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Occupational Radiation Exposure at Commercial Nuclear Power Reactors And Other Facilities 1986

Nineteenth Annual Report

U.S. Nuclear Regulatory Commission

Office of Nuclear Regulatory Research

B.G. Brooks, D. Hagemeyer

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PREVIOUS REPORTS IN SERIES

WASH-1311 A Compilation of Occupational Radiation Exposure from Light Water Cooled Nuclear Power Plants, 1969-1973, U.S. Atomic Energy Commission, May 1974.

NUREG-75/032 Occupational Radiation Exposure at Light Water Cooled Power Reactors, 1969-1974, U.S. Nuclear Regulatory Commission, June 1975.

NUREG-0109 Occupational Radiation Exposure at Light Water Cooled Power Reactors, 1969-1975, U.S. Nuclear Regulatory Commission, August 1976.

NUREG-0323 Occupational Radiation Exposure at Light Water Cooled Power Reactors, 1969-1976, U.S. Nuclear Regulatory Commission, March 1978.

NUREG-0482 Occupational Radiation Exposure at Light Water Cooled Power Reactors, 1977, U.S. Nuclear Regulatory Commission, May 1979.

NUREG-0594 Occupational Radiation Exposure at Commercial Nuclear Power Reactors, 1978, U.S. Nuclear Regulatory Commission, November 1979.

NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors 1979, Vol. 1, U.S. Nuclear Regulatory Commission, March 1981.

NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors 1980, Vol. 2, U.S. Nuclear Regulatory Commission, December 1981.

NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors 1981, Vol. 3, U.S. Nuclear Regulatory Commission, November 1982.

NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors 1982, Vol. 4, U.S. Nuclear Regulatory Commission, December 1983.

NUREG-0713 Occupational Radiation Exposure at Commercial Nuclear Power Reactors 1983, Vol. 5, U.S. Nuclear Regulatory Commission, March 1985.

NUREG-0713 Occupational Radiation Exposure At Commercial Nuclear Power Reactors and Other Facilities 1984, Vol. 6, U.S. Nuclear Regulatory Commission, October 1986.

NUREG-0713 Occupational Radiation Exposure At Commercial Nuclear Power Reactors and Other Facilities 1985, Vol. 7, U.S. Nuclear Regulatory Commission, April 1988.

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

WASH-1350-R1 through WASH-1350-R6 First through Sixth Annual Reports of the Operation of the U.S. AEC's Centralized Ionizing Radiation Exposure Records and Reporting System, U.S. Atomic Energy Commission.

NUREG-75/108 Seventh Annual Occupational Radiation Exposure Report for Certain NRC Licensees - 1974, U.S. Nuclear Regulatory Commission, October 1975.

NUREG-0119 Eighth Annual Occupational Radiation Exposure Report for 1975, U.S. Nuclear Regulatory Commission, October 1976.

NUREG-0322 Ninth Annual Occupational Radiation Exposure Report for 1976, U.S. Nuclear Regulatory Commission, October 1977.

NUREG-0463 Tenth Annual Occupational Radiation Exposure Report for 1977, U.S. Nuclear Regulatory Commission, October 1978.

NUREG-0593 Eleventh Annual Occupational Radiation Exposure Report for 1978, U.S. Nuclear Regulatory Commission, January 1981.

NUREG-0714 Twelfth Annual Occupational Radiation Exposure Report for 1979, Vol. 1, U.S. Nuclear Regulatory Commission, August 1982.

NUREG-0714 Occupational Radiation Exposure, Thirteenth and Fourteenth Annual Reports, 1980 and 1981, Vols. 2 and 3, U.S. Nuclear Regulatory Commission, October 1983.

NUREG-0714 Occupational Radiation Exposure, Fifteenth and Sixteenth Annual Reports, 1982 and 1983, Vols. 4 and 5, U.S. Nuclear Regulatory Commission, October 1985.

ABSTRACT

This report summarizes the occupational exposure data that are maintained in the U.S. Nuclear Regulatory Commission's Radiation Exposure Information and Reporting System (REIRS). The bulk of the information contained in the report was extracted from the 1986 annual statistical reports submitted by six of the seven categories* of NRC licensees subject to the reporting requirements of 10 CFR § 20.407. Since there are no geologic repositories for high level waste currently licensed, only six categories will be considered in this report. These six categories of licensees also submit personal identification and exposure information for terminating employees pursuant to 10 CFR § 20.408, and some analysis of this "termination" data is also presented in this report.

Annual reports for 1986 were received from a total of 482 NRC licensees, 101 of whom were licensed nuclear power reactors. Compilations of the 482 reports indicated that some 227,652 individuals were monitored, 116,241 of whom received a measurable dose (Table 3.1). The collective dose incurred by these individuals was calculated to be 46,366 person-rems (person-cSv)** which represents a decrease of 23% from the 1985 value. The number of workers receiving a measurable dose increased while the collective dose decreased slightly, causing the average measurable dose to decrease from 0.43 rem (cSv) to 0.40 rem (cSv). About 13% of the monitored individuals were found to have received doses greater than 0.50 rem (cSv), which is about the same as the value for 1985.

Some 235,300 termination reports (Table 5.1) were submitted to the NRC which contained personal identification and exposure information for 77,575 individuals who had completed their work assignment or employment with a covered category of NRC licensees during 1985. This number is approximately the same as reported for 1983 and 1984. Due to such a large number of records being submitted each year, all of the termination data for 1986 has not yet been entered into REIRS. The total number of monitored individuals for whom personal identification and exposure information has been incorporated into REIRS during the 18 years that it has been operating is now about 480,000, more than 400,000 of whom terminated from nuclear power facilities. Analyses of these termination data indicate that 6,740 individuals completed work assignments at two or more nuclear reactor facilities during calendar year 1985 and received an average dose of 0.75 rems (cSv). Approximately 2,700 of these individuals worked at two or more reactor facilities during one calendar quarter and received an average dose of 0.25 rem (cSv).

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

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

EDITOR'S NOTE

In the fall of 1987, Science Applications International Corporation (SAIC) was selected to assist the NRC Staff in the preparation of the NUREG-0713 series. In the months and years ahead, SAIC will be suggesting changes in the presentation of certain data in these reports. Readers should be alert to these changes, and the NRC welcomes responses, especially where these changes can be improved upon. Comments should be directed to B. G. Brooks, Office of Nuclear Regulatory Research, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555 (301)492-3738.

PREFACE

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

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

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

3. The data provide for governmental monitoring of the potential transient-worker problem.

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

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

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

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

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

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1 INTRODUCTION

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

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

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

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

In 1982 and 1983, paragraph 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 new categories are (1) geologic repositories for high-level radioactive waste, (2) independent spent fuel storage installations, and (3) facilities for the land disposal of low-level radioactive waste. Therefore, this document presents the exposure information that was reported by NRC licensees representing two of these new categories. (There are no geologic repositories for high-level waste currently licensed.)

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

2 LIMITATIONS OF THE DATA

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

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

One source of error that is present in the calculation of the annual collective dose (i.e., the summation of each monitored person's whole body dose) incurred by workers is the assumption that the midpoint of the dose range is the mean dose of the individuals reported in each dose range (dose ranges are shown in Table 3.2). This allows the collective dose to be calculated without knowing each person's actual annual dose. Past experience has shown that the actual mean dose of the individuals reported in each range is usually less than the midpoint. Thus, the collective doses presented for categories of licenses shown in this report may be 10% higher than the sum of the actual individual doses. However, nearly 75% of the nuclear power reactors reported the actual collective dose in 1986 so the figure shown for this category is more accurate.

The average dose per individual, as well as the dose distributions shown for groups of licensees, also could have been affected by the multiple reporting of individuals who were monitored by two or more licensees during the year. Since individuals are not identified in the annual reports, an individual who was monitored by five different licensees would have been counted once on each report. Therefore, when the data were summed to determine the total number of individuals monitored by a group of licensees, this person would be counted as five individuals rather than as one. This could also affect the distribution of doses because the individual has been counted five times in the lower dose ranges rather than one time in the higher range in which his actual accumulated dose (the sum of his doses incurred at each facility) would have placed him. This source of error has the greatest potential

impact on the data reported by power reactor facilities since they employ many short-term workers. Further discussion of this point is provided in Section 5.

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

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

Also, it should be again pointed out that this report contains information reported by NRC licensees only. Since the NRC licenses all commercial nuclear power reactors, fuel processors, fabricators and reprocessors, and independent spent fuel storage facilities, information shown for these categories reflects the U.S. experience. This is not the case, however, for the remaining categories of industrial radiography, manufacturing and distribution of specified quantities of by-product material, and low-level waste disposal. Companies that conduct these types of activities in Agreement States* are licensed by the state and are not required to submit occupational exposure reports to the NRC. Therefore, information shown for these categories does not reflect the total U.S. experience.

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

3 ANNUAL PERSONNEL MONITORING REPORTS - 10 CFR § 20.407

3.1 Definition of Terms and Sources of Data

3.1.1 Statistical Summary Reports

On February 4, 1974, 10 CFR § 20.407 was amended to require certain categories* of licensees to submit an annual statistical report indicating the distribution of the whole body doses incurred by individuals whom they monitored for exposure to radiation. Table 3.2 shows the dose ranges specified by 10 CFR § 20.407(b) among which the doses are distributed. In prior years, the annual report was formatted differently and was not very useful as a basis for estimating the collective dose.

3.1.2 Number of Monitored Individuals

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

3.1.3 Number of Workers with Measurable Doses

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

3.1.4 Collective Dose

The concept of collective dose is used in this report to denote the summation of the whole body external dose received by each monitored individual and has the units person-rems (person-cSv)**. The collective dose is not usually provided in the annual dose distribution reports

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

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

submitted pursuant to 10 CFR § 20.407, but NRC staff calculated it from the reports by summing the products obtained by multiplying the number of individuals reported in each of the dose ranges (shown in Table 1) by the midpoint of the corresponding range. This assumes that the midpoint of the range is equal to the arithmetic mean of the individual doses in the range. Past experience has shown that the actual mean dose of individuals reported in each dose range is less than the midpoint of the range, and the collective doses shown in this report for these may be about 10% too high. In 1981, a few power reactor licensees began reporting the actual collective dose (as determined from official personnel dosimetry results) on the § 20.407 annual reports, and, when provided, the NRC staff used these doses instead of the above-described calculations. The staff would prefer to use the actual collective dose and encourages more licensees to make it available.

3.1.5 Average Individual Dose

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

3.1.6 Average Measurable Dose

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

3.1.7 Number of Licensees Reporting

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

3.1.8 CR

One of the parameters that the United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) recommends be calculated for occupational dose distributions to aid in the comparison of exposure data is a ratio "CR." CR is defined to be the ratio of the annual collective dose incurred by individuals whose annual doses exceed 1.5* rems to the total annual collective dose. One UNSCEAR report [Ref. 10] states that normal

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

TABLE 3.1
ANNUAL EXPOSURE DATA FOR CERTAIN CATEGORIES OF LICENSEES
1976-1986

License Category+	Calendar Year	Number of Licensees Reporting	Number of Monitored Individuals	Number of Workers With Measurable Doses	Collective Dose (person-rems or person-cSv)	Average Individual Dose (rems or cSv)	Average Measurable Dose per Worker (rems or cSv)	CR*
Industrial Radiography	1986	335	7,952	5,130	2,108	0.26	0.41	0.39
	1985	340	8,476	5,550	2,374	0.28	0.43	0.45
	1984	361	8,458	5,446	2,490	0.30	0.46	0.46
	1983	340	8,624	5,131	2,384	0.28	0.46	0.45
	1982	353	9,235	6,160	2,998	0.32	0.49	0.46
	1981	266	9,938	5,486	2,652	0.27	0.48	0.48
	1980	292	11,102	6,556	2,979	0.27	0.45	0.45
	1979	341	11,969	6,904	3,461	0.29	0.50	0.47
	1978	337	13,093	6,685	2,950	0.23	0.44	0.43
	1977	339	10,569	6,197	3,159	0.30	0.51	0.45
	1976	321	11,245	6,222	3,629	0.32	0.58	0.51
Manufacturing and Distribution	1986	33	4,042	2,065	745	0.18	0.36	0.49
	1985	33	3,958	2,250	755	0.19	0.34	0.50
	1984	40	5,076	1,977	671	0.13	0.34	0.46
	1983	33	5,051	2,003	824	0.16	0.41	0.54
	1982	34	5,453	2,199	890	0.16	0.40	0.51
	1981	29	4,846	2,395	904	0.19	0.38	0.52
	1980	29	5,119	2,460	1,033	0.20	0.42	0.61
	1979	28	3,937	2,219	888	0.23	0.40	0.55
	1978	27	3,973	1,886	851	0.21	0.45	0.61
	1977	30	4,243	2,459	1,329	0.31	0.54	0.63
	1976	24	3,501	1,976	1,226	0.35	0.62	0.67
Low-Level Waste Disposal	1986	2	996	175	31	0.03	0.18	0.05
	1985	2	1,240	252	70	0.06	0.28	0.24
	1984	2	925	297	72	0.08	0.24	0.16
	1983	1	612	358	71	0.12	0.20	0.14
	1982	1	680	251	53	0.08	0.21	0.20
Independent Spent Fuel Storage	1986	1	32	32	34	1.06	1.06	0.46
	1985	1	32	32	34	1.06	1.06	0.51
	1984	1	32	32	13	0.41	0.41	0.06
	1983	1	33	27	8	0.24	0.30	0.00
	1982	1	35	32	9	0.26	0.28	0.00
Fuel Fabrication and Processing	1986	10	8,017	3,790	466	0.06	0.12	0.01
	1985	11	8,596	5,032	643	0.07	0.13	0.05
	1984	14	9,488	5,772	818	0.09	0.14	0.04
	1983	15	9,023	5,013	835	0.09	0.17	0.19
	1982	16	9,808	5,433	831	0.08	0.15	0.20
	1981	18	10,552	5,942	940	0.09	0.16	0.09
	1980	18	10,204	5,900	1,111	0.11	0.19	0.12
	1979	21	9,946	5,365	1,268	0.13	0.24	0.16
	1978	20	11,305	6,100	1,525	0.13	0.25	0.24
	1977	21	11,496	7,004	1,725	0.15	0.25	0.34
	1976	24	11,227	5,285	1,830	0.16	0.35	0.41
Commercial Light Water Reactors***	1986	101	206,613	105,049	42,982	0.21	0.41	0.40
	1985	93	180,518**	92,141**	43,624	0.24	0.47	0.48
	1984	88	169,242**	94,996**	55,353	0.32	0.58	0.55
	1983	80	139,885**	83,546**	56,758	0.41	0.68	0.60
	1982	79	127,904**	80,871**	52,227	0.41	0.65	0.57
	1981	73	123,978**	80,664**	54,271	0.44	0.67	0.58
	1980	70	124,250**	77,903**	53,810	0.43	0.69	0.59
	1979	69	99,463**	62,316**	39,759	0.40	0.64	0.57
	1978	68	72,448**	45,474**	31,910	0.44	0.70	0.61
	1977	65	67,130**	42,867**	32,731	0.49	0.76	0.64
	1976	62	66,800	36,715	26,555	0.40	0.72	0.62
Grand Totals and Averages	1986	482	227,652	116,241	46,366	0.20	0.40	0.39
	1985	480	202,211**	104,926**	47,474	0.23	0.45	0.47
	1984	506	193,221**	108,520**	59,421	0.31	0.55	0.54
	1983	470	163,238**	96,878**	60,880	0.37	0.63	0.59
	1982	482	153,118**	94,946**	57,008	0.37	0.60	0.56
	1981	385	149,314**	94,490**	58,767	0.39	0.62	0.56
	1980	410	150,675**	92,819**	58,933	0.39	0.63	0.57
	1979	459	125,316**	76,804**	45,376	0.36	0.59	0.55
	1978	453	100,819**	60,145**	37,236	0.37	0.62	0.59
	1977	455	93,438**	58,527**	38,944	0.42	0.67	0.62
	1976	428	92,773	50,198	33,240	0.36	0.66	0.60

+These categories consist only of NRC licensees. Agreement States license organizations conducting industrial radiography, manufacturing and distribution, and low-level waste disposal in those states do not report occupational exposure data to the NRC.

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

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

***Includes all LWRs that reported, although all of them may not have been in commercial operation for a full year, and excludes the gas-cooled reactor.

values of CR should be between 0.05 and 0.50. This means that, usually, no more than 50% of the collective dose should be due to individual doses that exceed 1.5 rems. The last column in Table 3.1 shows the values of CR for the different types of licensees; one can see that each category now has a CR that is less than 0.50 and that 1986 is the second year in a row the CR for commercial LWRs and the grand total for all licensees has dropped below 0.50.

3.2 Annual Whole Body Dose Distributions

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

It should be pointed out that annual exposures that exceed five rems (cSv) are not necessarily classified as personnel overexposures. Although 1.25 rems (cSv) is the quarterly limit set forth in paragraph (a) of 10 CFR § 20.101, paragraph (b) permits licensees, under certain conditions, to allow a worker to receive a whole body dose of three rems (cSv) per calendar quarter (up to 12 rems (cSv) annually.) The conditions are that the licensee must have determined and recorded the worker's prior accumulated occupational dose to the whole body and that the worker's whole body dose when added to his accumulated occupational dose does not exceed 5(N - 18) rems (cSv), where N equals the individual's age in years. Although there is no annual limit, annual exposures that exceed 12 rems (cSv) indicate that an over exposure has occurred. Any quarterly exposure in excess of the applicable quarterly limits must be reported. A discussion of various types of occurrences in which the limits have been exceeded is given in Section 6.

A summary of the annual whole body exposures reported to the Commission by certain categories of NRC Licensees required to submit reports pursuant to 10 CFR § 20.407 is presented in Table 3.3, which shows that about 95% of the exposures have consistently remained less than two rems (cSv) since 1967. The number of individuals receiving an annual exposure in excess of five rems (cSv) has been gradually declining since 1971 and reached an all-time low of less than 0.01% in 1986.

3.3 Summary of Occupational Exposure Data by License Category

3.3.1 Industrial Radiography Licenses, Single and Multiple Locations

These licenses are issued to allow the use of sealed radioactive materials, usually in exposure devices or "cameras," that primarily emit gamma rays for nondestructive testing of pipeline weld joints, steel structures, boilers, air craft and ship parts, and other high-stress alloy parts. Some firms are licensed to conduct such activities in one location, usually in a permanent facility which was designed and shielded for radiography, and others perform radiography at multiple, temporary sites in the field. The radioisotopes most commonly used are cobalt-60 and iridium-192. As shown in Table. 3.1, annual reports were received for 335 radiography licensees in 1986, which is about the same number that has reported since 1982.

TABLE 3.2
DISTRIBUTION OF ANNUAL WHOLE BODY DOSES BY LICENSE CATEGORY
1986

LICENSE CATEGORY	*Number of Individuals with Whole Body Doses in the Ranges (rems or cSv)															TOTAL NUMBER MONI-TORED	NUMBER WITH MEAS. EXPOSURE	TOTAL COLLECTIVE DOSE (PERSON-cSv)
	No Meas-urable	Meas. <0.10	0.10-0.25	0.25-0.50	0.50-0.75	0.75-1.00	1.00-2.00	2.00-3.00	3.00-4.00	4.00-5.00	5.00-6.00	6.00-7.00	7.00-8.00	8.00-9.00	9.00-12.00	>12.0			
INDUSTRIAL RADIOGRAPHY																		
Single Location	974	261	69	33	4	3	1										1,345	371	44
Multiple Locations	1,848	2,130	772	656	346	266	420	122	34	5	7				1		6,607	4,759	2,064
Total	2,822	2,391	841	689	350	269	421	122	34	5	7				1		7,952	5,130	2,108
MANUFACTURING AND DISTRIBUTION																		
Broad	1,739	999	263	156	74	50	114	67	20	6							3,488	1,749	678
Limited	238	186	75	27	10	5	9	3	1								554	316	67
Total	1,977	1,185	338	183	84	55	123	70	21	6							4,042	2,065	745
LOW-LEVEL WASTE DISPDSAL																		
Total	821	118	21	15	16	3	2										996	175	31
INDEPENDENT SPENT FUEL STORAGE																		
Total	0	2	2	5	2	7	11	3									32	32	34
FUEL FABRICATION																		
Total	4,227	2,574	677	393	120	19	7										8,017	3,790	466
**COMMERCIAL POWER REACTORS																		
+Boiling Water	49,889	17,456	6,168	5,093	3,036	2,135	5,099	1,429	354	45							90,704	40,815	19,797
+Pressurized Water	51,675	30,523	10,428	8,280	4,822	3,069	5,599	1,244	239	30							115,909	64,234	23,185
+High Temperature Gas	221	66	4														291	70	2
Total	101,785	48,045	16,600	13,373	7,858	5,204	10,698	2,673	593	75							206,904	105,119	42,984
+GRAND TOTALS	111,632	54,315	18,479	14,658	8,430	5,557	11,262	2,868	648	86	7				1		227,943	116,311	46,368

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

TABLE 3.3
SUMMARY OF ANNUAL DOSE DISTRIBUTIONS FOR CERTAIN NRC LICENSEES

1968-1986

Year	Total Number of Monitored Persons: Reported Number	Total Number of Monitored Persons: (Corrected Number)*	Percent of Individuals With Doses <2 rems	Percent of Individuals With Doses >5 rems	Number of Individuals With Doses >12 rems
1968	36,836		97.2%	0.5%	3
1969	31,176		96.5%	0.5%	7
1970	36,164		96.1%	0.6%	0
1971	36,311		96.3%	0.7%	1
1972	44,690		95.7%	0.5%	8
1973	67,862		95.0%	0.5%	1
1974	85,097		96.4%	0.3%	1
1975	78,713		94.8%	0.5%	1
1976	92,773		95.0%	0.4%	3
1977	98,212	(93,438)	93.8%*	0.4%*	1
1978	105,893	(100,818)	94.6%*	0.2%*	3
1979	131,027	(125,316)	95.2%*	0.2%*	1
1980	159,177	(150,675)	94.6%*	0.3%*	0
1981	157,874	(149,314)	94.6%*	0.2%*	1
1982	162,456	(154,117)	94.9%*	0.1%*	0
1983	172,927	(164,239)	94.6%*	0.1%*	0
1984	204,136	(194,840)	95.9%*	0.1%*	0
1985	215,197	(204,583)	96.9%*	<0.01%*	2
1986	195,849		98.2%	<0.01%	0

* Based on the distribution of individual doses after adjusting for the multiple counting of transient reactor works (see Section 5).

Table 3.4 summarizes the reported data for the two types of radiography licenses for 1986 and for the previous two years for comparison purposes. For single location facilities, the table shows that in 1986, the number of workers receiving measurable doses (371) decreased by 42%, while the collective dose decreased from 124 to 44 person-rems (cSv), a reduction of 65%. This resulted in the average measurable dose falling from 0.20 to 0.12 rem (cSv) in 1986. The sharp reduction in the collective dose reported by the single-location facilities was primarily due to change in the status of three licensees. One licensee ceased operations, and two other licensees became licensed for radiography in multiple locations.

At firms having multiple-location licenses, the number of monitored workers decreased by 2%, and the collective dose decreased by 8%. This resulted in the average measurable dose again decreasing slightly to 0.43 rem (cSv). Overall, while the number of radiography firms remains about the same, the values of the other parameters shown in Table 3.4 have begun to decline, the average measurable dose now being about 0.4 rem(cSv). However, one notes that the average dose for workers performing radiography at a single

TABLE 3.4
ANNUAL EXPOSURE INFORMATION FOR INDUSTRIAL RADIOGRAPHERS

1984-1986

Year	Type of License	Number of Licenses	Number of Monitored Individuals	Workers with Measurable Doses	Collective Dose (person-rems or person-cSv)	Average Measurable Dose (rems or cSv)
1986	Single location	95	1,345	371	44	0.12
	Multiple locations	240	6,607	4,759	2,064	0.43
	Total	335	7,952	5,130	2,108	0.41
1985	Single location	111	1,703	635	124	0.20
	Multiple locations	229	6,773	4,915	2,250	0.46
	Total	340	8,476	5,550	2,374	0.43
1984	Single location	129	1,778	701	196	0.28
	Multiple locations	232	6,680	4,745	2,294	0.48
	Total	361	8,458	5,446	2,490	0.46

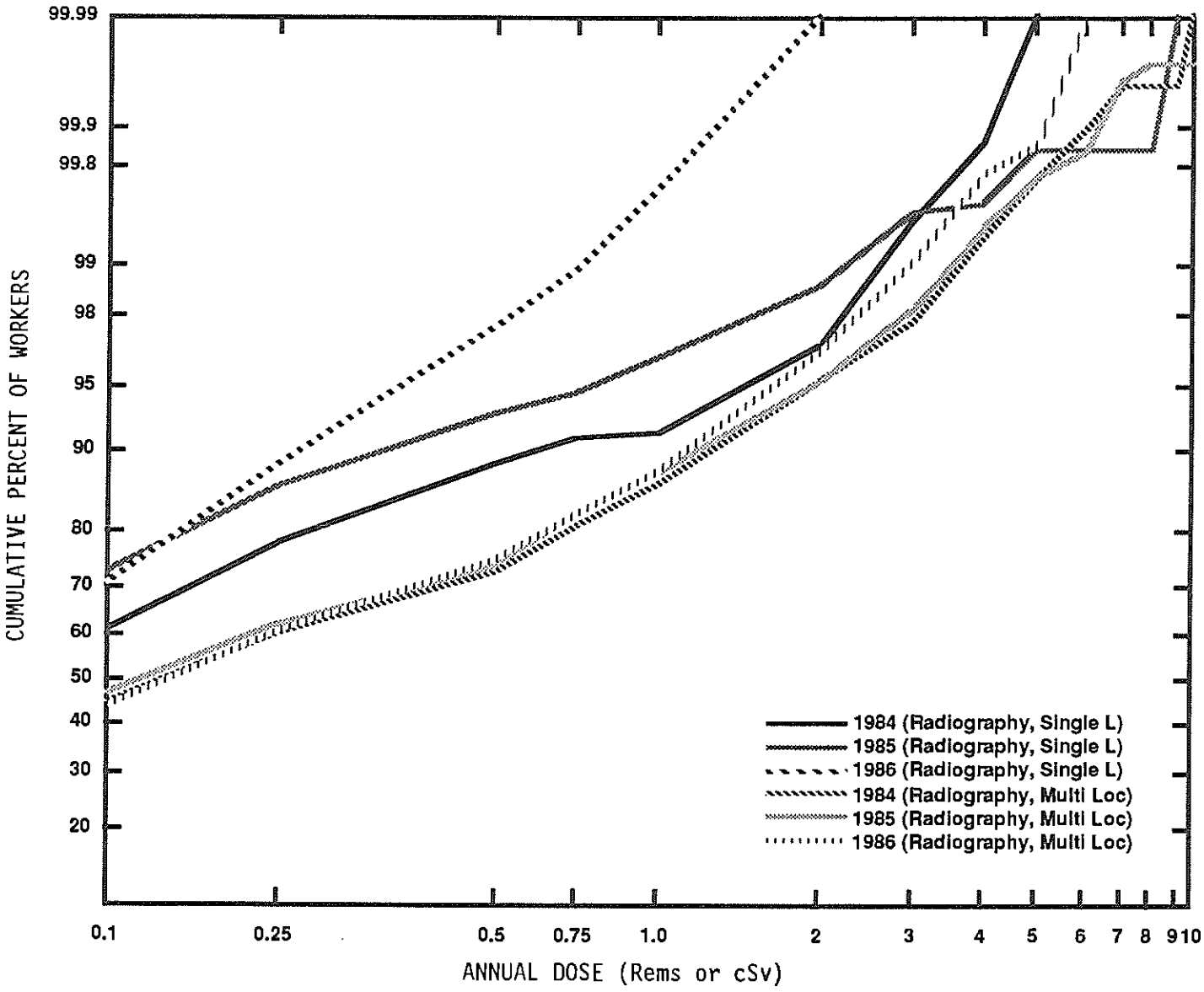
location is about one-fourth this amount. This is probably due to the fact that it is more difficult for workers to avoid exposure to radiation in the field, where conditions are not the best and may change every day. In order to see the contribution that each radiography licensee made to the total collective dose, a summary of the information reported by each of these licensees in 1986 is presented in alphabetical order in Appendix A.

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

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

FIGURE 3.1
ANNUAL DOSE DISTRIBUTION OF WORKERS
AT INDUSTRIAL RADIOGRAPHY FACILITIES

1984-1986



	AVERAGE MEAS. DOSE (Rem or cSv)		CR*	
	Single Location	Multiple Location	Single Location	Multiple Location
1984	0.28	0.48	0.42	0.46
1985	0.20	0.46	0.34	0.45
1986	0.12	0.43	0.02	0.38

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

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

Figure 3.1 displays such plots of the doses incurred by workers monitored by the two types of radiography licensees for each of the years 1984 through 1986. The plots of the dose distributions of workers at single-location radiography facilities, where the workers receive doses that are lower than those usually received by workers at multiple-location facilities, form fairly straight lines and lie above those of the multiple-location facilities.

Another feature of these types of graphs is that several comparisons of various dose distributions can be quickly made. For example, one can easily see in Figure 3.1 that in 1986, about 75% of the workers monitored by firms licensed for radiography at multiple locations received doses that were less than 0.50 rem (cSv), while some 98% of the workers monitored at single location radiography facilities received such doses. One should also note that the doses at which the 50 percentile line crosses the plot corresponds to the median dose, i.e. the dose below which half of the dose fell and above which half fell. For single location radiography, the median dose is near 0.10 rem (cSv) while for multiple locations, the median dose is considerably less.

The relative positions and curvature of the graphs are indicative of certain characteristics of the dose distributions. The positions of the 1986 plots of the dose distribution of workers at single-location facilities above that of the other plots indicate smaller values of the average doses and CR (as shown in the chart at the bottom of the graph). This is due to a sharp decrease in the number of workers with doses that exceeded 1.5 rems (cSv) in 1986 as compared to previous years. The plots of the multiple-location licensees are also moving upwards, and one finds that the average doses and values of CR exhibit a decreasing trend, overall.

The tendency of the plots to curve upward for doses greater than one rem (cSv) is typical of distributions having several workers with doses in the higher dose ranges [Refs. 10, 11], and indicates that the entire distribution is not a log-normal one. Another theoretical analysis of occupational dose distributions [Ref. 12] has found that these data may be fitted by a hybrid log-normal distribution. At low doses, this distribution is log-normal, but at higher doses, where radiation control programs very closely monitor each worker's total dose so that the frequency of doses approaching the dose limits is reduced, the distribution is normal.

3.3.2 Manufacturer and Distributor Licenses, Broad and Limited

Manufacturer and distributor licenses are issued to allow the manufacture and distribution of radionuclides in various forms for a number of diverse purposes. The products are usually distributed to persons specifically licensed by the NRC or an Agreement State. Broad licenses are issued to larger organizations who may use many different radionuclides in many different ways and who have a comprehensive radiation protection program. The Limited licenses are usually issued to smaller firms requiring a more restrictive license. Some firms are medical suppliers that process, package, or distribute such products as diagnostic test kits, radioactive surgical implants, and tagged radiochemicals for use in medical research, diagnosis, and therapy. Limited firms are suppliers of industrial radionuclides and are involved in the processing, encapsulation, packaging,

and distribution of the radionuclides that they have purchased in bulk quantities from production reactors and cyclotrons. Major products include gamma radiography sources, cobalt irradiation sources, well-logging sources, sealed sources for gauges and smoke detectors, and radiochemicals for nonmedical research. However, only those NRC licensees (about 35) that possess or use at any one time specified quantities of the nuclides listed in paragraph 20.408(a)(6) are required to submit annual (10 CFR § 20.407) and termination (10 CFR § 20.408) reports.

Table 3.5 presents the annual data that were reported by the two types of licensees for 1986 and the previous two years. The total number of workers receiving measurable doses as reported by these types of licensees decreased by about 10% to 2,065 workers in 1986 as compared to 2,250 in 1985. The collective dose remained approximately the same, causing the average dose to increase slightly to 0.36 rem (cSv). Looking at the information shown separately for the Broad and Limited licensees, one can see that the values of all of the parameters remain higher for the Broad licensees, probably because this type of license allows the possession of larger quantities of radioactive materials than do the Limited licenses. However, when attempting to examine trends in the data presented for this category of licensees, one should note that the types and quantities of radionuclides may fluctuate from year to year, and even during the year, so that some licensees may report dose data one year and not the next and may be included as a Broad licensee one year and an Limited licensee at other times. Since

TABLE 3.5
ANNUAL EXPOSURE INFORMATION FOR MANUFACTURERS AND DISTRIBUTORS

1984-1986

Year	Type of License	Number of Licenses	Number of Monitored Individuals	Workers with Measurable Doses	Collective Dose (person-rems or person-cSv)	Average Measurable Dose (rems or cSv)
1986	M & D-Broad	11	3,488	1,749	678	0.39
	M & D-Limited	22	554	316	67	0.21
	Total	33	4,042	2,065	745	0.36
1985	M & D-Broad	12	3,460	1,967	668	0.34
	M & D-Limited	21	498	283	87	0.31
	Total	33	3,958	2,250	755	0.34
1984	M & D-Broad	13	4,625	1,716	594	0.35
	M & D-Limited*	27	451	261	77	0.29
	Total*	40	5,076	1,977	671	0.34

* The figures for 1984 were corrected to include data for two licensees that had been erroneously excluded from this category.

the number of reporting licensees is quite small, these fluctuations may have a significant impact on the values of the parameters.

In order to see the contribution that each of these licensees made toward the total values of the number of persons monitored, number of workers, and collective dose, Appendix A lists the values of these parameters for each licensee in alphabetical order by licensee name for 1986.

Figure 3.2 displays log probability plots of the doses incurred by workers under the two types of manufacturing and distribution licenses for the years 1984 through 1986. The position of the curves plotted for the Limited licenses above those plotted for the Broad licenses indicates that a larger portion of the workers reported by the Limited licensees have lower doses than those reported by the Broad licensees. For example, the graphs show that about 90% of workers monitored by the broad licensees received doses that were less than one rem (cSv), while about 96% of the workers monitored by the Limited licensees received such doses in 1986. The value of CR reported for the Limited scope licensees dropped to 0.27 from last year's value of 0.49 primarily due to a considerable reduction at one facility in the number of workers receiving doses in excess of 1.5 rems.

3.3.3 Low-Level Waste Disposal Licenses

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

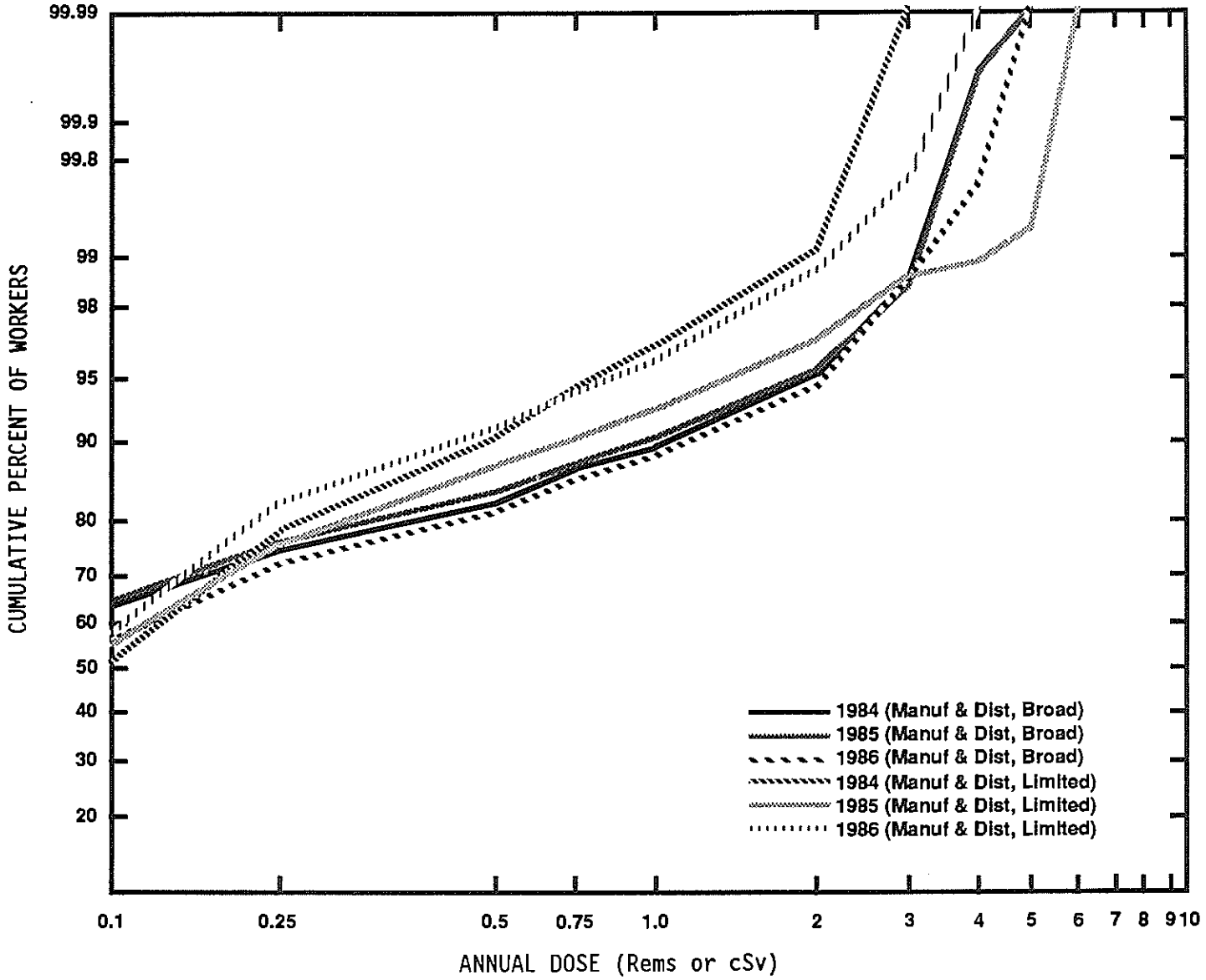
The requirement for this category of NRC licensee to file annual reports became effective in January 1983. While in 1982 and 1983 there was only one licensee in this category, there have been two licensees in this category since 1984. Table 3.1 summarizes the data reported for 1982 through 1986.

In 1986, the total number of monitored individuals declined from 1,240 to 996 individuals, a 24% decrease. The collective dose decreased even more, dropping from 70 to 31 person-rem (-cSv). The average measurable dose was also reduced from 0.28 person-rem (-cSv) by 55% to a value of 0.18 person-rem (-cSv).

Figure 3.3 displays log probability plots of the doses incurred by workers at the low-level waste disposal facilities from 1984 through 1986. One can quickly see that the distributions are quite similar, with all of the doses being two rems (cSv) or less, and at least 96% of the doses being less than one rem (cSv) each year. The position of the plot for 1986 above that of the others is indicative of the decreases in the average dose and CR. Appendix A summarizes the exposure information reported by these two licensees in 1986.

FIGURE 3.2
ANNUAL DOSE DISTRIBUTION OF WORKERS
AT MANUFACTURING AND DISTRIBUTION FACILITIES

1984-1986



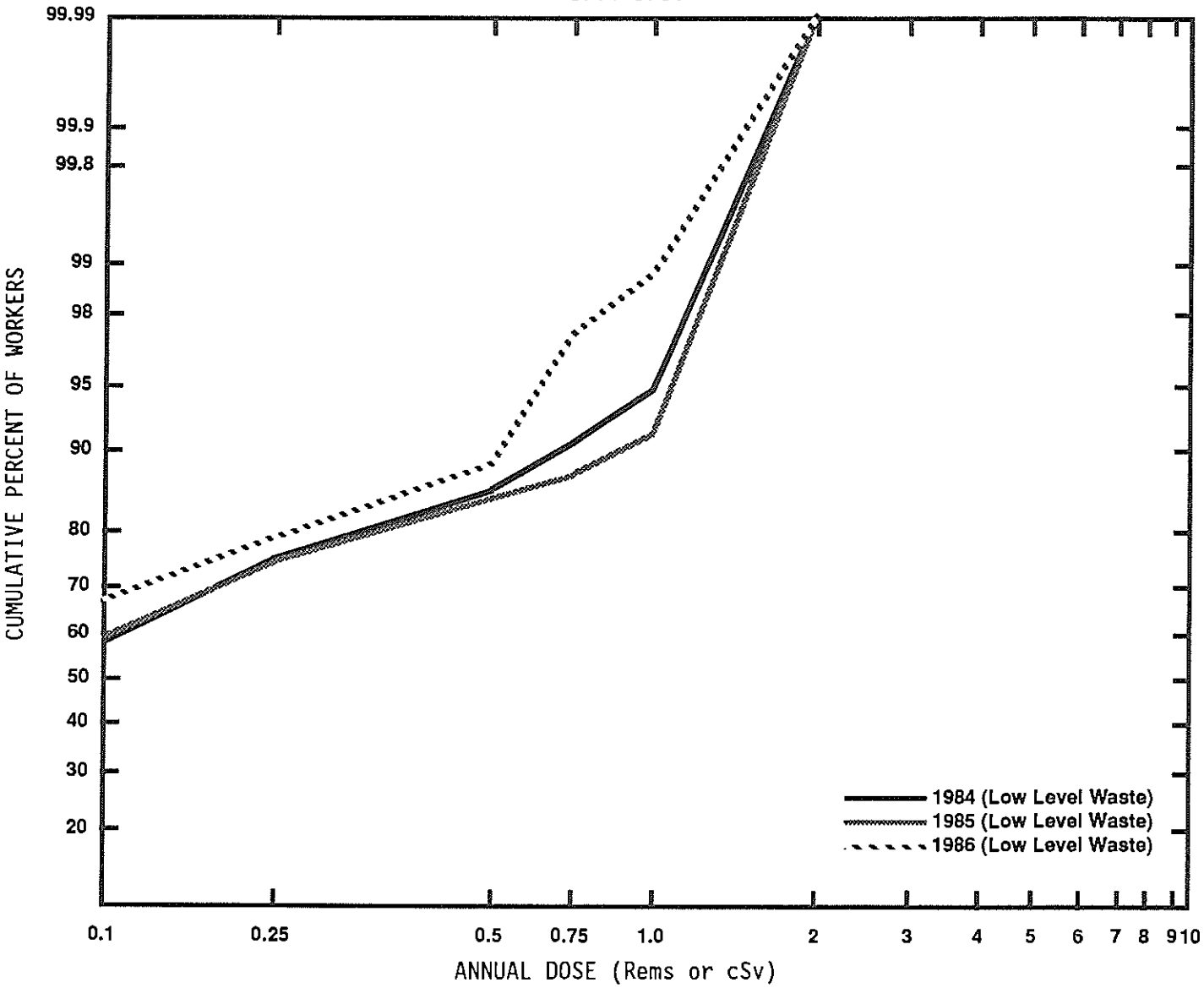
	AVERAGE MEAS. DOSE (Rem or cSv)		CR*	
	Broad	Limited	Broad	Limited
1984	0.35	0.29	0.48	0.34
1985	0.34	0.31	0.50	0.49
1986	0.39	0.21	0.52	0.27

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

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

FIGURE 3.3
ANNUAL DOSE DISTRIBUTION OF WORKERS
AT LOW-LEVEL WASTE DISPOSAL FACILITIES

1984-1986



	AVERAGE MEAS. DOSE (Rem or cSv)	CR*
1984	0.24	0.16
1985	0.28	0.24
1986	0.18	0.05

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

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

3.3.4 Independent Spent Fuel Storage Installation Licenses

These licenses are issued to allow the possession of power reactor spent fuel and other associated radioactive materials for the purpose of storage of such fuel in an independent spent fuel storage installation (ISFSI). Here, the spent fuel, which has undergone at least one year of decay since being used as a source of energy in a power reactor, is provided interim storage, protection, and safeguarding for a limited time pending its ultimate disposal. Presently, there is only one license for a facility that is not located at a nuclear power plant. Two other licenses have been issued to nuclear power utilities and any doses due to the storage of spent fuel are included in the annual dose report submitted for the utilities' nuclear power plants.

Table 3.1 summarizes the data submitted for 1982 through 1986 by the only ISFSI that is separate from a nuclear power plant. Only 32 individuals have been monitored at the facility for the past three years. For the last two years, the collective dose has remained at 34 person-rems (person-cSv), and the number of workers receiving measurable dose has remained at 32, causing the average dose to also remain at the 1985 value of 1.06 rems (cSv). A contributing factor to this high average dose is that the licensee reports the doses of only those workers required to be monitored for exposure to radiation, unlike most other licensees which report the doses of all individuals for whom monitoring was provided. This has a tendency to result in the calculation of a higher average dose.

Figure 3.4 displays log probability plots of the doses incurred by workers at the ISFSI for the years 1984 through 1986. The position of the plots of the 1985 and 1986 data considerably below that of the previous year indicates more doses in the higher ranges. This is also reflected in the significant increase in CR since 1984. However, the figure shows that all doses remained less than 3 rems (cSv). Appendix A summarizes the exposure information reported by this installation in 1986.

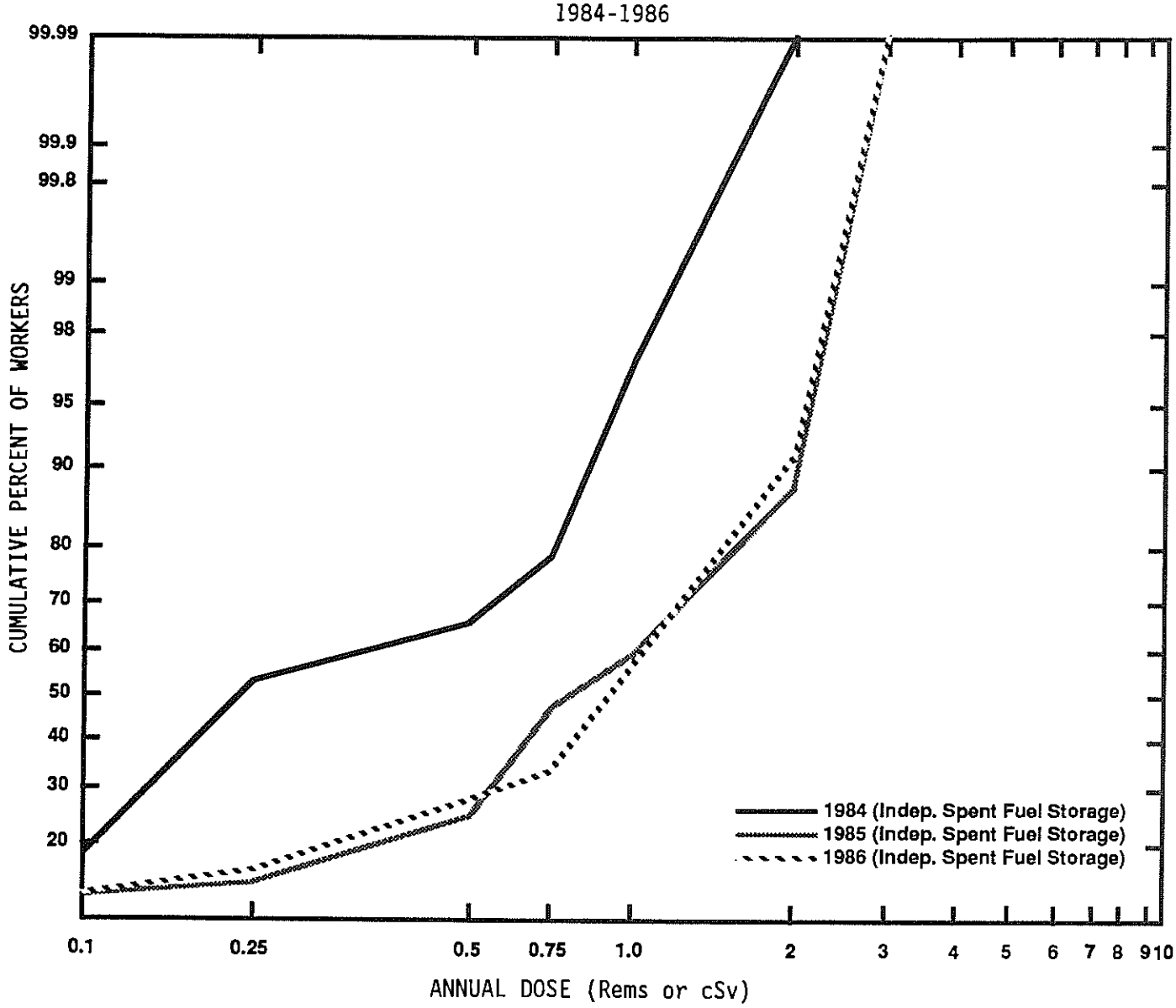
3.3.5 Fuel Fabrication and Reprocessing Licenses

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

The number of facilities licensed by the NRC to fabricate fuel, especially plutonium fuel, has been decreasing for the last several years (Table 3.1). A number of licensees began decontamination and decommissioning of their plutonium facilities, and for several years, the data for these licensees was shown in the "Decommissioning" category in Table 3.6. Since these facilities have ceased to fabricate plutonium fuel, they are not required to

FIGURE 3.4
ANNUAL DOSE DISTRIBUTION OF WORKERS
AT INDEPENDENT SPENT FUEL STORAGE FACILITIES

1984-1986



	AVERAGE MEAS. DOSE (Rem or cSv)	CR*
1984	0.41	0.06
1985	1.06	0.51
1986	1.06	0.46

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

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

TABLE 3.6
ANNUAL EXPOSURE INFORMATION FOR FUEL FABRICATORS
1984-1986

Year	Type of License	Number of Licenses	Number of Monitored Individuals	Workers with Measurable Doses	Collective Dose (person-rems or person-cSv)	Average Measurable Dose (rems or cSv)
1986	Uranium Fuel Fab	10	8,077	3,790	466	0.12
1985	Uranium Fuel Fab	10	7,777	4,732	575	0.12
	Pu Decommissioning	1	819	300	68	0.23
	Total	11	8,596	5,032	643	0.13
1984	Uranium Fuel Fab	11	9,379	5,947	815	0.14
	Pu Decommissioning	3	109	25	3	0.12
	Total	14	9,488	5,772	818	0.14

file annual reports and are no longer shown in the tables.

Table 3.6 shows that in 1986 the number of licensees involved in uranium fuel fabrication is now 10 and that the collective dose decreased by 19%, from 643 to 466 person-rems (cSv). Appendix A lists alphabetically each of the ten licensees reporting in 1986, with the number of persons monitored, the number of workers receiving measurable doses, and the collective dose for each licensee.

Figure 3.5 consists of the log-normal plots of the dose distributions of workers at fuel fabrication facilities for the years 1984 through 1986. The plots for 1985 and 1986 are quite similar, with all doses being less than three rems (cSv) and about 99% of the doses being less than 0.75 rem (cSv) each year. This is evident from the small average measurable doses to external radiation and the extremely small values for CR.

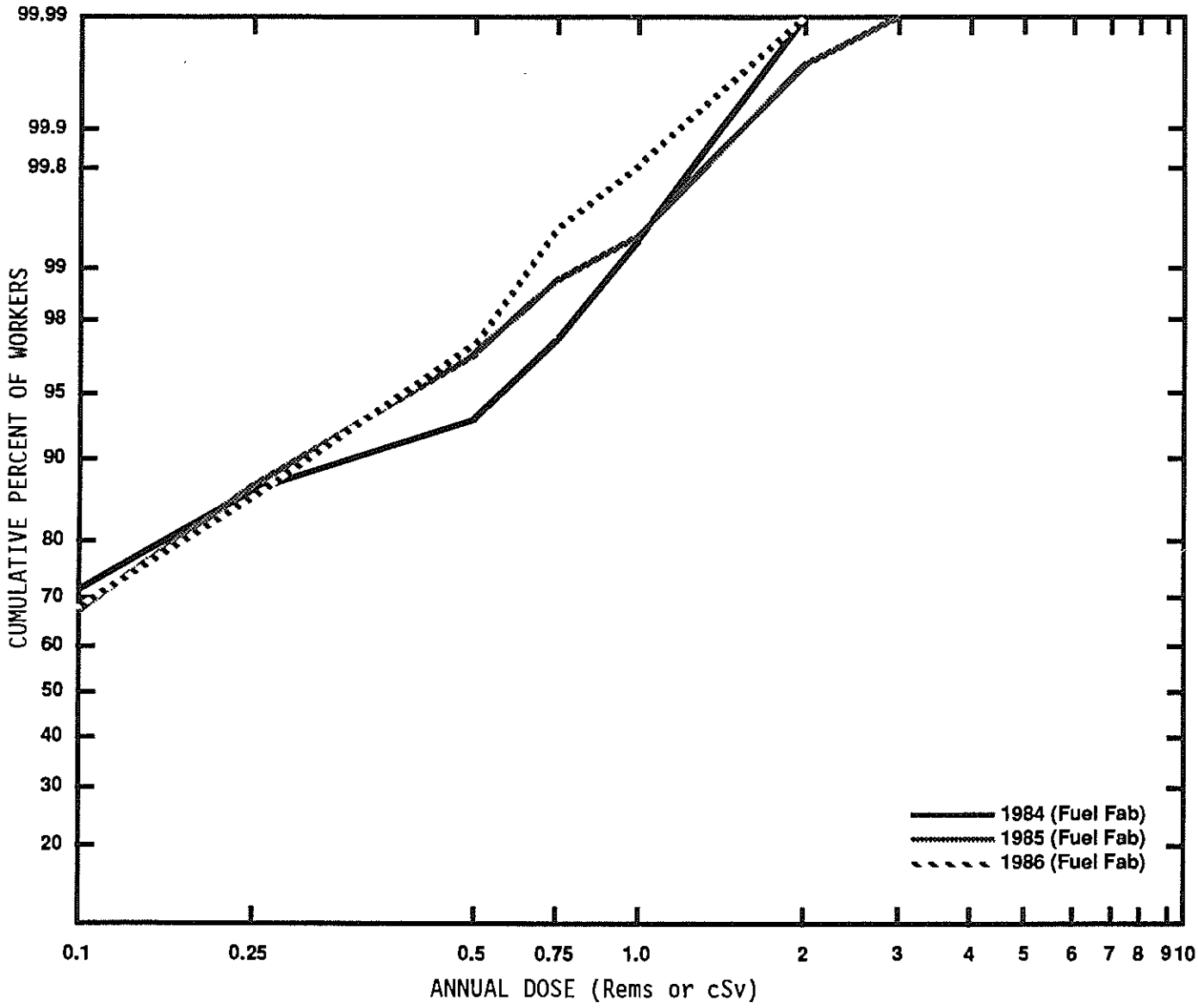
Fuel reprocessing licenses are issued to allow the separation of usable uranium and plutonium from spent nuclear fuel. There was only one commercial facility that was ever licensed to reprocess fuel, and it has been shut down since 1972. However, the licensee did some decontamination work and stored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

3.3.6 Light Water-Cooled Power Reactor (LWR) Licenses

These licenses are issued to utilities to allow them to use special nuclear

FIGURE 3.5
ANNUAL DOSE DISTRIBUTION OF WORKERS
AT FUEL FABRICATORS AND PROCESSORS

1984-1986



	AVERAGE MEAS. DOSE (Rem or cSv)	CR*
1984	0.14	0.04
1985	0.13	0.05
1986	0.12	0.01

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

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

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

As shown in Table 3.1, annual reports were received from nuclear power facilities for 101 licensed LWRs where 206,613 individuals were monitored for exposure to radiation in 1986. Of this number, 105,049 workers received a measurable dose and incurred a collective dose of 42,982 person-rems (person-cSv). This is about the same as the collective dose reported for 1985. However, the number of workers has continued to increase somewhat. This has resulted in the average measurable dose continuing to decrease to an all-time low of 0.41 rem (cSv) in 1986. The dose distribution of workers monitored at each plant site is presented in alphabetical order by site name in Appendix B.

Figure 3.6 presents the log-normal plot of the distribution of the whole body doses received by radiation workers at nuclear power facilities for the years 1984, 1985, and 1986. The higher position of the plots of the 1985 and 1986 data indicates that a smaller portion of doses were distributed in the higher ranges. For example, in 1984 about 78% of the workers receiving measurable doses at BWRs received doses that were less than one rem (cSv), but in 1985 and 1986 about 82% of such workers at BWRs received doses of less than one rem (cSv). The plots for the PWRs showed a similar shift. The graph also shows that the median dose has been decreasing and is now near 0.1 rem (cSv) for PWRs and 0.2 rem (cSv) for BWRs. The position of the BWR plots below those of the PWRs each year indicates that higher average doses were received at BWRs. Also, departures from a straight line for doses that exceed one rem are again seen, and, according to the hybrid log-normal method [Ref. 12] of analyzing these dose distributions, the sharpness of the departure indicates that a strong feedback mechanism operates when workers begin to incur larger doses and may reflect efforts to keep doses as low as reasonably achievable [Ref. 13].

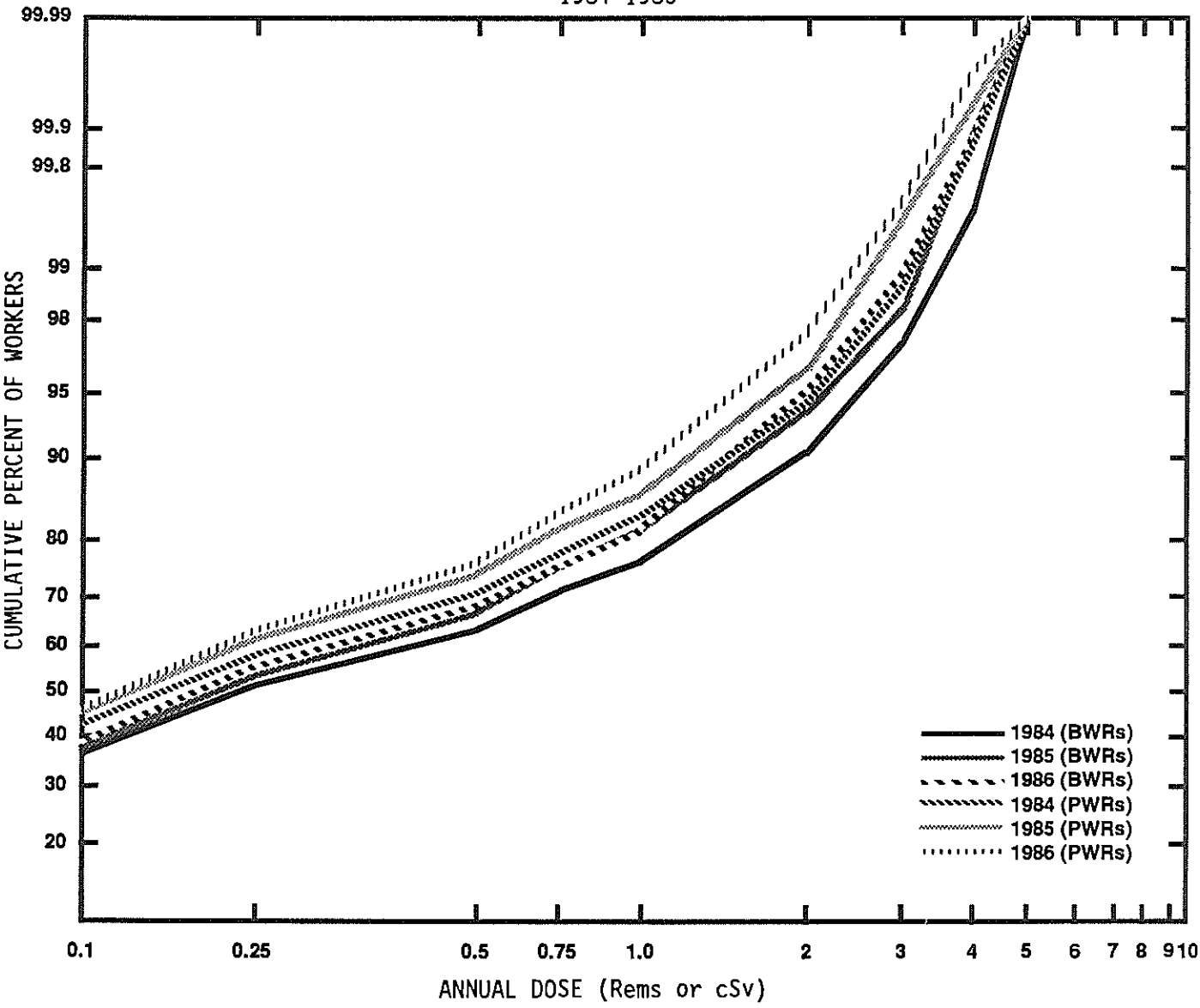
Listed at the bottom of the figure are the values of the average measurable dose and of CR for the last three years. These data show that both parameters continue to be larger at BWRs, but that both types of reactors showed a significant decrease during 1985 in these values, and have continued the decreasing trend in 1986. The portion of the collective dose due to doses greater than 1.5 rems (cSv) in 1986 diminished to 36% at PWRs and 45% at BWRs, and the average doses fell to 0.36 rem (cSv) and 0.49 rem (cSv) at PWRs and BWRs, respectively. More detailed presentations and analyses of the annual exposure information reported by nuclear power facilities can be found in Section 4.

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

A license to operate a power reactor is issued to utilities to allow them to use special nuclear material in a reactor to produce heat to generate electricity to be sold to consumers. In this type of a reactor, a gas, usually helium, is used as the primary coolant. Fort St. Vrain near Greeley, Colorado, was the only such reactor in operation in the U.S. in 1986. As shown in Table 3.7, annual whole body doses incurred by workers at the plant have been minimal. No one exceeded an annual dose of 0.25 rem

FIGURE 3.6
ANNUAL DOSE DISTRIBUTION OF WORKERS
AT LIGHT WATER REACTOR FACILITIES

1984-1986



	AVERAGE MEAS. DOSE (Rem or cSv)		CR*	
	BWRs	PWRs	BWRs	PWRs
1984	0.66	0.49	0.57	0.48
1985	0.53	0.30	0.47	0.40
1986	0.49	0.36	0.45	0.36

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

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

TABLE 3.7
ANNUAL EXPOSURE INFORMATION FOR FORT ST. VRAIN

1974-1986

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

(cSv) until 1985 when the highest annual dose was between 1 and 2 rems (cSv). In 1986 the average dose per worker dropped back down to 0.03 rem (cSv) along with a large decrease in the number of workers at the site. The reactor has not operated near full power for significant periods of time since July, 1984, with most of the collective dose in 1985 resulting from maintenance activities. These activities resulted in the largest collective and average annual doses in the history of the plant, though these figures still remain much smaller than for PWRs and BWRs.

4 COMMERCIAL LIGHT WATER REACTORS - FURTHER ANALYSIS

4.1 Introduction

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

4.2 Definitions of Terms and Sources of Data

4.2.1 Number of Reactors

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

4.2.2 Electric Energy Generated

The electric energy generated in gross megawatt-years (MW-yr) each year by each facility is shown in Appendix C and graphically represented in Appendix E. This number was obtained by dividing the gross megawatt-hours of electricity annually produced by each facility by 8,760, the number of hours in the year, except for leap years when the number is 8,784 hours. The gross megawatt-years of generated electricity that are presented in Tables 4.1, 4.2, and 4.3 are the sums of that produced by the number of reactors included in each year. These sums are divided by the number of those reactors included in each year to yield the average amount of electric energy generated (MW-yr) per reactor, which is also shown in Tables 4.1, 4.2, and 4.3. The number of gross megawatt-hours of electricity produced each year was also found in Reference 14.

4.2.3 Collective Dose per Megawatt-Year

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

TABLE 4.1

SUMMARY OF ANNUAL INFORMATION REPORTED BY COMMERCIAL BOILING WATER REACTORS†

1973-1986

Year	Number of Reactors Included	Annual Collective Doses (person-rems or person-cSv)	No. of Workers With Measurable Doses	Gross Electricity Generated (MW-yr)	Average Dose Per Worker (rems or cSv)	Average Collective Dose Per Reactor (person-rems or person-cSv)	Average No. Personnel With Measurable Doses Per Reactor	Average Collective Dose per MW-yr	Average Electricity Generated Per Reactor (MW-yr)	Average Maximum Dependable Capacity Net (MWe)
1973	12	4,564	5,340	3,394	0.85	380	445	1.3	283	459
1974	14	7,095	8,769	4,059	0.81	507	626	1.7	290	513
1975	18	12,611	14,607	5,786	0.86	701	812	2.2	321	611
1976	23	12,626	17,859	8,586	0.71	549	776	1.5	373	647
1977	23	19,042	21,388	9,098	0.89	828	930	2.1	396	645
1978	25	15,096	20,278	11,774	0.74	604	811	1.3	471	668
1979	25	18,322	25,245	11,671	0.73	733	1,010	1.6	467	669
1980	26	29,530	34,094	10,868	0.87	1,136	1,311	2.7	418	664
1981	26	25,471	34,832	10,899	0.73	980	1,340	2.3	419	674
1982	26	24,437	32,235	10,665	0.76	940	1,240	2.3	410	674
1983	26	27,455	33,473	9,730	0.82	1,056	1,287	2.8	374	675
1984	27*	27,074	41,105	9,963	0.66	1,003	1,522	2.7	369	722
1985	28**	20,572	38,237	11,461	0.54	735	1,366	1.8	409	766
1986	30	19,515	37,928	11,055	0.51	651	1,264	1.8	369	786

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

*In 1984 it was decided that Humboldt Bay, a plant that has been shut down since 7/76, would not be put in commercial operation again, and it is no longer included in the count of reactors.

**In 1985 it was decided that Dresden 1, a plant that has been shut down since 10/78, would not be put in commercial operation again, and it is no longer included in the count of reactors.

TABLE 4.2

SUMMARY OF ANNUAL INFORMATION REPORTED BY COMMERCIAL PRESSURIZED WATER REACTORS†

1973-1986

Year	Number of Reactors Included	Annual Collective Doses (person-rems or person-cSv)	No. of Workers With Measurable Doses	Gross Electricity Generated (MW-yr)	Average Dose Per Worker (rems or cSv)	Average Collective Dose Per Reactor (person-rems or person-cSv)	Average No. Personnel With Measurable Doses Per Reactor	Average Collective Doses per MW-yr	Average Electricity Generated Per Reactor (MW-yr)	Average Maximum Dependabl Capacity Net (MWe)
1973	12	9,399	9,440	3,770	1.00	783	787	2.5	314	533
1974	20	6,627	9,697	6,824	0.68	331	485	1.0	341	619
1975	26	8,268	10,884	11,983	0.76	318	419	0.7	461	643
1976	30	13,807	17,588	13,325	0.79	460	586	1.0	444	675
1977	34	13,469	20,878	17,346	0.65	396	614	0.8	510	699
1978	39	16,713	25,720	19,840	0.65	429	659	0.8	509	723
1979	42	21,659	38,877	18,249	0.56	516	924	1.2	434	729
1980	42	24,266	46,237	18,287	0.52	578	1,101	1.3	435	721
1981	44	28,671	47,351	20,552	0.61	652	1,076	1.4	467	745
1982	48	27,753	52,147	22,141	0.53	578	1,086	1.3	461	773
1983	49	29,016	52,173	23,196	0.56	592	1,065	1.3	473	778
1984	51	28,140	56,987	26,478	0.49	552	1,117	1.1	519	805
1985	54*	22,470	54,634	30,140	0.41	416	1,012	0.7	558	826
1986	59	23,008	62,994	32,743	0.37	390	1,068	0.7	555	835

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

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

TABLE 4.3

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

1973-1986

Year	Number of Reactors Included	Annual Collective Doses (person-rems or person-cSv)	No. of Workers With Measurable Doses	Gross Electricity Generated (MW-yr)	Average Dose Per Worker (rems or cSv)	Average Collective Dose Per Reactor (person-rems or person-cSv)	Average No. Personnel With Measurable Doses Per Reactor	Average Collective Dose per MW-yr	Average Electricity Generated Per Reactor (MW-yr)	Average Maximum Dependable Capacity Net (MWe)
1973	24	13,963	14,780	7,164	0.94	582	616	1.9	299	496
1974	34	13,722	18,466	10,883	0.74	404	543	1.3	320	575
1975	44	20,879	25,489	17,769	0.82	475	579	1.2	404	630
1976	53	26,433	35,447	21,911	0.75	499	669	1.2	413	663
1977	57	32,511	42,266	26,444	0.77	570	742	1.2	462	677
1978	64	31,809	45,998	31,614	0.69	497	719	1.0	494	702
1979	67	39,981	64,122	29,920	0.62	597	956	1.3	447	705
1980	68	53,796	80,331	29,155	0.67	791	1,181	1.8	429	699
1981	70	54,142	82,183	31,451	0.66	773	1,174	1.7	449	719
1982	74	52,190	84,382	32,795	0.62	705	1,139	1.6	443	738
1983	75	56,471	85,646	32,926	0.66	753	1,142	1.7	439	742
1984	78*	55,214	98,092	36,441	0.56	708	1,258	1.5	467	776
1985	82**	43,042	92,871	41,601	0.46	525	1,132	1.0	507	806
1986	89	42,523	100,922	43,798	0.42	478	1,134	1.0	492	818

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

*In 1984 it was decided that Humboldt Bay and Indian Point 1 would not be put in commercial operation again, and they are no longer included in the count of reactors.

**In 1985 it was decided that Dresden 1, a plant that has been shut down since 10/78, would not be put in commercial operation again, and it is no longer included in the count of reactors.

4.2.4 Average Maximum Dependable Capacity

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

4.3 Annual Whole Body Dose Distributions

Table 4.4 summarizes the distribution of the annual whole body doses received by workers at all commercial LWRs during each of the years 1973 through 1986. This distribution is the sum of the annual dose distributions reported by each licensed LWR each year. As previously mentioned, the distribution reported by each LWR site for 1986 is shown in Appendix B. The table shows that the number of monitored individuals continues to increase somewhat while the collective dose, after leveling off for a couple of years, declined sharply in 1985 and has continued this decline in 1986. The values of CR show that the fraction of the collective dose due to individual doses greater than 1.5 rems (cSv), also decreased, falling to a value of 0.40, less than 0.50 for the second year in a row. However, the distribution shown in Table 4.4 for 1986 has not been corrected for the number of individuals that may have been reported by more than one site (see Section 5) and the corrected value of CR would probably be slightly higher. Appendix F provides uncorrected dose distributions for BWRs and PWRs separately for the years 1981 through 1986.

4.4 Average Annual Whole Body Doses

Some of the data presented in Tables 4.1, 4.2, and 4.3 are graphically displayed in Figure 4.1, where it can be seen that the average collective dose and average number of workers per BWR have been higher than those for PWRs since 1974 and that the values of both parameters, in general, continued to rise at both types of facilities until 1983. At that time, the average collective dose per reactor appeared to begin leveling off or decreasing slightly. After a sharp decrease in 1985, the collective dose has resumed the more moderate decreasing trend in 1986 with collective doses per reactor of 651 person-rem (-cSv) and 390 person-rem (-cSv) at BWRs and PWRs, respectively. However, the number of workers per reactor has remained at about 1300 for BWRs and 1100 for PWRs since 1980.

Figures 4.2 and 4.3 are plots of most of the other information that is given in Tables 4.1, 4.2, and 4.3. The values of all of the parameters plotted, except for the electricity generated and the number of workers per reactor, decreased from last year's values. These figures, and the fluctuations in the parameters for the years following the accident at the Three Mile Island plant in 1979, may reflect some of the impact that this incident had on the nuclear power industry. The recent reversal in dose trends may be attributable to several factors. Utilities have completed most of the tasks initiated as a result of the lessons learned from the Three Mile Island accident and they are increasing efforts to avoid and reduce exposure. The

TABLE 4.4

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

1973 - 1986

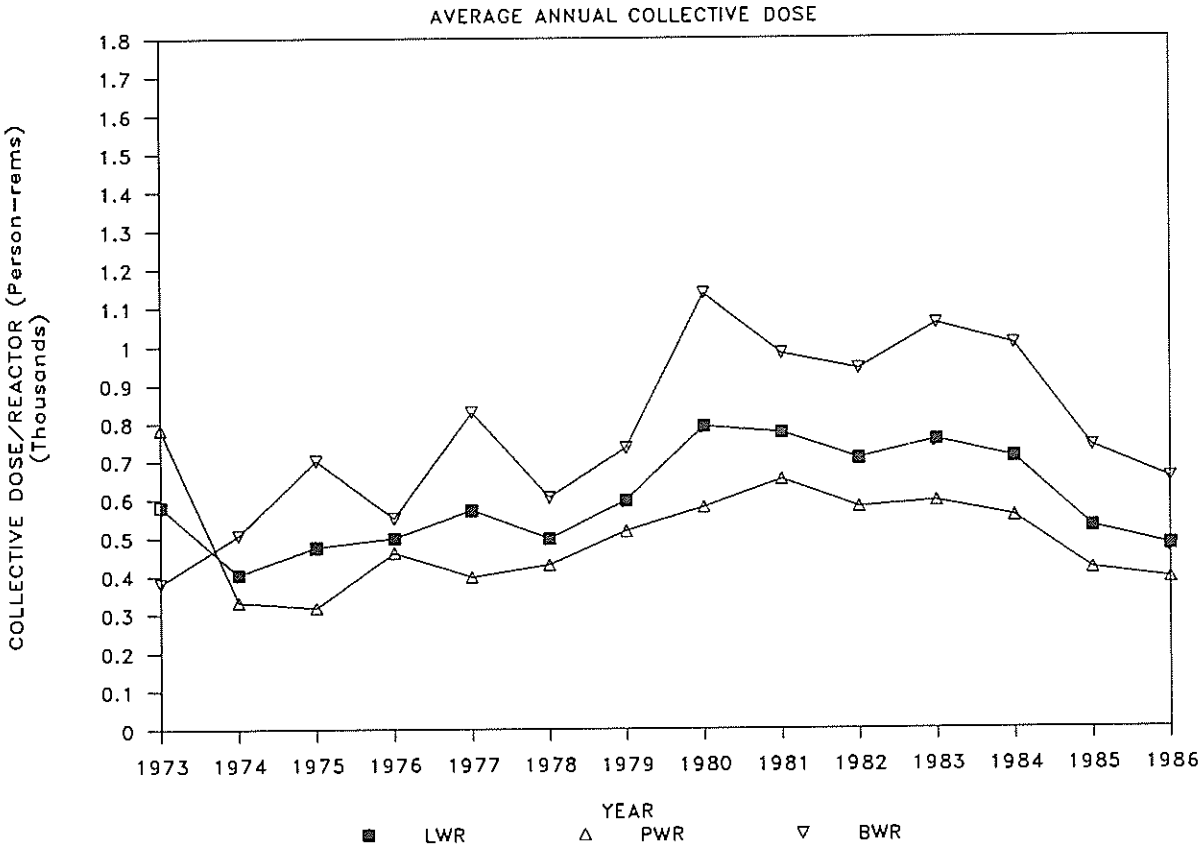
Year	Number of Individuals with Whole Body Doses in the Ranges (rems or cSv)																	Total Number Monitored	Number with Measurable Exposure	**Collective Dose (person-rems or cSv)	CR***
	No Meas'ble Exposure	Meas'ble <0.10	0.10-0.25	0.25-0.50	0.50-0.75	0.75-1.0	1.0-2.0	2.0-3.0	3.0-4.0	4.0-5.0	5.0-6.0	6.0-7.0	7.0-8.0	8.0-9.0	9.0-10.0	10.0-12.0	>12.0				
1973	19,043	5,494	1,698	1,214	740	652	2,468	1,584	422	251	125	71	38	16	7			33,823	14,780	13,963	0.72
1974	20,472	6,735	2,887	2,056	1,182	906	2,503	1,378	471	226	86	30	6					38,938	18,466	13,722	0.63
1975	18,854	8,841	3,674	2,750	1,685	1,339	3,948	1,872	691	423	169	60	24	12	0	1		44,343	25,489	20,879	0.65
1976	25,704	12,821	5,130	4,135	2,520	2,030	4,880	2,354	789	487	188	70	26	11	5	1		61,151	35,447	26,433	0.62
1977	23,502	12,395	6,030	4,518	2,890	2,220	5,649	2,856	1,288	661	186	89	47	23	6			62,360	38,858	32,511	0.64
1978	28,372	15,101	6,342	4,998	3,088	2,247	5,995	3,034	1,197	514	109	37	9	0	1	0	2	71,046	42,674	31,804	0.61
1979	39,434	22,711	9,020	7,400	4,755	3,206	7,536	3,403	1,404	545	117	42	17	3	0	1		99,594	60,160	39,981	0.57
1980	44,703	26,903	10,676	8,904	5,570	4,134	10,671	4,607	1,816	831	235	119	29	7	1			119,206	74,503	53,796	0.59
1981	39,245	26,836	11,226	9,330	6,042	4,497	11,170	4,811	1,999	585	122	96	11	3	1	0	1	115,975	76,730	54,142	0.58
1982	41,713	29,226	11,713	9,903	6,229	4,420	10,220	4,716	2,066	596	97	31	5	0	1	1		120,937	79,224	52,190	0.57
1983	48,545	29,774	11,413	9,522	5,998	4,366	11,553	5,390	2,276	716	121	38	8	2				129,722	81,177	57,212	0.60
1984	55,606	37,723	13,936	10,734	6,689	5,061	12,026	5,364	2,153	485	52	19						149,848	94,252	57,487	0.55
1985	64,470	39,991	14,115	11,978	7,214	4,897	10,557	3,317	716	84								157,339	92,869	43,042	0.44
1986	73,597	44,829	15,996	13,122	7,780	5,179	10,678	2,670	593	75								174,519	100,922	42,523	0.40

*Summary of reports submitted in accordance with 10 CFR 20.407 by plants that had been in commercial operation for at least one full year as of December 31 of each of the indicated years. Figures shown for the years 1977-1984 have been adjusted for the muliple reporting of transient individuals (see Section 5).

**Not all plants' collective dose and no values of CR were reported by the utilities; they were calculated by the NRC staff using methods described in this document.

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

FIGURE 4.1
AVERAGE COLLECTIVE DOSE AND NUMBER OF WORKERS PER REACTOR
1973 - 1986



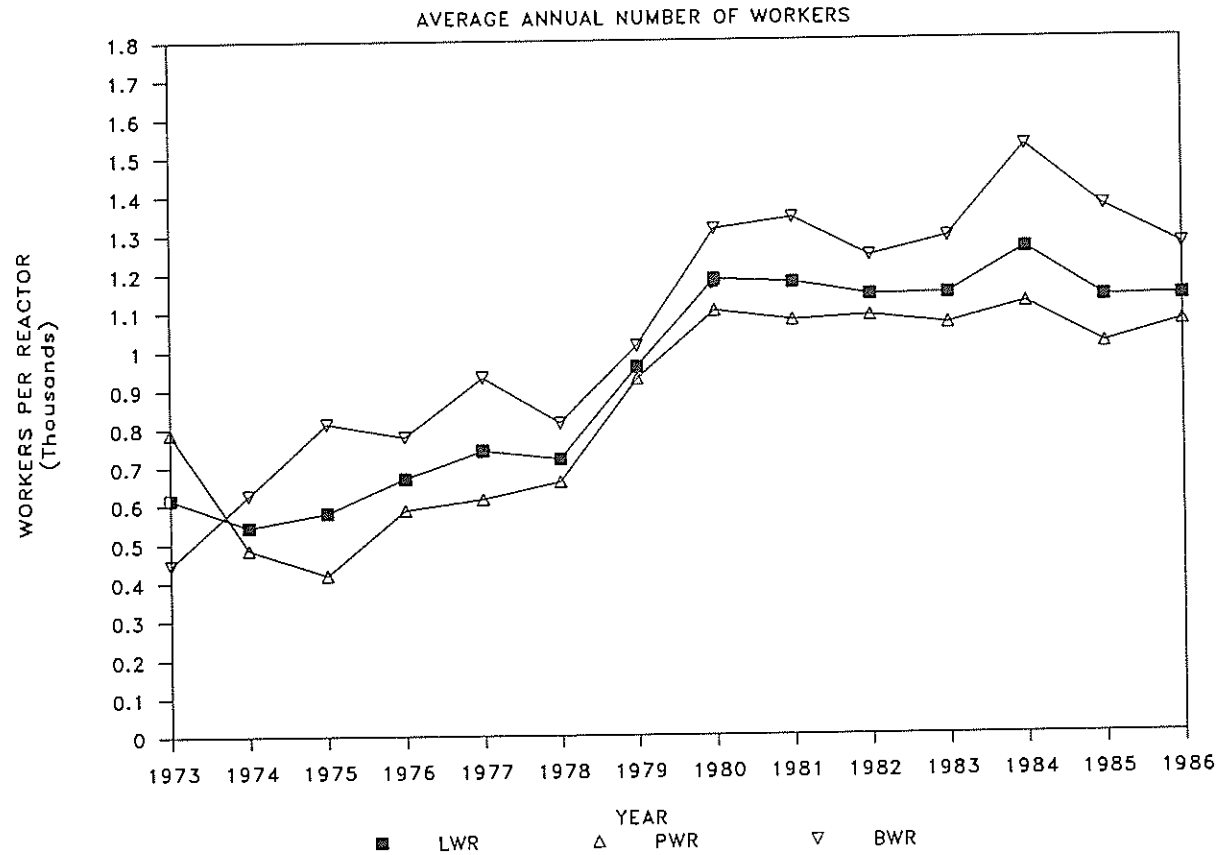


FIGURE 4.2
ANNUAL VALUES AT BWRs AND PWRs
1973 - 1986

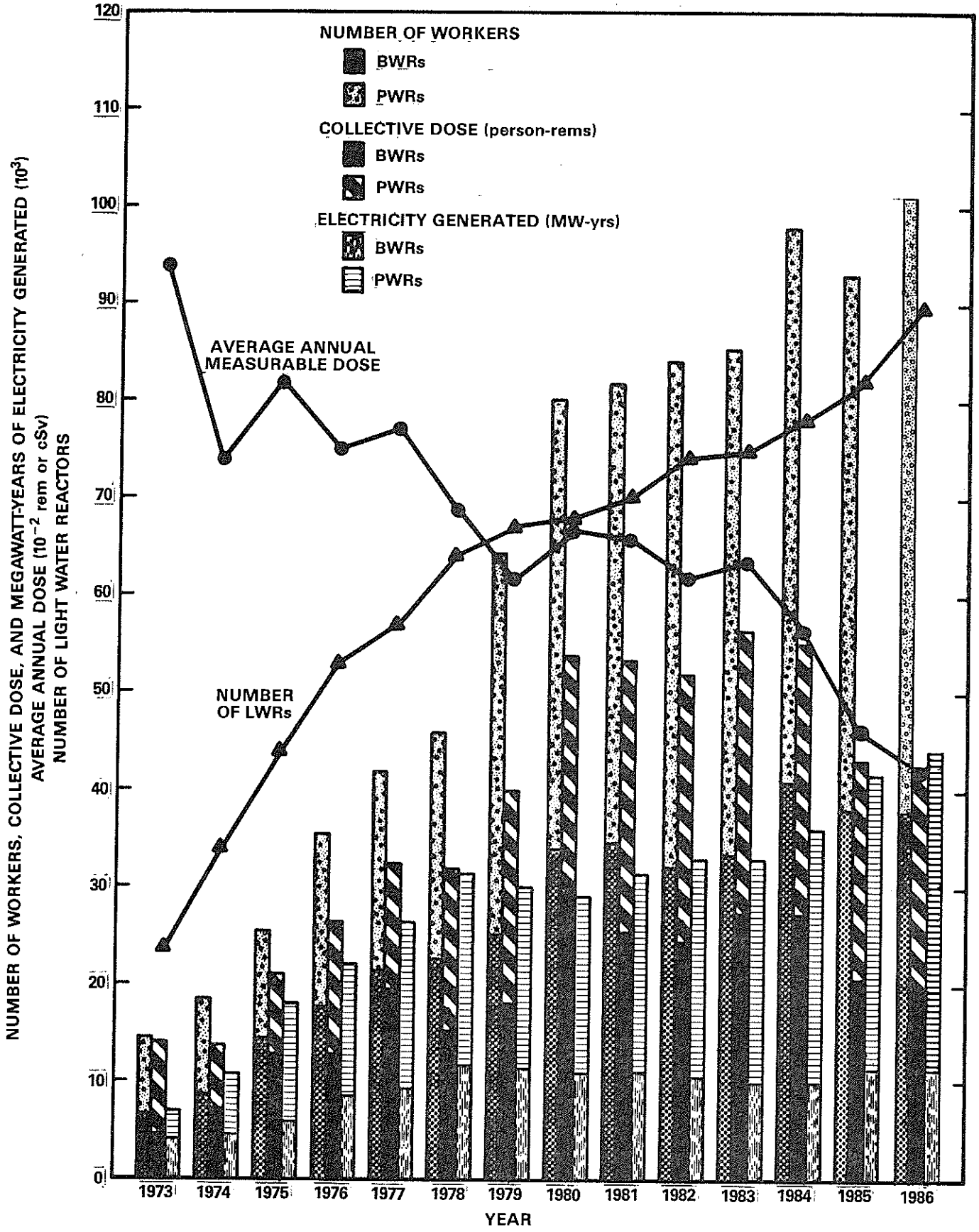
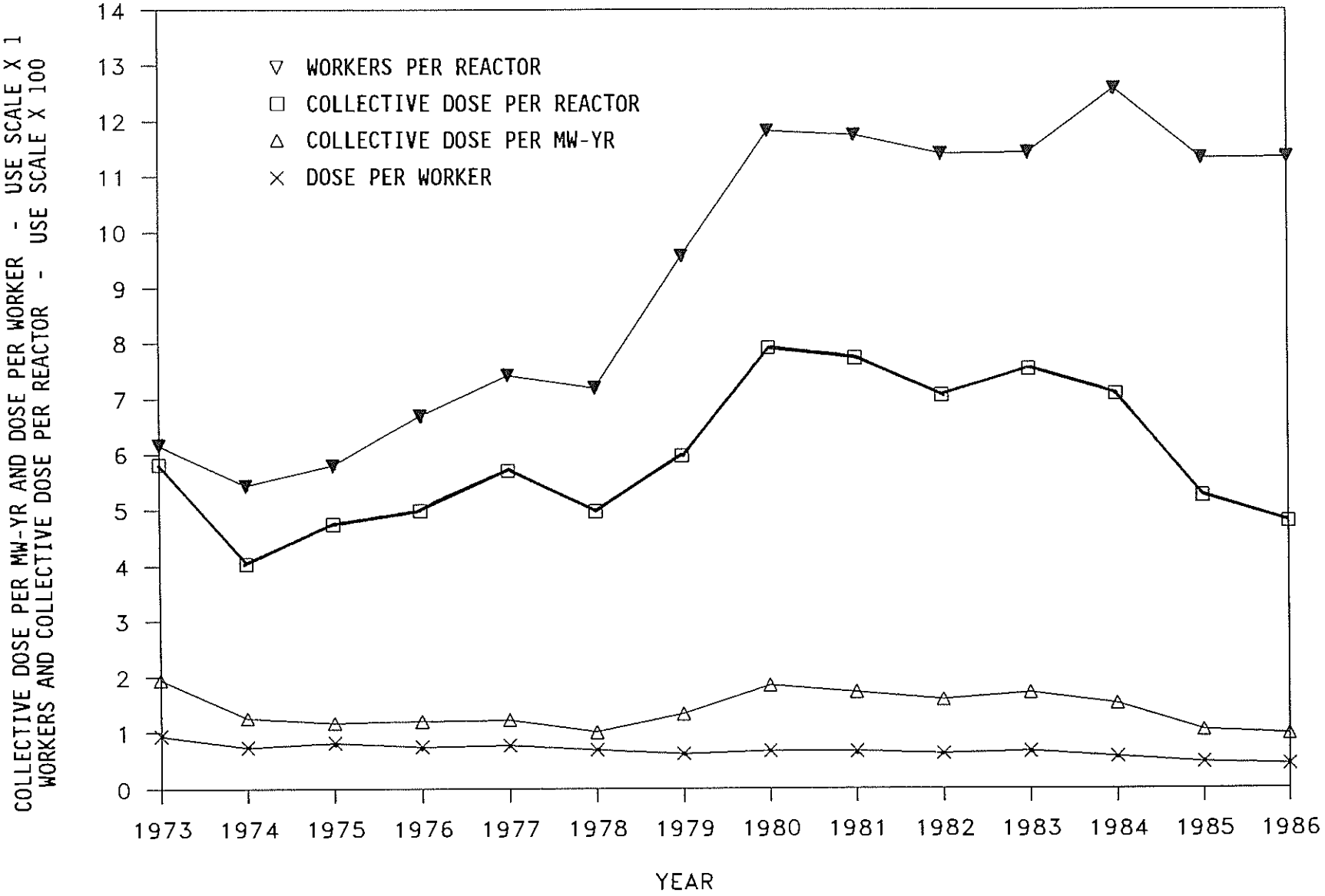


FIGURE 4.3

AVERAGE ANNUAL VALUES AT LWRs 1973 - 1986



importance of exposure control and the concept of keeping exposures as low as reasonably achievable is continually being stressed, and programs to collect and share information relative to tasks, techniques, and exposures have been established.

To further assist in the identification of any trends that might exist, Figure 4.4 displays the average and median* values of the collective dose per reactor for BWRs and for PWRs for the years 1973 through 1986. The ranges of the values reported each year are shown by the vertical lines with a small bar at each end marking the two extreme values. The rectangles indicate the range of values of the collective dose exhibited by those plants ranked in the twenty-fifth through the seventy-fifth percentiles. Since the median values usually are not as greatly affected by the extreme values of the collective doses, they do not normally fluctuate as much from year to year as do the average values. After remaining between 400 and 500 person-rem (person-cSv) for years, the median collective dose for PWRs fell to a value of 300 person-rem (person-cSv) in 1986. At BWRs the median fluctuates more from year to year, and in 1986 the median collective dose continued on a downward trend, falling to about 475 person-rems (person-cSv). Figure 4.4 also shows that in 1986 fifty percent of the PWRs reported collective doses between 200 and 470 person-rems (person-cSv) while fifty percent of the BWRs reported collective doses between 350 and 811 person-rems (person-cSv). Nearly every year, the median collective dose is less than the average, which indicates that the collective dose for most plants is less than the average collective dose per reactor (the value that is widely quoted).

4.5 Plant Rankings by Collective Dose per Reactor

The number of reactors from which data have been collected is still rather small, and the information reported by a few reactors where unusual conditions or problems may have occurred could have a large impact on some of the statistics presented in this report. In an effort to identify those plants, Tables 4.5 and 4.6 list the BWRs and PWRs in ascending order of collective dose per reactor for each of the five years from 1982 through 1986. Two other parameters, dose per worker and collective dose per megawatt-year, are also given for each plant and could have been used in ranking the plants as well. Also shown is a parameter "CR" which is defined to be the ratio of the annual collective dose delivered at individual doses exceeding 1.5 rems (cSv) to the total annual collective dose. In 1986 the value of CR continued to decline for most plants so that 84% (up slightly from 80% in 1985) of the U.S. LWRs fell within the range 0.05 to 0.50 which is recommended by the UNSCEAR [Ref. 10]. Most of the reactors having values of CR greater than 0.50 were BWRs, the highest value being 0.89.

