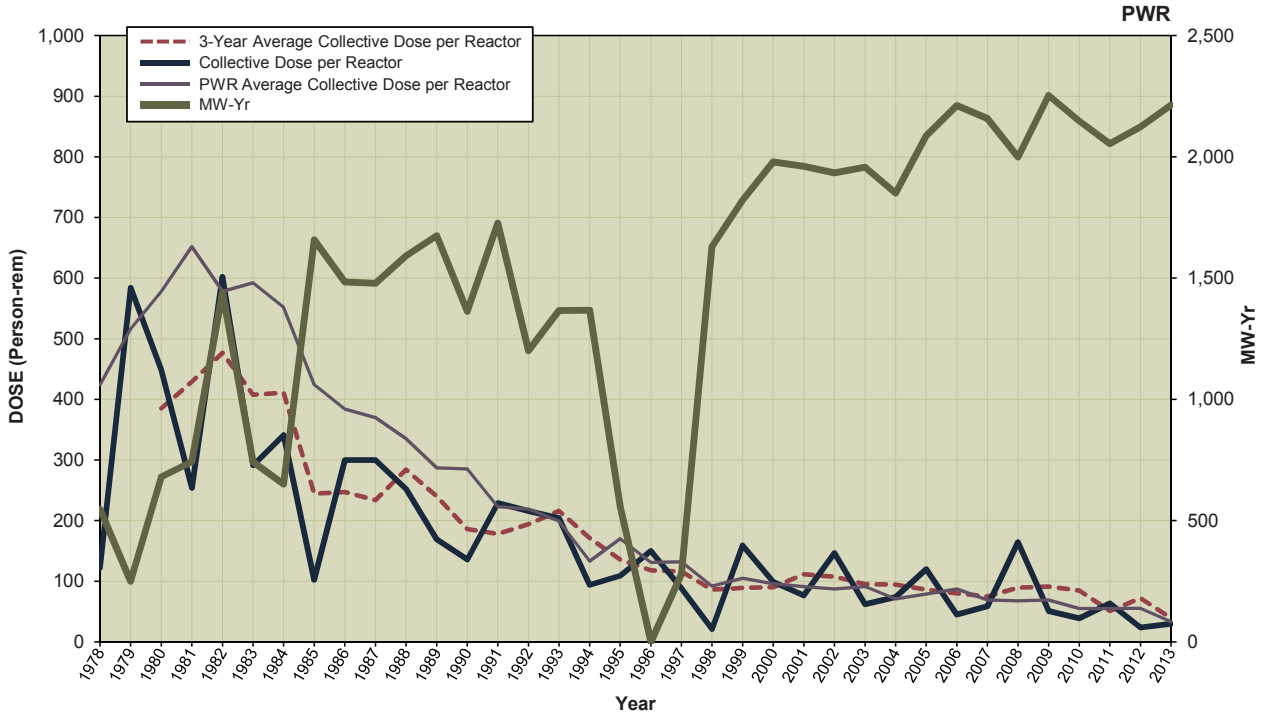

## RIVER BEND 1
Dose Performance Trends



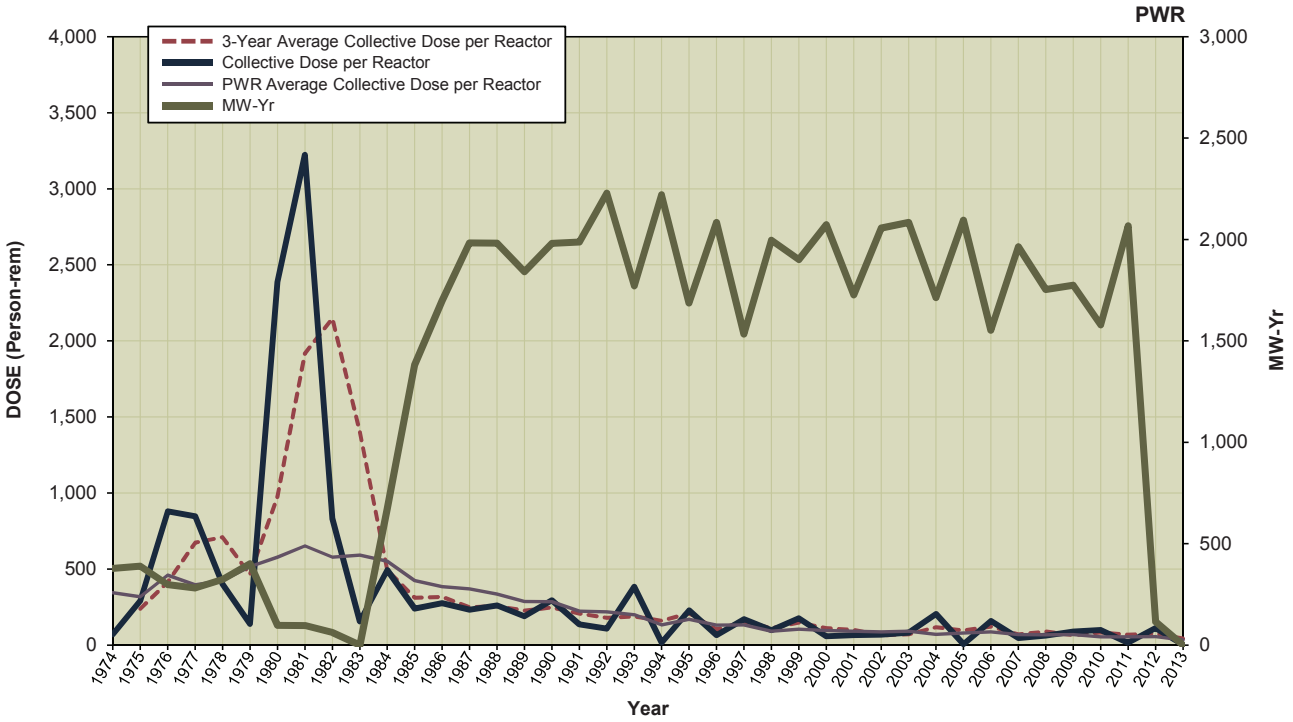
## ROBINSON 2
Dose Performance Trends



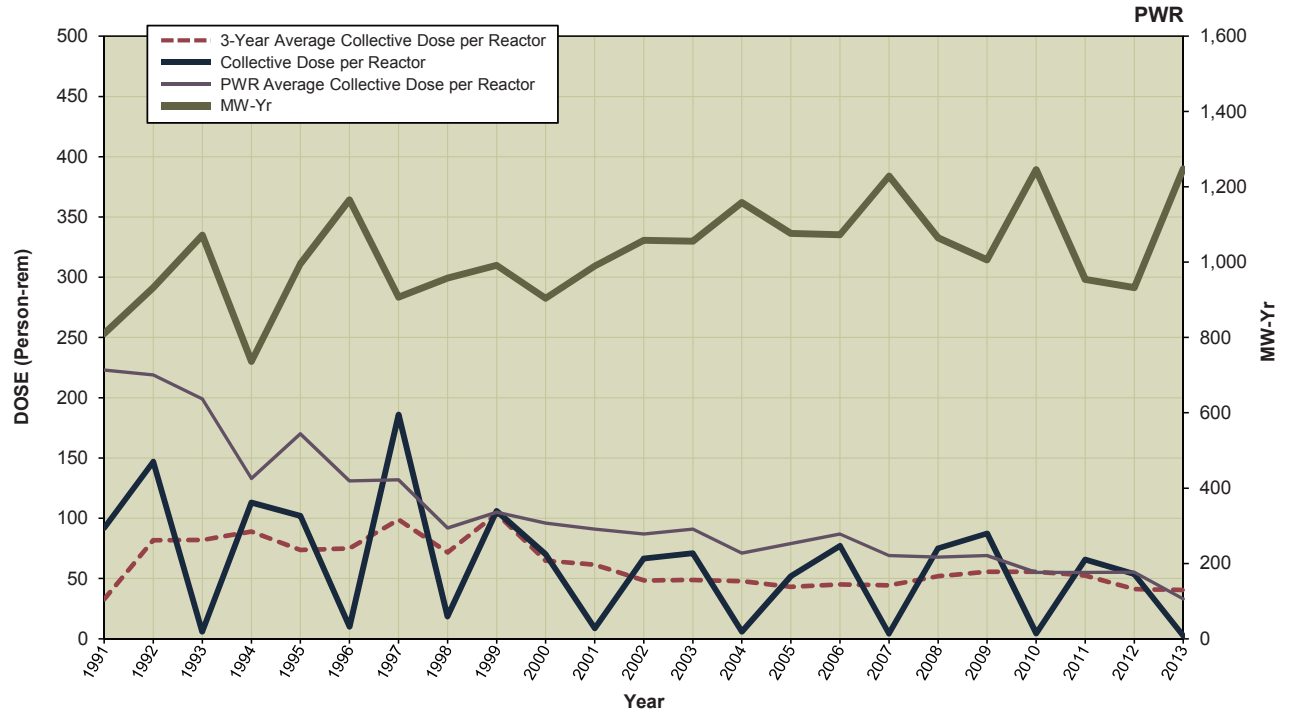

## SALEM 1, 2
Dose Performance Trends



## SAN ONOFRE 1, 2, 3
Dose Performance Trends