Table 4.7 lists the plants that had been in commercial operation for at least five years as of December 31, 1986, and shows the values of several parameters for each of the sites. It also gives a number of averages for the two types of reactors. Based on the 105 reactor-years of operation accumulated by the BWRs listed, the average annual collective dose per

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

FIGURE 4.4
AVERAGE, MEDIAN AND EXTREME VALUES OF THE COLLECTIVE DOSE PER REACTOR 1973 - 1986

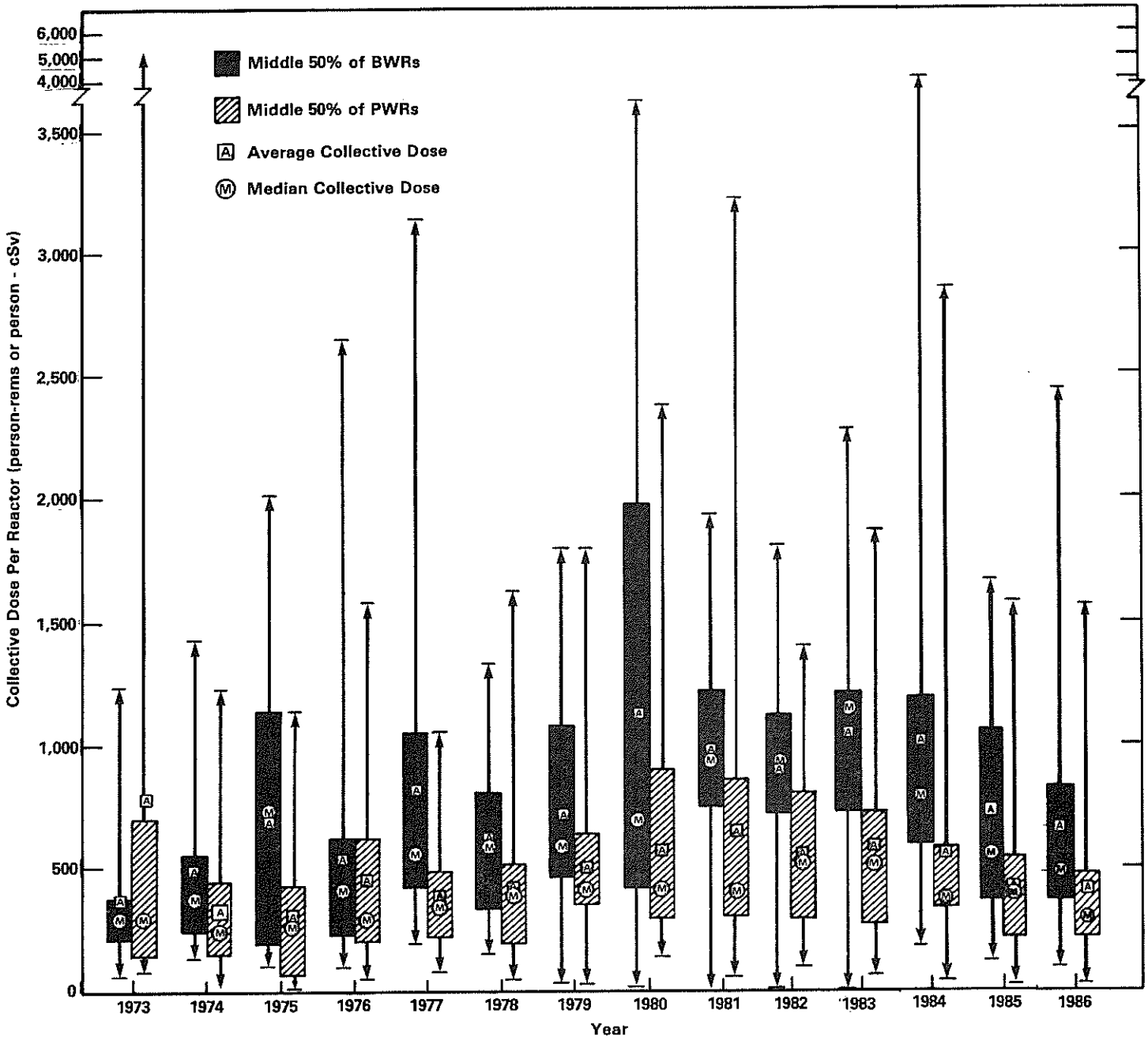


TABLE 4.5

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

1982 - 1986

1982

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Coll. Dose per MW-Yr	CR**
Humboldt Bay	19	0.27	-	0.08
La Crosse	205	1.39	11.9	0.81
Vermont Yankee	205	0.43	0.4	0.24
Duane Arnold	227	0.44	0.8	0.48
Big Rock Point	328	0.63	7.5	0.58
Cooper Station	542	0.73	0.9	0.52
Hatch 1, 2	1,460	0.43	1.9	0.33
Browns Ferry 1, 2, 3	2,220	0.68	1.1	0.51
Oyster Creek	865	0.68	3.6	0.51
Millstone Point 1	929	0.68	1.9	0.48
Dresden 1, 2, 3	2,923	1.14	2.7	0.73
Peach Bottom 2, 3	1,977	0.72	1.2	0.48
Monticello	993	0.76	3.4	0.57
Fitzpatrick	1,190	0.51	2.0	0.37
Nine Mile Point	1,264	0.93	9.5	0.66
Pilgrim	1,539	0.54	3.9	0.42
Quad Cities 1, 2	3,757	1.62	3.7	0.79
Brunswick 1, 2	3,792	0.76	6.5	0.70

1983

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Coll. Dose per MW-Yr	CR**
Humboldt Bay	17	0.20	-	0.09
Monticello	121	0.29	0.2	0.16
Millstone Point 1	244	0.79	0.4	0.66
Big Rock Point	263	0.53	6.2	0.46
La Crosse	313	1.96	12.6	0.90
Hatch 1, 2	1,299	0.38	1.4	0.29
Nine Mile Point	860	0.61	2.6	0.45
Fitzpatrick	1,090	0.64	2.0	0.58
Browns Ferry 1, 2, 3	3,363	1.02	2.0	0.68
Duane Arnold	1,135	0.77	4.0	0.53
Pilgrim	1,162	0.50	2.1	0.47
Dresden 1, 2, 3	3,582	1.26	3.9	0.75
Quad Cities 1, 2	2,491	1.38	2.3	0.77
Cooper Station	1,293	0.93	3.3	0.68
Peach Bottom 2, 3	2,963	0.95	3.6	0.67
Vermont Yankee	1,527	1.16	4.4	0.61
Brunswick 1, 2	3,475	0.62	5.5	0.63
Oyster Creek	2,257	0.98	80.9	0.63

1984

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Coll. Dose per MW-Yr	CR**
Big Rock Point	155	0.52	3.1	0.52
La Salle 1, 2	252	0.20	0.4	0.07
Duane Arnold	189	0.31	0.6	0.19
La Crosse	252	0.87	6.5	0.87
Susquehanna 1	308	0.11	0.4	0.02
Dresden 1, 2, 3	1,774	0.78	2.2	0.54
Vermont Yankee	603	0.63	1.5	0.39
Browns Ferry 1, 2, 3	1,940	0.66	1.4	0.51
Quad Cities 1, 2	1,579	0.94	1.6	0.63
Cooper Station	799	0.50	1.9	0.53
Millstone Point 1	836	0.42	1.6	0.31
Nine Mile Point	890	0.58	2.1	0.50
Fitzpatrick	971	0.60	1.7	0.57
Hatch 1,2	2,218	0.54	3.4	0.44
Peach Bottom 2,3	2,450	0.74	2.1	0.57
Brunswick 1,2	3,260	0.66	4.3	0.62
Oyster Creek	2,054	0.87	55.4	0.60
Monticello	2,462	1.32	73.1	0.79
Pilgrim	4,082	0.90	-	0.65

1985

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Coll. Dose per MW-Yr	CR**
Washington Nuclear 2	119	0.16	0.2	0.11
La Crosse	173	0.46	4.4	0.68
Nine Mile Point 1	265	0.26	0.5	0.25
Big Rock Point 1	291	0.67	6.6	0.61
Monticello	327	0.56	0.6	0.42
La Salle 1, 2	685	0.42	0.7	0.35
Browns Ferry 1, 2, 3	1,159	0.42	3.1	0.30
Hatch 1, 2	818	0.29	0.7	0.19
Quad Cities 1, 2	990	0.84	0.8	0.58
Millstone Point 1	608	0.83	1.1	0.60
Oyster Creek 1	748	0.32	1.7	0.33
Dresden 2,3	1,685	0.60	1.9	0.39
Pilgrim 1	893	0.40	1.5	0.39
Fitzpatrick	1,051	0.57	2.1	0.53
Vermont Yankee	1,051	0.76	2.9	0.42
Susquehanna 1	1,106	0.30	1.8	0.20
Duane Arnold	1,112	0.79	4.7	0.30
Cooper Station	1,333	0.67	10.5	0.59
Brunswick 1,2	2,804	0.69	3.4	0.65
Peach Bottom 2,3	3,354	0.80	4.9	0.59

1986

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Coll. Dose per MW-Yr	CR**
Big Rock Point	84	0.42	1.4	0.33
Millstone Point 1	150	0.39	0.2	0.31
Duane Arnold	187	0.39	0.5	0.22
Washington Nuclear 2	222	0.22	0.4	0.14
Lacrosse	290	1.12	14.8	0.89
Cooper Station	320	0.36	0.7	0.34
Browns Ferry 1,2,3	1,050	0.35	---	0.30
Fitzpatrick	411	0.35	0.6	0.32
Susquehanna 1,2	828	0.28	0.6	0.16
Grand Gulf 1	436	0.29	0.9	0.23
Lasalle 1,2	949	0.59	3.0	0.37
Quad Cities 1,2	992	0.68	0.9	0.44
Peach Bottom 2,3	1,080	0.44	0.8	0.36
Monticello	596	0.67	1.5	0.40
Hatch 1,2	1,497	0.43	3.4	0.32
Pilgrim 1	874	0.33	7.2	0.31
Brunswick 1,2	1,909	0.57	1.8	0.52
Vermont Yankee 1	1,188	0.86	4.8	0.56
Nine Mile Point 1	1,220	0.65	3.3	0.60
Dresden 2,3	2,796	0.90	3.8	0.59
Oyster Creek	2,436	0.65	15.5	0.58

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

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

TABLE 4.6

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

1982 - 1986

1982

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Coll. Dose per MW-Yr	CR**
Kewaunee	101	0.29	0.2	0.11
Prairie Island 1, 2	229	0.36	0.2	0.16
Haddam Neck	126	0.23	0.2	0.27
Davis Besse	164	0.12	0.4	0.06
McGuire	169	0.11	0.3	0.03
Crystal River	177	0.23	0.3	0.13
Fort Calhoun	217	0.36	0.5	0.42
Farley 1, 2	484	0.33	0.4	0.18
St. Lucie	272	0.26	0.3	0.18
Point Beach 1, 2	609	0.79	0.8	0.50
Palisades	330	0.21	0.8	0.20
Rancho Seco	337	0.44	0.8	0.36
Cook 1, 2	699	0.46	0.5	0.27
Arkansas 1, 2	803	0.50	0.9	0.40
Trojan	419	0.42	0.7	0.35
Yankee Rowe	474	0.58	4.4	0.54
Three Mile Island 1,2	1,004	0.47	-	0.44
Calvert Cliffs 1, 2	1,057	0.59	0.8	0.40
Sequoyah	570	0.29	1.0	0.18
Oconee 1, 2, 3	1,792	0.73	1.4	0.58
Beaver Valley	599	0.34	1.8	0.26
Salem 1, 2	1,203	0.37	0.8	0.29
Maine Yankee	619	0.48	1.1	0.32
Surry 1, 2	1,490	0.79	1.1	0.73
Indian Point 1, 2	1,635	0.76	3.1	0.52
San Onofre	832	0.27	13.5	0.35
North Anna 1, 2	1,915	0.67	2.5	0.67
Zion 1, 2	2,103	1.34	1.8	0.76
Turkey Point 3, 4	2,119	0.72	2.3	0.48
Ginna	1,140	1.02	3.9	0.65
Indian Point 3	1,226	0.83	7.1	0.52
Millstone Point 2	1,413	0.68	2.4	0.48
Robinson 2	1,426	0.71	5.1	0.65

1983

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Coll. Dose per MW-Yr	CR**
Yankee Rowe	68	0.17	0.4	0.20
Davis Besse	80	0.11	0.1	0.04
Prairie Island 1, 2	233	0.36	0.3	0.24
San Onofre 1	155	0.09	-	0.13
Maine Yankee	164	0.28	0.2	0.14
Kewaunee	165	0.37	0.4	0.24
Indian Point 1, 2	486	0.46	0.7	0.46
Sesquoyah 1, 2	491	0.28	0.3	0.14
Salem 1, 2	581	0.24	0.8	0.16
Trojan	307	0.32	0.6	0.25
Cook 1, 2	658	0.46	0.5	0.33
North Anna 1, 2	665	0.30	0.5	0.38
Calvert Cliffs 1, 2	668	0.35	0.5	0.32
Oconee 1, 2, 3	1,207	0.63	0.6	0.46
Fort Calhoun	433	0.50	1.3	0.39
Farley 1, 2	1,021	0.53	0.8	0.41
McGuire 1	521	0.30	0.9	0.32
Crystal River	552	0.32	1.2	0.18
Three Mile Island 1, 2	1,159	0.73	-	0.57
Indian Point 3	607	0.65	77.8	0.46
Zion 1, 2	1,311	1.02	1.1	0.62
Arkansas 1, 2	1,397	0.66	1.5	0.65
Point Beach 1, 2	1,403	0.82	2.2	0.53
Beaver Valley	772	0.52	1.4	0.42
Rancho Seco	787	0.59	2.3	0.39
Ginna	855	0.88	2.3	0.55
Robinson	923	0.41	2.3	0.44
Palisades	977	0.45	2.2	0.54
St. Lucie	1,204	0.54	4.2	0.47
Turkey Point 1, 2	2,581	0.92	3.1	0.60
Haddam Neck	1,384	0.84	3.1	0.57
Surry 1, 2	3,220	1.17	3.5	0.78
Millstone Point 2	1,881	0.79	6.4	0.67

1984

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Coll. Dose per MW-Yr	CR**
Crystal River	49	0.09	0.1	0.00
Prairie Island 1, 2	147	0.27	0.2	0.16
Millstone Point 2	120	0.42	0.2	0.33
Kewaunee	139	0.29	0.3	0.15
Davis Besse	177	0.16	0.3	0.07
Rancho Seco	222	0.28	0.5	0.22
Indian Point 3	230	0.35	0.3	0.61
Calvert Cliffs 1, 2	479	0.35	0.3	0.33
Summer	295	0.26	0.6	0.11
Salem 1, 2	681	0.49	1.0	0.39
Three Mile Island 1, 2	688	0.64	-	0.45
Yankee Rowe	348	0.53	2.8	0.44
Oconee 1, 2, 3	1,106	0.53	0.5	0.39
Cook 1, 2	762	0.49	0.5	0.32
Zion 1, 2	786	0.71	0.6	0.47
Ginna	394	0.55	1.0	0.39
Point Beach 1, 2	789	0.58	1.0	0.50
Arkansas 1, 2	806	0.46	0.6	0.37
Trojan	433	0.42	0.8	0.34
Farley 1, 2	902	0.44	0.6	0.41
San Onofre 1, 2	946	0.15	0.7	0.14
Beaver Valley	504	0.36	0.9	0.32
McGuire 1	507	0.30	0.7	0.26
Sequoyah 1, 2	1,117	0.47	0.8	0.36
Fort Calhoun	563	0.62	2.0	0.47
Palisades	573	0.43	5.8	0.41
Turkey Point 3, 4	1,255	0.62	1.3	0.53
St. Lucie 1, 2	1,263	0.60	1.1	0.49
Maine Yankee	884	0.70	1.5	0.47
North Anna 1, 2	1,945	0.64	1.9	0.59
Surry 1, 2	2,247	0.70	2.2	0.61
Haddam Neck	1,216	0.85	3.0	0.66
Indian Point 2	2,644	0.91	6.3	0.61
Robinson 2	2,880	0.70	-	0.69

1985

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Coll. Dose per MW-Yr	CR**
Callaway 1	36	0.04	0.0	0.00
Beaver Valley	60	0.10	0.1	0.00
Davis-Besse	71	0.10	0.3	0.04
Haddam Neck	101	0.26	0.2	0.28
Salem 1, 2	204	0.18	0.1	0.15
Arkansas 1, 2	286	0.23	0.2	0.10
Kewaunee	176	0.34	0.4	0.15
San Onofre 1	189	0.07	0.6	0.06
Indian Point 2	192	0.27	0.2	0.20
Prarie Island 1, 2	416	0.38	0.5	0.31
Yankee-Rowe	211	0.32	1.5	0.24
Point Beach 1, 2	482	0.72	0.6	0.43
San Onofre 2, 3	533	0.17	0.5	0.18
Robinson 2	311	0.23	0.5	0.28
Calvert Cliffs 1, 2	694	0.43	0.6	0.37
Trojan	363	0.43	0.4	0.26
Fort Calhoun 1	373	0.38	1.0	0.37
Summer 1	379	0.32	0.6	0.34
McGuire 1, 2	771	0.35	0.5	0.29
Farley 1, 2	799	0.31	0.6	0.30
North Anna 1, 2	839	0.34	0.6	0.31
Ginna	426	0.50	1.0	0.37
Three Mile Island 1, 2	857	0.45	8.3	0.50
Oconee 1, 2, 3	1,304	0.48	0.6	0.42
Cook 1, 2	945	0.48	1.0	0.31
Palisades	507	0.37	0.8	0.27
Sequoyah 1, 2	1,071	0.58	0.9	0.47
Indian Point 3	570	0.52	1.0	0.20
Zion 1, 2	1,166	0.78	1.0	0.55
Turkey Point 3, 4	1,253	0.66	1.2	0.48
St. Lucie 1, 2	1,344	0.68	0.9	0.50
Crystal River 3	689	0.35	2.0	0.20
Maine Yankee	700	0.69	1.1	0.49
Rancho Seco	756	0.43	3.2	0.27
Surry 1, 2	1,815	0.57	1.6	0.58
Millstone 2	1,581	0.83	3.8	0.64

1986

Site Name	Coll. Dose per Site*	Dose per Worker (rems or cSv)	Coll. Dose per MW-Yr	CR**
Summer 1	23	0.06	0.0	0.00
Yankee-Rowe 1	45	0.12	0.3	0.05
Fort Calhoun	74	0.10	0.2	0.17
Maine Yankee	100	0.20	0.1	0.17
Byron 1	104	0.10	0.1	0.04
Davis-Besse	124	0.13	37.8	0.03
Prairie Island 1,2	255	0.31	0.3	0.27
Wolf Creek 1	142	0.21	0.2	0.03
Kewaunee	169	0.34	0.4	0.21
Calvert Cliffs 1,2	347	0.27	0.2	0.19
Point Beach 1,2	402	0.61	0.5	0.33
Indian Point 3	202	0.34	0.3	0.20
Three Mile Island 1	213	0.16	0.4	0.10
Waterford 3	223	0.18	0.3	0.17
Callaway	225	0.21	0.3	0.04
St. Lucie 1,2	491	0.38	0.3	0.23
Zion 1,2	490	0.51	0.3	0.27
Sequoyah 1,2	526	0.30	---	0.24
San Onofre 1,2,3	824	0.23	0.5	0.15
Catawba 1	286	0.17	0.4	0.04
Salem 1,2	599	0.17	0.4	0.21
Diablo Canyon 1	304	0.24	0.5	0.16
Oconee 1,2,3	949	0.38	0.5	0.30
Ginna	357	0.40	0.8	0.27
North Anna 1,2	722	0.26	0.5	0.40
Cook 1,2	745	0.42	0.6	0.27
Trojan	381	0.29	0.4	0.15
Rancho Seco	402	0.27	---	0.22
Farley 1,2	858	0.37	0.6	0.35
Crystal River 3	472	0.45	1.5	0.38
Turkey Point 3,4	946	0.52	1.3	0.36
McGuire 1,2	1,015	0.44	0.7	0.37
Robinson 2	539	0.34	0.9	0.26
Arkansas 1,2	1,141	0.53	1.1	0.47
Beaver Valley	627	0.40	1.1	0.35
Palisades	672	0.47	6.6	0.44
Three Mile Island 2	915	0.61	---	0.59
Millstone Point 2	910	0.38	1.5	0.32
Surry 1,2	2,356	0.63	2.2	0.64
Indian Point 2	1,250	0.65	2.7	0.45
Haddam Neck	1,567	0.81	5.3	0.53

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

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

TABLE 4.7a

FIVE-YEAR TOTALS AND AVERAGES LISTED IN ASCENDING ORDER OF COLLECTIVE DOSE PER BWR

1982-1986

BWRs **Site name	*Total Collective Dose per Site	Workers with Measurable Doses	Average Dose per Worker (rem or cSv)	Total Mega-watt-years	Average Collective Dose per MW-yr
Big Rock Point	1,121	1,948	0.58	241.0	4.7
La Crosse	1,233	1,229	1.00	139.3	8.9
Duane Arnold	2,852	4,493	0.63	1,492.6	1.9
Hatch 1,2	3,646	17,283	0.21	4,009.0	0.9
Browns Ferry 1,2,3	9,732	15,299	0.64	5,466.5	1.8
Cooper Station	4,287	6,599	0.65	2,038.1	2.1
Monticello	4,499	5,076	0.89	1,731.9	2.6
Nine Mile Point 1	4,499	7,172	0.63	1,842.0	2.4
Vermont Yankee 1	4,574	5,532	0.83	1,854.7	2.5
Fitzpatrick	4,713	8,677	0.54	2,909.5	1.6
Quad Cities 1,2	9,809	8,429	1.16	5,463.0	1.8
Peach Bottom 2,3	11,824	15,817	0.75	5,651.5	2.1
Brunswick 1,2	15,240	23,032	0.66	3,811.8	4.0
Oyster Creek	8,360	12,024	0.70	911.1	9.2
Pilgrim 1	8,550	14,566	0.59	1,660.0	5.2
Grand Totals and Averages	94,939	147,176	0.65	39,222.0	2.4
Averages per Reactor-year	904	1,402		373.5	

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

**Sites where not all reactors had completed five full years of commercial operation as of 12/31/86 are not included.

TABLE 4.7b

FIVE-YEAR TOTALS AND AVERAGES LISTED IN ASCENDING ORDER OF COLLECTIVE DOSE PER PWR

1982-1986

PWRs **Site name	*Total Collective Dose per Site	Workers with Measurable Doses	Average Dose per Worker (rem or cSv)	Total Mega-watt-years	Average Collective Dose per MW-yr
Davis-Besse	616	7,222	0.09	1743.0	0.4
Prairie Island 1,2	1,280	4,120	0.31	4651.6	0.3
Kewaunee	750	2,579	0.29	2262.6	0.3
Yankee Rowe 1	1,146	3,476	0.33	710.9	1.6
Calvert Cliffs 1,2	3,245	8,595	0.38	6744.7	0.5
Salem 1,2	3,268	13,391	0.24	5974.5	0.5
Fort Calhoun	1,660	4,225	0.39	1826.4	0.9
Point Beach 1,2	3,685	5,595	0.66	3884.5	0.9
Trojan	1,903	5,947	0.32	3322.1	0.6
Cook 1,2	3,809	8,829	0.43	6676.6	0.6
Crystal River 3	1,939	6,805	0.28	2479.8	0.8
Farley 1,2	4,064	10,524	0.39	6852.6	0.6
Oconee 1,2,3	6,358	12,609	0.50	9679.4	0.7
Arkansas 1,2	4,433	10,070	0.44	5315.3	0.8
Maine Yankee	2,467	4,882	0.51	3173.2	0.8
Rancho Seco	2,548	7,430	0.34	1456.1	1.7
Beaver Valley	2,562	7,761	0.33	2763.6	0.9
Indian Point 3	2,835	5,487	0.52	2115.5	1.3
Zion 1,2	5,864	7,552	0.78	6448.5	0.9
North Anna 1,2	6,086	14,191	0.43	6100.9	1.0
Palisades	3,059	8,119	0.38	1698.9	1.8
Ginna	3,172	4,983	0.64	1902.1	1.7
Turkey Point 3,4	8,254	13,400	0.62	4529.8	1.8
Haddam Neck	4,394	6,599	0.67	2252.5	2.0
Surry 1,2	11,128	15,771	0.71	5513.1	2.0
Millstone Point 2	5,913	10,702	0.55	2704.1	2.2
Robinson 2	6,079	12,978	0.47	1921.9	3.2
Grand Totals and Averages	102,517	223,842	0.46	104,704.1	1.0
Averages per Reactor-year	513	1,119		523.5	

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

**Sites where not all reactors had completed five full years of commercial operation as of 12/31/86 are not included.

reactor was found to be 904 person-rems (person-cSv), the average measurable dose was 0.65 rem (cSv), and the average collective dose per megawatt-year was 2.4.

Based on the 200 reactor-years of operation at the PWRs listed, the average annual collective dose per reactor, average measurable dose, and average collective dose per megawatt-year were found to be 513 person-rems (person-cSv), 0.46 rem (cSv) and 1.0 person-rem/megawatt-year, respectively. All of these values, at both types of facilities, are lower than those found for the previous five year period.

In 1986, the five BWR sites with the highest collective doses all exceeded 950 person-rems (person-cSv) per reactor (Table 4.5). Although these five sites represented only 23% of the 30 BWRs, they contributed nearly 50% of the total collective dose incurred at BWRs in 1986. Most of the collective dose accumulated at the BWR site with the highest collective dose per reactor (2,436 person-rems (person-cSv)) was attributed to routine maintenance activities, such as in-service inspection of the drywell, control rod drive work, and refueling operations.

At PWRs, the five sites with the highest collective doses all exceeded 900 person-rems (person-cSv) per reactor (Table 4.6). Although representing 10% of the 59 PWRs included in 1986, they contributed over 30% of the total collective dose at PWRs. The plant with the highest collective dose per reactor (1,567 person-rems (person-cSv)) in 1986 accumulated most of the dose during steam generator decontamination, eddy current testing and tube plugging.

In general, the plants having the lower values of most of the parameters shown are usually the newer plants. Some of the older, smaller plants also appear near the top of the listings since they report small collective doses; however, the ratio of their collective dose to the number of megawatt-years of electricity generated will be higher because of their limited power generation capacity. In the case of PWRs, this generalization does not always apply. For example, Prairie Island 1 and 2 and Kewaunee, three reactors that have been operating for 11 or 12 years, continued to experience lower collective doses than many newer reactors.

Usually, the combination of a large annual collective dose and a large collective dose to megawatt-year ratio for a plant indicates that extensive maintenance or modifications were undertaken during the year. For example, maintenance jobs that were large contributors to BWR doses in 1986 included replacement of recirculation system piping, induction heating stress improvement (IHSI) of welds, reactor vessel component in-service inspection, and plant decontamination activities. At PWR facilities, the major contributors to the collective dose have been extensive tube inspection, sleeving, and plugging related to the repair of steam generators. Even with the use of better techniques and robots, these tasks continue to be a major source of exposure. It should be noted that the differences in nuclear plant designs and the ages of the plants [Ref. 15], even between plants of a given type, affect the nature of these parameters. Therefore care should be exercised when attempting to draw conclusions from these data.

4.6 Collective Dose by Work Function and Employee Type

A second type of annual statistical report that is required by each plant's technical specifications provides the collective dose of workers monitored at each plant site by employee type (plant, utility, or contractor) and by work and job functions. A copy of the report submitted for each reactor site is provided in Appendix D, and much of the data are graphically represented for each site in Appendix E. Tables 4.8 and 4.10 summarize the 1986 data for BWRs, PWRs and LWRs. One should note that the collective doses obtained from these reports are not used in any other tables in this document for the following reasons: the technical specifications of each plant requires only 80% of the plant's collective dose be accounted for and some utilities may not use the official dosimeter results in compiling the data. Also, when examining the number of personnel shown on these reports, it should be kept in mind that individuals who perform tasks in more than one category may be counted more than once.

Table 4.9 shows that workers performing special maintenance usually incurred the largest portion (35%-45%) of the collective dose and that workers performing routine maintenance activities usually incurred between 30% and 35% of the total each year since 1977. The figures have been fairly stable over the years with these two categories always accounting for the majority of the collective dose. Figure 4.5 graphically shows the trends in the collective dose by work function and type of personnel for the years 1981 through 1986 for BWRs and PWRs separately. Contractor personnel still incur most of the collective dose during special maintenance, but, at least in recent years, the collective dose is nearly equally divided between contractor and plant and utility personnel during routine maintenance, waste processing, and refueling activities. The general decrease in collective dose is also apparent among most of these activities.

Table 4.10 presents the distribution of the collective dose for 1986 at all LWRs among five occupations. As expected, maintenance personnel incurred the majority (67%) of the collective dose with contractor maintenance personnel receiving about twice as much as the station and utility maintenance employees combined. This is about the same as that reported for 1985. Supervisory personnel received 3.6% of the dose, compared to 3.1% in 1985, while workers in the remaining three occupations--operations, health physics, and engineering--received 8.6%, 13.4%, and 6.9% respectively, of the collective dose. None of these values changed very much from those found for 1984 and 1985. The collective doses shown in Tables 4.8 and 4.10 do not equal those shown in other tables in the report because they are the sum of the doses taken from the type of annual reports shown in Appendix D rather than the collective dose that was obtained or calculated from the annual reports required to be submitted pursuant to § 20.407.

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

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

TABLE 4.8

ANNUAL COLLECTIVE DOSE
BY WORK FUNCTION AND PERSONNEL TYPE
1986

WORK AND JOB FUNCTION	STATION EMPLOYEES PERSON-REM	% OF TOTAL	UTILITY EMPLOYEES PERSON-REM	% OF TOTAL	CONTRACT WORKERS PERSON-REM	% OF TOTAL	TOTAL PER FUNCTION PERSON-REM	% OF TOTAL
BOILING WATER REACTORS								
REACTOR OPS & SURV	1,391.045	7.42%	278.635	1.49%	785.177	4.19%	2,454.857	13.09%
ROUTINE MAINTENANCE	2,153.337	11.48%	789.552	4.21%	3,198.957	17.06%	6,141.846	32.75%
IN-SERVICE INSPECTION	113.260	0.60%	122.491	0.65%	900.939	4.80%	1,136.690	6.06%
SPECIAL MAINTENANCE	1,095.829	5.84%	303.049	1.62%	6,479.059	34.55%	7,877.937	42.01%
WASTE PROCESSING	236.398	1.26%	12.380	0.07%	431.174	2.30%	679.952	3.63%
REFUELING	200.799	1.07%	40.396	0.22%	222.254	1.19%	463.449	2.47%
TOTALS	5,190.668	27.68%	1,546.503	8.25%	12,017.560	64.08%	18,754.731	100.00%
PRESSURIZED WATER REACTORS*								
REACTOR OPS & SURV	1,843.810	7.65%	137.532	0.57%	1,064.527	4.42%	3,045.869	12.64%
ROUTINE MAINTENANCE	2,774.474	11.51%	882.187	3.66%	4,437.696	18.41%	8,094.357	33.59%
IN-SERVICE INSPECTION	227.681	0.94%	231.959	0.96%	1,959.505	8.13%	2,419.145	10.04%
SPECIAL MAINTENANCE	1,454.827	6.04%	813.851	3.38%	5,048.661	20.95%	7,317.339	30.36%
WASTE PROCESSING	452.465	1.88%	27.081	0.11%	566.236	2.35%	1,045.782	4.34%
REFUELING	675.273	2.80%	342.995	1.42%	1,159.678	4.81%	2,177.946	9.04%
TOTALS	7,428.530	30.82%	2,435.605	10.11%	14,236.303	59.07%	24,100.438	100.00%
ALL LIGHT WATER REACTORS*								
REACTOR OPS & SURV	3,234.855	7.55%	416.167	0.97%	1,849.704	4.32%	5,500.726	12.84%
ROUTINE MAINTENANCE	4,927.811	11.50%	1,671.739	3.90%	7,636.653	17.82%	14,236.203	33.22%
IN-SERVICE INSPECTION	340.941	0.80%	354.450	0.83%	2,860.444	6.67%	3,555.835	8.30%
SPECIAL MAINTENANCE	2,550.656	5.95%	1,116.900	2.61%	11,527.720	26.90%	15,195.276	35.46%
WASTE PROCESSING	688.863	1.61%	39.461	0.09%	997.410	2.33%	1,725.734	4.03%
REFUELING	876.072	2.04%	383.391	0.89%	1,381.932	3.22%	2,641.395	6.16%
TOTALS	12,619.198	29.45%	3,982.108	9.29%	26,253.863	61.26%	42,855.169	100.00%

*Table does not inlcude results from the PWRs at Point Beach 1, 2 (402 person-rems) because the data for these units were not submitted in the suggested format.

TABLE 4.9

PERCENTAGES OF ANNUAL COLLECTIVE
DOSE AT LWRs BY WORK FUNCTION

1975-1986

WORK FUNCTION	PERCENTAGE OF COLLECTIVE DOSE EACH YEAR											
	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986
REACTOR OPERATIONS AND SURVEILLANCE	10.8%	10.2%	10.5%	13.3%	12.2%	9.5%	8.9%	9.4%	10.1%	11.4%	12.8%	12.8%
ROUTINE MAINTENANCE	52.6%	31.0%	28.1%	31.5%	29.2%	35.5%	36.1%	27.9%	29.7%	26.9%	34.6%	33.2%
INSERVICE INSPECTION	3.0%	6.0%	6.4%	7.7%	9.0%	5.5%	5.3%	6.5%	7.6%	6.3%	8.6%	8.3%
SPECIAL MAINTENANCE	19.0%	40.0%	42.5%	35.9%	39.4%	40.6%	40.5%	46.8%	43.9%	45.4%	32.5%	35.5%
WASTE PROCESSING	6.9%	5.0%	5.8%	5.0%	3.6%	3.0%	4.2%	5.0%	4.6%	3.6%	5.1%	4.0%
REFUELING	7.7%	7.9%	6.7%	6.6%	6.6%	6.1%	5.0%	4.4%	4.1%	6.4%	6.5%	6.2%

TABLE 4.10

ANNUAL COLLECTIVE DOSE
BY OCCUPATION AND PERSONNEL TYPE
1986

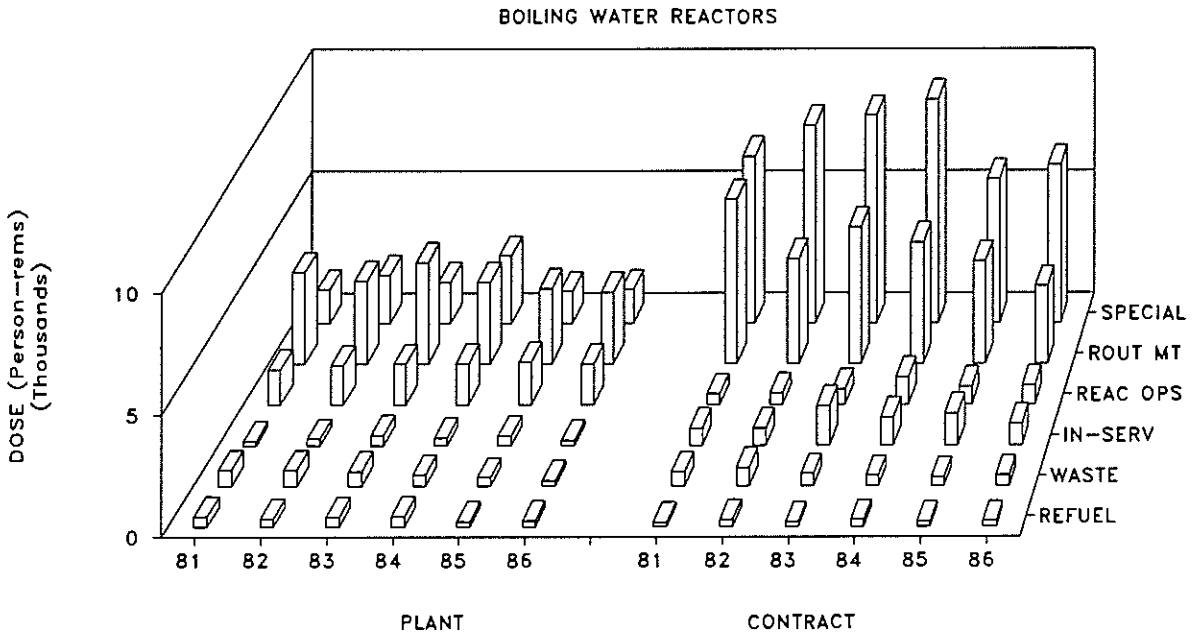
OCCUPATION	STATION EMPLOYEES PERSON-REM	% OF TOTAL	UTILITY EMPLOYEES PERSON-REM	% OF TOTAL	CONTRACT WORKERS PERSON-REM	% OF TOTAL	TOTAL PER FUNCTION PERSON-REM	% OF TOTAL
BOILING WATER REACTORS								
MAINTENANCE	2,759.224	14.71%	1,185.805	6.32%	9,660.233	51.51%	13,605.262	72.54%
OPERATIONS	1,048.301	5.59%	99.229	0.53%	394.626	2.10%	1,542.156	8.22%
HEALTH PHYSICS	799.613	4.26%	116.679	0.62%	922.150	4.92%	1,838.442	9.80%
SUPERVISORY	300.562	1.60%	47.566	0.25%	437.259	2.33%	785.387	4.19%
ENGINEERING	282.968	1.51%	97.224	0.52%	603.292	3.22%	983.484	5.24%
TOTALS	5,190.668	27.68%	1,546.503	8.25%	12,017.560	64.08%	18,754.731	100.00%
PRESSURIZED WATER REACTORS*								
MAINTENANCE	3,715.269	15.42%	2,096.580	8.70%	9,473.586	39.31%	15,285.435	63.42%
OPERATIONS	1,597.257	6.63%	57.831	0.24%	504.041	2.09%	2,159.129	8.96%
HEALTH PHYSICS	1,200.317	4.98%	40.248	0.17%	2,680.471	11.12%	3,921.036	16.27%
SUPERVISORY	413.454	1.72%	78.502	0.33%	275.464	1.14%	767.420	3.18%
ENGINEERING	502.233	2.08%	162.444	0.67%	1,302.741	5.41%	1,967.418	8.16%
TOTALS	7,428.530	30.82%	2,435.605	10.11%	14,236.303	59.07%	24,100.438	100.00%
ALL LIGHT WATER REACTORS*								
MAINTENANCE	6,474.493	15.11%	3,282.385	7.66%	19,133.819	44.65%	28,890.697	67.41%
OPERATIONS	2,645.558	6.17%	157.060	0.37%	898.667	2.10%	3,701.285	8.64%
HEALTH PHYSICS	1,999.930	4.67%	156.927	0.37%	3,602.621	8.41%	5,759.478	13.44%
SUPERVISORY	714.016	1.67%	126.068	0.29%	712.723	1.66%	1,552.807	3.62%
ENGINEERING	785.201	1.83%	259.668	0.61%	1,906.033	4.45%	2,950.902	6.89%
TOTALS	12,619.198	29.45%	3,982.108	9.29%	26,253.863	61.26%	42,855.169	100.00%

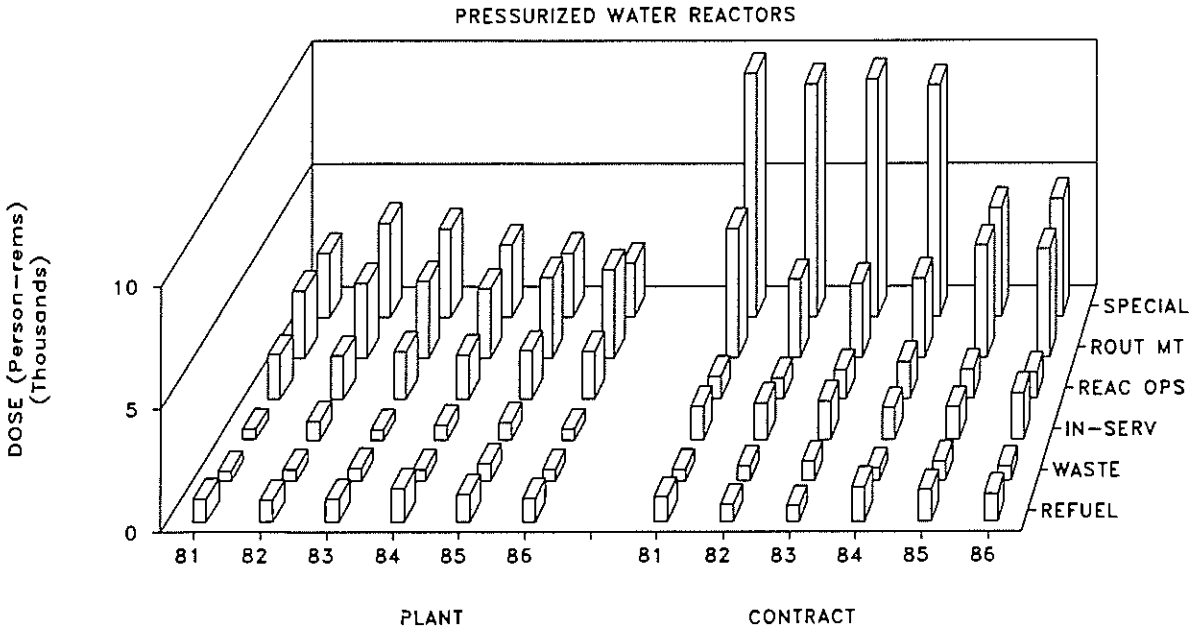
*Table does not include results from the PWRs at Point Beach 1, 2 (402 person-rems) because the data for these plants were not submitted in the suggested format.

FIGURE 4.5

COLLECTIVE DOSE BY WORK FUNCTION AND PERSONNEL TYPE

1981 - 1986





last column in Appendix D) was determined.

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

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

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

4.7 Graphical Representation of Dose Trends in Appendix E

Appendix E is a new addition to this report. Each page of Appendix E presents two types of graphs for one site. One graph plots certain dose-performance indicators from 1973 through 1986, and the other indicates the collective dose by job function for 1986. The dose and performance indicators shown in the top graph illustrate the history of the collective dose for the site, the rolling three-year average dose per reactor, and the gross electricity generated at the site. These data are plotted, beginning with the plant's first full year of commercial operation, and continuing through 1986. However, any data reported prior to 1973 are not included. The three-year average dose per reactor data is included because it appears to provide a better overall indication as to the plant's general trend in collective dose. This average is determined by summing the collective dose for the current year and the previous two years and then dividing this sum by the number of reactors in operation during those years. This reduces the sporadic effects of refueling operations and occasional high-dose maintenance activities, and gives a better idea of collective dose trends over the life of the plant. (One may note that for sites with more than one reactor, the plot of the three-year rolling average will lie below that of the plot of the annual collective dose for the site because it is calculated on a per-reactor basis.)

The second type of graph at the bottom of each page in Appendix E displays the breakdown of collective dose by job function and employee type for 1986. The horizontal axis lists the six job functions of reactor operations, routine maintenance, in-service inspection, special maintenance, waste management and refueling operations and the vertical axis indicates collective dose. This representation quickly shows the job functions where most of the dose was accumulated as well as the division of the collective dose among plant and contract workers. The data are taken from the submittals presented in Appendix D and therefore represent at least 80% of the collective dose. It is important to note that this graph represents only the breakdown for 1986 which may not reflect the normal distribution of dose among these job functions and personnel. Only those reactors that have

completed at least one full year of commercial operation are presented in Appendix E.

4.8 Health Implications of Average Annual Doses

Of interest to individuals exposed to radiation in the workplace, are the potential health risks associated with occupational exposure. If any damage to health is caused by exposure to radiation in the workplace, it would likely manifest itself as certain types of cancer in the exposed worker or, less likely, as inherited genetic damage in the first few generations of the workers' offspring. However, the likelihood of cancer or genetic damage occurring as a result of radiation exposure experienced by workers in the nuclear industry is very small. A vast amount of scientific information is available from which estimates of these risks can be made. Much of this information, however, has been obtained from epidemiologic studies of human populations at levels of exposure considerably higher than those normally experienced in the workplace. Complementary to this, information obtained from many animal and cell biology studies have greatly enhanced our knowledge and understanding of the biological effects of ionizing radiation. Although using this information to estimate risks in the workplace introduces uncertainties, these uncertainties can be dealt with in such a manner that the risk is not likely to be underestimated. Thus, the discussion below is likely to overstate the health implications rather than understate them.

Cancer induction as a result of radiation exposure has been examined by many organizations having scientific and medical expertise in the subject. One of these, the National Academy of Sciences (NAS), published a comprehensive review of the biological effects of ionizing radiation in 1980 [Ref. 16]. Based on this report, a large working population receiving one million person-rems (person-cSv) might suffer an estimated 100 to 200 additional cancer deaths over the remaining years of their lives. This risk estimate can be applied to the 46,366 person-rems (person-cSv) (Table 3.1) and the 116,241 workers who received measurable exposures in 1986. The result is that for these workers the expected number of additional cancer deaths that might result from the collective radiation dose received that year would be about ten. These deaths would occur many years following the exposure and would be in addition to the approximately 20,000 cancer deaths that occur normally in a population of 116,241 workers without exposure to this amount of radiation. Perhaps more meaningful to the individual workers are the health implications to the workers receiving the average dose of 0.42 rem (cSv) or the maximum accidental dose of 21 rems (cSv) to the whole body during 1986 (see page 6-4). The estimated increased cancer death risk is about one chance in 10,000 for the average dose and about three chances in 1000 for the maximum dose. Should a worker receive 0.42 rem (cSv) per year continuously during his entire working career (working from age 20 until age 65) his risk of dying from cancer could increase by less than 2% over the normal risk of dying of cancer. These risks can be compared to the American Cancer Society's estimates of one chance in four of developing cancer and one chance in five of dying of cancer.

The potential genetic effects from a worker population receiving about 46,366 person-rems (person-cSv) is very small compared to genetic damages that normally occur spontaneously in a population of this size.

Approximately 100,000 serious genetic defects occur normally in one million live births, i.e., an average of about one serious defect in every ten live births. Theoretically, the total genetic damage in the first generation children of the 116,241 exposed workers would, according to the 1980 NAS report, be an increase of three or less cases (less than 0.05%) compared to the expected 10,000 cases that occur normally*. No significant increase in the number of genetic defects has been observed in the children of individuals exposed to much higher levels of ionizing radiation at Hiroshima and Nagasaki, Japan.

* Assuming that, on the average, each exposed person will have one live born child in the future, i.e., 116,241 children born to this worker population.

5 TERMINATION DATA SUBMITTED PURSUANT TO 10 CFR § 20.408

5.1 Termination Reports, 1969-1985

In 1969, the Atomic Energy Commission (predecessor of the NRC) began requiring certain categories of licensees* to submit personal identification and exposure information upon the termination of each monitored person's employment or work assignment at their facility. The appropriate information on each report has been manually coded and entered into the Commission's computerized Radiation Exposure Information Reporting System (REIRS) for permanent retention. The data are retrievable by several criteria - social security number, name, facility, etc. - which allows statistical analysis of the data as well as the tracing of individual dose histories. During the years that this information has been collected, some 2,100,000 termination records have been received for approximately 480,000 individuals who have been reported as having terminated their employment at facilities in one or more of the categories of covered licensees. The figures given for the number of reports and the number of individuals are different because numerous individuals have been terminated more than once over the years and because some individuals may have had external doses reported for more than one part of the body, as well as estimates of internal depositions of radioactive material, each of which is counted as one record. Due to the large number of records, it takes a considerable amount of time to process these records so that the termination data for 1986 are not yet available. Table 5.1 provides a breakdown of this information for individuals terminating during each of these 17 years and, since the majority of termination reports are now submitted by nuclear power facilities, the number of records and individuals that they reported are displayed separately. Primarily because of the need for workers at an increasing number of nuclear power plants, the number of individuals terminating employment or work assignment has increased nearly every year, and in 1985, about 75,500 individuals terminated from power plants.

5.2 Limitations of Termination Data

When examining or using the statistics that are based on the termination data, one should keep in mind that these data have various limitations: (1) some licensees submit a termination report for each monitoring period rather than waiting until the individual actually completes his work assignment at the facility, (2) the period(s) of exposure that are reported for terminating individuals may indicate the monitoring period during which they may have been exposed to radiation rather than the actual dates of exposure, (3) some licensees report cumulative periods of exposure and doses rather than the actual periods and dose incurred during each period, and (4) licensees having more than one licensed facility sometimes include in the

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

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

TABLE 5.1

TERMINATION REPORTS SUBMITTED TO THE NRC

1969 - 1985

YEAR	All Covered Categories*		Power Reactor Licensees	
	Number of Termination Records	Number of Terminating Individuals	Number of Termination Records	Number of Terminating Individuals
1969	5,009	3,992	790	727
1970	8,606	6,069	2,126	1,908
1971	12,955	8,874	2,246	2,197
1972	15,685	10,353	4,997	3,888
1973	19,985	15,588	11,525	9,071
1974	30,389	21,499	16,946	11,603
1975	44,676	27,415	38,376	22,627
1976	70,230	40,079	63,593	35,294
1977	88,295	42,183	81,074	36,864
1978	96,010	44,541	85,308	37,359
1979	133,470	58,913	118,218	48,305
1980	175,408	73,662	162,515	65,092
1981	205,103	73,004	196,104	67,908
1982	200,191	67,589	192,314	63,848
1983	243,229	76,202	234,803	72,869
1984	305,302	79,760	294,386	76,371
1985	235,300	77,575	231,200	75,505

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

5.3 Transient Workers per Calendar Quarter

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

different licensed facilities within one calendar quarter. This allows one to examine the doses of those workers that move rapidly between facilities.

Table 5.2 displays some of the information gathered from these termination reports that were submitted by all covered licensees and by licensed nuclear power facilities, separately. One can quickly see that the vast majority of these individuals are monitored by nuclear power facilities. The number of these individuals increased about tenfold during the past ten years from some 330 in 1974 to about 3,300 in 1984, while the average individual dose (which is close to being a quarterly dose for these workers) has steadily decreased over these years to a value of 0.34 rem (cSv) in 1984. In 1985, however, both the number and the collective dose of these individuals dropped sharply to 684 and 2,759, respectively. This resulted in the average quarterly dose falling to an all-time low of 0.25 rem (cSv).

The bottom half of the table separates the information shown for power reactor licensees into that for reactor workers employed by two, three, and four or more different reactor licensees. The table shows that most of these transients were reported by two different licensees during a quarter. In 1985, the table shows that the collective dose incurred by the quarterly transients decreased sharply, particularly the collective dose incurred by persons terminated by three or more plants. Their average dose has decreased by more than 80% from what it was 10 years ago. This is believed to be a reflection of the industry's efforts to reduce the exposure of all individuals working at their facilities and their efforts to control the workers' doses so that no one exceeds an annual dose of five rems.

Examination of these records also revealed that some individuals have worked for as many as six different NRC licensees during one calendar quarter, and examination of their doses revealed, on the average, less than two instances per year in which a worker exceeded his quarterly limit of three rems (cSv) as a result of his working at two or more different licensed facilities within one calendar quarter. No instances of this has been found during the last four years. In most of the cases that were found, the doses that the workers had received while employed by the first utility were revised upward later in the year. The underestimates resulted in quarterly doses that slightly exceeded three rems (cSv). However, the manner in which some of the data are reported could have allowed a few quarterly exposures that exceeded three rems (cSv) to go undetected. This is because some facilities do not report the workers' doses in quarterly increments. When this happens, it is not possible to determine the portion of the dose received during each quarter.

5.4 Transient Workers per Calendar Year at Nuclear Power Facilities

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

TABLE 5.2

TRANSIENT WORKERS PER CALENDAR QUARTER

1974 - 1985

All Covered Licensees				Power Reactor Facilities			
Year	No. of Persons Terminated by Two or more Licensees Within One Quarter	Collective Dose (person-rems person-cSv)	Average Individual Dose (rem or cSv)	Year	No. of Persons Terminated by Two or more Licensees Within One Quarter	Collective Dose (person-rems person-cSv)	Average Individual Dose (rem or cSv)
1974	332	170	0.51	1974	285	158	0.55
1975	709	508	0.72	1975	684	493	0.72
1976	1,299	904	0.70	1976	1,257	889	0.71
1977	1,481	870	0.59	1977	1,437	851	0.59
1978	1,570	720	0.46	1978	1,500	680	0.45
1979	1,809	836	0.46	1979	1,754	802	0.46
1980	2,355	1,063	0.45	1980	2,218	1,033	0.47
1981	2,344	955	0.41	1981	2,335	952	0.41
1982	2,428	935	0.39	1982	2,396	914	0.38
1983	2,774	913	0.33	1983	2,728	886	0.32
1984	3,284	1,122	0.34	1984	3,223	1,090	0.34
1985	2,759	684	0.25	1985	2,730	669	0.25

	Power Reactor Facilities								
Year	No. of Persons Terminated by Two Licensees	Collective Dose	Average Dose	No. of Persons Terminated by Three Licensees	Collective Dose	Average Dose	No. of Persons Terminated by >Three Licensees	Collective Dose	Average Dose
1974	255	132	0.52	28	24	0.86	2	1	0.50
1975	609	427	0.70	70	62	0.89	5	4	0.80
1976	1,095	720	0.66	145	146	1.01	17	23	1.35
1977	1,271	718	0.56	147	115	0.78	17	18	1.06
1978	1,303	590	0.45	165	75	0.45	32	15	0.47
1979	1,527	647	0.43	178	130	0.73	49	25	0.51
1980	1,896	856	0.45	259	140	0.54	63	36	0.57
1981	1,967	780	0.40	308	145	0.47	60	27	0.45
1982	2,047	789	0.39	288	113	0.39	61	12	0.20
1983	2,276	767	0.34	362	101	0.28	90	18	0.20
1984	2,677	907	0.34	414	146	0.35	132	37	0.28
1985	2,326	580	0.25	337	70	0.21	67	9	0.13

Table 5.3 summarizes the number and doses of the transients found among the individuals terminating during the nine years from 1977 through 1985. The number of these individuals increased from about 3,200 in 1977 to about 7,400 in 1984. During this time their collective dose also increased from about 3800 to 7800 person-rems (cSv) so that the average dose remained at about 1 rem (cSv). In 1985, however, the number of individuals and the collective dose decreased to 6,740 and 5,031, respectively, which resulted in the average dose decreasing by about 30% to 0.75 rem (cSv).

The lower portion of Table 5.3 shows the number and doses of workers who were terminated by two, three, and four or more different licensees during each calendar year. One can quickly see that the dose incurred by persons terminating from three or more facilities in 1985 dropped by 44% to an all-time low of 0.91 rem (cSv). The average doses of persons terminating from two or three facilities also decreased significantly in 1985 to values of 0.64 and 1.01 rems (cSv), respectively.

Another way in which the distribution of the doses received by transient workers can be useful is in the determination of the impact that the inclusion of these individuals in each of two or more licensee's annual reports had on the annual summary (Table 4.4) for all nuclear power facilities (one of the problems mentioned in Section 2). Table 5.4a shows the correct distribution of transient worker doses as determined from the above-mentioned termination reports and compares it with the distribution of the doses of these workers as they would have appeared in a summation of the annual statistical reports submitted by each of the nuclear power facilities. During each of the years shown, each of the transient workers was counted an average of 2.6 times. This was not surprising because some individuals were reported by as many as nine different facilities.

Table 5.4b illustrates the impact that the multiple reporting of these transient individuals had on the staff's summation of the annual statistical reports for the years 1979 through 1985. Since each nuclear power facility reports the distribution of the doses received by workers while monitored by the particular facility during the year, one would expect that a summation of these reports would result in individuals being counted several times in dose ranges lower than the range in which their total accumulated dose (the sum of the personnel monitoring results incurred at each facility during the year) would actually place them. Thus, while the total collective dose would remain the same, the number of workers, their dose distribution, and average dose would be affected by this multiple reporting. This was found to be true because too few workers were reported in the higher dose ranges. For example, in 1984 the summation of annual reports indicated that 98,162 workers received a measurable dose, none of whom received doses greater than five rems (cSv). After accounting for those individuals that were reported more than once, the corrected distribution indicated that there were only 90,724 workers that received a measurable dose and that 71 of them received doses greater than five rems (cSv). This resulted in an average measurable dose of 0.61 rem (cSv) rather than the 0.56 rem (cSv) obtained from a summation of the reports.

Since the number of transient workers receiving measurable doses and the collective dose they receive are only about 6% and 12% of the total number of workers and their total collective dose, respectively, each year, their

TABLE 5.3

TRANSIENT WORKERS PER CALENDAR YEAR AT NUCLEAR POWER FACILITIES

1977 - 1985

Year	No. of Commercial Reactors	No. of Persons Terminated by Two or More Licensees	Collective Dose (person-rems person-cSv)	Average Dose (rems or cSv)
1977	58	3,161	3,776	1.19
1978	65	3,202	3,231	1.01
1979	68	3,938	3,891	0.99
1980	69	5,463	6,028	1.10
1981	71	5,425	5,381	0.99
1982	75	5,303	5,610	1.06
1983	76	6,340	6,675	1.05
1984	79	7,403	7,763	1.05
1985	83	6,740	5,031	0.75

Year	No. of Persons Terminated by Two Licensees	Collective Dose	Average Dose	No. of Persons Terminated by Three Licensees	Collective Dose	Average Dose	No. of Persons Terminated by >Three Licensees	Collective Dose	Average Dose
1977	2,166	1,987	0.92	572	842	1.47	423	947	2.24
1978	2,119	1,490	0.70	621	792	1.28	462	949	2.05
1979	2,761	2,097	0.76	688	805	1.17	489	989	2.02
1980	3,772	3,444	0.91	959	1,245	1.30	732	1,339	1.83
1981	3,745	3,033	0.81	924	1,172	1.27	756	1,176	1.56
1982	3,645	3,349	0.92	913	1,131	1.24	745	1,130	1.52
1983	4,203	3,624	0.86	1,256	1,694	1.39	881	1,357	1.53
1984	4,868	4,034	0.83	1,420	1,924	1.35	1,115	1,805	1.62
1985	4,529	2,882	0.64	1,335	1,353	1.01	876	796	0.91

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

Type of Distribution and Year	Number of Individuals with Whole Body Doses in the Ranges (rems or cSv)																Total Individuals	[b]Collective Dose (Person-rem or -cSv)	Avg. Dose (rem or cSv)	Avg. Measurable Dose (rem or cSv)
	Less than Measurable	Meas'ble <0.10	0.10-0.25	0.25-0.50	0.50-0.75	0.75-1.00	1.00-2.00	2.00-3.00	3.00-4.00	4.00-5.00	5.0-6.0	6.0-7.0	7.0-8.0	8.0-9.0	9.0-10.0	>10				
Correct Distribution of Transients - 1979	373	883	398	358	281	240	678	410	195	71	32	14	4	1			3,938	3,888	0.99	1.09
Reported Distribution of Transients - 1979	2,130	2,676	1,259	1,048	673	460	1,040	313	46	13	1						9,649	3,888	0.40	0.52
Correct Distribution of Transients - 1980	533	1,175	565	482	388	277	829	595	353	174	47	25	15	4	1		5,463	6,028	1.10	1.22
Reported Distribution of Transients - 1980	3,207	3,910	1,639	1,398	900	661	1,632	503	74	29	4	4	4				13,955	6,028	0.43	0.56
Correct Distribution of Transients - 1981	562	1,271	482	422	380	310	954	614	275	107	30	17	0	1			5,425	5,381	0.99	1.08
Reported Distribution of Transients - 1981	3,640	3,767	1,473	1,418	963	716	1,550	349	69	8	1	1					13,955	5,381	0.39	0.52
Correct Distribution of Transients - 1982	623	1,226	452	397	332	286	867	536	339	184	42	18	1	0	0	1	5,303	5,610	1.06	1.20
Reported Distribution of Transients - 1982	3,803	3,480	1,432	1,308	842	661	1,502	506	87	20	1						13,642	5,610	0.41	0.57
Correct Distribution of Transients - 1983	881	1,480	513	445	367	320	975	663	420	185	61	24	4	2			6,340	6,675	1.05	1.22
Reported Distribution of Transients - 1983	4,904	4,273	1,529	1,397	986	752	1,801	642	101	13	5	2					16,405	6,675	0.41	0.58
Correct Distribution of Transients - 1984	1,043	1,748	539	510	406	361	1,148	844	536	197	52	19					7,403	7,762	1.05	1.22
Reported Distribution of Transients - 1984	5,757	5,120	1,826	1,692	1,184	930	2,335	611	93	7	0						19,555	7,762	0.40	0.56
Correct Distribution of Transients - 1985	1,172	1,855	520	529	450	312	944	591	308	58	1						6,740	5,031	0.75	0.90
Reported Distribution of Transients - 1985	5,949	4,976	1,593	1,413	998	635	1,407	338	44	1							17,354	5,031	0.29	0.44

[a]Includes data from Fort St. Vrain.
[b]Collective dose found by summing the actual doses reported for those workers on their termination reports.

TABLE 5.4b
EFFECTS OF TRANSIENT WORKERS ON ANNUAL STATISTICAL COMPILATIONS[a]

Type of Distribution and Year	Number of Individuals with Whole Body Doses in the Ranges (rems or cSv)																Total Individuals	Collective Dose (Person-rem or -cSv)	Avg. Dose (rem or cSv)	Avg. Measurable Dose (rem or cSv)
	Less than Measurable	Meas'ble <0.10	0.10-0.25	0.25-0.50	0.50-0.75	0.75-1.00	1.00-2.00	2.00-3.00	3.00-4.00	4.00-5.00	5.0-6.0	6.0-7.0	7.0-8.0	8.0-9.0	9.0-10.0	>10				
Reported Statistical Distribution - 1979	42,340	24,632	9,883	8,090	5,147	3,426	7,898	3,306	1,255	477	86	28	13	2	0	1	106,584	39,987	0.38	0.62
[b]Correct Statistical Distribution - 1979	48,583	22,831	9,022	7,400	4,755	3,206	7,536	3,403	1,404	545	117	42	17	3	0	1	100,865	39,525	0.39	0.66
Reported Statistical Distribution - 1980	47,377	29,695	11,751	9,820	6,082	4,518	11,474	4,515	1,537	686	192	98	18	3			128,668	53,799	0.42	0.67
[b]Correct Statistical Distribution - 1980	44,703	26,960	10,677	8,904	5,570	4,134	10,671	4,607	1,816	831	235	119	29	7	1		120,166	53,626	0.45	0.72
Reported Statistical Distribution - 1981	42,323	29,332	12,217	10,326	6,625	4,903	11,766	4,546	1,763	486	93	81	11	2	1	1	124,506	54,152	0.43	0.66
[b]Correct Statistical Distribution - 1981	39,245	25,836	11,226	9,330	6,042	4,497	11,170	4,811	1,969	585	122	91	11	3	1	1	115,946	54,142	0.47	0.71
Reported Statistical Distribution - 1982	45,871	31,502	12,693	10,814	6,739	4,795	10,855	4,686	1,814	432	56	13	4	0	1		130,275	52,191	0.40	0.62
[b]Correct Statistical Distribution - 1982	42,691	29,248	11,713	9,903	6,229	4,420	10,220	4,716	2,066	596	97	31	5	0	1	1	121,937	52,191	0.43	0.66
Reported Statistical Distribution - 1983	52,036	31,948	12,211	10,296	6,470	4,708	12,171	5,311	1,950	544	65	16	4				137,703	56,472	0.41	0.66
[b]Correct Statistical Distribution - 1983	48,013	29,155	11,195	9,344	5,851	4,276	11,345	5,332	2,269	716	121	38	8	2			127,665	56,472	0.44	0.71
Reported Statistical Distribution - 1984	61,232	39,946	14,772	11,492	7,166	5,396	12,453	4,967	1,675	295							159,394	55,217	0.35	0.56
[b]Correct Statistical Distribution - 1984	56,518	36,574	13,485	10,310	6,388	4,827	11,266	5,200	2,118	485	52	19					147,242	55,217	0.38	0.61
Reported Statistical Distribution - 1985	66,399	40,361	14,155	12,012	7,214	4,897	10,557	3,317	716	84							159,712	43,077	0.27	0.46
[b]Correct Statistical Distribution - 1985	61,622	37,240	13,082	11,128	6,666	4,574	10,094	3,570	980	141	1						149,098	43,077	0.29	0.49

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

impact on most of the statistics derived from compilations of the annual summary reports is not very great. However, when examining the number of annual doses exceeding five rems, one finds that the correct statistical distribution (Table 5.4a) indicates that the number of workers who received doses greater than five rems (cSv) was between 50 and 70 more than the number found in the reported statistical distribution for each year before 1985. This is more clearly shown in Table 5.5, where it can be seen that in 1984 the corrected number of transient workers receiving doses greater than five rems (cSv) was 71, as opposed to zero reported doses in excess of five rems. In 1985, the correct number of workers receiving a dose greater than 5 rems is one, which represents a significant decrease from previous years and reflects the industry's concerted efforts to keep the total annual doses of all workers under five rems.

TABLE 5.5

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

Year	Reported Number >5 Rems (cSv)	Correct Number >5 Rems (cSv)	Percent of Workers
1977	270	351	0.9
1978	103	158	0.4
1979	130	180	0.3
1980	311	391	0.5
1981	189	235	0.3
1982	74	135	0.2
1983	85	168	0.2
1984	0	71	0.1
1985	0	1	0.0

5.5 Temporary Workers per Calendar Year at Nuclear Power Facilities

To complete the examination of the doses received by the short-term workers employed at nuclear power facilities, Table 5.6 summarizes the data compiled on "temporary workers." For purposes of this report, temporary workers were defined to be those individuals who began and ended a period of employment or work assignment at only one nuclear power facility during the calendar year. Table 5.6 shows that the number of these temporary individuals increased by 77% between 1977 and 1984 while the number of reactors increased by about 40% during this time. The number of temporary workers receiving a measurable dose, however, increased by only 51%. The average measurable dose remained at about 0.6 rem during this time. In 1985, however, all of the parameters listed in Table 5.6, except for the number of reactors, decreased significantly. This resulted in the collective dose and the average measurable dose of these workers falling to 9,934 person-rems (person-cSv) and 0.40 rem (cSv), respectively. These values are comparable to those found in 1979 when there were only 68 operating reactors.

TABLE 5.6

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

Year	No. of Reactors	Number of Temps. Monitored	Number with Measurable Doses	Collective Dose (person-rems person-cSv)	Average Dose (rem or cSv)	Average Measurable Dose (rem or cSv)
1977	57	29,090	19,094	11,373	0.39	0.60
1978	64	28,864	17,110	9,821	0.34	0.57
1979	68	38,347	21,491	9,488	0.25	0.44
1980	69	48,383	28,305	16,168	0.33	0.57
1981	71	48,265	28,675	16,755	0.35	0.58
1982	75	44,503	25,646	14,266	0.32	0.56
1983	76	50,903	26,682	16,007	0.31	0.60
1984	79	51,502	28,820	15,549	0.30	0.54
1985	83	48,073	24,720	9,934	0.21	0.40

One apparent discrepancy in the above analysis of termination data is that not all of the individuals that terminated during CY1985 are included. When one compares the total number of persons terminating during a year to the sum of workers terminating from one facility (temporary workers) and the number of individuals terminating from two or more facilities (transient workers), one finds a considerable difference in these figures. This is because of the criteria that is used to determine which individuals should be included in the "temporary" and "transient" worker groups. To be included in either of these groups in this analysis, the individuals' periods of employment must begin and end during the same calendar year. Any individual whose beginning or ending dates of employment overlap the calendar year are not included in these analyses. In 1985, for example, one finds that the number of individuals not included in these analyses is roughly 20,700. However, there is no indication that the exclusion of these individuals significantly impacts most of the statistics presented.

6 PERSONNEL OVEREXPOSURES - 10 CFR § 20.403 and 10 CFR § 20.405

6.1 Control Levels

One requirement of the above-referenced sections of Part 20, Title 10, Chapter I, Code of Federal Regulations, is that all persons licensed by the NRC must submit reports of all occurrences involving personnel radiation exposures that exceed certain control levels, thus providing for investigations and corrective actions as necessary. The term "overexposure" is not necessarily intended to indicate that a worker has been subjected to an unacceptable biological risk. Based on the magnitude of the exposure, the occurrence may be placed into one of three categories:

(1) Category A

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

(2) Category B

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

(3) Category C

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

6.2 Summary of Overexposures

Table 6.1 summarizes all the occupational overexposures to external sources of radiation as reported by Commission licensees pursuant to § 20.403 and § 20.405 during the years 1978 through 1986. For 1984, 1985, and 1986, it shows the number of individuals that exceeded various limits while employed by one of several types of licensees. For the years 1978 through 1982, only the overexposures reported by licensed industrial radiography firms are shown separately. Most of the occurrences included in the "Others" category

TABLE 6.1
PERSONNEL OVEREXPOSURES TO EXTERNAL RADIATION
1978-1986

YEAR	LICENSE CATEGORY	PERSONS AND DOSES (REM)	TYPES OF OVEREXPOSURES AND DOSES								
			WHOLE BODY (REMS)			SKIN (REMS)			EXTREMITY (REMS)		
			(<5)	(>5<25)	(>25)	(>7.5<30)	(>30<150)	(>150)	(>18.75<75)	(>75<375)	(>375)
1986	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	2								
		SUM OF DOSES	4.4								
	POWER REACTORS	NO. OF PERSONS	1								2
		SUM OF DOSES	3.3								900
	MEDICAL FACILITIES	NO. OF PERSONS	1								
		SUM OF DOSES	4.2								
	MARKETING & MANUFACT.	NO. OF PERSONS									
		SUM OF DOSES									
	OTHERS	NO. OF PERSONS							1	1	
		SUM OF DOSES							41.2	115	
1985	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	6	3	1					1	
		SUM OF DOSES	16.7	32.6	27.0					288	
	POWER REACTORS	NO. OF PERSONS	3			1					
		SUM OF DOSES	3.3			10.8					
	MEDICAL FACILITIES	NO. OF PERSONS	3								
		SUM OF DOSES	6.7								
	MARKETING & MANUFACT.	NO. OF PERSONS							2	1	
		SUM OF DOSES							38.7	93	
	OTHERS	NO. OF PERSONS	1				1		1		
		SUM OF DOSES	1.8				38.0		21.5		
1984	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	3	1					3		
		SUM OF DOSES	12.5	8.2					127.9		
	POWER REACTORS	NO. OF PERSONS	3								
		SUM OF DOSES	7.6								
	MEDICAL FACILITIES	NO. OF PERSONS	2	1					1		
		SUM OF DOSES	5.7	5.2					18.8		
	MARKETING & MANUFACT.	NO. OF PERSONS							1		
		SUM OF DOSES							21.8		
	OTHERS	NO. OF PERSONS	1						3		
		SUM OF DOSES	1.7						70.1		
1983	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	1								1
		SUM OF DOSES	4.7								650
	ALL OTHERS	NO. OF PERSONS	11	1[a]					27	2	
		SUM OF DOSES	20.1	25					887	228	
1982	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	6	3							
		SUM OF DOSES	16.1	20.7							
	ALL OTHERS	NO. OF PERSONS	5[b]	1					15	2	
		SUM OF DOSES	12.5	9.4					569	206	
1981	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	7	1							
		SUM OF DOSES	12.2	7.1							
	ALL OTHERS	NO. OF PERSONS	10	2[c]		1			4		
		SUM OF DOSES	24.1	30.9		8.1			102.9		
1980	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	4	1					1		
		SUM OF DOSES	23.6	7.7					56		
	ALL OTHERS	NO. OF PERSONS	86						3		3
		SUM OF DOSES	291.8[d]						73.5		33,000
1979	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	8[d]	3							
		SUM OF DOSES	25.9	34.6							
	ALL OTHERS	NO. OF PERSONS	30	3[e]		7	1	2[f]	15	1[g]	
		SUM OF DOSES	65.0	39.0		125.7	40.0	327	468.1	147	
1978	INDUSTRIAL RADIOGRAPHY	NO. OF PERSONS	4	1						1	
		SUM OF DOSES	15.3	21.6						150	
	ALL OTHERS	NO. OF PERSONS	12	4	1	2			2		
		SUM OF DOSES	36.0	51.9	27.3	18.2			49.2		

[a] This person simultaneously received an extremity overexposure of 61 rems (cSv) that is not shown.
[b] One of these persons simultaneously received a skin overexposure of 15.2 rems (cSv) that is not shown.
[c] One of these persons simultaneously received an extremity overexposure of 21 rems (cSv) that is not shown.
[d] One of these persons simultaneously received an extremity overexposure of 46 rems (cSv) that is not shown.
[e] One of these persons simultaneously received an extremity overexposure of 45 rems (cSv) that is not shown.
[f] These two persons simultaneously received extremity overexposures of 82 and 38 rems (cSv) that are not shown.
[g] This person simultaneously received a skin overexposure of 13 rems (cSv) that is not shown.

come from research facilities, universities and measuring and well-logging activities. In 1980, the total number of individuals reported as being overexposed was 96, a considerable increase over the numbers reported for other years. This increase was due to the overexposure of some 67 individuals at one nuclear power facility during steam generator repair work. They received doses between three and five rems. In 1986, the number of individuals receiving external doses that exceeded applicable quarterly limits decreased to 8, the lowest number reported for the years shown. The highest external whole body dose was 4.2 rem (cSv). In each of the years from 1978 through 1986, the highest external whole body doses were 27.3, 17.0, 7.7, 21.0, 9.4, 25.0, 8.2, 27.0, and 4.2 rems (cSv), respectively.

In 1986, there were three incidents in which external exposures of the magnitude described in Category A or B were received by three individuals. Two incidents resulted from exposure to very small, highly radioactive debris, usually called "hot particles"; both were treated as extremity overexposures and both occurred at nuclear power reactors. The other incident occurred at a university research laboratory and was an extremity overexposure also. Summaries of all three incidents are presented below.

On November 7, 1986, radioactive contamination was detected on the right hand of an electrician leaving a radiation control area in a nuclear power plant. The contamination was determined to be a single "hot particle" that was removed immediately by decontamination. Unfortunately, the particle was lost into the radioactive waste system of the plant, making the dose reconstruction very difficult. Initial estimates of the skin dose indicated that there was no overexposure involved. Following a formal investigation, it was determined the dose to a small area of skin could have been in excess of 75 rems (cSv). The final dose assigned to the incident by the NRC was an extremity exposure of 420 rems (cSv).

During October, 1986, a maintenance worker was involved in overhauling a power reactor coolant pump seal. Subsequently, his ring dosimeter indicated the worker's right hand had received an extremity exposure of 510 rems (cSv). The overexposure was attributed to direct contact of the worker's hand with a small "hot particle" of irradiated fuel that had been released because of defects in the fuel cladding.

On June 9, 1986, a student researcher at a university research reactor transferred ten thulium-170 pellets from an activated aluminum container to a petri dish using long tweezers. The student then transferred six of the pellets to a non-radioactive aluminum container using a suction device. The remaining four were similarly transferred to a brass storage container. A ring dosimeter worn by the student indicated an extremity exposure of 115 rems (cSv). The NRC reviewed the information available and concluded that it was probable that an overexposure did occur, and the cause was attributed to the failure to perform an adequate hazard evaluation prior to the pellet handling.

For the first time in several years, there were two events reported in 1986 in which the estimated intake of radioactive materials exceeded the quarterly limit, equivalent to exposure to 520 hours at the maximum permissible concentration (MPC-hrs), and descriptions of these events are given below. Also, there were two reports of personnel exposures to airborne

concentrations of radioactive material in which 10 individuals were exposed to concentrations of uranium that only slightly exceeded the 40 MPC-hr control limit that applies to uranium because of its chemical toxicity. Descriptions of the events are not included in this document.

One of the incidents in which the quarterly control level was exceeded was partly the result of inadequate management and documentation of radioactive waste. This allowed waste that contained soluble Am-241 to be stored in unmarked drums in an Air Force warehouse for several years. When it was decided to inventory the contents of the drums so that the material could be transferred to a disposal contractor, the use of inadequate precautions and procedures by workers when opening a drum resulted in the release of the Am-241 on October 6, 1986. The warehouse became contaminated, and one individual inhaled or ingested approximately 8.1 nanocuries of Am-241. This is more than twice the quarterly limit of 3.8 nanocuries and is roughly equivalent to the risk that would be incurred from a whole body dose of 6 or 7 rems (cSv).

The second incident occurred during the third quarter of 1985, but it went unreported until 1986. In this event a university researcher was exposed to tritium when a nitrogen purging system in a hood allowed tritiated water to escape into the laboratory. Bioassay data indicated the researcher had been exposed to 9,500 MPC-hrs, well in excess of the 520 MPC-hr limit. The internal whole body dose was estimated to be 21 rems. The cause of the overexposure was attributed to failure in management's oversight of the radiation safety program, the lack of an effective audit program to monitor personnel, and failure to take reasonable actions to ensure that NRC requirements were being followed.

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APPENDIX A

Alphabetical Listing of Annual Exposure Data Compiled for Certain NRC Licensees

1986

APPENDIX A

INDUSTRIAL RADIOGRAPHERS Single Location - 1986

Licensee Name	Program Code	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-rem)	Average Meas'ble Dose (rems or cSv)
ABEX CORPORATION	03310	29-01208-02	11	0	0	0.00
ABEX CORPORATION - RPG	03310	29-01208-03	11	0	0	0.00
ABEX CORPORATION	03310	34-24346-01	9	5	1	0.10
ABEX CORPORATION (WAUKESHA FOUNDRY)	03310	48-13776-01	8	0	0	0.00
AIR PRODUCTS AND CHEMICALS, INC.	03310	37-05105-05	17	4	0	0.05
ALONSO & CARUS IRON WORKS	03310	52-21350-01	6	5	1	0.17
ARMY, DEPARTMENT OF THE	03310	13-18235-01	162	14	1	0.05
ARMY, DEPARTMENT OF THE	03310	29-00047-06	166	15	1	0.06
ARMY, DEPARTMENT OF THE (MCALESTER)	03310	35-19189-02	29	0	0	0.00
ARROW TANK & ENGINEERING COMPANY	03310	22-13253-01	5	2	0	0.05
ATLANTIC RESEARCH CORPORATION	03310	45-02808-04	22	22	3	0.12
BABCOCK & WILCOX COMPANY	03310	34-02160-03	37	4	0	0.08
BELOIT CORPORATION	03310	48-02412-02	2	1	0	0.38
BRIGHTON CORP.	03310	34-21480-01	6	6	2	0.31
BUCKEYE INTERNATIONAL	03310	34-06627-01	3	1	0	0.05
CATERPILLAR TRACTOR COMPANY	03310	12-18023-01	7	0	0	0.00
CBI SERVICES	03310	12-05639-01	7	3	0	0.05
CONNECTICUT, STATE OF	03310	06-06472-03	29	1	0	0.05
CONSOLIDATED FOUNDRIES & MFG.	03310	34-04657-02	0	0	0	0.00
COPES-VULCAN	03310	37-19530-01	1	1	0	0.18
CRANE COMPANY - INDIAN ORCHARD PLANT	03310	20-00518-02	2	2	0	0.05
DAY AND ZIMMERMANN INC.	03310	42-15051-02	3	3	0	0.05
DELTAK CORP.	03310	22-21447-01	0	0	0	0.00
DRAVO CORPORATION	03310	34-00850-02	9	8	1	0.16
DRESSER IND.,WORTHINGTON PUMP DIV	03310	29-02210-02	4	0	0	0.00
DURALOY COMPANY (THE)	03310	37-02279-02	4	4	2	0.45
DURIRON COMPANY INCORPORATED	03310	34-06398-01	3	3	1	0.27
EMPIRE STEEL CASTINGS, INC.	03310	37-02448-01	3	1	1	0.63
EXXON COMPANY U. S. A.	03310	25-03375-02	6	2	0	0.05
E. I. DU PONT DE NEMOURS & COMPANY INC.	03310	07-00455-30	0	0	0	0.00
GENERAL ELECTRIC COMPANY	03310	20-00815-05	10	6	1	0.10
GENERAL ELECTRIC CO. (AFT ENGINE GRP)	03310	34-00499-10	3	1	0	0.05
GENERAL MOTORS CORPORATION	03310	12-02251-01	5	1	0	0.05
GENERAL MOTORS CORPORATION	03310	21-02392-01	3	0	0	0.00
GENERAL MOTORS CORPORATION	03310	34-15315-02	45	0	0	0.00
GREDE FOUNDRIES INCORPORATED	03310	48-02844-01	3	1	0	0.18
HARRISON STEEL CASTINGS COMPANY	03310	13-02141-01	4	4	1	0.13
HESS OIL VIRGIN ISLAND CORPORATION	03310	55-15533-02	3	3	0	0.09
HIGH STEEL STRUCTURES INC.	03310	37-17534-01	15	4	0	0.05
INDUSTRIAL RADIOGRAPHIC SERVICE	03310	55-16734-01	0	0	0	0.00
INGERSOLL-RAND COMPANY	03310	29-02015-02	2	2	1	0.53
INTERIOR, DEPARTMENT OF THE	03310	24-02619-02	6	2	0	0.05
JOHN DEERE FOUNDRY	03310	12-09111-01	3	0	0	0.00

APPENDIX A (cont.)

INDUSTRIAL RADIOGRAPHERS Single Location - 1986

Licensee Name	Program Code	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-rem)	Average Meas'ble Dose (rems or cSv)
KELSEY-HAYES COMPANY INCORPORATED	03310	12-02360-02	5	0	0	0.00
LABARGE INC.	03310	35-15514-01	2	2	0	0.21
LUCIUS PITKIN	03310	29-27816-01	5	3	0	0.09
LUKENS STEEL COMPANY	03310	37-02827-01	12	12	2	0.15
LYNCHBURG FOUNDRY COMPANY	03310	45-17464-01	9	5	0	0.05
MARATHON PETROLEUM CO.	03310	12-24435-01	0	0	0	0.00
MASON & HANGER-SILAS CO	03310	14-24479-01	74	7	0	0.05
MAYNARD ELECTRIC STEEL CASTING COMPANY	03310	48-07080-01	5	5	1	0.14
MINNEAPOLIS ELECTRIC STEEL CASTINGS CO.	03310	22-05572-02	2	2	0	0.05
MINNESOTA VALLEY ENGINEERING	03310	22-24393-01	4	3	1	0.31
MISSOURI STEEL CASTINGS CO.	03310	25-15152-01	4	2	0	0.11
NATIONAL AERONAUTICS AND SPACE ADMIN.	03310	34-00507-04	51	7	0	0.05
NATIONAL AERONAUTICS AND SPACE ADMIN.	03310	45-08886-02	4	0	0	0.00
NATIONAL CASTING CO.	03310	34-01115-03	5	2	0	0.05
NAVY, DEPARTMENT OF THE	03310	04-06145-01	35	3	0	0.13
NAVY, DEPARTMENT OF THE	03310	04-06145-02	0	0	0	0.00
NAVY, DEPARTMENT OF THE (EXPLOSIVE ORD.)	03310	19-00318-03	22	0	0	0.00
NAVY, DEPARTMENT OF THE	03310	28-01012-02	59	58	5	0.09
NAVY, DEPARTMENT OF THE, USS HUNLEY	03310	31-17677-01	18	18	3	0.16
NAVY, DEPARTMENT OF THE, USS FRANK CABLE	03310	31-19283-01	11	8	1	0.07
NAVY, DEPARTMENT OF THE	03310	37-00314-06	38	12	2	0.14
NAVY, DEPARTMENT OF THE	03310	39-19047-01	13	0	0	0.00
NAVY, DEPARTMENT OF THE	03310	45-02757-01	0	0	0	0.00
NAVY, DEPARTMENT OF THE	03310	45-17845-01	28	0	0	0.00
NAVY, DEPARTMENT OF THE	03310	46-09611-01	1	0	0	0.00
NILES STEEL TANK COMPANY	03310	21-04741-01	4	1	0	0.05
NORTHWEST AIRLINES INC.	03310	22-12080-01	28	0	0	0.00
OKLAHOMA STEEL CASTINGS CO.	03310	35-21159-01	7	2	0	0.05
OZARK AIR LINES, INC.	03310	24-13591-01	26	3	0	0.05
PELTON CASTEEL INC	03310	48-02669-02	3	3	1	0.18
PENNSYLVANIA SHIPBUILDING CO.	03310	37-21067-01	7	0	0	0.00
PRYOR FOUNDRY INC.	03310	35-18099-01	2	1	0	0.05
P. X. ENGINEERING COMPANY INC.	03310	20-15102-01	3	2	0	0.11
QUAKER ALLOY CASTING COMPANY	03310	37-03671-01	19	13	3	0.24
REFINERY PRODUCTS CORPORATION	03310	48-03665-02	3	1	0	0.38
ROCKWELL INTERNATIONAL (SPACE TRANSP.)	03310	04-17624-03	0	0	0	0.00
SAWYER RESEARCH PRODUCT INC	03310	34-02044-01	6	2	0	0.05
SHAFER VALVE CO.	03310	34-21198-01	5	2	0	0.05
SOUTHWESTERN ENGINEERING CO.	03310	24-19500-01	3	3	1	0.27
STRUTHERS WELLS CORPORATION	03310	37-11152-01	15	4	0	0.05
ST. LOUIS STEEL CASTING, INC.	03310	24-01587-01	3	0	0	0.00
TAYLOR AND FENN COMPANY	03310	06-02024-01	3	3	0	0.05
THIOKOL CHEMICAL CORPORATION	03310	01-00856-02	9	7	1	0.09

INDUSTRIAL RADIOGRAPHERS Single Location - 1986

Licensee Name	Program Code	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-rem)	Average Meas'ble Dose (rems or cSv)
THIOKOL CORPORATION (AEROSPACE GROUP)	03310	17-16380-01	43	29	2	0.05
TRANS WORLD AIRLINES INC	03310	24-05151-05	39	4	0	0.05
UNITED STATES PIPE AND FOUNDRY COMPANY	03310	29-07262-01	3	0	0	0.00
VOLLRATH COMPANY (THE)	03310	48-05395-01	4	0	0	0.00
WEHR STEEL COMPANY	03310	48-02005-02	0	0	0	0.00
WESTINGHOUSE ELECTRIC CORPORATION	03310	37-05809-02	5	2	0	0.05
WHITING CORPORATION	03310	12-04921-01	3	0	0	0.00
WILLIAM POWELL COMPANY (THE)	03310	34-02963-01	5	1	0	0.05
WISCONSIN CENTRIFUGAL INCORPORATED	03310	48-11641-01	5	4	1	0.28
YUBA HEAT TRANSFER CORPORATION	03310	35-13735-01	4	4	2	0.46

INDUSTRIAL RADIOGRAPHERS Multiple Location - 1986

Licensee Name	Program Code	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-rem)	Average Meas'ble Dose (rems or cSv)
ABC TESTING	03320	20-19778-01	9	9	4	0.40
ADVANCED RADIATION SERVICE INC.	03320	29-14171-01	5	4	1	0.30
ADVEX CORPORATION	03320	45-16452-01	15	14	8	0.56
AKRON INDUSTRIAL SERVICE	03320	34-24673-01	6	6	1	0.24
ALASKA INDUSTRIAL X-RAY	03320	50-16084-01	7	7	3	0.40
ALASKA WELDING CENTER	03320	50-19202-01	44	35	29	0.81
ALLIED INSPECTION SERVICES INC.	03320	21-18428-01	6	5	3	0.62
ALLOY CRAFTS COMPANY	03320	13-17511-01	5	3	0	0.05
AMERICAN AIRLINES INC	03320	35-13964-01	113	30	2	0.05
AMERICAN OIL COMPANY (THE)	03320	13-00155-10	20	11	1	0.06
AMERICON	03320	34-02160-04	76	28	3	0.11
AMOCO OIL COMPANY	03320	45-01378-02	14	3	1	0.17
ANCHOR/DARLING VALVE COMPANY	03320	37-15476-01	9	4	1	0.33
ANP PIPELINE CO, LABORATORY SERVICES	03320	21-24502-01	6	1	0	0.37
ANVIL CORP	03320	46-23236-01	23	23	12	0.51
ARMY, DEPARTMENT OF THE	03320	30-02405-05	4	3	0	0.05
ARNOLD GREENE TESTING LABORATORIES INC	03320	20-01074-02	42	27	5	0.17
ARROW NDE CO	03320	35-23198-01	4	4	2	0.60
ASTROTECH INC	03320	37-09928-01	12	9	3	0.38
A-1 INSPECTION, INC.	03320	49-21496-01	6	5	3	0.58
BAKER TESTING SERVICES INC.	03320	20-19067-01	5	3	1	0.20
BASIN INDUSTRIAL X-RAY, INC.	03320	42-19906-01	0	0	0	0.00
BATH IRON WORKS CORPORATION	03320	18-00828-04	22	16	2	0.11
BENJAMIN SHAW CO.	03320	01-24890-01	0	0	0	0.00
BILL MILLER INC.	03320	35-19048-01	29	24	13	0.55
BMY, DIV. OF HARSCO	03320	37-20684-02	7	3	0	0.05
BRANCH RADIOGRAPHIC LABORATORIES INC.	03320	29-03405-02	42	42	13	0.31
BRAND EXAM SERVICE & TESTING	03320	12-20350-02	10	5	2	0.45
BRIGGS ENGINEERING & TESTING CO.	03320	20-16401-01	8	6	1	0.12
BRISTOL STEEL AND IRON WORKS INC.	03320	45-16947-01	8	5	1	0.23
C & R LABORATORIES	03320	53-19179-01	6	6	0	0.05
CALUMET TESTING SERVICES INC.	03320	13-16347-01	27	18	14	0.75
CAPITAL X-RAY SERVICE	03320	35-11114-01	20	20	47	2.32
CARIBE SHELL & TUBE, INC.	03320	52-19438-01	9	6	6	0.93
CARROLL ENGINEERS	03320	20-13042-02	3	1	0	0.05
CBI INDUSTRIES	03320	42-13553-02	97	80	28	0.35
CERTIFIED TESTING LABORATORIES INC	03320	29-14150-01	46	46	12	0.25
CHERNE CONTRACTING CORPORATION	03320	22-18342-01	0	0	0	0.00
CLEVELAND X-RAY INSPECTION INC.	03320	35-15205-01	43	43	47	1.09
COLBY AND THIELMEIER TESTING COMPANY, INC.	03320	24-13737-01	5	5	2	0.30
COLONIAL GAS CO	03320	20-15003-01	5	0	0	0.00
COLUMBIA GAS TRANSMISSION CORPORATION	03320	47-16060-01	6	4	1	0.21
COMBUSTION ENGINEERING INC	03320	06-04154-01	34	30	4	0.14

INDUSTRIAL RADIOGRAPHERS Multiple Location - 1986

Licensee Name	Program Code	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-rem)	Average Meas'ble Dose (rems or cSv)
CONSOLIDATED NDE	03320	29-21452-01	127	126	132	1.05
CONSOLIDATED X-RAY SERVICE CORPORATION	03320	42-08456-02	103	99	93	0.94
CONSTRUCTION ENGINEERING CONSULTANTS INC.	03320	37-18456-01	41	31	3	0.08
CONSUMERS POWER COMPANY	03320	21-08606-03	23	22	3	0.12
CORROSION MONITORING SERVICE	03320	12-24827-01	0	0	0	0.00
COTTON HOUSTON, INC.	03320	42-26823-01	62	59	25	0.42
CRAMER & LINDELL ENGINEERS	03320	06-20794-01	5	3	0	0.05
CRANE COMPANY	03320	24-00563-02	7	7	2	0.23
CTL ENGINEERING INC.	03320	34-08331-01	2	2	1	0.62
D & S TESTING, INC.	03320	34-21458-01	9	9	10	1.06
DANIEL INTERNATIONAL CORPORATION	03320	39-01261-02	0	0	0	0.00
DANIEL INTERNATIONAL CORPORATION	03320	39-01261-03	0	0	0	0.00
DAYTON X-RAY COMPANY (NDT LAB)	03320	34-06943-01	19	13	7	0.50
DETROIT TESTING LABORATORY INC.	03320	21-18302-01	11	11	2	0.21
DUQUESNE LIGHT COMPANY	03320	37-17507-01	14	13	2	0.13
EAGLE INSPECTION AND TESTING	03320	17-26831-01	0	0	0	0.00
EASTERN AIRLINES, AIRCRAFT INSPEC.	03320	20-27917-01	13	7	0	0.05
EASTERN TESTING AND INSPECTION INC	03320	29-09814-01	25	23	9	0.40
EBASCO SERVICES INC.	03320	29-07056-03	60	40	14	0.34
EDWARDS PIPELINE TESTING	03320	35-23193-01	47	44	29	0.66
EG & G FLORIDA, INC.	03320	09-21233-01	31	17	1	0.06
ELPASO NATURAL GAS COMPANY	0332D	42-03201-02	5	5	1	0.28
EQUITABLE GAS COMPANY	03320	37-17491-01	7	1	0	0.17
EXAM COMPANY	03320	35-16191-01	486	486	57	0.11
E. L. CONWELL & COMPANY	03320	37-17637-01	0	0	0	0.00
FACTORY MUTUAL RESEARCH CORPORATION	03320	20-04007-02	7	6	0	0.05
FINLAY TESTING LABORATORIES	03320	53-17854-01	11	11	7	0.61
FOSTER WHEELER ENERGY CORP.	03320	31-01776-05	21	12	3	0.27
FROEHLING & ROBERTSON INC.	03320	45-08890-01	13	11	5	0.45
GAMMA FIELD RADIOGRAPHIC FACILITY	03320	12-13858-01	24	17	3	0.18
GENERAL DYNAMICS CORPORATION	03320	06-01781-08	91	91	18	0.19
GLITCH FIELD SERVICE	03320	34-14071-01	53	42	14	0.32
GLOBE X-RAY SERVICES INC	03320	35-15194-01	26	26	22	0.84
GREAT LAKES TESTING CORP.	03320	13-21306-01	0	0	0	0.00
GRINNELL COMPANY, INC.	03320	38-02839-01	37	23	2	0.07
H & G INSPECTION	03320	42-26838-01	53	53	57	1.07
HERRON TESTING LABORATORY INC.	03320	34-00681-03	14	10	1	0.14
HIGH MOUNTAIN INSPECTION SERV.	03320	49-26808-01	28	18	10	0.56
HOUSTON INSPECTION SERVICE, INC.	D3320	42-23150-01	5	5	5	1.03
HUNTINGTON TESTING LAB	03320	47-23076-01	14	14	9	0.66
HUNTINGTON TESTING LAB	03320	47-23624-01	23	0	0	0.00
HUTCHINSON AREA VO-TECH INSTITUTE	03320	22-15554-01	269	16	1	0.05
H&H X-RAY SERVICES INC.	03320	17-19236-01	8	8	5	0.60

INDUSTRIAL RADIOGRAPHERS Multiple Location - 1986

Licensee Name	Program Code	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-rem)	Average Meas'ble Dose (rems or cSv)
H. C. NUTTING CO.	03320	34-14924-01	5	2	0	0.11
H. R. INSPECTION SERVICE INC.	03320	15-06209-01	8	6	7	1.13
INDEPENDENT INSPECTION	03320	35-26824-01	2	2	1	0.52
INDUSTRIAL GAMMA INSPECTION	03320	24-19850-01	1	1	0	0.17
INDUSTRIAL NDT COMPANY	03320	45-19494-01	15	10	3	0.26
INDUSTRIAL NDT SERVICES DIVISION	03320	13-06147-04	10	9	3	0.28
INDUSTRIAL TESTING LAB. SERVICES CORP.	03320	37-16406-01	11	0	0	0.00
INDUSTRIAL TESTING LAB. SERVICES CORP.	03320	37-17054-01	25	8	4	0.44
INSPECTION SERVICE, INC.	03320	41-21154-01	40	27	24	0.88
INSPECTION SERVICE CORP OF PENNSYLVANIA	03320	37-11636-01	4	3	5	1.68
INTERMOUNTAIN TESTING COMPANY	03320	05-07872-01	17	16	16	0.98
INTERNATIONAL TESTING LABS. INC.	03320	29-14027-01	8	0	0	0.00
ITL MANLIFT SERVICES	03320	03-26832-01	27	21	5	0.22
JACKSONVILLE SHIPYARDS INC.	03320	09-15611-01	7	6	2	0.40
JAN X-RAY SERVICES INC.	03320	21-16560-01	16	16	18	1.15
J.T. CULLEN COMPANY INC.	03320	12-15025-01	8	7	3	0.48
KELLOG RUST CONSTRUCTORS	03320	42-16573-01	0	0	0	0.00
KIAMIC HI X-RAY SERVICE	03320	35-21309-01	0	0	0	0.00
LABARGE PIPE & STEEL	03320	35-26736-01	0	0	0	0.00
LAKEHEAD TESTING LABORATORY INC.	03320	22-14897-01	10	3	0	0.05
LAW ENGINEERING TESTING COMPANY	03320	10-00346-03	13	6	3	0.42
LEHIGH TESTING LABORATORIES INC.	03320	07-01173-03	14	12	2	0.14
LOCKHEED SHIPBUILDING & CONSTRUCTION	03320	46-06926-02	5	3	0	0.05
MAGNA CHEK, INC.	03320	21-19111-02	32	19	3	0.14
MASSACHUSETTS MATERIALS RESEARCH INC.	03320	20-19130-01	5	2	0	0.05
MATERIALS TESTING LABORATORY OF VIRGINIA	03320	45-17151-01	21	15	5	0.34
MATTINGLY & O1REILLY SERVICE & TESTING	03320	25-21479-01	3	3	2	0.54
MET LAB INC	03320	45-09963-01	5	0	0	0.00
METALOGIC, INC.	03320	02-19728-01	18	12	3	0.24
METILS INC.	03320	42-16534-01	0	0	0	0.00
MIDWEST INSPECTION SERVICE LTD	03320	48-16296-01	10	7	2	0.29
MINNOTTE MANUFACTURING CORPORATION	03320	37-11460-01	1	0	0	0.00
MK-FERGUSON CO	03320	34-24757-01	0	0	0	0.00
MONROE X-RAY CO.	03320	17-12201-02	8	8	5	0.60
MONTANA X-RAY INC.	03320	25-21134-01	1	1	2	1.50
MQS INSPECTION	03320	12-00622-07	666	492	285	0.58
NATIONAL INSPECTION & CONSUL.	03320	09-21289-01	0	0	0	0.00
NATIONWIDE TESTING SERVICE	03320	12-24461-01	5	5	7	1.47
NAVY, DEPARTMENT OF THE, (NDT LAB.)	03320	04-06145-03	13	0	0	0.00
NAVY, DEPARTMENT OF THE, USS AJAX	03320	04-17872-01	17	5	0	0.05
NAVY, DEPARTMENT OF THE, USS DIXON	03320	04-17976-01	12	11	1	0.08
NAVY, DEPARTMENT OF THE, USS HECTOR	03320	04-18130-01	28	0	0	0.00
NAVY, DEPARTMENT OF THE, USS JASON	03320	04-17765-01	33	11	0	0.05

INDUSTRIAL RADIOGRAPHERS Multiple Location - 1986

Licensee Name	Program Code	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-rem)	Average Meas'ble Dose (rems or cSv)
NAVY, DEPARTMENT OF THE, USS PRAIRIE	03320	04-18013-01	41	22	1	0.05
NAVY, DEPARTMENT OF THE, USS PROTEUS	03320	04-18041-01	16	16	1	0.05
NAVY, DEPARTMENT OF THE, USS SAMUEL GOMPERS	03320	04-18082-01	14	4	0	0.05
NAVY, DEPARTMENT OF THE, (MARE ISLAND)	03320	04-00364-06	43	34	3	0.08
NAVY, DEPARTMENT OF THE	03320	04-03141-01	29	1	0	0.17
NAVY, DEPARTMENT OF THE	03320	04-09369-01	117	1	0	0.05
NAVY, DEPARTMENT OF THE	03320	04-13252-01	21	4	0	0.05
NAVY, DEPARTMENT OF THE, USS MCKEE	03320	04-19966-01	9	9	1	0.06
NAVY, DEPARTMENT OF THE, USS CAPE COD	03320	04-21246-01	22	3	0	0.05
NAVY, DEPARTMENT OF THE, USS ACADIA	03320	04-19846-01	12	12	1	0.05
NAVY, DEPARTMENT OF THE	03320	06-07150-01	16	16	2	0.14
NAVY, DEPARTMENT OF THE, USS SIERRA	03320	09-19770-01	12	0	0	0.00
NAVY, DEPARTMENT OF THE, USS SIMON LAKE	03320	09-21465-01	10	9	0	0.05
NAVY, DEPARTMENT OF THE, USS YOSEMITE	03320	09-23579-01	10	0	0	0.00
NAVY, DEPARTMENT OF THE, USS CANOPUS	03320	09-19932-01	15	15	2	0.10
NAVY, DEPARTMENT OF THE, USS SHENANDOAH	03320	31-17825-02	17	6	0	0.05
NAVY, DEPARTMENT OF THE, USS VULCAN	03320	31-17968-02	7	1	0	0.05
NAVY, DEPARTMENT OF THE, USS FULTON	03320	31-18014-01	13	13	1	0.05
NAVY, DEPARTMENT OF THE, USS L. Y. SPEAR	03320	31-17970-01	13	13	1	0.06
NAVY, DEPARTMENT OF THE, USS ORION	03320	31-18096-01	14	14	1	0.05
NAVY, DEPARTMENT OF THE, USS PUGET SOUND	03320	31-17928-01	8	0	0	0.00
NAVY, DEPARTMENT OF THE, USS YELLOWSTONE	03320	31-19317-02	13	0	0	0.00
NAVY, DEPARTMENT OF THE, USS EMORY LAND	03320	31-19040-01	13	13	1	0.05
NAVY, DEPARTMENT OF THE, USS HOLLAND	03320	31-18061-01	15	15	1	0.06
NAVY, DEPARTMENT OF THE,	03320	38-05314-05	9	0	0	0.00
NAVY, DEPARTMENT OF THE,	03320	39-06126-01	60	51	5	0.10
NAVY, DEPARTMENT OF THE,	03320	45-04052-03	64	56	7	0.11
NAVY, DEPARTMENT OF THE,	03320	46-19259-01	34	34	2	0.05
NAVY, DEPARTMENT OF THE, (PUGET SOUND)	03320	46-03078-01	43	39	5	0.12
NAVY, DEPARTMENT OF THE, (PEARL HARBOR)	03320	53-06007-01	32	31	2	0.05
NAVY, DEPARTMENT OF THE, NAVAL SUB BASE	03320	53-10226-01	18	3	0	0.05
NAVY, DEPARTMENT OF THE, SHORE INT. MTN.	03320	53-23653-01	7	0	0	0.00
NDE SERVICES, INC.	03320	05-19821-01	10	10	3	0.27
NEWPORT NEWS SHIPBUILDING AND DRY DOCK CO.	03320	45-09428-02	81	80	19	0.23
NEW YORK TESTING LABORATORIES INC.	03320	31-02933-01	5	4	2	0.41
NONDESTRUCTIVE INSPECTION SERVICE, INC	03320	47-11883-01	6	6	2	0.29
NONDESTRUCTIVE TESTING CORP	03320	29-19742-01	15	10	2	0.21
NOOTER CORPORATION	03320	24-03783-01	20	11	1	0.06
NORFOLK SHIPBUILDING AND DRYDOCK CORP.	03320	45-12042-01	19	19	3	0.14
NORTH AMERICAN INSPECTION, INC.	03320	37-23370-01	22	22	16	0.71
NORTHEASTERN RESEARCH & TESTING	03320	29-18006-01	0	0	0	0.00
NOVA DATA TESTING LABS	03320	45-24872-01	0	0	0	0.00
NUCLEAR ENERGY SERVICE INC	03320	42-16559-01	54	38	9	0.23

INDUSTRIAL RADIOGRAPHERS Multiple Location - 1986

Licensee Name	Program Code	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-rem)	Average Meas'ble Dose (rems or cSv)
NUCLEAR INSTALLATION SERV. CO.	03320	09-23042-01	7	3	0	0.13
OKLAHOMA TRSTING LABORATORIES	03320	35-10577-01	14	3	1	0.28
OLD DOMINION IRON & STEEL CORPORATION	03320	45-15581-01	10	7	2	0.27
PANHANDLE EASTERN PIPE LINE	03320	24-08074-03	9	6	1	0.16
PARKER INDUSTRIAL X-RAY LABORATORY	03320	06-01337-03	20	13	3	0.21
PENN INSPECTION CO.	03320	35-21144-01	22	18	10	0.53
PHOTON FIELD INSPECTION, INC.	03320	21-21010-01	4	1	0	0.05
PIPING SPECIALISTS	03320	24-24826-01	0	0	0	0.00
PITTSBURGH DES MOINES STEEL COMPANY	03320	14-01837-05	9	6	0	0.05
PITTSBURGH DES MOINES STEEL COMPANY	03320	37-02607-02	18	9	1	0.12
PITTSBURGH TESTING LABORATORY	03320	37-00276-25	316	228	136	0.59
PITT.DES MOINES	03320	37-27878-01	8	6	1	0.09
PITT.DES MOINES	03320	37-27883-02	9	0	0	0.00
PLANT INSPECTION CO	03320	04-21032-01	0	0	0	0.00
POGUE INDUSTRIES	03320	24-24541-01	11	10	8	0.82
PORTABLE ATOMIC X-RAY COMPANY	03320	35-07488-03	2	1	1	0.87
POWER INSPECTION, INC.	03320	37-21428-01	0	0	0	0.00
POWER PIPING COMPANY	03320	37-09945-01	9	8	1	0.09
PRECISION COMPONENTS	03320	37-16280-01	71	54	6	0.11
PROGRESS SERVICES,INC.	03320	34-19592-01	12	8	2	0.20
PULLMAN POWER PRODUCTS, DIV. OF KELLOGG	03320	37-08042-01	41	26	6	0.23
QUAD CITY TESTING LABORATORY, INC.	03320	14-17989-01	7	7	7	1.00
QUALITY ASSURANCE LABORATORIES INC.	03320	18-19078-01	8	6	2	0.35
QUALITY ENGINEERING SERV.& TEST.	03320	35-26815-01	7	5	4	0.85
QUALITY TESTING INC.	03320	34-17799-01	2	2	0	0.11
QUALITY TESTING INC.	03320	34-18481-01	17	17	4	0.20
Q.C. LABORATORIES INC.	03320	09-11579-03	25	22	13	0.58
RADIOGRAPHY INSPECTION	03320	35-26812-01	18	18	12	0.64
RELIANCE TESTING LABORATORIES INC.	03320	19-17176-01	23	15	7	0.48
RICHARD KRUEGEL, DBA GENERAL TESTING & ENG.	03320	34-09037-01	5	5	0	0.05
ROCKY MOUNTAIN SURVEYORS	03320	25-26835-01	0	0	0	0.00
S & S INSPECTION COMPANY	03320	12-19780-01	29	29	2	0.08
SCIENTIFIC TECHNICAL	03320	45-24882-01	0	0	0	0.00
SMITH-EMERY COMPANY	03320	04-19467-01	12	5	0	0.05
SOUTHWEST X-RAY CORP.	03320	03-21354-01	20	20	20	0.98
SPACE SCIENCE SERVICES INC	03320	09-07550-01	42	42	43	1.03
SPEC CONSULTANTS	03320	37-27891-01	3	3	0	0.05
SPECTRUM LABORATORIES INC.	03320	29-07266-01	7	2	0	0.05
STANDARD TESTING & ENGINEERING	03320	35-17054-02	1	1	0	0.17
STONE & WEBSTER ENGINEERING CORPORATION	03320	20-05600-02	39	7	0	0.06
ST. LOUIS TESTING LABORATORIES INC.	03320	24-00188-02	13	12	12	1.02
SUPERIOR INDUSTRIAL X-RAY COMPANY	03320	12-02370-01	0	0	0	0.00
TECHNICAL WELDING & INSPECTION SERVICE	03320	16-24812-01	13	6	1	0.17

INDUSTRIAL RADIOGRAPHERS Multiple Location - 1986

Licensee Name	Program Code	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-rem)	Average Meas'ble Dose (rems or cSv)
TENNECO INC	03320	42-09073-02	0	0	0	0.00
TENNESSEE VALLEY AUTHORITY (CONST. DIV.)	03320	41-06832-06	29	10	2	0.19
TEREX CORPORATION	03320	34-19607-01	3	0	0	0.00
TESTING INSTITUTE OF ALASKA	03320	50-17446-01	9	9	5	0.56
TESTING LAB OF UTAH	03320	43-26821-01	41	39	38	0.96
THE UNIVERSITY OF WYOMING	03320	49-09955-01	194	22	1	0.05
TOWNSEND AND BOTTUM INC.	03320	21-17095-01	0	0	0	0.00
TOWNSEND AND BOTTUM INC.	03320	21-17841-01	39	15	1	0.06
TRANS-EASTERN INSPECTION SERVICES INC.	03320	37-14855-01	125	108	68	0.62
TRANS-WORLD TESTING LABS., INC.	03320	04-23360-01	12	12	1	0.10
TRI-STATE INSPECTION & CONSULTANTS	03320	37-19640-01	4	4	3	0.83
TRUTOM LTD.	03320	06-20755-01	23	21	14	0.67
TULSA GAMMA RAY INC.	03320	35-17178-01	24	23	19	0.83
TUMBLEWEED X-RAY	03320	03-23185-01	41	32	17	0.51
TWIN CITY TESTING AND ENGINEERING LAB. INC.	03320	22-01376-02	29	26	19	0.72
TWIN PORTS TESTING, INC.	03320	48-23476-01	31	19	13	0.69
TWIN PORTS TESTING, INC.	03320	48-23476-02	0	0	0	0.00
ULRA TECHNOLOGY, INC.	03320	50-23363-01	17	9	4	0.47
UNITED INSPECTION, INC.	03320	35-23436-01	11	11	8	0.70
UNITED STATES TESTING	03320	04-23240-01	322	227	90	0.39
UNIVERSAL TECHNICAL TESTING LAB. INC.	03320	37-00453-03	25	19	9	0.46
UNIVERSAL TESTING	03320	43-11213-02	17	12	14	1.12
UNIVERSAL TESTING LABORATORIES INC.	03320	29-16397-01	12	10	3	0.31
VECTOR CORP.	03320	37-20827-01	6	4	0	0.05
VENEGAS INDUSTRIAL TESTING LAB. INC.	03320	28-14847-02	5	3	1	0.36
VOITH HYDRO INC	03320	37-16280-03	16	13	1	0.05
WALASHEK ENTERPRISES	03320	53-23225-01	8	7	2	0.21
WESTERN X-RAY COMPANY	03320	35-19993-01	14	14	9	0.61
WISCONSIN INDUSTRIAL TESTING INC.	03320	48-17480-01	67	60	43	0.71
X-RAY, INC.	03320	46-03414-03	45	42	31	0.73
X-R-I TESTING OF MICHIGAN	03320	21-05472-01	64	37	7	0.18
X-SCAN INSPECTION COMPANY	03320	35-19507-01	6	6	2	0.26

APPENDIX A (cont.)

MANUFACTURERS AND DISTRIBUTORS - 1986

Licensee Name	Program Type	Program Code	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-rem)	Average Meas'ble Dose (rems or cSv)
ACCURAY CORPORATION	BROAD	03211	34-00255-03	342	111	9	0.08
AMERSHAM CORP	BROAD	03211	20-12836-01	65	30	9	0.30
AMERSHAM CORPORATION	BROAD	03211	12-12836-01	296	63	19	0.30
E. I. DUPONT (NEN) BIOMEDICAL DEPT.	BROAD	03211	20-00320-21	1391	1001	409	0.40
E. R. SQUIBB AND SONS INC.	BROAD	03211	29-00139-02	339	74	34	0.45
HALLIBURTON COMPANY	BROAD	03211	35-00502-03	8	7	0	0.06
MALLINCKRODT/NUCLEAR	BROAD	03211	24-04206-01	325	295	174	0.58
NEW ENGLAND NUCLEAR CORPORATION	BROAD	03211	20-00320-19	0	0	0	0.00
NUCLEAR RESEARCH CORPORATION	BROAD	03211	29-04236-01	32	8	1	0.09
RAMSEY ENGINEERING CO. (TEXAS DIV.)	BROAD	03211	42-01485-04	86	78	19	0.24
UPJOHN COMPANY	BROAD	03211	21-00182-03	604	82	6	0.06
ADVANCED MEDICAL SYSTEMS INC.	LIMITED	03214	34-19089-01	33	18	13	0.74
ATOMIC ENERGY OF CANADA LIMITED	LIMITED	03212	12-18482-01	16	16	2	0.10
ATOMIC ENERGY OF CANADA LIMITED	LIMITED	03212	54-00300-04	0	0	0	0.00
CAMBRIDGE NUCLEAR CORPORATION	LIMITED	03214	20-06799-02	19	6	1	0.11
CANBERRA INDUSTRIES	LIMITED	03214	06-15099-01	22	7	1	0.09
FRONTIER TECHNOLOGY CORP	LIMITED	03214	SNM-1957	8	3	0	0.05
KAY-RAY INCORPORATED	LIMITED	03211	12-11184-01	48	26	2	0.08
NUCLEAR RESEARCH CORPORATION	LIMITED	03214	37-02401-01	47	10	1	0.06
OHMART CORPORATION (THE)	LIMITED	03212	34-00639-01	81	63	8	0.12
PITTWAY CORPORATION	LIMITED	03214	12-15023-01	45	1	0	0.05
SEAMAN NUCLEAR CORPORATION	LIMITED	03212	48-12016-01	16	15	12	0.80
VARIAN ASSOCIATES	LIMITED	03212	20-02237-04	20	5	0	0.05
ELFRETH ALLEY APOTHECARY	LIMITED*	02500	37-18461-01	23	19	3	0.17
PHARMATOPES INC.	LIMITED*	02500	21-19219-01	17	4	1	0.13
PHARMATOPES INC.	LIMITED*	02500	34-16654-01	23	22	9	0.39
PHARNATOPES & COMPANY	LIMITED*	02500	13-19451-01	0	0	0	0.00
SUMMA PHARMACY OF PHILADELPHIA	LIMITED*	02500	37-27830-01	19	6	0	0.05
SYNCOR CORP.	LIMITED*	02500	12-19333-01	57	46	8	0.18
SYNCOR CORP.	LIMITED*	02500	24-19360-01	16	13	2	0.12
SYNCOR CORP.	LIMITED*	02500	34-18484-01	17	17	3	0.20
SYNCOR CORP.	LIMITED*	02500	35-19583-01	9	4	0	0.08
SYNCOR CORP.	LIMITED*	02500	37-21092-01	18	15	2	0.11

FUEL FABRICATORS AND PROCESSORS - 1986

Licensee Name	Program Code	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-rem)	Average Meas'ble Dose (rems or cSv)
BABCOCK AND WILCOX INC (NAVAL DIV.)	21210	SNM-0042	2606	1149	82	0.07
BABCOCK AND WILCOX (COMMERCIAL)	21210	SNM-1168	167	167	15	0.09
COMBUSTION ENGINEERING, INC.	21210	SNM-0033	64	52	7	0.13
COMBUSTION ENGINEERING INC.	21210	SNM-1067	276	115	12	0.10
EXXON NUCLEAR COMPANY INC	21210	SNM-1227	842	344	34	0.10
GENERAL ATOMIC COMPANY	21210	SNM-0696	1040	174	33	0.19
GENERAL ELECTRIC CO.	21210	SNM-1097	1025	555	63	0.11
NUCLEAR FUEL SERVICES INC,	21210	SNM-0124	996	389	22	0.06
UNITED NUCLEAR CORP. (NAVAL DIV.)	21210	SNM-0368	130	49	3	0.06
WESTINGHOUSE ELECTRIC CORP	21210	SNM-1107	871	796	226	0.28

INDEPENDENT SPENT FUEL STORAGE INSTALLATION - 1986

Licensee Name	Program Code	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-rem)	Average Meas'ble Dose (rems or cSv)
GENERAL ELECTRIC COMPANY	23200	SNM-2500	32	32	34	1.05

LOW LEVEL WASTE DISPOSAL FACILITIES - 1986

Licensee Name	Program Code	License Number	Total Individuals Monitored	Workers with Measurable Exposure	Collective Dose (person-rem)	Average Meas'ble Dose (rems or cSv)
CHEM-NUCLEAR SYSTEMS	03231	12-13536-01	562	124	19	0.15
U.S. ECOLOGY INC.	03231	16-19204-01	434	51	12	0.24

APPENDIX B

Annual Whole Body Doses at Licensed Nuclear Power Facilities

1986

APPENDIX B
ANNUAL WHOLE BODY DOSES AT LICENSED NUCLEAR POWER FACILITIES
CY 1986

PLANT NAME	TYPE	Number of Individuals with Whole Body Doses in the Ranges (rems or cSv)													TOTAL NUMBER MONI- TORED	NUMBER WITH MEAS. EXPOSURE	TOTAL MAN- REMS
		No Meas- urable	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	1,214	710	371	331	215	121	257	114	16						3,349	2,135	1,141 **
BEAVER VALLEY	PWR	934	633	297	227	120	96	166	32	4						2,509	1,575	627 **
BIG ROCK POINT	BWR	148	100	28	16	18	8	30	2							350	202	84
BROWNS FERRY 1,2,3	BWR	5,027	1,144	687	516	243	128	228	57							8,030	3,003	1,050 **
BRUNSWICK 1,2	BWR	1,678	1,443	361	337	249	179	589	200	12						5,048	3,370	1,909 **
BYRON 1*	PWR	3,191	871	148	44	7	5	6								4,272	1,081	104
CALLAWAY	PWR	983	453	277	204	74	32	12								2,035	1,052	225 **
CALVERT CLIFFS 1,2	PWR	612	668	208	157	112	64	87								1,908	1,296	347 **
CATAWBA 1*	PWR	1,718	956	409	196	103	44	16								3,442	1,724	286 **
COOK 1,2	PWR	567	706	298	265	174	116	192	21	2						2,341	1,774	745
COOPER STATION	BWR	1,684	459	119	101	76	49	67	24							2,579	895	320 **
CRYSTAL RIVER 3	PWR	723	370	234	177	101	50	82	34	9						1,780	1,057	472
DAVIS-BESSE	PWR	2,367	633	207	101	25	10	5								3,348	981	124 **
DIABLO CANYON 1*	PWR	1,508	582	295	184	101	48	43	7							2,768	1,260	304 **
DRESDEN 2,3	BWR	1,243	752	394	417	205	188	779	261	98	17					4,354	3,111	2,796
DUANE ARNOLD	BWR	1,776	167	76	87	57	42	44	3							2,252	476	187 **
FARLEY 1,2	PWR	222	967	421	377	230	87	166	59	7						2,536	2,314	858 **
FITZPATRICK	BWR	695	636	174	126	81	53	91	19	5						1,880	1,185	411 **
FORT CALHOUN	PWR	108	615	63	39	10	12	17								864	756	74 **
GINNA	PWR	438	297	177	168	103	48	99	9							1,339	901	357 **
GRAND GULF 1*	BWR	1,882	673	279	251	130	51	90	11	1						3,368	1,486	436 **
HADDAM NECK	PWR	636	521	213	196	150	140	571	138	16						2,581	1,945	1,567 **
HATCH 1,2	BWR	1,312	1,340	696	516	274	210	374	68	7	1					4,798	3,486	1,497
INDIAN POINT 2	PWR	290	585	240	241	189	172	398	88	13						2,216	1,926	1,250 **
INDIAN POINT 3	PWR	730	252	103	106	51	26	48	2							1,318	588	202
KEWAUNEE	PWR	278	183	96	92	59	37	30	5							780	502	169 **
LACROSSE	BWR	430	131	13	11	9	9	16	23	28	20					690	260	290 **
LASALLE 1,2	BWR	1,078	530	219	203	180	119	323	33	7						2,692	1,614	949
MAINE YANKEE	PWR	229	337	59	42	25	10	22								724	495	100
MCGUIRE 1,2	PWR	1,334	875	415	361	194	132	283	63	3						3,660	2,326	1,015 **
MILLSTONE POINT 1	BWR	269	179	54	45	38	25	43	4	1						658	389	150 **
MILLSTONE POINT 2	PWR	1,653	1,101	328	275	236	153	265	24	11						4,046	2,393	918
MONTICELLO	BWR	933	277	90	117	95	67	219	29	1						1,828	895	596
NINE MILE POINT 1	BWR	2,163	756	237	184	119	97	309	114	60	2					4,041	1,878	1,220
NORTH ANNA 1,2	PWR	762	1,903	225	224	151	98	169	49	11	1					3,593	2,831	722 **
OCONEE 1,2,3	PWR	949	967	431	429	212	174	246	40							3,448	2,499	949 **

* Indicates plants counted for the first time in 1986 after completing their first full year of operation.

** Indicates actual collective dose reported by facility, otherwise calculated by staff.

APPENDIX B (Continued)
ANNUAL WHOLE BODY DOSES AT LICENSED NUCLEAR POWER FACILITIES
CY 1986

PLANT NAME	TYPE	Number of Individuals with Whole Body Doses in the Ranges (rems or cSv)													TOTAL NUMBER MONI- TORED	NUMBER WITH MEAS. EXPOSURE	TOTAL MAN- REMS	
		No Meas- urable	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				
OYSTER CREEK	BWR	359	1,657	400	342	218	202	561	264	92	4					4,099	3,740	2,436	
PALISADES	PWR	261	687	180	175	94	77	161	52	11	1					1,699	1,438	672	
PEACH BOTTOM 2,3	BWR	2,425	942	515	362	174	123	267	59	11	1					4,879	2,454	1,080	
PILGRIM 1	BWR	1,688	1,324	406	309	186	150	221	35	4						4,323	2,635	874	**
POINT BEACH 1,2	PWR	419	183	87	107	77	62	135	13							1,083	664	402	
PRAIRIE ISLAND 1,2	PWR	382	320	204	134	74	32	39	14	1						1,200	818	255	**
QUAD CITIES 1,2	BWR	968	434	164	207	136	108	326	71	5						2,419	1,451	992	
RANCHO SECO	PWR	1,247	764	263	214	105	61	102	4							2,760	1,513	402	**
ROBINSON 2	PWR	1,647	700	243	224	162	108	113	20	1						3,218	1,571	539	**
SALEM 1,2	PWR	1,719	2,209	546	411	161	86	130	11							5,273	3,554	599	**
SAN ONOFRE 1,2,3	PWR	5,539	1,946	617	436	273	167	151	4							9,133	3,594	824	**
SEQUOYAH 1,2	PWR	2,025	781	342	243	155	81	117	16							3,760	1,735	526	**
ST. LUCIE 1,2	PWR	1,317	480	260	223	116	71	119	10							2,596	1,279	491	
SUMMER 1	PWR	762	344	30	15	3										1,154	392	23	**
SURRY 1,2	PWR	972	1,830	315	295	247	190	508	224	126	28					4,735	3,763	2,356	**
SUSQUEHANNA 1,2*	BWR	1,177	1,376	550	463	279	155	170	3							4,173	2,996	828	**
THREE MILE ISLAND 1	PWR	201	930	184	127	50	44	24	1							1,561	1,360	213	**
THREE MILE ISLAND 2	PWR	225	649	135	117	104	65	304	118	5						1,722	1,497	915	**
TROJAN	PWR	786	560	244	234	144	66	72	1							2,107	1,321	381	**
TURKEY POINT 3,4	PWR	1,791	598	294	311	148	143	258	53	3						3,599	1,808	946	
VERMONT YANKEE 1	BWR	869	218	214	203	154	126	310	143	21						2,258	1,389	1,188	**
WASHINGTON NUCLEAR 2	BWR	1,428	537	189	149	75	32	27	3	1						2,441	1,013	222	**
WATERFORD 3*	PWR	1,082	740	278	119	34	24	48	1							2,326	1,244	223	**
WOLF CREEK 1*	PWR	851	330	160	121	47	18	5								1,532	681	142	
YANKEE-ROWE 1	PWR	576	265	63	35	13	5	3								960	384	45	**
ZION 1,2	PWR	1,117	253	171	183	135	83	125	17							2,084	967	498	
TOTALS - PWR's		44,365	29,754	10,131	8,160	4,784	3,058	5,594	1,244	239	30					107,359	62,994	23,008	
TOTALS - BWR's		29,232	15,075	5,865	4,962	2,996	2,121	5,084	1,426	354	45					67,160	37,928	19,515	
TOTALS - LWR's		73,597	44,829	15,996	13,122	7,780	5,179	10,678	2,670	593	75					174,519	100,922	42,523	
FT. ST. VRAIN	HTGR	221	66	4												291	70	2	**

* Indicates plants counted for the first time in 1986 after completing their first full year of operation.

** Indicates actual collective dose reported by facility, otherwise calculated by staff.

APPENDIX B(cont.)
ANNUAL WHOLE BODY DOSES AT LICENSED NUCLEAR POWER FACILITIES
PLANTS NOT IN COMMERCIAL OPERATION OR IN OPERATION LESS THAN ONE YEAR
CY 1986

PLANT NAME	TYPE	Number of Individuals with Whole Body Doses in the Ranges (rems or cSv)													TOTAL NUMBER MONITORED	NUMBER WITH MEAS. EXPOSURE	TOTAL MAN-REMS
		No Measurable	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			
BRAIDWOOD 1*	PWR	1,657	72	1												1,730	73	4
CLINTON 1*	BWR	2,493	162	3												2,658	165	8
FERMI 2*	BWR	3,068	151	1												3,220	152	8
HARRIS 1*	BWR	2,289	124	3												2,416	127	3
HUMBOLOT BAY*	BWR	172	45	21	18	9	7	12	3							287	115	48
LIMMERICK 1**	BWR	5,578	877	122	37	11	6									6,631	1,053	91
PALO VERDE 1,2**	PWR	3,695	664	296	120	38	11	5								4,829	1,134	171
PERRY 1*	BWR	2,906	314	8												3,228	322	17
RIVER BEND 1*	BWR	1,194	496	144	76	20	1	3								1,934	740	96
SHOREHAM*	BWR	2,957	212	1												3,170	213	11
VOGTLE 1*	PWR	1,958	33													1,991	33	2
TOTALS		27,967	3,150	600	251	78	25	20	3							32,094	4,127	459

* Not in commercial operation during 1986.
** Began first year of commercial operation during 1986.

APPENDIX C*

Personnel, Dose and Power Generation Summary

1969-1986

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

APPENDIX C
PERSONNEL, DOSE AND POWER GENERATION SUMMARY

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
ARKANSAS 1,2	1975	588.0	76.5	147	21					0.14	0.0
Docket 50-313; DPR-51; NPF-6	1976	464.6	56.6	476	289	27	262	100	189	0.61	0.6
1st commercial operation 12/74	1977	610.3	76.8	601	256	28	228	111	145	0.43	0.4
Type - PWRs	1978	627.2	77.5	722	189	32	157	109	80	0.26	0.3
Capacity - 836, 858 MWe	1979	397.0	55.3	1,321	369	54	315	252	117	0.28	0.9
	1980	452.8	63.7	1,233	342	81	261	213	129	0.28	0.8
	1981	1,104.7	68.3	2,225	1,102	130	972	843	259	0.50	1.0
	1982	905.4	58.6	1,608	803	97	706	505	298	0.50	0.9
	1983	915.0	54.6	2,109	1,397	97	1,300	1,145	252	0.66	1.5
	1984	1,289.1	77.4	1,742	806	89	717	533	273	0.46	0.6
	1985	1,192.3	73.6	1,262	286	61	225	148	138	0.23	0.2
	1986	1,070.3	66.9	2,135	1,141	194	947	881	260	0.53	1.1
BEAVER VALLEY 1	1977	355.6	57.0	331	87	8	79	58	29	0.26	0.2
Docket 50-334; DPR-66	1978	304.2	40.8	646	190	11	179	152	38	0.29	0.6
1st commercial operation 10/76	1979	221.0	40.0	704	132	22	110	67	65	0.19	0.6
Type - PWR	1980	39.8	6.8	1,817	553	76	477	477	76	0.30	13.9
Capacity - 810 MWe	1981	573.4	73.6	1,237	229	38	191	142	87	0.19	0.4
	1982	326.7	41.6	1,755	599	126	473	481	118	0.34	1.8
	1983	561.2	68.2	1,485	772	158	614	615	157	0.52	1.4
	1984	576.7	71.8	1,393	504	125	379	302	202	0.36	0.9
	1985	717.7	91.9	619	60	17	43	12	48	0.10	0.1
	1986	581.3	70.7	1,575	627	82	545	456	171	0.40	1.1
BIG ROCK POINT	1969	48.1		165	136					0.82	2.8
Docket 50-155; DPR-6	1970	43.5		290	194					0.67	4.5
1st commercial operation 3/63	1971	44.4		260	184					0.71	4.1
Type - BWR	1972	43.5		195	181					0.93	4.2
Capacity - 69 MWe	1973	50.9		241	285			119	166	1.18	5.6
	1974	40.7	70.3	281	276	54	222	42	234	0.98	6.8
	1975	35.1	59.8	300	180	58	122	20	160	0.60	5.1
	1976	29.5	50.1	488	289	82	207	105	184	0.59	9.8
	1977	43.6	73.4	465	334	94	240	60	274	0.72	7.7
	1978	48.5	77.9	285	175	93	82	9	166	0.61	3.6
	1979	13.0	23.5	623	455	89	366	102	353	0.73	35.0
	1980	48.9	79.0	599	354	16	338	91	263	0.59	7.2
	1981	56.9	90.6	479	160	58	102	38	122	0.33	2.8
	1982	43.6	70.8	521	328	129	199	68	260	0.63	7.5
	1983	42.3	71.0	493	263	32	231	55	208	0.53	6.2
	1984	50.3	78.6	297	155	37	118	20	135	0.52	3.1

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
BIG ROCK POINT (Continued)	1985	43.8	73.5	435	291	54	237	60	231	0.67	6.6
	1986	61.0	95.5	202	84	34	50	17	67	0.42	1.4
BROWNS FERRY 1,2,3	1975	161.7	17.8	2,380	325					0.14	2.0
Docket 50-259, 50-260, 50-296	1976	337.6	26.9	2,207	234					0.11	0.7
DPR - 33, - 52, - 68	1977	1,327.5	73.0	1,858	863	60	803	249	614	0.46	0.7
1st commercial operation 8/74, 3/75, 3/77	1978	1,992.1	73.5	2,376	1,792	4	1,788	259	1,533	0.75	0.9
Type - BWRs	1979	2,393.0	79.1	2,689	1,667	0	1,667	289	1,378	0.62	0.7
Capacity - 1065,1065,1065 MWe	1980	2,182.1	73.6	2,712	1,825	4	1,821	49	1,776	0.67	0.8
	1981	2,132.9	69.5	3,379	2,380	100	2,280	404	1,976	0.70	1.1
	1982	2,025.4	67.6	3,277	2,220	181	2,039	317	1,903	0.68	1.1
	1983	1,641.0	54.3	3,302	3,363	276	3,087	908	2,454	1.02	2.0
	1984	1,431.9	54.2	2,962	1,940	229	1,711	541	1,399	0.65	1.4
	1985	368.2	11.9	2,755	1,159	201	958	306	853	0.42	3.1
	1986	0.0	0.0	3,003	1,050	13	1,037	343	707	0.35	---
BRUNSWICK 1,2	1976	297.2	56.0	1,265	326	15	311	222	104	0.26	1.1
Docket 50-324, 50-325; DPR-62, -71	1977	291.1	55.7	1,512	1,119	48	1,071	782	337	0.74	3.8
1st commercial operation 3/77, 11/75	1978	1,173.1	83.7	1,458	1,004	99	905	695	309	0.69	0.9
Type - BWRs	1979	810.0	60.1	2,891	2,602	97	2,505	2,074	528	0.90	3.2
Capacity - 790, 790 MWe	1980	687.2	52.2	3,788	3,870	111	3,759	3,098	772	1.02	5.6
	1981	925.2	56.9	3,854	2,638	159	2,479	1,890	748	0.68	2.9
	1982	540.3	50.3	4,957	3,792	162	3,630	2,841	951	0.76	7.0
	1983	636.7	40.6	5,602	3,475	152	3,323	2,428	1,047	0.62	5.5
	1984	761.3	51.5	5,046	3,260	143	3,117	2,363	897	0.65	4.3
	1985	822.2	58.4	4,057	2,804	121	2,683	2,078	726	0.69	3.4
	1986	1,051.3	69.1	3,370	1,909	232	1,677	761	1,148	0.57	1.8
BYRON 1	1986	894.5	88.6	1,081	104	16	88	65	39	0.10	0.1
Docket 50-454; NPF-37											
1st commercial operation 9/85											
Type - PWR											
Capacity - 1129 MWe											

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
CALLAWAY 1 Docket 50-483; NPF-30 1st commercial operation 12/84 Type - PWR Capacity - 1120	1985	967.4	90.0	964	36	16	20	7	29	0.04	0.0
	1986	865.2	81.3	1,052	225	53	172	129	96	0.21	0.3
CALVERT CLIFFS 1,2 Docket 50-317, 50-318; DPR-53, -69 1st commercial operation 5/75, 4/77 Type - PWRs Capacity - 825, 825 MWe	1976	753.4	95.2	507	74	28	46	8	66	0.15	0.1
	1977	583.0	72.1	2,265	547	36	511	224	323	0.24	0.9
	1978	1,188.5	75.8	1,391	500	13	487	143	357	0.36	0.4
	1979	1,161.0	74.0	1,428	805	33	772	423	382	0.56	0.7
	1980	1,309.9	84.1	1,496	677	15	662	402	275	0.45	0.5
	1981	1,379.7	83.1	1,555	607	29	578	378	229	0.39	0.4
	1982	1,238.3	73.7	1,805	1,057	84	973	402	655	0.59	0.9
	1983	1,397.2	81.6	1,915	668	5	663	143	525	0.35	0.5
	1984	1,389.4	79.2	1,369	479	61	418	78	401	0.35	0.3
	1985	1,189.8	68.4	1,598	694	69	625	144	550	0.43	0.6
	1986	1,530.1	87.2	1,296	347	2	345	101	246	0.27	0.2
CATAWBA 1 Docket 50-413; NPF-35 1st commercial operation 6/85 Type - PWR Capacity - 1145 MWe	1986	638.9	58.8	1,724	286	27	259	68	218	0.17	0.4
COOK 1,2 Docket 5-315; DPR-58, -74 1st commercial operation 8/75, 7/78 Type - PWRs Capacity - 1020, 1060 MWe	1976	807.4	83.1	395	116	13	103	71	45	0.29	0.1
	1977	573.0	76.1	802	299	21	278	138	161	0.37	0.5
	1978	744.8	73.6	778	336	49	287	139	197	0.43	0.5
	1979	1,373.0	65.3	1,445	718	45	673	454	264	0.50	0.5
	1980	1,552.4	74.1	1,345	493	46	447	323	170	0.37	0.3
	1981	1,557.3	73.4	1,341	655	48	607	442	213	0.49	0.4
	1982	1,461.6	69.8	1,527	699	67	632	472	227	0.46	0.5
	1983	1,456.5	71.2	1,418	658	50	608	467	191	0.46	0.5
	1984	1,526.0	75.3	1,559	762	42	720	597	165	0.49	0.5
	1985	925.4	47.6	1,984	945	93	852	758	187	0.48	1.0
	1986	1,307.1	73.4	1,774	745	22	723	585	160	0.42	0.6

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
COOPER STATION	1975	456.4	83.6	579	117	30	87	19	98	0.20	0.3
Docket 50-298; DPR-46	1976	433.3	75.5	763	350	39	311	210	140	0.46	0.8
1st commercial operation 7/74	1977	538.2	86.2	315	197	50	147	66	131	0.63	0.4
Type - BWR	1978	576.0	91.0	297	158	40	118	58	100	0.53	0.3
Capacity - 764 MWe	1979	591.0	87.6	426	221	50	171	89	132	0.52	0.4
	1980	448.3	71.2	785	859	70	789	644	215	1.09	1.9
	1981	457.1	71.2	935	579	63	516	382	197	0.62	1.3
	1982	622.3	84.6	743	542	66	476	361	181	0.73	0.9
	1983	396.6	63.3	1,383	1,293	57	1,236	1,081	212	0.93	3.3
	1984	411.9	67.2	1,598	799	46	753	635	164	0.50	1.9
	1985	127.3	21.5	1,980	1,333	49	1,284	1,104	229	0.67	10.5
	1986	480.0	74.7	895	320	49	271	115	205	0.36	0.7
CRYSTAL RIVER 3	1978	311.5	41.4	643	321	8	313	244	77	0.50	1.0
Docket 50-302; DPR-72	1979	453.0	58.9	1,150	495	29	466	346	149	0.43	1.1
1st commercial operation 3/77	1980	404.1	53.2	1,053	625	24	601	382	243	0.59	1.5
Type - PWR	1981	490.4	62.2	1,120	408	18	340	236	172	0.36	0.8
Capacity - 821 MWe	1982	589.8	76.0	780	177	9	168	116	61	0.23	0.3
	1983	452.1	58.8	1,720	552	71	481	353	199	0.32	1.2
	1984	774.2	94.5	549	49	10	39	22	27	0.09	0.1
	1985	344.2	47.6	1,976	689	43	646	424	265	0.35	2.0
	1986	319.5	41.8	1,057	472	25	447	298	174	0.45	1.5
DAVIS-BESSE 1	1978	326.4	48.7	421	48	13	35	14	34	0.11	0.1
Docket 50-346; NPF-3	1979	381.0	67.0	304	30	8	22	5	25	0.10	0.1
1st commercial operation 11/77	1980	256.4	36.2	1,283	154	4	150	121	33	0.12	0.6
Type - PWR	1981	531.4	67.4	578	58	1	57	32	26	0.10	0.1
Capacity - 860 MWe	1982	390.8	51.5	1,350	164	12	152	139	25	0.12	0.4
	1983	592.1	73.0	718	80	6	74	46	34	0.11	0.1
	1984	518.5	62.5	1,088	177	10	167	122	55	0.16	0.3
	1985	238.3	31.2	718	71	3	68	46	25	0.10	0.3
	1986	3.3	1.3	981	124	22	102	103	21	0.13	37.6
DIABLO CANYON	1986	641.5	80.6	1,260	304	4	300	206	98	0.24	0.5
Docket 50-275, DPR-80											
1st commercial operation 5/85											
Type - PWRs											
Capacity - 1073											

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
DRESDEN 1*,2,3	1969	99.7			286						2.9
Docket 50-010, 50-237, 50-249;	1970	163.1			143						0.9
DPR-2, -19, -25	1971	394.5			715						1.8
1st commercial operation 7/60, 7/70,	1972	1,243.7			728						0.6
11/71	1973	1,112.2		1,341	939	143	796	344	595	0.70	0.8
Type - BWRs	1974	842.5	54.9	1,594	1,662			57	1,605	1.04	2.0
Capacity - 0, 772, 773 MWe	1975	708.1	54.6	2,310	3,423	271	3,152	2,252	1,171	1.48	4.8
	1976	1,127.2	80.8	1,746	1,680	228	1,452	749	931	0.96	1.5
	1977	1,132.9	77.0	1,862	1,693	316	1,377	693	1,000	0.91	1.5
	1978	1,242.2	79.5	1,946	1,529	204	1,325	619	910	0.79	1.2
	1979	1,013.0	74.7	2,407	1,800	191	1,609	641	1,159	0.75	1.8
	1980	1,074.4	55.0	2,717	2,105	236	1,869	1,093	1,012	0.77	2.0
	1981	1,035.7	51.5	2,408	2,802	120	2,682	1,850	952	1.16	2.7
	1982	1,085.3	77.9	2,572	2,923	136	2,787	1,731	1,192	1.14	2.7
	1983	913.6	65.6	2,854	3,582	176	3,406	2,127	1,455	1.26	3.9
	1984	789.8	55.3	2,261	1,774	153	1,621	814	960	0.78	2.2
	1985	903.0	64.5	2,817	1,685	473	1,212	878	807	0.60	1.9
	1986	740.5	52.6	3,111	2,796	272	2,524	2,113	683	0.90	3.8
DUANE ARNOLD	1976	305.2	78.0	350	105	14	91	62	43	0.30	0.3
Docket 50-331; DPR-49	1977	353.6	78.9	538	299	36	263	220	79	0.56	0.8
1st commercial operation 2/75	1978	149.2	33.2	1,112	974	59	915	932	42	0.88	6.5
Type - BWR	1979	352.0	78.0	757	275	35	240	219	56	0.36	0.8
Capacity - 515 MWe	1980	339.1	73.3	1,108	671	32	639	570	101	0.61	2.0
	1981	277.7	69.8	1,286	790	56	734	598	192	0.61	2.8
	1982	278.5	74.7	524	229	18	211	175	54	0.44	0.8
	1983	283.0	62.9	1,468	1,135	42	1,093	1,016	119	0.77	4.0
	1984	329.4	72.9	611	189	27	162	117	72	0.31	0.6
	1985	236.2	53.8	1,414	1,112	49	1,063	954	158	0.79	4.7
	1986	365.5	82.0	476	187	49	138	94	93	0.39	0.5
FARLEY 1,2	1978	713.8	86.5	527	108	39	69	34	74	0.20	0.2
Docket 50-348, 50-364; NPF-2, -8	1979	211.0	28.6	1,227	643	108	535	460	183	0.52	3.0
1st commercial operation 12/77, 7/81	1980	557.3	69.3	1,330	435	106	329	185	250	0.33	0.8
Type - PWR	1981	310.2	41.4	1,331	511	96	415	270	241	0.38	1.6
Capacity - 816, 807 MWe	1982	1,271.5	79.2	1,453	484	155	329	196	288	0.33	0.4
	1983	1,356.5	82.9	1,938	1,021	241	780	479	542	0.53	0.8

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

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
FARLEY 1,2 (Continued)	1984	1,447.0	86.6	2,046	902	177	725	504	398	0.44	0.6
	1985	1,368.2	81.1	2,551	799	157	642	443	356	0.31	0.6
	1986	1,409.3	82.4	2,314	858	148	710	464	394	0.37	0.6
FITZPATRICK	1976	489.0	71.6	600	202					0.34	0.4
Docket 50-333; DPR-59	1977	460.5	68.4	1,380	1,080	14	1,066	937	143	0.78	2.3
1st commercial operation 7/75	1978	497.0	72.1	904	909	166	743	597	312	1.01	1.8
Type - BWR	1979	349.0	50.8	850	859	169	690	538	321	1.01	2.5
Capacity - 810 MWe	1980	509.5	70.3	2,056	2,040	118	1,922	1,808	232	0.99	4.0
	1981	562.9	74.7	2,490	1,425	187	1,238	1,072	353	0.57	2.5
	1982	583.6	75.0	2,322	1,190	136	1,054	862	328	0.51	2.0
	1983	546.2	70.6	1,715	1,090	158	932	667	423	0.64	2.0
	1984	576.2	76.8	1,610	971	82	889	467	504	0.60	1.7
	1985	492.3	63.7	1,845	1,051	110	941	718	333	0.57	2.1
	1986	711.2	90.6	1,185	411	81	330	168	243	0.35	0.6
FORT CALHOUN	1975	252.3	67.4	469	294			92	202	0.63	1.2
Docket 50-285; DPR-40	1976	265.9	69.5	516	313	28	285	38	275	0.61	1.2
1st commercial operation 9/73	1977	351.8	79.4	535	297	33	264	72	225	0.56	0.8
Type - PWR	1978	342.3	75.1	596	410	59	351	151	259	0.69	1.2
Capacity - 478 MWe	1979	440.0	95.7	451	126	19	107	47	79	0.28	0.3
	1980	242.3	60.4	891	668	38	630	426	242	0.75	2.8
	1981	260.9	72.3	822	458	61	397	254	204	0.56	1.8
	1982	418.0	89.7	604	217	44	173	99	118	0.36	0.5
	1983	330.4	73.1	860	433	66	367	205	228	0.50	1.3
	1984	279.2	59.9	913	563	91	472	313	250	0.62	2.0
	1985	367.0	73.7	984	373	54	319	231	142	0.38	1.0
	1986	431.8	94.3	756	74	26	48	30	44	0.10	0.2
GINNA	1971	327.8		340	430	69	361	108	322	1.26	1.3
Docket 50-244; DPR-18	1972	293.6		677	1,032	71	961	278	754	1.52	3.5
1st commercial operation 7/70	1973	409.5		319	224	55	169	84	140	0.70	0.5
Type - PWR	1974	253.7	62.4	884	1,225					1.39	4.8
Capacity - 470 MWe	1975	365.2	76.7	685	538					0.79	1.5
	1976	248.8	58.2	758	636	29	607	210	426	0.84	2.6
	1977	365.6	85.5	530	401	15	386	120	281	0.76	1.1
	1978	386.5	80.6	657	450	20	430	98	352	0.68	1.2
	1979	355.0	72.8	878	592	68	524	207	385	0.67	1.7
	1980	370.5	76.0	1,073	708	64	644	302	406	0.66	1.9

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
GINNA (Continued)	1981	399.0	82.1	925	655	49	606	251	404	0.71	1.6
	1982	289.0	58.8	1,117	1,140	80	1,060	546	594	1.02	3.9
	1983	365.0	74.6	969	855	42	813	378	477	0.88	2.3
	1984	378.1	77.2	713	394	57	337	195	199	0.55	1.0
	1985	436.7	87.9	845	426	91	335	178	248	0.50	1.0
	1986	433.3	87.4	901	357	45	312	107	250	0.40	0.8
GRAND GULF Docket 50-416; NPF-29 1st commercial operation 7/85 Type - BWR Capacity - 1108 MWe	1986	494.7	60.9	1,486	436	68	368	329	107	0.29	0.9
HADDAM NECK	1969	438.5		138	106			27	79	0.77	0.2
Docket 50-213; DPR-61	1970	424.7		734	689			463	226	0.94	1.6
1st commercial operation 1/68	1971	502.2		289	342			166	176	1.18	0.7
Type -PWR	1971	515.6		355	325			181	144	0.91	0.6
Capacity - 569 MWe	1973	293.1		951	697			544	153	0.73	2.4
	1974	521.4	91.2	550	201					0.37	0.4
	1975	494.3	89.9	795	703	20	683			0.88	1.4
	1976	482.9	82.5	644	449	5	444	253	196	0.70	0.9
	1977	480.7	83.9	894	641	59	582	440	201	0.72	1.3
	1978	563.4	98.6	216	117	25	92	18	99	0.54	0.2
	1979	493.0	87.5	1,226	1,161	73	1,088	783	378	0.95	2.4
	1980	426.8	75.0	1,860	1,353	175	1,178	1,076	277	0.73	3.2
	1981	487.5	84.3	1,554	1,036	174	862	809	227	0.67	2.1
	1982	543.9	93.4	559	126	46	80	22	104	0.23	0.2
	1983	453.7	77.8	1,645	1,384	106	1,278	1,017	367	0.84	3.1
	1984	404.0	71.7	1,430	1,216	154	1,062	803	413	0.85	3.0
	1985	556.1	98.4	384	101	21	80	22	79	0.26	0.2
	1986	294.8	53.6	1,945	1,567	179	1,388	1,274	293	0.81	5.3
HATCH 1,2	1976	496.3	83.8	630	134	79	55	4	130	0.21	0.3
Docket 50-321, 50-366; DPR-57;	1977	446.8	66.3	1,303	465	96	369	220	245	0.36	1.0
NPF-05	1978	513.0	72.8	1,304	248	88	160	52	196	0.19	0.5
1st commercial operation 12/75, 9/79	1979	401.0	54.6	2,131	582	85	497	382	200	0.27	1.5
Type - BWRs	1980	1,008.7	70.9	1,930	449	143	306	163	286	0.23	0.4
Capacity - 752, 748 MWe	1981	870.9	64.3	2,899	1,337	200	1,137	792	545	0.46	1.5
	1982	768.0	56.6	3,418	1,460	218	1,242	1,064	396	0.43	1.9

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
HATCH 1, 2 (Continued)	1983	934.7	68.6	3,428	1,299	253	1,046	851	448	0.38	1.4
	1984	658.6	117.3	4,110	2,218	311	1,907	1,861	357	0.54	3.4
	1985	1,211.0	79.1	2,841	818	182	636	507	311	0.29	0.7
	1986	872.1	59.0	3,486	1,497	347	1,150	862	635	0.43	1.7
HUMBOLDT BAY*	1969	44.6		125	164	69	95	12	152	1.31	3.7
Docket 50-133; OPR-7	1970	49.3		115	209	130	79	37	172	1.82	4.2
1st commercial operation 8/63	1971	39.6		140	292	114	178	65	227	2.09	7.4
Type - BWR	1972	43.1		127	253	81	172	57	196	1.99	5.9
Capacity - 0 MWe	1973	50.1		210	266	60	206			1.27	5.3
	1974	43.4	83.8	296	318	103	215			1.07	7.3
	1975	45.3	83.9	265	339	131	208	112	227	1.28	7.5
	1976	23.5	46.4	523	683	37	646	50	633	1.31	29.1
	1977	0.0	0.0	1,063	1,904	24	1,880	973	931	1.79	---
	1978	0.0	0.0	320	335	13	322	145	190	1.05	---
	1979	0.0	0.0	135	31	11	20	2	29	0.23	---
	1980	0.0	0.0	142	22	10	12	3	19	0.15	---
	1981	0.0	0.0	75	9					0.12	---
	1982	0.0	0.0	71	19	5	14	0	19	0.27	---
	1983	0.0	0.0	84	17	4	13	0	17	0.20	---
INDIAN POINT 1**,2,3***	1969	206.2			298						1.4
Docket 50-3, 50-247, 50-286;	1970	43.3			1,639						37.8
OPR-5, -26, -64	1971	154.0			768						5.0
1st commercial operation 10/62, 8/73,	1972	142.3			967						6.8
8/76	1973	0.0		2,998	5,262	709	4,553	2,847	2,415	1.75	---
Type - PWR	1974	556.1	59.4	1,019	910					0.89	1.6
	1975	584.4	74.8	891	705	166	539	47	658	0.79	1.2
	1976	273.9	34.8	1,590	1,950	154	1,796	172	1,778	1.23	7.1
	1977	1,278.3	75.3	1,391	1,070	189	881	383	687	0.77	0.8
	1978	1,172.3	67.8	1,909	2,006	260	1,746	759	1,247	1.05	1.7

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

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

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

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
INDIAN POINT 1**,2	1979	574.0	71.4	1,349	1,279	209	1,070	612	667	0.95	2.2
Docket 50-3, 50-247; DPR-5, -26	1980	510.8	64.8	1,577	971	181	790	398	573	0.62	1.9
1st commercial operation 10/62, 8/73	1981	367.5	46.0	2,595	2,731	237	2,494	1,595	1,137	1.05	7.4
Type - PWR	1982	532.4	65.4	2,144	1,635	343	1,292	883	752	0.76	3.1
Capacity - 0, 864 MWe	1983	702.6	84.0	1,057	486	200	286	217	269	0.46	0.7
	1984	416.7	51.9	2,919	2,644	650	1,994	1,863	781	0.91	6.3
	1985	791.4	95.7	708	192	123	69	95	97	0.27	0.2
INDIAN POINT 2	1986	457.5	56.2	1,926	1,250	350	900	349	901	0.65	2.7
Docket 50-247; DPR-26											
1st commercial operation 8/73											
Type - PWR											
Capacity - 864 MWe											
INDIAN POINT 3***	1979	574.0	66.5	808	636	63	573	482	154	0.79	1.1
Docket 50-286; DPR-64	1980	367.3	53.2	977	308	47	261	210	98	0.32	0.8
1st commercial operation 8/76	1981	367.5	59.8	677	364	46	318	255	109	0.54	1.0
Type - PWR	1982	171.5	22.5	1,477	1,226	42	1,184	1,094	132	0.83	7.1
Capacity - 965 MWe	1983	7.8	2.6	941	607	38	569	494	113	0.65	77.8
	1984	714.4	76.3	658	230	48	182	127	103	0.35	0.3
	1985	566.5	66.0	1,093	570	35	535	455	115	0.52	1.0
	1986	655.3	73.4	588	202	34	168	123	79	0.34	0.3
KEWAUNEE	1975	401.9	88.2	104	28	1	27	12	16	0.27	0.1
Docket 50-305; DPR-43	1976	405.9	78.9	381	270	16	254	193	77	0.71	0.7
1st commercial operation 6/74	1977	425.0	79.9	312	139	8	131	76	63	0.45	0.3
Type - PWR	1978	466.6	89.5	335	154	11	143	89	65	0.46	0.3
Capacity - 503 MWe	1979	412.0	79.0	343	127	6	121	79	48	0.37	0.3
	1980	433.8	82.1	401	165	7	158	103	62	0.41	0.4
	1981	451.8	86.7	383	141	7	134	94	47	0.37	0.3
	1982	458.4	87.6	353	101	5	96	51	50	0.29	0.2
	1983	444.1	83.7	445	165	10	155	119	46	0.37	0.4

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

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

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
KEWAUNEE (Continued)	1984	455.3	85.7	482	139	7	132	90	19	0.29	0.3
	1985	443.1	82.4	519	176	4	172	118	58	0.34	0.4
	1986	461.7	85.8	502	169	8	161	111	58	0.34	0.4
LACROSSE	1970	15.3			111			40	71		7.2
Docket 50-409; DPR-45	1971	323.1		218	158					0.72	4.8
1st commercial operation 11/69	1972	29.2		151	172					1.14	5.9
Type - BWR	1973	24.4		157	221					1.41	9.1
Capacity - 48 MWe	1974	37.9	81.0	115	139	89	50	6	133	1.21	3.7
	1975	32.0	69.6	165	234					1.42	7.3
	1976	21.2	47.6	118	111	40	71	6	105	0.94	5.2
	1977	11.3	33.7	141	224	60	164	8	216	1.59	19.8
	1978	21.6	62.0	182	164	69	95	6	158	0.90	7.6
	1979	24.0	71.8	153	186	65	121	21	165	1.22	7.8
	1980	26.4	68.5	124	218	63	155	11	207	1.76	8.3
	1981	29.6	76.0	187	123	62	61	3	120	0.66	4.2
	1982	17.2	44.6	148	205	65	140	16	189	1.39	11.9
	1983	24.8	59.7	160	313	103	210	31	282	1.96	12.6
	1984	38.5	80.5	288	252	141	111	5	247	0.88	6.5
	1985	39.2	86.7	373	173	76	97	22	151	0.46	4.4
	1986	19.6	46.1	260	290					1.12	14.8
LASALLE 1,2	1984	677.8	68.9	1,245	252	30	222	86	166	0.20	0.4
Docket 50-373, -374; NPF-11, -18	1985	987.9	52.5	1,635	685	88	597	420	265	0.42	0.7
1st commercial operation 1/84, 10/84	1986	929.5	26.6	1,614	949	151	798	557	392	0.59	1.0
Type - BWR											
Capacity - 1036, 1036 MWe											
MAINE YANKEE	1973	408.7		782	117			59	58	0.15	0.3
Docket 50-309; DPR-36	1974	432.6	68.7	619	420	64	356	188	232	0.68	1.0
1st commercial operation 12/72	1975	542.9	79.9	440	319	15	304	181	138	0.73	0.6
Type - PWR	1976	712.2	95.0	244	85	27	58	26	59	0.35	0.1
Capacity - 810 MWe	1977	617.6	82.2	508	245	46	199	112	133	0.48	0.4
	1978	642.7	84.1	638	420	54	366	262	158	0.66	0.7
	1979	537.0	68.4	393	154	70	84	26	128	0.39	0.3
	1980	527.0	72.2	735	462	117	345	277	185	0.63	0.9
	1981	624.2	78.2	868	424	11	413	308	116	0.49	0.7
	1982	542.5	69.1	1,295	619	33	586	462	157	0.48	1.1
	1983	677.1	83.6	592	164	40	124	72	92	0.28	0.2

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
MAINE YANKEE (Continued)	1984	605.7	74.4	1,262	884	9	875	702	182	0.70	1.5
	1985	635.4	79.2	1,009	700	54	646	529	171	0.69	1.1
	1986	737.6	87.8	495	100	21	79	14	86	0.20	0.1
MCGUIRE 1,2	1982	524.9	80.4	1,560	169	26	143	29	140	0.11	0.3
Docket 50-369, -370; NPF-9, -17	1983	558.3	55.4	1,751	521	35	486	123	398	0.30	0.9
1st commercial operation 12/81, 3/84	1984	764.1	68.5	1,663	507	40	467	110	397	0.30	0.7
Type - PWR	1985	1,477.6	68.1	2,217	771	92	679	277	494	0.35	0.5
Capacity - 1180, 1180 MWe	1986	1,360.0	56.1	2,326	1,015	46	969	399	616	0.44	0.7
MILLSTONE POINT 1	1972	377.6		612	596	50	546	340	256	0.97	1.6
Docket 50-245; DPR-21	1973	225.1		1,184	663	125	538	422	241	0.56	2.9
1st commercial operation 3/71	1974	430.3	79.1	2,477	1,430					0.58	3.3
Type - BWR	1975	465.4	75.6	2,587	2,022					0.78	4.3
Capacity - 654 MWe	1976	449.8	76.1	1,377	1,194	54	1,140	955	239	0.87	2.7
	1977	575.7	89.6	1,075	392	118	274	159	233	0.36	0.7
	1978	556.6	87.6	1,391	1,239	140	1,099	907	332	0.89	2.2
	1979	505.0	77.3	1,769	1,793	198	1,595	1,326	467	1.01	3.6
	1980	405.8	69.0	3,024	2,158	100	2,058	1,864	294	0.71	5.3
	1981	304.3	51.6	2,506	1,496	96	1,400	1,201	295	0.60	4.9
	1982	490.2	79.9	1,370	929	78	851	587	342	0.68	1.9
	1983	640.1	95.6	309	244	63	181	74	170	0.79	0.4
	1984	516.1	78.8	1,992	836	80	756	532	304	0.42	1.6
	1985	548.5	83.6	732	608	65	543	369	239	0.83	1.1
	1986	626.8	95.4	389	150	46	104	52	98	0.39	0.2
MILLSTONE POINT 2	1976	545.7	78.7	620	168	26	142	73	95	0.27	0.3
Docket 50-336; DPR-65	1977	518.7	65.7	667	242	38	204	153	89	0.36	0.5
1st commercial operation 12/75	1978	536.6	67.3	1,420	1,621	72	1,549	1,534	87	1.14	3.0
Type - PWR	1979	520.0	62.8	757	472	81	391	305	167	0.62	0.9
Capacity - 857 MWe	1980	579.3	69.2	892	636	76	560	514	122	0.71	1.1
	1981	722.4	82.6	890	531	44	487	393	138	0.60	0.7
	1982	595.9	70.6	2,083	1,413	27	1,386	1,219	194	0.68	2.4
	1983	294.0	34.2	2,383	1,881	170	1,711	1,548	333	0.79	6.4
	1984	782.7	93.5	285	120	11	109	63	57	0.42	0.2
	1985	417.8	49.4	1,905	1,581	60	1,521	1,255	326	0.83	3.8
	1986	613.7	72.5	2,393	918	125	793	737	181	0.38	1.5

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
MONTICELLO	1972	424.4		99	61	40	21	1	60	0.62	0.1
Docket 50-263; DPR-22	1973	389.5		401	176	48	128	67	109	0.44	0.5
1st commercial operation 6/71	1974	349.3	74.9	842	349			91	258	0.41	1.0
Type - BWR	1975	344.8	72.2	1,353	1,353					1.00	3.9
Capacity - 536 MWe	1976	476.4	91.5	325	263	59	204	51	212	0.81	0.6
	1977	425.6	79.9	860	1,000	135	865	661	339	1.16	2.3
	1978	459.4	87.2	679	375	62	313	165	210	0.55	0.8
	1979	522.0	97.6	372	157	62	95	51	106	0.42	0.3
	1980	411.8	78.2	1,114	531	82	449	248	283	0.48	1.3
	1981	389.3	72.6	1,446	1,004	101	903	756	248	0.69	2.6
	1982	291.1	63.3	1,307	993	130	863	760	233	0.76	3.4
	1983	494.6	96.3	416	121	57	64	23	98	0.29	0.2
	1984	33.7	9.2	1,872	2,462	208	2,254	927	1,535	1.32	73.1
	1985	509.8	91.7	586	327	87	240	47	280	0.56	0.6
	1986	402.7	79.1	895	596	94	502	115	481	0.67	1.5
NINE MILE POINT 1	1970	227.0		821	44	12	32	17	27	0.05	0.2
Docket 50-220; DPR-63	1971	346.5		1,006	195	43	152	63	132	0.19	0.6
1st commercial operation 12/69	1972	381.8		735	285	59	226	28	257	0.39	0.7
Type - BWR	1973	411.0		550	567	139	428	118	449	1.03	1.4
Capacity - 610 MWe	1974	385.9	70.5	740	824	42	782	279	545	1.11	2.1
	1975	359.0	72.1	649	681	68	613	203	478	1.05	1.9
	1976	484.6	88.2	392	428	52	376	229	199	1.09	0.9
	1977	347.4	59.2	1,093	1,383	41	1,342	883	500	1.27	4.0
	1978	527.7	95.1	561	314	59	255	26	288	0.56	0.6
	1979	354.0	66.1	1,326	1,497	106	1,391	940	557	1.13	4.2
	1980	533.9	92.3	1,174	591	75	516	251	340	0.50	1.1
	1981	385.2	66.0	2,029	1,592	144	1,448	1,064	528	0.78	4.1
	1982	133.5	21.4	1,352	1,264	63	1,201	944	320	0.93	9.5
	1983	329.8	56.2	1,405	860	50	810	576	284	0.61	2.6
	1984	426.8	71.9	1,530	890	163	727	372	518	0.58	2.1
	1985	580.9	96.4	1,007	265	60	205	43	222	0.26	0.5
	1986	371.0	65.3	1,878	1,220	36	1,184	698	522	0.65	3.3
NORTH ANNA 1,2	1979	507.0	61.7	2,025	449	78	371	190	259	0.22	0.9
Docket 50-338; NPF-04, -09	1980	681.8	86.5	2,086	218	128	90	85	133	0.10	0.3
1st commercial operation 6/78, 12/80	1981	1,241.9	71.5	2,416	680	188	492	343	337	0.28	0.5
Type - PWRs	1982	777.7	45.8	2,872	1,915	78	1,837	1,207	708	0.67	2.5
Capacity - 893, 893 MWe	1983	1,338.4	76.1	2,228	665	129	536	296	369	0.30	0.5
	1984	1,021.3	58.8	3,062	1,945	154	1,791	1,416	529	0.64	1.9

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
NORTH ANNA 1,2 (Continued)	1985	1,516.9	86.1	2,436	839	141	698	502	337	0.34	0.6
	1986	1,484.5	83.7	2,831	722	111	611	343	379	0.26	0.5
OCONEE 1,2,3	1974	650.6	60.1	844	517	18	499	144	373	0.61	0.8
Docket 50-269, 50-270, 50-287;	1975	1,838.3	75.5	829	497	72	425	90	407	0.60	0.3
DPR-38, -47, -55	1976	1,561.4	63.0	1,215	1,026	65	961	219	807	0.84	0.7
1st commercial operation 7/73, 9/74,	1977	1,566.4	65.9	1,595	1,328	244	1,084	294	1,034	0.83	0.8
12/74	1978	1,909.0	75.8	1,636	1,393	179	1,214	340	1,053	0.85	0.7
Type - PWRs	1979	1,708.0	67.7	2,100	1,001	123	878	181	820	0.48	0.6
Capacity - 860, 860, 860 MWe	1980	1,703.7	70.1	2,124	1,055	117	938	162	893	0.50	0.6
	1981	1,661.5	66.8	2,445	1,211	113	1,098	275	936	0.50	0.7
	1982	1,293.1	52.5	2,445	1,792	97	1,695	364	1,428	0.73	1.4
	1983	2,141.5	82.2	1,902	1,207	88	1,119	316	891	0.63	0.6
	1984	2,242.9	85.7	2,085	1,106	63	1,043	260	846	0.53	0.5
	1985	2,036.3	80.5	2,729	1,304	143	1,161	378	926	0.48	0.6
	1986	1,995.5	79.0	2,499	949	37	912	261	688	0.38	0.5
OYSTER CREEK	1970	413.6		95	63	21	42	11	52	0.66	0.1
Docket 50-219; DPR-16	1971	448.9		249	240	50	190	92	148	0.96	0.5
1st commercial operation 12/69	1972	515.0		339	582	150	432	167	415	1.72	1.1
Type - BWR	1973	424.6		782	1,236	195	1,041	683	553	1.58	2.9
Capacity - 620 MWe	1974	434.5	70.4	935	984	166	818	162	822	1.05	2.3
	1975	373.6	73.3	1,210	1,140	169	971	271	869	0.94	3.1
	1976	456.5	79.3	1,582	1,078	70	1,008	587	491	0.68	2.4
	1977	385.7	70.1	1,673	1,614	76	1,538	1,048	566	0.96	4.2
	1978	431.8	74.3	1,411	1,279	134	1,145	696	583	0.91	3.0
	1979	541.0	85.9	842	467	95	372	135	332	0.55	0.9
	1980	232.9	41.4	1,966	1,733	97	1,636	1,182	551	0.88	7.4
	1981	314.8	59.8	1,689	917	48	869	479	438	0.54	2.9
	1982	242.7	62.5	1,270	865	33	832	491	374	0.68	3.6
	1983	27.9	11.5	2,303	2,257	65	2,192	1,863	394	0.98	80.9
	1984	37.1	9.6	2,369	2,054	134	1,920	1,538	516	0.87	55.4
	1985	446.1	89.4	2,342	748	116	632	318	430	0.32	1.7
	1986	157.3	31.5	3,740	2,436	288	2,148	1,924	512	0.65	15.5

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
PALISADES	1972	216.8			78						0.4
Docket 50-255; DPR-20	1973	286.8		975	1,133	16	1,117	661	472	1.16	4.0
1st commercial operation 12/71	1974	10.7	5.5	774	627					0.81	58.6
Type - PWR	1975	302.0	64.5	495	306					0.62	1.0
Capacity - 730 MWe	1976	346.9	55.2	742	696	23	673	109	587	0.94	2.0
	1977	616.6	91.4	332	100	13	87	23	77	0.30	0.2
	1978	320.2	49.7	849	764	52	712	173	591	0.90	2.4
	1979	415.0	59.9	1,599	854	99	755	360	494	0.53	2.1
	1980	288.3	42.9	1,307	424	191	233	312	112	0.32	1.5
	1981	418.2	57.2	2,151	902	167	735	737	165	0.42	2.2
	1982	404.3	54.7	1,554	330	73	257	203	127	0.21	0.8
	1983	454.4	60.3	2,167	977	145	832	494	483	0.45	2.2
	1984	98.7	15.2	1,344	573	79	494	339	334	0.43	5.8
	1985	639.2	83.8	1,355	507	105	402	239	268	0.37	0.8
	1986	102.3	15.1	1,438	672	148	524	204	468	0.47	6.6
PEACH BOTTOM 2,3	1975	1,234.3	80.9	971	228					0.23	0.2
Docket 50-277, 50-278; DPR-44, -56	1976	1,379.2	73.0	2,136	840	180	660	434	406	0.39	0.6
1st commercial operation 7/74, 12/74	1977	1,052.4	58.7	2,827	2,036	223	1,813	1,374	662	0.72	1.9
Type - BWR	1978	1,636.3	84.0	2,244	1,317	162	1,155	709	608	0.59	0.8
Capacity - 1051, 1035 MWe	1979	1,740.0	84.5	2,276	1,388	245	1,143	717	671	0.61	0.8
	1980	1,374.2	66.3	2,774	2,302	311	1,991	1,596	706	0.83	1.7
	1981	1,161.8	58.0	2,857	2,506	273	2,233	1,880	626	0.88	2.2
	1982	1,583.3	76.9	2,734	1,977	313	1,664	1,347	630	0.72	1.2
	1983	824.7	40.5	3,107	2,963	331	2,632	2,422	541	0.95	3.6
	1984	1,165.8	57.4	3,313	2,450	225	2,225	2,045	405	0.74	2.1
	1985	682.7	42.5	4,209	3,354	396	2,958	2,727	627	0.80	4.9
	1986	1,394.9	71.7	2,454	1,080	294	786	671	409	0.44	0.8
PILGRIM 1	1973	484.0		230	126	49	77			0.55	0.3
Docket 50-293; DPR-35	1974	234.1	39.2	454	415					0.91	1.8
1st commercial operation 12/72	1975	308.1	71.3	473	798	142	656	412	386	1.69	2.6
Type - BWR	1976	287.8	60.7	1,317	2,648	66	2,582	2,270	378	2.01	9.2
Capacity - 670 MWe	1977	316.6	61.4	1,875	3,142	146	2,996	2,176	966	1.68	9.9
	1978	519.5	83.1	1,667	1,327	157	1,170	895	432	0.80	2.6
	1979	574.0	89.4	2,458	1,015	131	884	516	499	0.41	1.8
	1980	360.3	56.2	3,549	3,626	207	3,419	3,076	550	1.02	10.1
	1981	408.9	65.9	2,803	1,836	70	1,766	1,418	418	0.66	4.5
	1982	389.9	63.9	2,854	1,539	314	1,225	1,094	445	0.54	3.9
	1983	559.5	87.2	2,326	1,162	296	886	776	386	0.50	2.1

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
PILGRIM 1 (Continued)	1984	1.4	0.4	4,542	4,082	647	3,435	3,767	315	0.90	---
	1985	587.3	91.5	2,209	893	13	880	718	175	0.40	1.5
	1986	121.9	18.8	2,635	874	16	764	718	156	0.33	7.2
POINT BEACH 1,2	1971	393.4			164						0.4
Docket 50-266, 50-301; DPR-24, -27	1972	378.3			580						1.5
1st commercial operation 12/70	1973	693.7		501	588	72	516			1.17	0.8
Type - PWRs	1974	760.2	81.3	400	295	70	225	81	214	0.74	0.4
Capacity - 485, 485 MWe	1975	801.2	82.9	339	459					1.35	0.6
	1976	857.3	86.7	313	370	58	312	107	263	1.18	0.4
	1977	873.9	87.3	417	429	63	366	212	217	1.03	0.5
	1978	914.4	90.9	336	320	71	249	111	209	0.95	0.3
	1979	808.0	80.8	610	644	65	579	449	195	1.06	0.8
	1980	727.2	82.5	561	598	60	538	420	178	1.07	0.8
	1981	760.4	83.6	773	596	83	513	364	232	0.77	0.8
	1982	757.2	84.3	767	609	72	537	375	234	0.79	0.8
	1983	648.2	72.7	1,702	1,403	81	1,322	1,179	224	0.82	2.2
	1984	788.9	78.6	1,372	789	121	668	457	332	0.58	1.0
	1985	831.3	82.5	671	482	71	411	242	240	0.72	0.6
	1986	858.9	85.7	664	402	50	352	219	183	0.61	0.5
PRAIRIE ISLAND 1,2	1974	181.9	43.9	150	18			5	13	0.12	0.1
Docket 50-282, 50-306; DPR-42, -60	1975	836.0	83.3	477	123					0.26	0.1
1st commercial operation 12/73	1976	725.2	76.6	818	447	68	379	235	212	0.55	0.6
Type - PWRs	1977	922.9	87.2	718	300	73	227	60	240	0.42	0.3
Capacity - 503, 500 MWe	1978	941.1	92.2	546	221	43	178	48	173	0.40	0.2
	1979	865.0	86.0	594	180	29	151	49	131	0.30	0.2
	1980	800.7	79.9	983	353	40	313	141	212	0.36	0.4
	1981	844.9	80.5	836	329	153	176	128	201	0.39	0.4
	1982	944.9	90.4	645	229	30	199	68	161	0.36	0.2
	1983	921.1	86.8	654	233	14	219	73	160	0.36	0.3
	1984	972.4	91.7	539	147	18	129	52	95	0.27	0.2
	1985	882.6	84.0	1,082	416	31	385	136	280	0.38	0.5
	1986	930.6	90.3	818	255	11	244	80	175	0.31	0.3

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
QUAD CITIES 1,2	1974	958.1	72.3	678	482			36	446	0.71	0.5
Docket 50-254, 50-265; DPR-29, -30	1975	833.6	68.4	1,083	1,618	114	1,504	692	926	1.49	1.9
1st commercial operation 2/73, 3/73	1976	951.2	73.1	1,225	1,651	269	1,382	648	1,003	1.35	1.7
Type - BWRs	1977	970.1	84.0	907	1,031	108	923	373	658	1.14	1.1
Capacity - 769, 769 MWe	1978	1,124.5	88.6	1,207	1,618	156	1,462	722	896	1.34	1.4
	1979	1,075.0	84.6	1,688	2,158	215	1,943	1,250	908	1.28	2.0
	1980	866.9	64.4	3,089	4,838	291	4,547	3,657	1,181	1.57	5.6
	1981	1,156.9	81.1	2,246	3,146	100	3,046	2,623	523	1.40	2.7
	1982	1,018.7	76.0	2,314	3,757	177	3,580	2,653	1,104	1.62	3.7
	1983	1,088.5	79.2	1,802	2,491	166	2,325	1,937	554	1.38	2.3
	1984	994.6	65.7	1,678	1,579	122	1,457	1,078	501	0.94	1.6
	1985	1,268.0	82.7	1,184	990	172	818	27	963	0.84	0.8
	1986	1,093.2	71.0	1,451	992	134	858	593	399	0.68	0.9
RANCHO SECO	1976	268.1	30.4	297	58	6	52	17	41	0.20	0.2
Docket 50-312; DPR-54	1977	706.4	77.1	515	390	61	329	248	142	0.76	0.6
1st commercial operation 4/75	1978	607.7	80.5	508	323	76	247	176	147	0.64	0.5
Type - PWR	1979	687.0	91.1	287	126	27	99	64	62	0.44	0.2
Capacity - 873 MWe	1980	530.9	60.4	890	412	110	302	281	131	0.46	0.8
	1981	321.2	40.2	772	402	83	319	266	137	0.52	1.3
	1982	409.5	53.3	766	337	49	288	217	120	0.44	0.8
	1983	347.9	46.8	1,338	787	158	629	604	183	0.59	2.3
	1984	460.0	58.3	802	222	73	149	115	107	0.28	0.5
	1985	238.7	30.8	1,764	756	183	573	583	173	0.43	3.2
	1986	0.0	0.0	1,513	402	17	385	125	277	0.27	---
ROBINSON 2	1972	580.0		245	215	42	173	137	78	0.88	0.4
Docket 50-261; DPR-23	1973	455.1		831	695					0.84	1.5
1st commercial operation 3/71	1974	578.1	83.3	853	672	185	487			0.79	1.2
Type - PWR	1975	501.8	72.7	849	1,142					1.35	2.3
Capacity - 665 MWe	1976	585.5	84.7	597	715	30	685	457	758	1.20	1.2
	1977	511.5	85.2	634	455	52	403	223	232	0.72	0.9
	1978	480.5	72.0	943	963	63	900	529	434	1.02	2.0
	1979	482.0	70.8	1,454	1,188	60	1,128	794	394	0.82	2.5
	1980	387.3	62.2	2,009	1,852	79	1,773	1,379	473	0.92	4.8
	1981	426.6	73.0	1,462	733	45	688	513	220	0.50	1.7
	1982	277.5	48.9	2,011	1,426	128	1,298	945	481	0.71	5.1
	1983	409.8	75.5	2,244	923	96	827	628	295	0.41	2.3
	1984	28.0	7.0	4,127	2,880	196	2,684	2,549	331	0.70	102.9

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
ROBINSON 2 (Continued)	1985	629.5	87.9	1,378	311	52	259	165	146	0.23	0.5
	1986	577.1	80.3	1,571	539	46	493	340	199	0.34	0.9
SALEM 1,2	1978	546.4	55.6	574	122	28	94	32	90	0.21	0.2
Docket 50-272, -311; DPR-70, -75	1979	250.0	25.5	1,488	584	100	484	359	225	0.39	2.3
1st commercial operation 6/77	1980	680.6	69.2	1,704	449	55	394	281	168	0.26	0.7
Type - PWRs	1981	743.0	78.1	1,652	254	4	250	152	102	0.15	0.3
Capacity - 1079, 1106 MWe	1982	1,440.4	72.6	3,228	1,203	66	1,137	846	357	0.37	0.8
	1983	742.0	35.4	2,383	581	10	571	463	118	0.24	0.8
	1984	650.1	31.8	1,395	681	10	671	469	212	0.49	1.0
	1985	1,657.7	75.8	1,112	204	26	178	91	113	0.18	0.1
	1986	1,484.3	70.4	3,554	599	10	589	459	140	0.17	0.4
SAN ONOFRE 1,2,3	1969	314.1		123	42	10	32	5	37	0.34	0.1
Docket 50-206, -361, -362;	1970	365.9		251	155	13	142	59	96	0.62	0.4
DPR-13, NPF-10, NPF-15	1971	362.1		121	50	12	38	3	47	0.41	0.1
1st commercial operation 1/68, 8/83, 4/84	1972	338.5		326	256	29	227	117	139	0.79	0.8
Type - PWR	1973	273.7		570	353	40	313	168	185	0.62	1.3
Capacity - 436, 1070, 1080 MWe	1974	377.8	86.1	219	71					0.32	0.2
	1975	389.0	87.4	424	292					0.69	0.8
	1976	297.9	70.2	1,330	880	147	733	629	251	0.66	3.0
	1977	281.2	63.7	985	847	77	770	451	396	0.86	3.0
	1978	323.2	80.2	764	401	25	376	234	167	0.52	1.2
	1979	401.0	90.2	521	139	23	116	65	74	0.27	0.3
	1980	97.3	22.3	3,063	2,387	219	2,168	2,018	369	0.78	24.5
	1981	95.9	26.7	2,902	3,223	100	3,123	3,104	119	1.11	33.6
	1982	61.6	15.7	3,055	832	81	751	729	102	0.27	13.5
	1983	0.0	0.0	1,701	155	31	124	113	42	0.09	---
	1984	670.4		7,514	986	105	879	830	154	0.13	1.5
	1985	1,381.8		5,742	722	58	664	581	141	0.13	0.5
	1986	1,698.2	61.1	3,594	824	86	738	574	250	0.23	0.5
SEQUOYAH 1,2	1982	583.5	52.8	1,965	570	67	503	57	513	0.29	1.0
Docket 50-327, -328; DPR-77, -79	1983	1,663.7	75.0	1,772	491	74	417	46	445	0.28	0.3
1st commercial operation 7/81, 6/82	1984	1,481.9	69.0	2,373	1,117	153	964	111	1,006	0.47	0.8
Type - PWR	1985	1,151.3	51.3	1,854	1,071	118	953	243	828	0.58	0.9
Capacity - 1148, 1148 MWe	1986	0.0	0.0	1,735	526	101	425	70	456	0.30	---

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
ST. LUCIE 1,2	1977	649.1	84.7	445	152	26	126	92	60	0.34	0.2
Docket 50-335, -387; DPR-67; NPF-16	1978	606.4	76.5	797	337	15	322	140	197	0.42	0.6
1st commercial operation 12/76, 3/83	1979	592.0	74.0	907	438	25	413	209	229	0.48	0.7
Type - PWRs	1980	627.9	77.5	1,074	532	82	450	195	337	0.50	0.8
Capacity - 827, 837 MWe	1981	599.1	72.7	1,473	929	20	909	556	373	0.63	1.6
	1982	816.8	94.0	1,045	272	17	255	105	167	0.26	0.3
	1983	290.3	15.4	2,211	1,204	5	1,199	924	280	0.54	4.1
	1984	1,183.0	69.6	2,090	1,263	41	1,222	808	455	0.60	1.1
	1985	1,445.8	82.5	1,971	1,344	293	1,046	809	535	0.68	0.9
	1986	1,588.6	89.1	1,279	491	81	410	322	169	0.38	0.3
SUMMER 1	1984	504.6	61.1	1,120	295	29	266	202	93	0.26	0.6
Docket 50-395; NPF-12	1985	627.7	71.6	1,201	379	74	305	241	138	0.32	0.6
1st commercial operation 1/84	1986	853.7	95.3	392	23	5	18	12	11	0.06	0.03
Type - PWR											
Capacity - 885 MWe											
SURRY 1,2	1973	420.6		936	152					0.16	0.4
Docket 50-280, 50-281; DPR-32, -37	1974	717.4	49.8	1,715	884	72	812			0.52	1.2
1st commercial operation 12/72, 5/73	1975	1,079.0	70.8	1,948	1,649	27	1,622	1,065	584	0.85	1.5
Type - PWRs	1976	930.7	60.4	2,753	3,165	444	2,721	1,873	1,292	1.15	3.4
Capacity - 781, 775 MWe	1977	1,139.0	72.2	1,860	2,307	348	1,959	1,380	927	1.24	2.0
	1978	1,210.6	77.2	2,203	1,837	726	1,111	1,029	808	0.83	1.5
	1979	343.0	42.3	5,065	3,584	173	3,411	2,975	609	0.71	10.4
	1980	568.2	40.3	5,317	3,836	353	3,483	3,117	719	0.72	6.8
	1981	907.6	59.3	3,753	4,244	428	3,816	3,040	1,204	1.13	4.7
	1982	1,323.3	88.5	1,878	1,490	399	1,091	506	984	0.79	1.1
	1983	916.2	61.3	2,754	3,220	571	2,649	1,786	1,434	1.17	3.5
	1984	1,026.7	71.0	3,198	2,247	536	1,711	1,575	672	0.70	2.2
	1985	1,166.4	78.2	3,206	1,815	508	1,307	1,232	583	0.57	1.6
	1986	1,080.5	69.0	3,763	2,356	430	1,926	1,677	679	0.63	2.2
SUSQUEHANNA 1,2	1984	719.9	72.6	2,827	308	71	237	128	180	0.11	0.4
Docket 50-387, 50-388; NPF-14; NPF-22	1985	628.8	62.5	3,669	1,106	77	1,029	790	316	0.30	1.8
1st commercial operation 6/83, 2/85	1986	1,344.7	68.4	2,996	828	80	748	402	426	0.28	0.6
Type - BWR											
Capacity - 1032 MWe											

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
THREE MILE ISLAND 1,2	1975	675.9	82.2	131	73			18	55	0.56	0.1
Docket 50-289, -320; DPR-50, -73	1976	530.0	65.4	819	286	23	263	69	217	0.35	0.5
1st commercial operation 9/74, 12/78	1977	664.5	80.9	1,122	359	15	344	128	231	0.32	0.5
Type - PWRs	1978	690.0	85.1	1,929	504	23	481	235	269	0.26	0.7
Capacity - 776, 880 MWe	1979	266.0	21.9	4,024	1,392	197	1,195	907	485	0.35	5.2
	1980	0.0	0.0	2,328	394	29	365	234	160	0.17	---
	1981	0.0	0.0	2,103	376	50	326	190	186	0.18	---
	1982	0.0	0.0	2,123	1,004	62	942	433	571	0.47	---
	1983	0.0	0.0	1,592	1,159	79	1,080	637	522	0.73	---
	1984	0.0	0.0	1,079	688	49	639	330	358	0.64	---
THREE MILE ISLAND 1*	1985	103.6	21.2	864	77	7	70	16	61	.09	0.7
Docket 50-289; DPR-50	1986	585.2	70.9	1,360	213	36	177	89	124	0.16	0.4
1st commercial operation 9/74											
Type - PWR											
Capacity - 776 MWe											
THREE MILE ISLAND 2**	1985	0.0	0.0	1,026	780	47	733	565	215	0.76	---
Docket 50-320; DPR-73	1986	0.0	0.0	1,497	915	152	763	613	302	0.61	---
1st commercial operation 12/78											
Type - PWR											
Capacity - 880 MWE											
TROJAN	1977	792.0	92.6	591	174	30	144	105	69	0.29	0.2
Docket 50-344; NPF-1	1978	205.5	20.6	711	319	81	238	124	195	0.45	1.6
1st commercial operation 5/76	1979	631.0	58.1	736	257	74	183	113	144	0.35	0.4
Type - PWR	1980	727.5	72.5	1,159	421	77	344	305	116	0.36	0.6
Capacity - 1080 MWe	1981	775.6	74.1	1,311	609	113	496	363	246	0.46	0.8
	1982	579.5	60.8	977	419	76	343	168	251	0.43	0.7
	1983	494.2	62.4	969	307	35	272	129	178	0.32	0.6
	1984	567.0	54.4	1,042	433	40	393	230	203	0.42	0.8
	1985	829.1	76.7	852	363	31	332	210	153	0.43	0.4
	1986	852.3	79.7	1,321	381	46	335	274	107	0.29	0.4

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

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

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
TURKEY POINT 3,4	1973	401.9		444	78					0.18	0.2
Docket 50-250, 50-251; DPR-31, -41	1974	953.6		794	454	88	366	202	252	0.57	0.5
1st commercial operation 12/72, 9/73	1975	1,003.7	74.9	1,176	876	270	606	559	317	0.74	0.9
Type - PWRs	1976	974.2	71.2	1,647	1,184	89	1,095	868	316	0.72	1.2
Capacity - 666, 666 MWe	1977	979.5	72.1	1,319	1,036	94	942	522	514	0.79	1.1
	1978	1,000.2	78.8	1,336	1,032	90	942	546	486	0.77	1.0
	1979	811.0	62.4	2,002	1,680	299	1,381	997	683	0.84	2.1
	1980	990.6	73.6	1,803	1,651	232	1,419	1,218	433	0.92	1.7
	1981	654.0	46.8	2,932	2,251	274	1,977	1,854	397	0.77	3.4
	1982	915.7	65.2	2,956	2,119	197	1,922	1,656	463	0.72	2.3
	1983	878.4	62.8	2,930	2,681	272	2,409	2,119	562	0.92	3.1
	1984	946.7	68.5	2,010	1,255	217	1,038	876	379	0.62	1.3
	1985	1,034.9	74.7	1,905	1,253	91	1,162	817	436	0.66	1.2
	1986	754.1	54.9	1,808	946	71	875	716	230	0.52	1.3
VERMONT YANKEE	1973	222.1		244	85					0.35	0.4
Docket 50-271; DPR-28	1974	303.5		357	216	24	192	103	113	0.61	0.7
1st commercial operation 11/72	1975	429.0	87.8	282	153	70	83	63	90	0.54	0.4
Type - BWR	1976	389.6	77.1	815	411	36	375	246	165	0.50	1.1
Capacity - 504 MWe	1977	423.5	85.1	641	258	83	175	90	168	0.40	0.6
	1978	387.5	75.9	934	339	78	261	158	181	0.36	0.9
	1979	414.0	82.1	1,220	1,170	546	624	642	528	0.96	2.8
	1980	357.8	71.5	1,443	1,338	141	1,197	926	412	0.93	3.7
	1981	429.1	84.6	1,264	731	121	610	408	323	0.58	1.7
	1982	501.0	96.0	481	205	60	145	80	125	0.43	0.4
	1983	346.1	69.3	1,316	1,527	215	1,312	787	740	1.16	4.4
	1984	398.1	79.0	954	603	80	523	307	296	0.63	1.5
	1985	361.4	71.8	1,392	1,051	164	887	898	153	0.76	2.9
	1986	248.1	48.9	1,389	1,188	44	1,144	1,092	96	0.86	4.8
WASHINGTON NUCLEAR 2	1985	616.0	87.6	755	119	42	77	42	77	0.16	0.2
Docket 50-397; NPF-21	1986	616.0	74.0	1,013	222	56	166	70	152	0.22	0.4
1st commercial operation 12/84											
Type - BWR											
Capacity - 1095 MWe											