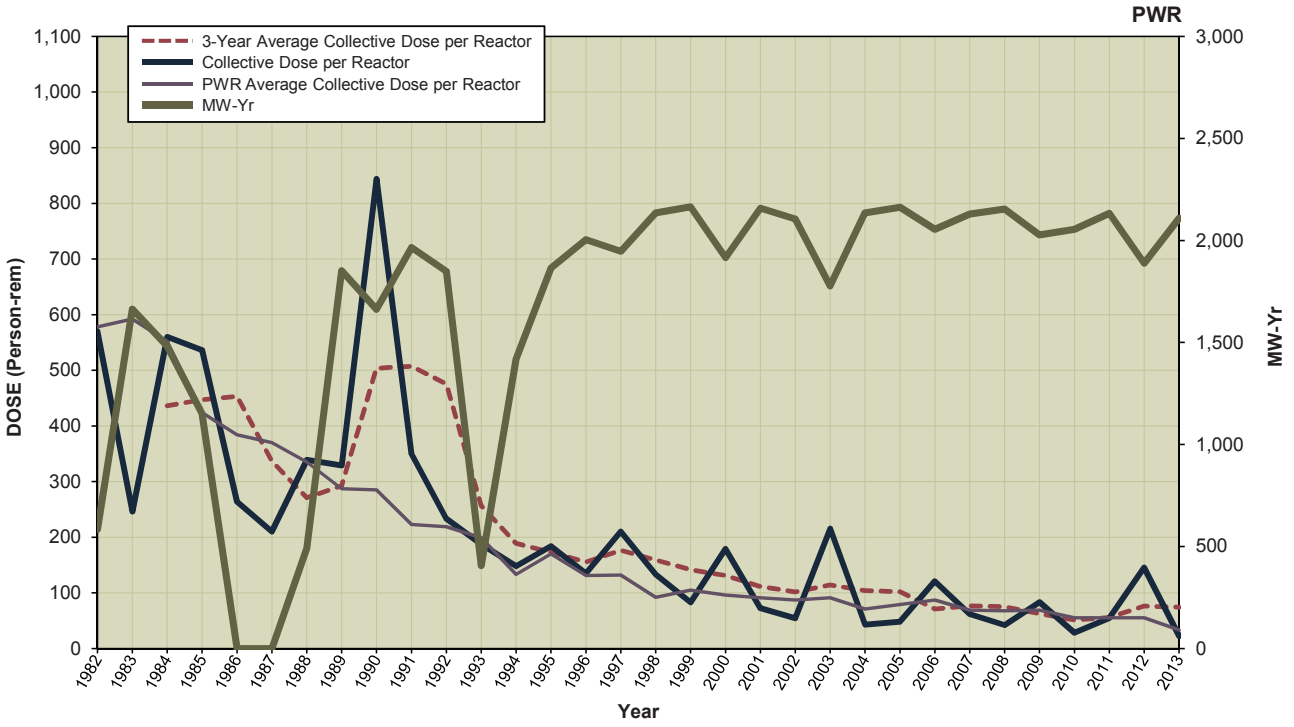



## SEABROOK
Dose Performance Trends

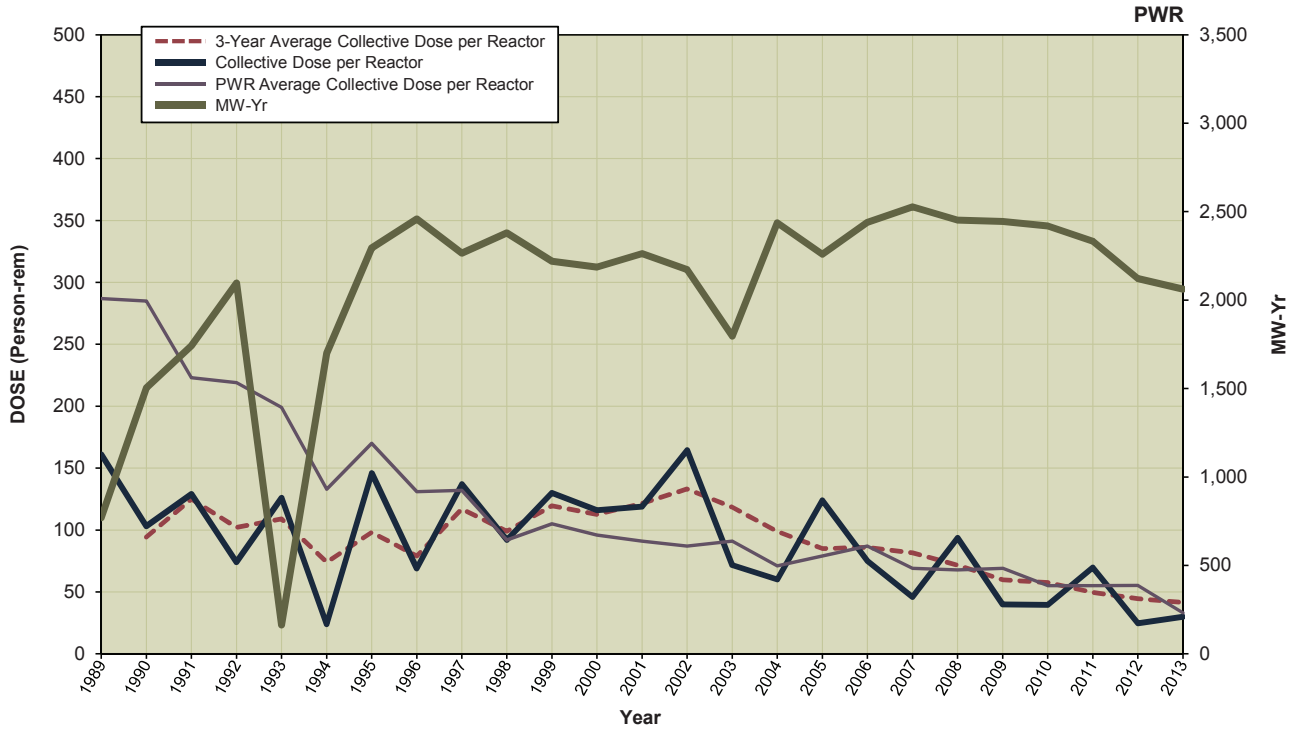



NOTE: Since 2001, data only include San Onofre Units 2 and 3.

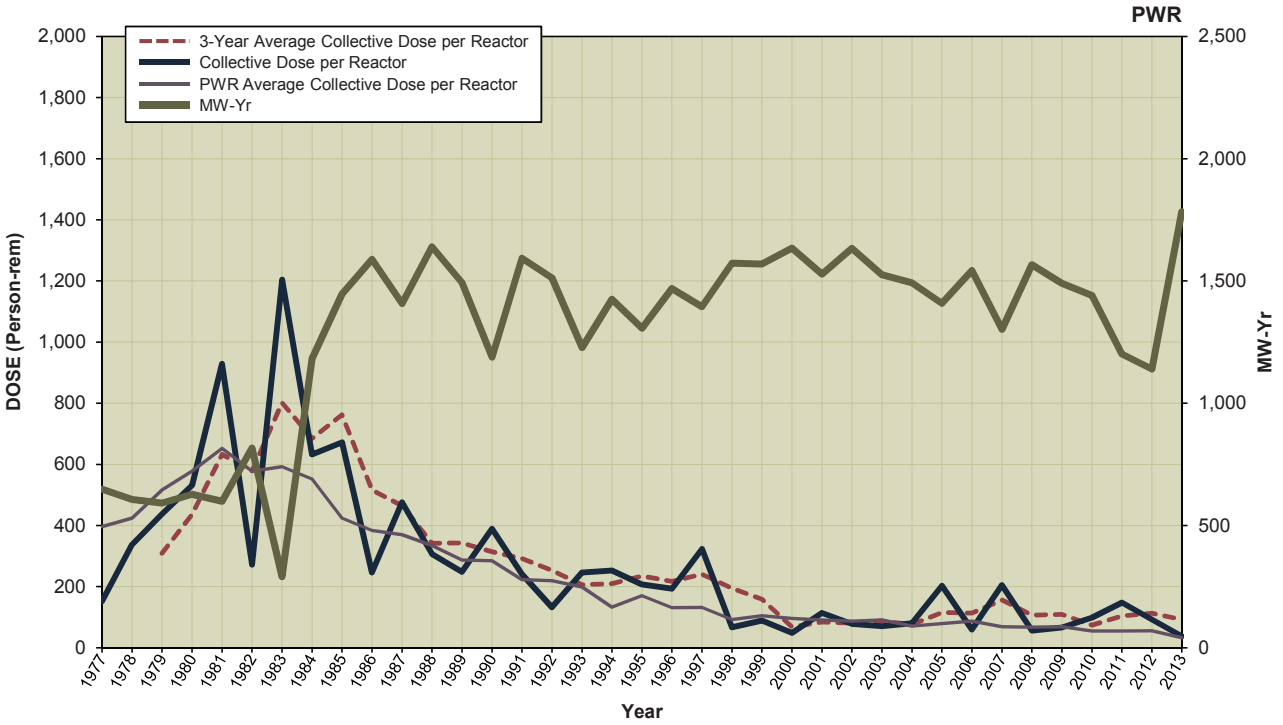
## SEQUOYAH 1, 2
Dose Performance Trends



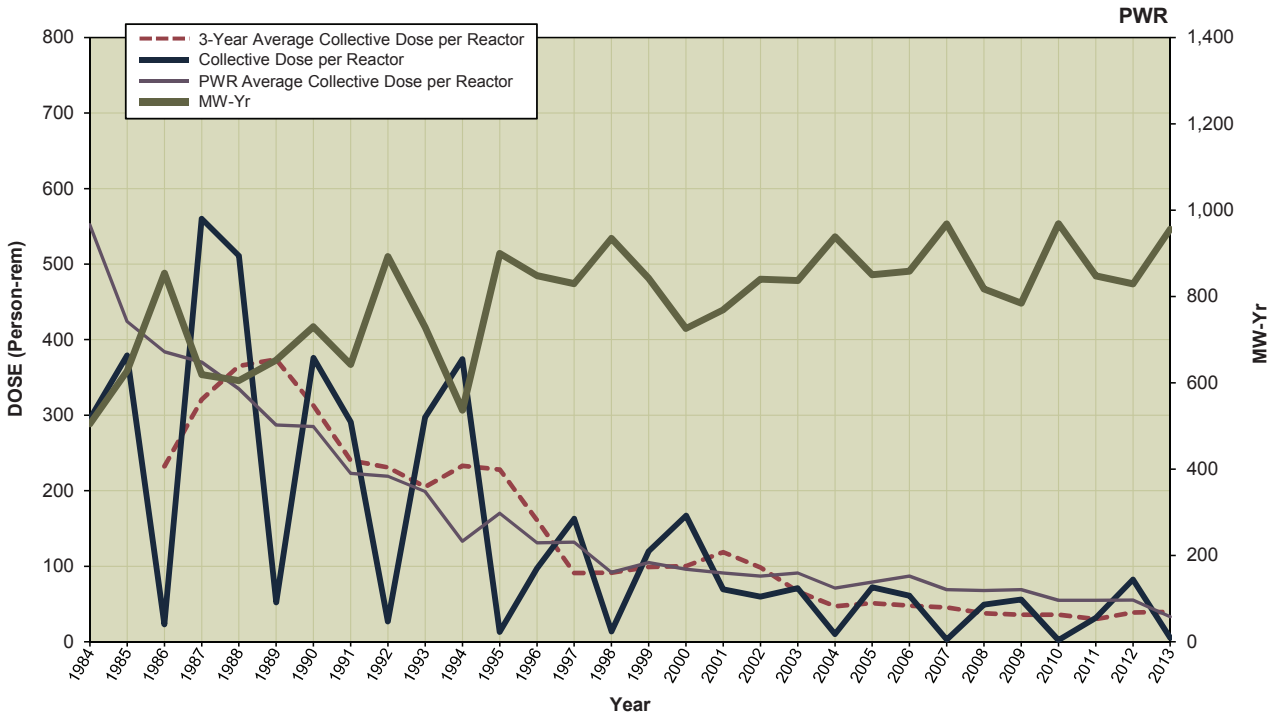

## SOUTH TEXAS 1, 2
Dose Performance Trends



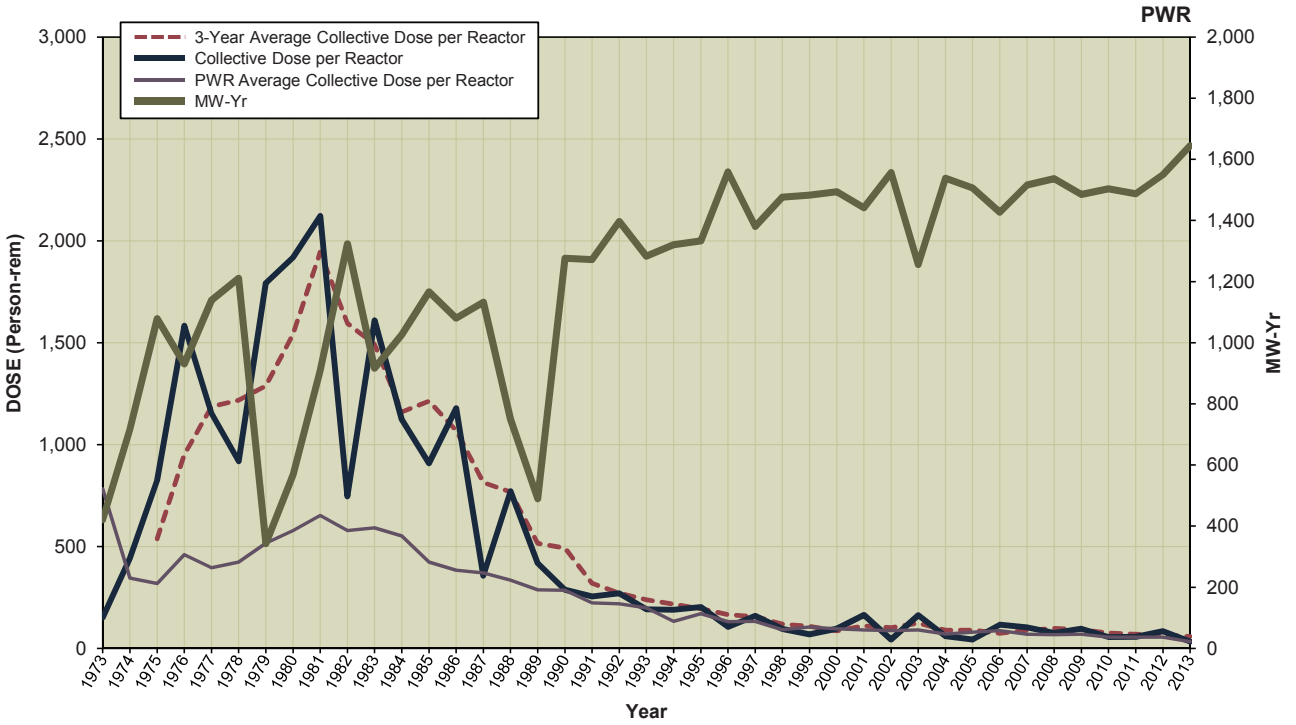
## ST. LUCIE 1, 2
Dose Performance Trends