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
WATERFORD 3 Docket 50-382; NPF-38 1st commercial operation 9/85 Type - PWR Capacity - 1075 MWe	1986	875.7	79.1	1,244	223	62	161	178	45	0.18	0.3
WOLF CREEK 1 Docket 50-482; NPF-42 1st commercial operation 9/85 Type - PWR Capacity - 1128 MWe	1986	832.8	73.3	681	142	27	115	77	65	0.21	0.2
YANKEE ROWE Docket 50-29; DPR-3 1st commercial operation 7/61 Type - PWR Capacity - 167 MWe	1969	138.3		193	215	83	132	78	133	1.11	1.6
	1970	146.1		355	255	90	165	158	97	0.72	1.7
	1971	173.5		155	90	46	44	19	71	0.58	0.5
	1972	78.7		282	255	63	192	146	109	0.90	3.2
	1973	127.1		133	99			47	52	0.74	0.8
	1974	111.3		243	205			99	106	0.84	1.8
	1975	145.1	82.4	249	116	52	64	66	50	0.47	0.8
	1976	152.2	89.9	152	59	17	42	4	55	0.39	0.4
	1977	124.6	73.9	725	356	28	328	174	182	0.49	2.9
	1978	145.0	81.0	565	282	26	256	95	187	0.50	1.9
	1979	149.0	81.6	441	127	16	111	52	75	0.29	0.9
	1980	35.6	22.0	502	213	6	207	90	123	0.42	6.0
	1981	109.0	74.4	515	302	8	294	136	166	0.59	2.8
	1982	108.6	73.4	814	474	6	468	215	259	0.58	4.4
	1983	163.5	91.4	395	68	19	49	4	64	0.17	0.4
	1984	124.8	71.4	654	348	15	33	141	207	0.53	2.8
	1985	144.3	85.3	653	211	17	194	81	130	0.32	1.5
	1986	169.7	95.0	384	45	20	25	2	43	0.12	0.3

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

Reporting Organization	Year	Mega-watt-Years (MW-Yr)	Unit Availa-bility Factor	Total Personnel With Measur-able Doses	Collective Dose (person-rems or cSv)	Person-rems (-cSv) per Work Function		Person-rems (-cSv) per Personnel Type		Average Meas'ble Dose (rems or cSv)	Person rems (-cSv)/ MW-Yr
						Opera-tions	Maint. & Others	Contrac-tor	Station & Utility		
ZION 1,2	1974	425.3	71.1	306	56			13	43	0.18	0.1
Docket 50-295, 50-304; DPR-39, -48	1975	1,181.5	74.9	436	127	17	110	49	78	0.29	0.1
1st commercial operation 12/73, 9/74	1976	1,134.9	61.9	774	571	64	507	257	314	0.74	0.5
Type - PWRs	1977	1,358.6	75.0	784	1,003	43	960	561	442	1.28	0.7
Capacity - 1040, 1040 MWe	1978	1,613.5	80.2	1,104	1,017	150	867	418	599	0.92	0.6
	1979	1,238.0	67.6	1,472	1,274	168	1,106	747	527	0.87	1.0
	1980	1,411.2	74.1	1,363	920	97	823	560	360	0.67	0.7
	1981	1,366.9	72.3	1,754	1,720	50	1,670	1,155	564	0.98	1.3
	1982	1,186.4	64.3	1,575	2,103	42	2,061	1,688	415	1.34	1.8
	1983	1,222.3	66.8	1,285	1,311	118	1,193	905	406	1.02	1.1
	1984	1,389.9	69.5	1,110	786	23	763	556	230	0.71	0.6
	1985	1,187.9	62.9	1,498	1,166	41	1,125	784	382	0.78	1.0
	1986	588.0	73.2	967	498	22	476	346	152	0.51	0.8

APPENDIX D

Number of Personnel and Collective Dose by Work and Job Function

1986

APPENDIX D

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *ARKANSAS 1, 2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	21	0	106		12.347	0	48.249	
OPERATING PERSONNEL	55	0	0		30.509	0	0	
HEALTH PHYSICS PERSONNEL	38	0	115		15.25	0	68.275	
SUPERVISORY PERSONNEL	0	0	1		0	0	0.125	
ENGINEERING PERSONNEL	4	4	5		0.845	0.677	0.594	
TOTAL	118	4	227	349	58.951	0.677	117.243	176.871
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	87	6	227		31.762	2.133	80.776	
OPERATING PERSONNEL	4	0	0		0.726	0	0	
HEALTH PHYSICS PERSONNEL	10	0	47		2.166	0	8.964	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	20		0	0	5.714	
TOTAL	101	6	294	401	34.654	2.133	95.454	132.241
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	11	3	168		2.674	0.699	80.275	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	9	0	51		2.449	0	12.404	
SUPERVISORY PERSONNEL	1	0	2		0.226	0	1.277	
ENGINEERING PERSONNEL	4	5	30		0.655	1.184	10.573	
TOTAL	25	8	251	284	6.004	1.883	104.529	112.416
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	113	8	553		56.603	4.461	290.076	
OPERATING PERSONNEL	12	0	1		3.651	0	0.12	
HEALTH PHYSICS PERSONNEL	29	0	88		9.175	0	42.23	
SUPERVISORY PERSONNEL	0	0	4		0	0	2.783	
ENGINEERING PERSONNEL	0	5	70		0	0.85	25.617	
TOTAL	154	13	716	883	69.429	5.311	360.826	435.566
WASTE PROCESSING								
MAINTENANCE PERSONNEL	7	0	24		3.626	0	10.988	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	19	0	13		11.089	0	2.991	
SUPERVISORY PERSONNEL	1	0	0		0.132	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	27	0	37	64	14.847	0	13.979	28.826
REFUELING								
MAINTENANCE PERSONNEL	79	4	149		38.183	1.669	68.832	
OPERATING PERSONNEL	7	0	1		1.398	0	0.114	
HEALTH PHYSICS PERSONNEL	3	0	31		1.807	0	11.999	
SUPERVISORY PERSONNEL	0	1	1		0	0.346	0.213	
ENGINEERING PERSONNEL	0	2	50		0	0.461	31.715	
TOTAL	89	7	232	328	41.388	2.476	112.873	156.737
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	318	21	1227	1566	145.195	8.962	579.196	733.353
OPERATING PERSONNEL	78	0	2	80	36.284	0	0.234	36.518
HEALTH PHYSICS PERSONNEL	108	0	345	453	41.936	0	146.863	188.799
SUPERVISORY PERSONNEL	2	1	8	11	0.358	0.346	4.398	5.102
ENGINEERING PERSONNEL	8	16	175	199	1.5	3.172	74.213	78.885
GRAND TOTALS	514	38	1757	2309	225.273	12.48	804.904	1042.657

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM
BY WORK AND JOB FUNCTION
1986

PLANT: BEAVER VALLEY TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	D.8	0	11.4		0.745	0	7.92	
OPERATING PERSONNEL	63.5	0	2		15.24	0	0.205	
HEALTH PHYSICS PERSONNEL	11.4	0	15		3.32	0	7.69	
SUPERVISORY PERSONNEL	31.3	0	52.4		11.06	0	19.55	
ENGINEERING PERSONNEL	18.2	0	3		5.01	0	0.925	
TOTAL	125.2	0	83.8	209	35.375	0	36.29	71.665
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	70	0	165.5		50.075	0	109.665	
OPERATING PERSONNEL	4	0	0		2.14	0	0	
HEALTH PHYSICS PERSONNEL	22.2	0	61		15.245	0	39.79	
SUPERVISORY PERSONNEL	9.6	0	13.8		3.82	0	4.305	
ENGINEERING PERSONNEL	4.2	0	0.5		1.795	0	0.17	
TOTAL	110	0	240.8	350.8	73.075	0	153.93	227.005
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2.1	0	67.5		1.73	0	47.225	
OPERATING PERSONNEL	0.3	0	0		0.035	0	0	
HEALTH PHYSICS PERSONNEL	0.3	0	10.7		0.145	0	5.64	
SUPERVISORY PERSONNEL	2.6	0	46.4		0.975	0	45.045	
ENGINEERING PERSONNEL	0.8	0	14		0.265	0	12.835	
TOTAL	6.1	0	138.6	144.7	3.15	0	110.745	113.895
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	6.6	0	99.6		4.69	0	57.975	
OPERATING PERSONNEL	0.1	0	0		0.07	0	0	
HEALTH PHYSICS PERSONNEL	0.2	0	1.5		0.1	0	0.835	
SUPERVISORY PERSONNEL	2.3	0	7.8		0.97	0	3.415	
ENGINEERING PERSONNEL	0.8	0	1.5		0.255	0	0.285	
TOTAL	10	0	110.4	120.4	6.085	0	62.51	68.595
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0.2	0	2.8		0.255	0	1.235	
OPERATING PERSONNEL	2.8	0	0		2.125	0	0	
HEALTH PHYSICS PERSONNEL	0.4	0	2.6		0.205	0	1.03	
SUPERVISORY PERSONNEL	1.7	0	0.4		0.635	0	0.195	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	5.1	0	5.8	10.9	3.22	0	2.46	5.68
REFUELING								
MAINTENANCE PERSONNEL	18.3	0	21.2		20.315	0	17.885	
OPERATING PERSONNEL	0.1	0	0		0.025	0	0	
HEALTH PHYSICS PERSONNEL	0.5	0	1.2		0.435	0	0.275	
SUPERVISORY PERSONNEL	10.5	0	11.2		7.565	0	13.13	
ENGINEERING PERSONNEL	1	0	7		0.62	0	3.92	
TOTAL	30.4	0	40.6	71	28.96	0	35.21	64.17
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	98	0	368	466	77.81	0	241.905	319.715
OPERATING PERSONNEL	70.8	0	2	72.8	19.635	0	0.205	19.84
HEALTH PHYSICS PERSONNEL	35	0	92	127	19.45	0	55.26	74.71
SUPERVISORY PERSONNEL	58	0	132	190	25.025	0	85.64	110.665
ENGINEERING PERSONNEL	25	0	26	51	7.945	0	18.135	26.08
GRAND TOTALS	286.8	0	620	906.8	149.865	0	401.145	551.01

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *BIG ROCK POINT TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	1	0	0		0.154	0.002	0	
OPERATING PERSONNEL	24	0	0		17.46	0.154	0.024	
HEALTH PHYSICS PERSONNEL	15	0	0		7.399	0.001	0.004	
SUPERVISORY PERSONNEL	3	0	0		1.006	0.06	0.007	
ENGINEERING PERSONNEL	1	0	0		0.297	0.03	0.002	
TOTAL	44	0	0	44	26.316	0.247	0.037	26.6
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	23	0	0		5.861	0.143	0.004	
OPERATING PERSONNEL	0	0	0		0.146	0.161	0	
HEALTH PHYSICS PERSONNEL	6	0	1		1.309	0.02	0.174	
SUPERVISORY PERSONNEL	2	0	0		0.367	0.047	0.002	
ENGINEERING PERSONNEL	0	0	0		0.098	0	0	
TOTAL	31	0	1	32	7.781	0.371	0.18	8.332
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0		0.02	0.009	0	
OPERATING PERSONNEL	0	0	0		0.004	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0.006	0.015	0	
ENGINEERING PERSONNEL	0	0	0		0.043	0.004	0	
TOTAL	0	0	0	0	0.073	0.028	0	0.101
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	16	2	4		6.269	0.641	1.214	
OPERATING PERSONNEL	1	0	0		0.269	0.121	0.027	
HEALTH PHYSICS PERSONNEL	11	0	1		2.661	0	0.335	
SUPERVISORY PERSONNEL	5	0	1		0.757	0.017	0.321	
ENGINEERING PERSONNEL	4	0	2		0.559	0	0.793	
TOTAL	37	2	8	47	10.515	0.779	2.69	13.984
WASTE PROCESSING								
MAINTENANCE PERSONNEL	12	0	12		3.211	0.043	8.542	
OPERATING PERSONNEL	5	0	0		1.158	0.086	0	
HEALTH PHYSICS PERSONNEL	8	0	5		2.122	0.02	1.923	
SUPERVISORY PERSONNEL	0	0	0		0.064	0	0	
ENGINEERING PERSONNEL	0	0	0		0.125	0	0	
TOTAL	25	0	17	42	6.68	0.149	10.465	17.294
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0.022	0.002	0	
TOTAL	0	0	0	0	0.022	0.002	0	0.024
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	52	2	16	70	15.515	0.838	9.76	26.113
OPERATING PERSONNEL	30	0	0	30	19.037	0.522	0.051	19.61
HEALTH PHYSICS PERSONNEL	40	0	7	47	13.491	0.041	2.436	15.968
SUPERVISORY PERSONNEL	10	0	1	11	2.2	0.139	0.33	2.669
ENGINEERING PERSONNEL	5	0	2	7	1.144	0.036	0.795	1.975
GRAND TOTALS	137	2	26	165	51.387	1.576	13.372	66.335

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

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

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	706	44	38		40.494	4.283	2.924	
OPERATING PERSONNEL	54	1	1		5.961	0.106	0.106	
HEALTH PHYSICS PERSONNEL	129	19	79		26.014	7.348	28.809	
SUPERVISORY PERSONNEL	18	0	1		2.019	0	0.086	
ENGINEERING PERSONNEL	106	2	261		9.8	0.016	48.513	
TOTAL	1013	66	380	1459	84.288	11.753	80.438	176.479
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	815	48	63		271.757	2.651	34.294	
OPERATING PERSONNEL	51	1	0		2.407	0	0	
HEALTH PHYSICS PERSONNEL	124	18	79		12.822	4.048	16.313	
SUPERVISORY PERSONNEL	18	0	0		1.531	0	0	
ENGINEERING PERSONNEL	114	1	225		17.17	0.16	35.306	
TOTAL	1122	68	367	1557	305.687	6.859	85.913	398.459
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	188	43	7		29.876	33.82	0.081	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	49	13	62		1.442	1.495	8.268	
SUPERVISORY PERSONNEL	6	3	2		0.145	0.562	0.609	
ENGINEERING PERSONNEL	22	0	35		2.386	0	17.747	
TOTAL	265	59	106	430	33.849	35.877	26.705	96.431
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	637	24	109		119.067	3.707	104.05	
OPERATING PERSONNEL	40	1	0		1.417	0.029	0	
HEALTH PHYSICS PERSONNEL	59	6	57		14.764	0.04	8.635	
SUPERVISORY PERSONNEL	14	0	0		1.641	0	0	
ENGINEERING PERSONNEL	31	0	93		6.386	0	2.765	
TOTAL	781	31	259	1071	143.275	3.862	115.45	262.495
WASTE PROCESSING								
MAINTENANCE PERSONNEL	114	5	0		6.709	0.021	0	
OPERATING PERSONNEL	8	0	0		1.837	0	0	
HEALTH PHYSICS PERSONNEL	76	9	34		1.134	0.085	0.169	
SUPERVISORY PERSONNEL	3	0	0		0.077	0	0	
ENGINEERING PERSONNEL	14	0	7		0.771	0	0.002	
TOTAL	215	14	41	270	10.528	0.106	0.171	10.805
REFUELING								
MAINTENANCE PERSONNEL	5	0	0		0	0	0	
OPERATING PERSONNEL	5	0	0		0.066	0	0	
HEALTH PHYSICS PERSONNEL	2	0	6		0	0	0.005	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	18	0	6		0.036	0	0.006	
TOTAL	30	0	12	42	0.102	0	0.011	0.113
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	2465 (886)	164 (51)	217 (124)	2846 (1061)	467.903	44.482	141.349	653.728
OPERATING PERSONNEL	158 (54)	3 (1)	1 (1)	162 (56)	11.688	0.135	0.106	11.929
HEALTH PHYSICS PERSONNEL	439 (127)	65 (8)	317 (77)	821 (212)	56.176	13.016	62.199	131.391
SUPERVISORY PERSONNEL	59 (17)	3 (3)	3 (2)	65 (22)	5.413	0.562	0.695	6.67
ENGINEERING PERSONNEL	305 (101)	3 (1)	627 (264)	935 (366)	36.549	0.176	104.339	141.064
GRAND TOTALS	3426 (1185)	238 (64)	1165 (468)	4829 (1717)	577.729	58.371	308.688	944.782

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

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: BRUNSWICK 1, 2 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	2	1	3		0.045	0.015	1.948	
OPERATING PERSONNEL	115	0	0		61.079	0	0	
HEALTH PHYSICS PERSONNEL	22	0	5		19.712	0	5.094	
SUPERVISORY PERSONNEL	2	0	0		0.703	0	0	
ENGINEERING PERSONNEL	18	0	2		4.42	0	0.46	
TOTAL	159	1	10	170	85.959	0.015	7.502	93.476
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	214	64	177		140.707	67.902	149.459	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	13	0	10		11.828	0	10.168	
SUPERVISORY PERSONNEL	0	0	2		0	0	0.812	
ENGINEERING PERSONNEL	11	5	60		4.736	1.122	40.6	
TOTAL	238	69	249	556	157.271	69.024	201.039	427.334
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	15	28	49		7.722	12.052	39.118	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	9	0	10		7.565	0	10.184	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	4	0	35		2.587	0.305	26.167	
TOTAL	28	28	94	150	17.874	12.357	75.469	105.7
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	142	13	577		158.048	3.633	706.745	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	31	0	59		27.596	0	61.13	
SUPERVISORY PERSONNEL	0	0	6		0	0	3.267	
ENGINEERING PERSONNEL	18	9	173		5.639	3.888	111.171	
TOTAL	191	22	815	1028	191.283	7.521	882.313	1081.117
WASTE PROCESSING								
MAINTENANCE PERSONNEL	28	1	26		20.474	0.04	14.288	
OPERATING PERSONNEL	14	0	6		7.186	0	5.428	
HEALTH PHYSICS PERSONNEL	9	0	10		8.205	0	10.201	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	3		0	0	0.64	
TOTAL	51	1	45	97	35.865	0.04	30.557	66.462
REFUELING								
MAINTENANCE PERSONNEL	22	9	39		14.521	5.032	15.956	
OPERATING PERSONNEL	7	0	8		3.593	0	7.195	
HEALTH PHYSICS PERSONNEL	5	0	5		3.942	0	5.105	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	2	0	16		0.645	0	7.153	
TOTAL	36	9	68	113	22.701	5.032	35.409	63.142
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	423	116	871	1410	341.517	88.674	927.514	1357.705
OPERATING PERSONNEL	136	0	14	150	71.858	0	12.623	84.481
HEALTH PHYSICS PERSONNEL	89	0	99	188	78.848	0	101.882	180.73
SUPERVISORY PERSONNEL	2	0	8	10	0.703	0	4.079	4.782
ENGINEERING PERSONNEL	53	14	289	356	18.027	5.315	186.191	209.533
GRAND TOTALS	703	130	1281	2114	510.953	93.989	1232.289	1837.231

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: BYRON 1 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	2	0	4		0.112	0	0.066	
OPERATING PERSONNEL	57	0	345		1.22	0	0.782	
HEALTH PHYSICS PERSONNEL	49	0	40		7.189	0	1.72	
SUPERVISORY PERSONNEL	10	0	0		0.235	0	0	
ENGINEERING PERSONNEL	176	0	15		0.176	0	0.098	
TOTAL	294	0	404	698	8.932	0	2.666	11.598
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	178	0	2355		12.219	0	38.979	
OPERATING PERSONNEL	128	0	0		2.725	0	0	
HEALTH PHYSICS PERSONNEL	8	0	26		0.749	0	1.105	
SUPERVISORY PERSONNEL	86	0	0		1.589	0	0	
ENGINEERING PERSONNEL	116	170	261		1.048	0.42	1.738	
TOTAL	516	170	2642	3328	18.33	0.42	41.822	60.572
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2	0	4		0.073	0	0.065	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	2	0	0		0.064	0	0	
SUPERVISORY PERSONNEL	1	0	0		0.021	0	0	
ENGINEERING PERSONNEL	8	0	9		0.125	0	0.06	
TOTAL	13	0	13	26	0.283	0	0.125	0.408
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	3	0	0		0.133	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	5		0	0	0.04	
TOTAL	3	0	5	8	0.133	0	0.04	0.173
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	83		0.024	0	1.3	
OPERATING PERSONNEL	1	0	0		0.027	0	0	
HEALTH PHYSICS PERSONNEL	2	0	5		0.048	0	0.245	
SUPERVISORY PERSONNEL	1	0	0		0.01	0	0	
ENGINEERING PERSONNEL	0	0	118		0	0	0.785	
TOTAL	6	0	206	212	0.109	0	2.33	2.439
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	187	0	2446	2633	12.561	0	40.41	52.971
OPERATING PERSONNEL	186	0	345	531	3.972	0	0.782	4.754
HEALTH PHYSICS PERSONNEL	61	0	71	132	8.05	0	3.07	11.12
SUPERVISORY PERSONNEL	98	0	0	98	1.855	0	0	1.855
ENGINEERING PERSONNEL	300	170	408	878	1.349	0.42	2.721	4.49
GRAND TOTALS	832	170	3270	4272	27.787	0.42	46.983	75.19

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *CALLAWAY TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	1		0.949	0	1.251	
OPERATING PERSONNEL	66	0	8		17.371	0.045	5.525	
HEALTH PHYSICS PERSONNEL	23	0	38		12.984	0	8.565	
SUPERVISORY PERSONNEL	15	0	0		4.32	0.053	0.03	
ENGINEERING PERSONNEL	2	0	2		1.266	0.001	0.694	
TOTAL	106	0	49	155	36.89	0.099	16.065	53.054
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	91	0	95		25.314	0	31.763	
OPERATING PERSONNEL	8	0	38		3.116	0.078	10.511	
HEALTH PHYSICS PERSONNEL	7	0	2		1.668	0	0.629	
SUPERVISORY PERSONNEL	2	1	0		0.523	0.174	0.017	
ENGINEERING PERSONNEL	2	0	18		0.762	0.005	8.232	
TOTAL	110	1	153	264	31.383	0.257	51.152	82.792
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	44		0.139	0	11.998	
OPERATING PERSONNEL	1	0	3		0.249	0.011	1.003	
HEALTH PHYSICS PERSONNEL	3	0	7		1.146	0	2.597	
SUPERVISORY PERSONNEL	0	0	0		0.015	0.019	0	
ENGINEERING PERSONNEL	1	0	58		0.845	0.008	21.902	
TOTAL	5	0	112	117	2.394	0.038	37.5	39.932
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0		0.111	0	0.059	
OPERATING PERSONNEL	0	0	0		0.173	0	0.463	
HEALTH PHYSICS PERSONNEL	0	0	0		0.061	0	0.041	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	1	0	15		0.137	0	3.983	
TOTAL	1	0	15	16	0.482	0	4.546	5.028
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0		0.004	0	0.009	
OPERATING PERSONNEL	12	0	14		3.481	0	3.66	
HEALTH PHYSICS PERSONNEL	2	0	0		0.476	0	0	
SUPERVISORY PERSONNEL	2	0	0		0.91	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	16	0	14	30	4.871	0	3.669	8.54
REFUELING								
MAINTENANCE PERSONNEL	55	0	9		16.598	0	3.268	
OPERATING PERSONNEL	2	0	4		2.11	0	1.652	
HEALTH PHYSICS PERSONNEL	0	0	1		0.144	0	0.172	
SUPERVISORY PERSONNEL	1	0	0		0.581	0	0.001	
ENGINEERING PERSONNEL	1	0	13		0.162	0.015	10.735	
TOTAL	59	0	27	86	19.595	0.015	15.828	35.438
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	146	0	149	295	43.115	0	48.348	91.463
OPERATING PERSONNEL	89	0	67	156	26.5	0.134	22.814	49.448
HEALTH PHYSICS PERSONNEL	35	0	48	83	16.479	0	12.004	28.483
SUPERVISORY PERSONNEL	20	1	0	21	6.349	0.246	0.048	6.643
ENGINEERING PERSONNEL	7	0	106	113	3.172	0.029	45.546	48.747
GRAND TOTALS	297	1	370	668	95.615	0.409	128.76	224.784

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *CALVERT CLIFFS 1, 2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	9	0	0		1.539	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	9	0	0	9	1.539	0	0	1.539
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	69	3	8		16.492	1.104	1.185	
OPERATING PERSONNEL	61	0	0		19.634	0	0	
HEALTH PHYSICS PERSONNEL	28	0	13		13.768	0	5.026	
SUPERVISORY PERSONNEL	8	0	0		2.334	0	0	
ENGINEERING PERSONNEL	2	0	0		0.879	0	0	
TOTAL	168	3	21	192	53.107	1.104	6.211	60.422
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	12	32	42		3.241	15.609	12.727	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	3	0	4		0.439	0	0.663	
SUPERVISORY PERSONNEL	2	0	1		0.399	0	0.122	
ENGINEERING PERSONNEL	7	0	10		3.657	0	2.721	
TOTAL	24	32	57	113	7.736	15.609	16.233	39.578
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	113	68	66		38.554	36.006	29.23	
OPERATING PERSONNEL	5	2	0		1.2	0.24	0	
HEALTH PHYSICS PERSONNEL	21	0	46		7.889	0	17.155	
SUPERVISORY PERSONNEL	8	2	0		1.965	1.092	0	
ENGINEERING PERSONNEL	14	0	10		4.806	0	5.163	
TOTAL	161	72	122	355	54.414	37.338	51.548	143.3
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	25	0	17		9.893	0	6.65	
SUPERVISORY PERSONNEL	3	0	0		0.741	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	28	0	17	45	10.634	0	6.65	17.284
REFUELING								
MAINTENANCE PERSONNEL	45	15	22		24.713	4.492	5.607	
OPERATING PERSONNEL	1	0	0		0.102	0	0	
HEALTH PHYSICS PERSONNEL	7	0	6		1.275	0	1.069	
SUPERVISORY PERSONNEL	5	0	0		2.528	0	0	
ENGINEERING PERSONNEL	3	0	4		0.393	0	0.582	
TOTAL	61	15	32	108	29.011	4.492	7.258	40.761
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	239 (150)	118 (104)	138 (126)	495 (380)	83	57.211	48.749	188.96
OPERATING PERSONNEL	76 (76)	2 (2)	0 (0)	78 (78)	22.475	0.24	0	22.715
HEALTH PHYSICS PERSONNEL	84 (41)	0 (0)	86 (71)	170 (112)	33.264	0	30.563	63.827
SUPERVISORY PERSONNEL	26 (20)	2 (2)	1 (2)	29 (24)	7.967	1.092	0.122	9.181
ENGINEERING PERSONNEL	26 (23)	0 (0)	24 (19)	50 (42)	9.735	0	8.466	18.201
GRAND TOTALS	451 (310)	122 (108)	249 (218)	822 (636)	156.441	58.543	87.9	302.884

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

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *CATAWBA 1 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	104	296	48		3.015	1.415	0.735	
OPERATING PERSONNEL	79	2	38		9.245	0	0.145	
HEALTH PHYSICS PERSONNEL	46	1	71		8.755	0	3.755	
SUPERVISORY PERSONNEL	5	0	0		0.145	0	0	
ENGINEERING PERSONNEL	58	15	16		3.645	0.3	0.32	
TOTAL	292	314	173	779	24.805	1.715	4.955	31.475
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	107	361	52		3.442	16.42	2.195	
OPERATING PERSONNEL	36	2	44		0.405	0	11.99	
HEALTH PHYSICS PERSONNEL	42	0	54		1.96	0	1.865	
SUPERVISORY PERSONNEL	3	0	0		0	0	0	
ENGINEERING PERSONNEL	43	16	9		3.63	0.825	0	
TOTAL	231	379	159	769	9.437	17.245	16.05	42.732
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	14	97	2		0.51	23.97	0.165	
OPERATING PERSONNEL	7	0	1		0.04	0	0.01	
HEALTH PHYSICS PERSONNEL	16	1	36		0.66	0	4.785	
SUPERVISORY PERSONNEL	1	0	0		0	0	0	
ENGINEERING PERSONNEL	38	3	17		4.295	0.645	3.8	
TOTAL	76	101	56	233	5.505	24.615	8.76	38.88
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	104	307	50		8.075	43.625	5.465	
OPERATING PERSONNEL	65	0	31		1.755	0	1.885	
HEALTH PHYSICS PERSONNEL	44	1	62		3.7	0.015	5.23	
SUPERVISORY PERSONNEL	5	0	0		0.155	0	0	
ENGINEERING PERSONNEL	45	13	18		3.36	0.82	3.07	
TOTAL	263	321	161	745	17.045	44.46	15.65	77.155
WASTE PROCESSING								
MAINTENANCE PERSONNEL	5	15	0		0	0	0	
OPERATING PERSONNEL	11	0	28		0.32	0	1.08	
HEALTH PHYSICS PERSONNEL	27	0	17		1.63	0	1.03	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	2	1	2		0	0	0.145	
TOTAL	45	16	47	108	1.95	0	2.255	4.205
REFUELING								
MAINTENANCE PERSONNEL	101	339	42		17.495	69.045	8.78	
OPERATING PERSONNEL	60	1	30		6.285	0.2	5.075	
HEALTH PHYSICS PERSONNEL	41	1	71		5.435	0.135	15.006	
SUPERVISORY PERSONNEL	5	0	0		0.35	0	0	
ENGINEERING PERSONNEL	52	7	27		5.78	2.43	3.08	
TOTAL	259	348	170	777	35.345	71.81	31.941	139.096
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	435 (109)	1415 (379)	194 (62)	2044 (550)	32.537	154.475	17.34	204.352
OPERATING PERSONNEL	258 (79)	5 (1)	172 (45)	435 (125)	18.05	0.2	20.185	38.435
HEALTH PHYSICS PERSONNEL	216 (48)	4 (1)	311 (71)	531 (120)	22.14	0.15	31.671	53.961
SUPERVISORY PERSONNEL	19 (5)	0 (0)	0 (0)	19 (5)	0.65	0	0	0.65
ENGINEERING PERSONNEL	238 (59)	55 (14)	89 (31)	382 (104)	20.71	5.02	10.415	36.145
GRAND TOTALS	1166 (300)	1479 (395)	766 (209)	3411 (904)	94.087	159.845	79.611	333.543

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

APPENDIX D (Continued)
NUMBER OF PERSONNEL AND PERSON-REM
BY WORK AND JOB FUNCTION
1986

PLANT: *COOK 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	1	0	20		0.164	0	3.806	
OPERATING PERSONNEL	71	0	16		28.656	0	2.614	
HEALTH PHYSICS PERSONNEL	17	0	62		3.347	0	18.718	
SUPERVISORY PERSONNEL	1	0	0		0.263	0	0	
ENGINEERING PERSONNEL	1	1	0		0.102	0.096	0	
TOTAL	91	1	98	190	32.532	0.096	25.138	57.766
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	121	2	394		64.489	0.234	159.964	
OPERATING PERSONNEL	52	1	10		8.619	0.308	1.92	
HEALTH PHYSICS PERSONNEL	13	0	51		1.823	0	15.734	
SUPERVISORY PERSONNEL	8	0	1		1.934	0	0.285	
ENGINEERING PERSONNEL	3	3	4		0.312	0.59	0.866	
TOTAL	197	6	460	663	77.177	1.132	178.769	257.078
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	7	0	110		1.477	0	60.013	
OPERATING PERSONNEL	4	1	14		0.955	0.684	6.847	
HEALTH PHYSICS PERSONNEL	14	0	44		2.729	0	17.815	
SUPERVISORY PERSONNEL	1	0	2		0.109	0	1.191	
ENGINEERING PERSONNEL	1	3	0		0.349	0.385	0	
TOTAL	27	4	170	201	5.619	1.069	85.866	92.554
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	51	0	211		14.006	0	123.85	
OPERATING PERSONNEL	3	0	17		0.456	0	7.11	
HEALTH PHYSICS PERSONNEL	2	0	41		0.245	0	9.477	
SUPERVISORY PERSONNEL	5	0	1		0.829	0	0.104	
ENGINEERING PERSONNEL	6	6	14		1.523	0.753	2.69	
TOTAL	67	6	284	357	17.059	0.753	143.231	161.043
WASTE PROCESSING								
MAINTENANCE PERSONNEL	4	0	118		0.445	0	64.021	
OPERATING PERSONNEL	1	0	0		0.151	0	0	
HEALTH PHYSICS PERSONNEL	4	0	12		0.582	0	1.751	
SUPERVISORY PERSONNEL	1	0	0		0.866	0	0	
ENGINEERING PERSONNEL	1	0	0		0.75	0	0	
TOTAL	11	0	130	141	2.794	0	65.772	68.566
REFUELING								
MAINTENANCE PERSONNEL	11	0	61		2.925	0	27.841	
OPERATING PERSONNEL	10	0	5		2.852	0	1.553	
HEALTH PHYSICS PERSONNEL	0	0	1		0	0	0.364	
SUPERVISORY PERSONNEL	1	0	0		0.188	0	0	
ENGINEERING PERSONNEL	0	0	1		0	0	0.129	
TOTAL	22	0	68	90	5.965	0	29.887	35.852
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	195 (129)	2 (2)	914 (648)	1111 (779)	83.506	0.234	439.495	523.235
OPERATING PERSONNEL	141 (91)	2 (1)	62 (40)	205 (132)	41.689	0.992	20.044	62.725
HEALTH PHYSICS PERSONNEL	50 (28)	0 (0)	211 (82)	261 (110)	8.726	0	63.859	72.585
SUPERVISORY PERSONNEL	17 (11)	0 (0)	4 (4)	21 (15)	4.189	0	1.58	5.769
ENGINEERING PERSONNEL	12 (8)	13 (11)	19 (16)	44 (35)	3.036	1.824	3.685	8.545
GRAND TOTALS	415 (267)	17 (14)	1210 (790)	1642 (1071)	141.146	3.05	528.663	672.859

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

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *COOPER STATION TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	6	0	5		0.093	0	0.151	
OPERATING PERSONNEL	57	0	0		25.958	0	0	
HEALTH PHYSICS PERSONNEL	19	0	6		7.723	0	1.702	
SUPERVISORY PERSONNEL	8	0	2		1.733	0	0.219	
ENGINEERING PERSONNEL	19	14	10		4.354	0.987	1.958	
TOTAL	109	14	23	146	39.861	0.987	4.03	44.878
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	116	0	159		110.595	0	85.264	
OPERATING PERSONNEL	1	0	0		0.012	0	0	
HEALTH PHYSICS PERSONNEL	15	0	9		9.447	0	5.831	
SUPERVISORY PERSONNEL	5	0	3		0.673	0	0.503	
ENGINEERING PERSONNEL	2	16	15		0.06	7.185	1.927	
TOTAL	139	16	186	341	120.787	7.185	93.525	221.497
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	14		0	0	5.223	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	1	0	0		0.034	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	2	0	0		0.011	0	0	
TOTAL	3	0	14	17	0.045	0	5.223	5.268
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	8	0	5		4.284	0	1.488	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	11	0	3		1.149	0	0.246	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	2	0	0		0.025	0	0	
TOTAL	21	0	8	29	5.458	0	1.734	7.192
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	0		0.006	0	0	
OPERATING PERSONNEL	17	0	0		4.981	0	0	
HEALTH PHYSICS PERSONNEL	12	0	2		5.714	0	0.676	
SUPERVISORY PERSONNEL	1	0	0		0.006	0	0	
ENGINEERING PERSONNEL	3	0	0		1.097	0	0	
TOTAL	34	0	2	36	11.804	0	0.676	12.48
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	42	0	0		1.456	0	0	
HEALTH PHYSICS PERSONNEL	6	0	3		0.778	0	0.217	
SUPERVISORY PERSONNEL	1	0	0		0.109	0	0	
ENGINEERING PERSONNEL	6	0	0		0.479	0	0	
TOTAL	55	0	3	58	2.822	0	0.217	3.039
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	131 (116)	0	183 (164)	314 (280)	114.978	0	92.126	207.104
OPERATING PERSONNEL	117 (59)	0	0 (0)	117 (59)	32.407	0	0	32.407
HEALTH PHYSICS PERSONNEL	64 (20)	0	23 (10)	87 (30)	24.845	0	8.672	33.517
SUPERVISORY PERSONNEL	15 (9)	0	5 (3)	20 (12)	2.521	0	0.722	3.243
ENGINEERING PERSONNEL	34 (19)	30 (16)	25 (19)	89 (54)	6.026	8.172	3.885	18.083
GRAND TOTALS	361 (223)	30 (16)	236 (196)	627 (435)	180.777	8.172	105.405	294.354

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

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: .*CRYSTAL RIVER 3 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	3	0		0.028	0.571	0.199	
OPERATING PERSONNEL	1	25	0		0.11	7.082	0.14	
HEALTH PHYSICS PERSONNEL	0	3	1		0	1.154	0.216	
SUPERVISORY PERSONNEL	1	4	17		0.521	1.361	8.672	
ENGINEERING PERSONNEL	2	2	1		0.545	3.066	0.288	
TOTAL	4	37	19	60	1.204	13.234	9.515	23.953
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	75	146	242		60.419	59.612	190.72	
OPERATING PERSONNEL	0	7	0		0	2.598	0.02	
HEALTH PHYSICS PERSONNEL	1	19	67		0.18	15.372	43.234	
SUPERVISORY PERSONNEL	1	5	13		0.445	1.732	6.275	
ENGINEERING PERSONNEL	2	4	17		0.576	2.868	10.421	
TOTAL	79	181	339	599	61.62	82.182	250.67	394.472
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	1		0	0	0.149	
OPERATING PERSONNEL	1	0	0		0.726	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	2	1	2		0.53	0.387	3.409	
ENGINEERING PERSONNEL	2	0	15		1.432	0	2.136	
TOTAL	5	1	18	24	2.688	0.387	5.694	8.769
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	1	8		0	0.283	11.216	
OPERATING PERSONNEL	0	4	2		0	1.48	0.665	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	3	2		0	2.13	4.122	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	8	12	20	0	3.893	16.003	19.896
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	75	150	251	476	60.447	60.466	202.284	323.197
OPERATING PERSONNEL	2	36	2	40	0.836	11.16	0.825	12.821
HEALTH PHYSICS PERSONNEL	1	22	68	91	0.18	16.526	43.45	60.156
SUPERVISORY PERSONNEL	4	13	34	51	1.496	5.61	22.478	29.584
ENGINEERING PERSONNEL	6	6	33	45	2.553	5.934	12.845	21.332
GRAND TOTALS	88	227	388	703	65.512	99.696	281.882	447.09

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *DAVIS-BESSE TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	79	3	286		1.474	0.055	10.063	
OPERATING PERSONNEL	89	0	1		3.123	0	0	
HEALTH PHYSICS PERSONNEL	60	0	57		2.375	0	11.737	
SUPERVISORY PERSONNEL	28	1	0		0.452	0.005	0	
ENGINEERING PERSONNEL	19	0	13		0.369	0	0.647	
TOTAL	275	4	357	636	7.793	0.06	22.447	30.3
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	132	4	500		2.983	0.105	29.434	
OPERATING PERSONNEL	16	0	1		0.236	0	0.005	
HEALTH PHYSICS PERSONNEL	30	0	37		1.286	0	3.928	
SUPERVISORY PERSONNEL	26	0	0		0.42	0	0	
ENGINEERING PERSONNEL	14	0	15		0.271	0	0.323	
TOTAL	218	4	553	775	5.196	0.105	33.69	38.991
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	66	0	337		3.246	0	16.564	
OPERATING PERSONNEL	2	0	0		0.03	0	0	
HEALTH PHYSICS PERSONNEL	1	0	2		0	0	0.124	
SUPERVISORY PERSONNEL	14	0	1		0.259	0	0.015	
ENGINEERING PERSONNEL	5	0	10		0.56	0	0.173	
TOTAL	88	0	350	438	4.095	0	16.876	20.971
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	107	2	462		5.764	0.025	61.482	
OPERATING PERSONNEL	17	0	0		0.501	0	0	
HEALTH PHYSICS PERSONNEL	16	0	6		0.935	0	0.375	
SUPERVISORY PERSONNEL	15	1	0		1.152	0.005	0	
ENGINEERING PERSONNEL	14	0	30		0.236	0	2.649	
TOTAL	169	3	498	670	8.588	0.03	64.506	73.124
WASTE PROCESSING								
MAINTENANCE PERSONNEL	3	0	39		0.02	0	3.358	
OPERATING PERSONNEL	2	0	0		0.006	0	0	
HEALTH PHYSICS PERSONNEL	9	0	20		3.279	0	2.43	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	14	0	59	73	3.305	0	5.788	9.093
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	387	9	1624	2020	13.487	0.185	120.901	134.573
OPERATING PERSONNEL	126	0	2	128	3.896	0	0.005	3.901
HEALTH PHYSICS PERSONNEL	116	0	122	238	7.875	0	18.594	26.469
SUPERVISORY PERSONNEL	83	2	1	86	2.283	0.01	0.015	2.308
ENGINEERING PERSONNEL	52	0	68	120	1.436	0	3.792	5.228
GRAND TOTALS	764	11	1817	2592	28.977	0.195	143.307	172.479

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *DIABLO CANYON 1 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	6	0	0		1	0	0	
HEALTH PHYSICS PERSONNEL	14	0	0		2	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	20	0	0	20	3	0	0	3
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	28	14	97		6	5	21	
OPERATING PERSONNEL	6	2	6		1	1	2	
HEALTH PHYSICS PERSONNEL	31	1	73		8	0	26	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	10	0	6		2	0	1	
TOTAL	75	17	182	274	17	6	50	73
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	17	3		0	5	1	
OPERATING PERSONNEL	5	0	0		3	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	5	17	3	25	3	5	1	9
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	51	18	226		16	6	98	
OPERATING PERSONNEL	5	5	5		1	1	1	
HEALTH PHYSICS PERSONNEL	14	1	32		6	0	9	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	4	0	10		1	0	2	
TOTAL	74	24	273	371	24	7	110	141
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	2	0	7		0	0	1	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	2	0	7	9	0	0	1	1
REFUELING								
MAINTENANCE PERSONNEL	25	13	4		7	4	1	
OPERATING PERSONNEL	24	1	1		4	0	0	
HEALTH PHYSICS PERSONNEL	0	0	15		0	0	3	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	1	0	3		0	0	1	
TOTAL	50	14	23	87	11	4	5	20
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	104	62	330	496	33	24	126	183
OPERATING PERSONNEL	46	8	12	66	13	2	3	18
HEALTH PHYSICS PERSONNEL	61	2	127	190	19	0	43	62
SUPERVISORY PERSONNEL	0	0	0	0	0	0	0	0
ENGINEERING PERSONNEL	15	0	19	34	4	0	4	8
GRAND TOTALS	226	72	488	786	69	26	176	271

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *DRESDEN 2, 3 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	42	62	74		34.136	14.03	60.038	
OPERATING PERSONNEL	94	0	2		85.121	0	0.735	
HEALTH PHYSICS PERSONNEL	26	0	1		30.227	0	0.24	
SUPERVISORY PERSONNEL	53	5	5		20.926	0.593	6.307	
ENGINEERING PERSONNEL	31	7	16		9.544	1.731	4.86	
TOTAL	246	74	98	418	179.954	16.354	72.18	268.488
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	294	33	174		237.493	7.409	142.378	
OPERATING PERSONNEL	39	0	26		35.61	0	8.772	
HEALTH PHYSICS PERSONNEL	35	0	11		41.322	0	8.614	
SUPERVISORY PERSONNEL	97	2	2		38.104	0.343	1.766	
ENGINEERING PERSONNEL	37	3	1		11.255	0.719	0.473	
TOTAL	502	38	214	754	363.784	8.471	162.003	534.258
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	6	0	10		4.668	0	8.577	
OPERATING PERSONNEL	0	0	1		0	0	0.023	
HEALTH PHYSICS PERSONNEL	1	0	0		0.874	0	0	
SUPERVISORY PERSONNEL	1	0	1		0.477	0	0.505	
ENGINEERING PERSONNEL	1	8	8		0.068	1.984	2.504	
TOTAL	9	8	20	37	6.087	1.984	11.609	19.68
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	4	45	1818		3.501	10.088	1487.246	
OPERATING PERSONNEL	1	0	2		1.059	0	0.965	
HEALTH PHYSICS PERSONNEL	6	0	3		7.338	0	1.834	
SUPERVISORY PERSONNEL	11	5	205		4.09	0.637	243.214	
ENGINEERING PERSONNEL	38	34	6		11.836	8.736	1.794	
TOTAL	60	84	2034	2178	27.824	19.461	1735.053	1782.338
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	13		1.751	0	10.292	
OPERATING PERSONNEL	9	0	36		8.208	0	12.469	
HEALTH PHYSICS PERSONNEL	6	0	1		7.163	0	0.23	
SUPERVISORY PERSONNEL	8	0	1		2.931	0	0.505	
ENGINEERING PERSONNEL	4	1	1		1.266	0.107	0.187	
TOTAL	29	1	52	82	21.319	0.107	23.683	45.109
REFUELING								
MAINTENANCE PERSONNEL	13	0	8		10.212	0	6.862	
OPERATING PERSONNEL	3	0	0		2.383	0	0	
HEALTH PHYSICS PERSONNEL	1	0	0		0.437	0	0	
SUPERVISORY PERSONNEL	4	0	0		1.636	0	0	
ENGINEERING PERSONNEL	1	0	6		0.24	0.04	1.794	
TOTAL	22	0	14	36	14.908	0.04	8.656	23.604
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	361	140	2097	2598	291.761	31.527	1715.393	2038.681
OPERATING PERSONNEL	146	0	67	213	132.381	0	22.964	155.345
HEALTH PHYSICS PERSONNEL	75	0	16	91	87.361	0	10.918	98.279
SUPERVISORY PERSONNEL	174	12	214	400	68.164	1.573	252.297	322.034
ENGINEERING PERSONNEL	112	53	38	203	34.209	13.317	11.612	59.138
GRAND TOTALS	868	205	2432	3505	613.876	46.417	2013.184	2673.477

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *DUANE ARNOLD TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	41	0	105		1.004	0	10.552	
OPERATING PERSONNEL	74	1	12		21.903	0.004	0.493	
HEALTH PHYSICS PERSONNEL	47	0	14		5.166	0	1.078	
SUPERVISORY PERSONNEL	43	11	26		0.664	0.04	2.476	
ENGINEERING PERSONNEL	37	31	73		1.939	0.608	3.609	
TOTAL	242	43	230	515	30.676	0.652	18.208	49.536
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	57	0	146		8.32	0	15.967	
OPERATING PERSONNEL	10	0	3		0.217	0	0.017	
HEALTH PHYSICS PERSONNEL	80	0	15		22.533	0	1.393	
SUPERVISORY PERSONNEL	14	0	30		0.605	0	0.459	
ENGINEERING PERSONNEL	26	12	50		1.255	0.136	1.065	
TOTAL	187	12	244	443	32.93	0.136	18.901	51.967
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	7	0	68		0.067	0	8.145	
OPERATING PERSONNEL	2	0	0		0.008	0	0	
HEALTH PHYSICS PERSONNEL	26	0	8		0.7	0	0.057	
SUPERVISORY PERSONNEL	6	0	7		0.093	0	0.207	
ENGINEERING PERSONNEL	10	3	41		0.702	0.022	5.016	
TOTAL	51	3	124	178	1.57	0.022	13.425	15.017
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	41	0	155		5.792	0	31.81	
OPERATING PERSONNEL	10	0	5		0.336	0	0.057	
HEALTH PHYSICS PERSONNEL	57	0	6		6.598	0	1.556	
SUPERVISORY PERSONNEL	20	0	19		0.663	0	0.793	
ENGINEERING PERSONNEL	26	6	57		5.059	0.076	2.191	
TOTAL	154	6	242	402	18.448	0.076	36.407	54.931
WASTE PROCESSING								
MAINTENANCE PERSONNEL	12	0	45		0.082	0	3.122	
OPERATING PERSONNEL	19	0	14		3.429	0	2.521	
HEALTH PHYSICS PERSONNEL	74	0	5		4.392	0	0.055	
SUPERVISORY PERSONNEL	11	0	10		0.195	0	1.414	
ENGINEERING PERSONNEL	20	2	12		0.336	0.015	0.307	
TOTAL	136	2	86	224	8.434	0.015	7.419	15.868
REFUELING								
MAINTENANCE PERSONNEL	1	0	8		0.004	0	0.175	
OPERATING PERSONNEL	3	0	0		0.006	0	0	
HEALTH PHYSICS PERSONNEL	11	0	1		0.063	0	0.019	
SUPERVISORY PERSONNEL	0	0	1		0	0	0.004	
ENGINEERING PERSONNEL	2	0	0		0.008	0	0	
TOTAL	17	0	10	27	0.081	0	0.198	0.279
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	159 (111)	0 (1)	527 (259)	686 (371)	15.269	0	69.771	85.04
OPERATING PERSONNEL	118 (127)	1 (1)	34 (37)	153 (165)	25.899	0.004	3.088	28.991
HEALTH PHYSICS PERSONNEL	295 (126)	0 (0)	49 (26)	344 (152)	39.452	0	4.158	43.61
SUPERVISORY PERSONNEL	94 (116)	11 (34)	93 (125)	198 (275)	2.22	0.04	5.353	7.613
ENGINEERING PERSONNEL	121 (87)	54 (61)	233 (183)	408 (331)	9.299	0.857	12.188	22.344
GRAND TOTALS	787 (567)	66 (97)	936 (630)	1789 (1294)	92.139	0.901	94.558	187.598

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

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *FARLEY 1, 2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	121	5	201		4.73	0.23	5.17	
OPERATING PERSONNEL	157	0	21		42.12	0	0.48	
HEALTH PHYSICS PERSONNEL	93	0	156		34.02	0	42.13	
SUPERVISORY PERSONNEL	154	30	42		10.92	0.84	1.06	
ENGINEERING PERSONNEL	56	19	80		2.98	0.55	3.15	
TOTAL	581	54	500	1135	94.77	1.62	51.99	148.38
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	198	1	221		34.81	0.03	9.43	
OPERATING PERSONNEL	93	0	40		18.46	0	2.21	
HEALTH PHYSICS PERSONNEL	28	0	51		4.42	0	2.61	
SUPERVISORY PERSONNEL	45	4	5		2.88	0.29	0.08	
ENGINEERING PERSONNEL	17	5	41		0.36	0.13	2.85	
TOTAL	381	10	358	749	60.93	0.45	17.18	78.56
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	13	1	236		0.18	0.07	118.6	
OPERATING PERSONNEL	15	0	9		0.58	0	2.17	
HEALTH PHYSICS PERSONNEL	14	0	26		1.39	0	3.93	
SUPERVISORY PERSONNEL	6	3	4		0.62	0.11	0.65	
ENGINEERING PERSONNEL	17	3	60		1.12	0.59	21.51	
TOTAL	65	7	335	407	3.89	0.77	146.86	151.52
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	193	7	882		163.77	0.49	199.73	
OPERATING PERSONNEL	92	0	44		15.92	0	5.62	
HEALTH PHYSICS PERSONNEL	47	0	94		14.53	0	7.81	
SUPERVISORY PERSONNEL	65	13	12		11.47	0.84	1.76	
ENGINEERING PERSONNEL	39	13	104		3.1	1.13	21.59	
TOTAL	436	33	1136	1605	208.79	2.46	236.51	447.76
WASTE PROCESSING								
MAINTENANCE PERSONNEL	13	1	46		0.49	0.01	2.31	
OPERATING PERSONNEL	18	0	4		2.6	0	0.16	
HEALTH PHYSICS PERSONNEL	22	0	7		4.66	0	1.78	
SUPERVISORY PERSONNEL	9	1	0		1.42	0	0	
ENGINEERING PERSONNEL	1	1	5		0	0.12	0.04	
TOTAL	63	3	62	128	9.17	0.13	4.29	13.59
REFUELING								
MAINTENANCE PERSONNEL	47	0	28		5.88	0	3.17	
OPERATING PERSONNEL	13	0	20		0.91	0	2.49	
HEALTH PHYSICS PERSONNEL	7	0	11		0.61	0	0.64	
SUPERVISORY PERSONNEL	14	1	3		2.7	0	0.13	
ENGINEERING PERSONNEL	8	0	6		0.63	0	0.63	
TOTAL	89	1	68	158	10.73	0	7.06	17.79
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	585	15	1614	2214	209.86	0.83	338.41	549.1
OPERATING PERSONNEL	388	0	138	526	80.59	0	13.13	93.72
HEALTH PHYSICS PERSONNEL	211	0	345	556	59.63	0	58.9	118.53
SUPERVISORY PERSONNEL	293	52	66	411	30.01	2.08	3.68	35.77
ENGINEERING PERSONNEL	138	41	296	475	8.19	2.52	49.77	60.48
GRAND TOTALS	1615	108	2459	4182	388.28	5.43	463.89	857.6

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: FERMI-2 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	0		0.014	0	0.032	
OPERATING PERSONNEL	0	0	0		0.212	0	0.012	
HEALTH PHYSICS PERSONNEL	0	0	0		0.074	0	0.075	
SUPERVISORY PERSONNEL	0	0	0		0.28	0	0.153	
ENGINEERING PERSONNEL	0	0	0		0.138	0.015	0.148	
TOTAL	0	0	0	0	0.718	0.015	0.42	1.153
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0		0.083	0.002	0.296	
OPERATING PERSONNEL	0	0	0		0.022	0	0.025	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0.002	0.005	
ENGINEERING PERSONNEL	0	0	0		0.013	0.006	0.032	
TOTAL	0	0	0	0	0.118	0.01	0.358	0.486
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0.002	
HEALTH PHYSICS PERSONNEL	0	0	0		0.002	0	0	
SUPERVISORY PERSONNEL	0	0	0		0.011	0	0.015	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0.013	0	0.017	0.03
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0		0.029	0	0.078	
OPERATING PERSONNEL	0	0	0		0.015	0	0.002	
HEALTH PHYSICS PERSONNEL	0	0	0		0.017	0	0.024	
SUPERVISORY PERSONNEL	0	0	0		0	0	0.016	
ENGINEERING PERSONNEL	0	0	0		0.011	0	0.011	
TOTAL	0	0	0	0	0.072	0	0.131	0.203
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	1		0	0	0.117	
HEALTH PHYSICS PERSONNEL	0	0	0		0.011	0	0.013	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	1	1	0.011	0	0.13	0.141
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	0	0	0	0	0.126	0.002	0.406	0.534
OPERATING PERSONNEL	0	0	1	1	0.249	0	0.158	0.407
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.104	0	0.112	0.216
SUPERVISORY PERSONNEL	0	0	0	0	0.291	0.002	0.189	0.482
ENGINEERING PERSONNEL	0	0	0	0	0.162	0.021	0.191	0.374
GRAND TOTALS	0	0	1	1	0.932	0.025	1.056	2.013

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *FITZPATRICK TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	81	17	81		10.96	0.181	6.027	
OPERATING PERSONNEL	116	9	5		25.348	0	0.226	
HEALTH PHYSICS PERSONNEL	43	4	38		18.041	0.174	9.942	
SUPERVISORY PERSONNEL	19	4	20		1.251	0.02	0.346	
ENGINEERING PERSONNEL	16	10	24		2.026	0.147	1.197	
TOTAL	275	44	168	487	57.626	0.522	17.738	75.886
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	113	52	226		110.387	0.334	32.033	
OPERATING PERSONNEL	63	10	5		5.373	0	0.226	
HEALTH PHYSICS PERSONNEL	26	2	29		5.389	0.256	4.196	
SUPERVISORY PERSONNEL	29	2	18		6.605	0.01	1.421	
ENGINEERING PERSONNEL	16	6	25		0.728	0.107	0.833	
TOTAL	247	72	303	622	128.482	0.707	38.709	167.898
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	67	16	110		2.813	1.299	8.6	
OPERATING PERSONNEL	64	17	4		2.115	0.03	0.172	
HEALTH PHYSICS PERSONNEL	17	2	11		0.927	0.382	0.465	
SUPERVISORY PERSONNEL	31	2	10		1.369	0.02	1.226	
ENGINEERING PERSONNEL	20	11	33		2.109	0.666	2.2	
TOTAL	199	48	168	415	9.333	2.397	12.663	24.393
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	55	14	249		1.21	0.116	77.041	
OPERATING PERSONNEL	6	5	2		0.325	0	0.035	
HEALTH PHYSICS PERSONNEL	13	1	14		0.644	0.038	0.937	
SUPERVISORY PERSONNEL	6	0	6		1.073	0	0.377	
ENGINEERING PERSONNEL	17	5	23		0.318	0.01	0.396	
TOTAL	97	25	294	416	3.57	0.164	78.786	82.52
WASTE PROCESSING								
MAINTENANCE PERSONNEL	74	57	73		10.818	0	2.531	
OPERATING PERSONNEL	63	15	7		11.367	0.01	4.843	
HEALTH PHYSICS PERSONNEL	20	0	18		1.411	0	0.75	
SUPERVISORY PERSONNEL	15	0	9		0.527	0	0.427	
ENGINEERING PERSONNEL	3	0	5		0.009	0	0.079	
TOTAL	175	72	112	359	24.132	0.01	8.63	32.772
REFUELING								
MAINTENANCE PERSONNEL	15	0	0		0.233	0	0	
OPERATING PERSONNEL	6	2	0		0.07	0	0	
HEALTH PHYSICS PERSONNEL	4	0	0		0.029	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	25	2	0	27	0.332	0	0	0.332
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	405	156	739	1300	136.421	1.93	126.232	264.583
OPERATING PERSONNEL	318	58	23	399	44.598	0.04	5.502	50.14
HEALTH PHYSICS PERSONNEL	123	9	110	242	26.441	0.85	16.29	43.581
SUPERVISORY PERSONNEL	100	8	63	171	10.825	0.05	3.797	14.672
ENGINEERING PERSONNEL	72	32	110	214	5.19	0.93	4.705	10.825
GRAND TOTALS	1018	263	1045	2326	223.475	3.8	156.526	383.801

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *FORT CALHOUN TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	0		0.394	0.099	0.258	
OPERATING PERSONNEL	4	1	2		1.694	0.789	0.555	
HEALTH PHYSICS PERSONNEL	0	0	0		0.377	0.006	0	
SUPERVISORY PERSONNEL	21	0	0		9.276	0	0.005	
ENGINEERING PERSONNEL	18	0	19		11.709	0.077	5.213	
TOTAL	43	1	21	65	23.45	0.971	6.031	30.452
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	31	3	10		11.648	1.897	5.248	
OPERATING PERSONNEL	6	0	3		2.134	0.269	0.627	
HEALTH PHYSICS PERSONNEL	0	0	0		0.087	0.005	0	
SUPERVISORY PERSONNEL	5	0	0		1.941	0	0	
ENGINEERING PERSONNEL	3	0	11		0.933	0	11.598	
TOTAL	45	3	24	72	16.743	2.171	17.473	36.387
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	4	2	6		1.789	0.753	2.397	
OPERATING PERSONNEL	1	0	0		0.655	0.157	0.078	
HEALTH PHYSICS PERSONNEL	0	0	0		0.058	0.015	0	
SUPERVISORY PERSONNEL	3	0	0		1.01	0	0	
ENGINEERING PERSONNEL	1	0	0		0.34	0	0.067	
TOTAL	9	2	6	17	3.852	0.925	2.542	7.319
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	1		0.563	0.11	0.832	
OPERATING PERSONNEL	0	0	0		0.042	0	0.04	
HEALTH PHYSICS PERSONNEL	0	0	0		0.005	0	0	
SUPERVISORY PERSONNEL	0	0	0		0.005	0	0	
ENGINEERING PERSONNEL	2	0	6		1.77	0	7.642	
TOTAL	3	0	7	10	2.385	0.11	8.514	11.009
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0.045	0.14	0	
OPERATING PERSONNEL	0	0	0		0.078	0	0.02	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0.123	0.14	0.02	0.283
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	36	5	17	58	14.439	2.999	8.735	26.173
OPERATING PERSONNEL	11	1	5	17	4.603	1.215	1.32	7.138
HEALTH PHYSICS PERSONNEL	0	0	0	0	0.527	0.026	0	0.553
SUPERVISORY PERSONNEL	29	0	0	29	12.232	0	0.005	12.237
ENGINEERING PERSONNEL	24	0	36	60	14.752	0.077	24.52	39.349
GRAND TOTALS	100	6	58	164	46.553	4.317	34.58	85.45

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: FORT ST. VRAIN TYPE: HTGR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	1	0	0		0.12	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	1	0	0	1	0.12	0	0	0.12
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	2	0	0		0.24	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	2	0	0	2	0.24	0	0	0.24
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	2	0	0	2	0.24	0	0	0.24
OPERATING PERSONNEL	0	0	0	0	0	0	0	0
HEALTH PHYSICS PERSONNEL	1	0	0	1	0.12	0	0	0.12
SUPERVISORY PERSONNEL	0	0	0	0	0	0	0	0
ENGINEERING PERSONNEL	0	0	0	0	0	0	0	0
GRAND TOTALS	3	0	0	3	0.36	0	0	0.36

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *GINNA TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	173	50	89		5.977	4.871	10.358	
OPERATING PERSONNEL	0	28	0		0	13.962	0	
HEALTH PHYSICS PERSONNEL	28	10	3		8.312	3.154	0.02	
SUPERVISORY PERSONNEL	25	15	14		3.432	3.094	0.647	
ENGINEERING PERSONNEL	13	0	4		0.439	0	0.154	
TOTAL	239	103	110	452	18.16	25.081	11.179	54.42
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	255	45	98		39.823	12.068	7.265	
OPERATING PERSONNEL	0	23	0		0	1.232	0	
HEALTH PHYSICS PERSONNEL	28	10	3		4.142	1.465	0.325	
SUPERVISORY PERSONNEL	26	15	13		3.382	1.176	0.556	
ENGINEERING PERSONNEL	17	0	3		6.571	0	0.335	
TOTAL	326	93	117	536	53.918	15.941	8.481	78.34
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	24	17	56		1.955	0.323	7.573	
OPERATING PERSONNEL	0	4	0		0	0.074	0	
HEALTH PHYSICS PERSONNEL	14	6	0		0.538	0.381	0	
SUPERVISORY PERSONNEL	10	8	10		0.53	0.258	1.746	
ENGINEERING PERSONNEL	1	0	0		0.034	0	0	
TOTAL	49	35	66	150	3.057	1.036	9.319	13.412
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	255	47	120		73.212	19.42	61.943	
OPERATING PERSONNEL	0	21	0		0	2.194	0	
HEALTH PHYSICS PERSONNEL	28	10	2		5.203	2.004	0.01	
SUPERVISORY PERSONNEL	27	15	14		7.593	2.704	3.749	
ENGINEERING PERSONNEL	7	0	4		1.045	0	0.353	
TOTAL	317	93	140	550	87.053	26.322	66.055	179.43
WASTE PROCESSING								
MAINTENANCE PERSONNEL	57	21	16		4.662	1.126	0.648	
OPERATING PERSONNEL	0	8	0		0	0.201	0	
HEALTH PHYSICS PERSONNEL	16	8	3		2.616	0.355	0.645	
SUPERVISORY PERSONNEL	8	6	5		0.428	0.069	0.089	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	81	43	24	148	7.706	1.751	1.382	10.839
REFUELING								
MAINTENANCE PERSONNEL	145	34	116		29.591	4.048	31.624	
OPERATING PERSONNEL	0	7	0		0	2.942	0	
HEALTH PHYSICS PERSONNEL	25	7	2		4.139	3.91	0.02	
SUPERVISORY PERSONNEL	14	12	9		6.842	1.047	0.231	
ENGINEERING PERSONNEL	17	0	3		7.866	0	0.062	
TOTAL	201	60	130	391	48.438	11.947	31.937	92.322
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	909 (295)	214 (50)	495 (130)	1618 (475)	155.22	41.856	119.411	316.487
OPERATING PERSONNEL	0 (0)	91 (29)	0 (0)	91 (29)	0	20.605	0	20.605
HEALTH PHYSICS PERSONNEL	139 (28)	51 (10)	13 (3)	203 (41)	24.95	11.269	1.02	37.239
SUPERVISORY PERSONNEL	110 (27)	71 (15)	65 (17)	246 (59)	22.207	8.348	7.018	37.573
ENGINEERING PERSONNEL	55 (21)	0 (0)	14 (4)	69 (25)	15.955	0	0.904	16.859
GRAND TOTALS	1213 (356)	427 (95)	587 (149)	2227 (600)	218.332	82.078	128.353	428.763

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

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *GRAND GULF 1 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	6	0	24		0.75	0	12.06	
OPERATING PERSONNEL	51	0	0		22.44	0	0	
HEALTH PHYSICS PERSONNEL	43	0	32		22.48	0	9.61	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	100	0	56	156	45.67	0	21.67	67.34
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	102	0	169		46.8	0	50.73	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	2	0	0		0.27	0	0	
SUPERVISORY PERSONNEL	3	0	21		0.46	0	6.06	
ENGINEERING PERSONNEL	0	0	2		0	0	0.78	
TOTAL	107	0	192	299	47.53	0	57.57	105.1
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	62		0	0	31.8	
OPERATING PERSONNEL	0	0	1		0	0	0.21	
HEALTH PHYSICS PERSONNEL	3	0	5		1.87	0	3.24	
SUPERVISORY PERSONNEL	1	0	50		0.23	0	37.02	
ENGINEERING PERSONNEL	0	0	2		0	0	0.86	
TOTAL	4	0	120	124	2.1	0	73.13	75.23
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	4	0	187		0.64	0	131.08	
OPERATING PERSONNEL	0	0	1		0	0	0.46	
HEALTH PHYSICS PERSONNEL	11	0	20		5.67	0	11.32	
SUPERVISORY PERSONNEL	1	0	4		0.46	0	1.56	
ENGINEERING PERSONNEL	2	0	0		0.32	0	0	
TOTAL	18	0	212	230	7.09	0	144.42	151.51
WASTE PROCESSING								
MAINTENANCE PERSONNEL	6	0	15		0.98	0	5.28	
OPERATING PERSONNEL	0	0	1		0	0	3.98	
HEALTH PHYSICS PERSONNEL	1	0	7		0.21	0	2.09	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	7	0	23	30	1.19	0	11.35	12.54
REFUELING								
MAINTENANCE PERSONNEL	0	0	49		0	0	11.88	
OPERATING PERSONNEL	1	0	0		0.11	0	0	
HEALTH PHYSICS PERSONNEL	5	0	5		1.41	0	1.59	
SUPERVISORY PERSONNEL	0	0	4		0	0	0.68	
ENGINEERING PERSONNEL	1	0	7		0.12	0	1.52	
TOTAL	7	0	65	72	1.64	0	15.67	17.31
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	118	0	506	624	49.17	0	242.83	292
OPERATING PERSONNEL	52	0	3	55	22.55	0	4.65	27.2
HEALTH PHYSICS PERSONNEL	65	0	69	134	31.91	0	27.85	59.76
SUPERVISORY PERSONNEL	5	0	79	84	1.15	0	45.32	46.47
ENGINEERING PERSONNEL	3	0	11	14	0.44	0	3.16	3.6
GRAND TOTALS	243	0	668	911	105.22	0	323.81	429.03

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *HADDAM NECK TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY CONTRACT	TOTAL		TOTAL PERSON-REM STATION	UTILITY CONTRACT	TOTAL	
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	17	1	28		10.33	0.69	12.68	
OPERATING PERSONNEL	43	2	2		57.71	1.39	1.5	
HEALTH PHYSICS PERSONNEL	29	5	94		24.23	3.74	68.98	
SUPERVISORY PERSONNEL	5	0	0		2.37	0	0	
ENGINEERING PERSONNEL	8	10	9		2.09	6.21	2.97	
TOTAL	102	18	133	253	96.73	12.03	86.13	194.89
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	55	48	202		69.24	19.42	181.95	
OPERATING PERSONNEL	5	0	0		2.17	0.08	0.46	
HEALTH PHYSICS PERSONNEL	25	4	78		12.04	1.48	34.89	
SUPERVISORY PERSONNEL	1	0	0		0.21	0	0.03	
ENGINEERING PERSONNEL	5	14	17		1.63	5.79	11.3	
TOTAL	91	66	297	454	85.29	26.77	228.63	340.69
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	28	13	184		20.13	4.51	206.92	
OPERATING PERSONNEL	2	0	4		1.58	0.04	2.16	
HEALTH PHYSICS PERSONNEL	4	2	42		1.65	1.17	21.58	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	9	11	39		4.72	4.23	32.35	
TOTAL	43	26	269	338	28.08	9.95	263.01	301.04
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	19	13	487		7.77	6.19	543.41	
OPERATING PERSONNEL	1	0	4		0.74	0.23	2.25	
HEALTH PHYSICS PERSONNEL	8	2	47		2.87	1.22	26.12	
SUPERVISORY PERSONNEL	0	0	0		0.07	0	0.01	
ENGINEERING PERSONNEL	6	17	61		1.23	6.91	44.41	
TOTAL	34	32	599	665	12.68	14.55	616.2	643.43
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	8		0.02	0.01	11.19	
OPERATING PERSONNEL	0	0	0		0.22	0	0.01	
HEALTH PHYSICS PERSONNEL	18	0	59		16.85	0.1	52.98	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0.17	0.03	0.06	
TOTAL	18	0	67	85	17.26	0.14	64.24	81.64
REFUELING								
MAINTENANCE PERSONNEL	21	4	138		9.45	1.6	99.71	
OPERATING PERSONNEL	3	0	4		1.28	0.05	3.88	
HEALTH PHYSICS PERSONNEL	5	0	15		2.16	0.09	6.2	
SUPERVISORY PERSONNEL	0	0	0		0.02	0	0	
ENGINEERING PERSONNEL	0	1	22		0.18	1.25	20.22	
TOTAL	29	5	179	213	13.09	2.99	130.01	146.09
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	140	79	1047	1266	116.94	32.42	1055.86	1205.22
OPERATING PERSONNEL	54	2	14	70	63.7	1.79	10.26	75.75
HEALTH PHYSICS PERSONNEL	89	13	335	437	59.8	7.8	210.75	278.35
SUPERVISORY PERSONNEL	6	0	0	6	2.67	0	0.04	2.71
ENGINEERING PERSONNEL	28	53	148	229	10.02	24.42	111.31	145.75
GRAND TOTALS	317	147	1544	2008	253.13	66.43	1388.22	1707.78

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *HATCH 1, 2 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	17	354		0.126	6.086	99.221	
OPERATING PERSONNEL	0	115	0		0.076	59.476	0.331	
HEALTH PHYSICS PERSONNEL	1	97	60		0.116	65.516	46.517	
SUPERVISORY PERSONNEL	4	57	8		1.246	20.806	3.677	
ENGINEERING PERSONNEL	1	29	30		0.401	14.332	11.419	
TOTAL	6	315	452	773	1.965	166.216	161.165	329.346
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	0	170	476		0.091	81.811	142.334	
OPERATING PERSONNEL	0	18	0		0.008	10.469	0.294	
HEALTH PHYSICS PERSONNEL	0	31	27		0.002	13.374	9.644	
SUPERVISORY PERSONNEL	0	16	13		0.058	4.377	5.533	
ENGINEERING PERSONNEL	0	10	31		0.039	3.47	11.337	
TOTAL	0	245	547	792	0.198	113.501	169.142	282.841
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	1	359		0.065	1.261	100.171	
OPERATING PERSONNEL	0	0	0		0.008	0.228	0.201	
HEALTH PHYSICS PERSONNEL	0	9	19		0.002	2.666	4.318	
SUPERVISORY PERSONNEL	0	1	9		0.086	1.209	3.33	
ENGINEERING PERSONNEL	0	3	24		0.026	1.318	11.451	
TOTAL	0	14	411	425	0.187	6.682	119.471	126.34
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	125	671		0.213	46.207	316.796	
OPERATING PERSONNEL	0	8	1		0.008	3.066	0.324	
HEALTH PHYSICS PERSONNEL	0	14	24		0.002	5.455	7.608	
SUPERVISORY PERSONNEL	0	4	24		0.245	2.17	14.624	
ENGINEERING PERSONNEL	1	20	84		0.229	9.1	28.746	
TOTAL	1	171	804	976	0.697	65.998	368.098	434.793
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	1	355		0.065	0.614	99.45	
OPERATING PERSONNEL	0	0	1		0.008	0.124	0.912	
HEALTH PHYSICS PERSONNEL	0	10	20		0.002	2.688	4.501	
SUPERVISORY PERSONNEL	0	0	7		0.015	0.231	2.508	
ENGINEERING PERSONNEL	0	0	21		0.026	0.176	8.381	
TOTAL	0	11	404	415	0.116	3.833	115.752	119.701
REFUELING								
MAINTENANCE PERSONNEL	0	20	356		0.065	7.577	99.838	
OPERATING PERSONNEL	0	2	0		0.008	1.621	0.201	
HEALTH PHYSICS PERSONNEL	0	11	23		0.002	2.941	5.113	
SUPERVISORY PERSONNEL	0	0	8		0.015	0.426	2.792	
ENGINEERING PERSONNEL	0	1	21		0.026	0.545	8.441	
TOTAL	0	34	408	442	0.116	13.11	116.385	129.611
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	0	334	2571	2905	0.625	143.556	857.81	1001.991
OPERATING PERSONNEL	0	143	2	145	0.116	74.984	2.263	77.363
HEALTH PHYSICS PERSONNEL	1	172	173	346	0.126	92.64	77.701	170.467
SUPERVISORY PERSONNEL	4	78	69	151	1.665	29,219	32.464	63.348
ENGINEERING PERSONNEL	2	63	211	276	0.747	28.941	79.775	109.463
GRAND TOTALS	7	790	3026	3823	3.279	369.34	1050.013	1422.632

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *HOPE CREEK TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	1	2		0.36	0.446	2.458	
OPERATING PERSONNEL	3	0	0		1.863	0	0.239	
HEALTH PHYSICS PERSONNEL	5	0	4		1.841	0	1.542	
SUPERVISORY PERSONNEL	0	0	0		0	0.003	0.005	
ENGINEERING PERSONNEL	0	0	2		0.685	0.013	0.249	
TOTAL	8	1	8	17	4.749	0.462	4.493	9.704
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	5	4	5		1.325	2.023	3.595	
OPERATING PERSONNEL	3	0	0		1.395	0	0.052	
HEALTH PHYSICS PERSONNEL	5	0	6		1.512	0	2.191	
SUPERVISORY PERSONNEL	0	0	0		0.002	0.006	0.004	
ENGINEERING PERSONNEL	0	0	1		0.546	0.017	0.252	
TOTAL	13	4	12	29	4.78	2.046	6.094	12.92
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	1		0.102	0.013	1.422	
OPERATING PERSONNEL	0	0	1		0.001	0	1.077	
HEALTH PHYSICS PERSONNEL	0	0	0		0.038	0	0.022	
SUPERVISORY PERSONNEL	0	0	0		0	0.002	0	
ENGINEERING PERSONNEL	0	0	0		0.062	0	0.044	
TOTAL	0	0	2	2	0.203	0.015	2.565	2.783
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	1	19	0		0.317	5.363	1.828	
OPERATING PERSONNEL	0	0	0		0.139	0	0.088	
HEALTH PHYSICS PERSONNEL	3	0	2		1.018	0	0.691	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	1		0.096	0	0.185	
TOTAL	4	19	3	26	1.57	5.363	2.792	9.725
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0		0	0.009	0	
OPERATING PERSONNEL	0	0	0		0.004	0	0	
HEALTH PHYSICS PERSONNEL	0	0	1		0.013	0	0.356	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0.04	0	0.004	
TOTAL	0	0	1	1	0.057	0.009	0.36	0.426
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	6	24	8	38	2.104	7.854	9.303	19.261
OPERATING PERSONNEL	6	0	1	7	3.402	0	1.456	4.858
HEALTH PHYSICS PERSONNEL	13	0	13	26	4.422	0	4.802	9.224
SUPERVISORY PERSONNEL	0	0	0	0	0.002	0.011	0.009	0.022
ENGINEERING PERSONNEL	0	0	4	4	1.429	0.03	0.734	2.193
GRAND TOTALS	25	24	26	75	11.359	7.895	16.304	35.558

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *INDIAN POINT 1, 2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	25	131	115		38.399	30.472	1.749	
OPERATING PERSONNEL	14	4	4		173.473	0	0	
HEALTH PHYSICS PERSONNEL	22	0	19		25.203	0	58.357	
SUPERVISORY PERSONNEL	42	18	29		14	7.498	4.184	
ENGINEERING PERSONNEL	31	33	6		29.521	7.032	4.546	
TOTAL	134	186	173	493	280.596	45.002	68.836	394.434
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	28	137	100		169.721	64.843	42.48	
OPERATING PERSONNEL	26	3	1		9.146	0	0.154	
HEALTH PHYSICS PERSONNEL	16	0	15		0.528	0	3.924	
SUPERVISORY PERSONNEL	25	16	10		24.589	5.477	0.874	
ENGINEERING PERSONNEL	31	14	3		4.445	1.832	0	
TOTAL	126	170	129	425	208.429	72.152	47.432	328.013
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	38	37	12		2.547	4.199	4.495	
OPERATING PERSONNEL	3	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	1	0	8		0	0	0.572	
SUPERVISORY PERSONNEL	18	13	2		1.321	1.578	0.294	
ENGINEERING PERSONNEL	6	8	0		0.473	0.858	0	
TOTAL	66	58	22	146	4.341	6.635	5.361	16.337
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	38	135	143		63.914	135.636	140.111	
OPERATING PERSONNEL	30	4	6		17.693	0	0.888	
HEALTH PHYSICS PERSONNEL	5	0	19		2.422	0	8.142	
SUPERVISORY PERSONNEL	34	17	40		23.831	17.461	13.349	
ENGINEERING PERSONNEL	37	27	8		8.878	6.381	7.276	
TOTAL	144	183	216	543	116.738	159.478	169.766	445.982
WASTE PROCESSING								
MAINTENANCE PERSONNEL	31	69	64		11.81	4.14	52.016	
OPERATING PERSONNEL	10	1	1		3.525	0	0	
HEALTH PHYSICS PERSONNEL	15	0	15		7.337	0	22.573	
SUPERVISORY PERSONNEL	29	11	24		13.499	0.48	5.471	
ENGINEERING PERSONNEL	19	18	2		5.224	1.783	5.805	
TOTAL	104	99	106	309	41.395	6.403	85.865	133.663
REFUELING								
MAINTENANCE PERSONNEL	74	94	100		8.361	34.336	12.612	
OPERATING PERSONNEL	64	1	1		15.405	0	0	
HEALTH PHYSICS PERSONNEL	9	0	39		1.964	0	2.805	
SUPERVISORY PERSONNEL	22	11	16		3.986	5.163	0.59	
ENGINEERING PERSONNEL	32	14	1		3.866	1.168	0	
TOTAL	201	120	157	478	33.582	40.667	16.007	90.256
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	234 (79)	603 (157)	534 (606)	1371 (842)	294.752	273.626	253.463	821.841
OPERATING PERSONNEL	147 (66)	13 (0)	13 (12)	173 (78)	219.242	0	1.042	220.284
HEALTH PHYSICS PERSONNEL	68 (25)	0 (0)	115 (147)	183 (172)	37.454	0	96.373	133.827
SUPERVISORY PERSONNEL	170 (48)	86 (24)	121 (81)	377 (153)	81.226	37.657	24.762	143.645
ENGINEERING PERSONNEL	156 (40)	114 (18)	20 (38)	290 (96)	52.407	19.054	17.627	89.088
GRAND TOTALS	775 (258)	816 (199)	803 (884)	2394 (1341)	685.081	330.337	393.267	1408.685

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

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *INDIAN POINT 3 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	2	0	3		0.62	0	0.6	
OPERATING PERSONNEL	42	0	1		12.22	0	0.1	
HEALTH PHYSICS PERSONNEL	20	0	7		8.71	0	1.89	
SUPERVISORY PERSONNEL	9	0	0		3.82	0	0	
ENGINEERING PERSONNEL	1	0	1		0.13	0	0.13	
TOTAL	74	0	12	86	25.5	0	2.72	28.22
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	7	0	30		0.86	0	9.57	
OPERATING PERSONNEL	1	0	0		0.53	0	0	
HEALTH PHYSICS PERSONNEL	9	0	25		3.18	0	10.79	
SUPERVISORY PERSONNEL	2	0	0		0.64	0	0	
ENGINEERING PERSONNEL	1	0	0		0.29	0	0	
TOTAL	20	0	55	75	5.5	0	20.36	25.86
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2	2	13		0.26	0.27	3.18	
OPERATING PERSONNEL	4	0	2		0.55	0	0.63	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	2	0	0		0.31	0	0	
ENGINEERING PERSONNEL	1	1	5		0.21	0.55	4.61	
TOTAL	9	3	20	32	1.33	0.82	8.42	10.57
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	34	2	99		17.4	1.11	66.38	
OPERATING PERSONNEL	11	0	4		2.73	0	1.05	
HEALTH PHYSICS PERSONNEL	5	0	0		1.57	0	0	
SUPERVISORY PERSONNEL	12	0	0		6.68	0	0	
ENGINEERING PERSONNEL	1	0	0		0.38	0	0	
TOTAL	63	2	103	168	28.76	1.11	67.43	97.3
WASTE PROCESSING								
MAINTENANCE PERSONNEL	10	0	13		2.91	0	2.87	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	1	0	0		0.13	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	11	0	13	24	3.04	0	2.87	5.91
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	55	4	158	217	22.05	1.38	82.6	106.03
OPERATING PERSONNEL	58	0	7	65	16.03	0	1.78	17.81
HEALTH PHYSICS PERSONNEL	34	0	32	66	13.46	0	12.68	26.14
SUPERVISORY PERSONNEL	26	0	0	26	11.58	0	0	11.58
ENGINEERING PERSONNEL	4	1	6	11	1.01	0.55	4.74	6.3
GRAND TOTALS	177	5	203	385	64.13	1.93	101.8	167.86

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *KEWAUNEE TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	3	0	4		0.55	0	1.109	
OPERATING PERSONNEL	17	2	0		3.024	0.013	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	10	0	0		1.194	0	0	
ENGINEERING PERSONNEL	7	8	0		0.502	1.786	0	
TOTAL	37	10	4	51	5.27	1.799	1.109	8.178
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	51	12	102		13.051	3.304	40.263	
OPERATING PERSONNEL	13	3	3		1.036	0.334	0.169	
HEALTH PHYSICS PERSONNEL	19	0	13		9.791	0	7.392	
SUPERVISORY PERSONNEL	3	1	2		0.039	0.772	0.271	
ENGINEERING PERSONNEL	7	1	1		0.959	0.274	0.113	
TOTAL	93	17	121	231	24.876	4.684	48.208	77.768
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2	0	17		0.009	0	1.375	
OPERATING PERSONNEL	0	0	5		0	0	0.741	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	1	0	0		0	0	0	
ENGINEERING PERSONNEL	1	0	1		0.075	0	0.335	
TOTAL	4	0	23	27	0.084	0	2.451	2.535
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	50	10	74		11.772	1.218	36.385	
OPERATING PERSONNEL	11	1	1		0.871	0.005	0	
HEALTH PHYSICS PERSONNEL	9	0	0		0.901	0	0	
SUPERVISORY PERSONNEL	4	1	17		0.379	0.278	14.635	
ENGINEERING PERSONNEL	5	3	3		0.374	0.147	1.079	
TOTAL	79	15	95	189	14.297	1.648	52.099	68.044
WASTE PROCESSING								
MAINTENANCE PERSONNEL	19	8	6		0.54	0.192	0.426	
OPERATING PERSONNEL	4	0	0		1.462	0	0	
HEALTH PHYSICS PERSONNEL	5	0	0		1.389	0	0	
SUPERVISORY PERSONNEL	1	1	0		0	0.002	0	
ENGINEERING PERSONNEL	0	1	0		0	0	0	
TOTAL	29	10	6	45	3.391	0.194	0.426	4.011
REFUELING								
MAINTENANCE PERSONNEL	10	3	11		0.904	0.068	5.22	
OPERATING PERSONNEL	0	0	3		0	0	1.566	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	3	1	0		0.113	0	0	
ENGINEERING PERSONNEL	4	0	0		0.23	0	0	
TOTAL	17	4	14	35	1.247	0.068	6.786	8.101
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	135	33	214	382	26.826	4.782	84.778	116.386
OPERATING PERSONNEL	45	6	12	63	6.393	0.352	2.476	9.221
HEALTH PHYSICS PERSONNEL	33	0	13	46	12.081	0	7.392	19.473
SUPERVISORY PERSONNEL	22	4	19	45	1.725	1.052	14.906	17.683
ENGINEERING PERSONNEL	24	13	5	42	2.14	2.207	1.527	5.874
GRAND TOTALS	259	56	263	578	49.165	8.393	111.079	168.637

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *LACROSSE TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	13	1	2		7.895	0.475	0.658	
OPERATING PERSONNEL	20	0	0		35.571	0	0	
HEALTH PHYSICS PERSONNEL	8	0	1		9.968	0	0.67	
SUPERVISORY PERSONNEL	9	0	0		6.215	0	0	
ENGINEERING PERSONNEL	6	0	2		2.407	0	0.474	
TOTAL	56	1	5	62	62.056	0.475	1.802	64.333
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	21	9	4		27.218	9.101	1.715	
OPERATING PERSONNEL	17	0	0		5.7	0	0	
HEALTH PHYSICS PERSONNEL	6	0	0		1.593	0	0	
SUPERVISORY PERSONNEL	7	0	0		4.312	0	0	
ENGINEERING PERSONNEL	6	0	0		3.187	0	0	
TOTAL	57	9	4	70	42.01	9.101	1.715	52.826
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	15		0.024	0.031	9.397	
OPERATING PERSONNEL	11	0	0		3.005	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0.157	0	0	
SUPERVISORY PERSONNEL	5	0	0		1.638	0	0	
ENGINEERING PERSONNEL	2	0	1		1.013	0	0.383	
TOTAL	18	0	16	34	5.837	0.031	9.78	15.648
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	22	11	8		31.763	14.189	6.737	
OPERATING PERSONNEL	19	0	0		10.605	0	0	
HEALTH PHYSICS PERSONNEL	8	0	0		4.692	0	0	
SUPERVISORY PERSONNEL	14	0	0		14.513	0	0	
ENGINEERING PERSONNEL	10	0	7		11.237	0	4.843	
TOTAL	73	11	15	99	72.81	14.189	11.58	98.579
WASTE PROCESSING								
MAINTENANCE PERSONNEL	7	0	0		1.691	0.175	0	
OPERATING PERSONNEL	7	0	0		1.607	0	0	
HEALTH PHYSICS PERSONNEL	4	0	0		1.286	0	0	
SUPERVISORY PERSONNEL	4	0	0		1.473	0	0	
ENGINEERING PERSONNEL	2	0	0		0.491	0	0	
TOTAL	24	0	0	24	6.548	0.175	0	6.723
REFUELING								
MAINTENANCE PERSONNEL	16	10	1		8.521	8.504	0.413	
OPERATING PERSONNEL	20	0	0		19.252	0	0	
HEALTH PHYSICS PERSONNEL	8	0	0		3.561	0	0	
SUPERVISORY PERSONNEL	9	0	0		5.192	0	0	
ENGINEERING PERSONNEL	6	0	0		3.289	0	0	
TOTAL	59	10	1	70	39.815	8.504	0.413	48.732
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	79 (23)	31 (15)	30 (24)	140 (62)	77.112	32.475	18.92	128.507
OPERATING PERSONNEL	94 (20)	0 (0)	0 (0)	94 (20)	75.74	0	0	75.74
HEALTH PHYSICS PERSONNEL	34 (8)	0 (0)	1 (0)	35 (8)	21.257	0	0.67	21.927
SUPERVISORY PERSONNEL	48 (14)	0 (0)	0 (0)	48 (14)	33.343	0	0	33.343
ENGINEERING PERSONNEL	32 (13)	0 (0)	10 (9)	42 (22)	21.624	0	5.7	27.324
GRAND TOTALS	287 (78)	31 (15)	41 (33)	359 (126)	229.076	32.475	25.29	286.841

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

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *LASALLE 1, 2 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	25	13	89		16.5	3.79	33.77	
OPERATING PERSONNEL	57	0	193		37.38	0	2.25	
HEALTH PHYSICS PERSONNEL	25	14	1		26.59	1.59	0.03	
SUPERVISORY PERSONNEL	65	1	0		5.37	0.03	0	
ENGINEERING PERSONNEL	54	57	129		6.87	0.6	8.29	
TOTAL	226	85	412	723	92.71	6.01	44.34	143.06
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	105	34	338		120.68	6.33	125.5	
OPERATING PERSONNEL	22	0	0		19.27	0	0	
HEALTH PHYSICS PERSONNEL	10	4	0		8.86	0.51	0	
SUPERVISORY PERSONNEL	76	6	0		18.34	0.24	0	
ENGINEERING PERSONNEL	26	27	38		4.54	1.31	5.93	
TOTAL	239	71	376	686	171.69	8.39	131.43	311.51
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	3	0	264		0.86	0	149.62	
OPERATING PERSONNEL	1	0	0		0.15	0	0	
HEALTH PHYSICS PERSONNEL	2	1	1		1.61	0.1	0.04	
SUPERVISORY PERSONNEL	4	0	0		0.11	0	0	
ENGINEERING PERSONNEL	21	85	67		3.7	1.51	13.17	
TOTAL	31	86	332	449	6.43	1.61	162.83	170.87
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	19	10	313		16.53	5.84	150.72	
OPERATING PERSONNEL	4	0	0		0.54	0	0	
HEALTH PHYSICS PERSONNEL	2	0	13		0.74	0	2.02	
SUPERVISORY PERSONNEL	6	1	0		0.62	0.04	0	
ENGINEERING PERSONNEL	7	58	49		1.73	0.74	5.25	
TOTAL	38	69	375	482	20.16	6.62	157.99	184.77
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	5	57		1.05	1.6	27.23	
OPERATING PERSONNEL	26	0	0		25.61	0	0	
HEALTH PHYSICS PERSONNEL	8	4	0		8.59	0.52	0	
SUPERVISORY PERSONNEL	20	0	0		1.84	0	0	
ENGINEERING PERSONNEL	11	2	57		2.04	0.06	0.59	
TOTAL	67	11	114	192	39.13	2.18	27.82	69.13
REFUELING								
MAINTENANCE PERSONNEL	6	4	3		6.22	1.46	0.32	
OPERATING PERSONNEL	7	0	0		5.78	0	0	
HEALTH PHYSICS PERSONNEL	3	1	0		1.17	0.06	0	
SUPERVISORY PERSONNEL	3	0	0		0.93	0	0	
ENGINEERING PERSONNEL	1	0	9		0.16	0	2.5	
TOTAL	20	5	12	37	14.26	1.52	2.82	18.6
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	160	66	1064	1290	161.84	19.02	487.16	668.02
OPERATING PERSONNEL	117	0	193	310	88.73	0	2.25	90.98
HEALTH PHYSICS PERSONNEL	50	24	15	89	47.56	2.78	2.09	52.43
SUPERVISORY PERSONNEL	174	8	0	182	27.21	0.31	0	27.52
ENGINEERING PERSONNEL	120	229	349	698	19.04	4.22	35.73	58.99
GRAND TOTALS	621	327	1621	2569	344.38	26.33	527.23	897.94

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *LIMERICK 1 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	1	57	49		0.048	2.56	2.283	
OPERATING PERSONNEL	63	17	40		5.962	0.385	1.198	
HEALTH PHYSICS PERSONNEL	34	1	16		5.401	0.101	5.726	
SUPERVISORY PERSONNEL	2	0	1		0.272	0	0.019	
ENGINEERING PERSONNEL	20	15	14		1.35	0.727	1.035	
TOTAL	120	90	120	330	13.033	3.773	10.261	27.067
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	6	257	184		0.249	17.766	6.577	
OPERATING PERSONNEL	20	47	133		0.505	1.054	3.086	
HEALTH PHYSICS PERSONNEL	31	4	21		1.81	0.13	1.048	
SUPERVISORY PERSONNEL	2	10	13		0.057	0.181	0.237	
ENGINEERING PERSONNEL	19	42	70		0.635	1.008	2.022	
TOTAL	78	360	421	859	3.256	20.139	12.97	36.365
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0.095	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0.095	0.095
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	6	20		0	0.103	1.007	
OPERATING PERSONNEL	9	0	39		0.301	0	3.749	
HEALTH PHYSICS PERSONNEL	8	0	6		0.336	0	0.411	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	4		0	0	0.157	
TOTAL	17	6	69	92	0.637	0.103	5.324	6.064
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	7 (6)	320 (265)	253 (213)	580	0.297	20.429	9.867	30.593
OPERATING PERSONNEL	92 (72)	64 (59)	212 (174)	368	6.768	1.439	8.128	16.335
HEALTH PHYSICS PERSONNEL	73 (46)	5 (5)	43 (26)	121	7.547	0.231	7.185	14.963
SUPERVISORY PERSONNEL	4 (3)	10 (10)	14 (13)	28	0.329	0.181	0.256	0.766
ENGINEERING PERSONNEL	39 (34)	57 (52)	88 (75)	184	1.985	1.735	3.214	6.934
GRAND TOTALS	215 (161)	456 (391)	610 (501)	1281	16.926	24.015	28.65	69.591

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

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *MAINE YANKEE TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	3	0	0		1.265	0	0.11	
OPERATING PERSONNEL	26	0	0		12.61	0	0	
HEALTH PHYSICS PERSONNEL	12	0	1		3.656	0	0.41	
SUPERVISORY PERSONNEL	7	0	0		3.383	0	0.325	
ENGINEERING PERSONNEL	7	0	2		2.728	0	1.13	
TOTAL	55	0	3	58	23.642	0	1.975	25.617
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	31	4	14		20.108	1.185	5.612	
OPERATING PERSONNEL	5	0	0		1.555	0	0	
HEALTH PHYSICS PERSONNEL	4	0	0		1.335	0.03	0.035	
SUPERVISORY PERSONNEL	9	0	5		4.3	0	1.165	
ENGINEERING PERSONNEL	8	0	0		3.295	0	0.17	
TOTAL	57	4	19	80	30.593	1.215	6.982	38.79
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	5	0	3		2.15	0	0.56	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0.04	0	0	
SUPERVISORY PERSONNEL	0	0	0		0.01	0	0.01	
ENGINEERING PERSONNEL	0	0	0		0.09	0	0.02	
TOTAL	5	0	3	8	2.29	0	0.59	2.88
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	2		0.56	0	0.86	
OPERATING PERSONNEL	6	0	0		1.77	0	0	
HEALTH PHYSICS PERSONNEL	7	0	1		2.875	0	0.56	
SUPERVISORY PERSONNEL	7	0	0		2.52	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	22	0	3	25	7.725	0	1.42	9.145
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	41	4	19	64	24.083	1.185	7.142	32.41
OPERATING PERSONNEL	37	0	0	37	15.935	.0	0	15.935
HEALTH PHYSICS PERSONNEL	23	0	2	25	7.906	0.03	1.005	8.941
SUPERVISORY PERSONNEL	23	0	5	28	10.213	0	1.5	11.713
ENGINEERING PERSONNEL	15	0	2	17	6.113	0	1.32	7.433
GRAND TOTALS	139	4	28	171	64.25	1.215	10.967	76.432

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *MCGUIRE 1, 2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	158	585	125		4.335	5.045	1.87	
OPERATING PERSONNEL	108	5	28		18.535	0.56	0.75	
HEALTH PHYSICS PERSONNEL	66	2	194		7.502	0	8.6	
SUPERVISORY PERSONNEL	13	0	0		0.75	0	0	
ENGINEERING PERSONNEL	84	27	53		4.115	0.93	0	
TOTAL	429	619	400	1448	35.237	6.535	11.22	52.992
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	164	575	72		33.98	96.444	14.98	
OPERATING PERSONNEL	102	5	47		19.36	2.46	23.796	
HEALTH PHYSICS PERSONNEL	67	1	193		18.8	0.01	88.528	
SUPERVISORY PERSONNEL	11	0	0		1.885	0	0	
ENGINEERING PERSONNEL	80	24	33		13.015	4.353	0.485	
TOTAL	424	605	345	1374	87.04	103.267	127.789	318.096
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	37	285	122		2.86	80.635	115.16	
OPERATING PERSONNEL	10	1	3		0.155	0	0.11	
HEALTH PHYSICS PERSONNEL	15	0	123		1.93	0	32.84	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	49	12	43		9.01	6.65	59.12	
TOTAL	111	298	291	700	13.955	87.285	207.23	308.47
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	153	547	72		38.175	219.89	25.28	
OPERATING PERSONNEL	41	3	18		2.025	0.015	1.385	
HEALTH PHYSICS PERSONNEL	63	1	142		9.34	0.125	43.165	
SUPERVISORY PERSONNEL	9	0	0		0.96	0	0	
ENGINEERING PERSONNEL	60	16	77		11.06	3.84	25.995	
TOTAL	326	567	309	1202	61.56	223.87	95.825	381.255
WASTE PROCESSING								
MAINTENANCE PERSONNEL	13	45	1		0.02	0.085	0	
OPERATING PERSONNEL	19	2	24		0.66	0.105	4.14	
HEALTH PHYSICS PERSONNEL	29	0	27		6.27	0	4.25	
SUPERVISORY PERSONNEL	1	0	0		0.15	0	0	
ENGINEERING PERSONNEL	11	2	1		0	0	0.03	
TOTAL	73	49	53	175	7.1	0.19	8.42	15.71
REFUELING								
MAINTENANCE PERSONNEL	62	189	33		5.135	66.873	2.61	
OPERATING PERSONNEL	56	3	24		6.925	0.145	1.335	
HEALTH PHYSICS PERSONNEL	31	0	96		1.675	0	5.27	
SUPERVISORY PERSONNEL	5	0	0		1.55	0	0	
ENGINEERING PERSONNEL	47	5	21		3.91	0.905	2.6	
TOTAL	201	197	174	572	19.195	67.923	11.815	98.933
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	587 (165)	2226 (620)	425 (152)	3238 (937)	84.505	468.972	159.9	713.377
OPERATING PERSONNEL	336 (110)	19 (6)	144 (48)	499 (164)	47.66	3.285	31.516	82.461
HEALTH PHYSICS PERSONNEL	271 (67)	4 (1)	775 (196)	1050 (264)	45.517	0.135	182.653	228.305
SUPERVISORY PERSONNEL	39 (12)	0 (0)	0 (0)	39 (12)	5.295	0	0	5.295
ENGINEERING PERSONNEL	331 (83)	86 (28)	228 (82)	645 (193)	41.11	16.678	88.23	146.018
GRAND TOTALS	1564 (437)	2335 (655)	1572 (478)	5471 (1570)	224.087	489.07	462.299	1175.456

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

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *MILLSTONE POINT 1 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	15	1	1		5.62	0.41	0.88	
OPERATING PERSONNEL	50	1	2		30.38	0.62	0.54	
HEALTH PHYSICS PERSONNEL	18	0	0		6.15	0.02	0.55	
SUPERVISORY PERSONNEL	0	1	0		0.04	0.12	0	
ENGINEERING PERSONNEL	4	5	1		1.48	1.81	1.09	
TOTAL	87	8	4	99	43.67	2.98	3.06	49.71
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	15	0	6		4.86	0.02	2.81	
OPERATING PERSONNEL	9	0	0		2.69	0.03	0.11	
HEALTH PHYSICS PERSONNEL	8	0	2		2.28	0	0.68	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	1	0	0		0.4	0.16	0.24	
TOTAL	33	0	8	41	10.23	0.21	3.84	14.28
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0		0.01	0	0	
OPERATING PERSONNEL	0	0	0		0.04	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0.02	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0.04	0	0	
TOTAL	0	0	0	0	0.11	0	0	0.11
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	43	1	80		30.96	1	35.03	
OPERATING PERSONNEL	10	0	0		2.36	0.04	0.32	
HEALTH PHYSICS PERSONNEL	13	0	1		4.51	0.02	0.36	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	4	5	10		1.32	2.3	3.04	
TOTAL	70	6	91	167	39.15	3.36	38.75	81.26
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	3		0.07	0	0.96	
OPERATING PERSONNEL	2	0	1		0.57	0	1.52	
HEALTH PHYSICS PERSONNEL	8	0	12		4.06	0.01	7.63	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	1		0.07	0	0.43	
TOTAL	10	0	17	27	4.77	0.01	10.54	15.32
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0.18	0	0	
OPERATING PERSONNEL	0	0	0		0.29	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0.22	0	0.01	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	2	0		0	0.63	0	
TOTAL	0	2	0	2	0.69	0.63	0.01	1.33
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	73	2	90	165	41.7	1.43	39.68	82.81
OPERATING PERSONNEL	71	1	3	75	36.33	0.69	2.49	39.51
HEALTH PHYSICS PERSONNEL	47	0	15	62	17.24	0.05	9.23	26.52
SUPERVISORY PERSONNEL	0	1	0	1	0.04	0.12	0	0.16
ENGINEERING PERSONNEL	9	12	12	33	3.31	4.9	4.8	13.01
GRAND TOTALS	200	16	120	336	98.62	7.19	56.2	162.01

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *MILLSTONE POINT 2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	1	0		0.11	0.28	0.03	
OPERATING PERSONNEL	40	0	0		17.96	0.03	0.06	
HEALTH PHYSICS PERSONNEL	9	0	12		2.26	0.18	4.47	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0.19	0.07	0.06	
TOTAL	49	1	12	62	20.52	0.56	4.62	25.7
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	84	24	557		65.41	7.51	368.54	
OPERATING PERSONNEL	30	1	108		8.3	0.3	125.19	
HEALTH PHYSICS PERSONNEL	18	1	99		9.11	1.1	64.96	
SUPERVISORY PERSONNEL	0	0	3		0	0	1.08	
ENGINEERING PERSONNEL	15	15	75		5	5.62	43.11	
TOTAL	147	41	842	1030	87.82	14.53	602.88	705.23
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	89		0.19	0	50.97	
OPERATING PERSONNEL	0	0	6		0.11	0	6.68	
HEALTH PHYSICS PERSONNEL	1	0	26		0.84	0	8.08	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	2	4	34		1.13	1.93	35.63	
TOTAL	3	4	155	162	2.27	1.93	101.36	105.56
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	8		0.04	0.01	5.68	
OPERATING PERSONNEL	0	0	0		0	0	0.06	
HEALTH PHYSICS PERSONNEL	0	0	1		0.03	0	0.22	
SUPERVISORY PERSONNEL	0	0	0		0	0	0.06	
ENGINEERING PERSONNEL	0	0	1		0.04	0.21	0.25	
TOTAL	0	0	10	10	0.11	0.22	6.27	6.6
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	21		0.06	0	8.26	
OPERATING PERSONNEL	17	0	0		6.07	0.03	0.06	
HEALTH PHYSICS PERSONNEL	17	1	32		13.1	0.3	23.07	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	6		0.24	0	1.45	
TOTAL	34	1	59	94	19.47	0.33	32.84	52.64
REFUELING								
MAINTENANCE PERSONNEL	45	2	17		33.53	1.31	15.29	
OPERATING PERSONNEL	26	0	0		7.09	0	0.02	
HEALTH PHYSICS PERSONNEL	1	0	30		0.48	0	8.83	
SUPERVISORY PERSONNEL	0	0	0		0.08	0	0.04	
ENGINEERING PERSONNEL	3	1	14		1.05	0.22	5.2	
TOTAL	75	3	61	139	42.23	1.53	29.38	73.14
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	129	27	692	848	99.34	9.11	448.77	557.22
OPERATING PERSONNEL	113	1	114	228	39.53	0.36	132.07	171.96
HEALTH PHYSICS PERSONNEL	46	2	200	248	25.82	1.58	109.63	137.03
SUPERVISORY PERSONNEL	0	0	3	3	0.08	0	1.18	1.26
ENGINEERING PERSONNEL	20	20	130	170	7.65	8.05	85.7	101.4
GRAND TOTALS	308	50	1139	1497	172.42	19.1	777.35	968.87

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *MILLSTONE POINT 3 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	0		0.01	0	0	
OPERATING PERSONNEL	0	0	0		0.82	0.01	0.04	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0.01	0	0	
ENGINEERING PERSONNEL	0	0	0		0.05	0	0	
TOTAL	0	0	0	0	0.89	0.01	0.04	0.94
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	6	0	2		2.74	0.03	1.05	
OPERATING PERSONNEL	6	0	0		2.54	0	0.03	
HEALTH PHYSICS PERSONNEL	11	1	9		3.8	0.17	2.4	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	1	0	0		0.21	0.09	0.24	
TOTAL	24	1	11	36	9.29	0.29	3.72	13.3
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	13	0	5		4.8	0.04	2.21	
OPERATING PERSONNEL	0	0	0		0.49	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0.43	0	0.34	
SUPERVISORY PERSONNEL	0	0	0		0	0	0.02	
ENGINEERING PERSONNEL	2	2	6		0.44	0.57	1.92	
TOTAL	15	2	11	28	6.16	0.61	4.49	11.26
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0.02	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	4		0.34	0	0.82	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	4	4	0.34	0	0.84	1.18
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	19	0	7	26	7.55	0.07	3.28	10.9
OPERATING PERSONNEL	6	0	0	6	3.85	0.01	0.07	3.93
HEALTH PHYSICS PERSONNEL	11	1	13	25	4.57	0.17	3.56	8.3
SUPERVISORY PERSONNEL	0	0	0	0	0.01	0	0.02	0.03
ENGINEERING PERSONNEL	3	2	6	11	0.7	0.66	2.16	3.52
GRAND TOTALS	39	3	26	68	16.68	0.91	9.09	26.68

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *MONTICELLO TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	40	50	0		13.1	18.824	1.421	
OPERATING PERSONNEL	44	1	0		25.15	0.101	1.17	
HEALTH PHYSICS PERSONNEL	22	0	9		8.724	0	2.381	
SUPERVISORY PERSONNEL	19	7	12		5.577	3.168	6.203	
ENGINEERING PERSONNEL	9	0	0		3.985	0.006	0	
TOTAL	134	58	21	213	56.536	22.099	11.175	89.81
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	42	228	40		34.81	168.347	19.706	
OPERATING PERSONNEL	14	0	0		3.911	0	0	
HEALTH PHYSICS PERSONNEL	13	0	17		3.891	0	18.974	
SUPERVISORY PERSONNEL	20	8	36		8.931	3.201	16.241	
ENGINEERING PERSONNEL	9	0	0		4.261	0.026	0.018	
TOTAL	98	236	93	427	55.804	171.574	54.939	282.317
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	6	16	4		1.471	5.246	0.965	
OPERATING PERSONNEL	0	0	0		0.191	0	0	
HEALTH PHYSICS PERSONNEL	1	0	1		0.156	0	0.329	
SUPERVISORY PERSONNEL	0	0	9		0.214	0.192	1.871	
ENGINEERING PERSONNEL	2	0	0		0.391	0	0	
TOTAL	9	16	14	39	2.423	5.438	3.165	11.026
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	9	146	47		4.245	100.934	18.809	
OPERATING PERSONNEL	5	0	0		1.814	0	0	
HEALTH PHYSICS PERSONNEL	5	0	2		1.076	0	0.621	
SUPERVISORY PERSONNEL	2	9	33		1.275	5.12	15.88	
ENGINEERING PERSONNEL	0	0	1		0.058	0	0.123	
TOTAL	21	155	83	259	8.468	106.054	35.433	149.955
WASTE PROCESSING								
MAINTENANCE PERSONNEL	21	1	0		4.959	0.6	0	
OPERATING PERSONNEL	0	0	0		0.328	0	0	
HEALTH PHYSICS PERSONNEL	2	0	1		0.667	0	0.358	
SUPERVISORY PERSONNEL	0	0	1		0.059	0	2.102	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	23	1	2	26	6.013	0.6	2.46	9.073
REFUELING								
MAINTENANCE PERSONNEL	14	15	0		6.245	8.021	0.098	
OPERATING PERSONNEL	26	0	0		8.189	0	0.288	
HEALTH PHYSICS PERSONNEL	3	0	3		1.393	0	1.041	
SUPERVISORY PERSONNEL	1	0	1		0.983	0.02	0.465	
ENGINEERING PERSONNEL	0	0	0		0.369	0	0.047	
TOTAL	44	15	4	63	17.179	8.041	1.939	27.159
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	132	456	91	679	64.83	301.972	40.999	407.801
OPERATING PERSONNEL	89	1	0	90	39.583	0.101	1.458	41.142
HEALTH PHYSICS PERSONNEL	46	0	33	79	15.907	0	23.704	39.611
SUPERVISORY PERSONNEL	42	24	92	158	17.039	11.701	42.762	71.502
ENGINEERING PERSONNEL	20	0	1	21	9.064	0.032	0.188	9.284
GRAND TOTALS	329	481	217	1027	146.423	313.806	109.111	569.34

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *NINE MILE POINT 1 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (> 0 mRem) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	189	3	62		6.306	0.015	2.14	
OPERATING PERSONNEL	140	20	63		6.405	0.607	2.401	
HEALTH PHYSICS PERSONNEL	140	5	30		7.377	0.046	3.864	
SUPERVISORY PERSONNEL	45	1	4		2.52	0.005	0.51	
ENGINEERING PERSONNEL	16	7	21		0.243	0.143	0.377	
TOTAL	530	36	180	746	22.851	0.816	9.292	32.959
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	291	19	203		28.008	0.911	16.042	
OPERATING PERSONNEL	154	15	106		5.14	0.219	4.515	
HEALTH PHYSICS PERSONNEL	90	0	44		4.138	0	5.142	
SUPERVISORY PERSONNEL	51	1	9		2.077	0.002	0.295	
ENGINEERING PERSONNEL	13	8	21		0.43	0.174	1.237	
TOTAL	599	43	383	1025	39.793	1.306	27.231	68.33
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	16	1	53		0.884	0.02	1.728	
OPERATING PERSONNEL	20	2	23		0.366	0.01	0.363	
HEALTH PHYSICS PERSONNEL	7	0	6		0.075	0	0.375	
SUPERVISORY PERSONNEL	3	0	3		0.05	0	0.1	
ENGINEERING PERSONNEL	0	1	4		0	0.002	0.06	
TOTAL	46	4	89	139	1.375	0.032	2.626	4.033
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	786	116	851		238.854	29.405	333.637	
OPERATING PERSONNEL	288	39	465		43.009	4.417	158.94	
HEALTH PHYSICS PERSONNEL	224	7	102		34.167	0.365	39.987	
SUPERVISORY PERSONNEL	107	3	18		16.657	0.009	10.366	
ENGINEERING PERSONNEL	39	27	55		7.062	2.655	14.792	
TOTAL	1444	192	1491	3127	339.749	36.851	557.722	934.322
WASTE PROCESSING								
MAINTENANCE PERSONNEL	81	0	111		6.707	0	33.64	
OPERATING PERSONNEL	62	3	29		8.757	0.038	3.185	
HEALTH PHYSICS PERSONNEL	64	4	17		3.876	0.017	2.814	
SUPERVISORY PERSONNEL	13	1	4		0.318	0.015	0.335	
ENGINEERING PERSONNEL	4	0	2		0.04	0	0.051	
TOTAL	224	8	163	395	19.698	0.07	40.025	59.793
REFUELING								
MAINTENANCE PERSONNEL	119	6	2		7.525	1.42	0.008	
OPERATING PERSONNEL	157	1	7		2.289	0.036	0.219	
HEALTH PHYSICS PERSONNEL	47	0	2		1.134	0	0.004	
SUPERVISORY PERSONNEL	24	0	2		0.785	0	0.01	
ENGINEERING PERSONNEL	4	2	4		0.577	0.14	0.044	
TOTAL	351	9	17	377	12.31	1.596	0.285	14.191
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	1482	145	1282	2909	288.284	31.771	387.195	707.25
OPERATING PERSONNEL	821	80	693	1594	65.966	5.327	169.623	240.916
HEALTH PHYSICS PERSONNEL	572	16	201	789	50.767	0.428	52.186	103.381
SUPERVISORY PERSONNEL	243	6	40	289	22.407	0.031	11.616	34.054
ENGINEERING PERSONNEL	76	45	107	228	8.352	3.114	16.561	28.027
GRAND TOTALS	3194 (987)	292 (108)	2323 (934)	5809 (2029)	435.776	40.671	637.181	1113.628

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

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *NORTH ANNA 1, 2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	172	34	401		14.219	0.566	15.104	
OPERATING PERSONNEL	225	3	15		30.543	0.191	3.563	
HEALTH PHYSICS PERSONNEL	72	1	145		28.195	0.01	17.857	
SUPERVISORY PERSONNEL	76	2	8		7.12	0.016	0.084	
ENGINEERING PERSONNEL	58	18	21		1.35	0.301	0.397	
TOTAL	603	58	590	1251	81.427	1.084	37.005	119.516
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	137	49	441		158.432	37.865	135.005	
OPERATING PERSONNEL	115	1	8		41.151	0.055	2.442	
HEALTH PHYSICS PERSONNEL	51	1	138		18.572	0.063	57.16	
SUPERVISORY PERSONNEL	46	0	5		17.833	0	0.304	
ENGINEERING PERSONNEL	58	9	65		9.69	0.137	11.267	
TOTAL	407	60	657	1124	245.678	38.12	206.178	489.976
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	15	9	60		1.171	0.216	25.792	
OPERATING PERSONNEL	8	0	1		0.303	0	0.075	
HEALTH PHYSICS PERSONNEL	0	1	38		0	0.005	3.841	
SUPERVISORY PERSONNEL	4	0	0		0.04	0	0	
ENGINEERING PERSONNEL	6	2	5		0.574	0.021	2.041	
TOTAL	33	12	104	149	2.088	0.242	31.749	34.079
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	38	6	335		10.592	4.243	61.092	
OPERATING PERSONNEL	17	0	5		1.075	0	0.167	
HEALTH PHYSICS PERSONNEL	23	0	77		1.233	0	9.534	
SUPERVISORY PERSONNEL	6	0	0		0.235	0	0	
ENGINEERING PERSONNEL	14	4	20		0.524	0.046	9.372	
TOTAL	98	10	437	545	13.659	4.289	80.165	98.113
WASTE PROCESSING								
MAINTENANCE PERSONNEL	7	0	6		0.741	0	0.283	
OPERATING PERSONNEL	8	1	1		1.956	0.035	0.407	
HEALTH PHYSICS PERSONNEL	20	0	16		2.996	0	3.368	
SUPERVISORY PERSONNEL	2	0	0		0.625	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	37	1	23	61	6.318	0.035	4.058	10.411
REFUELING								
MAINTENANCE PERSONNEL	37	3	17		10.359	0.136	4.1	
OPERATING PERSONNEL	30	2	2		1.701	0.45	0.26	
HEALTH PHYSICS PERSONNEL	8	0	52		0.12	0	2.827	
SUPERVISORY PERSONNEL	6	1	1		2.307	0.105	0.01	
ENGINEERING PERSONNEL	2	5	13		0.072	0.506	3.981	
TOTAL	83	11	85	179	14.559	1.197	11.178	26.934
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	406	101	1260	1767	195.514	43.026	241.376	479.916
OPERATING PERSONNEL	403	7	32	442	76.729	0.731	6.914	84.374
HEALTH PHYSICS PERSONNEL	174	3	466	643	51.116	0.078	94.587	145.781
SUPERVISORY PERSONNEL	140	3	14	157	28.16	0.121	0.398	28.679
ENGINEERING PERSONNEL	138	38	124	300	12.21	1.011	27.058	40.279
GRAND TOTALS	1261	152	1896	3309	363.729	44.967	370.333	779.029

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *OCONEE 1, 2, 3 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	115	358	103		0.965	0.215	0.115	
OPERATING PERSONNEL	112	1	11		37.111	0.56	0.675	
HEALTH PHYSICS PERSONNEL	67	0	76		0.77	0	0.34	
SUPERVISORY PERSONNEL	13	1	0		0.245	0	0	
ENGINEERING PERSONNEL	78	29	21		0.05	0	0	
TOTAL	385	389	211	985	39.141	0.775	1.13	41.046
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	170	634	167		85.97	198.46	40.98	
OPERATING PERSONNEL	117	1	49		19.255	0.475	52.99	
HEALTH PHYSICS PERSONNEL	67	0	96		16.755	0	44.19	
SUPERVISORY PERSONNEL	9	2	0		0.855	0.34	0	
ENGINEERING PERSONNEL	100	27	45		30.775	4.62	11.545	
TOTAL	463	664	357	1484	153.61	203.895	149.705	507.21
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	41	185	45		1.045	18.865	9.45	
OPERATING PERSONNEL	5	0	5		0.06	0	0.065	
HEALTH PHYSICS PERSONNEL	62	0	94		10.995	0	5.515	
SUPERVISORY PERSONNEL	1	0	0		0.12	0	0	
ENGINEERING PERSONNEL	58	12	8		7.905	1.055	0.92	
TOTAL	167	197	152	516	20.125	19.92	15.95	55.995
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	152	610	153		17.13	213.95	82.325	
OPERATING PERSONNEL	74	1	35		2.66	0.065	0.71	
HEALTH PHYSICS PERSONNEL	50	0	92		4.475	0	17.865	
SUPERVISORY PERSONNEL	6	1	0		1.305	0	0	
ENGINEERING PERSONNEL	77	33	28		11.265	12.328	12.93	
TOTAL	359	645	308	1312	36.835	226.343	113.83	377.008
WASTE PROCESSING								
MAINTENANCE PERSONNEL	104	291	30		10.357	6.695	0	
OPERATING PERSONNEL	17	0	11		6.035	0	0.65	
HEALTH PHYSICS PERSONNEL	58	0	48		3.006	0	0.765	
SUPERVISORY PERSONNEL	2	0	0		0.18	0	0	
ENGINEERING PERSONNEL	35	7	6		0.7	0	0	
TOTAL	216	298	95	609	20.278	6.695	1.415	28.388
REFUELING								
MAINTENANCE PERSONNEL	31	82	25		3.64	29.586	5.195	
OPERATING PERSONNEL	92	1	10		9.055	0.32	0.495	
HEALTH PHYSICS PERSONNEL	12	0	48		0.476	0	4.06	
SUPERVISORY PERSONNEL	3	0	0		0.85	0	0	
ENGINEERING PERSONNEL	19	4	16		1.39	0.73	1.43	
TOTAL	157	87	99	343	15.411	30.636	11.18	57.227
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	613 (173)	2160 (698)	523 (204)	3296 (1075)	119.107	467.771	138.065	724.943
OPERATING PERSONNEL	417 (123)	4 (1)	121 (52)	542 (176)	74.176	1.42	55.585	131.181
HEALTH PHYSICS PERSONNEL	316 (69)	0 (0)	454 (96)	770 (165)	36.477	0	72.735	109.212
SUPERVISORY PERSONNEL	34 (14)	4 (1)	0 (0)	38 (15)	3.555	0.34	0	3.895
ENGINEERING PERSONNEL	367 (98)	112 (35)	124 (45)	603 (178)	52.085	18.733	26.825	97.643
GRAND TOTALS	1747 (477)	2280 (735)	1222 (397)	5249 (1609)	285.4	488.264	293.21	1066.874

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

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *OYSTER CREEK TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	260	34	1556		30.704	0.923	58.029	
OPERATING PERSONNEL	322	1	73		74.029	0.022	3.43	
HEALTH PHYSICS PERSONNEL	82	0	117		36.985	0	65.232	
SUPERVISORY PERSONNEL	127	1	63		7.726	0.011	5.539	
ENGINEERING PERSONNEL	171	0	153		5.257	0	8.749	
TOTAL	962	36	1962	2960	154.701	0.956	140.979	296.636
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	304	31	1708		123.134	3.268	418.517	
OPERATING PERSONNEL	290	1	111		24.019	0.03	7.543	
HEALTH PHYSICS PERSONNEL	80	0	117		20.852	0	23.326	
SUPERVISORY PERSONNEL	122	1	98		9.534	0.002	6.795	
ENGINEERING PERSONNEL	167	0	222		5.659	0	12.075	
TOTAL	963	33	2256	3252	183.198	3.3	468.256	654.754
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	123	9	620		4.505	0.016	134.788	
OPERATING PERSONNEL	40	1	18		4.297	0	10.764	
HEALTH PHYSICS PERSONNEL	34	0	9		1.307	0	0.057	
SUPERVISORY PERSONNEL	16	0	21		0.515	0	2.148	
ENGINEERING PERSONNEL	19	0	43		2.84	0	13.232	
TOTAL	232	10	711	953	13.464	0.016	160.989	174.469
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	174	29	1466		101.004	3.964	1088.755	
OPERATING PERSONNEL	105	1	31		10.945	0	14.271	
HEALTH PHYSICS PERSONNEL	42	0	58		3.787	0	10.472	
SUPERVISORY PERSONNEL	31	1	39		10.732	0.01	9.911	
ENGINEERING PERSONNEL	39	0	79		3.065	0	22.697	
TOTAL	391	31	1673	2095	129.533	3.974	1146.106	1279.613
WASTE PROCESSING								
MAINTENANCE PERSONNEL	120	10	329		4.721	0.008	59.048	
OPERATING PERSONNEL	39	0	14		0.583	0	1.122	
HEALTH PHYSICS PERSONNEL	14	0	12		0.306	0	0.544	
SUPERVISORY PERSONNEL	8	0	7		0.225	0	0.397	
ENGINEERING PERSONNEL	7	0	11		0.133	0	1.499	
TOTAL	188	10	373	571	5.968	0.008	62.61	68.586
REFUELING								
MAINTENANCE PERSONNEL	133	16	139		20.068	0.26	2.46	
OPERATING PERSONNEL	75	1	8		8.314	0	0.114	
HEALTH PHYSICS PERSONNEL	11	0	9		0.615	0	0.359	
SUPERVISORY PERSONNEL	14	0	5		2.978	0	0.119	
ENGINEERING PERSONNEL	12	0	13		0.535	0	0.057	
TOTAL	245	17	174	436	32.51	0.26	3.109	35.879
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	1114 (319)	129 (34)	5818 (2079)	7061 (2432)	284.136	8.439	1761.597	2054.172
OPERATING PERSONNEL	871 (356)	5 (1)	255 (132)	1131 (489)	122.187	0.052	37.244	159.483
HEALTH PHYSICS PERSONNEL	263 (87)	0 (0)	322 (145)	585 (232)	63.852	0	99.99	163.842
SUPERVISORY PERSONNEL	318 (145)	3 (1)	233 (113)	554 (259)	31.71	0.023	24.909	56.642
ENGINEERING PERSONNEL	415 (204)	0 (0)	521 (256)	936 (460)	17.489	0	58.309	75.798
GRAND TOTALS	2981 (1111)	137 (36)	7149 (2725)	10267 (3872)	519.374	8.514	1982.049	2509.937

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

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *PALISADES TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY CONTRACT	TOTAL		TOTAL PERSON-REM STATION	UTILITY CONTRACT	TOTAL	
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	13	3	0		5.083	1.268	0.47	
OPERATING PERSONNEL	66	0	25		47.73	0.229	7.703	
HEALTH PHYSICS PERSONNEL	23	2	66		21.308	0.984	37.682	
SUPERVISORY PERSONNEL	25	5	1		9.161	1.179	0.224	
ENGINEERING PERSONNEL	17	3	6		4.848	1.287	1.103	
TOTAL	144	13	98	255	88.13	4.947	47.182	140.259
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	94	146	164		114.199	116.448	69.162	
OPERATING PERSONNEL	17	4	0		6.634	1.324	0.073	
HEALTH PHYSICS PERSONNEL	22	1	36		13.819	0.972	11.633	
SUPERVISORY PERSONNEL	15	16	5		6.258	7.265	2.061	
ENGINEERING PERSONNEL	11	14	26		6.86	5.3	15.27	
TOTAL	159	181	231	571	147.77	131.309	98.199	377.278
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	7	1	19		2.119	0.131	14.409	
OPERATING PERSONNEL	1	0	0		0.158	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0.083	0	0.154	
SUPERVISORY PERSONNEL	0	0	1		0.134	0	0.154	
ENGINEERING PERSONNEL	2	6	2		0.597	1.082	1.557	
TOTAL	10	7	22	39	3.091	1.213	16.274	20.578
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	6	1	67		1.603	0.332	17.896	
OPERATING PERSONNEL	0	0	2		0.111	0	0.459	
HEALTH PHYSICS PERSONNEL	0	0	0		0.264	0	0.198	
SUPERVISORY PERSONNEL	1	1	1		0.667	0.289	0.202	
ENGINEERING PERSONNEL	5	3	3		1.072	0.471	0.849	
TOTAL	12	5	73	90	3.717	1.092	19.604	24.413
WASTE PROCESSING								
MAINTENANCE PERSONNEL	14	3	22		6.5	0.823	7.171	
OPERATING PERSONNEL	2	0	0		0.391	0	0.038	
HEALTH PHYSICS PERSONNEL	4	0	0		5.086	0	0.105	
SUPERVISORY PERSONNEL	2	0	0		1.023	0.011	0.003	
ENGINEERING PERSONNEL	0	0	0		0.011	0	0	
TOTAL	22	3	22	47	13.011	0.834	7.317	21.162
REFUELING								
MAINTENANCE PERSONNEL	12	49	1		4.753	38.754	0.235	
OPERATING PERSONNEL	5	0	0		1.653	0.039	0	
HEALTH PHYSICS PERSONNEL	0	0	2		0.095	0.071	0.293	
SUPERVISORY PERSONNEL	0	2	0		0.119	1.306	0.055	
ENGINEERING PERSONNEL	2	0	3		1.508	0	4.255	
TOTAL	19	51	6	76	8.128	40.17	4.838	53.136
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	146	203	273	622	134.257	157.756	109.343	401.356
OPERATING PERSONNEL	91	4	27	122	56.677	1.592	8.273	66.542
HEALTH PHYSICS PERSONNEL	49	3	104	156	40.655	2.027	50.065	92.747
SUPERVISORY PERSONNEL	43	24	8	75	17.362	10.05	2.699	30.111
ENGINEERING PERSONNEL	37	26	40	103	14.896	8.14	23.034	46.07
GRAND TOTALS	366	260	452	1078	263.847	179.565	193.414	636.826

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *PALO VERDE 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	79	1	75		2.861	0.013	1.893	
OPERATING PERSONNEL	87	2	42		6.186	0.142	2.689	
HEALTH PHYSICS PERSONNEL	32	0	120		4.083	0	17.47	
SUPERVISORY PERSONNEL	10	0	4		1.127	0	0.497	
ENGINEERING PERSONNEL	10	0	23		1.296	0	1.571	
TOTAL	218	3	264	485	15.553	0.155	24.12	39.828
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	165	1	325		34.312	0.328	42.167	
OPERATING PERSONNEL	42	3	39		4.011	0.295	3.074	
HEALTH PHYSICS PERSONNEL	15	0	104		1.074	0	9.782	
SUPERVISORY PERSONNEL	5	0	2		1.156	0	0.203	
ENGINEERING PERSONNEL	14	1	43		0.982	0.061	2.522	
TOTAL	241	5	513	789	41.535	0.684	57.748	99.967
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
WASTE PROCESSING								
MAINTENANCE PERSONNEL	29	0	11		0.404	0	0.166	
OPERATING PERSONNEL	44	0	36		3.905	0	2.392	
HEALTH PHYSICS PERSONNEL	9	0	22		0.233	0	0.535	
SUPERVISORY PERSONNEL	1	0	1		0.028	0	0.012	
ENGINEERING PERSONNEL	0	0	2		0	0	0.063	
TOTAL	83	0	72	155	4.57	0	3.168	7.738
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	273 (194)	2 (1)	411 (339)	686 (534)	37.577	0.341	44.226	82.144
OPERATING PERSONNEL	173 (164)	5 (5)	117 (109)	295 (278)	14.102	0.437	8.155	22.694
HEALTH PHYSICS PERSONNEL	56 (35)	0 (0)	246 (173)	332 (209)	5.39	0	27.787	33.177
SUPERVISORY PERSONNEL	16 (17)	0 (0)	7 (5)	23 (22)	2.311	0	0.712	3.023
ENGINEERING PERSONNEL	24 (24)	1 (1)	68 (56)	93 (81)	2.278	0.061	4.156	6.495
GRAND TOTALS	542 (434)	8 (7)	849 (682)	1429 (1123)	61.658	0.839	85.036	147.533

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

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *PEACH BOTTOM 2, 3 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	9	164	357		2.511	27.82	26.613	
OPERATING PERSONNEL	107	39	187		48.789	4.714	12.75	
HEALTH PHYSICS PERSONNEL	91	7	100		66.357	2.325	37.191	
SUPERVISORY PERSONNEL	6	0	16		0.29	0	0.704	
ENGINEERING PERSONNEL	76	34	18		40.475	2.675	4.264	
TOTAL	289	244	678	1211	158.422	37.534	81.522	277.478
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	7	502	854		0.21	150.032	372.265	
OPERATING PERSONNEL	63	39	215		4.63	1.114	42.603	
HEALTH PHYSICS PERSONNEL	81	5	98		11.863	0.487	35.257	
SUPERVISORY PERSONNEL	9	5	14		0.144	0.078	0.223	
ENGINEERING PERSONNEL	35	40	33		4.03	2.875	6.136	
TOTAL	195	591	1214	2000	20.877	154.586	456.484	631.947
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	19	55		0	1.414	2.549	
OPERATING PERSONNEL	3	2	11		0.108	0.015	0.616	
HEALTH PHYSICS PERSONNEL	2	0	9		0.044	0	0.399	
SUPERVISORY PERSONNEL	0	1	0		0	0.031	0	
ENGINEERING PERSONNEL	1	1	5		0.013	0.013	0.312	
TOTAL	6	23	80	109	0.165	1.473	3.876	5.514
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	2	78	309		0.027	4.813	64.348	
OPERATING PERSONNEL	12	6	17		0.377	0.369	2.613	
HEALTH PHYSICS PERSONNEL	22	2	19		0.801	0.136	0.826	
SUPERVISORY PERSONNEL	0	1	0		0	0.08	0	
ENGINEERING PERSONNEL	9	14	3		0.506	0.7	0.23	
TOTAL	45	101	348	494	1.711	6.098	68.017	75.826
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	19	92		0	0.674	6.301	
OPERATING PERSONNEL	3	0	20		1.22	0	0.821	
HEALTH PHYSICS PERSONNEL	7	1	6		0.394	0.054	0.436	
SUPERVISORY PERSONNEL	0	1	0		0	0.019	0	
ENGINEERING PERSONNEL	5	5	4		0.311	0.137	0.12	
TOTAL	15	26	122	163	1.925	0.884	7.678	10.487
REFUELING								
MAINTENANCE PERSONNEL	0	15	66		0	0.867	14.324	
OPERATING PERSONNEL	2	0	4		0.076	0	0.516	
HEALTH PHYSICS PERSONNEL	9	1	7		0.556	0.015	0.316	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	1		0	0	0.013	
TOTAL	11	16	78	105	0.632	0.882	15.169	16.683
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	18 (9)	797 (568)	1733 (985)	2548 (1562)	2.748	185.62	486.4	674.768
OPERATING PERSONNEL	190 (115)	86 (60)	454 (278)	730 (453)	55.2	6.212	59.919	121.331
HEALTH PHYSICS PERSONNEL	212 (93)	16 (8)	239 (127)	467 (228)	80.015	3.017	74.425	157.457
SUPERVISORY PERSONNEL	15 (10)	8 (5)	30 (24)	53 (39)	0.434	0.208	0.927	1.569
ENGINEERING PERSONNEL	126 (79)	94 (54)	64 (39)	284 (172)	45.335	6.4	11.075	62.81
GRAND TOTALS	561 (306)	1001 (695)	2520 (1453)	4082 (2454)	183.732	201.457	632.746	1017.935

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

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: PERRY 1 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0.028	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	1		0	0.006	0.06	
TOTAL	0	0	1	1	0.028	0.006	0.06	0.094
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0.041	
TOTAL	0	0	0	0	0	0	0.041	0.041
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	3	0	0		0.3	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	1	2		0	0.1	0.22	
TOTAL	3	1	2	6	0.3	0.1	0.22	0.62
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	0	0	0	0	0	0	0	0
OPERATING PERSONNEL	0	0	0	0	0	0	0	0
HEALTH PHYSICS PERSONNEL	3	0	0	3	0.328	0	0	0.328
SUPERVISORY PERSONNEL	0	0	0	0	0	0	0	0
ENGINEERING PERSONNEL	0	1	3	4	0	0.106	0.321	0.427
GRAND TOTALS	3	1	3	7	0.328	0.106	0.321	0.755

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *PILGRIM 1 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	1	9		0.623	0.175	18.79	
OPERATING PERSONNEL	16	12	1		21.501	4.733	0.716	
HEALTH PHYSICS PERSONNEL	6	1	9		11.335	0.484	26.484	
SUPERVISORY PERSONNEL	4	0	5		1.849	0.026	2.204	
ENGINEERING PERSONNEL	2	3	3		0.644	0.628	0.819	
TOTAL	28	17	27	72	35.952	6.046	49.013	91.011
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	54	1	405		29.824	0.221	274.834	
OPERATING PERSONNEL	30	11	10		6.86	3.414	5.258	
HEALTH PHYSICS PERSONNEL	24	4	100		7.574	1.19	46.407	
SUPERVISORY PERSONNEL	23	5	10		6.474	1.406	3.868	
ENGINEERING PERSONNEL	13	7	31		3.512	4.285	17.814	
TOTAL	144	28	556	728	54.244	10.516	348.181	412.941
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	72		0.314	0.005	33.331	
OPERATING PERSONNEL	0	2	9		0.041	0.366	9.095	
HEALTH PHYSICS PERSONNEL	0	0	17		0	0.041	6.29	
SUPERVISORY PERSONNEL	0	0	0		0.041	0.01	0.196	
ENGINEERING PERSONNEL	1	1	6		0.391	0.232	3.172	
TOTAL	1	3	104	108	0.787	0.654	52.084	53.525
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	22	0	44		7.447	0	92.139	
OPERATING PERSONNEL	1	0	0		0.603	0.299	0	
HEALTH PHYSICS PERSONNEL	3	0	6		0.917	0.036	1.499	
SUPERVISORY PERSONNEL	3	0	2		1.465	0.108	1.262	
ENGINEERING PERSONNEL	3	0	1		1.082	0.335	0.237	
TOTAL	32	0	53	85	11.514	0.778	95.137	107.429
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	74		1.221	0.021	25.101	
OPERATING PERSONNEL	9	0	4		2.93	0.031	0.906	
HEALTH PHYSICS PERSONNEL	9	0	34		3.615	0.149	8.023	
SUPERVISORY PERSONNEL	0	0	2		0.158	0.103	0.448	
ENGINEERING PERSONNEL	0	0	4		0.052	0.015	0.798	
TOTAL	20	0	118	138	7.976	0.319	35.276	43.571
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0.082	0	9.548	
OPERATING PERSONNEL	0	0	0		0.021	0.026	1.138	
HEALTH PHYSICS PERSONNEL	0	0	0		0.046	0.031	2.034	
SUPERVISORY PERSONNEL	0	0	0		0	0	0.288	
ENGINEERING PERSONNEL	0	0	0		0	0	0.242	
TOTAL	0	0	0	0	0.149	0.057	13.25	13.456
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	78	2	604	684	39.511	0.422	453.743	493.676
OPERATING PERSONNEL	56	25	24	105	31.956	8.869	17.113	57.938
HEALTH PHYSICS PERSONNEL	42	5	166	213	23.487	1.931	90.737	116.155
SUPERVISORY PERSONNEL	30	5	19	54	9.987	1.653	8.266	19.906
ENGINEERING PERSONNEL	19	11	45	75	5.681	5.495	23.082	34.258
GRAND TOTALS	225	48	858	1131	110.622	18.37	592.941	721.933

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *PRAIRIE ISLAND 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	7	0	1		4.203	0.941	0.553	
OPERATING PERSONNEL	12	0	0		3.897	0.017	0.187	
HEALTH PHYSICS PERSONNEL	10	0	7		3.191	0	2.116	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	5	0	1		1.635	0.334	0.478	
TOTAL	34	0	9	43	12.926	1.292	3.334	17.552
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	24	28	1		6.36	12.013	0.301	
OPERATING PERSONNEL	0	0	0		0.068	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0.014	0	0.021	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	2	0	1		0.852	0.048	0.382	
TOTAL	26	28	2	56	7.294	12.061	0.704	20.059
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	9	51	65		2.166	42.794	42.67	
OPERATING PERSONNEL	0	0	0		0.025	0	0	
HEALTH PHYSICS PERSONNEL	1	0	21		0.276	0	5.382	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	3	1	16		1.166	0.351	6.544	
TOTAL	13	52	102	167	3.633	43.145	54.596	101.374
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	47	81	36		11.894	24.406	10.032	
OPERATING PERSONNEL	1	0	0		1.073	0	0	
HEALTH PHYSICS PERSONNEL	3	0	0		0.884	0	0.184	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	9	2	6		2.885	1.001	2.159	
TOTAL	60	83	42	185	16.736	25.407	12.375	54.518
WASTE PROCESSING								
MAINTENANCE PERSONNEL	16	13	1		4.621	4.608	0.252	
OPERATING PERSONNEL	2	0	0		0.775	0	0.013	
HEALTH PHYSICS PERSONNEL	4	0	3		2.458	0	0.572	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0.072	0.002	0	
TOTAL	22	13	4	39	7.926	4.61	0.837	13.373
REFUELING								
MAINTENANCE PERSONNEL	29	55	1		12.539	19.829	0.319	
OPERATING PERSONNEL	14	0	0		4.972	0.01	0	
HEALTH PHYSICS PERSONNEL	6	0	22		1.516	0	6.968	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	5	1	1		1.07	0.264	0.599	
TOTAL	54	56	24	134	20.097	20.103	7.886	48.086
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	132	228	105	465	41.783	104.591	54.127	200.501
OPERATING PERSONNEL	29	0	0	29	10.81	0.027	0.2	11.037
HEALTH PHYSICS PERSONNEL	24	0	53	77	8.339	0	15.243	23.582
SUPERVISORY PERSONNEL	0	0	0	0	0	0	0	0
ENGINEERING PERSONNEL	24	4	25	53	7.68	2	10.162	19.842
GRAND TOTALS	209	232	183	624	68.612	106.618	79.732	254.962

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *QUAD CITIES 1, 2 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	10	1	42		12.9	0.06	17.84	
OPERATING PERSONNEL	107	0	1		45.72	0	0.59	
HEALTH PHYSICS PERSONNEL	20	0	18		20.71	0	7.6	
SUPERVISORY PERSONNEL	44	0	0		13.25	0	0	
ENGINEERING PERSONNEL	28	19	22		6.53	0.48	2.58	
TOTAL	209	20	83	312	99.11	0.54	28.61	128.26
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	116	7	484		132.4	2.57	204.1	
OPERATING PERSONNEL	18	0	1		7.97	0	0.97	
HEALTH PHYSICS PERSONNEL	22	0	75		23.86	0	30.45	
SUPERVISORY PERSONNEL	88	0	0		26.56	0	0	
ENGINEERING PERSONNEL	45	72	28		10.43	1.8	3.29	
TOTAL	289	79	588	956	201.22	4.37	238.81	444.4
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2	0	93		0.48	0	39.02	
OPERATING PERSONNEL	1	0	0		0.08	0	0	
HEALTH PHYSICS PERSONNEL	1	0	0		0.6	0	0	
SUPERVISORY PERSONNEL	1	0	0		0.05	0	0	
ENGINEERING PERSONNEL	6	41	106		1.36	1.02	12.2	
TOTAL	11	41	199	251	2.57	1.02	51.22	54.81
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	10	35	493		11.28	12.7	207.69	
OPERATING PERSONNEL	1	0	26		0.13	0	23.61	
HEALTH PHYSICS PERSONNEL	2	0	3		1.42	0	1.05	
SUPERVISORY PERSONNEL	5	0	0		1.58	0	0	
ENGINEERING PERSONNEL	23	88	70		5.21	2.18	8.07	
TOTAL	41	123	592	756	19.62	14.88	240.42	274.92
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	2		0.03	0	0.64	
OPERATING PERSONNEL	16	0	2		6.89	0	3.28	
HEALTH PHYSICS PERSONNEL	2	0	1		0.91	0	0.12	
SUPERVISORY PERSONNEL	12	0	0		3.63	0	0	
ENGINEERING PERSONNEL	1	0	0		0.01	0	0	
TOTAL	32	0	5	37	11.47	0	4.04	15.51
REFUELING								
MAINTENANCE PERSONNEL	12	0	8		13.14	0	3.41	
OPERATING PERSONNEL	20	0	1		8.64	0	0.16	
HEALTH PHYSICS PERSONNEL	3	0	0		2.16	0	0	
SUPERVISORY PERSONNEL	9	0	0		2.71	0	0	
ENGINEERING PERSONNEL	2	1	7		0.35	0.02	0.81	
TOTAL	46	1	16	63	27	0.02	4.38	31.4
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	151	43	1122	1316	170.23	15.33	472.7	658.26
OPERATING PERSONNEL	163	0	31	194	69.43	0	28.61	98.04
HEALTH PHYSICS PERSONNEL	50	0	97	147	49.66	0	39.22	88.88
SUPERVISORY PERSONNEL	159	0	0	159	47.78	0	0	47.78
ENGINEERING PERSONNEL	105	221	233	559	23.89	5.5	26.95	56.34
GRAND TOTALS	628	264	1483	2375	360.99	20.83	567.48	949.3

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *RANCHO SECO TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	0	0	1		2.575	0	1.999	
OPERATING PERSONNEL	36	0	1		14.094	0	1.207	
HEALTH PHYSICS PERSONNEL	10	0	7		4.268	0	5.021	
SUPERVISORY PERSONNEL	0	0	3		0	0	0.672	
ENGINEERING PERSONNEL	3	0	14		1.443	0	2.615	
TOTAL	49	0	26	75	22.38	0	11.514	33.894
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	64	0	76		30.857	0	35.13	
OPERATING PERSONNEL	0	0	0		0.275	0	0.279	
HEALTH PHYSICS PERSONNEL	22	0	32		10.571	0	21.848	
SUPERVISORY PERSONNEL	1	0	2		0.18	0	1.669	
ENGINEERING PERSONNEL	9	0	9		3.142	0	2.916	
TOTAL	96	0	119	215	45.025	0	61.842	106.867
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	5	0	13		3.033	0	11.483	
OPERATING PERSONNEL	0	0	0		0.01	0	0	
HEALTH PHYSICS PERSONNEL	1	0	1		0.384	0	1.764	
SUPERVISORY PERSONNEL	0	0	1		0	0	0.258	
ENGINEERING PERSONNEL	0	0	7		0.695	0	2.396	
TOTAL	6	0	22	28	4.122	0	15.901	20.023
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	45	0	295		29.208	0	143.961	
OPERATING PERSONNEL	1	0	0		0.105	0	0	
HEALTH PHYSICS PERSONNEL	1	0	9		2.917	0	8.386	
SUPERVISORY PERSONNEL	0	0	3		0	0	0.882	
ENGINEERING PERSONNEL	15	0	31		6.869	0	8.967	
TOTAL	62	0	338	400	39.099	0	162.196	201.295
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	7		1.138	0	5.268	
OPERATING PERSONNEL	0	0	0		0.061	0	0	
HEALTH PHYSICS PERSONNEL	13	0	3		5.905	0	3.251	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	1	0	0		0.09	0	0.006	
TOTAL	14	0	10	24	7.194	0	8.525	15.719
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	114	0	392	506	66.811	0	197.841	264.652
OPERATING PERSONNEL	37	0	1	38	14.545	0	1.486	16.031
HEALTH PHYSICS PERSONNEL	47	0	52	99	24.045	0	40.27	64.315
SUPERVISORY PERSONNEL	1	0	9	10	0.18	0	3.481	3.661
ENGINEERING PERSONNEL	28	0	61	89	12.239	0	16.9	29.139
GRAND TOTALS	227	0	515	742	117.82	0	259.978	377.798

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *ROBINSON 2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	7	0	12		4.695	0.46	5.825	
OPERATING PERSONNEL	23	0	0		11.76	0	0	
HEALTH PHYSICS PERSONNEL	19	0	3		14.6	0.025	5.8	
SUPERVISORY PERSONNEL	1	0	0		0.3	0.03	0.27	
ENGINEERING PERSONNEL	8	3	13		3.8	0.79	2.35	
TOTAL	58	3	28	89	35.155	1.305	14.245	50.705
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	53	18	15		19.13	7.64	6.8	
OPERATING PERSONNEL	3	0	0		3.55	0	0	
HEALTH PHYSICS PERSONNEL	13	0	3		12.3	0	1.255	
SUPERVISORY PERSONNEL	0	0	0		0.22	0	0.07	
ENGINEERING PERSONNEL	1	0	8		0.42	0.06	1.8	
TOTAL	70	18	26	114	35.62	7.7	9.925	53.245
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	5	0	43		2.19	0.375	22.1	
OPERATING PERSONNEL	0	0	0		0.4	0	0	
HEALTH PHYSICS PERSONNEL	4	0	10		4.5	0	4.7	
SUPERVISORY PERSONNEL	0	0	0		0	0	0.035	
ENGINEERING PERSONNEL	8	0	62		2.355	0.14	44.5	
TOTAL	17	0	115	132	9.445	0.515	71.335	81.295
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	65	22	340		34.85	9.73	211.155	
OPERATING PERSONNEL	8	0	0		1.13	0	0	
HEALTH PHYSICS PERSONNEL	16	0	38		17.15	0	19.05	
SUPERVISORY PERSONNEL	0	0	4		0.2	0	1.63	
ENGINEERING PERSONNEL	11	3	36		3.17	1.41	15.275	
TOTAL	100	25	418	543	56.5	11.14	247.11	314.75
WASTE PROCESSING								
MAINTENANCE PERSONNEL	12	1	7		4.995	0.2	1.6	
OPERATING PERSONNEL	25	0	0		9.625	0	0	
HEALTH PHYSICS PERSONNEL	4	0	4		1.25	0	2.55	
SUPERVISORY PERSONNEL	0	0	0		0.1	0	0.06	
ENGINEERING PERSONNEL	0	0	1		0.055	0	0.295	
TOTAL	41	1	12	54	16.025	0.2	4.505	20.73
REFUELING								
MAINTENANCE PERSONNEL	26	20	45		21.925	10.755	25.195	
OPERATING PERSONNEL	30	0	0		9.125	0	0	
HEALTH PHYSICS PERSONNEL	2	0	9		1.055	0	2.81	
SUPERVISORY PERSONNEL	0	0	1		0.17	0.005	0.285	
ENGINEERING PERSONNEL	4	5	0		1.5	0.98	0	
TOTAL	62	25	55	142	33.775	11.74	28.29	73.805
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	168	61	462	691	87.785	29.16	272.675	389.62
OPERATING PERSONNEL	89	0	0	89	35.59	0	0	35.59
HEALTH PHYSICS PERSONNEL	58	0	67	125	50.855	0.025	36.165	87.045
SUPERVISORY PERSONNEL	1	0	5	6	0.99	0.035	2.35	3.375
ENGINEERING PERSONNEL	32	11	120	163	11.3	3.38	64.22	78.9
GRAND TOTALS	348	72	654	1074	186.52	32.6	375.41	594.53

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *SALEM 1,2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	5	0	0		1.614	0.066	0.975	
OPERATING PERSONNEL	15	0	1		4.429	0	0.149	
HEALTH PHYSICS PERSONNEL	0	0	2		0.855	0	0.938	
SUPERVISORY PERSONNEL	0	0	0		0	0.013	0.013	
ENGINEERING PERSONNEL	1	0	0		0.509	0	0	
TOTAL	21	0	3	24	7.407	0.079	2.075	9.561
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	56	2	179		17.003	0.479	86.229	
OPERATING PERSONNEL	24	0	6		8.93	0	3.597	
HEALTH PHYSICS PERSONNEL	28	0	112		10.611	0	29.439	
SUPERVISORY PERSONNEL	0	0	0		0.009	0.087	0.817	
ENGINEERING PERSONNEL	25	0	3		9.693	0.142	0.98	
TOTAL	133	2	300	435	46.246	0.708	121.062	168.016
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2	0	32		0.697	0.022	9.287	
OPERATING PERSONNEL	0	0	1		0.116	0	0.099	
HEALTH PHYSICS PERSONNEL	0	0	1		0.177	0	0.366	
SUPERVISORY PERSONNEL	0	0	1		0	0	0.187	
ENGINEERING PERSONNEL	1	1	0		0.688	0.334	0.07	
TOTAL	3	1	35	39	1.678	0.356	10.009	12.043
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	13	0	154		7.033	0.079	52.737	
OPERATING PERSONNEL	32	0	1		8.469	0	1.011	
HEALTH PHYSICS PERSONNEL	11	0	120		2.782	0	48.668	
SUPERVISORY PERSONNEL	0	0	3		0	0.014	0.752	
ENGINEERING PERSONNEL	7	0	3		3.157	0.06	0.673	
TOTAL	63	0	281	344	21.441	0.153	103.841	125.435
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	8		0.708	0.134	2.849	
OPERATING PERSONNEL	0	0	0		0.036	0	0	
HEALTH PHYSICS PERSONNEL	31	0	34		6.959	0	9.707	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	13	0	0		2.852	0	0	
TOTAL	46	0	42	88	10.555	0.134	12.556	23.245
REFUELING								
MAINTENANCE PERSONNEL	85	1	223		27.672	0.195	67.612	
OPERATING PERSONNEL	16	0	1		4.754	0	0.6	
HEALTH PHYSICS PERSONNEL	11	0	270		3.311	0	99.863	
SUPERVISORY PERSONNEL	0	0	4		0	0	1.152	
ENGINEERING PERSONNEL	12	1	9		4.293	0.531	4.196	
TOTAL	124	2	507	633	40.03	0.726	173.423	214.179
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	163	3	596	762	54.727	0.975	219.689	275.391
OPERATING PERSONNEL	87	0	10	97	26.734	0	5.456	32.19
HEALTH PHYSICS PERSONNEL	81	0	539	620	24.695	0	188.981	213.676
SUPERVISORY PERSONNEL	0	0	8	8	0.009	0.114	2.921	3.044
ENGINEERING PERSONNEL	59	2	15	76	21.192	1.067	5.919	28.178
GRAND TOTALS	390	5	1168	1563	127.357	2.156	422.966	552.479

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *SAN ONOFRE 1, 2, 3 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	71	1	172		3.227	0.099	10.433	
OPERATING PERSONNEL	35	0	1		14.552	0	0.346	
HEALTH PHYSICS PERSONNEL	80	0	65		18.046	0	10.335	
SUPERVISORY PERSONNEL	2	0	4		0.391	0	0.431	
ENGINEERING PERSONNEL	60	0	125		5.904	0	15.502	
TOTAL	248	1	367	616	42.12	0.099	37.047	79.266
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	178	4	654		42.806	0.964	96.356	
OPERATING PERSONNEL	6	0	0		0.071	0	0	
HEALTH PHYSICS PERSONNEL	123	0	123		44.779	0	30.06	
SUPERVISORY PERSONNEL	1	0	2		0.131	0	0.152	
ENGINEERING PERSONNEL	69	0	142		11.864	0	15.072	
TOTAL	377	4	921	1302	99.651	0.964	141.64	242.255
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	35	0	213		0.354	0	20.238	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	8	0	1		0.166	0	0.059	
SUPERVISORY PERSONNEL	1	0	4		0.001	0	0.285	
ENGINEERING PERSONNEL	39	0	110		1.977	0	11.859	
TOTAL	83	0	328	411	2.498	0	32.441	34.939
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	131	2	622		21.762	0.025	178.515	
OPERATING PERSONNEL	3	0	0		0.086	0	0	
HEALTH PHYSICS PERSONNEL	49	0	35		4.221	0	3.551	
SUPERVISORY PERSONNEL	0	0	2		0	0	0.065	
ENGINEERING PERSONNEL	55	0	147		7.778	0	35.392	
TOTAL	238	2	806	1046	33.847	0.025	217.523	251.395
WASTE PROCESSING								
MAINTENANCE PERSONNEL	14	1	32		1.288	0.14	3.586	
OPERATING PERSONNEL	4	0	0		0.094	0	0	
HEALTH PHYSICS PERSONNEL	57	0	57		11.982	0	8.092	
SUPERVISORY PERSONNEL	0	0	1		0	0	0.522	
ENGINEERING PERSONNEL	4	0	5		0.125	0	0.594	
TOTAL	79	1	95	175	13.489	0.14	12.794	26.423
REFUELING								
MAINTENANCE PERSONNEL	82	1	138		31.336	0.673	45.655	
OPERATING PERSONNEL	3	0	0		0.873	0	0	
HEALTH PHYSICS PERSONNEL	25	0	24		1.945	0	1.36	
SUPERVISORY PERSONNEL	0	0	1		0	0	0.297	
ENGINEERING PERSONNEL	29	0	110		3.492	0	43.254	
TOTAL	139	1	273	413	37.646	0.673	90.566	128.885
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	511 (190)	9 (6)	1831 (758)	2351 (954)	100.773	1.901	354.783	457.457
OPERATING PERSONNEL	51 (37)	0	1 (1)	52 (38)	15.676	0	0.346	16.022
HEALTH PHYSICS PERSONNEL	342 (127)	0	305 (127)	647 (254)	81.139	0	53.457	134.596
SUPERVISORY PERSONNEL	4 (3)	0	14 (8)	18 (11)	0.523	0	1.752	2.275
ENGINEERING PERSONNEL	256 (87)	0	639 (304)	895 (391)	31.14	0	121.673	152.813
GRAND TOTALS	1164 (444)	9 (6)	2790 (1198)	3963 (1648)	229.251	1.901	532.011	763.163

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

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *SEQUOYAH 1, 2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	791	26	39		31.49	0.048	1.68	
OPERATING PERSONNEL	295	13	4		12.906	0.072	0.046	
HEALTH PHYSICS PERSONNEL	52	1	1		14.975	0	0.02	
SUPERVISORY PERSONNEL	144	46	30		4.123	2.105	0.457	
ENGINEERING PERSONNEL	366	105	258		13.622	3.264	19.852	
TOTAL	1648	191	332	2171	77.116	5.489	22.055	104.66
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	826	14	32		152.141	0.014	3.994	
OPERATING PERSONNEL	116	0	6		4.66	0	1.727	
HEALTH PHYSICS PERSONNEL	51	0	0		7.728	0	0	
SUPERVISORY PERSONNEL	124	30	8		3.098	0.438	0.027	
ENGINEERING PERSONNEL	172	38	124		8.81	1.141	14.852	
TOTAL	1289	82	170	1541	176.437	1.593	20.6	198.63
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	176	0	0		19.66	0	0	
OPERATING PERSONNEL	17	0	0		0.019	0	0	
HEALTH PHYSICS PERSONNEL	39	3	0		3.611	0.133	0	
SUPERVISORY PERSONNEL	6	35	0		0.048	5.142	0	
ENGINEERING PERSONNEL	40	13	41		0.596	0.517	6.661	
TOTAL	278	51	41	370	23.934	5.792	6.661	36.387
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	789	6	16		128.399	0.002	2.314	
OPERATING PERSONNEL	81	0	6		3.275	0	0.498	
HEALTH PHYSICS PERSONNEL	46	2	0		2.534	0.012	0	
SUPERVISORY PERSONNEL	62	21	6		0.495	0.546	0.001	
ENGINEERING PERSONNEL	207	53	245		10.705	1.89	18.5	
TOTAL	1185	82	273	1548	145.408	2.45	21.313	169.171
WASTE PROCESSING								
MAINTENANCE PERSONNEL	182	0	0		5.872	0	0	
OPERATING PERSONNEL	20	1	5		3.177	0.008	1.437	
HEALTH PHYSICS PERSONNEL	48	0	0		1.393	0	0	
SUPERVISORY PERSONNEL	16	0	0		2.64	0	0	
ENGINEERING PERSONNEL	12	0	4		0.02	0	0.002	
TOTAL	278	1	9	288	13.102	0.008	1.439	14.549
REFUELING								
MAINTENANCE PERSONNEL	120	0	3		18.189	0	0.082	
OPERATING PERSONNEL	20	0	0		0.19	0	0	
HEALTH PHYSICS PERSONNEL	22	0	0		0.785	0	0	
SUPERVISORY PERSONNEL	5	7	0		0.724	0.15	0	
ENGINEERING PERSONNEL	16	3	4		0.597	0.18	0.52	
TOTAL	183	10	7	200	20.485	0.33	0.602	21.417
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	2884	46	90	3022	355.751	0.064	8.07	363.885
OPERATING PERSONNEL	549	14	21	590	24.227	0.08	3.708	28.015
HEALTH PHYSICS PERSONNEL	258	6	1	265	31.026	0.145	0.02	31.191
SUPERVISORY PERSONNEL	357	139	44	540	11.128	8.381	0.485	19.994
ENGINEERING PERSONNEL	813	212	676	1701	34.35	6.992	60.387	101.729
GRAND TOTALS	4861	417	832	6118	456.482	15.662	72.67	544.814

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: SHOREHAM TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY CONTRACT	TOTAL
REACTOR OPS & SURV						
MAINTENANCE PERSONNEL	0	0	0	0	0	0
OPERATING PERSONNEL	0	0	0	0	0	0
HEALTH PHYSICS PERSONNEL	1	0	0	0.116	0	0
SUPERVISORY PERSONNEL	0	0	0	0	0	0
ENGINEERING PERSONNEL	0	0	0	0	0	0
TOTAL	1	0	0 1	0.116	0	0 0.116
ROUTINE MAINTENANCE						
MAINTENANCE PERSONNEL	0	0	0	0	0	0
OPERATING PERSONNEL	0	0	0	0	0	0
HEALTH PHYSICS PERSONNEL	0	0	0	0	0	0
SUPERVISORY PERSONNEL	0	0	0	0	0	0
ENGINEERING PERSONNEL	0	0	0	0	0	0
TOTAL	0	0	0 0	0	0	0 0
IN-SERVICE INSPECTION						
MAINTENANCE PERSONNEL	0	0	0	0	0	0
OPERATING PERSONNEL	0	0	0	0	0	0
HEALTH PHYSICS PERSONNEL	0	0	0	0	0	0
SUPERVISORY PERSONNEL	0	0	0	0	0	0
ENGINEERING PERSONNEL	0	0	0	0	0	0
TOTAL	0	0	0 0	0	0	0 0
SPECIAL MAINTENANCE						
MAINTENANCE PERSONNEL	0	0	0	0	0	0
OPERATING PERSONNEL	0	0	0	0	0	0
HEALTH PHYSICS PERSONNEL	0	0	0	0	0	0
SUPERVISORY PERSONNEL	0	0	0	0	0	0
ENGINEERING PERSONNEL	0	0	0	0	0	0
TOTAL	0	0	0 0	0	0	0 0
WASTE PROCESSING						
MAINTENANCE PERSONNEL	0	0	0	0	0	0
OPERATING PERSONNEL	0	0	0	0	0	0
HEALTH PHYSICS PERSONNEL	0	0	0	0	0	0
SUPERVISORY PERSONNEL	0	0	0	0	0	0
ENGINEERING PERSONNEL	0	0	0	0	0	0
TOTAL	0	0	0 0	0	0	0 0
REFUELING						
MAINTENANCE PERSONNEL	0	0	0	0	0	0
OPERATING PERSONNEL	0	0	0	0	0	0
HEALTH PHYSICS PERSONNEL	0	0	0	0	0	0
SUPERVISORY PERSONNEL	0	0	0	0	0	0
ENGINEERING PERSONNEL	0	0	0	0	0	0
TOTAL	0	0	0 0	0	0	0 0
TOTAL BY JOB FUNCTION						
MAINTENANCE PERSONNEL	0	0	0 0	0	0	0 0
OPERATING PERSONNEL	0	0	0 0	0	0	0 0
HEALTH PHYSICS PERSONNEL	1	0	0 1	0.116	0	0 0.116
SUPERVISORY PERSONNEL	0	0	0 0	0	0	0 0
ENGINEERING PERSONNEL	0	0	0 0	0	0	0 0
GRAND TOTALS	1	0	0 1	0.116	0	0 0.116

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

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

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	87	3	5		25.319	0.88	2.69	
OPERATING PERSONNEL	26	0	30		16.542	0.023	10.143	
HEALTH PHYSICS PERSONNEL	24	0	14		13.654	0	5.401	
SUPERVISORY PERSONNEL	15	0	3		4.479	0.045	1.199	
ENGINEERING PERSONNEL	4	0	3		0.72	0.105	0.955	
TOTAL	156	3	55	214	60.714	1.053	20.388	82.155
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	63	5	45		20.095	1.18	15.226	
OPERATING PERSONNEL	7	0	8		1.96	0	3.442	
HEALTH PHYSICS PERSONNEL	8	0	16		2.945	0	4.545	
SUPERVISORY PERSONNEL	7	0	2		1.835	0.01	0.57	
ENGINEERING PERSONNEL	0	0	2		0.058	0.105	1.189	
TOTAL	85	5	73	163	26.893	1.295	24.972	53.16
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	6	0	8		2.411	0.22	4.971	
OPERATING PERSONNEL	15	0	17		7.876	0.035	5.083	
HEALTH PHYSICS PERSONNEL	0	0	0		0.105	0	0.01	
SUPERVISORY PERSONNEL	3	0	0		0.893	0.025	0.14	
ENGINEERING PERSONNEL	2	1	3		0.47	0.43	2.655	
TOTAL	26	1	28	55	11.755	0.71	12.859	25.324
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	34	4	153		10.665	1.33	121.197	
OPERATING PERSONNEL	5	0	36		2.015	0.07	21.283	
HEALTH PHYSICS PERSONNEL	2	0	1		0.68	0	0.85	
SUPERVISORY PERSONNEL	3	0	5		1.095	0.07	2.285	
ENGINEERING PERSONNEL	0	4	20		0.225	1.1	14.035	
TOTAL	44	8	215	267	14.68	2.57	159.65	176.9
WASTE PROCESSING								
MAINTENANCE PERSONNEL	36	1	66		12.712	0.27	34.99	
OPERATING PERSONNEL	15	0	49		4.64	0.135	24.55	
HEALTH PHYSICS PERSONNEL	13	0	49		3.97	0	16.609	
SUPERVISORY PERSONNEL	8	0	1		3.105	0.02	0.27	
ENGINEERING PERSONNEL	3	0	37		0.575	0.06	30.45	
TOTAL	75	1	202	278	25.002	0.485	106.869	132.356
REFUELING								
MAINTENANCE PERSONNEL	32	22	0		12.555	11.615	0.555	
OPERATING PERSONNEL	3	0	8		1.375	0	2.67	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0.03	
SUPERVISORY PERSONNEL	2	0	0		1.215	0	0	
ENGINEERING PERSONNEL	0	1	0		0.035	0.135	0.445	
TOTAL	37	23	8	68	15.18	11.75	3.7	30.63
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	258 (167)	35 (26)	277 (246)	570 (439)	83.757	15.495	179.629	278.881
OPERATING PERSONNEL	71 (50)	0 (0)	148 (120)	219 (170)	34.408	0.263	67.171	101.842
HEALTH PHYSICS PERSONNEL	47 (25)	0 (0)	80 (65)	127 (90)	21.354	0	27.445	48.799
SUPERVISORY PERSONNEL	38 (25)	0 (0)	11 (11)	49 (36)	12.622	0.17	4.464	17.256
ENGINEERING PERSONNEL	9 (5)	6 (3)	65 (51)	80 (59)	2.083	1.935	49.729	53.747
GRAND TOTALS	423 (272)	41 (29)	581 (493)	1045 (794)	154.224	17.863	328.438	500.525

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

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *SUMMER 1 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	7	0	0		0.118	0	0	
OPERATING PERSONNEL	53	1	30		1.251	0.01	0.332	
HEALTH PHYSICS PERSONNEL	19	0	26		0.71	0	1.927	
SUPERVISORY PERSONNEL	3	3	1		0.03	0.035	0.002	
ENGINEERING PERSONNEL	2	3	5		0.03	0.021	0.098	
TOTAL	84	7	62	153	2.139	0.066	2.359	4.564
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	114	2	68		2.357	0.025	2.132	
OPERATING PERSONNEL	6	0	1		0.129	0	0.005	
HEALTH PHYSICS PERSONNEL	11	0	13		0.248	0	0.275	
SUPERVISORY PERSONNEL	3	3	1		0.015	0.03	0.005	
ENGINEERING PERSONNEL	9	18	9		0.242	0.448	0.125	
TOTAL	143	23	92	258	2.991	0.503	2.542	6.036
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2	0	3		0.325	0	0.02	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	3		0	0	0.025	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	1	1	2		0.04	0.035	0.115	
TOTAL	3	1	8	12	0.365	0.035	0.16	0.56
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	83	0	43		2.27	0	2.099	
OPERATING PERSONNEL	11	0	3		0.224	0	0.015	
HEALTH PHYSICS PERSONNEL	10	0	17		0.426	0	0.595	
SUPERVISORY PERSONNEL	1	0	0		0.005	0	0	
ENGINEERING PERSONNEL	3	13	1		0.075	0.255	0.015	
TOTAL	108	13	64	185	3	0.255	2.724	5.979
WASTE PROCESSING								
MAINTENANCE PERSONNEL	7	0	19		0.045	0	1.915	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	4	0	10		0.045	0	0.38	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	11	0	29	40	0.09	0	2.295	2.385
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	213	2	133	348	5.115	0.025	6.166	11.306
OPERATING PERSONNEL	70	1	34	105	1.604	0.01	0.352	1.966
HEALTH PHYSICS PERSONNEL	44	0	69	113	1.429	0	3.202	4.631
SUPERVISORY PERSONNEL	7	6	2	15	0.05	0.065	0.007	0.122
ENGINEERING PERSONNEL	15	35	17	67	0.387	0.759	0.353	1.499
GRAND TOTALS	349	44	255	648	8.585	0.859	10.08	19.524

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *SURRY 1, 2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	48	12	258		4.495	0.432	16.327	
OPERATING PERSONNEL	258	26	102		163.052	0.791	5.378	
HEALTH PHYSICS PERSONNEL	74	2	323		63.726	0.228	148.3	
SUPERVISORY PERSONNEL	58	3	5		21.784	0.019	0.1	
ENGINEERING PERSONNEL	66	29	50		16.261	1.541	3.118	
TOTAL	504	72	738	1314	269.318	3.011	173.223	445.552
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	177	113	1110		236.791	61.683	676.181	
OPERATING PERSONNEL	74	20	111		21.593	8.402	36.448	
HEALTH PHYSICS PERSONNEL	34	3	242		16.806	0.008	147.283	
SUPERVISORY PERSONNEL	31	2	7		14.053	0.045	2.782	
ENGINEERING PERSONNEL	35	20	29		7.766	0.397	5.062	
TOTAL	351	158	1499	2008	297.009	70.535	867.756	1235.3
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	33	0	200		6.951	0	67.542	
OPERATING PERSONNEL	3	3	53		0.35	0.64	16.441	
HEALTH PHYSICS PERSONNEL	0	0	5		0	0	0.224	
SUPERVISORY PERSONNEL	0	0	1		0	0	0.013	
ENGINEERING PERSONNEL	2	1	6		0.461	0.091	0.056	
TOTAL	38	4	265	307	7.762	0.731	84.276	92.769
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	43	8	576		1.748	0.097	374.251	
OPERATING PERSONNEL	27	4	51		2.358	0.047	8.145	
HEALTH PHYSICS PERSONNEL	5	0	72		3.139	0	43.369	
SUPERVISORY PERSONNEL	3	0	1		1.855	0	0.252	
ENGINEERING PERSONNEL	8	0	15		1.896	0	1.829	
TOTAL	86	12	715	813	10.996	0.144	427.846	438.986
WASTE PROCESSING								
MAINTENANCE PERSONNEL	20	2	18		1.702	0.037	1.929	
OPERATING PERSONNEL	57	2	3		21.281	0.018	0.213	
HEALTH PHYSICS PERSONNEL	12	0	24		2.881	0	1.743	
SUPERVISORY PERSONNEL	8	0	0		2.624	0	0	
ENGINEERING PERSONNEL	0	1	0		0	0.015	0	
TOTAL	97	5	45	147	28.488	0.07	3.885	32.443
REFUELING								
MAINTENANCE PERSONNEL	22	1	120		1.497	0.002	32.921	
OPERATING PERSONNEL	22	15	13		2.545	1.422	0.584	
HEALTH PHYSICS PERSONNEL	26	2	170		6.547	0.092	146.941	
SUPERVISORY PERSONNEL	12	0	2		2.675	0	0.198	
ENGINEERING PERSONNEL	1	4	8		0.051	0.067	0.191	
TOTAL	83	22	313	418	13.315	1.583	180.835	195.733
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	343	136	2282	2761	253.184	62.251	1169.151	1484.586
OPERATING PERSONNEL	441	70	333	844	211.179	11.32	67.209	289.708
HEALTH PHYSICS PERSONNEL	151	7	836	994	93.099	0.328	487.86	581.287
SUPERVISORY PERSONNEL	112	5	16	133	42.991	0.064	3.345	46.4
ENGINEERING PERSONNEL	112	55	108	275	26.435	2.111	10.256	38.802
GRAND TOTALS	1159	273	3575	5007	626.888	76.074	1737.821	2440.783

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *SUSQUEHANNA 1, 2 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	6	1	0		4.06	0.355	0	
OPERATING PERSONNEL	75	3	2		43.335	2.178	0.48	
HEALTH PHYSICS PERSONNEL	2	0	7		0.53	0	2.087	
SUPERVISORY PERSONNEL	3	0	0		1.155	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	86	4	9	99	49.08	2.533	2.567	54.18
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	99	285	244		65.074	214.001	130.921	
OPERATING PERSONNEL	41	1	18		20.524	0.115	8.315	
HEALTH PHYSICS PERSONNEL	24	4	214		19.878	1.52	122.415	
SUPERVISORY PERSONNEL	27	3	0		7.857	0.358	0	
ENGINEERING PERSONNEL	21	5	2		7.362	0.77	0.317	
TOTAL	212	298	478	988	120.695	216.764	261.968	599.427
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	64	113		0.51	49.164	84.779	
OPERATING PERSONNEL	0	0	2		0	0	0.423	
HEALTH PHYSICS PERSONNEL	1	0	0		0.164	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	6	0	0		0.945	0	0	
TOTAL	8	64	115	187	1.619	49.164	85.202	135.985
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	4	18	141		1.894	8.363	61.432	
OPERATING PERSONNEL	0	0	3		0	0	2.075	
HEALTH PHYSICS PERSONNEL	2	0	2		1.374	0	1.208	
SUPERVISORY PERSONNEL	2	0	0		0.602	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	8	18	146	172	3.87	8.363	64.715	76.948
WASTE PROCESSING								
MAINTENANCE PERSONNEL	3	3	3		1.643	3.851	0.562	
OPERATING PERSONNEL	0	0	6		0	0	9.144	
HEALTH PHYSICS PERSONNEL	4	0	16		3.044	0	9.75	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	7	3	25	35	4.687	3.851	19.456	27.994
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	1	0	0		0.114	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	1	0	0	1	0.114	0	0	0.114
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	113	371	501	985	73.181	275.734	277.694	626.609
OPERATING PERSONNEL	117	4	31	152	63.973	2.293	20.437	86.703
HEALTH PHYSICS PERSONNEL	33	4	239	276	24.99	1.52	135.46	161.97
SUPERVISORY PERSONNEL	32	3	0	35	9.614	0.358	0	9.972
ENGINEERING PERSONNEL	27	5	2	34	8.307	0.77	0.317	9.394
GRAND TOTALS	322	387	773	1482	180.065	280.675	433.908	894.648

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *THREE MILE ISLAND 1 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	77	0	26		1.083	0	0.028	
OPERATING PERSONNEL	87	0	6		14.432	0	0.011	
HEALTH PHYSICS PERSONNEL	76	2	12		28.39	0.01	0.091	
SUPERVISORY PERSONNEL	172	6	43		3.389	0.009	0.183	
ENGINEERING PERSONNEL	65	12	32		2.624	0.044	0.335	
TOTAL	477	20	119	616	49.918	0.063	0.648	50.629
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	139	1	184		25.902	0	5.854	
OPERATING PERSONNEL	84	0	4		1.488	0	0.033	
HEALTH PHYSICS PERSONNEL	36	2	2		0.953	0.005	0	
SUPERVISORY PERSONNEL	154	5	44		2.933	0.017	0.483	
ENGINEERING PERSONNEL	65	20	70		0.802	0.158	1.776	
TOTAL	478	28	304	810	32.078	0.18	8.146	40.404
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	109	0	73		4.25	0	6.785	
OPERATING PERSONNEL	36	1	8		2.07	0.005	2.254	
HEALTH PHYSICS PERSONNEL	4	0	1		0.115	0	0	
SUPERVISORY PERSONNEL	82	3	29		1.579	0.01	2.223	
ENGINEERING PERSONNEL	39	16	57		0.666	0.063	4.414	
TOTAL	270	20	168	458	8.68	0.078	15.676	24.434
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	111	0	449		10.08	0	67.457	
OPERATING PERSONNEL	53	0	7		9.761	0	0.122	
HEALTH PHYSICS PERSONNEL	16	0	3		1.091	0	0.003	
SUPERVISORY PERSONNEL	68	0	44		4.95	0	2.407	
ENGINEERING PERSONNEL	37	8	65		4.928	0.079	6.993	
TOTAL	285	8	568	861	30.81	0.079	76.982	107.871
WASTE PROCESSING								
MAINTENANCE PERSONNEL	36	0	17		2.233	0	0.14	
OPERATING PERSONNEL	30	0	2		11.009	0	0.14	
HEALTH PHYSICS PERSONNEL	11	0	0		0.038	0	0	
SUPERVISORY PERSONNEL	17	1	2		0.538	0	0	
ENGINEERING PERSONNEL	7	0	5		0.117	0	0.001	
TOTAL	101	1	26	128	13.935	0	0.281	14.216
REFUELING								
MAINTENANCE PERSONNEL	61	0	23		5.337	0	0.555	
OPERATING PERSONNEL	17	0	0		0.211	0	0	
HEALTH PHYSICS PERSONNEL	5	0	0		0.078	0	0	
SUPERVISORY PERSONNEL	23	0	6		1.087	0	0.037	
ENGINEERING PERSONNEL	8	3	13		0.266	0.036	0.233	
TOTAL	114	3	42	159	6.979	0.036	0.825	7.84
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	533 (144)	1 (1)	772 (478)	1306 (623)	48.885	0	80.819	129.704
OPERATING PERSONNEL	307 (91)	1 (1)	27 (16)	335 (108)	38.971	0.005	2.56	41.536
HEALTH PHYSICS PERSONNEL	148 (79)	4 (3)	18 (13)	170 (95)	30.665	0.015	0.094	30.774
SUPERVISORY PERSONNEL	516 (221)	15 (12)	168 (83)	699 (316)	14.476	0.036	5.333	19.845
ENGINEERING PERSONNEL	221 (97)	59 (31)	242 (116)	522 (244)	9.403	0.38	13.752	23.535
GRAND TOTALS	1725 (632)	80 (48)	1227 (706)	3032 (1386)	142.4	0.436	102.558	245.394

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

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *THREE MILE ISLAND 2 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	55	0	285		1	0	42.672	
OPERATING PERSONNEL	84	0	5		18.439	0	0.286	
HEALTH PHYSICS PERSONNEL	70	3	134		12.349	0.072	23.566	
SUPERVISORY PERSONNEL	105	25	56		2.193	0.068	1.385	
ENGINEERING PERSONNEL	29	0	75		1.343	0	7.8	
TOTAL	343	28	555	926	35.324	0.14	75.709	111.173
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	105	0	358		41.657	0	24.985	
OPERATING PERSONNEL	71	0	2		5.937	0	0.006	
HEALTH PHYSICS PERSONNEL	53	1	118		3.89	0.007	10.57	
SUPERVISORY PERSONNEL	136	5	95		2.023	0.019	1.626	
ENGINEERING PERSONNEL	35	2	102		0.717	0.04	2.869	
TOTAL	400	8	675	1083	54.224	0.066	40.056	94.346
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	34	0	151		1.314	0	3.201	
OPERATING PERSONNEL	45	0	1		0.954	0	0.002	
HEALTH PHYSICS PERSONNEL	40	1	67		0.941	0	1.466	
SUPERVISORY PERSONNEL	52	1	26		0.162	0	0.123	
ENGINEERING PERSONNEL	14	1	49		0.079	0.003	0.447	
TOTAL	185	3	294	482	3.45	0.003	5.239	8.692
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	91	0	446		25.264	0	424.435	
OPERATING PERSONNEL	112	0	10		135.032	0	4.599	
HEALTH PHYSICS PERSONNEL	50	1	1000		33.999	0	73.78	
SUPERVISORY PERSONNEL	112	12	116		3.39	0.147	22.251	
ENGINEERING PERSONNEL	28	3	171		1.886	0.017	50.495	
TOTAL	393	16	1743	2152	199.571	0.164	575.56	775.295
WASTE PROCESSING								
MAINTENANCE PERSONNEL	85	1	154		35.242	0	2.283	
OPERATING PERSONNEL	82	0	5		10.111	0	0.117	
HEALTH PHYSICS PERSONNEL	48	0	102		7.126	0	3.219	
SUPERVISORY PERSONNEL	75	7	43		2.452	0.003	0.693	
ENGINEERING PERSONNEL	16	2	72		0.708	0.004	4.333	
TOTAL	306	10	376	692	55.639	0.007	10.645	66.291
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	370 (112)	1 (1)	1394 (467)	1765 (580)	104.477	0	497.576	602.053
OPERATING PERSONNEL	394 (128)	0 (0)	23 (11)	417 (139)	170.473	0	5.01	175.483
HEALTH PHYSICS PERSONNEL	261 (78)	6 (3)	1421 (145)	1688 (226)	58.305	0.079	112.601	170.985
SUPERVISORY PERSONNEL	480 (178)	50 (40)	336 (134)	866 (352)	10.22	0.237	26.078	36.535
ENGINEERING PERSONNEL	122 (47)	8 (4)	469 (197)	599 (248)	4.733	0.064	65.944	70.741
GRAND TOTALS	1627 (543)	65 (48)	3643 (954)	5335 (1545)	348.208	0.38	707.209	1055.797

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

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *TROJAN TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	4	0	28		2.25	0	8.76	
OPERATING PERSONNEL	32	0	0		9.53	0	0	
HEALTH PHYSICS PERSONNEL	50	0	32		15.89	0	13.08	
SUPERVISORY PERSONNEL	3	1	4		2.47	0.28	2.77	
ENGINEERING PERSONNEL	3	5	2		1.31	1.89	1.13	
TOTAL	92	6	66	164	31.45	2.17	25.74	59.36
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	87	9	312		40.51	2.74	177.52	
OPERATING PERSONNEL	2	0	0		0.76	0	0.05	
HEALTH PHYSICS PERSONNEL	18	0	72		6.77	0	45.65	
SUPERVISORY PERSONNEL	17	3	29		9.07	1.31	10.67	
ENGINEERING PERSONNEL	7	21	23		2.55	12.97	20.78	
TOTAL	131	33	436	600	59.66	17.02	254.67	331.35
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	0	0	37		0	0	19.91	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	4		0.19	0	1.47	
SUPERVISORY PERSONNEL	0	0	1		0.01	0	0.13	
ENGINEERING PERSONNEL	0	0	1		0.03	0	0.15	
TOTAL	0	0	43	43	0.23	0	21.66	21.89
WASTE PROCESSING								
MAINTENANCE PERSONNEL	0	0	2		0.31	0	1.54	
OPERATING PERSONNEL	0	0	0		0.1	0	0	
HEALTH PHYSICS PERSONNEL	20	0	6		9.08	0	2.75	
SUPERVISORY PERSONNEL	1	0	0		0.21	0.01	0.13	
ENGINEERING PERSONNEL	0	0	0		0.03	0	0	
TOTAL	21	0	8	29	9.73	0.01	4.42	14.16
REFUELING								
MAINTENANCE PERSONNEL	9	0	46		6	0.18	39.81	
OPERATING PERSONNEL	12	0	0		2.71	0	0	
HEALTH PHYSICS PERSONNEL	10	0	15		5.35	0	5.14	
SUPERVISORY PERSONNEL	6	0	4		1.65	0.04	1.34	
ENGINEERING PERSONNEL	2	0	0		0.69	0.02	0	
TOTAL	39	0	65	104	16.4	0.24	46.29	62.93
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	100 (76)	9 (8)	425 (366)	534 (450)	49.07	2.92	247.54	299.53
OPERATING PERSONNEL	46 (27)	0 (0)	0 (0)	46 (27)	13.1	0	0.05	13.15
HEALTH PHYSICS PERSONNEL	98 (55)	0 (0)	129 (103)	227 (158)	37.28	0	68.09	105.37
SUPERVISORY PERSONNEL	27 (18)	4 (4)	38 (30)	69 (52)	13.41	1.64	15.04	30.09
ENGINEERING PERSONNEL	12 (8)	26 (24)	26 (24)	64 (56)	4.61	14.88	22.06	41.55
GRAND TOTALS	283 (184)	39 (36)	618 (523)	940 (743)	117.47	19.44	352.78	489.69

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

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *TURKEY POINT 3, 4 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	23	5	13		11.085	3.225	5.865	
OPERATING PERSONNEL	19	0	1		14.855	0.02	0.155	
HEALTH PHYSICS PERSONNEL	23	0	61		9.67	0.01	19.53	
SUPERVISORY PERSONNEL	5	0	8		2.17	0.105	2.82	
ENGINEERING PERSONNEL	21	0	14		8.645	0.53	10.865	
TOTAL	91	5	97	193	46.425	3.89	39.235	89.55
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	202	25	308		133.83	20.625	114.085	
OPERATING PERSONNEL	21	0	0		6.8	0.015	0	
HEALTH PHYSICS PERSONNEL	20	0	121		16.705	0	125.765	
SUPERVISORY PERSONNEL	8	0	27		3.24	0.19	10.805	
ENGINEERING PERSONNEL	6	1	52		4.365	0.58	20.38	
TOTAL	257	26	508	791	164.94	21.41	271.035	457.385
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	3	0	224		1.555	0.045	152.31	
OPERATING PERSONNEL	0	0	0		0.09	0	0	
HEALTH PHYSICS PERSONNEL	1	0	27		0.47	0	7.675	
SUPERVISORY PERSONNEL	4	0	9		1.415	0.05	2.73	
ENGINEERING PERSONNEL	2	2	12		0.585	1.35	3.07	
TOTAL	10	2	272	284	4.115	1.445	165.785	171.345
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	17	2	530		5.985	0.54	316.871	
OPERATING PERSONNEL	1	0	1		0.365	0	0.12	
HEALTH PHYSICS PERSONNEL	4	0	29		1.34	0	9.75	
SUPERVISORY PERSONNEL	1	0	34		0.265	0.025	14.59	
ENGINEERING PERSONNEL	4	3	43		1.9	1.035	12.84	
TOTAL	27	5	637	669	9.855	1.6	354.171	365.626
WASTE PROCESSING								
MAINTENANCE PERSONNEL	5	0	6		1.47	0.09	4.85	
OPERATING PERSONNEL	0	0	0		0.02	0	0	
HEALTH PHYSICS PERSONNEL	10	0	1		9.245	0	1.375	
SUPERVISORY PERSONNEL	0	0	0		0.035	0	0	
ENGINEERING PERSONNEL	1	0	1		0.6	0	0.355	
TOTAL	16	0	8	24	11.37	0.09	6.58	18.04
REFUELING								
MAINTENANCE PERSONNEL	44	13	81		15.64	3.535	50.68	
OPERATING PERSONNEL	4	0	0		1.615	0	0.015	
HEALTH PHYSICS PERSONNEL	3	0	19		1.045	0	4.875	
SUPERVISORY PERSONNEL	4	0	5		1.17	0.02	1.685	
ENGINEERING PERSONNEL	3	1	8		0.71	0.375	3.93	
TOTAL	58	14	113	185	20.18	3.93	61.185	85.295
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	294 (213)	45 (25)	1162 (738)	1501 (976)	169.565	28.06	644.661	842.286
OPERATING PERSONNEL	45 (26)	0 (0)	2 (2)	47 (28)	23.745	0.035	0.29	24.07
HEALTH PHYSICS PERSONNEL	61 (29)	0 (0)	258 (156)	319 (185)	38.475	0.01	168.97	207.455
SUPERVISORY PERSONNEL	22 (13)	0 (0)	83 (48)	105 (61)	8.295	0.39	32.63	41.315
ENGINEERING PERSONNEL	37 (30)	7 (6)	130 (106)	174 (142)	16.805	3.87	51.44	72.115
GRAND TOTALS	459 (311)	52 (31)	1635 (1050)	2146 (1392)	256.885	32.365	897.991	1187.241

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

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *VERMONT YANKEE 1 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	17	0	44		5.11	0.03	13.668	
OPERATING PERSONNEL	26	0	11		8.057	0	1.839	
HEALTH PHYSICS PERSONNEL	15	0	24		5.171	0	9.013	
SUPERVISORY PERSONNEL	0	0	0		0.321	0	0.063	
ENGINEERING PERSONNEL	2	0	0		0.77	0	0.094	
TOTAL	60	0	79	139	19.429	0.03	24.677	44.136
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	46	1	599		32.051	0.235	315.155	
OPERATING PERSONNEL	27	0	5		9.323	0	1.907	
HEALTH PHYSICS PERSONNEL	14	0	80		7.198	0	53.299	
SUPERVISORY PERSONNEL	1	0	0		0.181	0	0.048	
ENGINEERING PERSONNEL	4	0	1		1.42	0	0.566	
TOTAL	92	1	685	778	50.173	0.235	370.975	421.383
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	6		0.37	0.034	3.57	
OPERATING PERSONNEL	0	0	0		0.038	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0.04	0	0.104	
SUPERVISORY PERSONNEL	0	0	0		0.018	0	0.019	
ENGINEERING PERSONNEL	0	0	0		0.092	0	0.098	
TOTAL	0	0	6	6	0.558	0.034	3.791	4.383
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	26	2	652		10.177	2.161	670.187	
OPERATING PERSONNEL	7	0	1		2.949	0	0.195	
HEALTH PHYSICS PERSONNEL	3	0	15		1.225	0	4.134	
SUPERVISORY PERSONNEL	2	0	1		0.443	0	0.585	
ENGINEERING PERSONNEL	5	0	7		2.265	0	5.741	
TOTAL	43	2	676	721	17.059	2.161	680.842	700.062
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	6		0.728	0	3.054	
OPERATING PERSONNEL	9	0	0		1.988	0	0.155	
HEALTH PHYSICS PERSONNEL	2	0	6		1.485	0	4.655	
SUPERVISORY PERSONNEL	1	0	0		0.11	0	0	
ENGINEERING PERSONNEL	0	0	0		0.005	0	0	
TOTAL	14	0	12	26	4.316	0	7.864	12.18
REFUELING								
MAINTENANCE PERSONNEL	3	0	6		1.339	0	2.346	
OPERATING PERSONNEL	1	0	0		1.211	0	0.135	
HEALTH PHYSICS PERSONNEL	0	0	3		0.01	0	0.685	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	1	0	1		0.329	0	0.112	
TOTAL	5	0	10	15	2.889	0	3.278	6.167
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	94	3	1313	1410	49.775	2.46	1007.98	1060.215
OPERATING PERSONNEL	70	0	17	87	23.566	0	4.231	27.797
HEALTH PHYSICS PERSONNEL	34	0	128	162	15.129	0	71.89	87.019
SUPERVISORY PERSONNEL	4	0	1	5	1.073	0	0.715	1.788
ENGINEERING PERSONNEL	12	0	9	21	4.881	0	6.611	11.492
GRAND TOTALS	214	3	1468	1685	94.424	2.46	1091.427	1188.311

*Workers may be counted in more than one category.