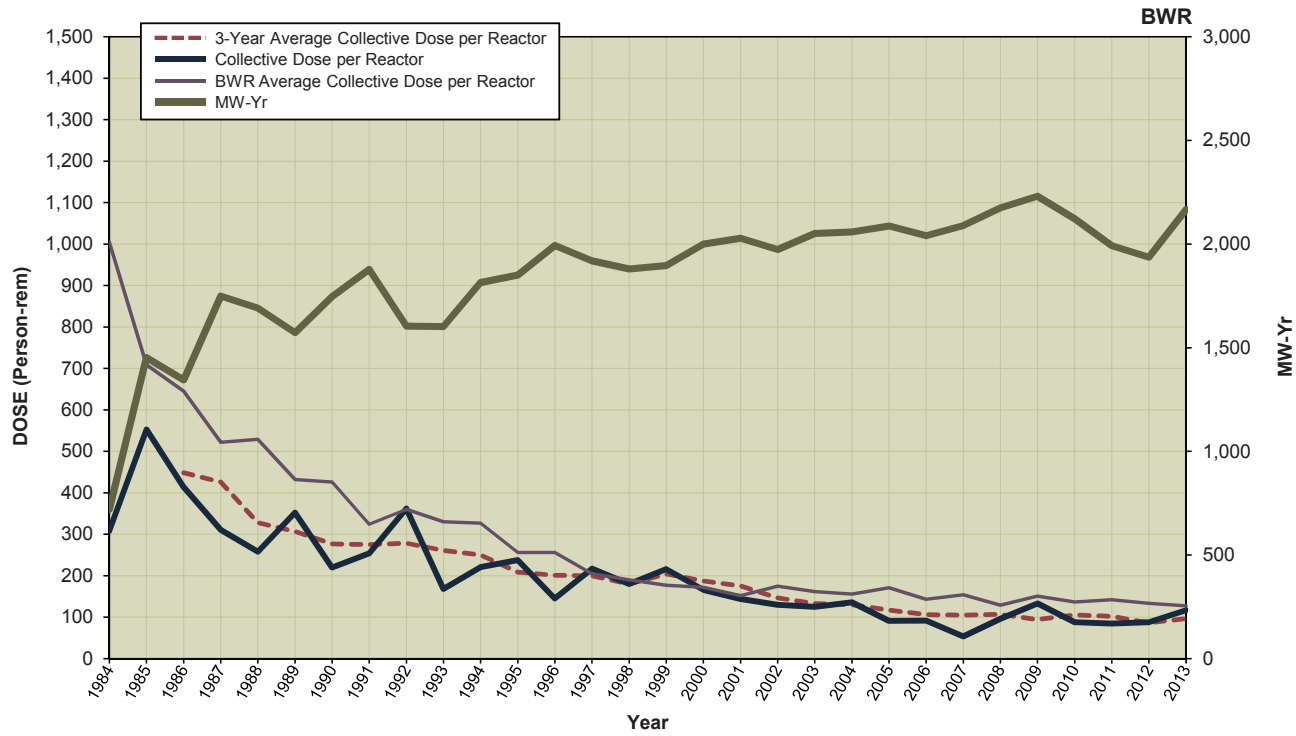

## SUMMER
Dose Performance Trends



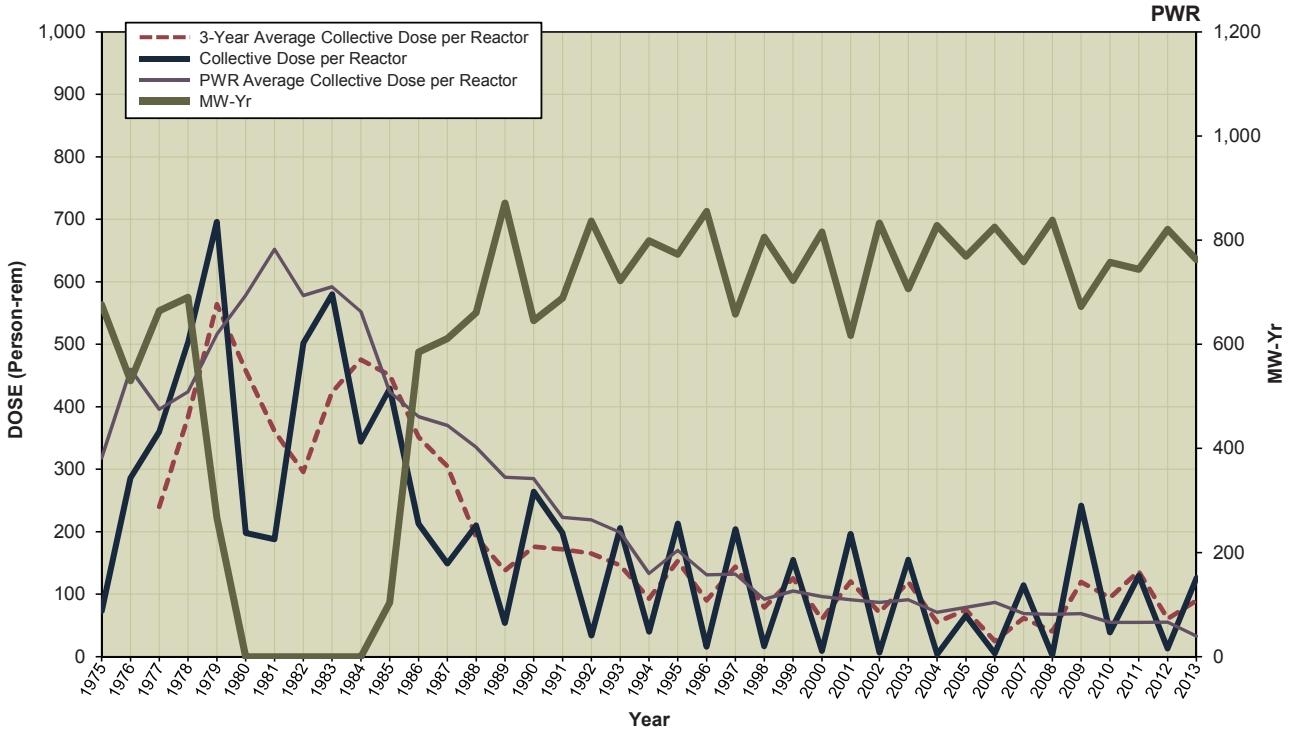
## SURRY 1, 2
Dose Performance Trends



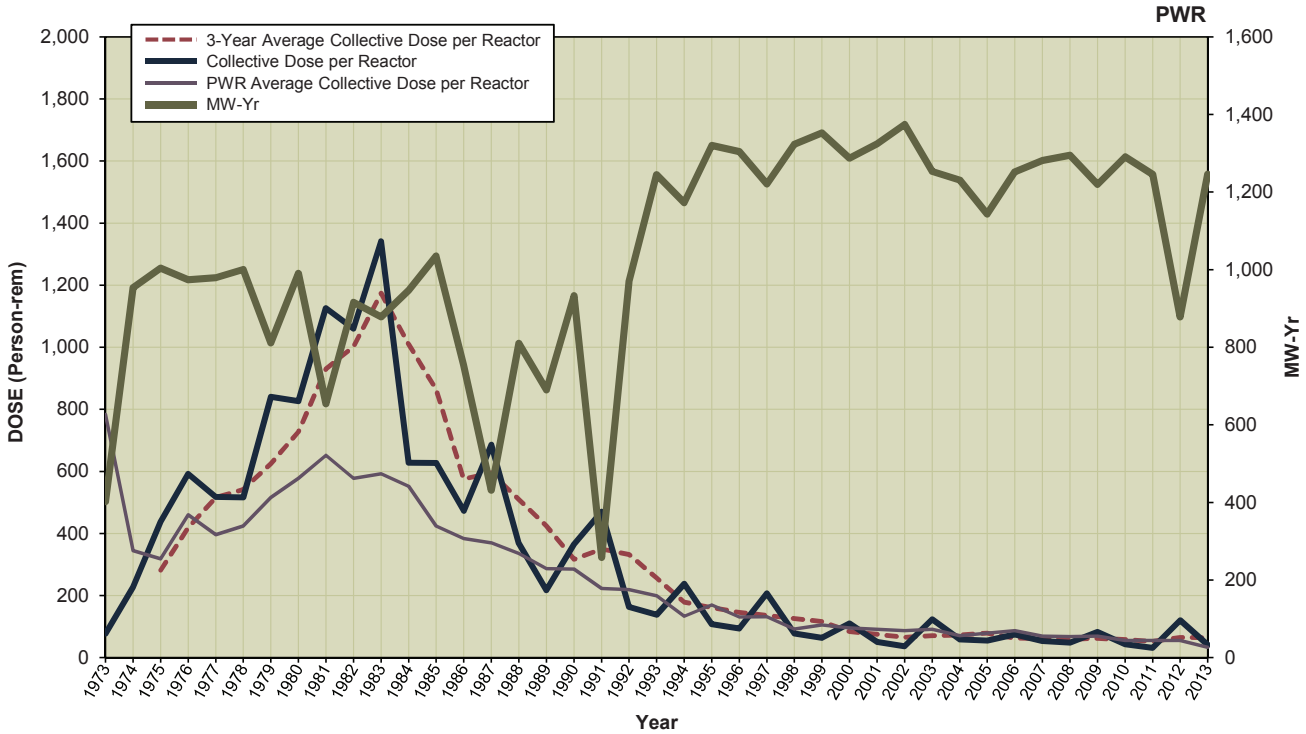

## SUSQUEHANNA 1, 2
Dose Performance Trends



## THREE MILE ISLAND 1*
Dose Performance Trends

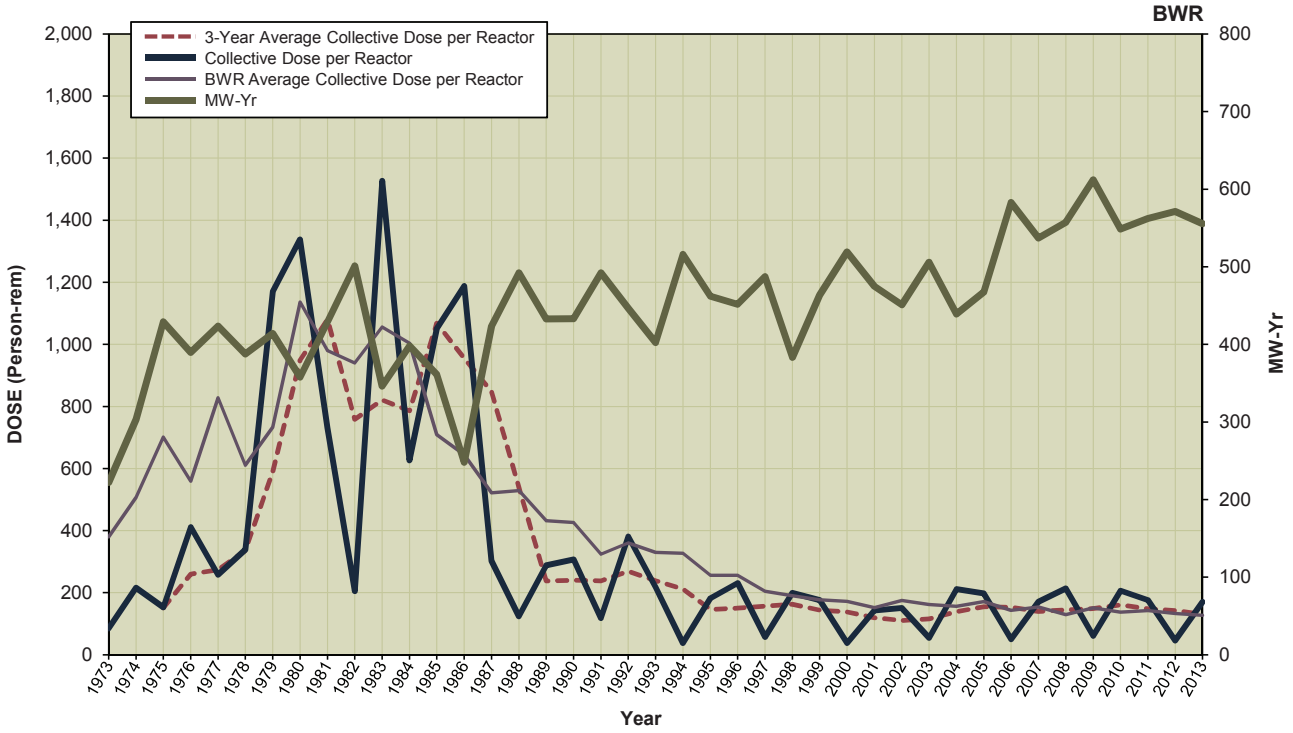



## TURKEY POINT 3, 4
Dose Performance Trends

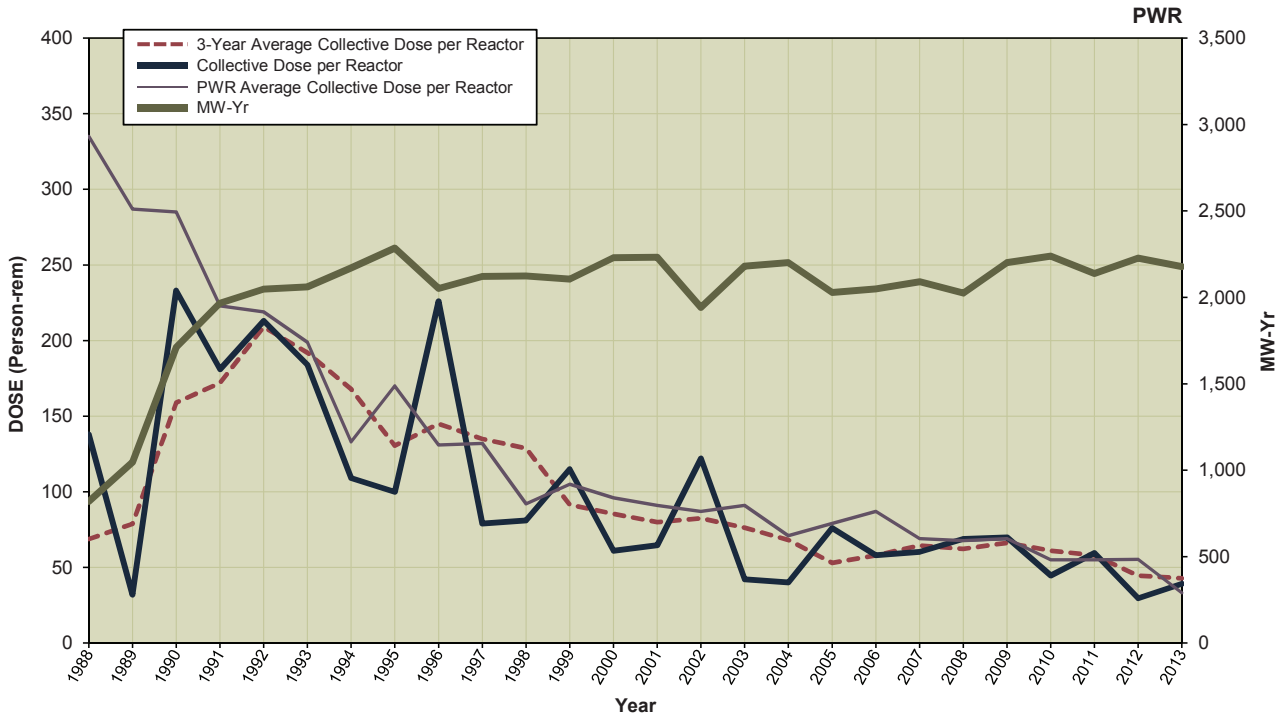



*Graph includes data for Three Mile Island 2 for the years 1975–1985.