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *WATERFORD 3 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	10	0	60		3.895	0	26.878	
OPERATING PERSONNEL	28	0	6		9.28	0.015	3.481	
HEALTH PHYSICS PERSONNEL	11	0	29		5.309	0	10.927	
SUPERVISORY PERSONNEL	2	0	0		0.347	0.066	0.034	
ENGINEERING PERSONNEL	0	0	4		0.285	0	2.138	
TOTAL	51	0	99	150	19.116	0.081	43.458	62.655
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	24	1	77		7.61	0.234	24.868	
OPERATING PERSONNEL	3	0	2		1.24	0	0.621	
HEALTH PHYSICS PERSONNEL	1	0	4		0.383	0	2.38	
SUPERVISORY PERSONNEL	0	0	0		0.07	0.002	0.018	
ENGINEERING PERSONNEL	0	0	2		0.104	0	1.252	
TOTAL	28	1	85	113	9.407	0.236	29.139	38.782
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	5	0	40		3.968	0	21.622	
OPERATING PERSONNEL	0	0	1		0.191	0	1.843	
HEALTH PHYSICS PERSONNEL	2	0	4		0.446	0	2.808	
SUPERVISORY PERSONNEL	1	0	0		1.152	0.002	0.009	
ENGINEERING PERSONNEL	0	0	2		0.037	0	1.446	
TOTAL	8	0	47	55	5.794	0.002	27.728	33.524
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	6	0	20		3.654	0	9.593	
OPERATING PERSONNEL	2	0	1		0.404	0	1.259	
HEALTH PHYSICS PERSONNEL	2	0	2		0.435	0	2.928	
SUPERVISORY PERSONNEL	0	0	0		0.017	0.002	0.018	
ENGINEERING PERSONNEL	1	0	2		0.141	0	1.579	
TOTAL	11	0	25	36	4.651	0.002	15.377	20.03
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	62		0.322	0	27.724	
OPERATING PERSONNEL	9	0	5		3.575	0	2.164	
HEALTH PHYSICS PERSONNEL	3	0	3		0.852	0	2.322	
SUPERVISORY PERSONNEL	0	0	0		0.008	0.002	0.022	
ENGINEERING PERSONNEL	0	0	2		0.04	0	1.875	
TOTAL	13	0	72	85	4.797	0.002	34.107	38.906
REFUELING								
MAINTENANCE PERSONNEL	2	0	57		0.537	0	23.007	
OPERATING PERSONNEL	2	0	1		0.682	0	1.641	
HEALTH PHYSICS PERSONNEL	1	0	4		0.206	0	2.89	
SUPERVISORY PERSONNEL	0	0	0		0.008	0.002	0.022	
ENGINEERING PERSONNEL	0	0	1		0.052	0	0.879	
TOTAL	5	0	63	68	1.485	0.002	28.439	29.926
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	48 (37)	1 (1)	316 (265)	364 (303)	19.986	0.234	133.692	153.912
OPERATING PERSONNEL	44 (43)	0 (0)	16 (33)	60 (76)	15.372	0.015	11.009	26.396
HEALTH PHYSICS PERSONNEL	20 (14)	0 (0)	46 (73)	66 (87)	7.631	0	24.255	31.886
SUPERVISORY PERSONNEL	3 (2)	0 (0)	0 (0)	3 (2)	1.602	0.076	0.123	1.801
ENGINEERING PERSONNEL	1 (1)	0 (0)	13 (36)	14 (37)	0.659	0	9.169	9.828
GRAND TOTALS	116 (97)	1 (1)	391 (407)	507 (505)	45.25	0.325	178.248	223.823

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

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM
BY WORK AND JOB FUNCTION
1986

PLANT: WNP-2 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	9.133	0	1.676		4.295	0	0.612	
OPERATING PERSONNEL	37.62	0	0.01		13.234	0	0.004	
HEALTH PHYSICS PERSONNEL	25.869	0.576	8.563		20.743	0.234	4.46	
SUPERVISORY PERSONNEL	9.673	0.873	0		4.573	0.314	0	
ENGINEERING PERSONNEL	4.282	3.846	0.589		1.368	1.322	0.096	
TOTAL	86.577	5.295	10.838	102.71	44.213	1.87	5.172	51.255
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	86.891	0.653	14.628		34.593	0.131	5.777	
OPERATING PERSONNEL	1.413	0	0		0.61	0	0	
HEALTH PHYSICS PERSONNEL	2.736	0.04	3.19		3.083	0.016	1.749	
SUPERVISORY PERSONNEL	0.129	0.089	0		0.072	0.025	0	
ENGINEERING PERSONNEL	2.928	4.893	3.557		0.595	2.774	0.62	
TOTAL	94.097	5.675	21.375	121.147	38.953	2.946	8.146	50.045
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	6.712	0	55.785		4.199	0	22.776	
OPERATING PERSONNEL	0.108	0	0		0.049	0	0	
HEALTH PHYSICS PERSONNEL	1.413	0	1.303		1.688	0	0.444	
SUPERVISORY PERSONNEL	0.053	1.242	0		0.049	0.653	0	
ENGINEERING PERSONNEL	2.532	7.96	12.999		0.819	3.019	4.461	
TOTAL	10.818	9.202	70.087	90.107	6.804	3.672	27.681	38.157
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	44.26	0	45.78		17.829	0	14.17	
OPERATING PERSONNEL	2.524	0	0		0.913	0	0	
HEALTH PHYSICS PERSONNEL	4.152	0.384	3.657		4.222	0.156	1.605	
SUPERVISORY PERSONNEL	1.037	0.813	0		0.271	0.357	0	
ENGINEERING PERSONNEL	3.603	3.881	7.972		0.79	1.439	1.621	
TOTAL	55.576	5.078	57.409	118.063	24.025	1.952	17.396	43.373
WASTE PROCESSING								
MAINTENANCE PERSONNEL	4.615	0	0		3.193	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0.886	0	1.524		0.435	0	1.223	
SUPERVISORY PERSONNEL	0	0	0.997		0	0	3.007	
ENGINEERING PERSONNEL	0.439	0.061	1.05		0.201	0.023	0.472	
TOTAL	5.94	0.061	3.571	9.572	3.829	0.023	4.702	8.554
REFUELING								
MAINTENANCE PERSONNEL	15.512	0	0.13		8.609	0	0.045	
OPERATING PERSONNEL	1.22	0	0		0.3	0	0	
HEALTH PHYSICS PERSONNEL	2.132	0	3.575		0.928	0	0.961	
SUPERVISORY PERSONNEL	0.172	0.966	0		0.099	0.23	0	
ENGINEERING PERSONNEL	0.91	1.589	0.194		0.591	0.472	0.049	
TOTAL	19.946	2.555	3.899	26.4	10.527	0.702	1.055	12.284
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	167.123	0.653	117.999	285.775	72.718	0.131	43.38	116.229
OPERATING PERSONNEL	42.885	0	0.01	42.895	15.106	0	0.004	15.11
HEALTH PHYSICS PERSONNEL	37.188	1	21.812	60	31.099	0.406	10.442	41.947
SUPERVISORY PERSONNEL	11.064	3.983	0.997	16.044	5.064	1.579	3.007	9.65
ENGINEERING PERSONNEL	14.694	22.23	26.361	63.285	4.364	9.049	7.319	20.732
GRAND TOTALS	272.954	27.866	167.179	467.999	128.351	11.165	64.152	203.668

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *WOLF CREEK 1 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	2	0	0		1.951	0	0.642	
OPERATING PERSONNEL	13	0	0		3.883	0	0.152	
HEALTH PHYSICS PERSONNEL	22	0	31		6.839	0	8.888	
SUPERVISORY PERSONNEL	2	0	1		0.983	0.168	0.367	
ENGINEERING PERSONNEL	0	1	2		0.526	0.288	0.472	
TOTAL	39	1	34	74	14.182	0.456	10.521	25.159
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	26	0	9		7.638	0.014	5.436	
OPERATING PERSONNEL	0	0	0		0.121	0	0.003	
HEALTH PHYSICS PERSONNEL	7	0	3		1.782	0	1.478	
SUPERVISORY PERSONNEL	0	0	0		0.47	0.006	0.382	
ENGINEERING PERSONNEL	0	0	1		0.297	0.007	0.339	
TOTAL	33	0	13	46	10.308	0.027	7.638	17.973
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	1	0	48		0.76	0	14.136	
OPERATING PERSONNEL	0	0	0		0.063	0	0.026	
HEALTH PHYSICS PERSONNEL	1	0	1		0.508	0	0.715	
SUPERVISORY PERSONNEL	3	0	5		0.948	0.019	2	
ENGINEERING PERSONNEL	1	0	12		0.319	0.027	4.671	
TOTAL	6	0	66	72	2.598	0.046	21.548	24.192
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	44	0	69		13.604	0.086	18.929	
OPERATING PERSONNEL	0	0	0		0.488	0	0.02	
HEALTH PHYSICS PERSONNEL	10	0	2		2.084	0	0.888	
SUPERVISORY PERSONNEL	9	0	3		2.484	0.106	1.227	
ENGINEERING PERSONNEL	1	0	2		0.429	0	0.825	
TOTAL	64	0	76	140	19.089	0.192	21.889	41.17
WASTE PROCESSING								
MAINTENANCE PERSONNEL	2	0	0		1.005	0	0.265	
OPERATING PERSONNEL	0	0	0		0.105	0	0.019	
HEALTH PHYSICS PERSONNEL	8	0	4		3.327	0	1.774	
SUPERVISORY PERSONNEL	0	0	0		0.039	0.002	0.002	
ENGINEERING PERSONNEL	0	0	0		0	0.043	0	
TOTAL	10	0	4	14	4.476	0.045	2.06	6.581
REFUELING								
MAINTENANCE PERSONNEL	20	0	23		7.96	0.007	7.617	
OPERATING PERSONNEL	5	0	0		0.991	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0.122	0	0.281	
SUPERVISORY PERSONNEL	3	0	1		0.79	0.006	0.348	
ENGINEERING PERSONNEL	0	0	2		0.135	0	0.909	
TOTAL	28	0	26	54	9.998	0.013	9.155	19.166
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	95 (79)	0 (1)	149 (120)	244 (200)	32.918	0.107	47.025	80.05
OPERATING PERSONNEL	18 (21)	0 (0)	0 (0)	18 (21)	5.651	0	0.22	5.871
HEALTH PHYSICS PERSONNEL	48 (30)	0 (0)	41 (43)	89 (73)	14.662	0	14.024	28.686
SUPERVISORY PERSONNEL	17 (15)	0 (1)	10 (12)	27 (28)	5.714	0.307	4.326	10.347
ENGINEERING PERSONNEL	2 (4)	1 (1)	19 (21)	22 (26)	1.706	0.365	7.216	9.287
GRAND TOTALS	180 (149)	1 (3)	219 (196)	400 (348)	60.651	0.779	72.811	134.241

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

APPENDIX D (Continued)

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *YANKEE-ROWE 1 TYPE: PWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	6	1	0		1.743	0.42	0	
OPERATING PERSONNEL	29	0	0		12.012	0	0	
HEALTH PHYSICS PERSONNEL	15	0	1		7.502	0	0.4	
SUPERVISORY PERSONNEL	0	0	0		0.015	0	0.045	
ENGINEERING PERSONNEL	0	13	0		0.107	0.322	0.04	
TOTAL	50	14	1	65	21.379	0.742	0.485	22.606
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	23	0	0		8.757	3.494	0.044	
OPERATING PERSONNEL	0	0	0		0.5	0	0	
HEALTH PHYSICS PERSONNEL	10	0	5		2.47	0	0.975	
SUPERVISORY PERSONNEL	0	0	0		0.09	0	0.03	
ENGINEERING PERSONNEL	0	0	1		0.02	0.522	0.215	
TOTAL	33	0	6	39	11.837	4.016	1.264	17.117
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	0	0	0		0	0.01	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0.01	0	0.01
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	3	0	0		0.89	0.05	0.045	
OPERATING PERSONNEL	0	0	0		0.08	0	0	
HEALTH PHYSICS PERSONNEL	1	0	0		0.253	0	0	
SUPERVISORY PERSONNEL	0	0	0		0.075	0	0.235	
ENGINEERING PERSONNEL	0	1	0		0.015	0.3	0	
TOTAL	4	1	0	5	1.313	0.35	0.28	1.943
WASTE PROCESSING								
MAINTENANCE PERSONNEL	1	0	0		0.43	0.225	0	
OPERATING PERSONNEL	8	0	0		2.865	0	0	
HEALTH PHYSICS PERSONNEL	3	0	0		4.522	0	0.22	
SUPERVISORY PERSONNEL	0	0	0		0.005	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0.15	0.005	
TOTAL	12	0	0	12	7.822	0.375	0.225	8.422
REFUELING								
MAINTENANCE PERSONNEL	0	0	0		0	0	0	
OPERATING PERSONNEL	0	0	0		0	0	0	
HEALTH PHYSICS PERSONNEL	0	0	0		0	0	0	
SUPERVISORY PERSONNEL	0	0	0		0	0	0	
ENGINEERING PERSONNEL	0	0	0		0	0	0	
TOTAL	0	0	0	0	0	0	0	0
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	33	1	0	34	11.82	4.199	0.089	16.108
OPERATING PERSONNEL	37	0	0	37	15.457	0	0	15.457
HEALTH PHYSICS PERSONNEL	29	0	6	35	14.747	0	1.595	16.342
SUPERVISORY PERSONNEL	0	0	0	0	0.185	0	0.31	0.495
ENGINEERING PERSONNEL	0	14	1	15	0.142	1.294	0.26	1.696
GRAND TOTALS	99	15	7	121	42.351	5.493	2.254	50.098

*Workers may be counted in more than one category.

NUMBER OF PERSONNEL AND PERSON-REM BY WORK AND JOB FUNCTION 1986

PLANT: *ZION 1, 2 TYPE: BWR

WORK AND JOB FUNCTION	NUMBER OF PERSONNEL (>100 mREM) STATION	UTILITY	CONTRACT	TOTAL	TOTAL PERSON-REM STATION	UTILITY	CONTRACT	TOTAL
REACTOR OPS & SURV								
MAINTENANCE PERSONNEL	2	1	6		0.588	0.006	0.267	
OPERATING PERSONNEL	65	0	42		9.884	0	2.28	
HEALTH PHYSICS PERSONNEL	5	0	2		4.511	0	0.209	
SUPERVISORY PERSONNEL	23	0	0		2.137	0	0	
ENGINEERING PERSONNEL	10	0	1		0.872	0	0.044	
TOTAL	105	1	51	157	17.992	0.006	2.8	20.798
ROUTINE MAINTENANCE								
MAINTENANCE PERSONNEL	72	97	288		37.686	9.284	63.632	
OPERATING PERSONNEL	26	0	0		5.649	0	0	
HEALTH PHYSICS PERSONNEL	25	0	64		15.181	0	41.128	
SUPERVISORY PERSONNEL	85	0	0		6.672	0	0	
ENGINEERING PERSONNEL	47	121	24		4.87	1.807	2.775	
TOTAL	255	218	376	849	70.058	11.091	107.535	188.684
IN-SERVICE INSPECTION								
MAINTENANCE PERSONNEL	2	0	314		0.651	0	73.84	
OPERATING PERSONNEL	3	0	0		0.073	0	0	
HEALTH PHYSICS PERSONNEL	2	0	18		0.203	0	16.589	
SUPERVISORY PERSONNEL	5	0	0		0.407	0	0	
ENGINEERING PERSONNEL	43	16	177		4.288	0.174	78.215	
TOTAL	55	16	509	580	5.622	0.174	168.644	174.44
SPECIAL MAINTENANCE								
MAINTENANCE PERSONNEL	6	17	129		2.53	0.902	39.653	
OPERATING PERSONNEL	2	0	0		0.054	0	0	
HEALTH PHYSICS PERSONNEL	1	0	1		0.054	0	0.098	
SUPERVISORY PERSONNEL	5	0	0		0.337	0	0	
ENGINEERING PERSONNEL	6	8	16		0.55	0.079	1.56	
TOTAL	20	25	146	191	3.525	0.981	41.311	45.817
WASTE PROCESSING								
MAINTENANCE PERSONNEL	7	0	39		2.967	0	2.437	
OPERATING PERSONNEL	14	0	80		1.767	0	4.234	
HEALTH PHYSICS PERSONNEL	4	0	1		1.156	0	0.074	
SUPERVISORY PERSONNEL	13	0	0		0.84	0	0	
ENGINEERING PERSONNEL	2	0	0		0.091	0	0	
TOTAL	40	0	120	160	6.821	0	6.745	13.566
REFUELING								
MAINTENANCE PERSONNEL	40	0	3		19.104	0	0.068	
OPERATING PERSONNEL	18	0	0		2.096	0	0	
HEALTH PHYSICS PERSONNEL	6	0	6		1.118	0	1.812	
SUPERVISORY PERSONNEL	40	0	0		3.189	0	0	
ENGINEERING PERSONNEL	23	8	3		2.424	0.068	0.104	
TOTAL	127	8	12	147	27.931	0.068	1.984	29.983
TOTAL BY JOB FUNCTION								
MAINTENANCE PERSONNEL	129	115	779	1023	63.526	10.192	179.897	253.615
OPERATING PERSONNEL	128	0	122	250	19.523	0	6.514	26.037
HEALTH PHYSICS PERSONNEL	43	0	92	135	22.223	0	59.91	82.133
SUPERVISORY PERSONNEL	171	0	0	171	13.582	0	0	13.582
ENGINEERING PERSONNEL	131	153	221	505	13.095	2.128	82.698	97.921
GRAND TOTALS	602	268	1214	2084	131.949	12.32	329.019	473.288

*Workers may be counted in more than one category.

APPENDIX E

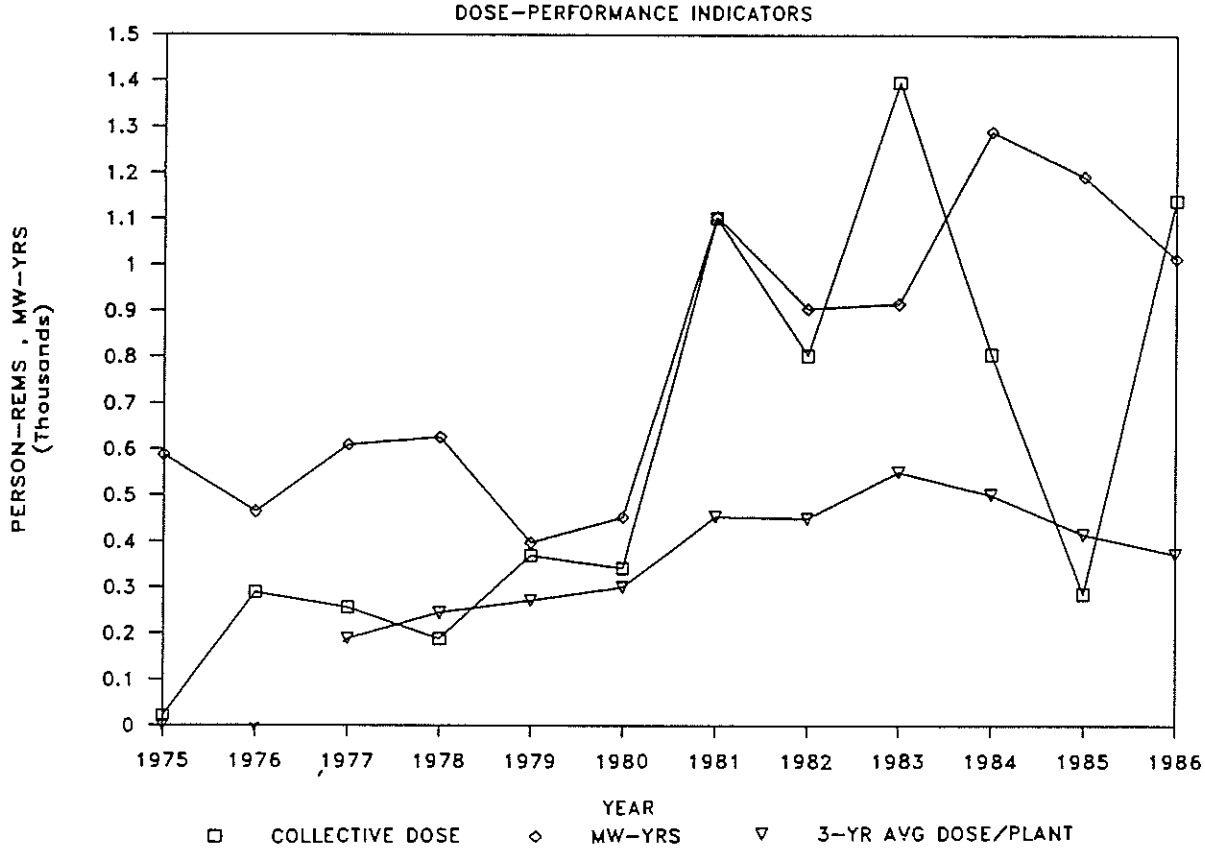
GRAPHICAL REPRESENTATION OF COLLECTIVE DOSE TRENDS BY YEAR AND JOB FUNCTION FOR EACH SITE

1973-1986

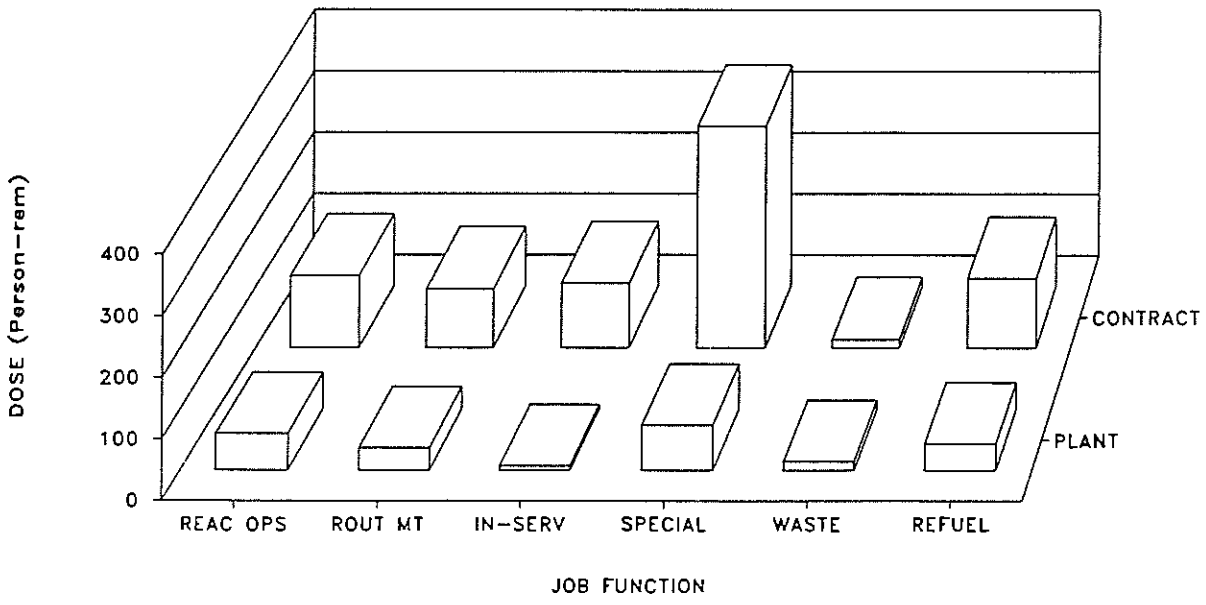
PWR

ARKANSAS 1,2

DOSE-PERFORMANCE INDICATORS



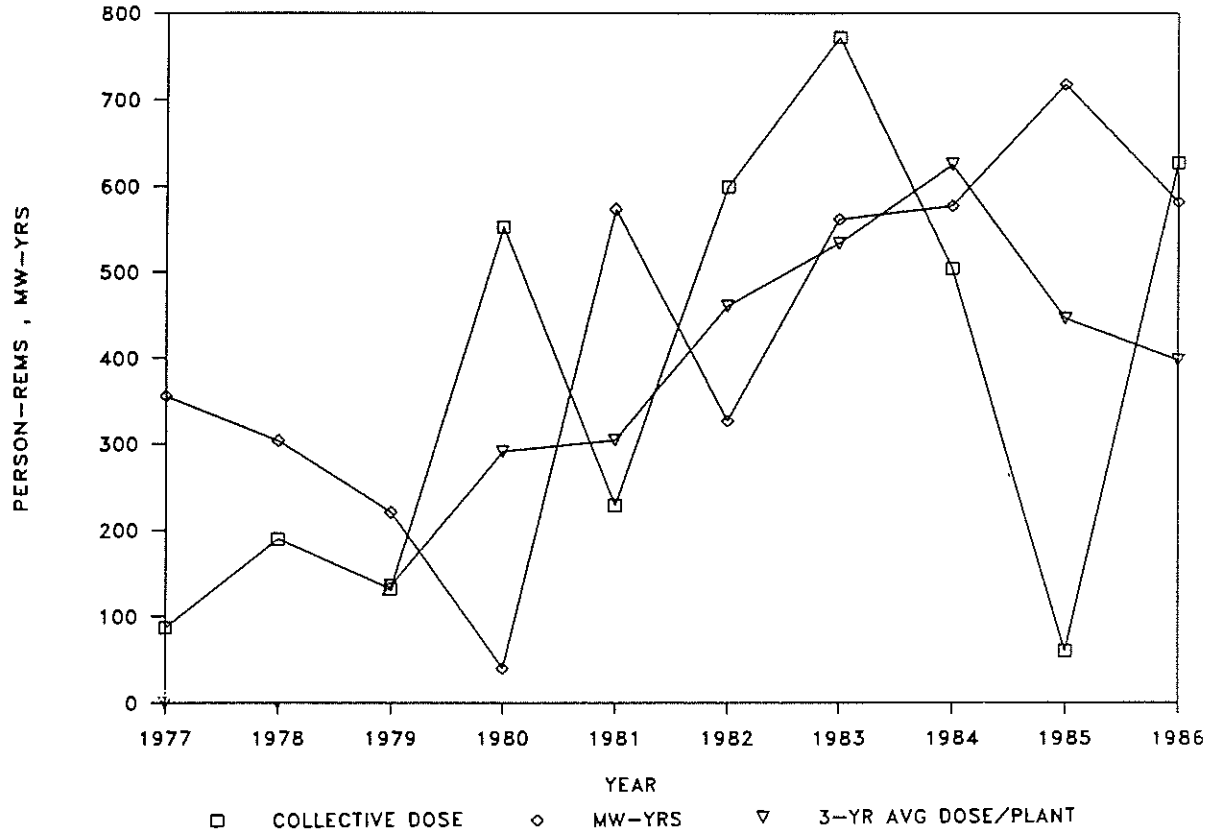
BREAKDOWN BY JOB FUNCTION 1986



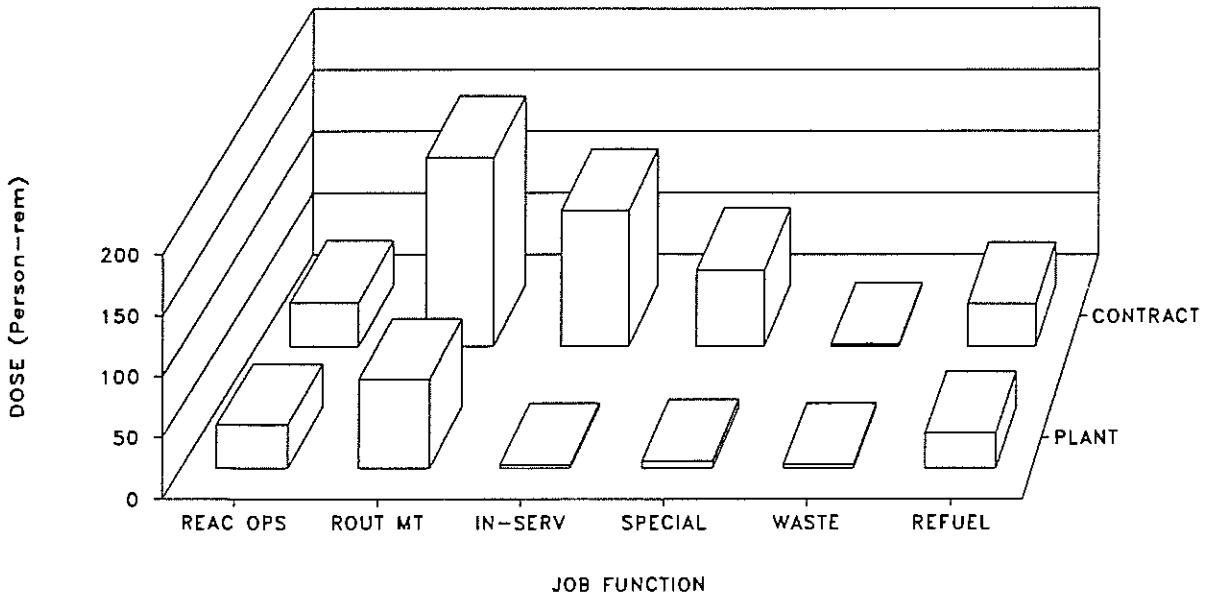
PWR

BEAVER VALLEY

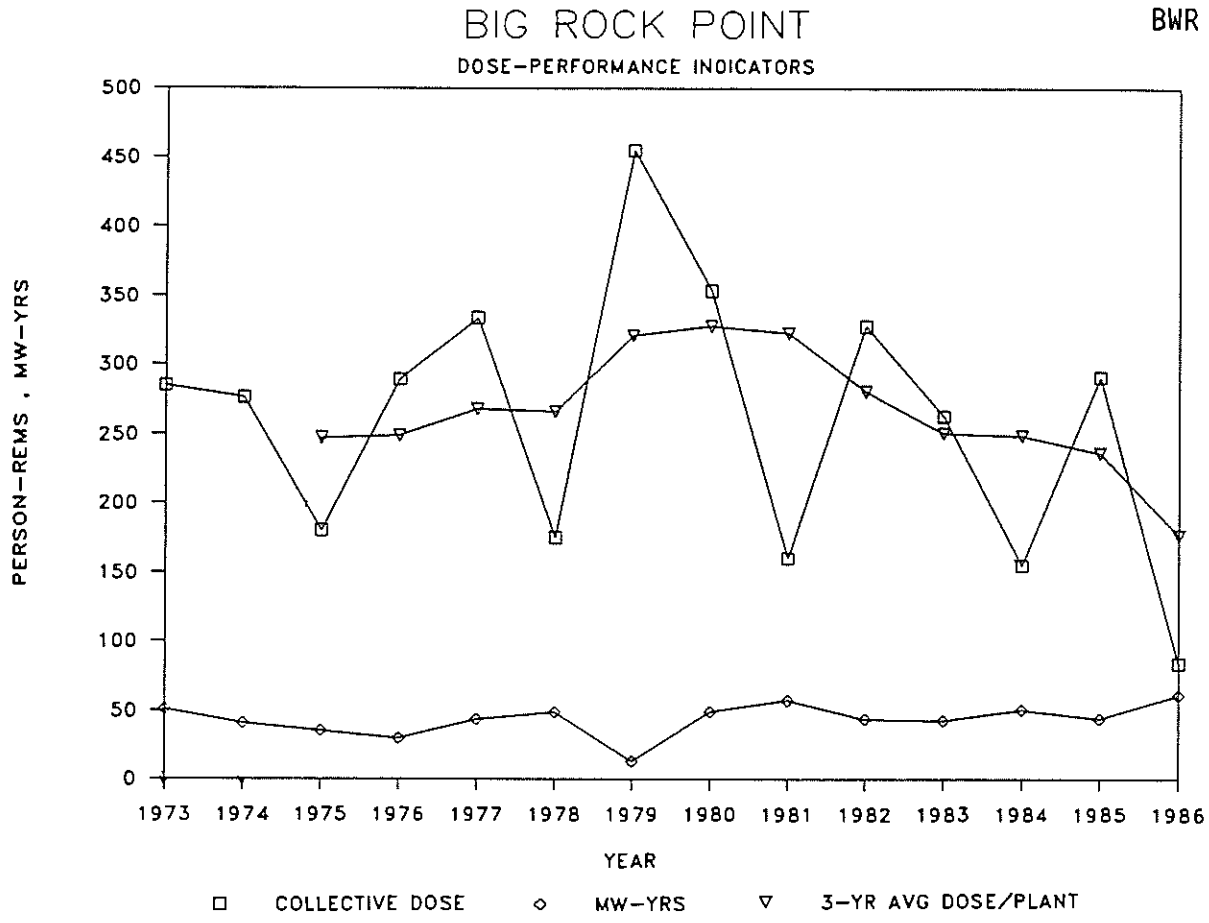
DOSE-PERFORMANCE INDICATORS

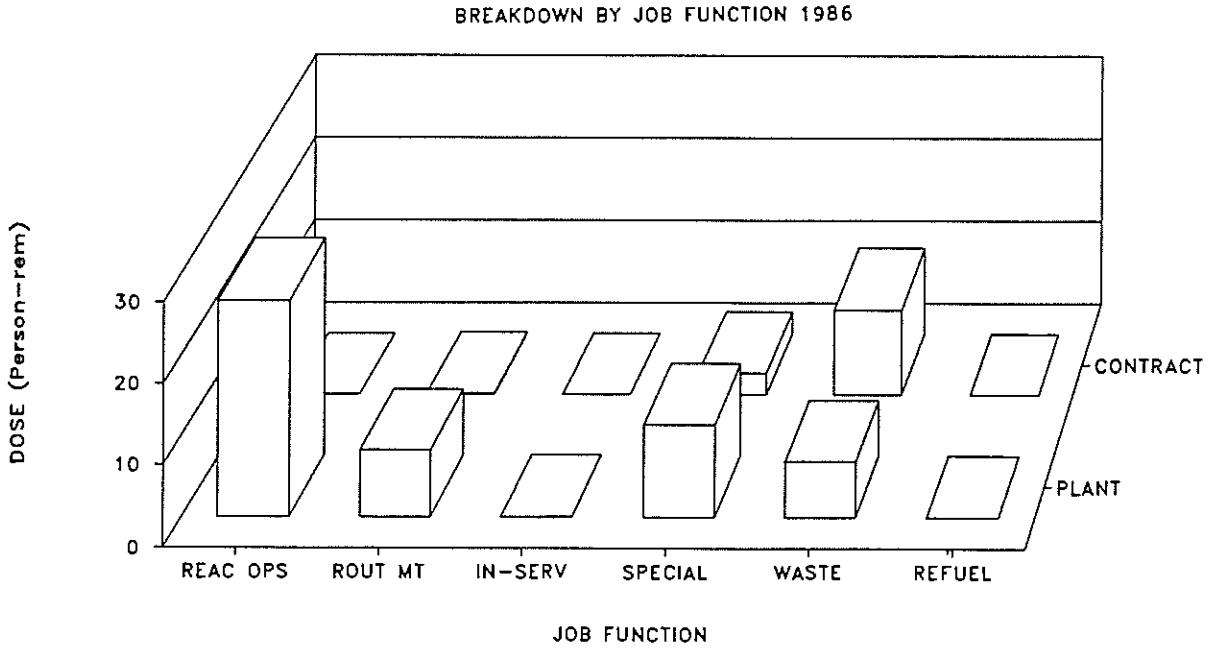


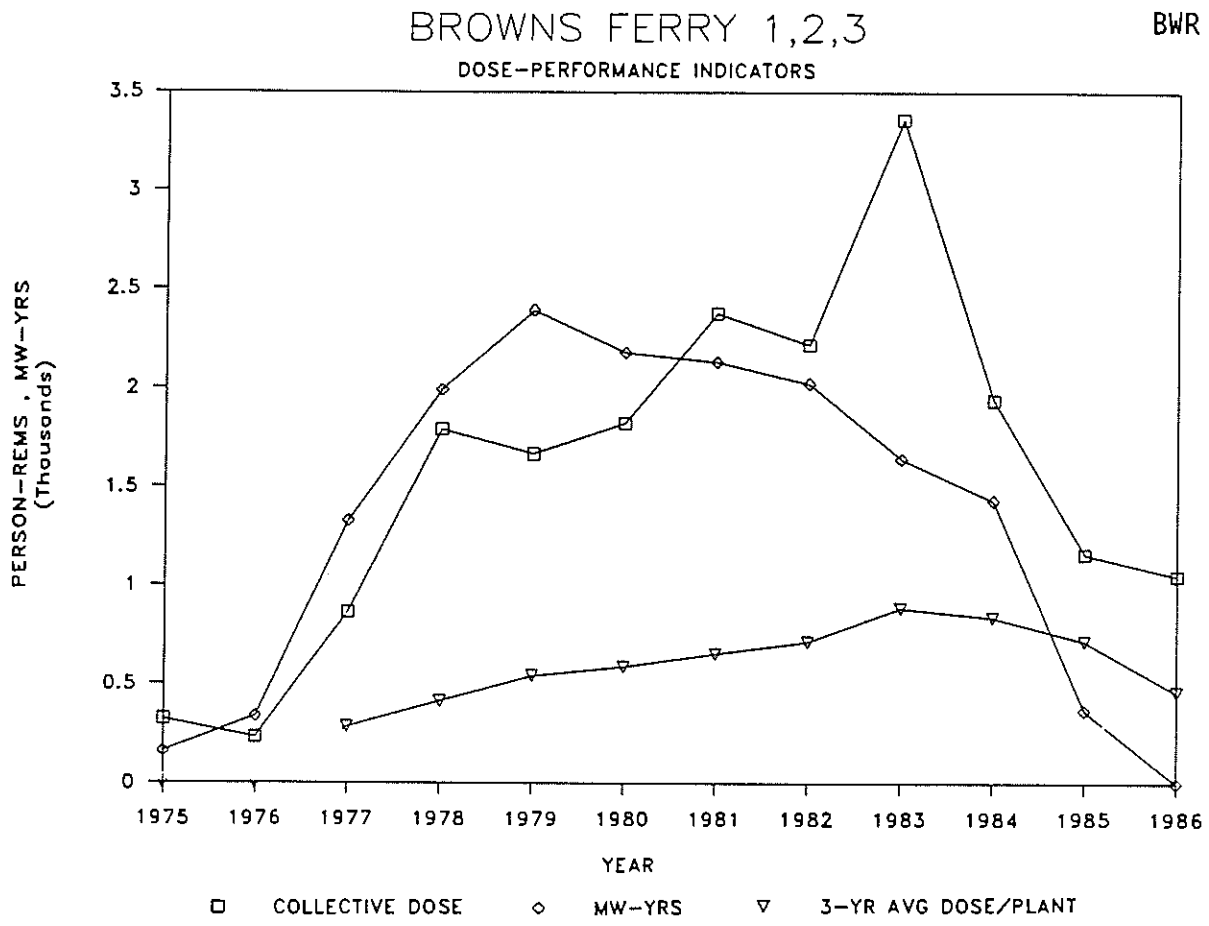
BREAKDOWN BY JOB FUNCTION 1986

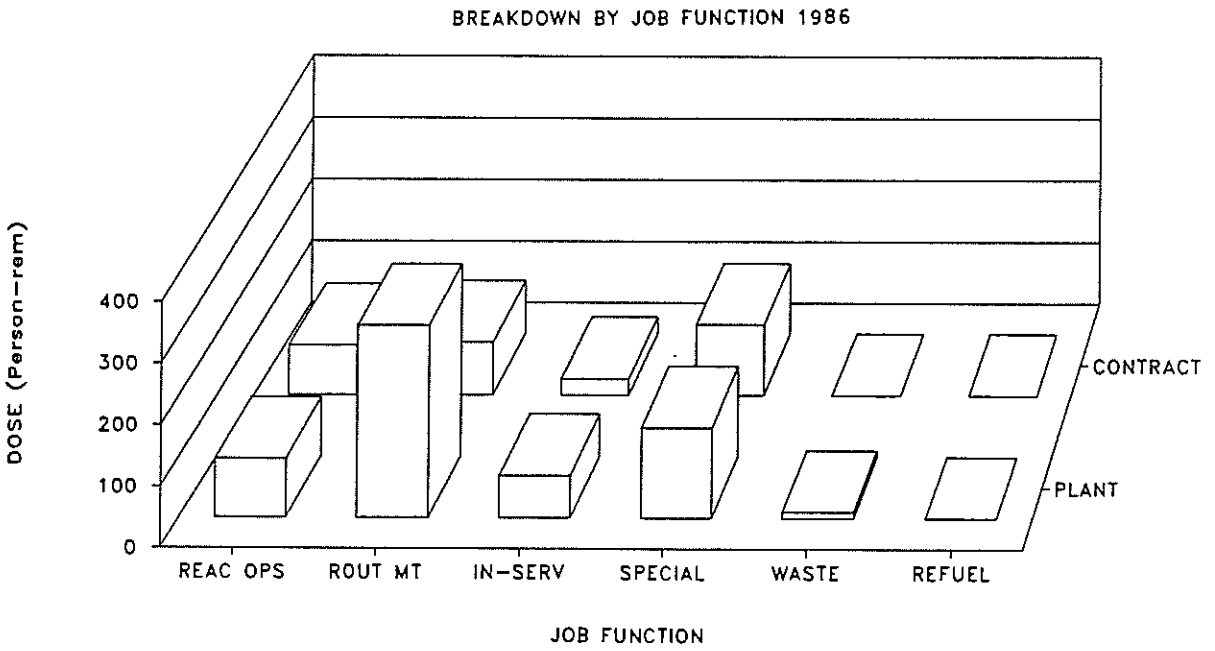


BWR


BIG ROCK POINT
DOSE-PERFORMANCE INDICATORS
PERSON-REMS , MW-YRS
500
450
400
350
300
250
200
150
100
50
0
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
YEAR
COLLECTIVE DOSE
MW-YRS
3-YR AVG DOSE/PLANT


BREAKDOWN BY JOB FUNCTION 1986
DOSE (Person-rem)
30
20
10
0
CONTRACT
PLANT
REAC OPS
ROUT MT
IN-SERV
SPECIAL
WASTE
REFUEL
JOB FUNCTION

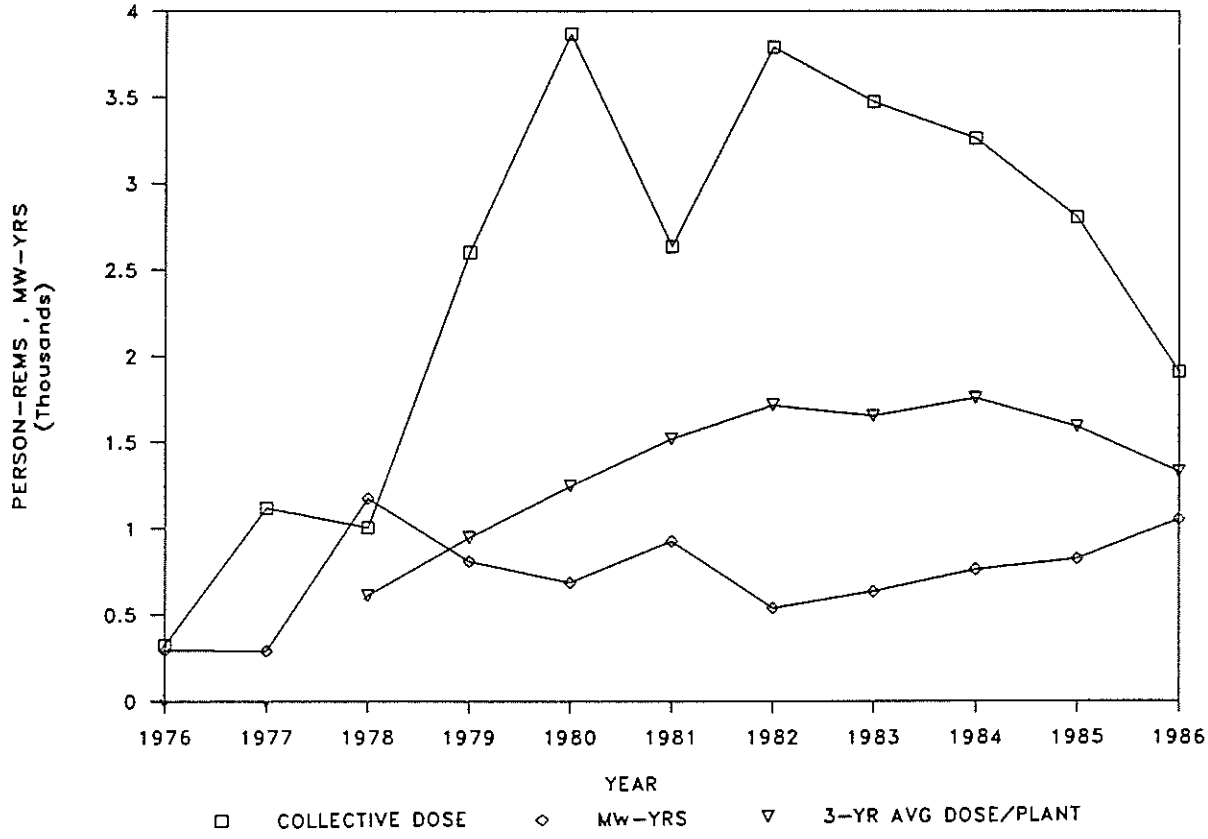

BROWNS FERRY 1,2,3
BWR
DOSE-PERFORMANCE INDICATORS
PERSON-REMS , MW-YRS (Thousands)
3.5
3
2.5
2
1.5
1
0.5
0
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
YEAR
COLLECTIVE DOSE
MW-YRS
3-YR AVG DOSE/PLANT


BREAKDOWN BY JOB FUNCTION 1986
DOSE (Person-rem)
400
300
200
100
0
CONTRACT
PLANT
REAC OPS
ROUT MT
IN-SERV
SPECIAL
WASTE
REFUEL
JOB FUNCTION

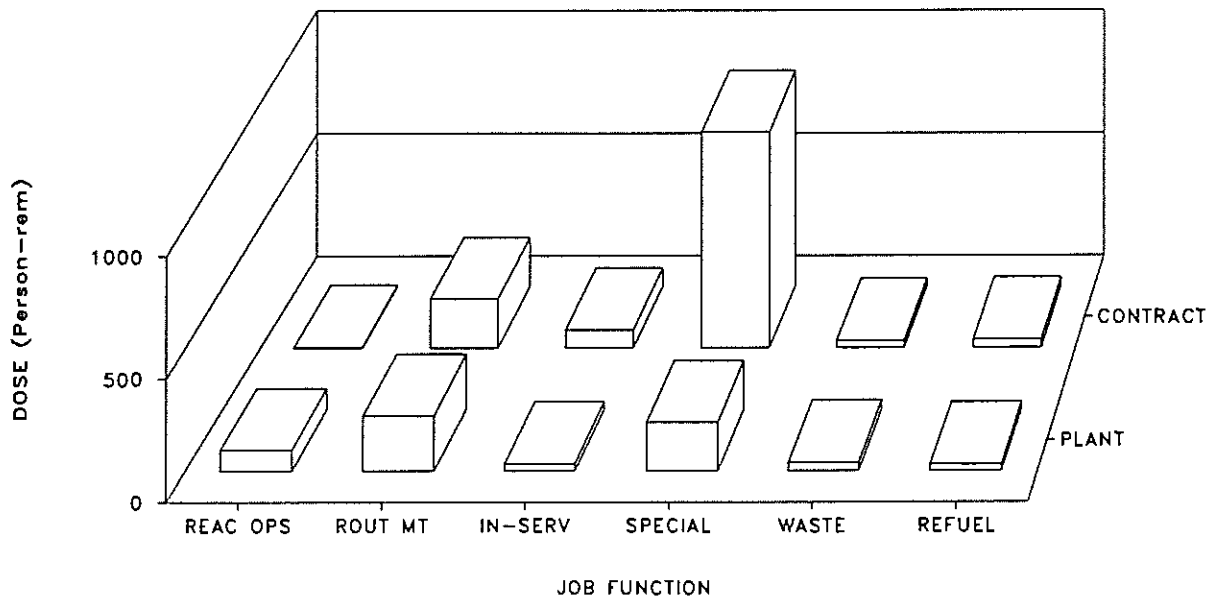
BWR

BRUNSWICK 1,2

DOSE-PERFORMANCE INDICATORS



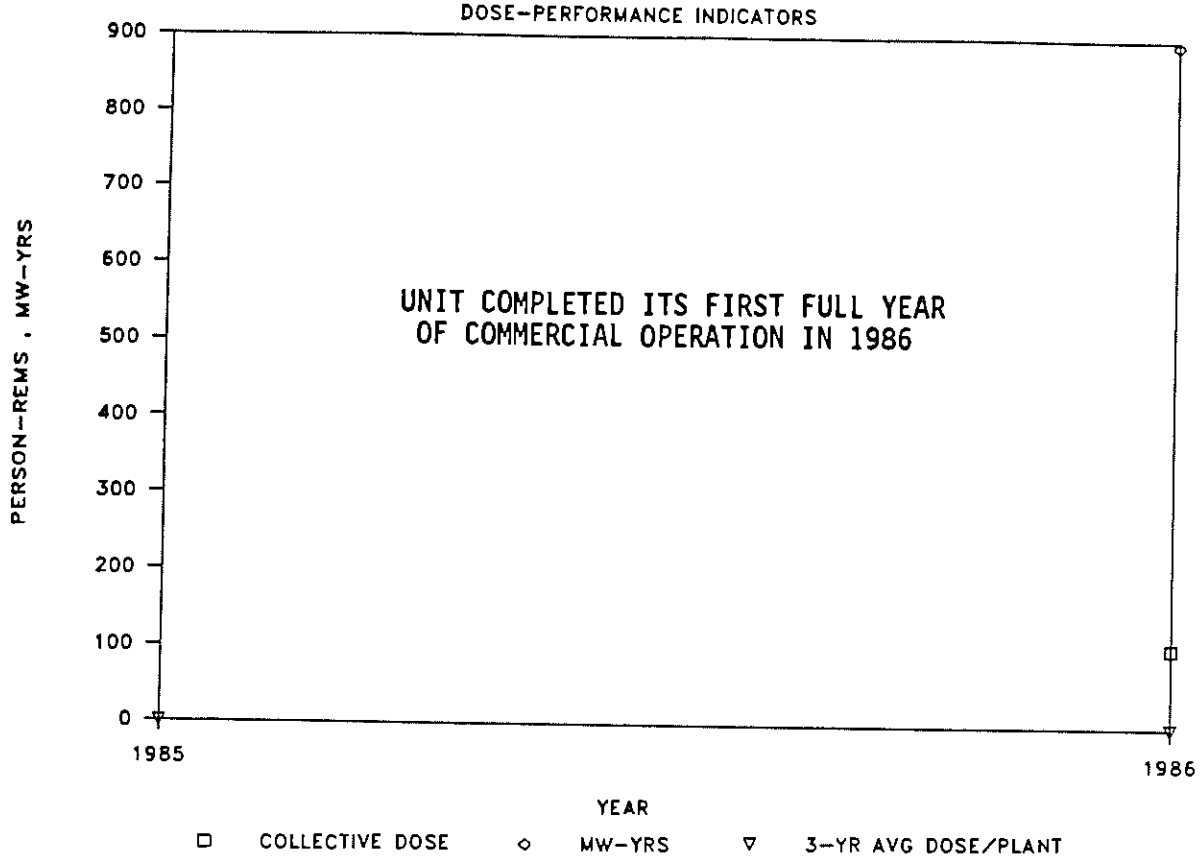
BREAKDOWN BY JOB FUNCTION 1986



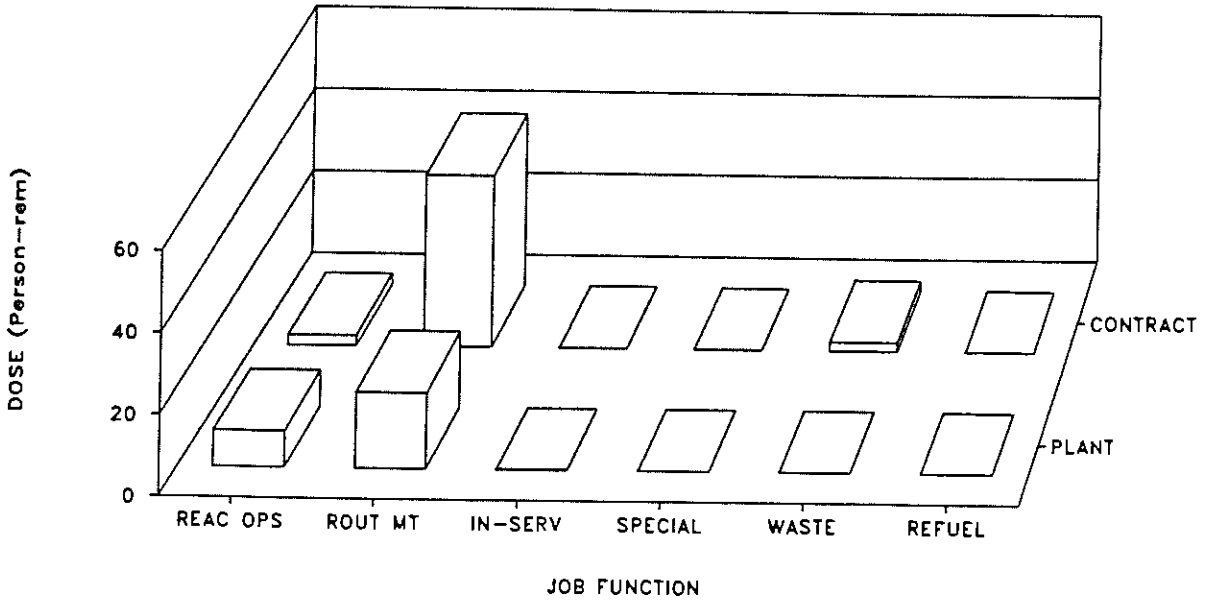
BYRON 1

PWR

DOSE-PERFORMANCE INDICATORS



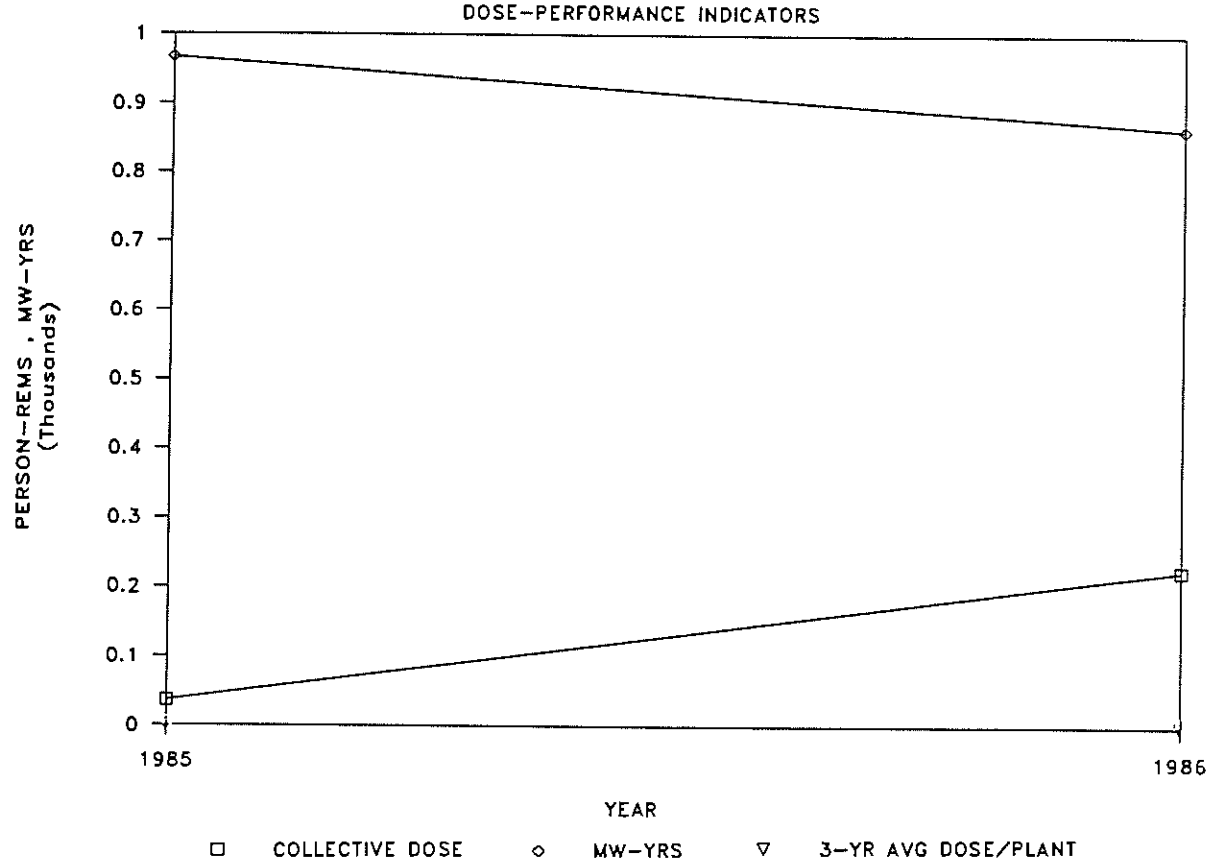
BREAKDOWN BY JOB FUNCTION 1986



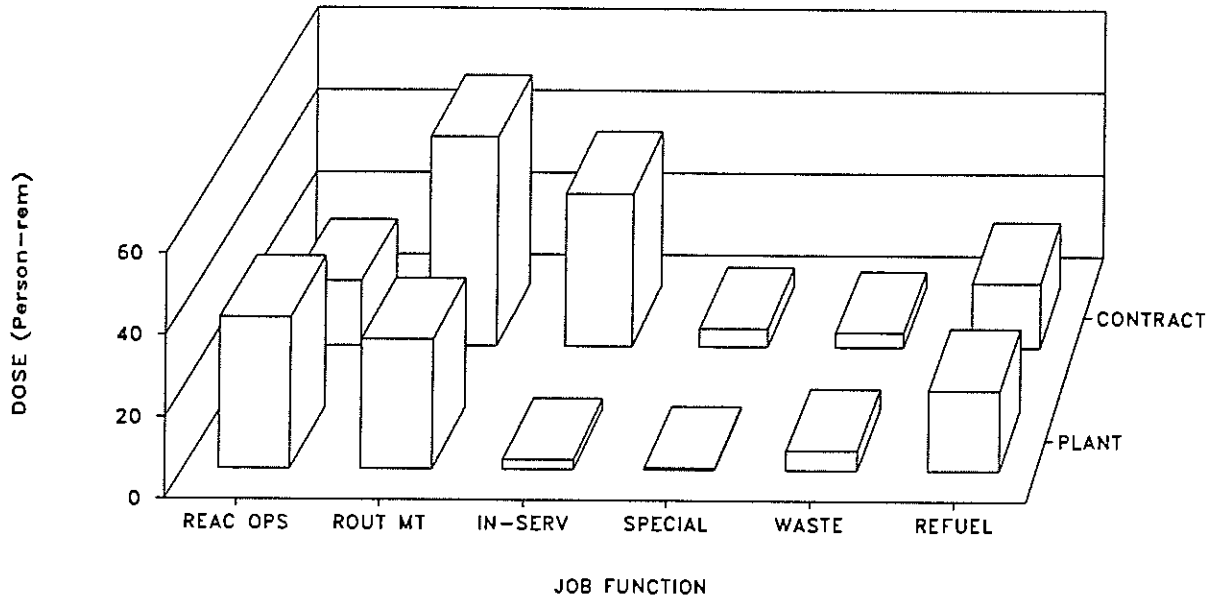
CALLAWAY

PWR

DOSE-PERFORMANCE INDICATORS



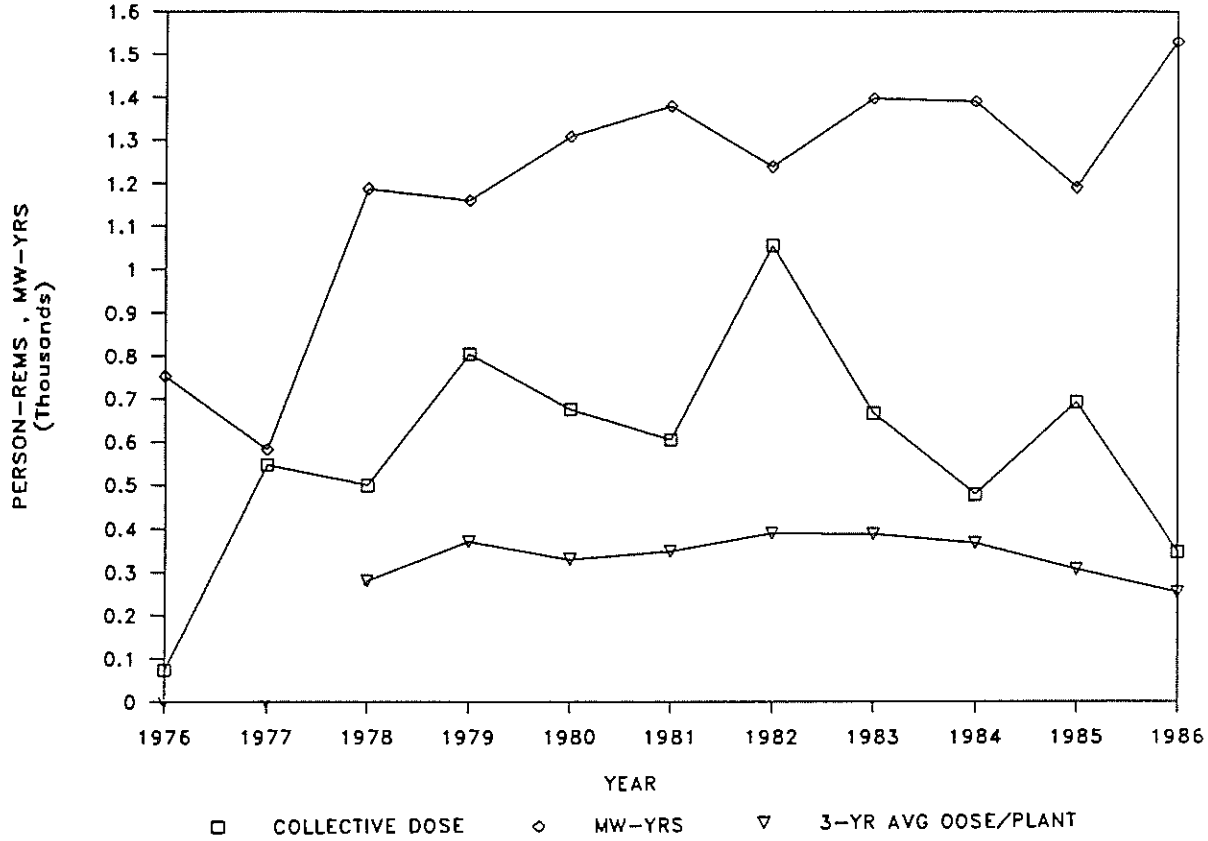
BREAKDOWN BY JOB FUNCTION 1986



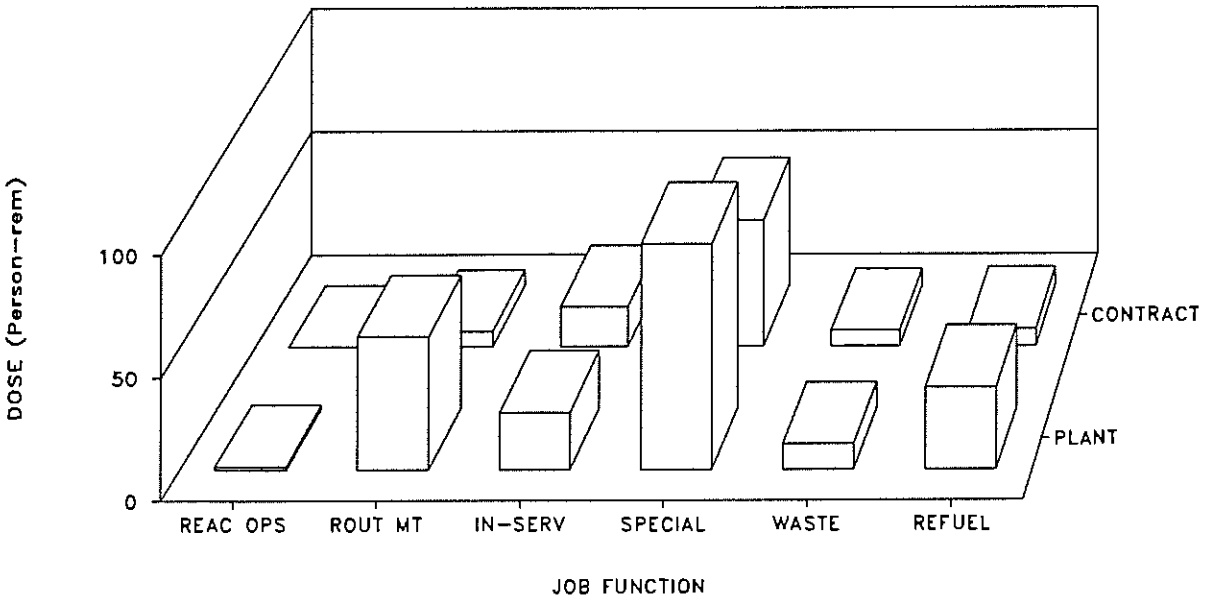
CALVERT CLIFFS 1,2

PWR

DOSE-PERFORMANCE INDICATORS

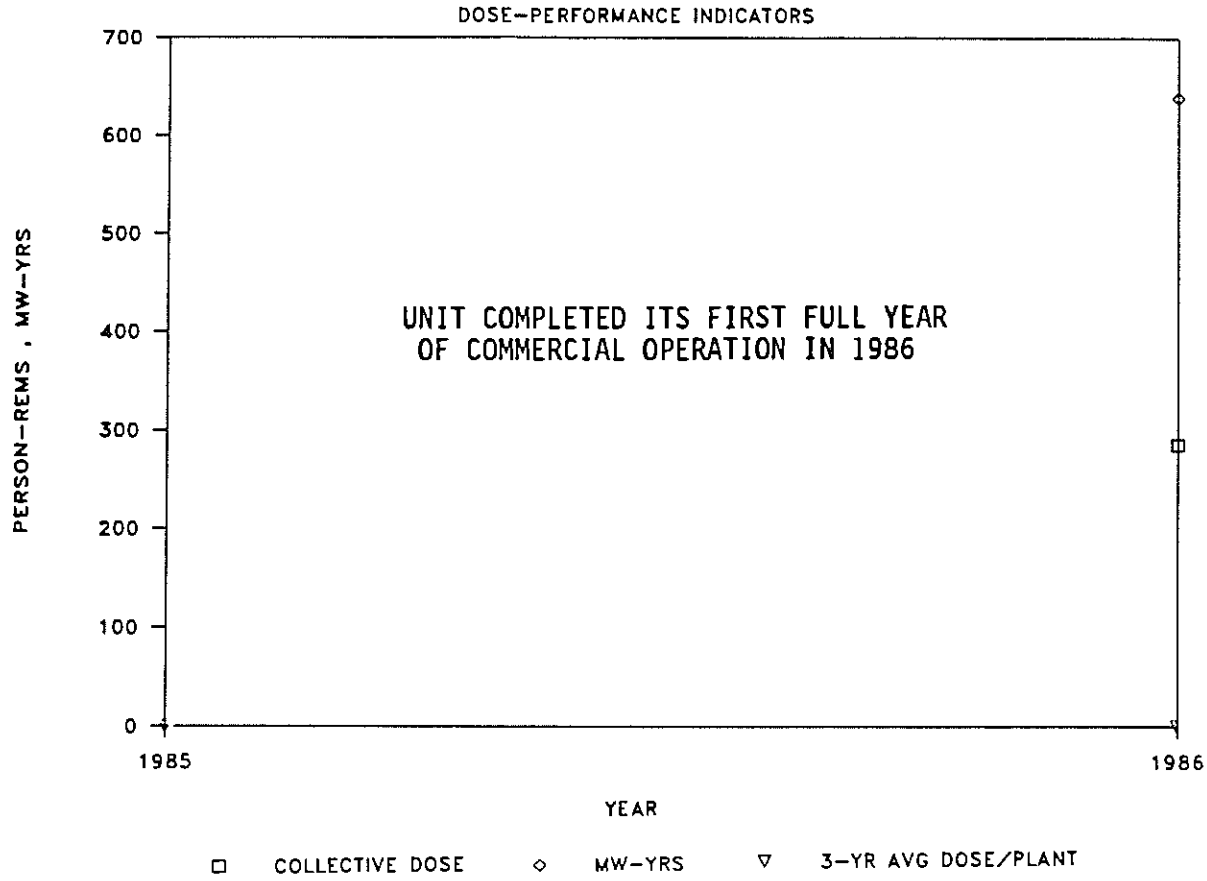


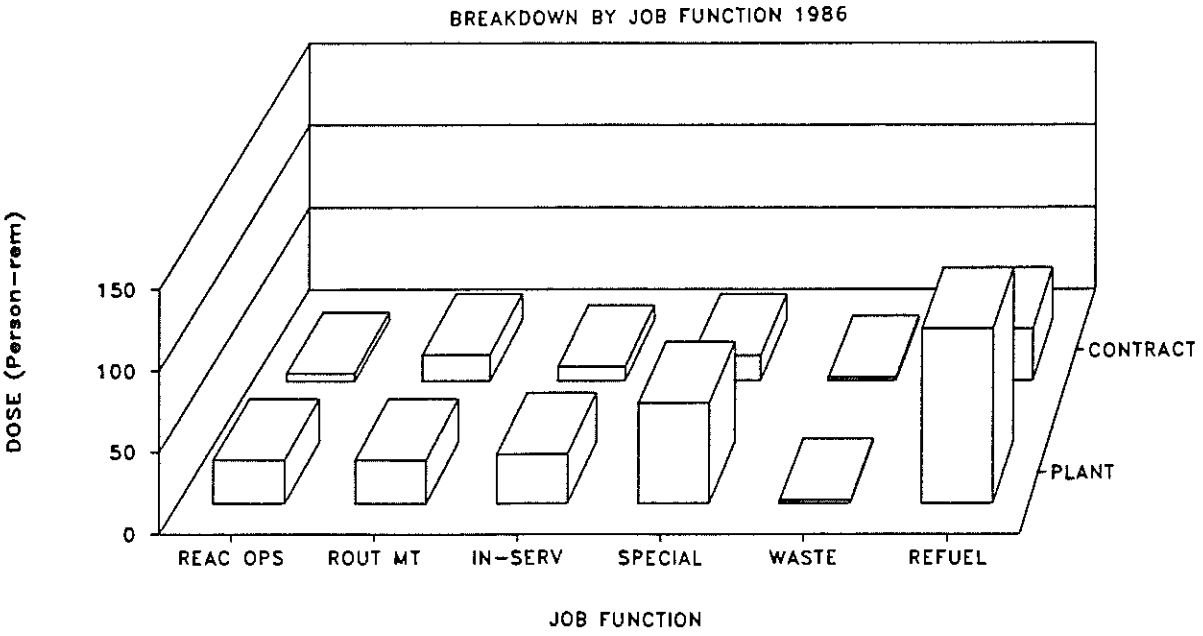
BREAKDOWN BY JOB FUNCTION 1986



CATAWBA 1

PWR

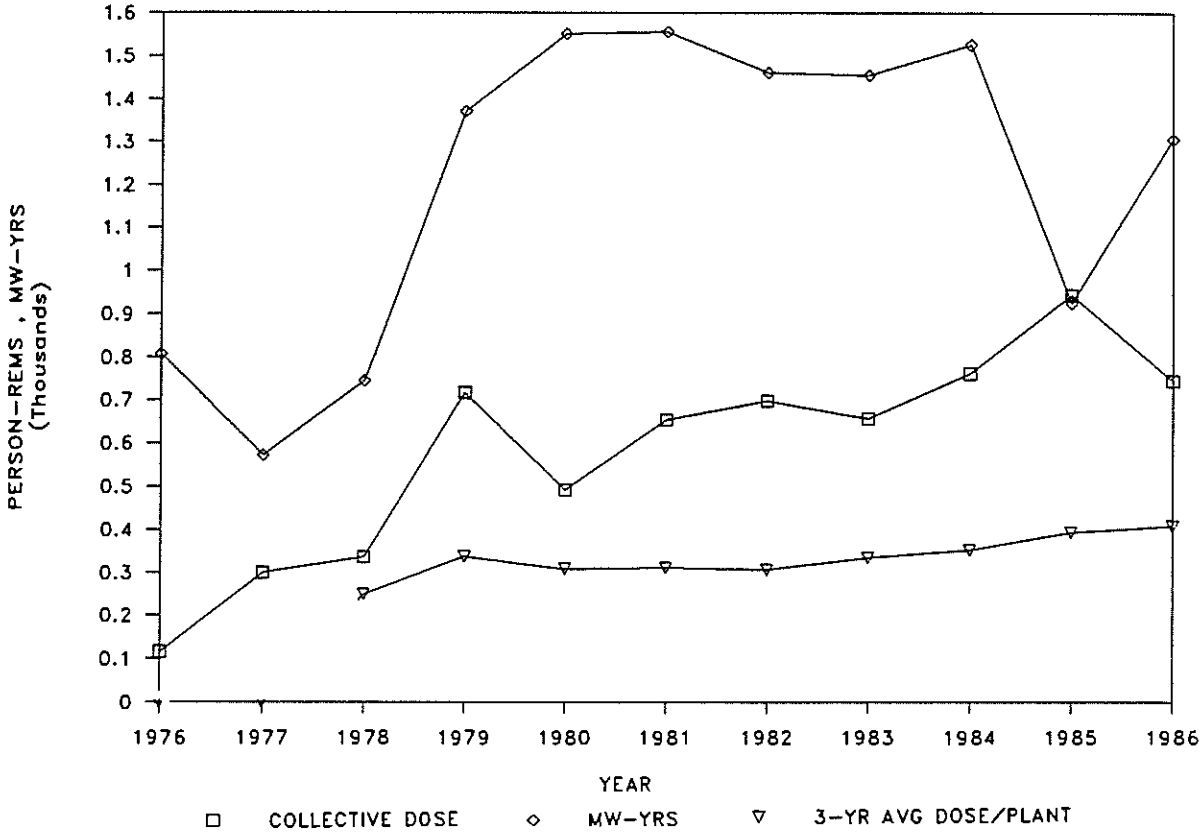




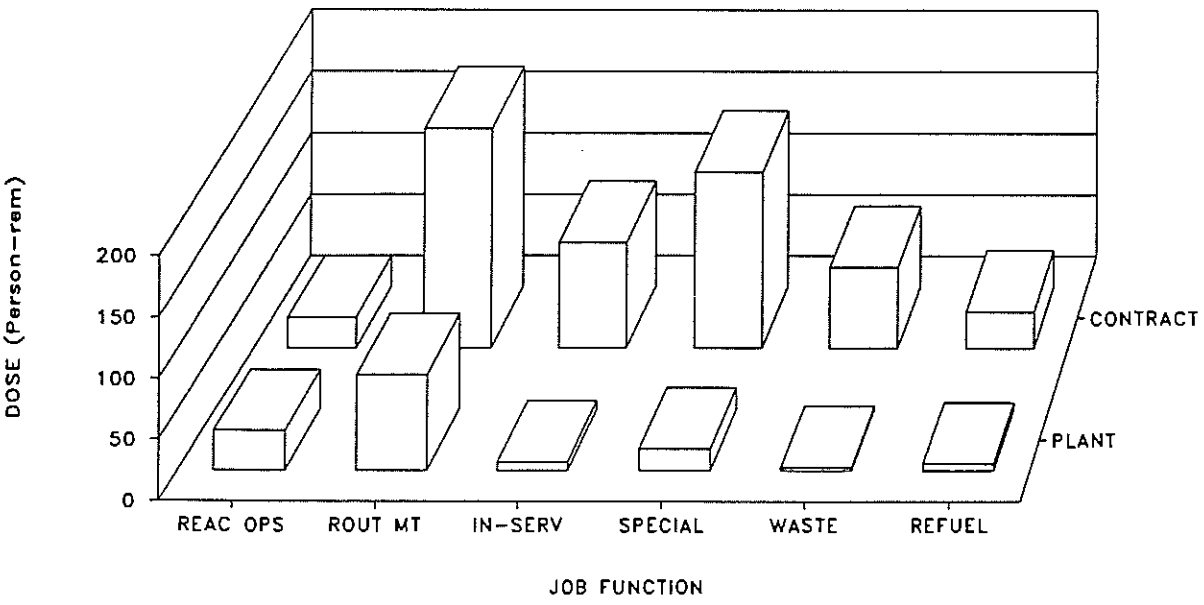
PWR

COOK 1,2

DOSE-PERFORMANCE INDICATORS



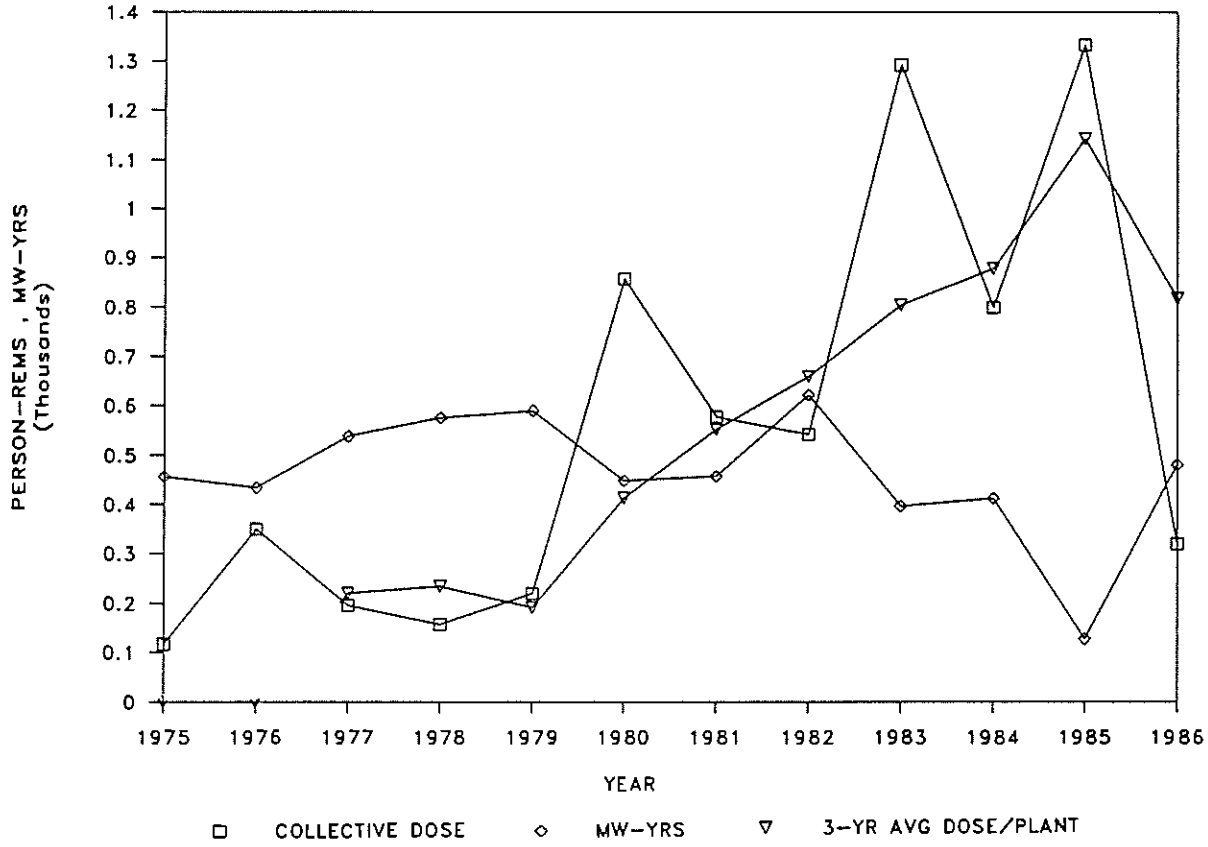
BREAKDOWN BY JOB FUNCTION 1986



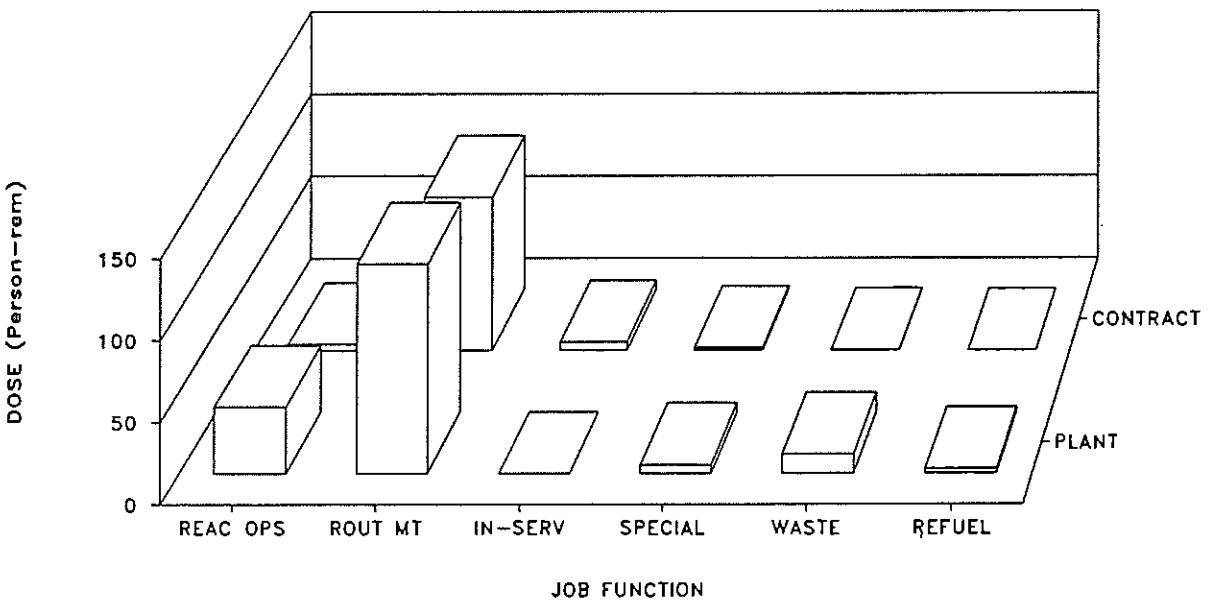
COOPER STATION

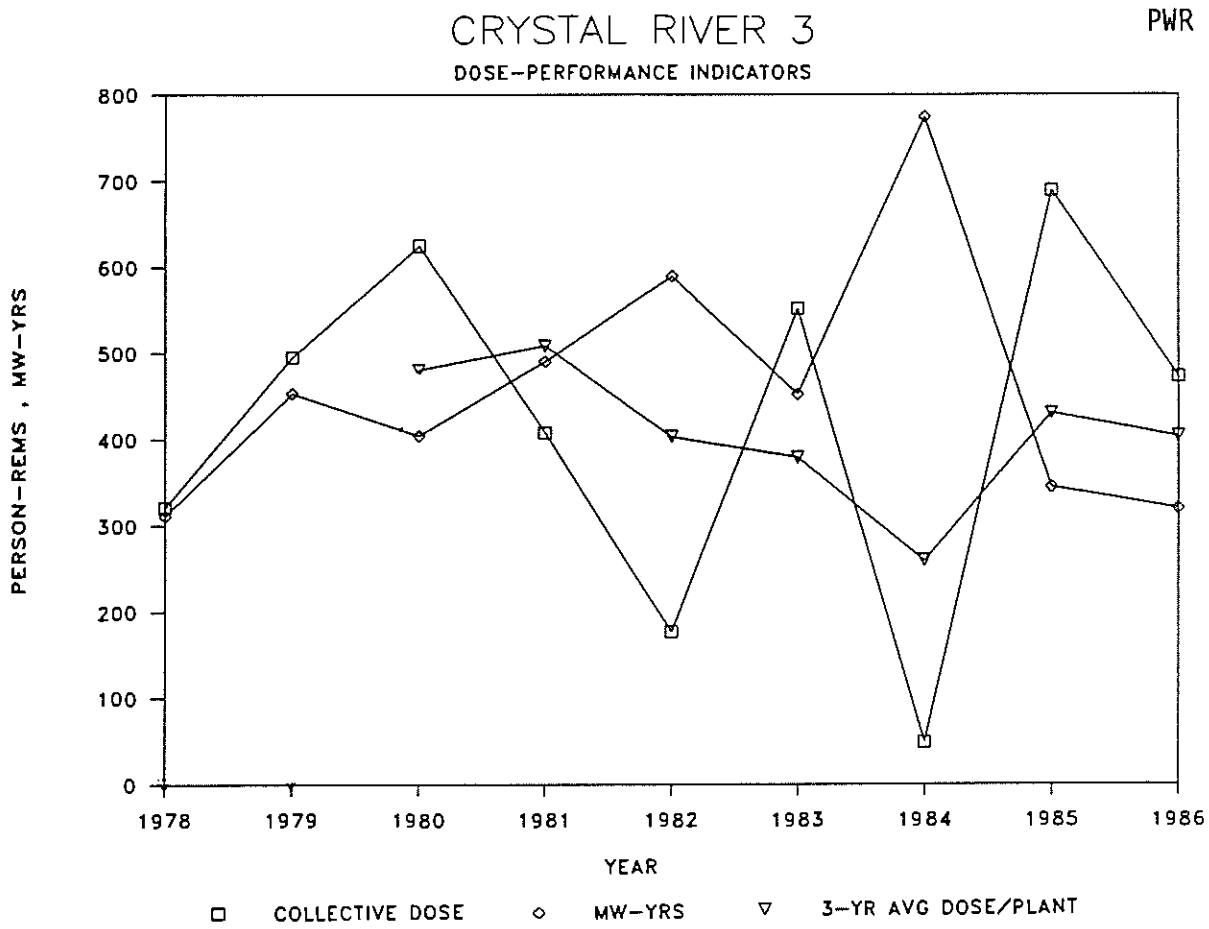
BWR

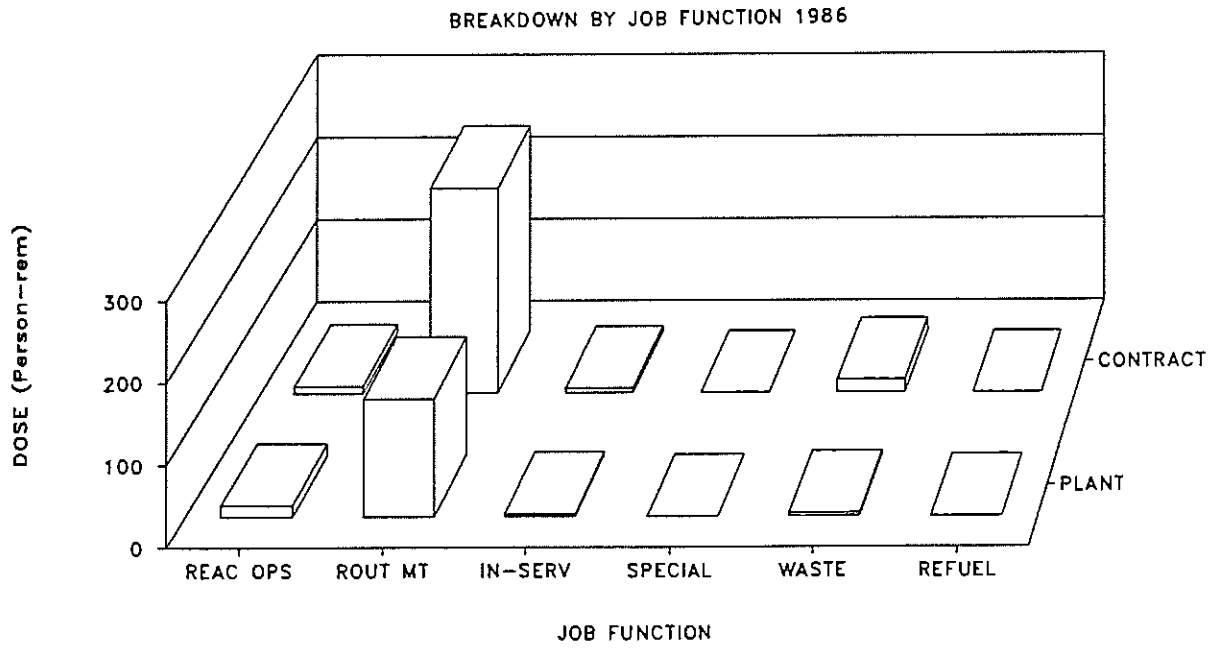
DOSE-PERFORMANCE INDICATORS



BREAKDOWN BY JOB FUNCTION 1986



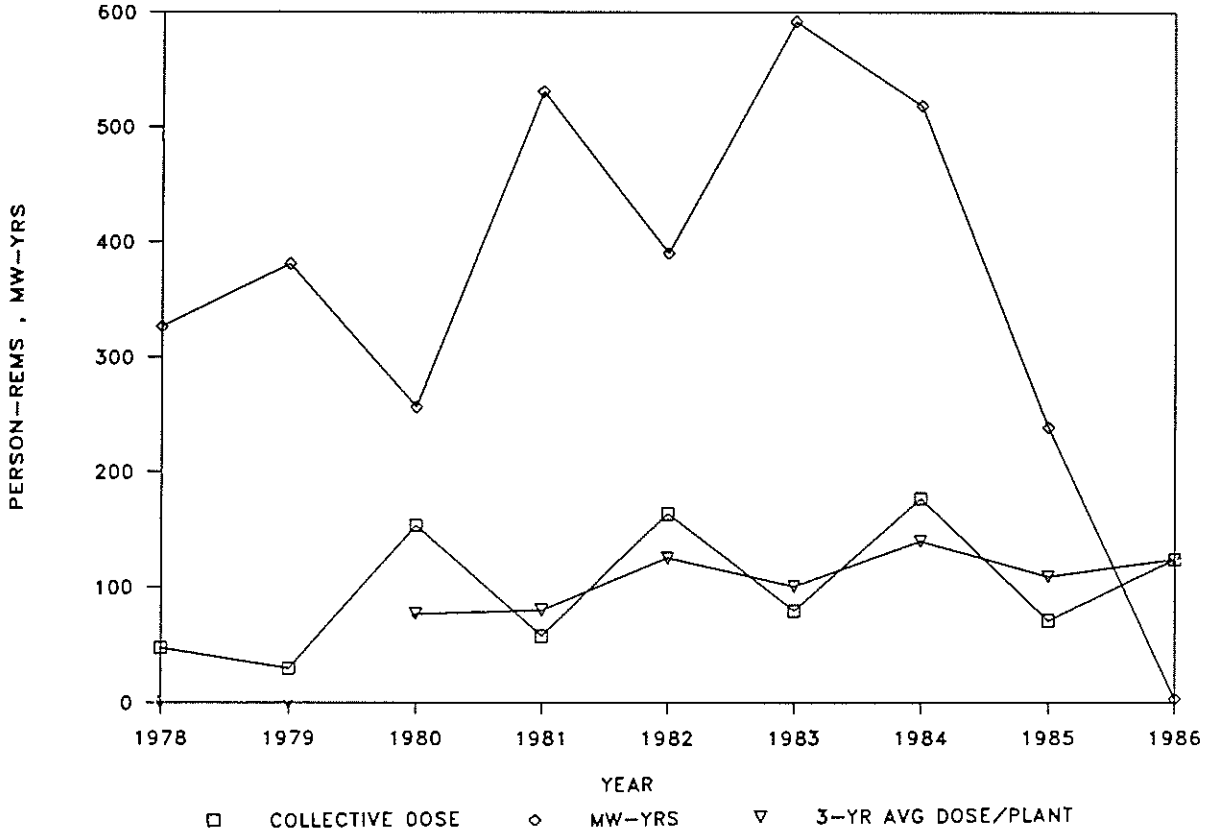

CRYSTAL RIVER 3
PWR
DOSE-PERFORMANCE INDICATORS
PERSON-REMS , MW-YRS
800
700
600
500
400
300
200
100
0
1978
1979
1980
1981
1982
1983
1984
1985
1986
YEAR
COLLECTIVE DOSE
MW-YRS
3-YR AVG DOSE/PLANT