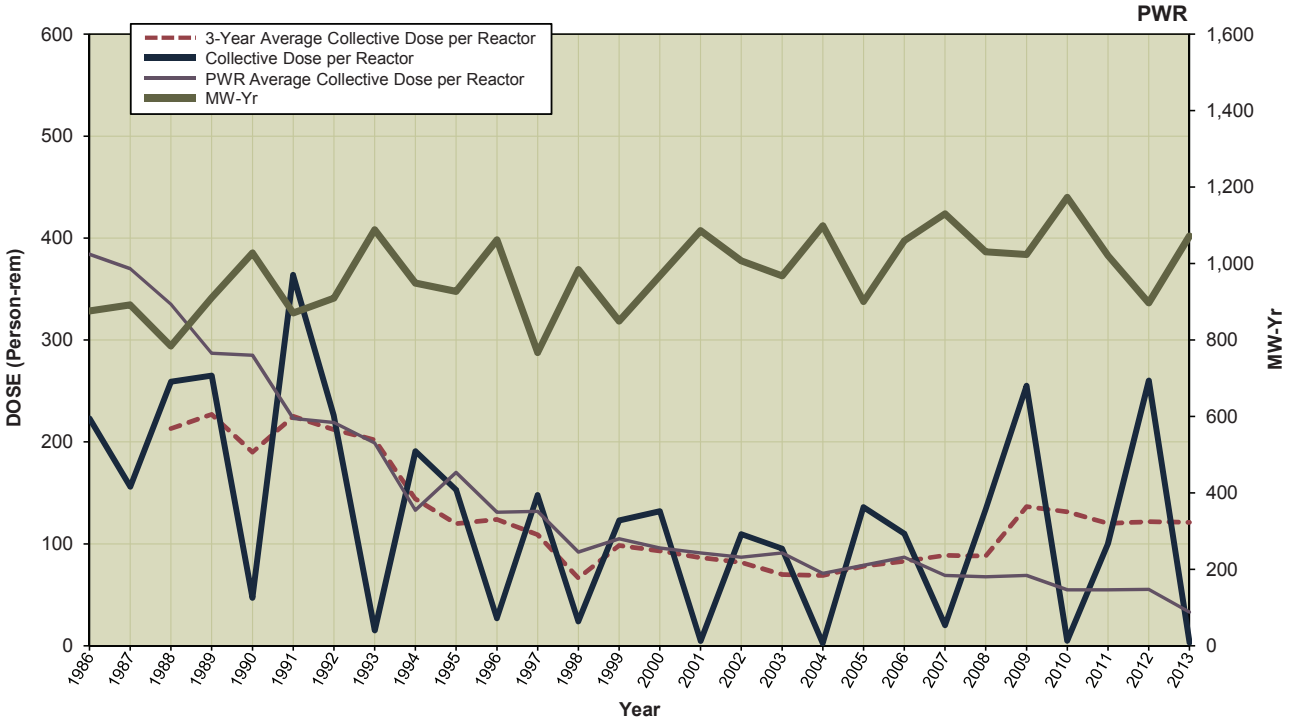
## VERMONT YANKEE
Dose Performance Trends



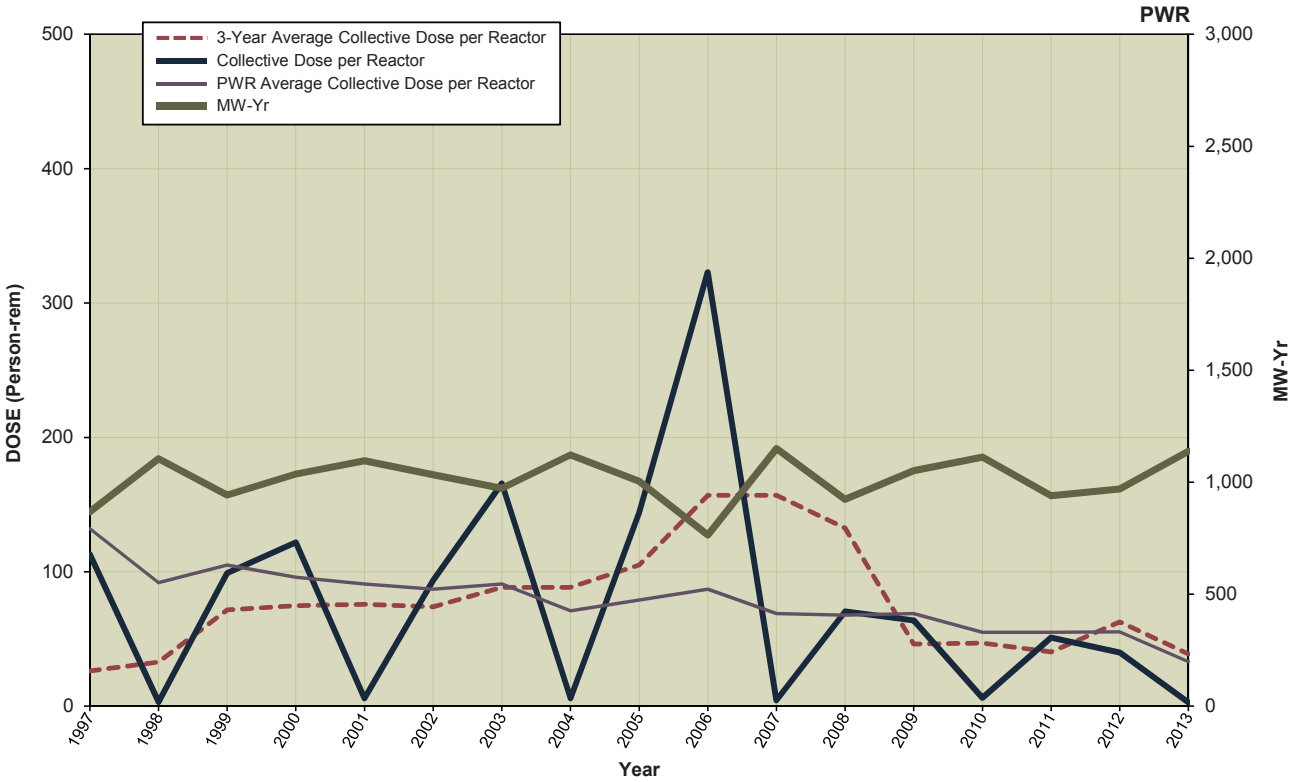

## VOGTLE 1, 2
Dose Performance Trends



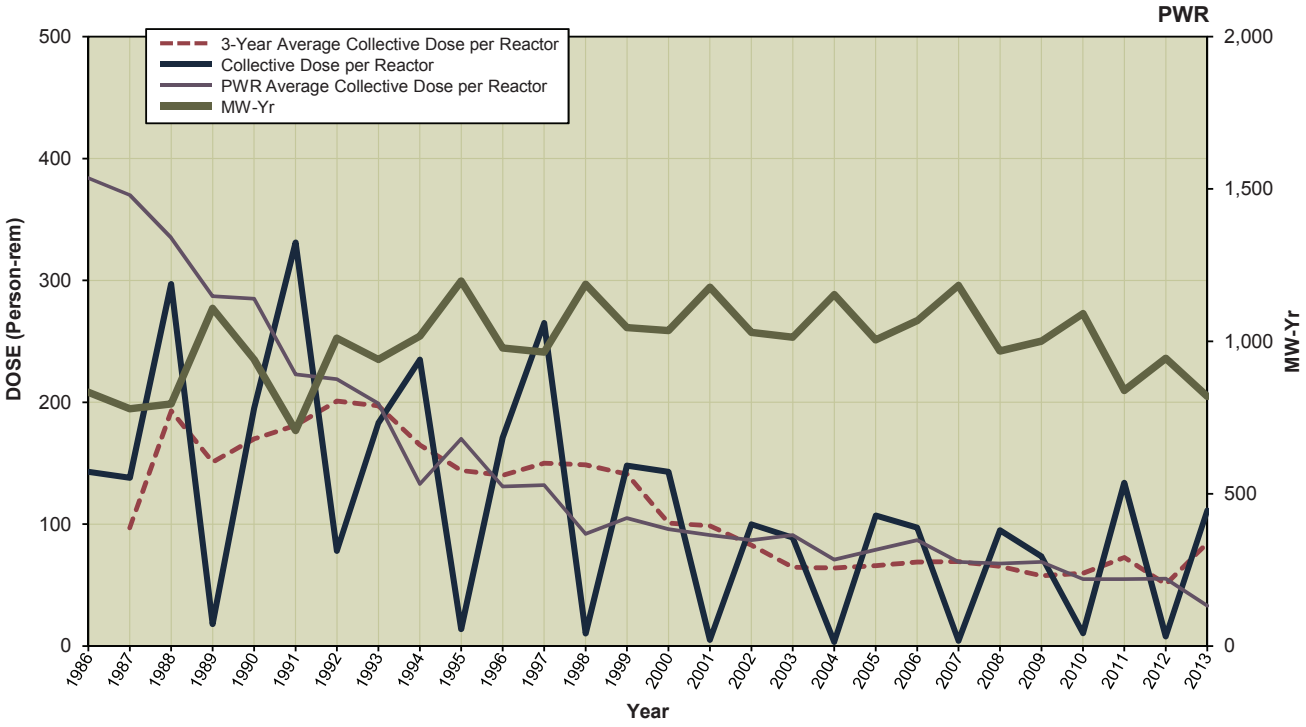
## WATERFORD 3
Dose Performance Trends




## WATTS BAR 1
Dose Performance Trends



## WOLF CREEK 1
Dose Performance Trends



Appendix E

# PLANTS NO LONGER IN OPERATION

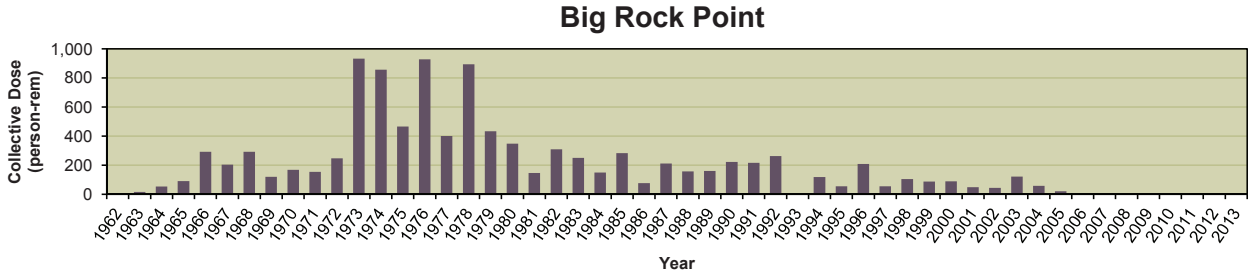
## 2013

Information in this appendix was obtained from References 18, 19, and 20.

## 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 and the U.S. Nuclear Regulatory Commission (NRC) terminated the reactor license in 2007.

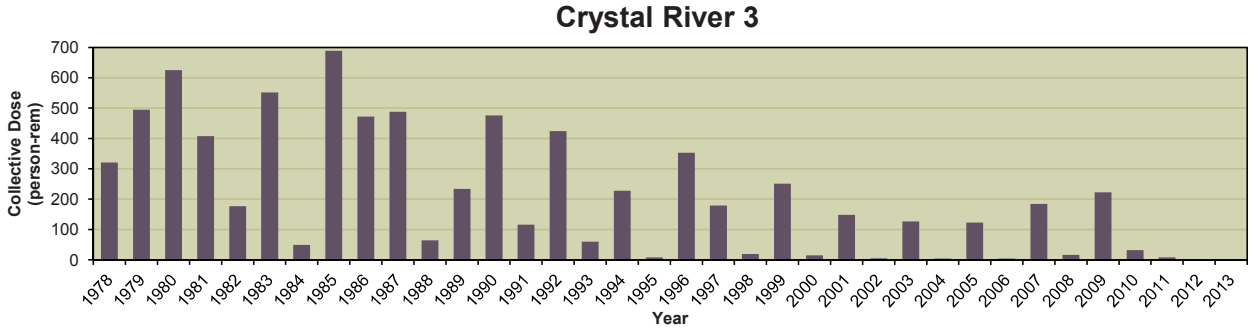
All fuel was transferred to the independent spent fuel storage installation (ISFSI) by March 2003. After fuel is removed from the site to a U.S. Department of Energy (DOE) facility, the ISFSI will be decommissioned and the license terminated. The NRC license termination plan (LTP) approval date is to be determined.




## 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 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. The licensee submitted the CR-3 post-shutdown decommissioning activities report (PSDAR), including the site-specific cost estimate, on December 2, 2013.



## Dresden Unit 1

Dresden Unit 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. Unit 1 was taken off line on October 31, 1978, to backfit the unit with equipment to meet new Federal regulations and to perform a chemical decontamination of major piping systems. While the unit was out of service for retrofitting, additional regulations were issued as a result of the March 1979 accident at Three Mile Island. The estimated cost to bring Unit 1 into compliance with these regulations was more than $300 million. Commonwealth Edison, the owner of the facility, concluded that the age of the unit and its relatively small size did not warrant the added investment and submitted a Decommissioning Plan to the NRC. The NRC approved the Decommissioning Plan in September 1993. Dresden Unit 1 is currently in SAFSTOR.

During the SAFSTOR period, through 2027, the Unit 1 facility will be subjected to periodic inspection and monitoring. These activities will include condition monitoring of the ISFSI, ongoing environmental surveys, and maintenance of equipment required to support the SAFSTOR condition of the facility. The licensee plans that decontamination and dismantlement of Unit 1, including removal of any remaining spent fuel that is stored in the Unit 3 spent fuel pool, will take place from 2029 through 2031. In 2031, a comprehensive radiological survey will be initiated to demonstrate readiness for demolition of the Unit 1 portions of the facility. A 4-year site restoration delay will follow the major decontamination and dismantlement of Unit 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 ISFSI complex with site security and periodic inspections until final transfer of the spent fuel to DOE. The NRC LTP approval date is to be determined.

## Fermi Unit 1

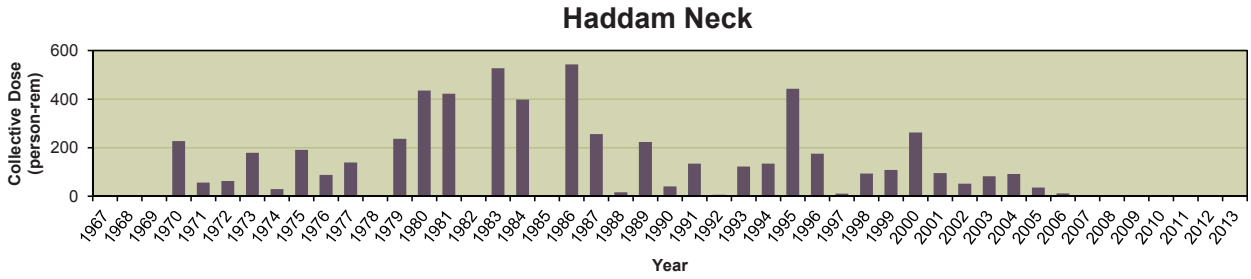
The Enrico Fermi Atomic Power Plant, Unit 1 (Fermi 1) was a fast breeder reactor power plant cooled by sodium and operated at essentially atmospheric pressure. The reactor plant was designed for a maximum capacity of 430 MW; however, the maximum reactor power was 200 MW. The primary system was filled 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 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.

## Haddam Neck – Connecticut Yankee

In 1996, Haddam Neck (a pressurized-water reactor) ceased power operations. 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.



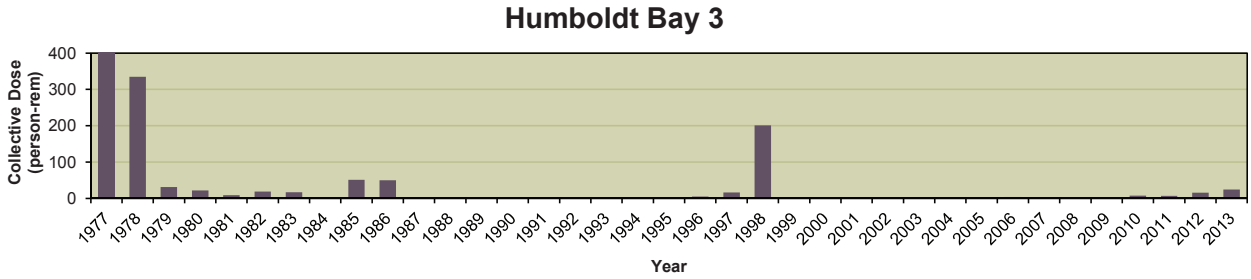

## Humboldt Bay Unit 3

Humboldt Bay Unit 3 produced power commercially from August 1, 1963, to July 1976. In July 1976, Unit 3 was shut down for 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 Humboldt Bay Units 1 and 2. Decommissioning activities at the old fossil Units 1 and 2 were completed in 2013. During this period, only incremental decommissioning of Unit 3 occurred. As decommissioning of Units 1 and 2 is completed, full decommissioning of Unit 3 will begin. It is estimated that all decommissioning activities will be completed in 2016.

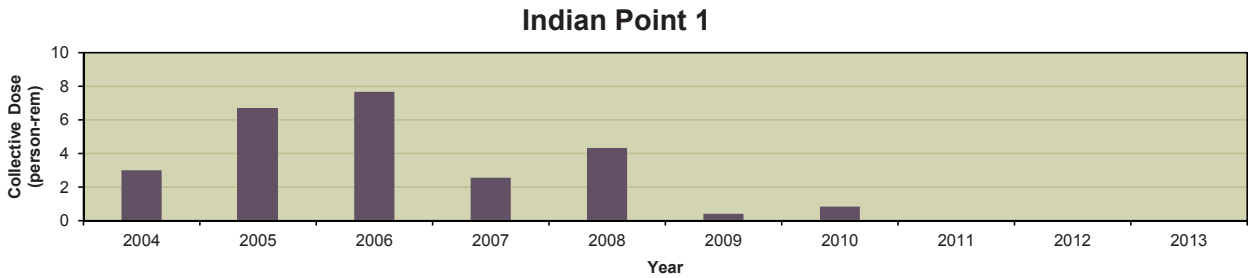
During 2012, the NRC staff issued two 10 CFR 20.2002 approvals for alternative disposal of Humboldt Bay decommissioning debris and soils. The NRC LTP approval date is to be determined. The Humboldt Bay Unit 3 decommissioning status is DECON.




## Indian Point Unit 1

Indian Point Unit 1 (IP-1) produced power commercially from August 1962 to October 31, 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.

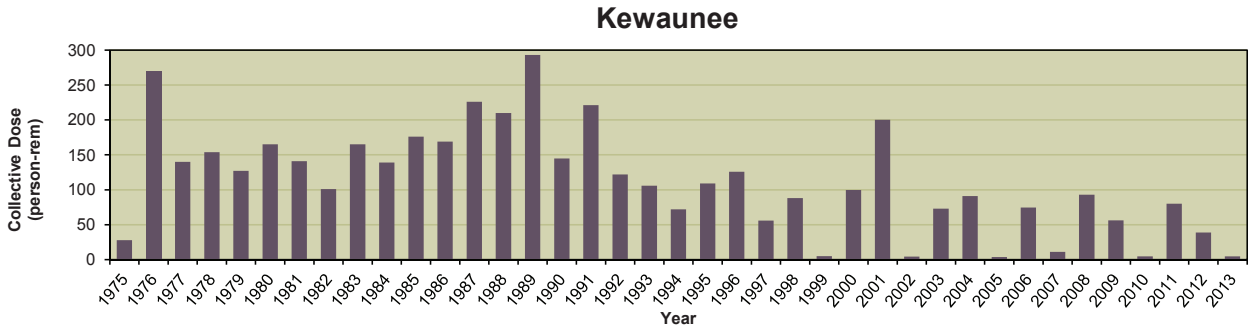
A PSDAR public meeting was held on January 20, 1999. The licensee plans to decommission IP-1 with Indian Point Unit 2 (IP-2), which is currently in operation. The licensee does not plan to begin active decontamination and decommissioning of IP-1 until the IP-2 license ceases operation. The NRC LTP approval date is to be determined.