BREAKDOWN BY JOB FUNCTION 1986
DOSE (Person-rem)
300
200
100
0
CONTRACT
PLANT
REAC OPS
ROUT MT
IN-SERV
SPECIAL
WASTE
REFUEL
JOB FUNCTION

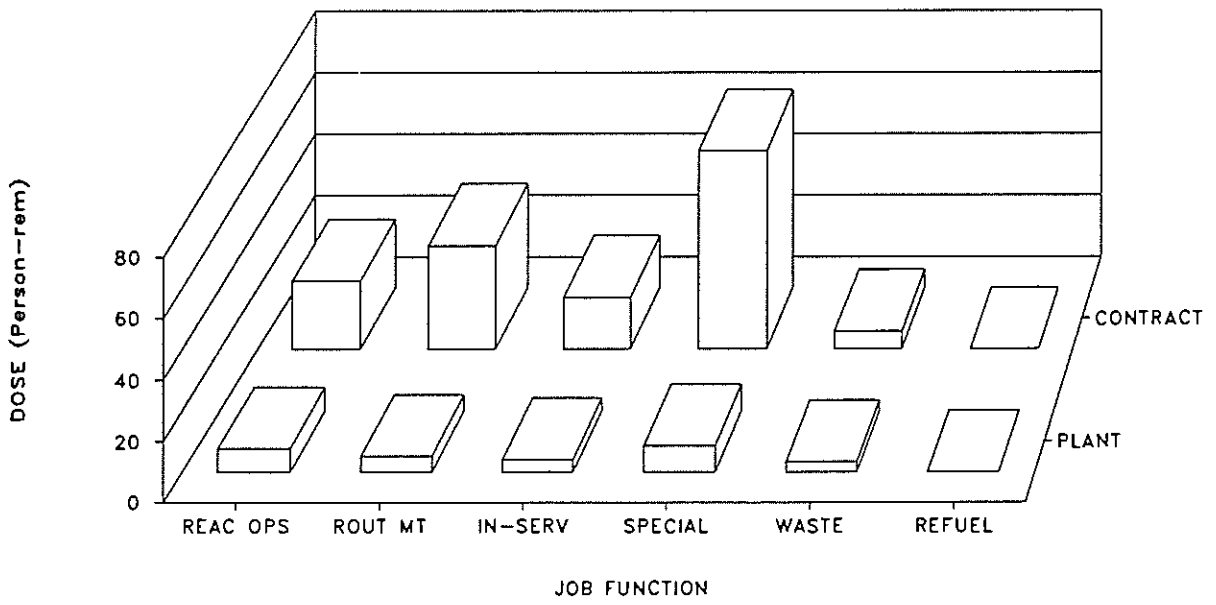
PWR

DAVIS–BESSE

DOSE–PERFORMANCE INDICATORS



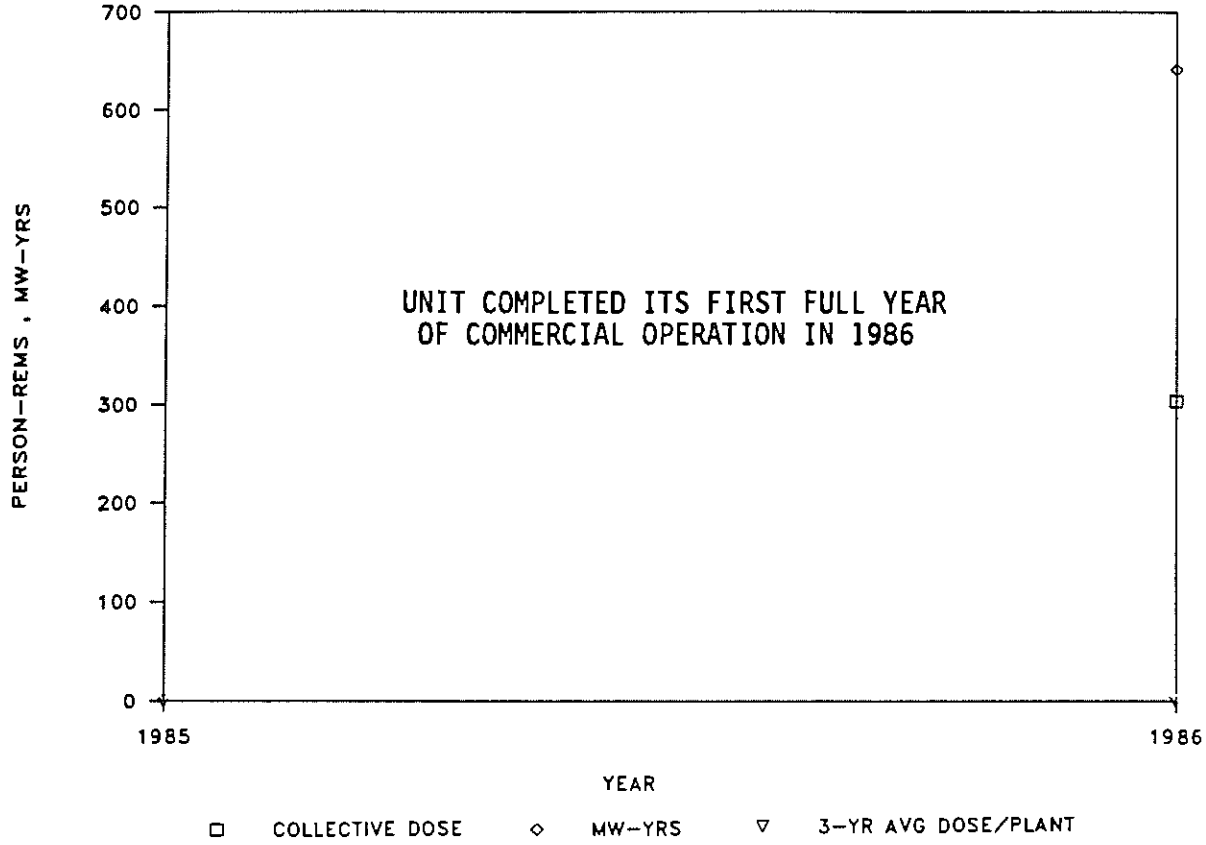
BREAKDOWN BY JOB FUNCTION 1986



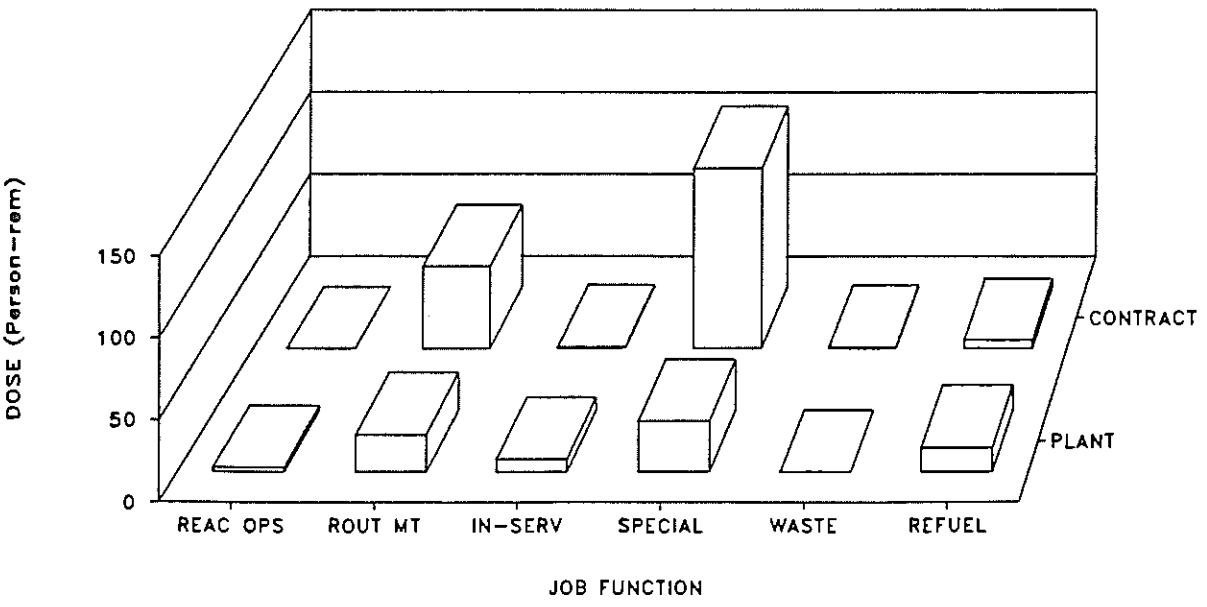
DIABLO CANYON 1

PWR

DOSE–PERFORMANCE INDICATORS



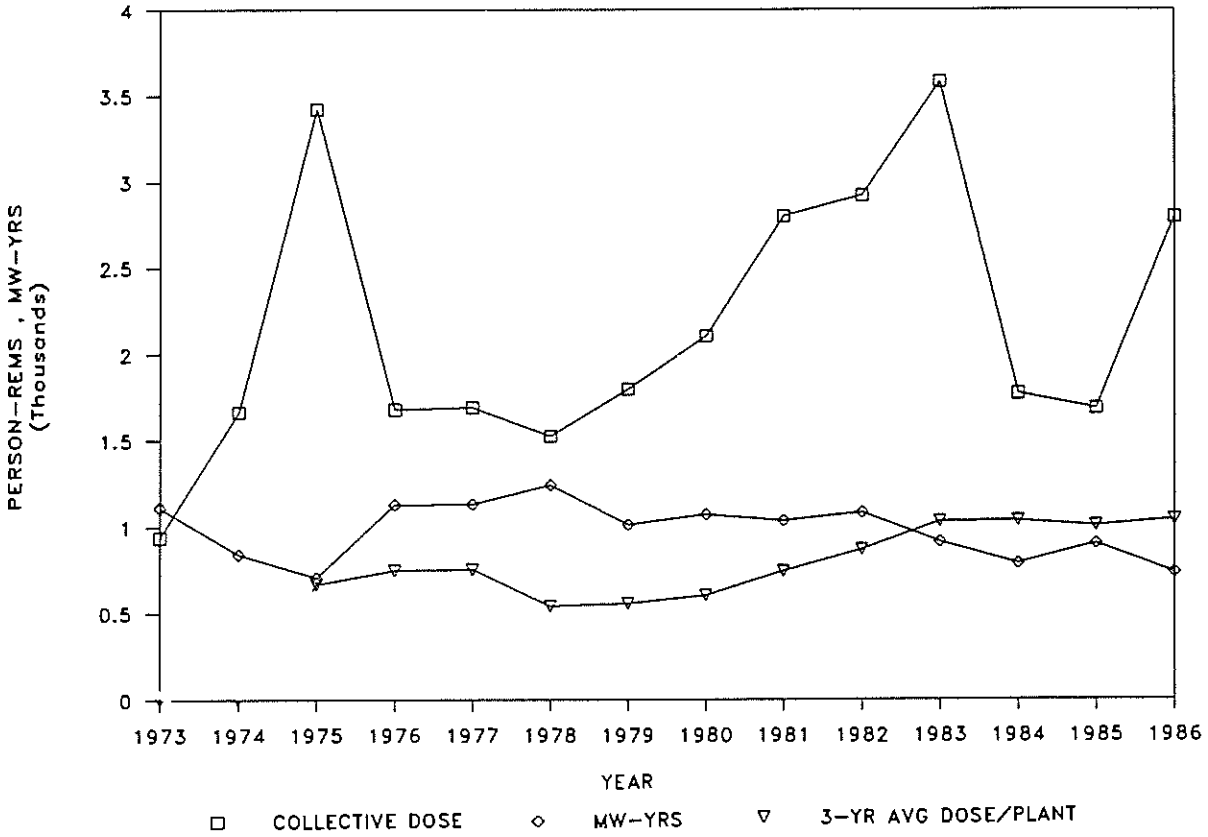
BREAKDOWN BY JOB FUNCTION 1986



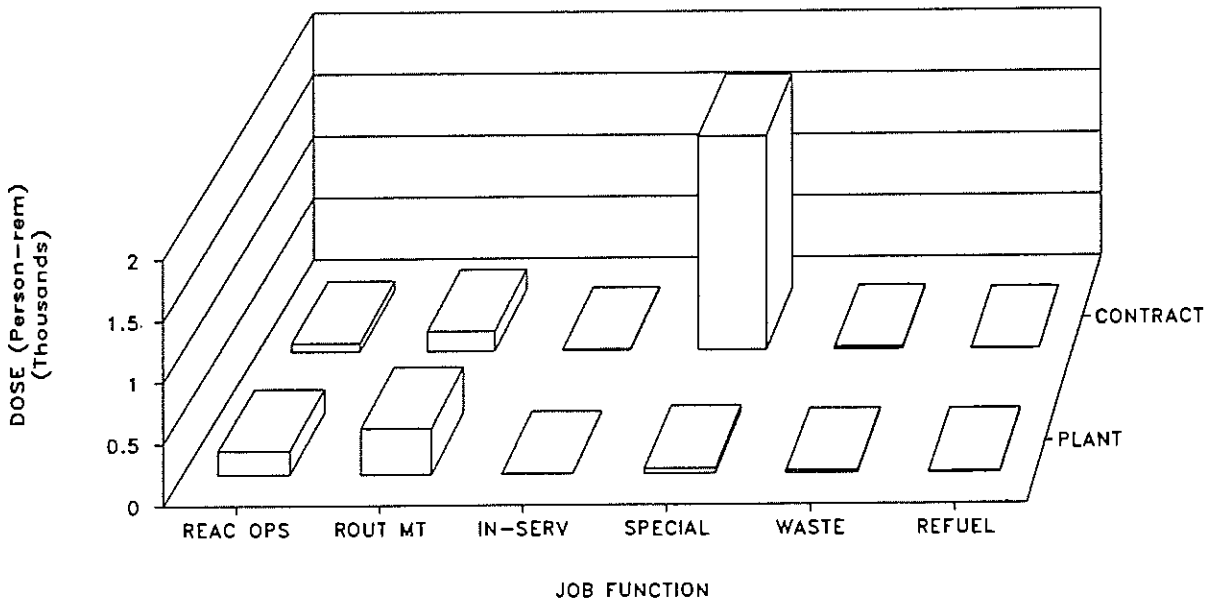
BWR

DRESDEN 2,3

DOSE-PERFORMANCE INDICATORS



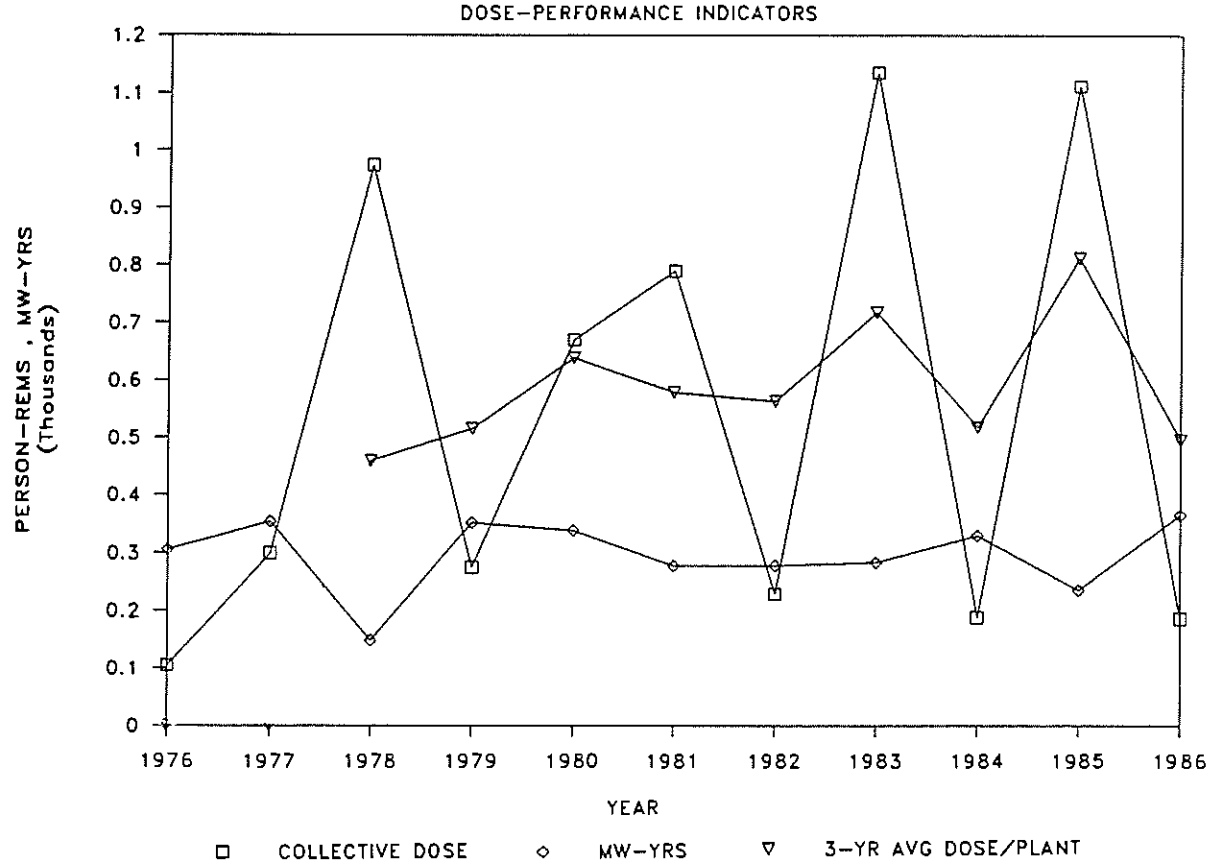
BREAKDOWN BY JOB FUNCTION 1986



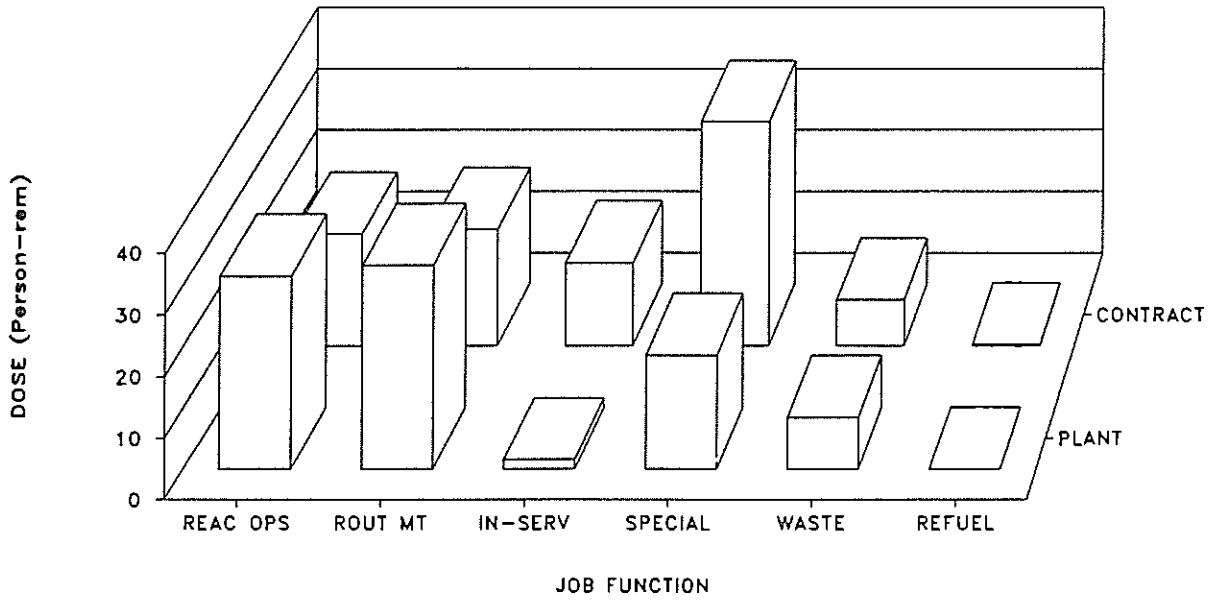
DUANE ARNOLD

BWR

DOSE-PERFORMANCE INDICATORS



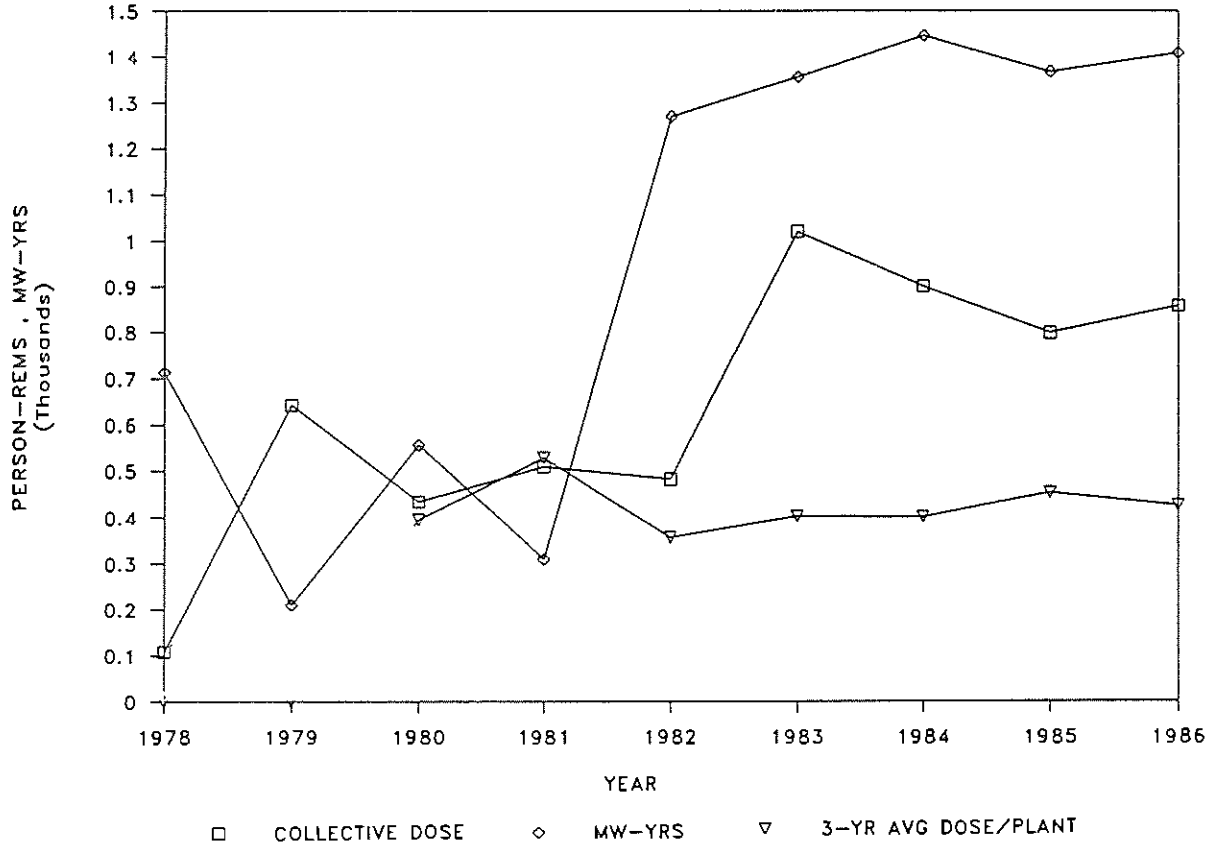
BREAKDOWN BY JOB FUNCTION 1986



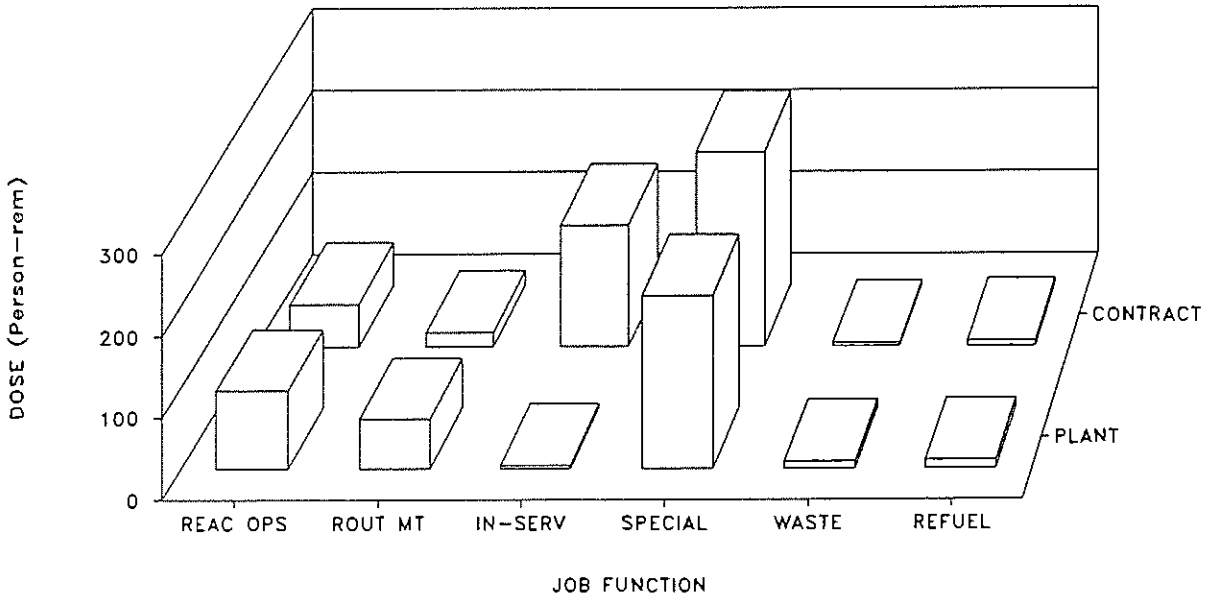
FARLEY 1,2

PWR

DOSE-PERFORMANCE INDICATORS



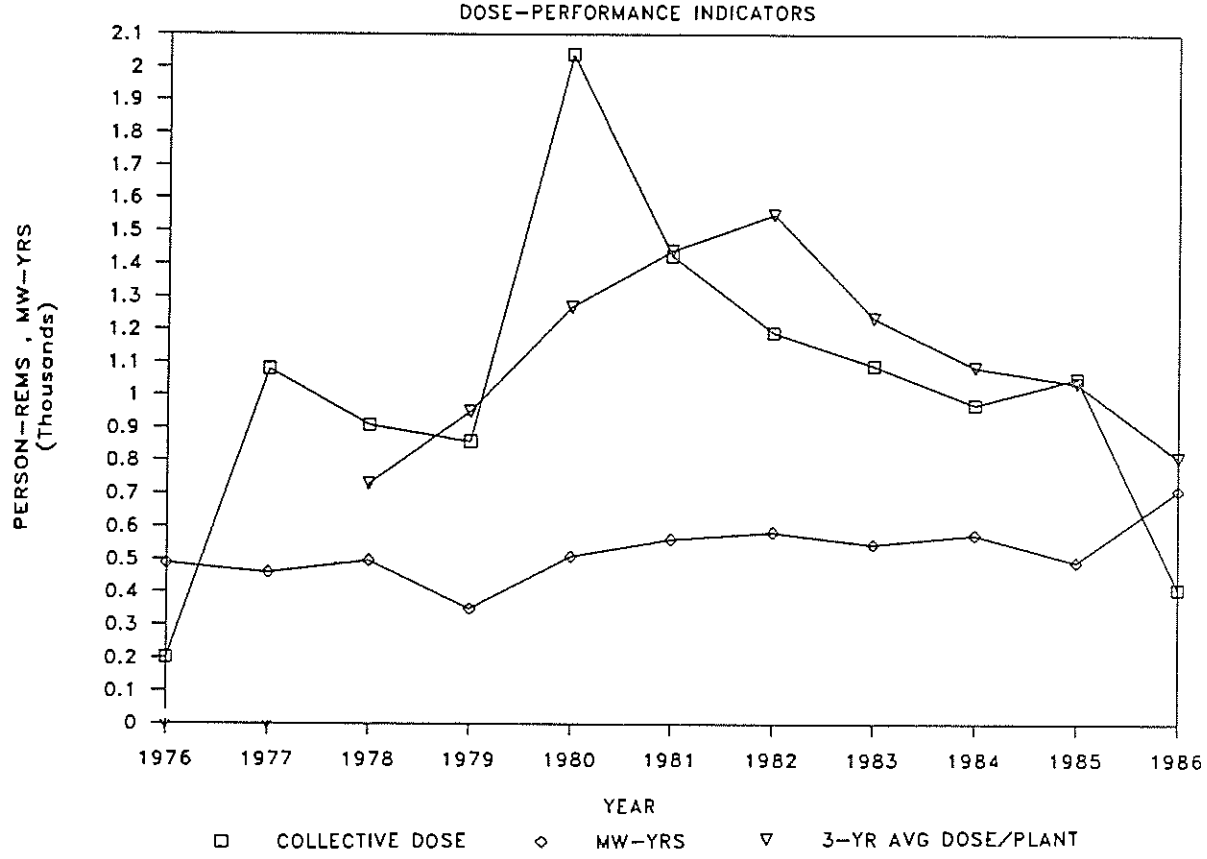
BREAKDOWN BY JOB FUNCTION 1986



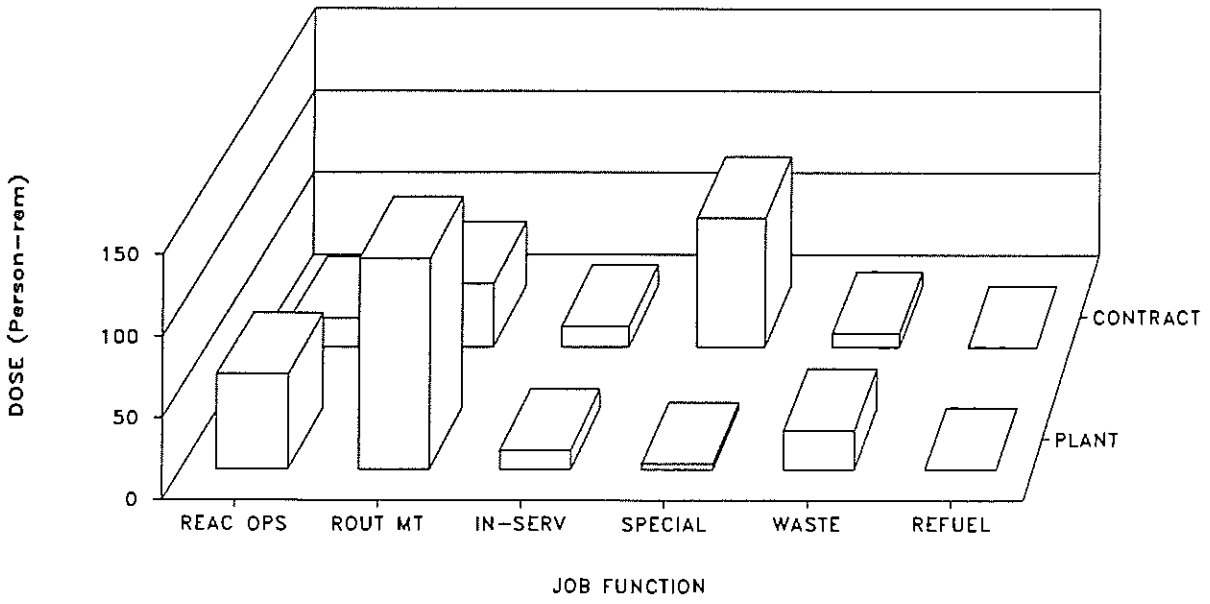
BWR

FITZPATRICK

DOSE-PERFORMANCE INDICATORS



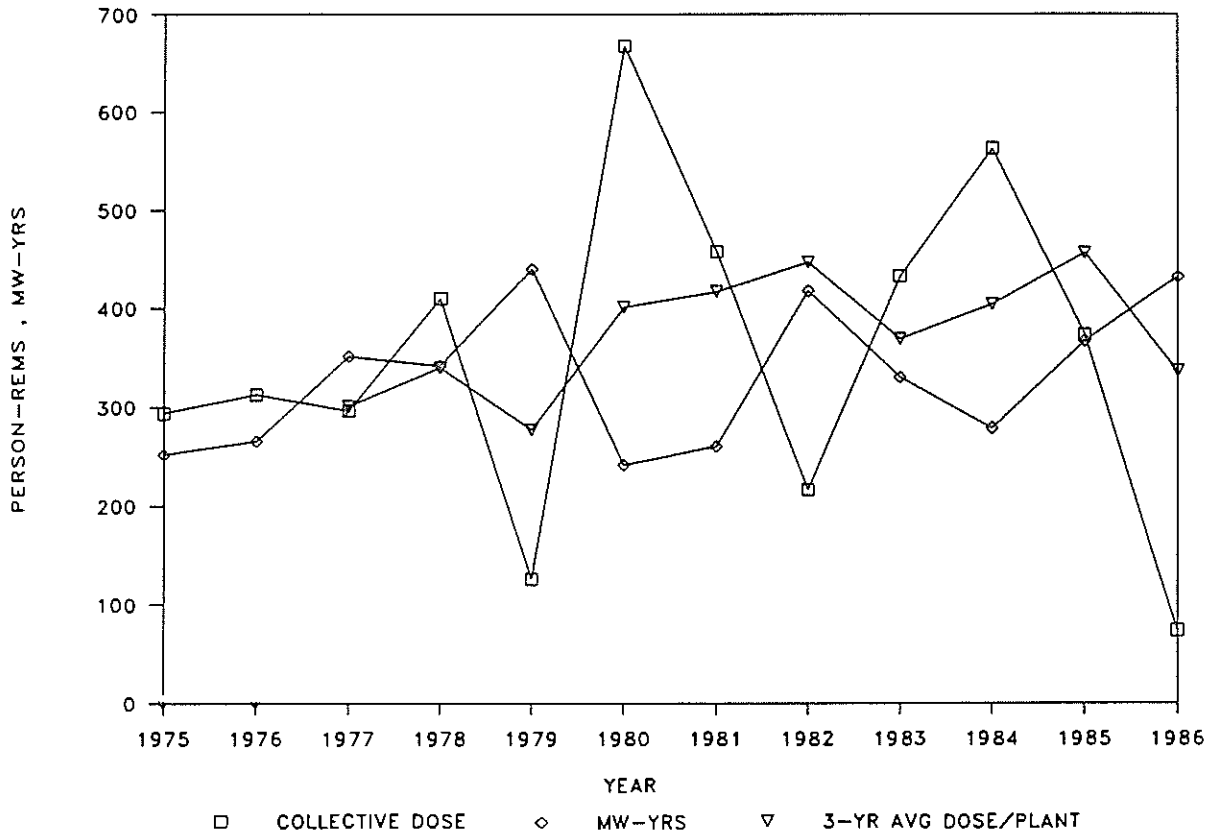
BREAKDOWN BY JOB FUNCTION 1986



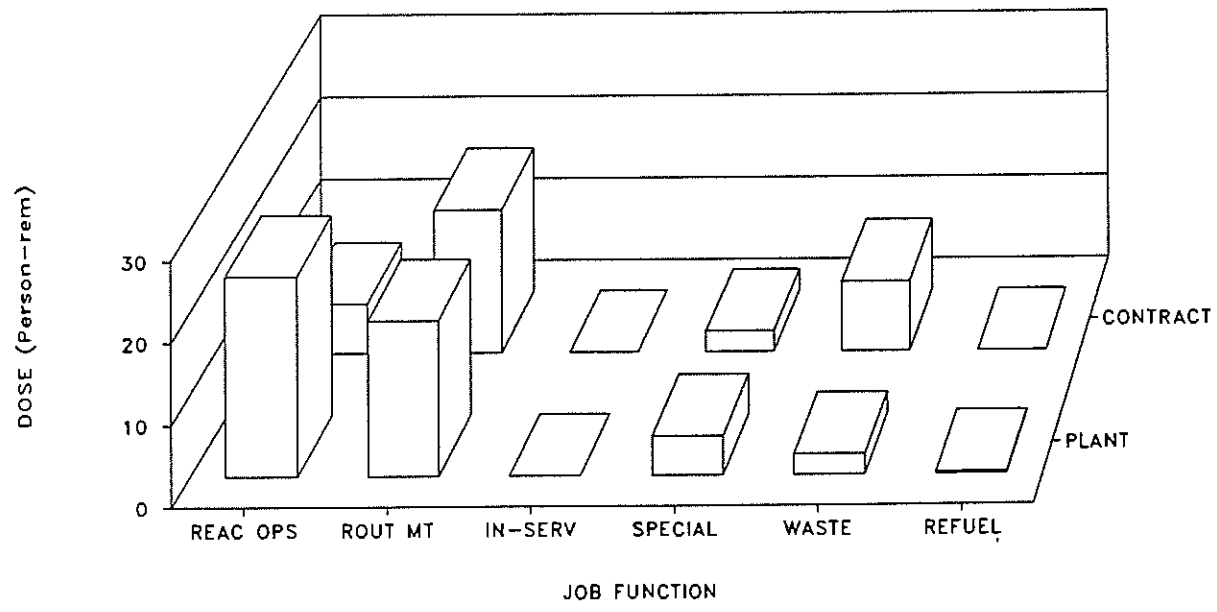
PWR

FORT CALHOUN

DOSE-PERFORMANCE INDICATORS



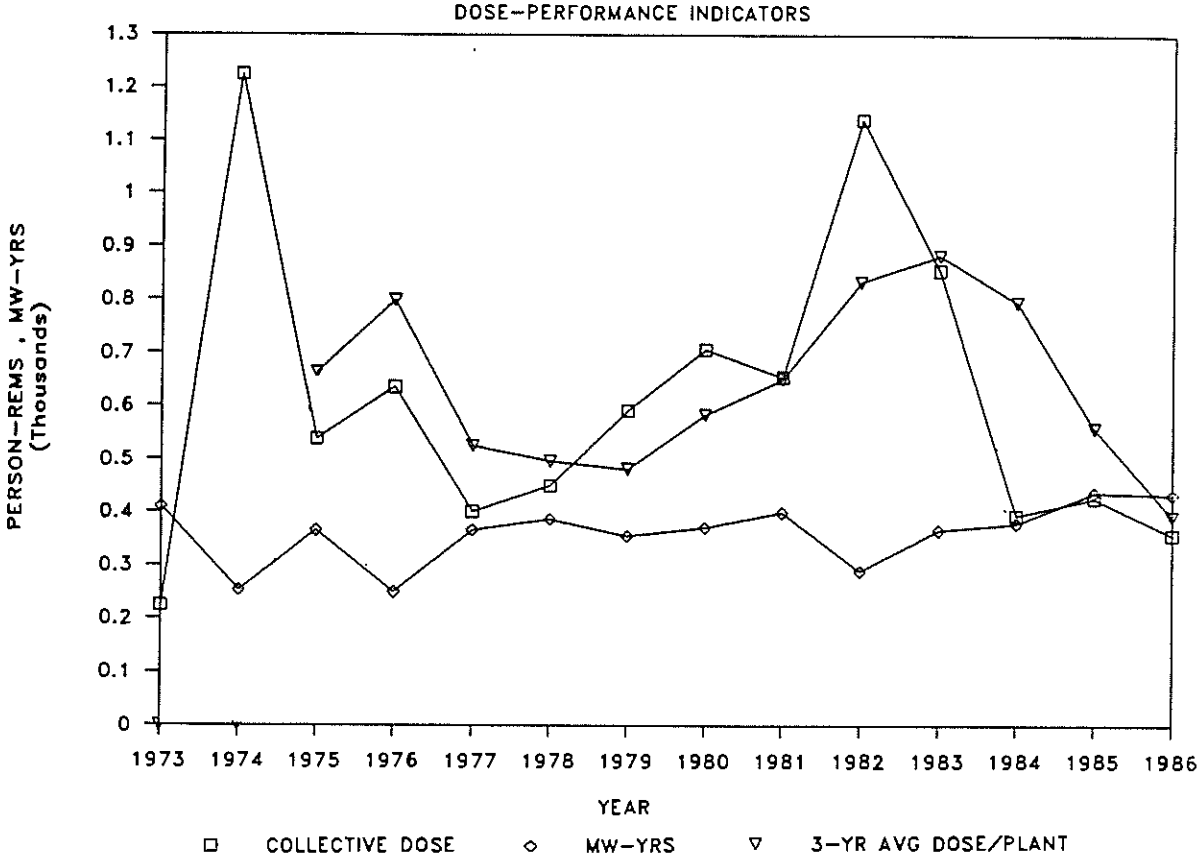
BREAKDOWN BY JOB FUNCTION 1986



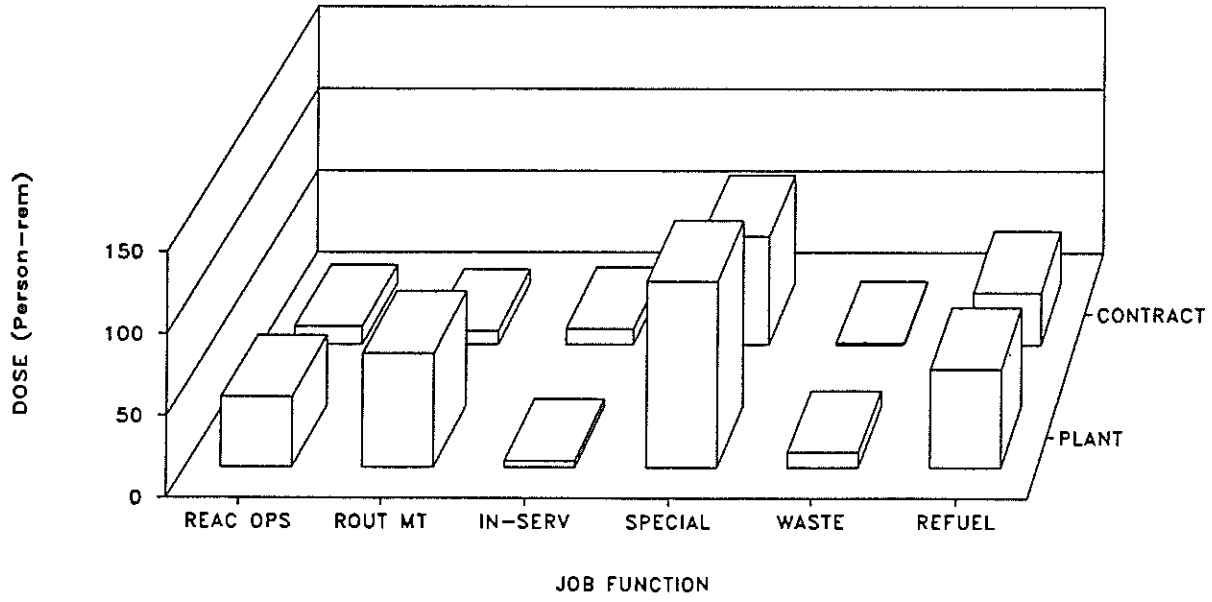
GINNA

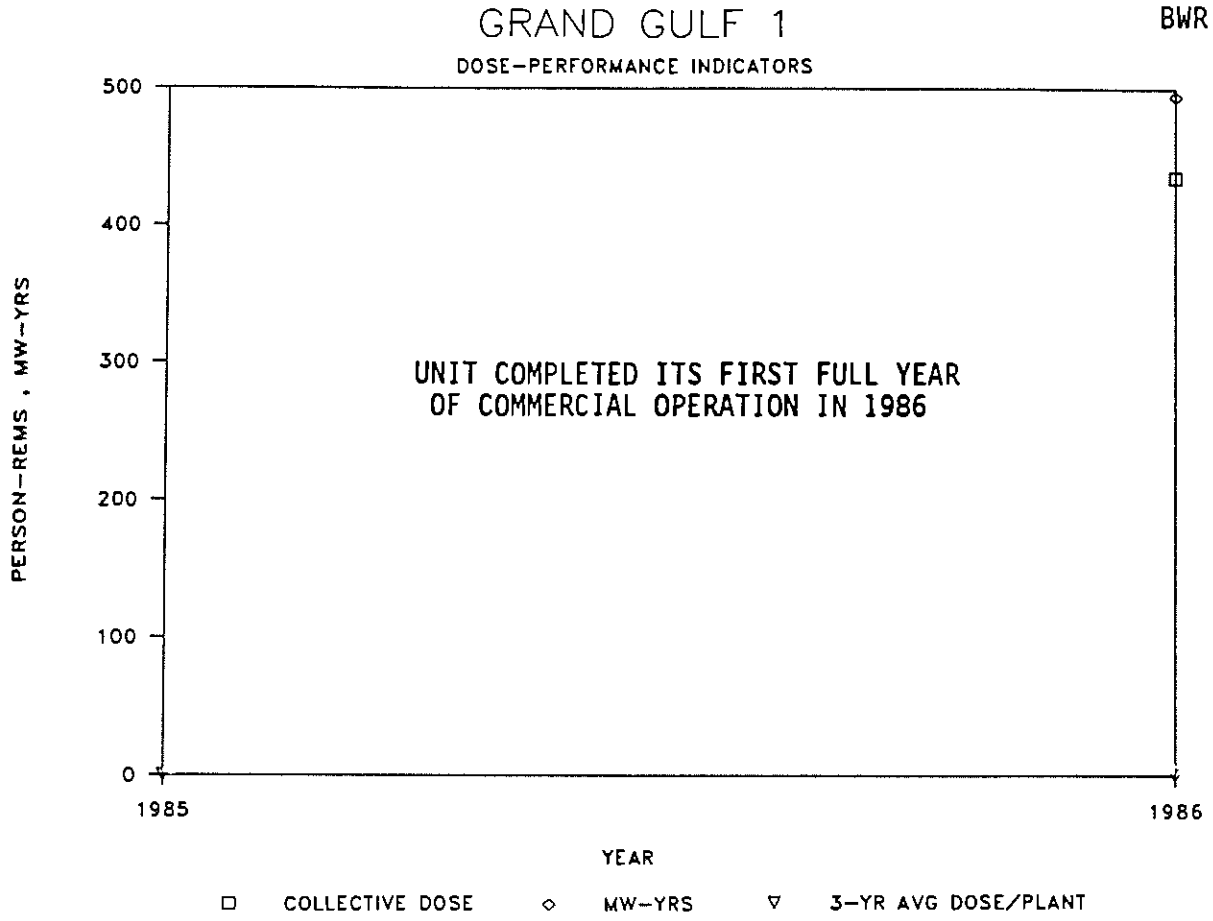
PWR

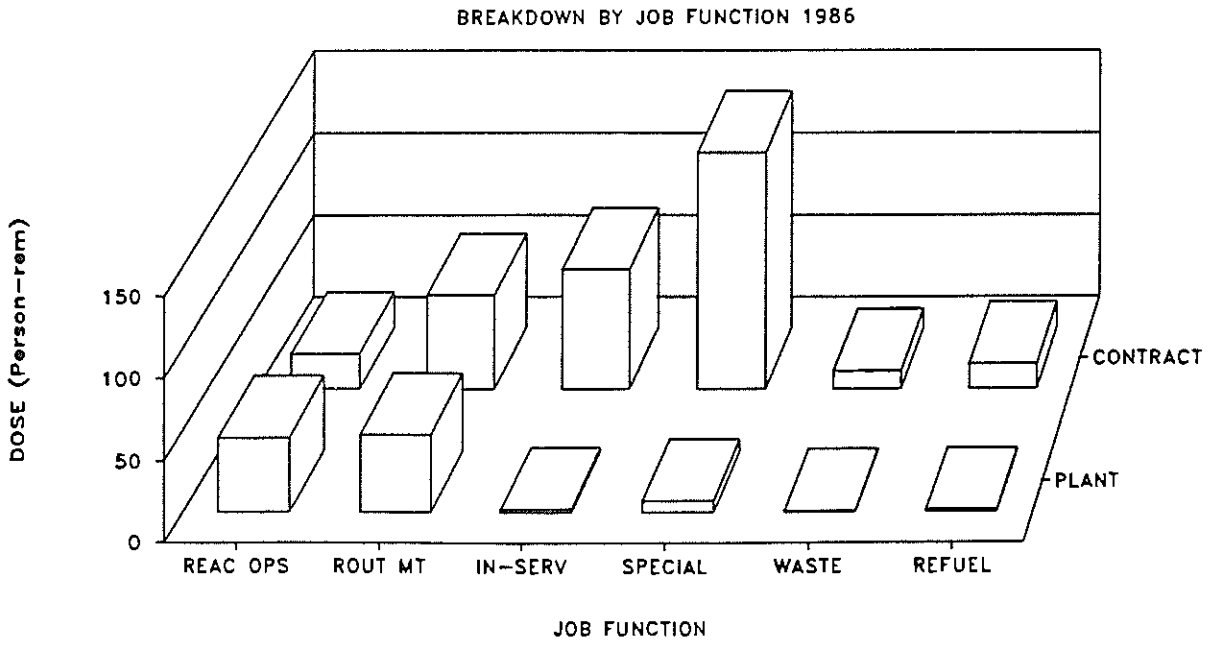
DOSE-PERFORMANCE INDICATORS



BREAKDOWN BY JOB FUNCTION 1986



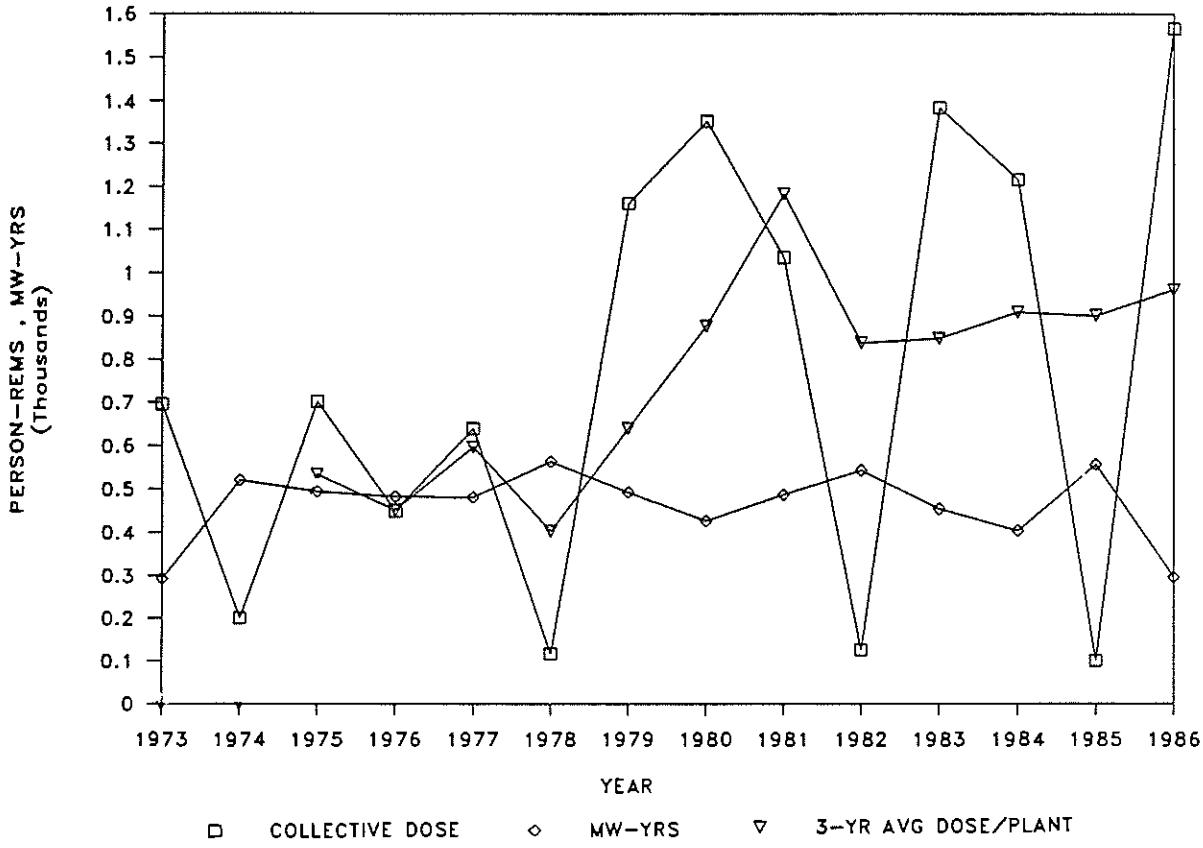

GRAND GULF 1
BWR
DOSE-PERFORMANCE INDICATORS
500
400
300
200
100
0
PERSON-REMS , MW-YRS
UNIT COMPLETED ITS FIRST FULL YEAR
OF COMMERCIAL OPERATION IN 1986
1985
1986
YEAR
COLLECTIVE DOSE
MW-YRS
3-YR AVG DOSE/PLANT


BREAKDOWN BY JOB FUNCTION 1986
DOSE (Person-rem)
150
100
50
0
CONTRACT
PLANT
REAC OPS
ROUT MT
IN-SERV
SPECIAL
WASTE
REFUEL
JOB FUNCTION

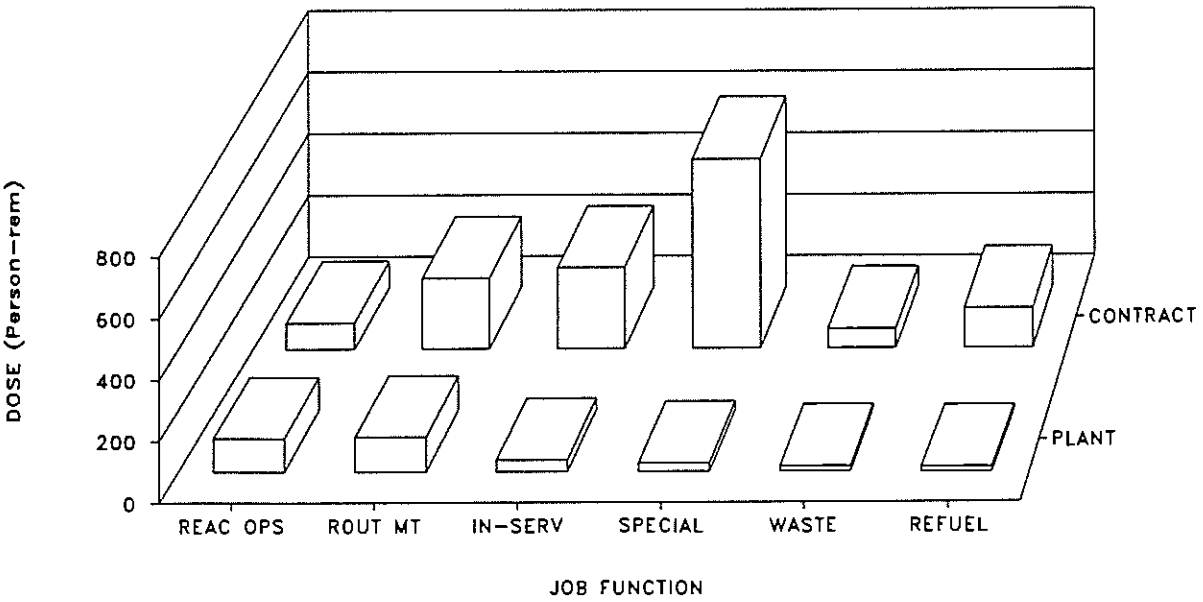
HADDAM NECK

PWR

DOSE-PERFORMANCE INDICATORS



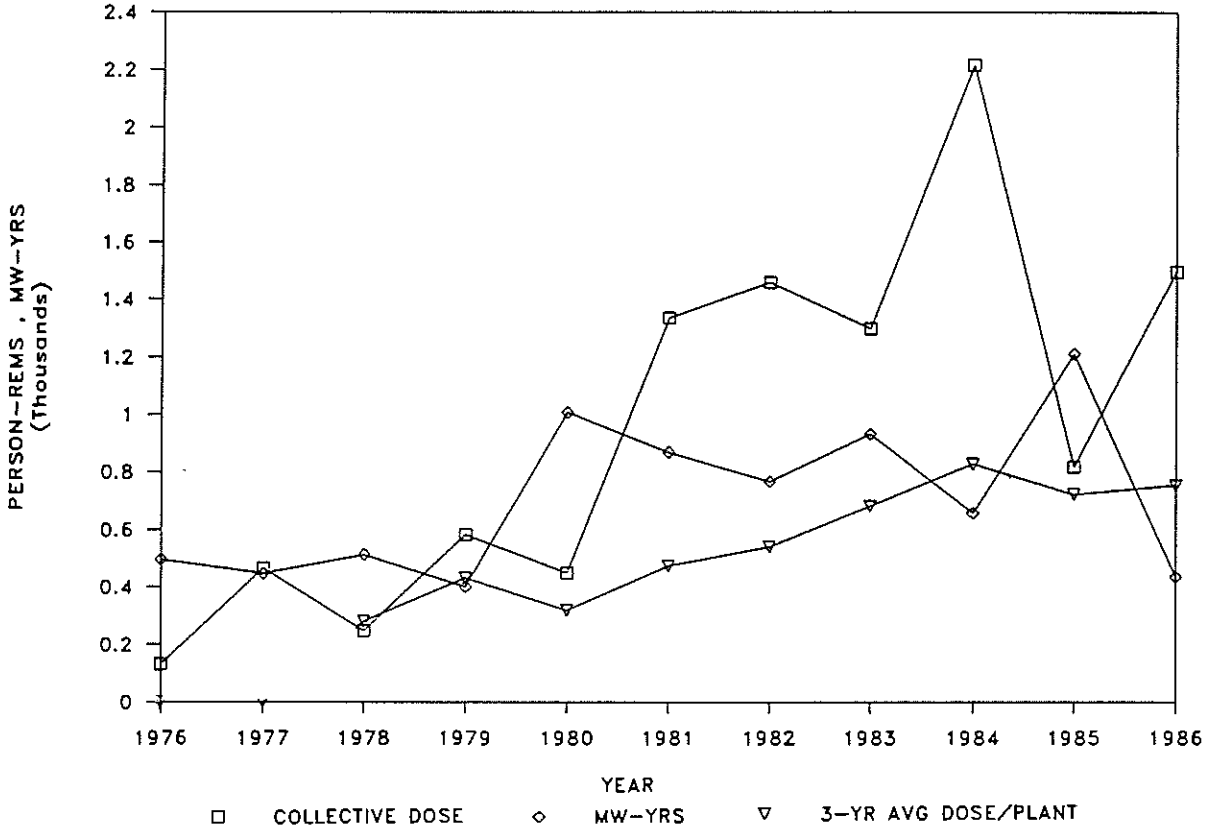
BREAKDOWN BY JOB FUNCTION 1986



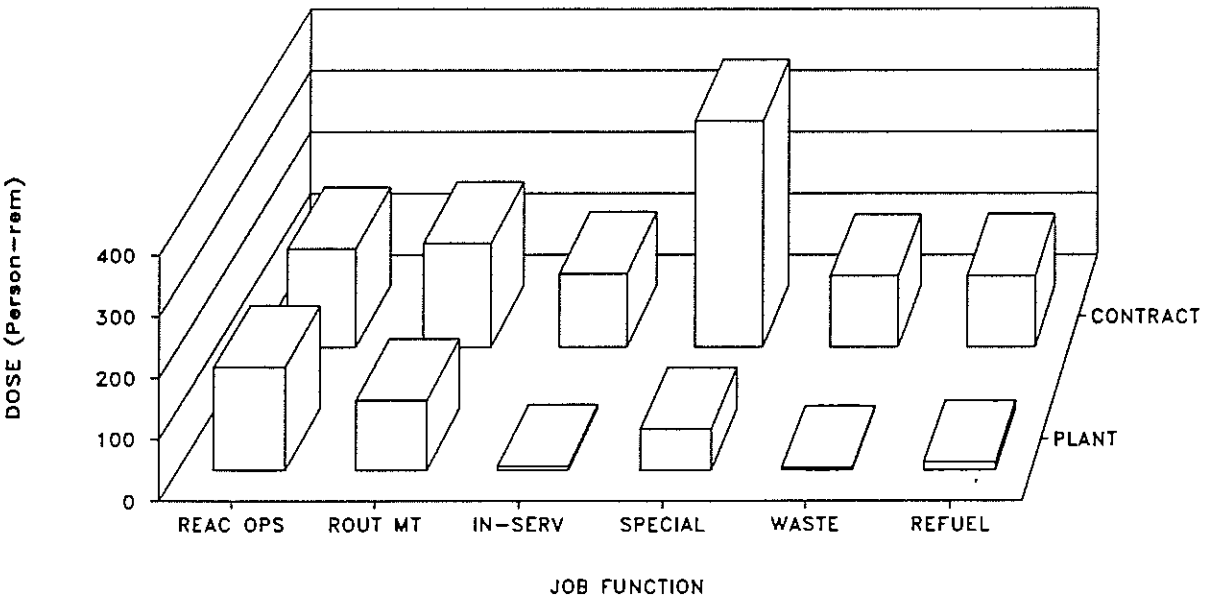
BWR

HATCH 1,2

DOSE-PERFORMANCE INDICATORS



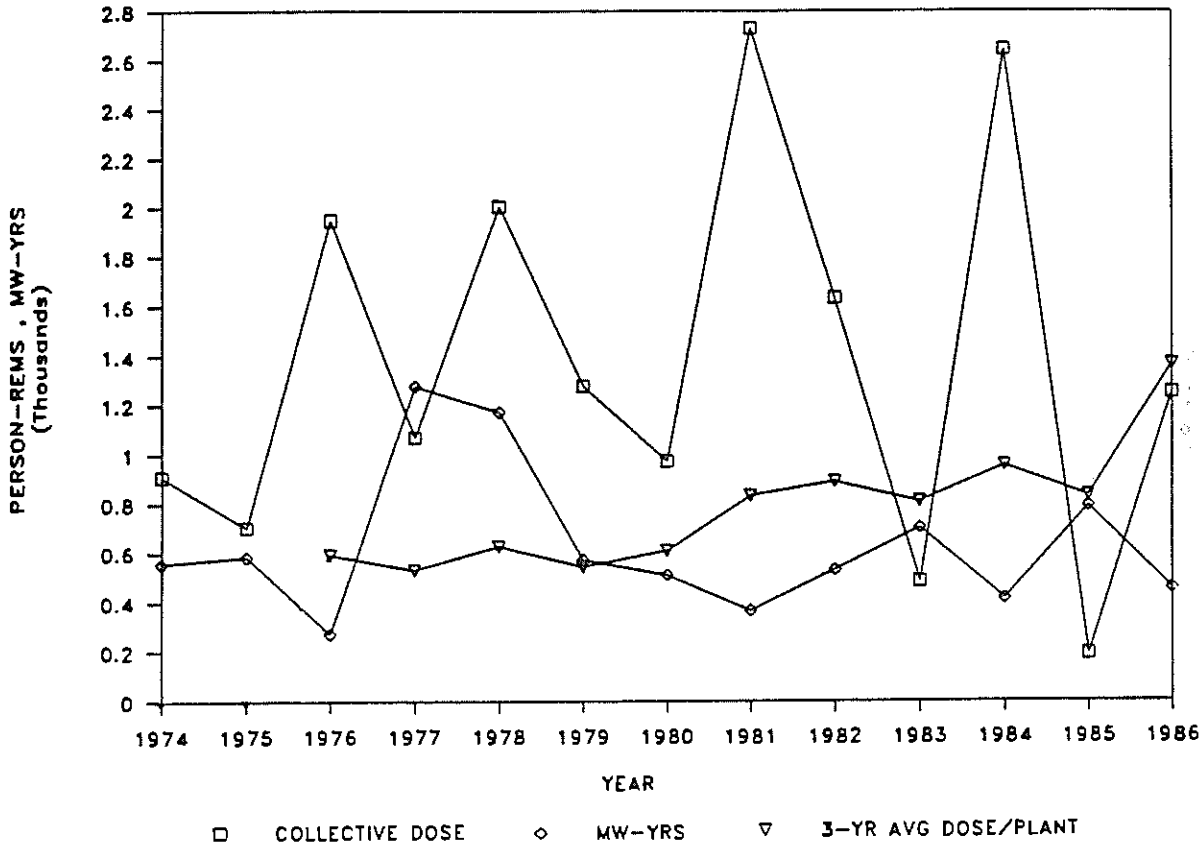
BREAKDOWN BY JOB FUNCTION 1986



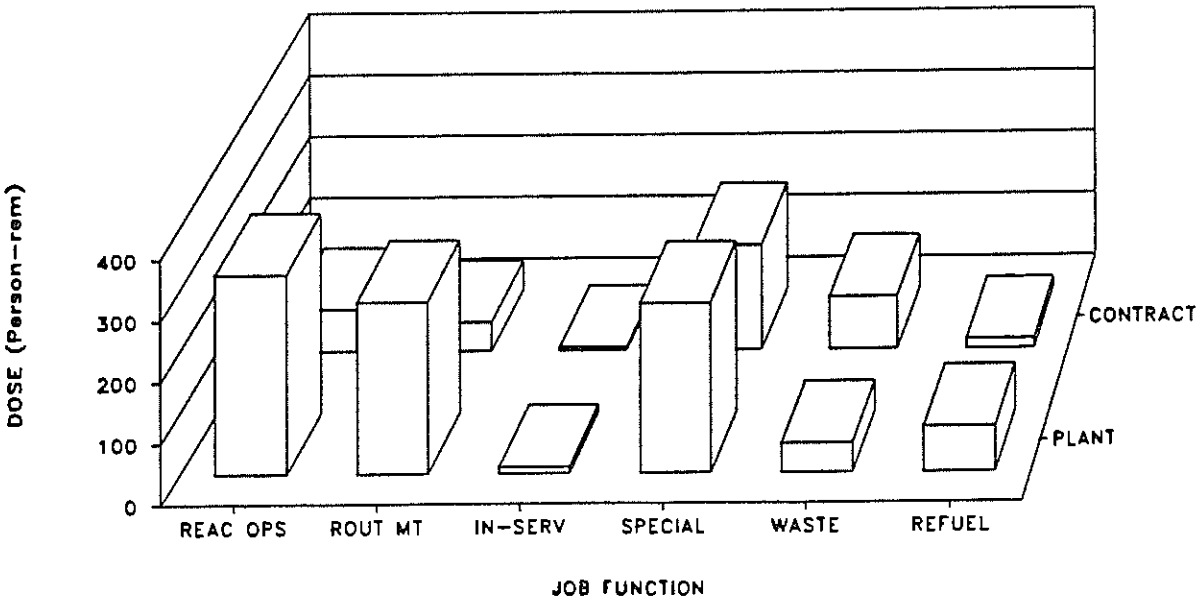
INDIAN POINT 1,2*

PWR

DOSE-PERFORMANCE INDICATORS



BREAKDOWN BY JOB FUNCTION 1986



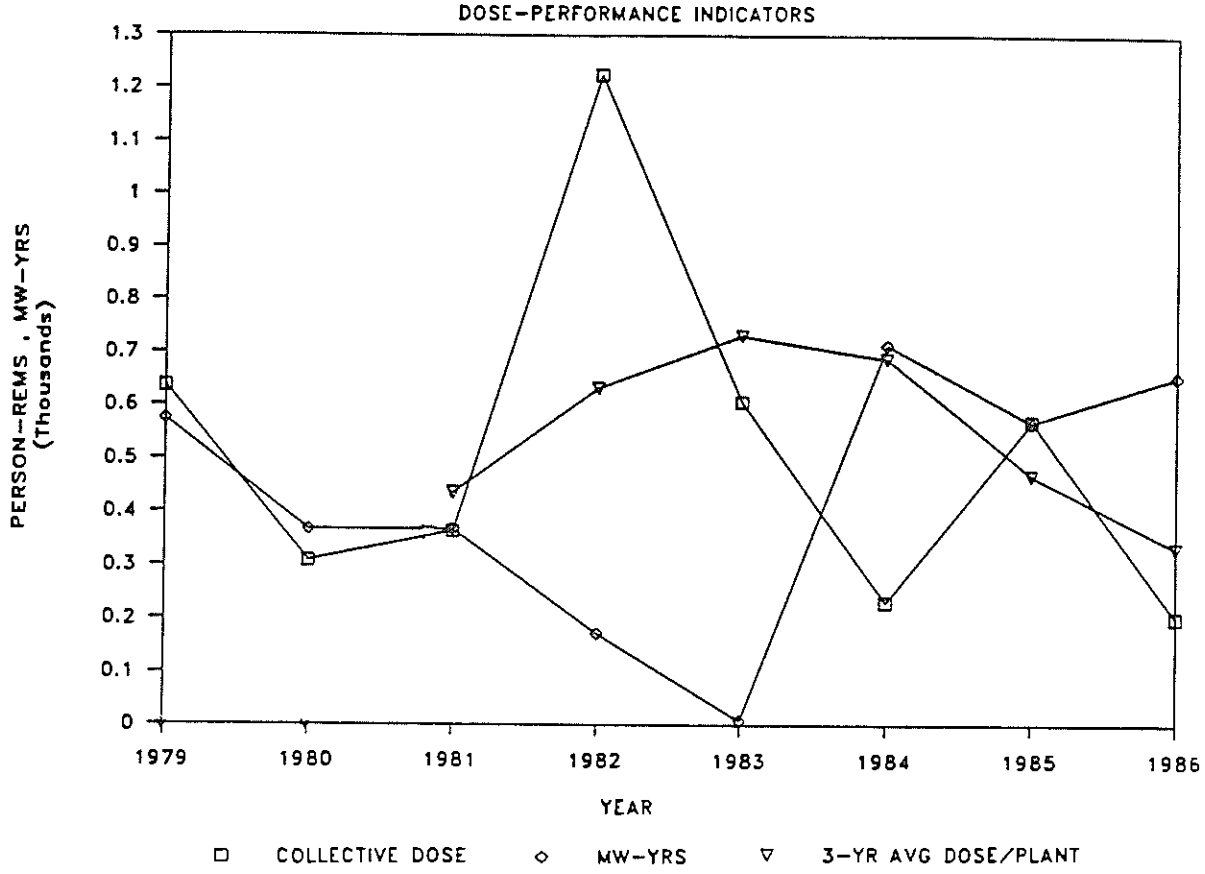
*Graph includes data for Unit 3 until 1979 and includes data for Unit 1 until 1984.

APPENDIX E

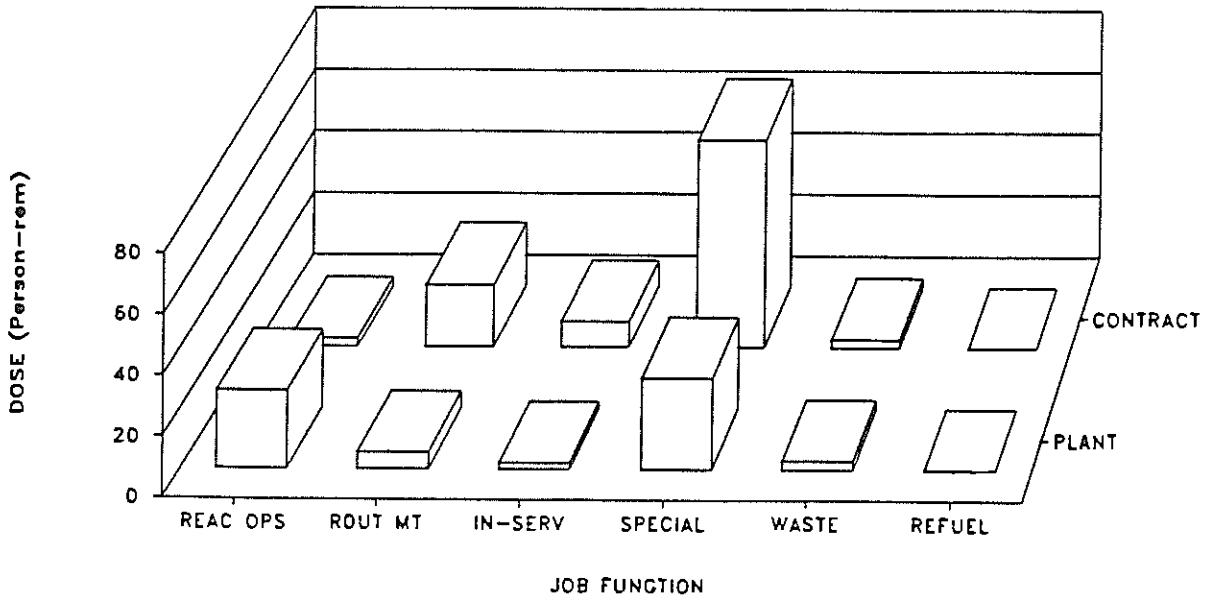
INDIAN POINT 3*

PWR

DOSE-PERFORMANCE INDICATORS



BREAKDOWN BY JOB FUNCTION 1986

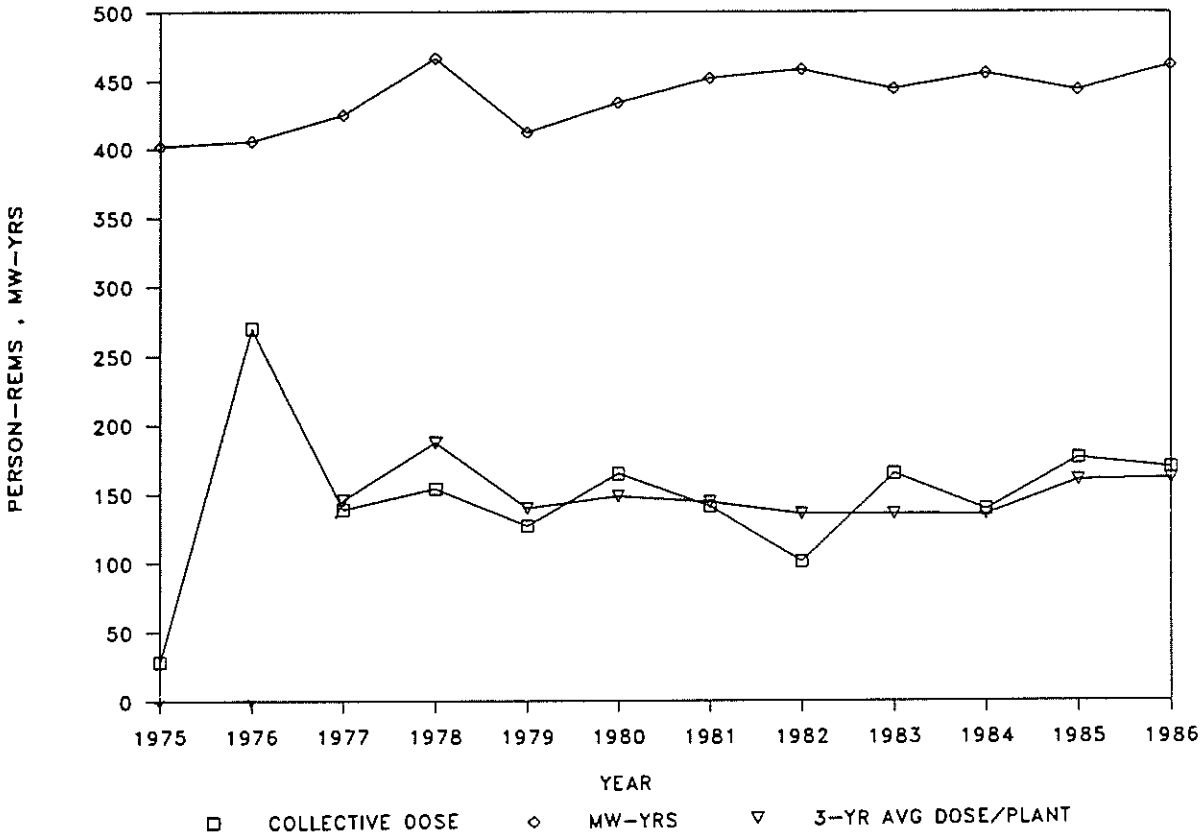


*INDAIN POINT 3 was purchased by a different utility and has reported seperately since 1979.

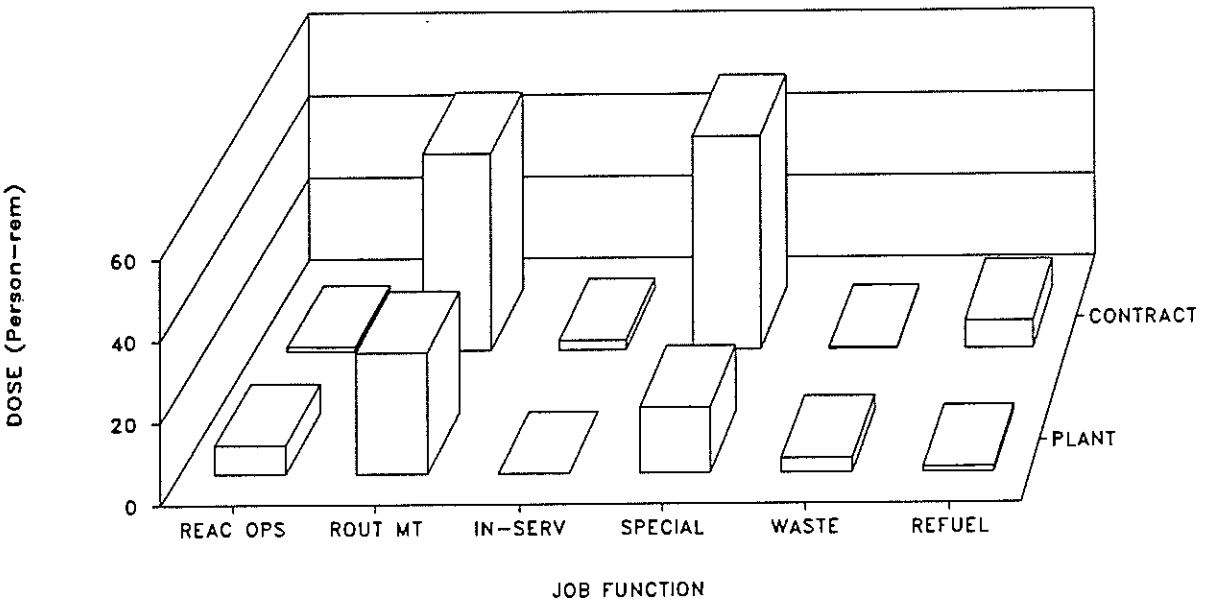
PWR

KEWAUNEE

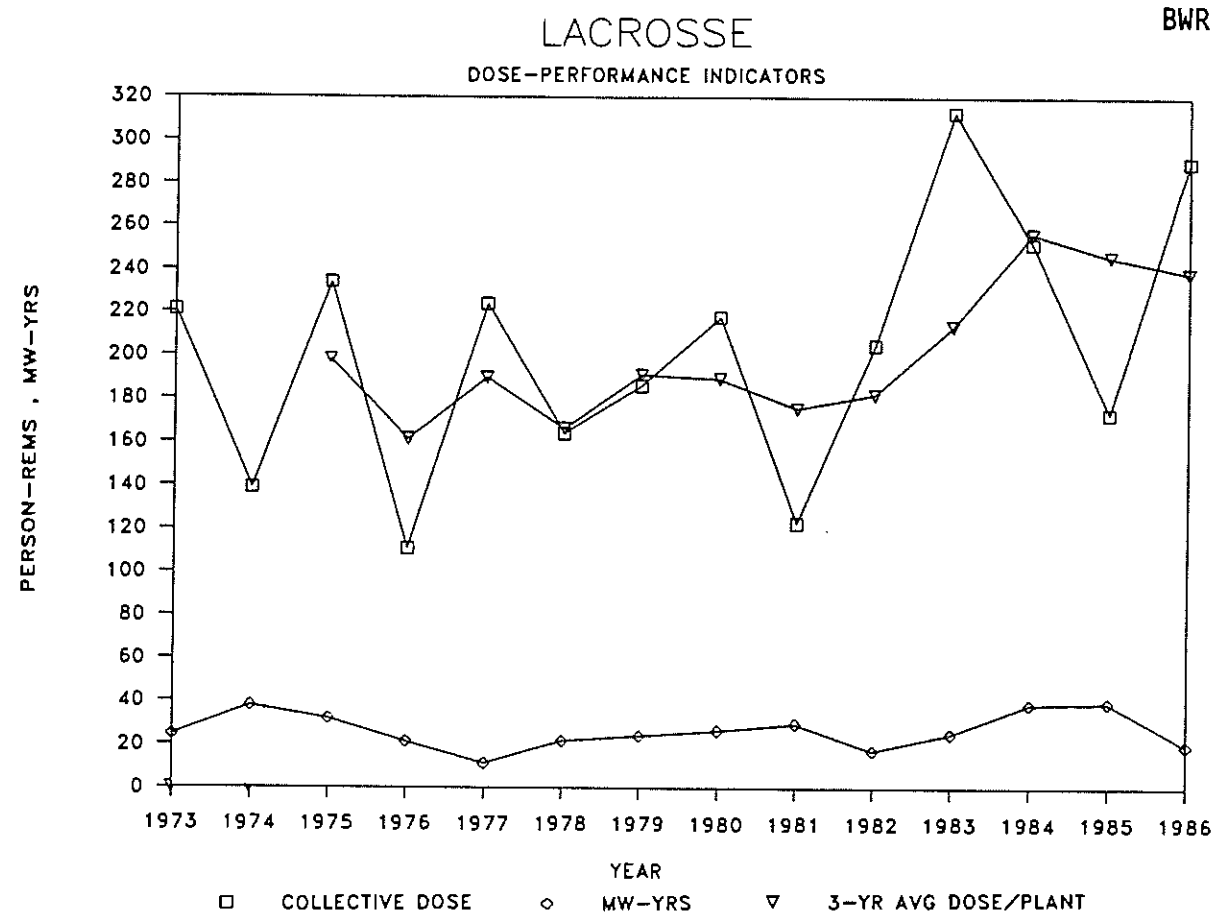
DOSE-PERFORMANCE INDICATORS

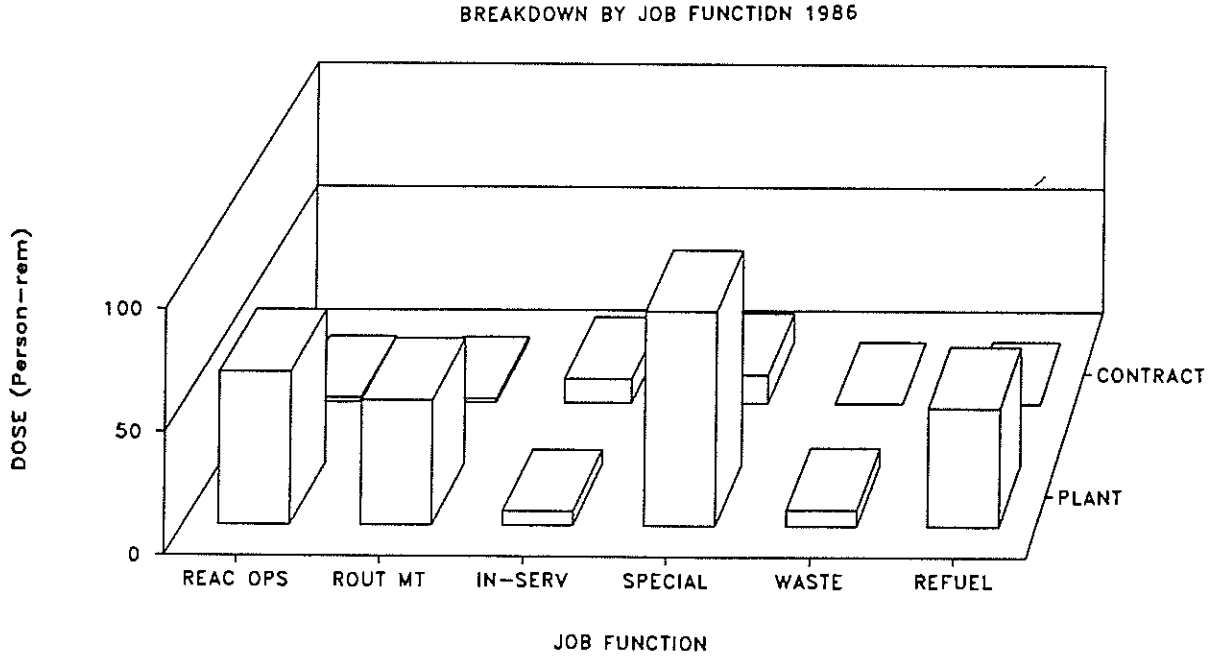


BREAKDOWN BY JOB FUNCTION 1986

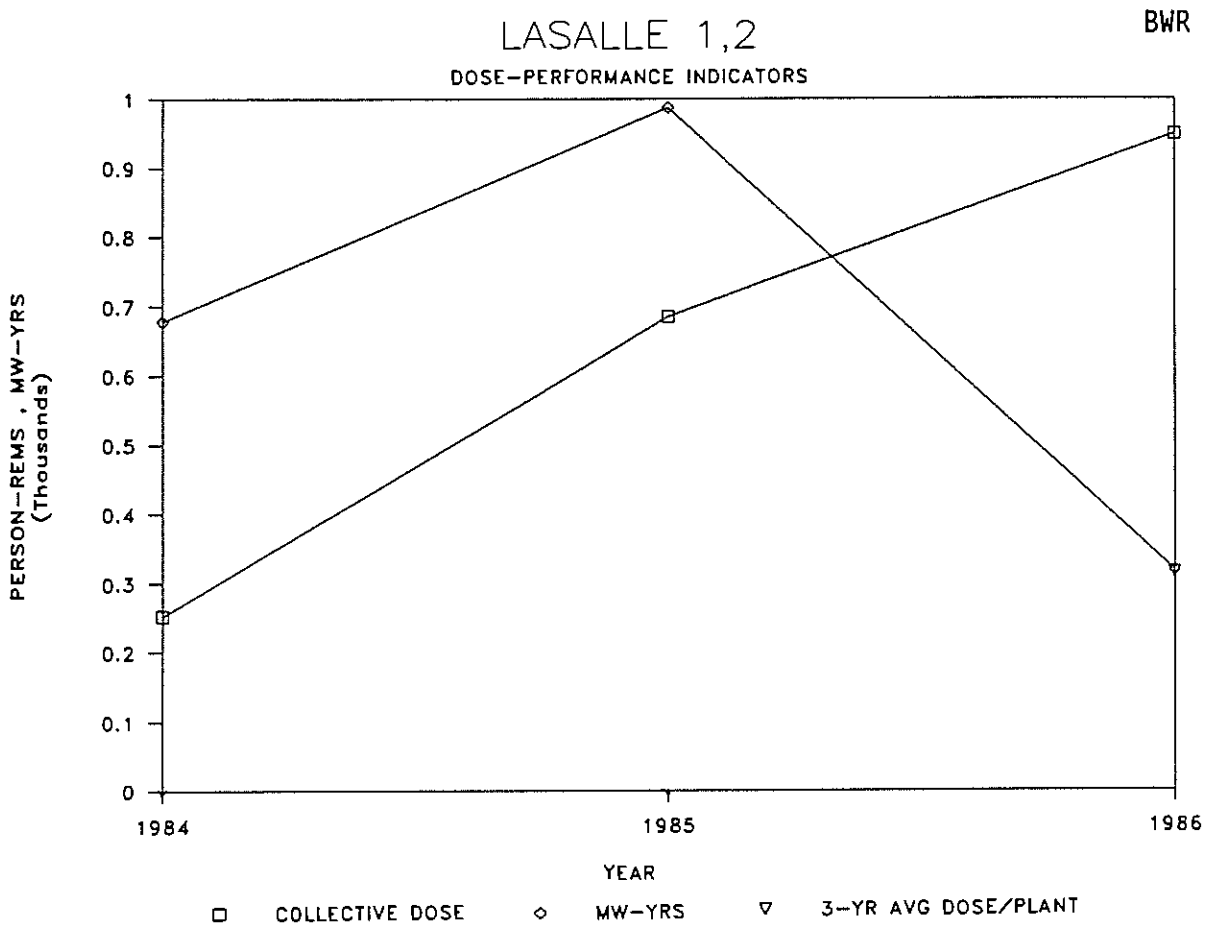


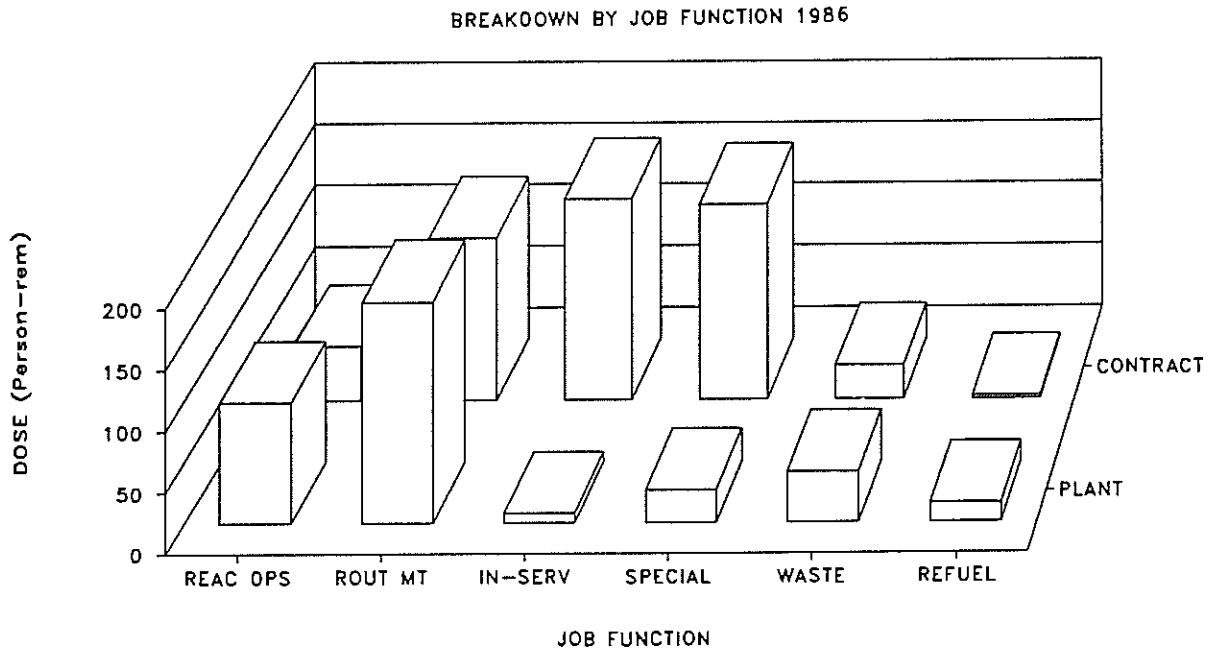
BWR


LACROSSE
DOSE-PERFORMANCE INDICATORS
PERSON-REMS , MW-YRS
320
300
280
260
240
220
200
180
160
140
120
100
80
60
40
20
0
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
YEAR
COLLECTIVE DOSE
MW-YRS
3-YR AVG DOSE/PLANT


BREAKDOWN BY JOB FUNCTION 1986
DOSE (Person-rem)
100
50
0
CONTRACT
PLANT
REAC OPS
ROUT MT
IN-SERV
SPECIAL
WASTE
REFUEL
JOB FUNCTION

BWR

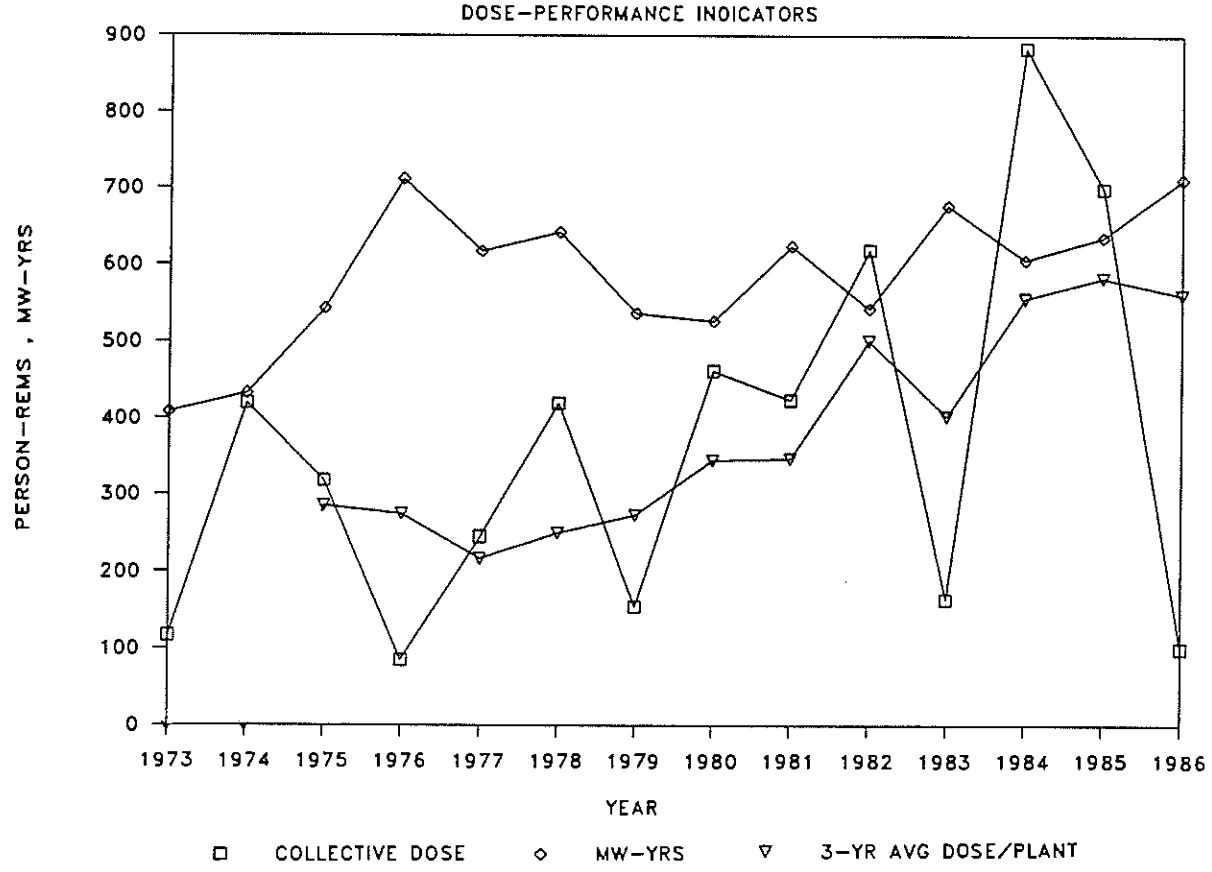

LASALLE 1,2
DOSE-PERFORMANCE INDICATORS
PERSON-REMS , MW-YRS (Thousands)
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1984
1985
1986
YEAR
COLLECTIVE DOSE
MW-YRS
3-YR AVG DOSE/PLANT