## Kewaunee

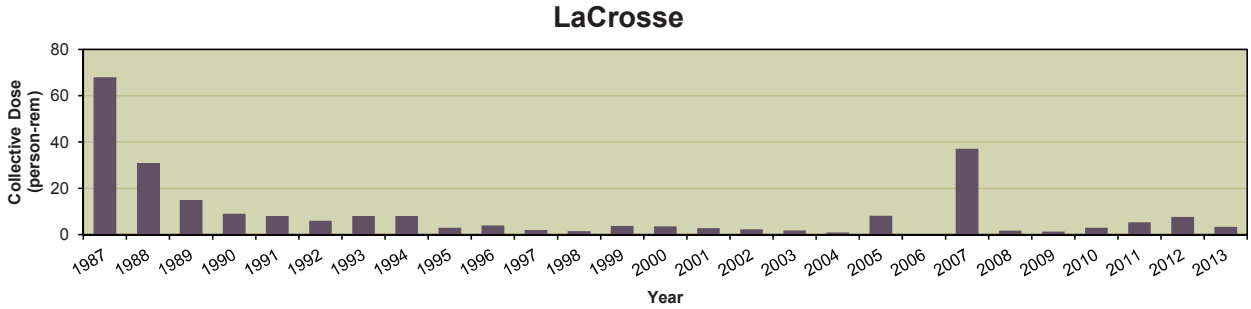
Kewaunee Power Station was a 556 MWe (1,772 MWt), pressurized-water reactor that was licensed to operate from December 1973 to February 25, 2013. Kewaunee is located in Carlton, WI, on Lake Michigan about 35 miles southeast of Green Bay.

The facility is currently transitioning to a SAFSTOR condition. Kewaunee submitted a PSDAR on February 26, 2013. Current planning is to transfer the entire spent fuel pool inventory to dry cask storage by 2020. License termination is scheduled in 2073.




## La Crosse

The La Crosse Boiling-Water Reactor (LACBWR) produced power commercially from November 1, 1969, to April 30, 1987. 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 Dairyland Power Cooperative (DPC). The AEC later sold the plant to 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. The LACBWR Decommissioning Plan is also its PSDAR.



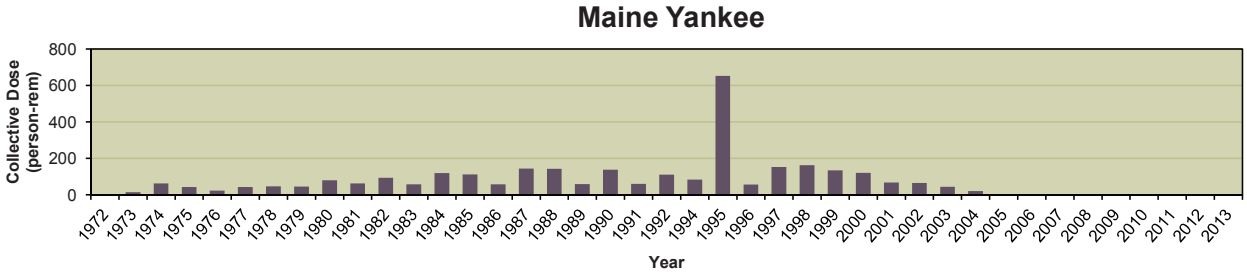

The NRC held a public meeting on LACBWR's PSDAR on May 13, 1998. DPC conducted dismantlement and decommissioning activities, and in 2011, testing began on spent fuel transfer equipment. Dry runs were conducted for the transfer of spent fuel from the spent fuel pool to

the ISFSI. By September 2012, DPC had safely transferred all spent fuel to an onsite ISFSI with Region III oversight and in coordination with the Office of Nuclear Material Safety and Safeguards (NMSS). It is estimated that all decommissioning activities will be completed in 2026. The NRC LTP approval date is to be determined. The LACBWR decommissioning status is DECON.

## Maine Yankee

Maine Yankee was a 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.

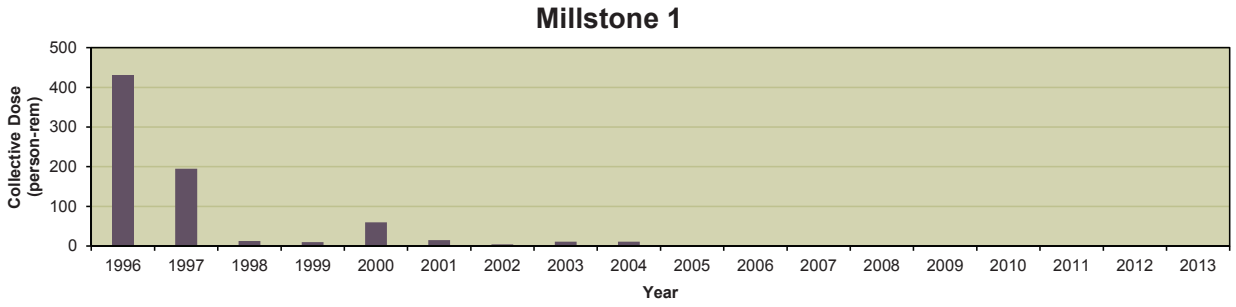



## Millstone Unit 1

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. Dominion Nuclear Connecticut, the owner of the facility, submitted its PSDAR to the NRC on June 14, 1999. Millstone Unit 1 is currently in SAFSTOR. The NRC LTP approval date is to be determined.

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 not provided an estimated date for completion of all decommissioning activities, and the estimated closure date of this site has not been determined.




## Peach Bottom Unit 1

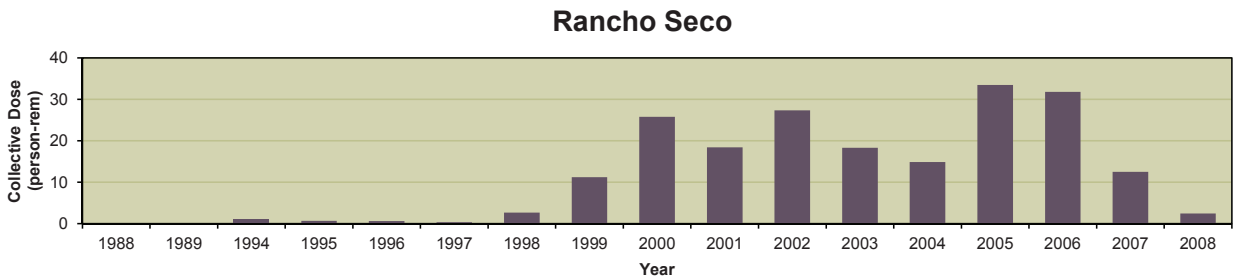
Peach Bottom Atomic Power Station, Unit 1, was a 200 MWt, high-temperature, gas-cooled reactor that was operated from June 1967 until its final shutdown on October 31, 1974. All spent fuel has been removed from the spent fuel pool, and the spent fuel pool has been drained and decontaminated. The reactor vessel, primary system piping, and SGs remain in place.

The facility is currently in a SAFSTOR condition. The PSDAR meeting was held on June 29, 1998. Final decommissioning is not expected until 2034, when Units 2 and 3 are scheduled to shut down. The NRC LTP approval date is to be determined.

## 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.

SMUD completed transfer of all the spent nuclear fuel to the Rancho Seco ISFSI in August 2002.

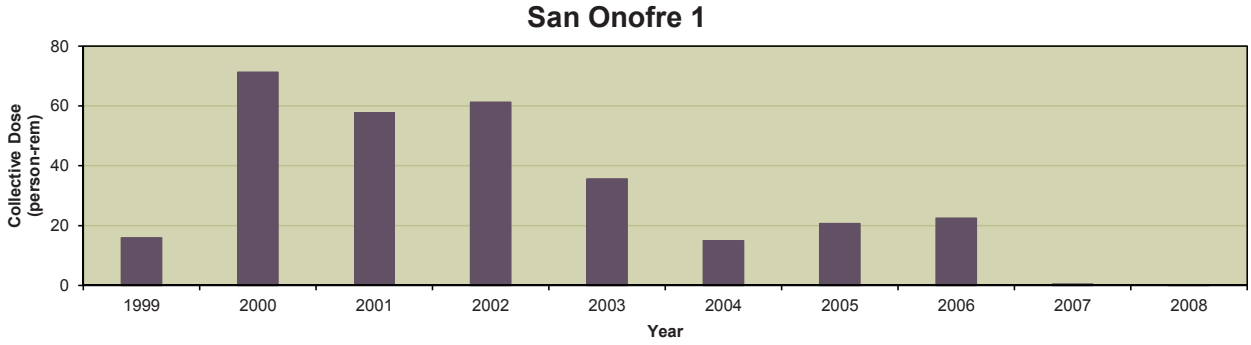


Rancho Seco completed decommissioning in 2009 and the site was released as greenfields, with the exception of a 6-acre ISFSI site. The NRC LTP approval date is to be determined.

## San Onofre Unit 1

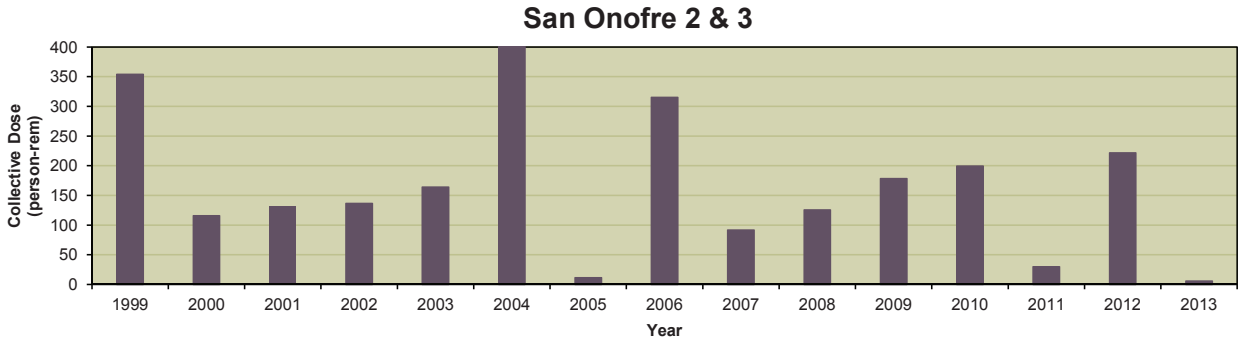
The San Onofre Nuclear Generating Station Unit 1 (SONGS-1), operated by Southern California Edison (SCE), produced power commercially from January 1, 1968, to November 30, 1992. Unit 1 was a Westinghouse three-loop pressurized-water reactor with a reactor thermal output of 1,347 MW. SONGS-1 subsequently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

Defueling of SONGS-1 was completed on March 6, 1993, and the NRC approved the Permanently Defueled Technical Specifications report 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 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. The ISFSI will be expanded into the area previously occupied by SONGS-1, as needed, to store all spent fuel from SONGS-2 and SONGS-3. In February 2010, the NRC staff issued a license amendment to release offshore portions of the San Onofre Unit 1 cooling intake and outlet pipes for unrestricted use. It is estimated that all decommissioning activities for SONGS-1 will be completed in 2030. The NRC LTP approval date is to be determined.



## San Onofre Units 2 and 3

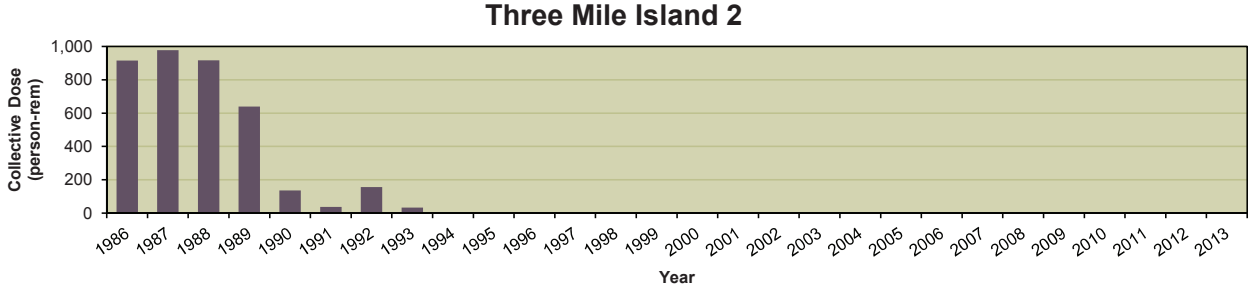
San Onofre Units 2 and 3 began commercial operation on August 18, 1983, and April 1, 1984, respectively. They are located next to San Onofre State Beach, in San Diego County. Since January 2012, San Onofre Units 2 and 3 have been out of service due to the installation of four replacement SGs. The SGs experienced a radioactive coolant leak caused by flow-induced vibration and extreme tube damage. Efforts to have the manufacturer repair and replace the faulty tubes were not successful and on June 7, 2013, SCE announced the permanent retirement of San Onofre Units 2 and 3.




## 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 nonoperating 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.

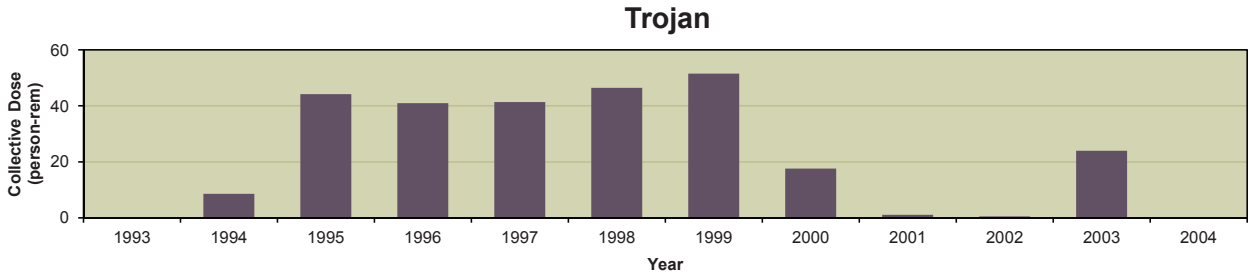
TMI-2 has been defueled and decontaminated to the extent the plant is in a safe, inherently stable condition suitable for long-term management. This long-term management condition is termed post-defueling monitored storage, which was approved in 1993. TMI-2 shares equipment with the operating Three Mile Island Unit 1 (TMI-1). The licensee plans to actively decommission TMI-2 in parallel with the decommissioning of TMI-1. It is estimated that decommissioning activities for TMI-2 will be completed in 2036. The NRC LTP approval date is to be determined.



## 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.

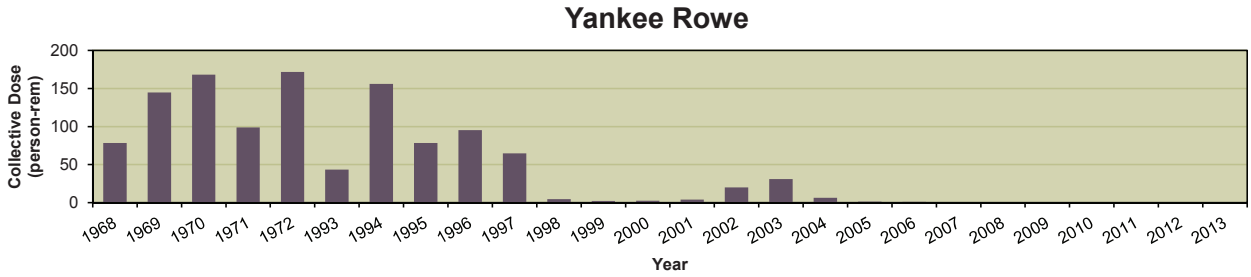



## Yankee Rowe

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. The NRC LTP approval date is to be determined.

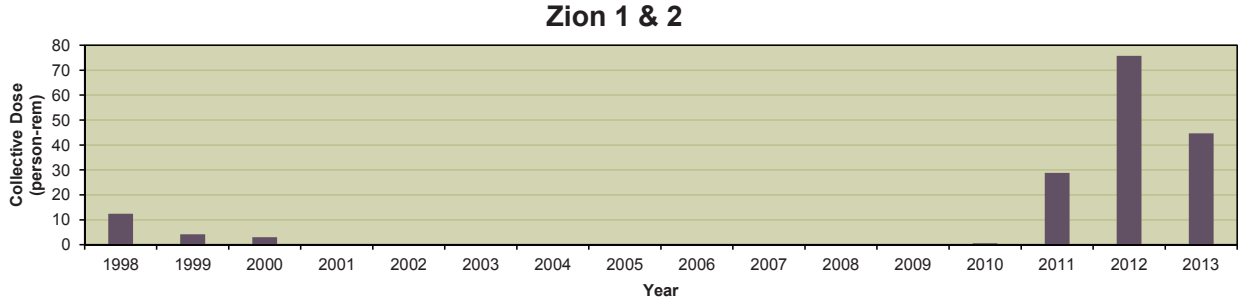


## Zion Units 1 and 2

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. In addition, containment accesses were constructed to allow for equipment removal.

It is estimated that all decommissioning activities will be completed at ZNPS in 2020. The NRC LTP approval date is to be determined. ZNPS is currently in DECON.



Appendix F

# GLOSSARY

# 2013

Information in this appendix was obtained from Reference 21.

***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. 19]

***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:*** 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. The acronym CDE is an NRC acronym used for this term.

***Committed effective dose equivalent:*** 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. 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. 20]

***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.

***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 restricted release of the property.

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

***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 and 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.

***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 rems).

***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 but does not include source material.

***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).

***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.

NRC FORM 335
(12-2010)
NRCMD 3.7

U.S. NUCLEAR REGULATORY COMMISSION

# BIBLIOGRAPHIC DATA SHEET

*(See instructions on the reverse)*

1. REPORT NUMBER
(Assigned by NRC, Add Vol., Supp., Rev., and Addendum Numbers, If any.)
NUREG-0713, Vol. 35

2. TITLE AND SUBTITLE
NUREG-0713, Vol. 35
Occupational Radiation Exposure at Commercial Nuclear Power Reactors and Other Facilities: Forty-Sixth Annual Report

3. DATE REPORT PUBLISHED

| MONTH | YEAR |
|---|---|
| December | 2015 |

4. FIN OR GRANT NUMBER
V6191


5. AUTHOR(S)
L.A. Benevides
T.A. Brock
D.A. Hagemeyer*
Y.U. McCormick*


6. TYPE OF REPORT
Technical

7. PERIOD COVERED (Inclusive Dates)


8. PERFORMING ORGANIZATION - NAME AND ADDRESS (If NRC, provide Division, Office or Region, U. S. Nuclear Regulatory Commission, and mailing address; if contractor, provide name and mailing address.)
Division of Systems Analysis
Office of Nuclear Regulatory Research
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

*Oak Ridge Associated Universities (ORAU)
1299 Bethel Valley Road, SC-200, MS-21
Oak Ridge, TN 37830


9. SPONSORING ORGANIZATION - NAME AND ADDRESS (If NRC, type "Same as above", if contractor, provide NRC Division, Office or Region, U. S. Nuclear Regulatory Commission, and mailing address.)

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 2013 annual reports submitted by five of the seven categories1 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 2013 were received from a total of 189 NRC licensees from the five categories described above. The summation of reports submitted by the 189 licensees indicated that 184,907 individuals were monitored, 74,054 of whom received a measurable dose (Table 3.1). When adjusted for transient individuals, there were actually 135,681 unique individuals that were monitored, 57,115 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


13. AVAILABILITY STATEMENT
unlimited

14. SECURITY CLASSIFICATION
*(This Page)*
unclassified
*(This Report)*
unclassified

15. NUMBER OF PAGES

16. PRICE


Federal Recycling Program


**UNITED STATES**
**NUCLEAR REGULATORY COMMISSION**
WASHINGTON, DC 20555-0001

OFFICIAL BUSINESS