BREAKDOWN BY JOB FUNCTION 1986
DOSE (Person-rem)
200
150
100
50
0
CONTRACT
PLANT
REAC OPS
ROUT MT
IN-SERV
SPECIAL
WASTE
REFUEL
JOB FUNCTION

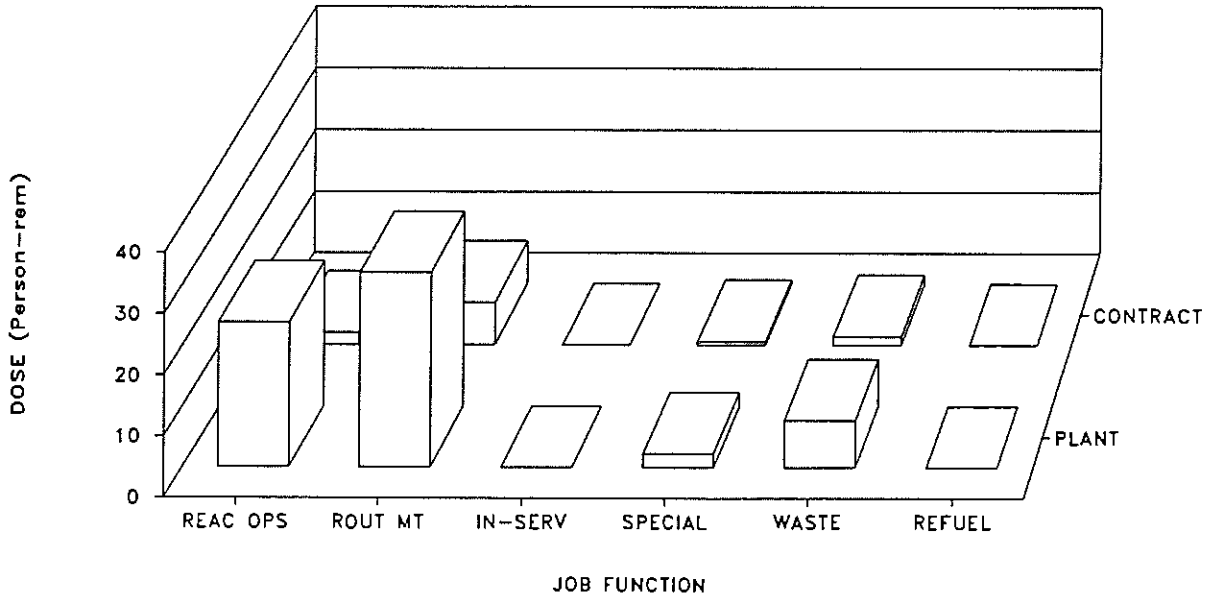
MAINE YANKEE

PWR

DOSE-PERFORMANCE INDICATORS



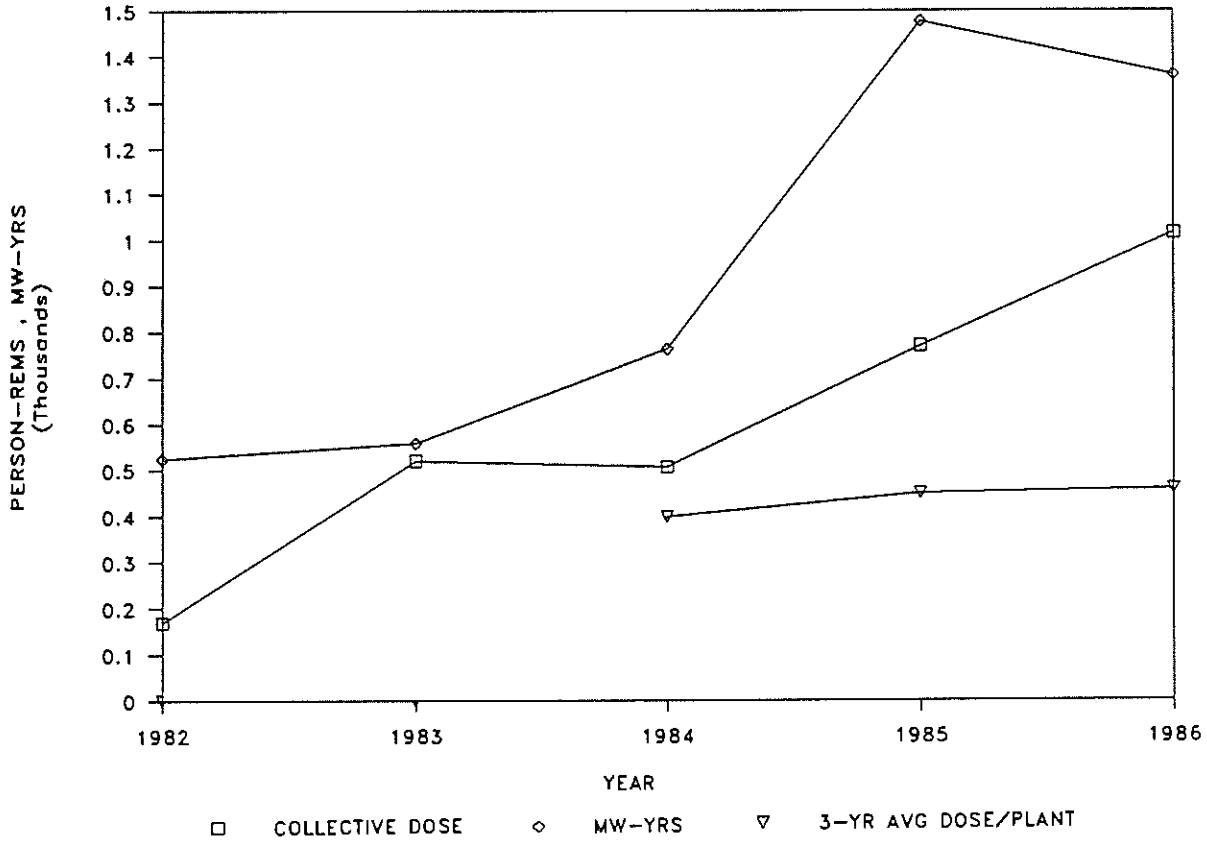
BREAKDOWN BY JOB FUNCTION 1986



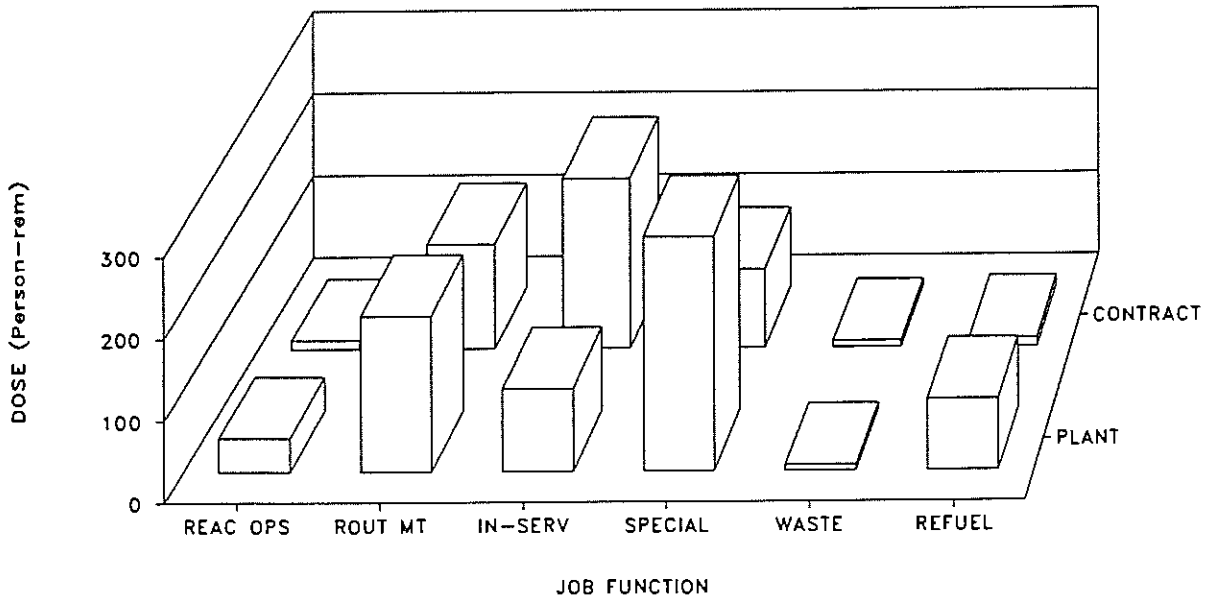
PWR

MCGUIRE 1,2

DOSE-PERFORMANCE INDICATORS



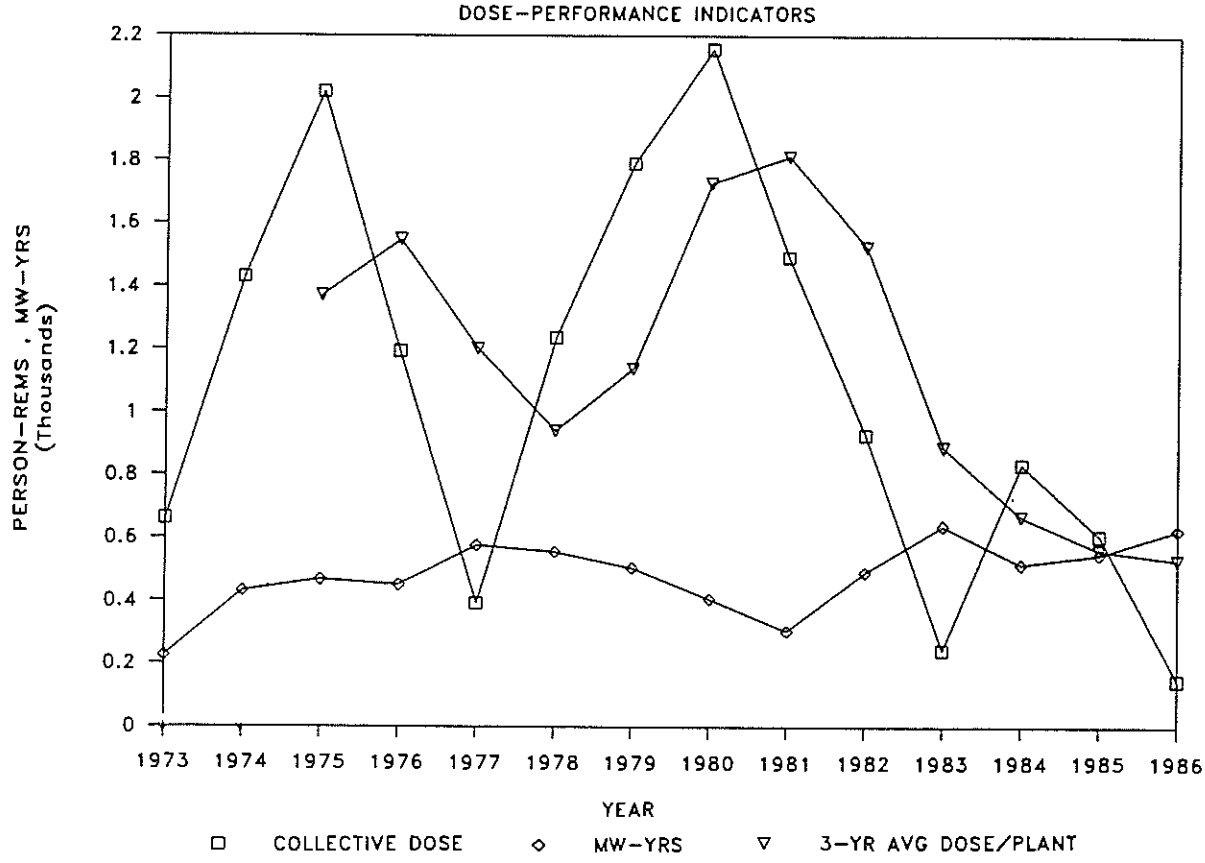
BREAKDOWN BY JOB FUNCTION 1986



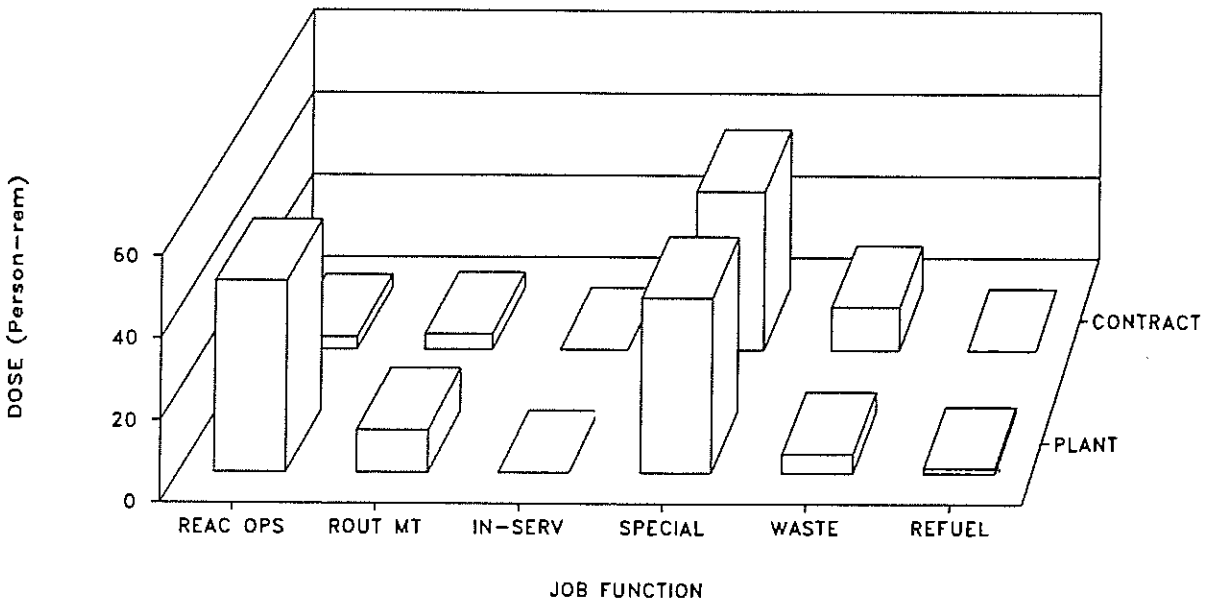
BWR

MILLSTONE POINT 1

DOSE-PERFORMANCE INDICATORS



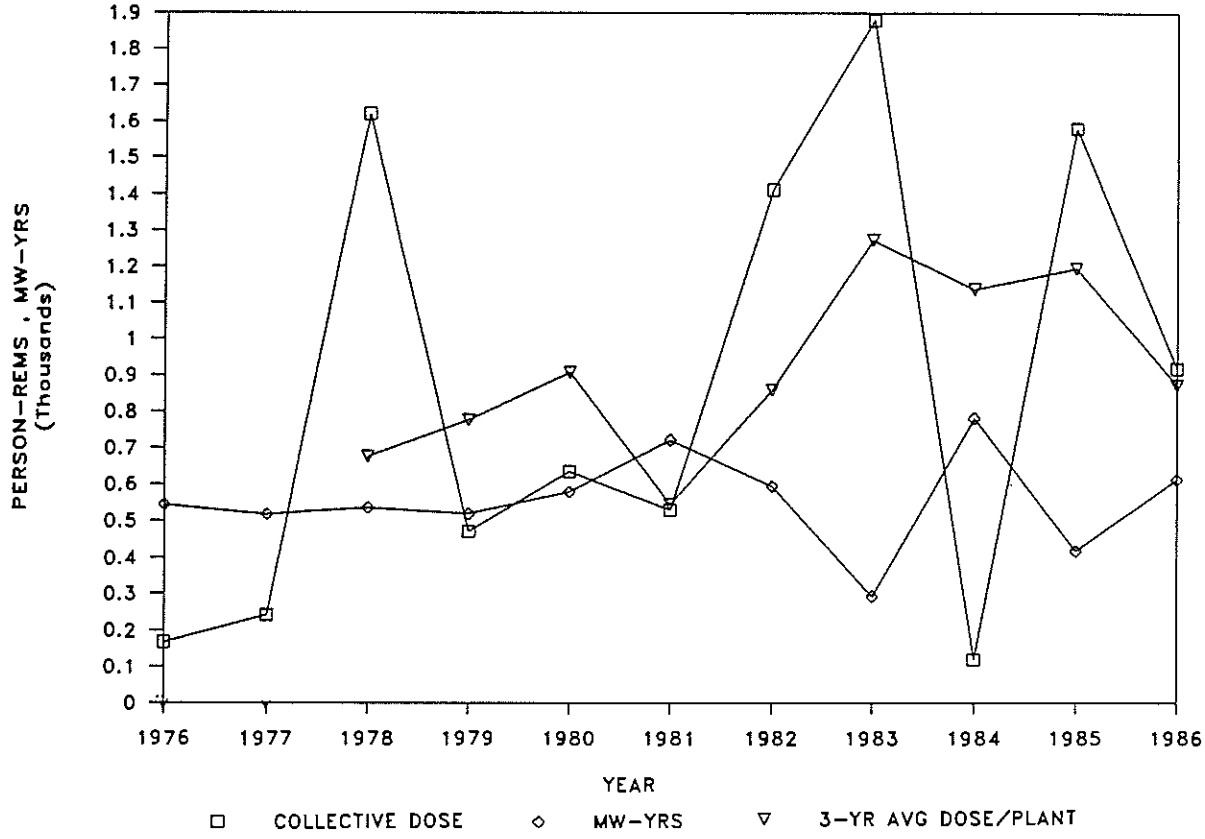
BREAKDOWN BY JOB FUNCTION 1986



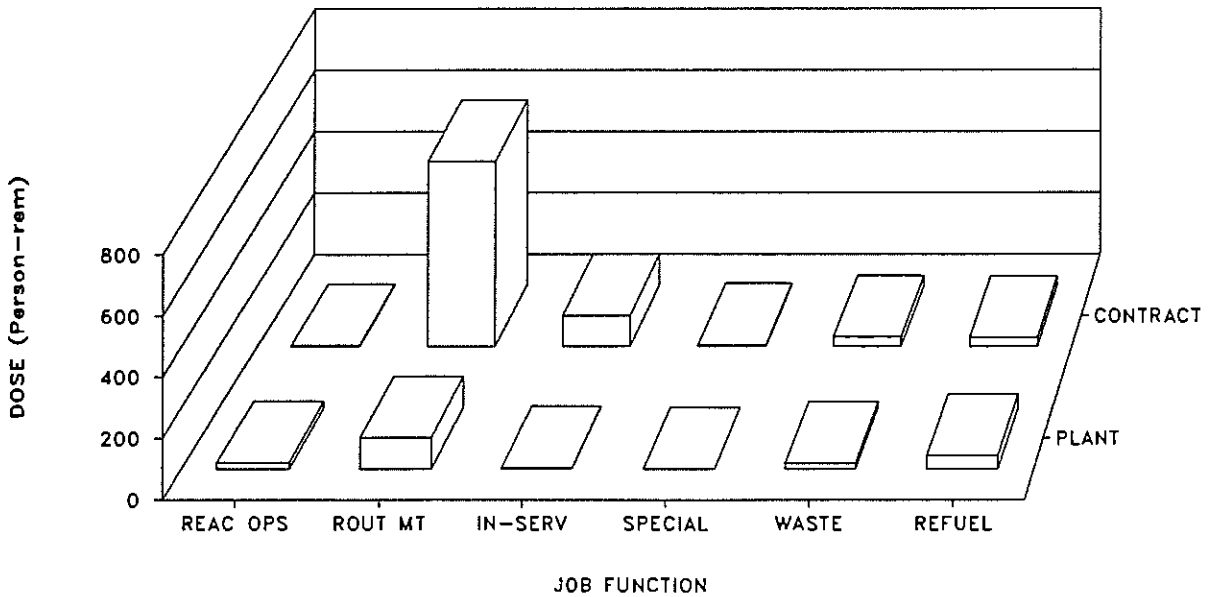
MILLSTONE POINT 2

PWR

DOSE-PERFORMANCE INDICATORS



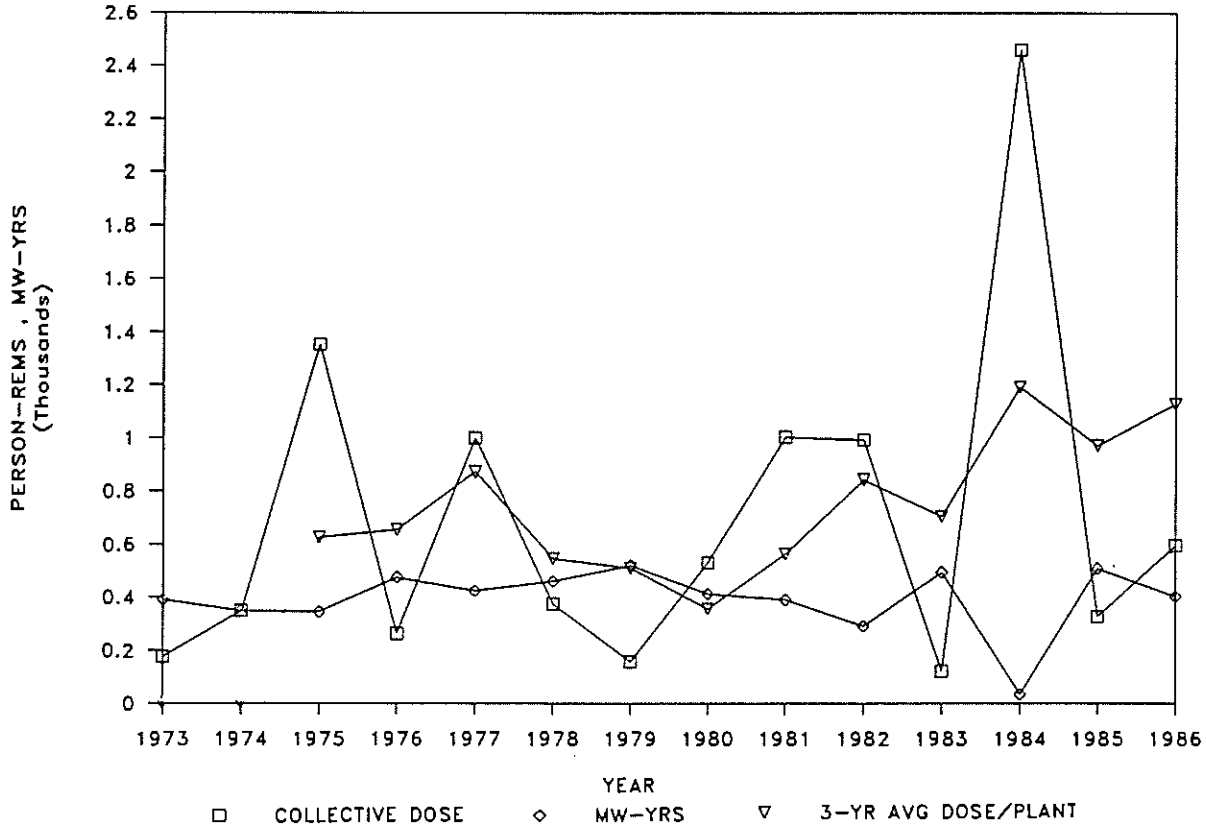
BREAKDOWN BY JOB FUNCTION 1986



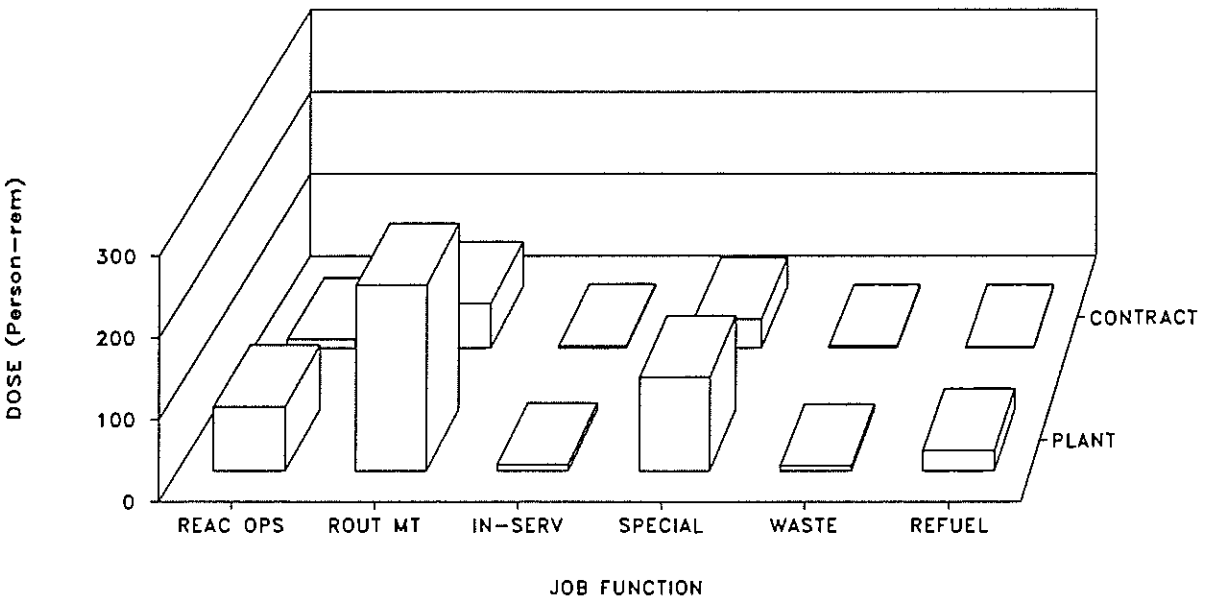
BWR

MONTICELLO

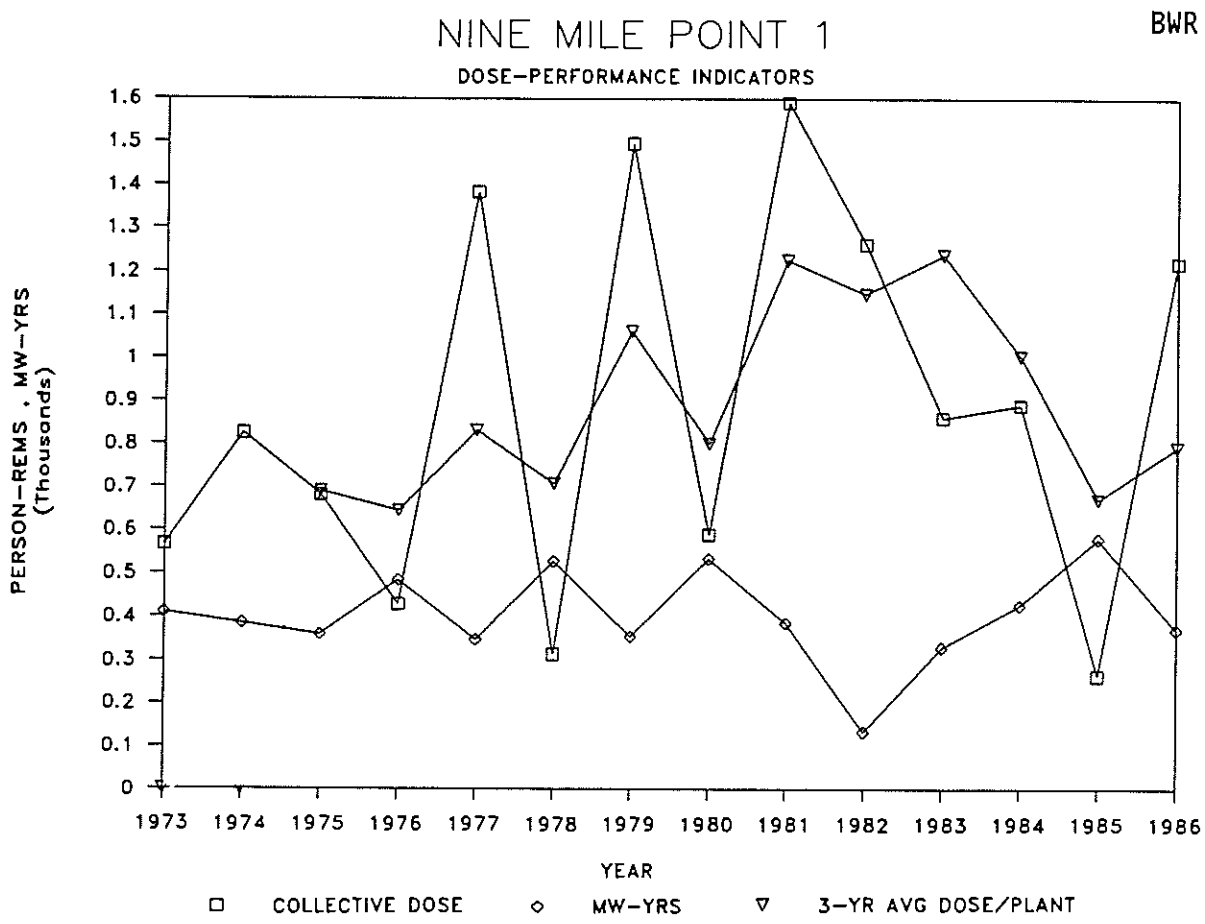
DOSE-PERFORMANCE INDICATORS

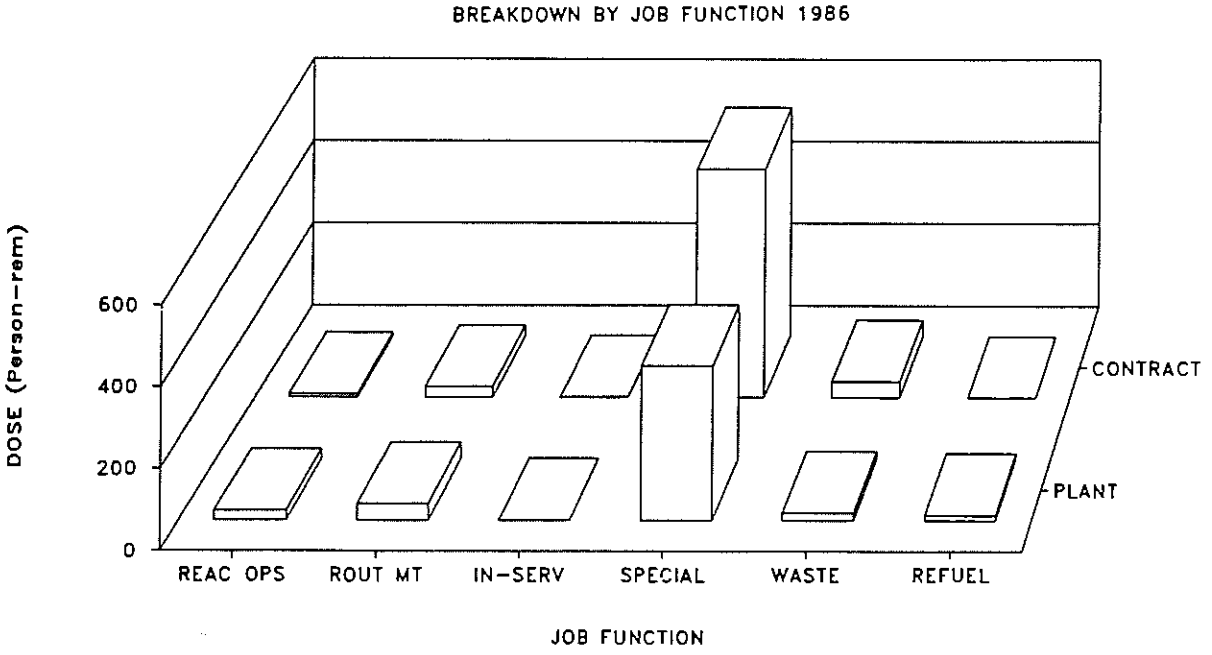


BREAKDOWN BY JOB FUNCTION 1986



BWR

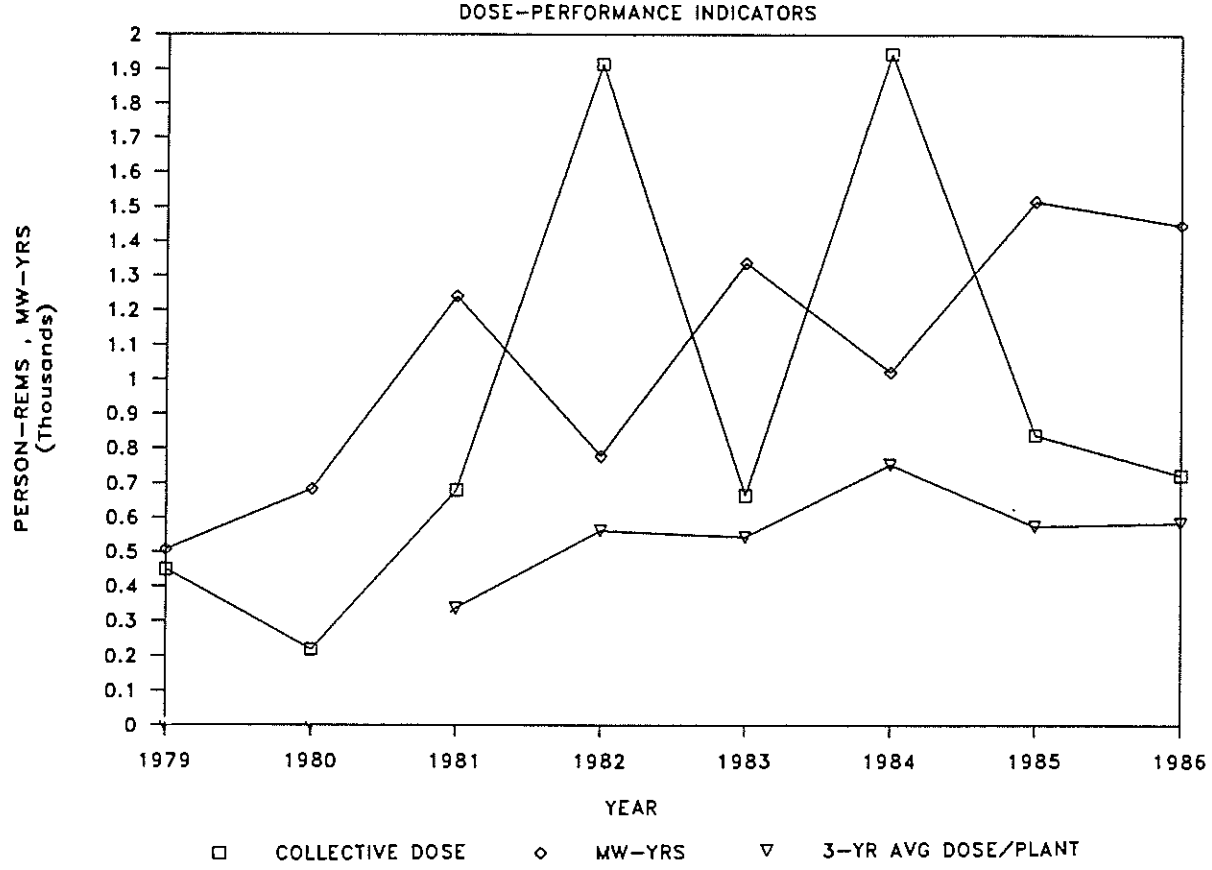

NINE MILE POINT 1
DOSE-PERFORMANCE INDICATORS
PERSON-REMS , MW-YRS (Thousands)
1.6
1.5
1.4
1.3
1.2
1.1
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986
YEAR
COLLECTIVE DOSE
MW-YRS
3-YR AVG DOSE/PLANT


BREAKDOWN BY JOB FUNCTION 1986
DOSE (Person-rem)
600
400
200
0
CONTRACT
PLANT
REAC OPS
ROUT MT
IN-SERV
SPECIAL
WASTE
REFUEL
JOB FUNCTION

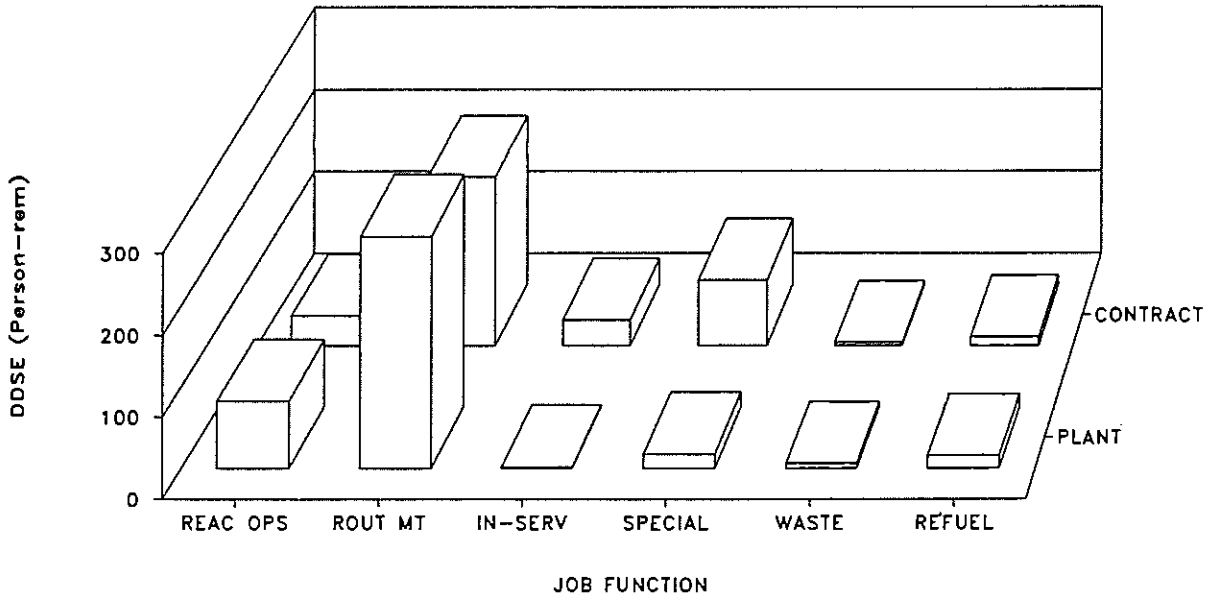
NORTH ANNA 1,2

PWR

DOSE-PERFORMANCE INDICATORS



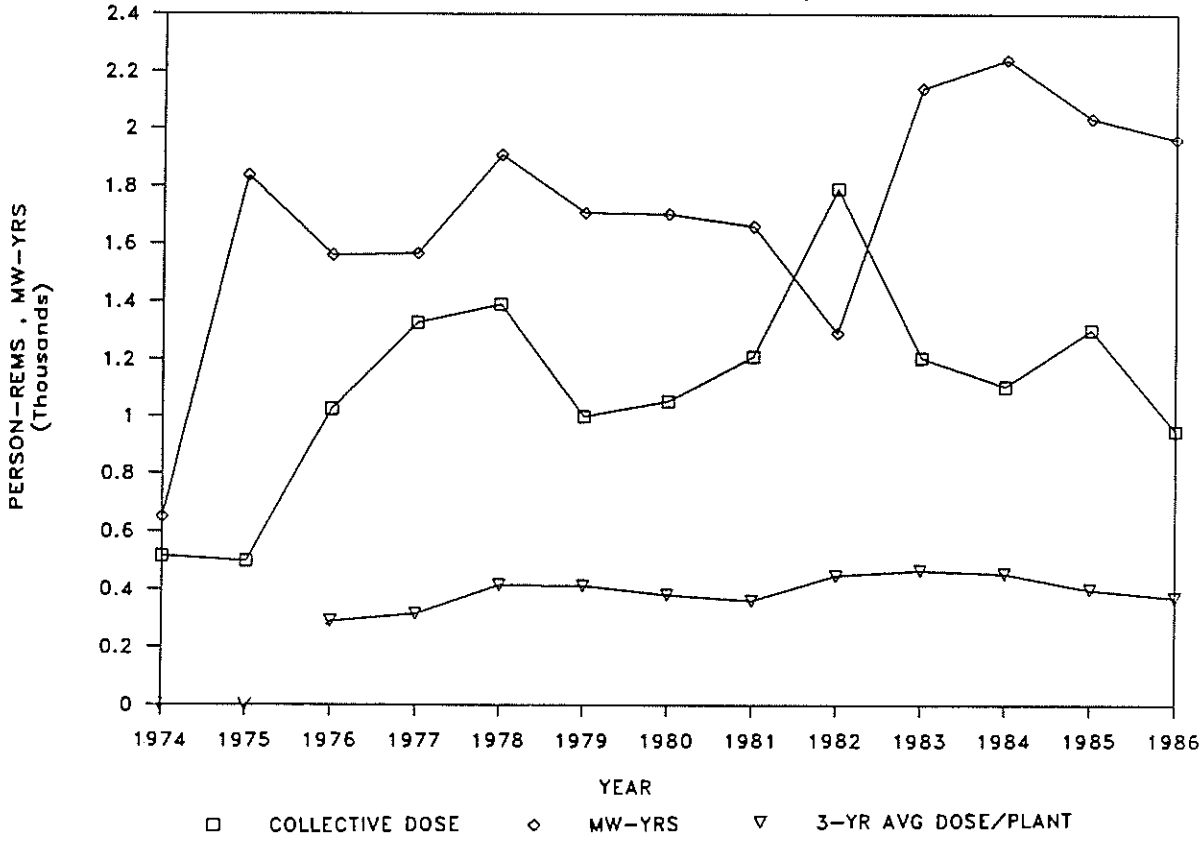
BREAKDOWN BY JOB FUNCTION 1986



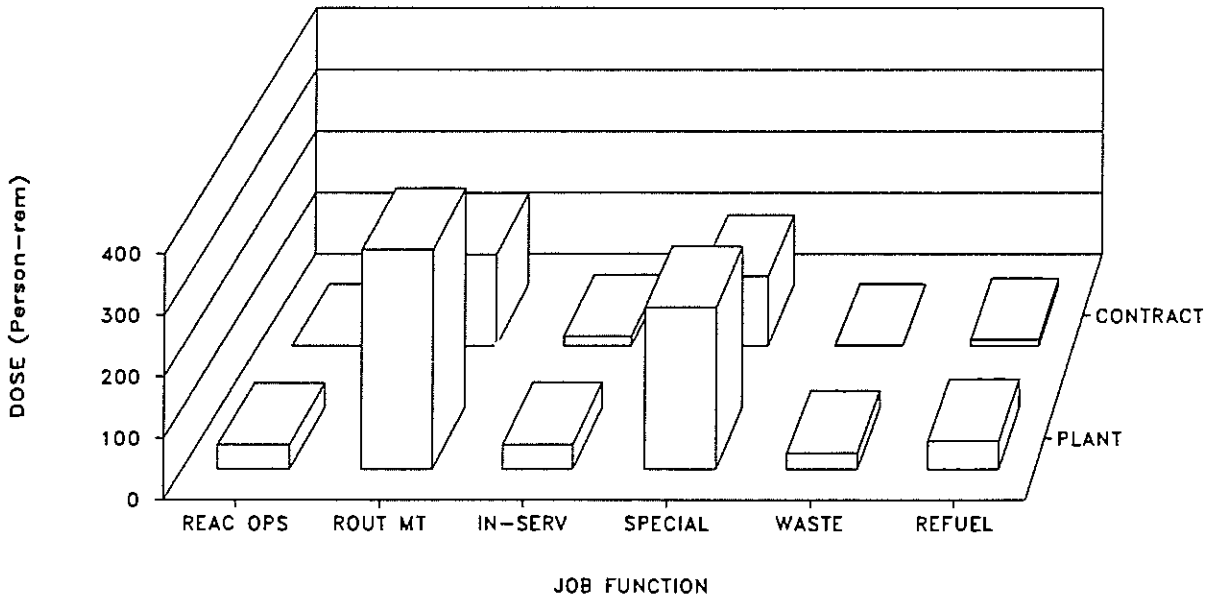
PWR

OCONEE 1,2,3

DOSE-PERFORMANCE INDICATORS



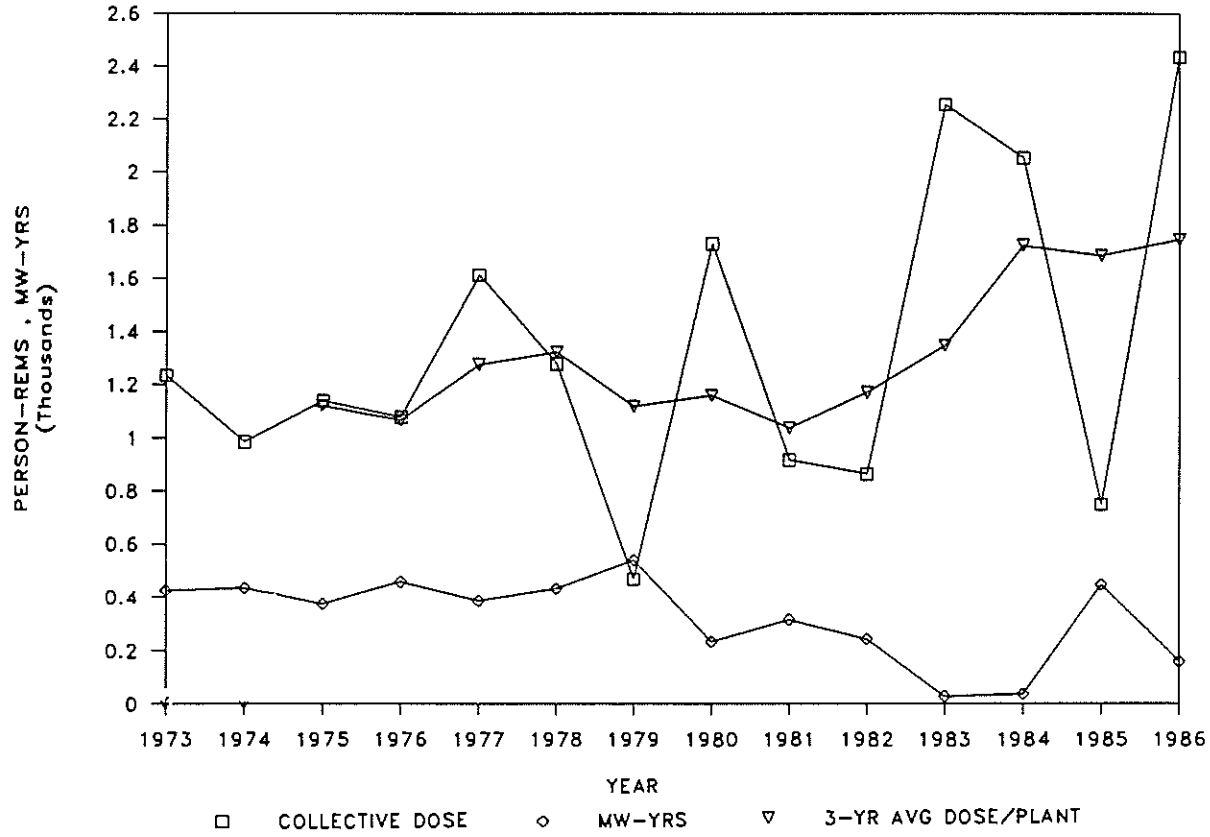
BREAKDOWN BY JOB FUNCTION 1986



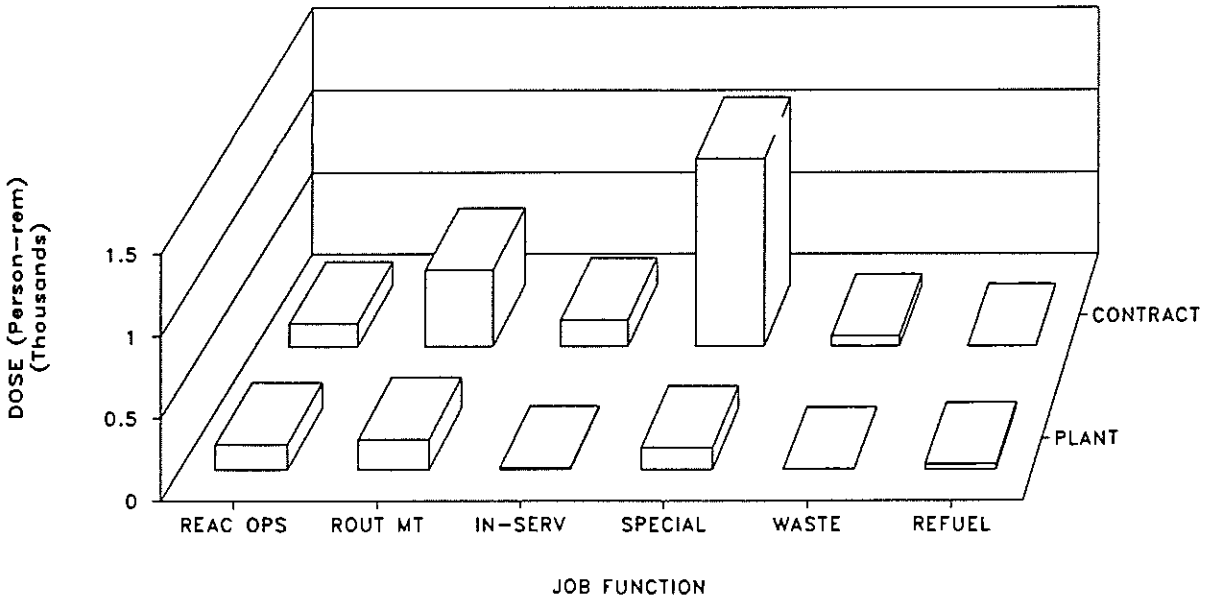
BWR

OYSTER CREEK

DOSE-PERFORMANCE INDICATORS



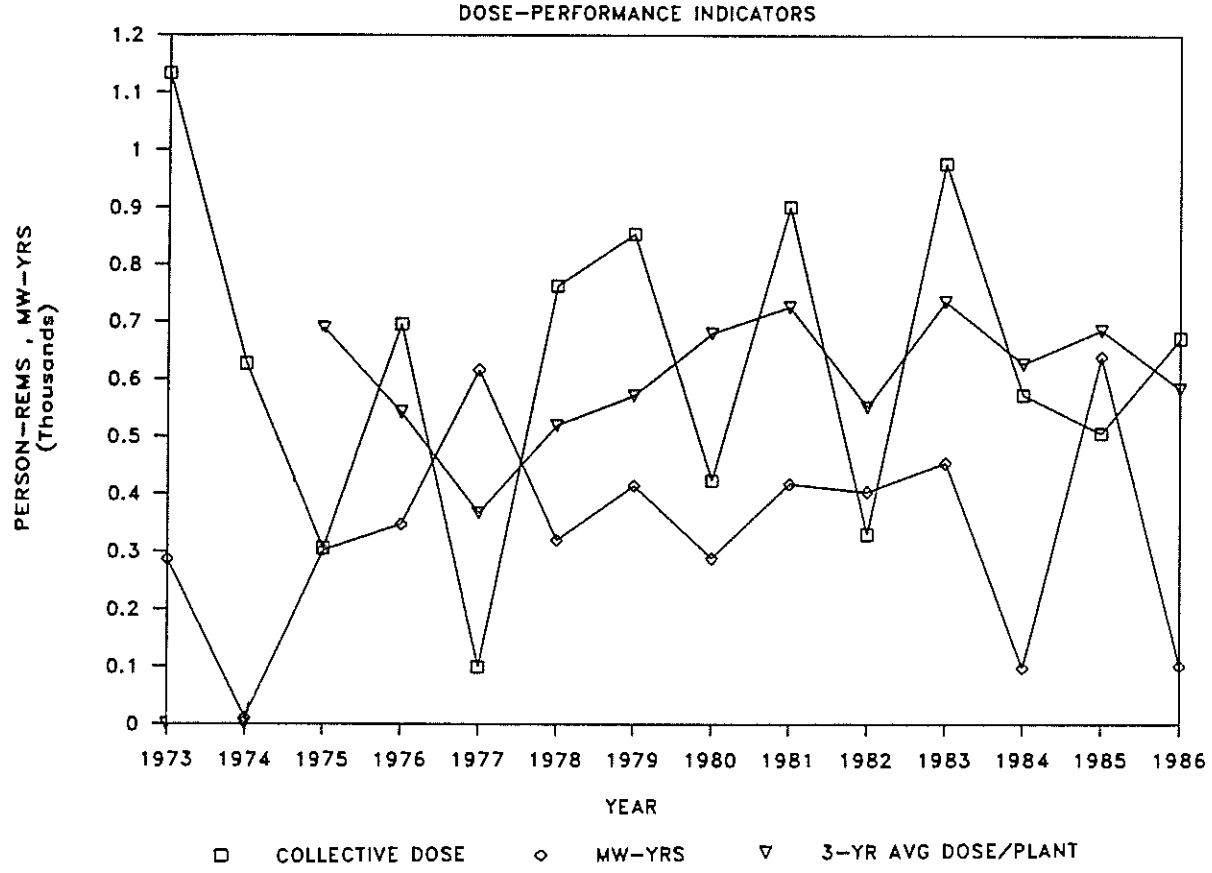
BREAKDOWN BY JOB FUNCTION 1986



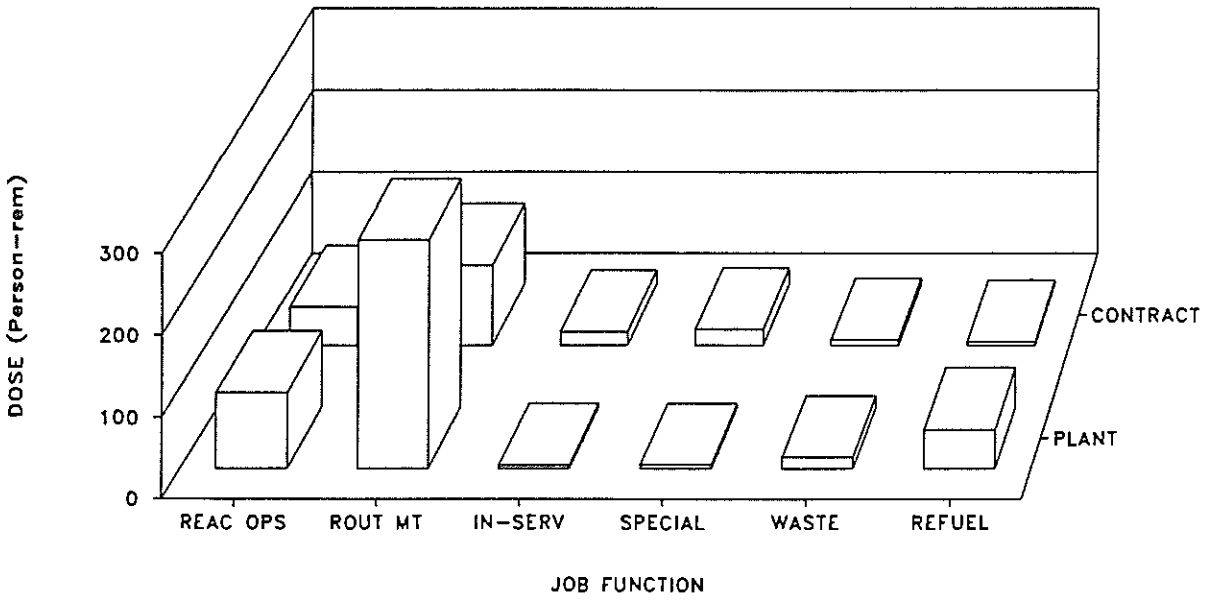
PALISADES

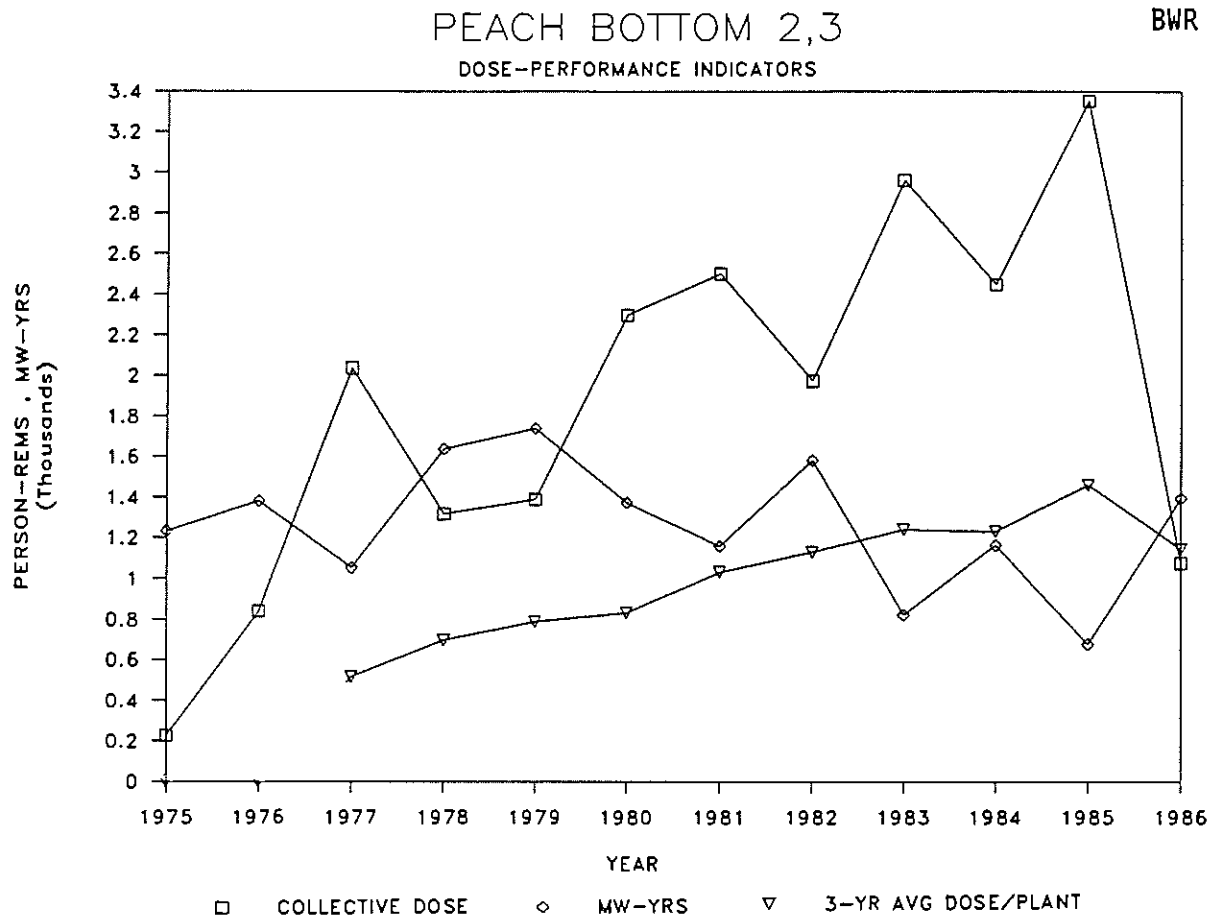
PWR

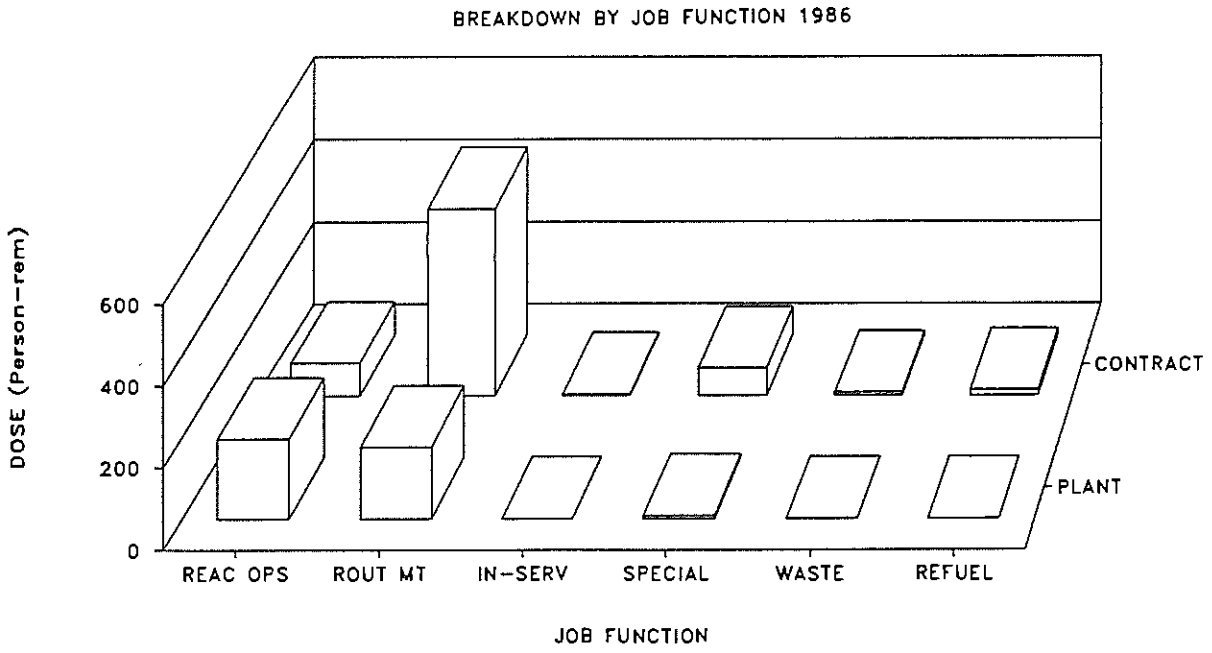
DOSE-PERFORMANCE INDICATORS



BREAKDOWN BY JOB FUNCTION 1986

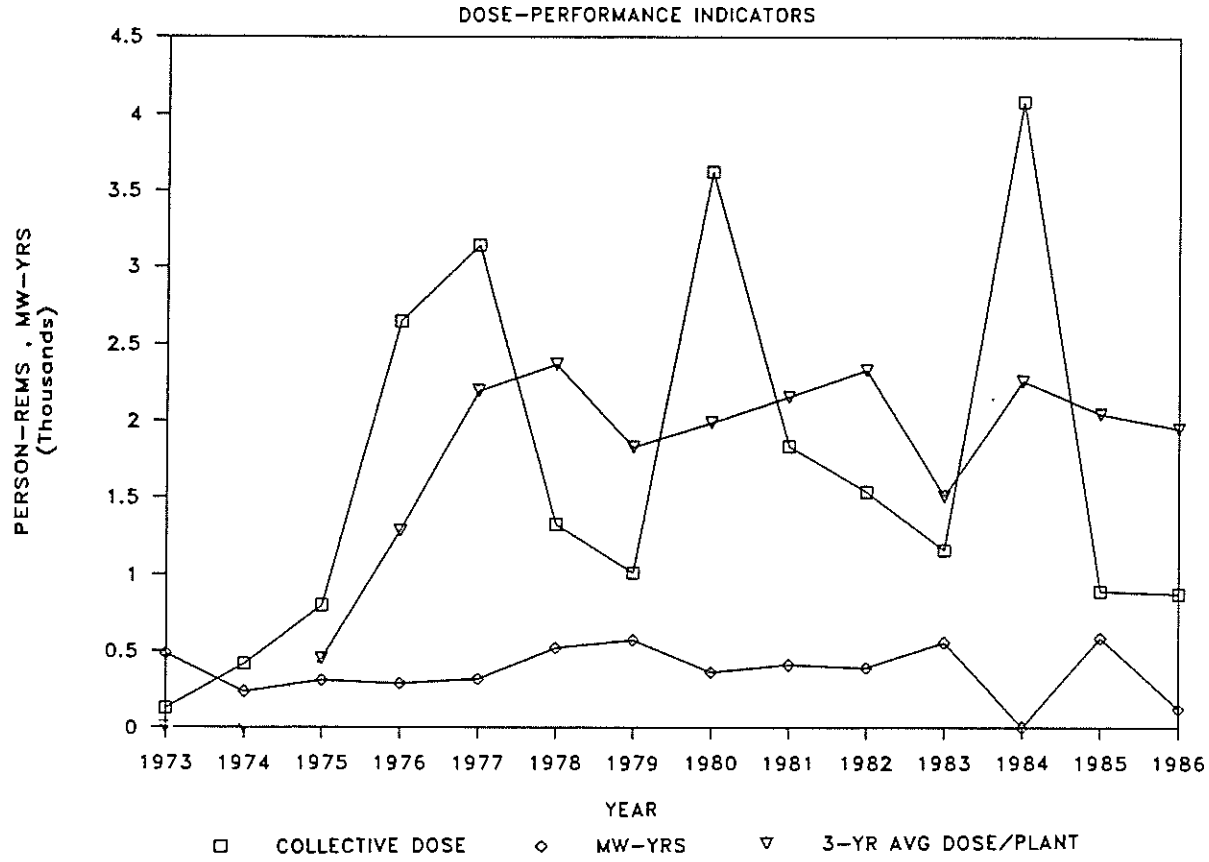


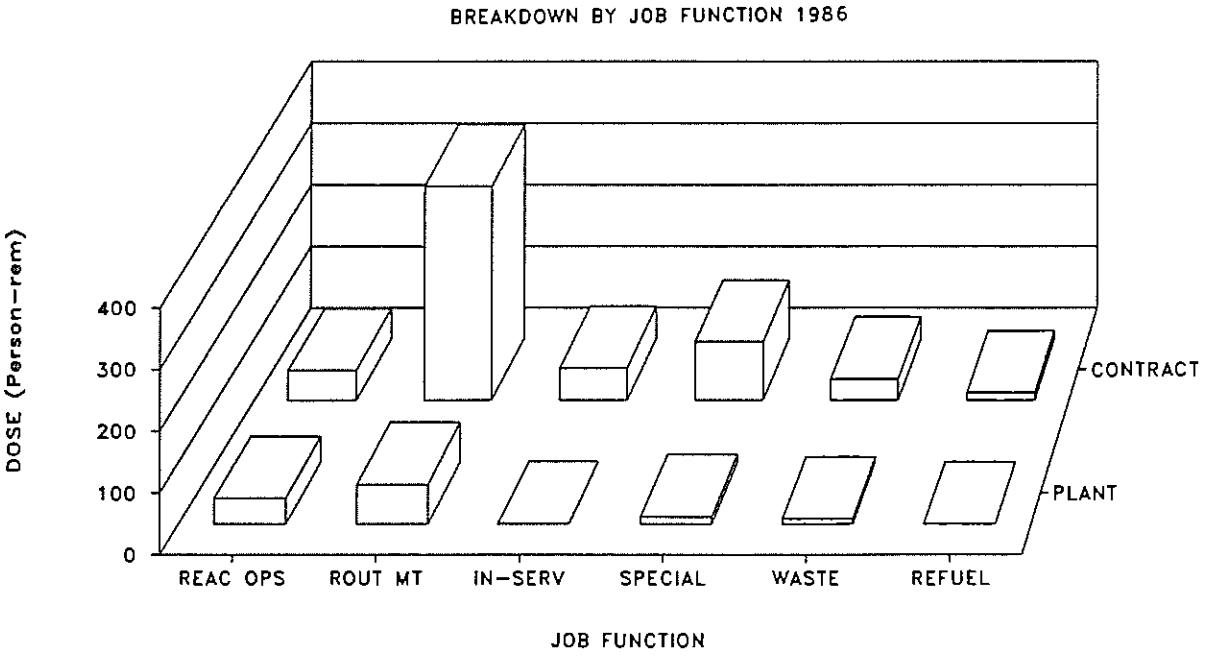

PEACH BOTTOM 2,3
BWR
DOSE-PERFORMANCE INDICATORS
PERSON-REMS . MW-YRS (Thousands)
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986
YEAR
COLLECTIVE DOSE
MW-YRS
3-YR AVG DOSE/PLANT


BREAKDOWN BY JOB FUNCTION 1986
DOSE (Person-rem)
600
400
200
0
CONTRACT
PLANT
REAC OPS
ROUT MT
IN-SERV
SPECIAL
WASTE
REFUEL
JOB FUNCTION

PILGRIM 1

BWR

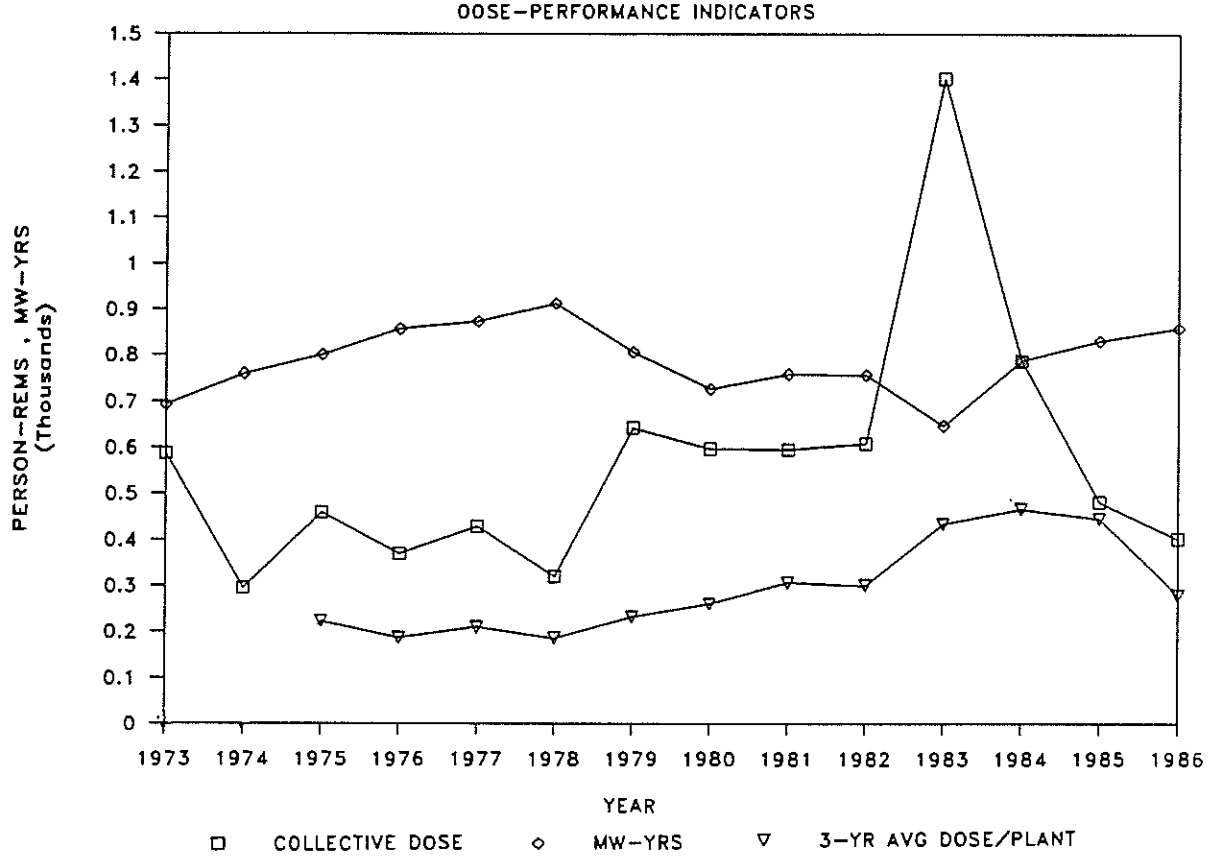




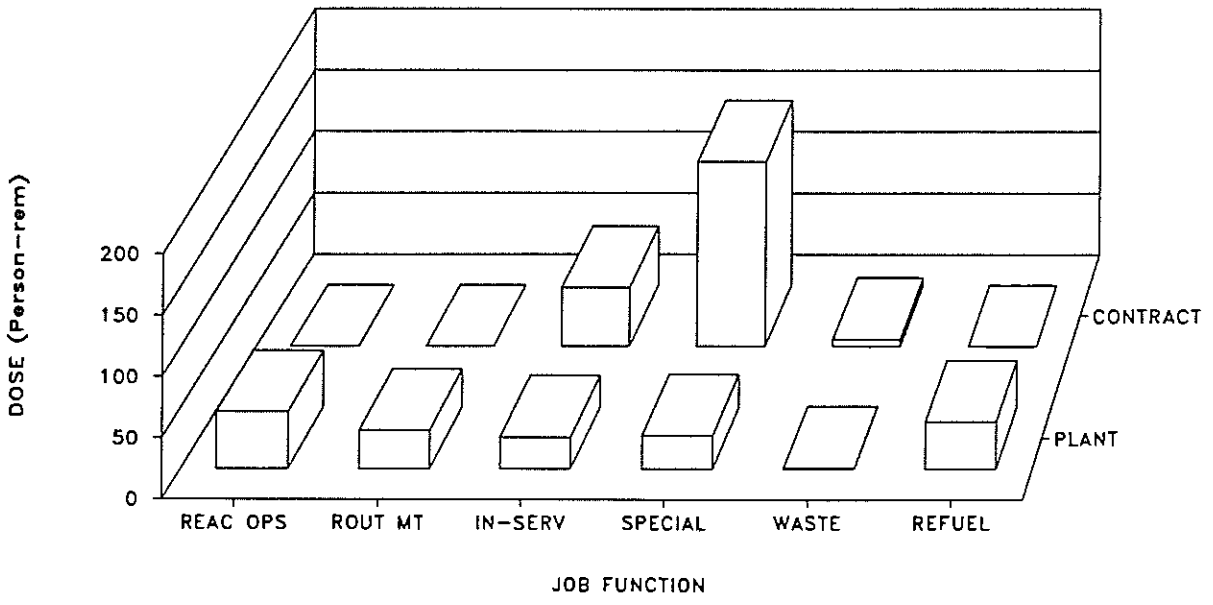
PWR

POINT BEACH 1,2

DOSE-PERFORMANCE INDICATORS



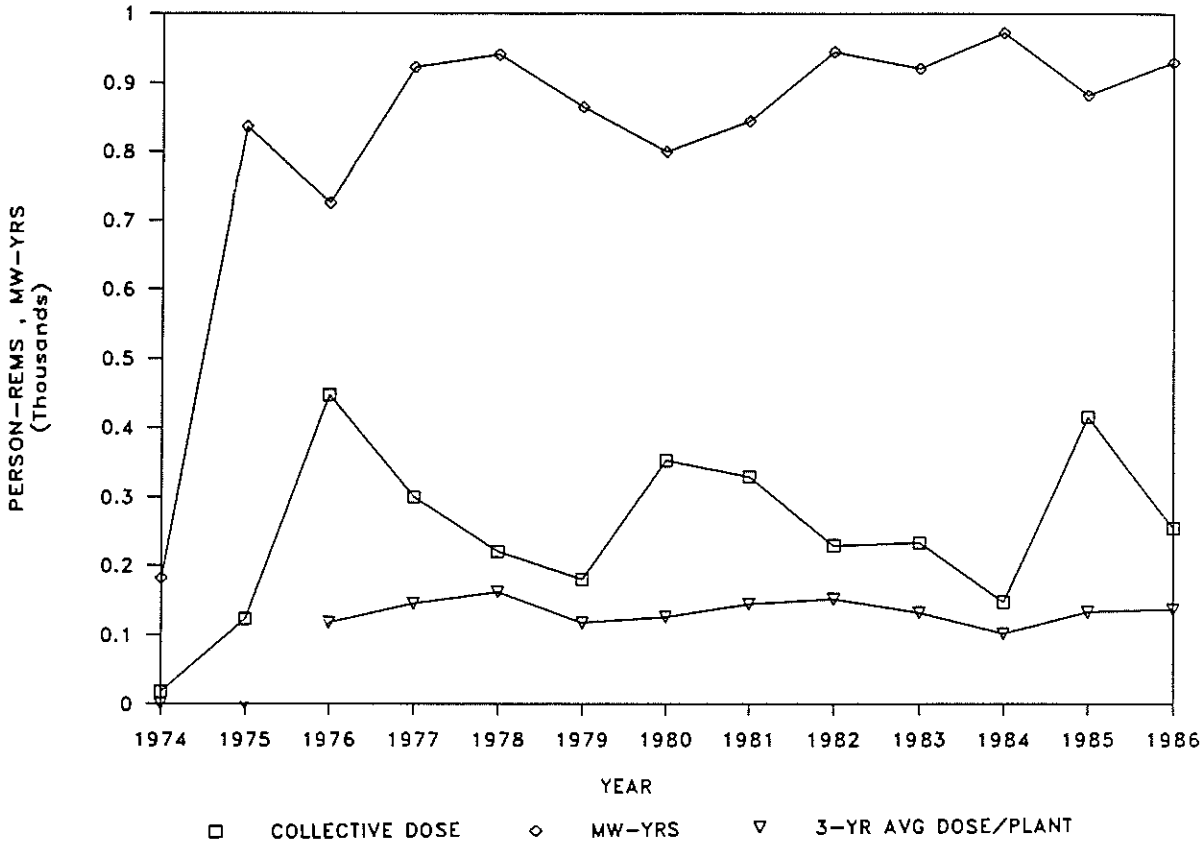
BREAKDOWN BY JOB FUNCTION 1986



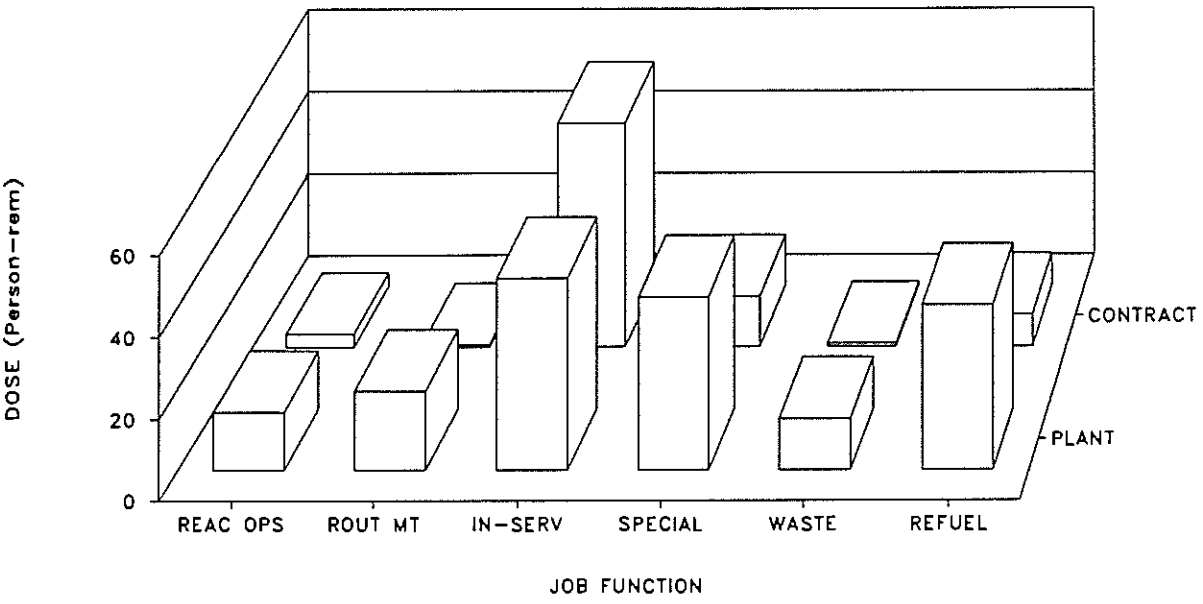
PRAIRIE ISLAND 1,2

PWR

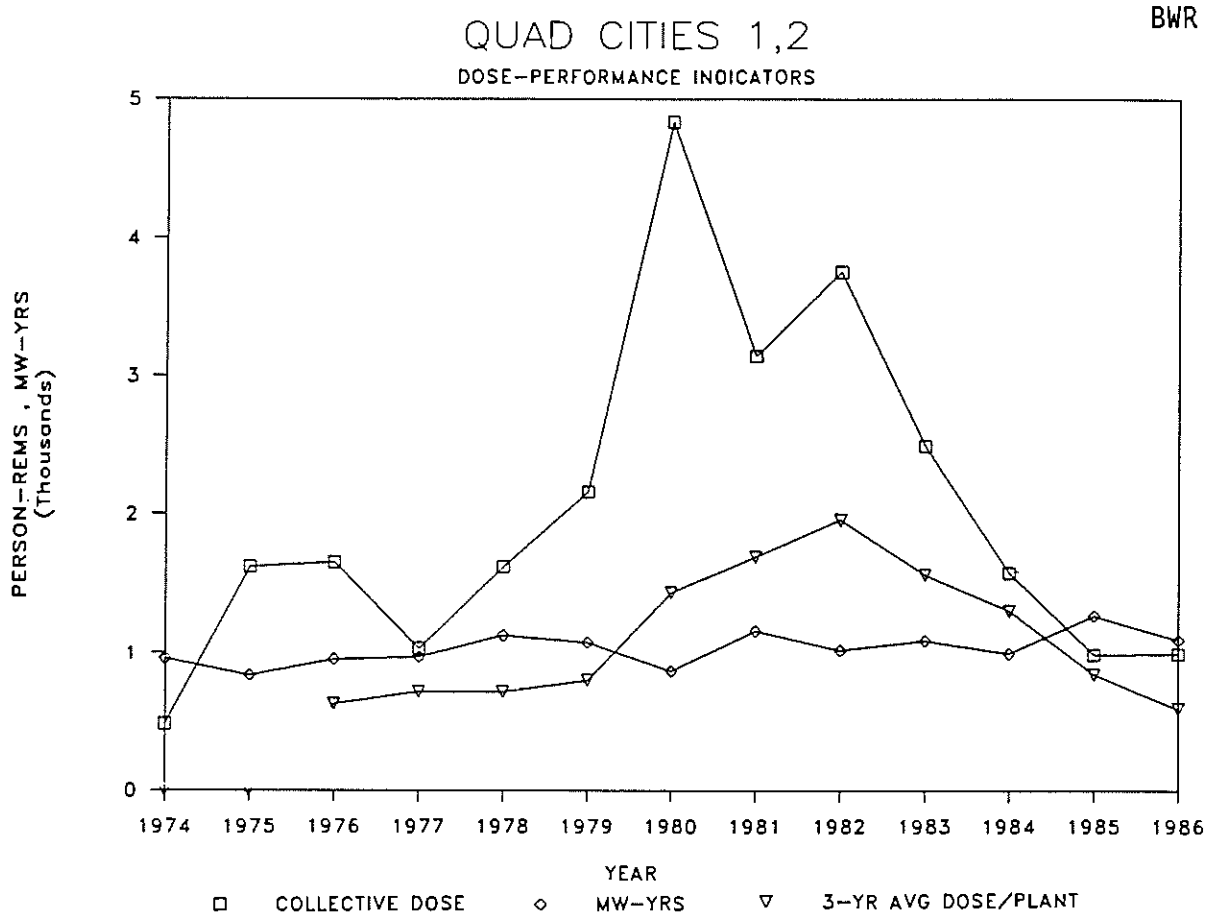
DOSE-PERFORMANCE INDICATORS

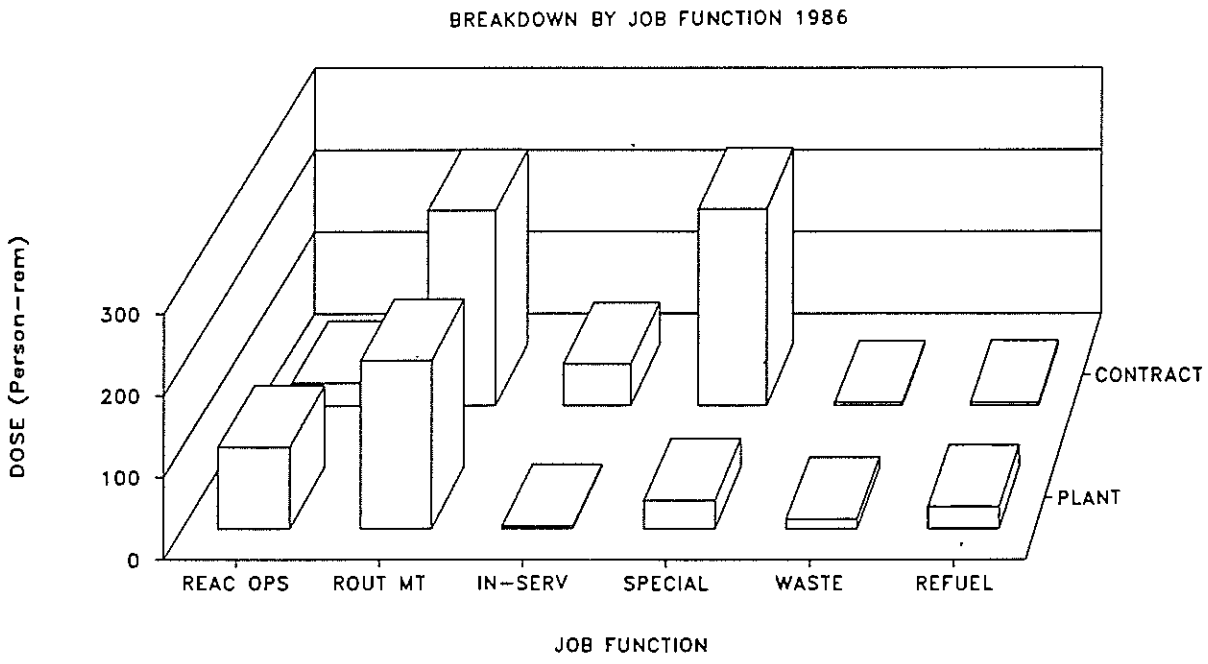


BREAKDOWN BY JOB FUNCTION 1986



BWR

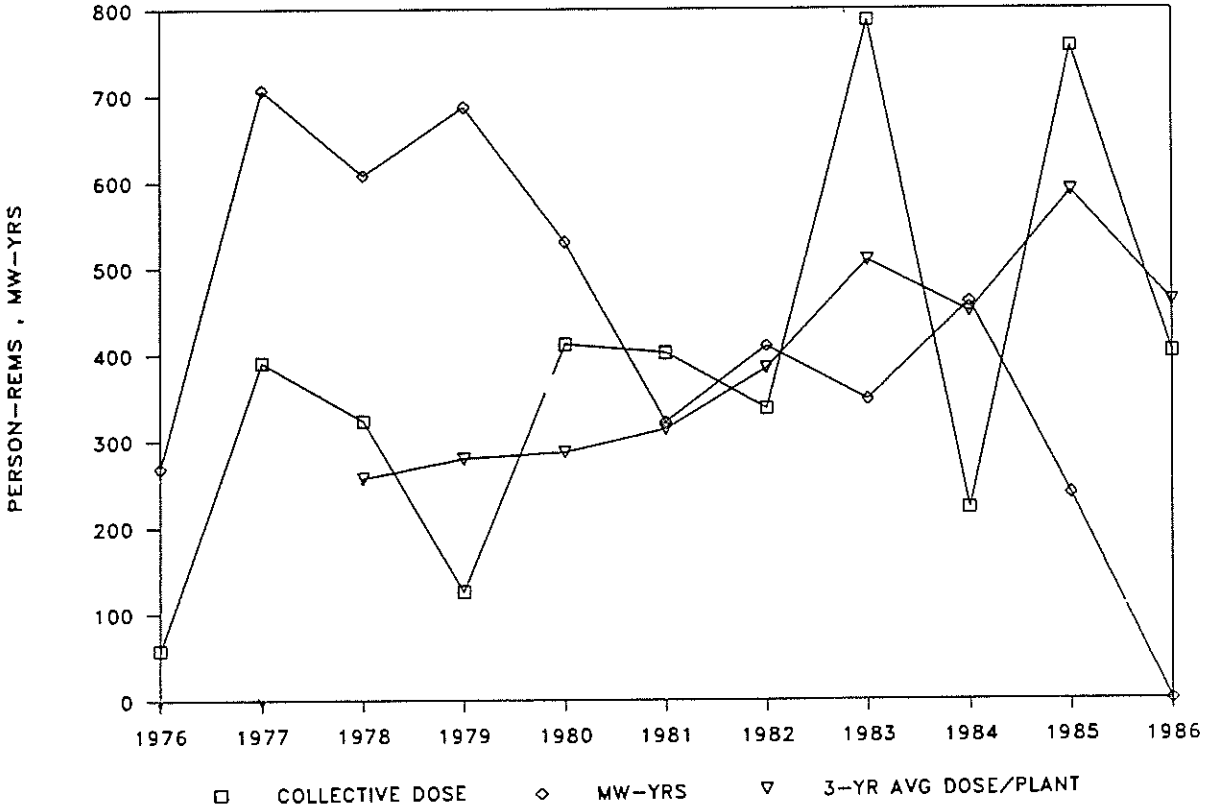

QUAD CITIES 1,2
DOSE-PERFORMANCE INDICATORS
PERSON-REMS , MW-YRS (Thousands)
0
1
2
3
4
5
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
YEAR
COLLECTIVE DOSE
MW-YRS
3-YR AVG DOSE/PLANT


BREAKDOWN BY JOB FUNCTION 1986
DOSE (Person-rem)
0
100
200
300
CONTRACT
PLANT
REAC OPS
ROUT MT
IN-SERV
SPECIAL
WASTE
REFUEL
JOB FUNCTION

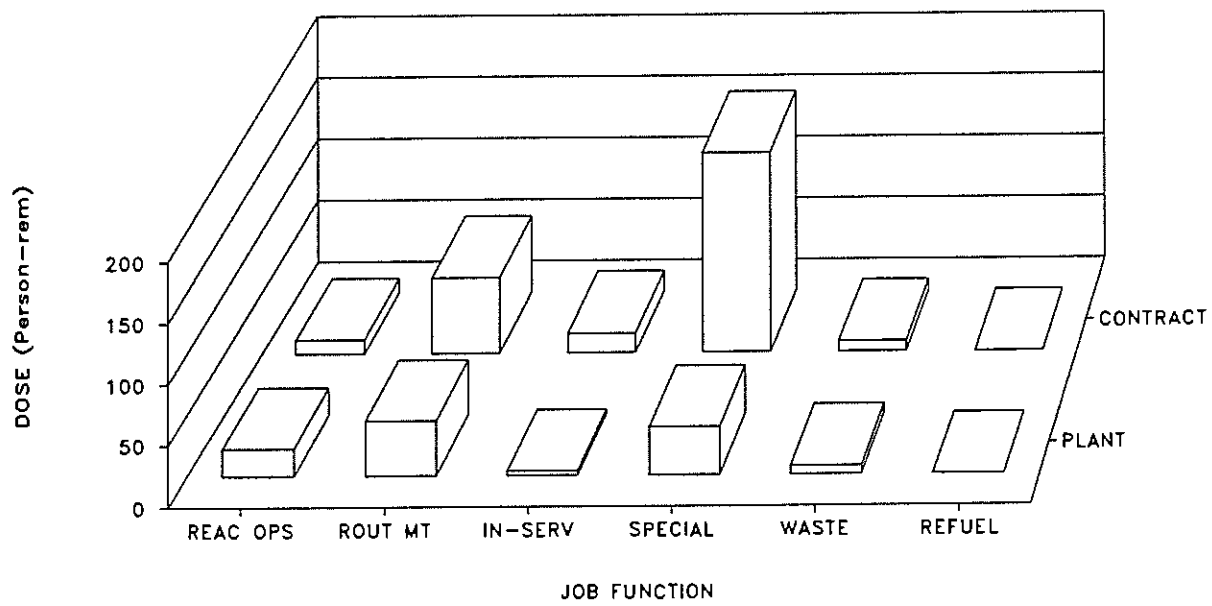
PWR

RANCHO SECO

DOSE-PERFORMANCE INDICATORS



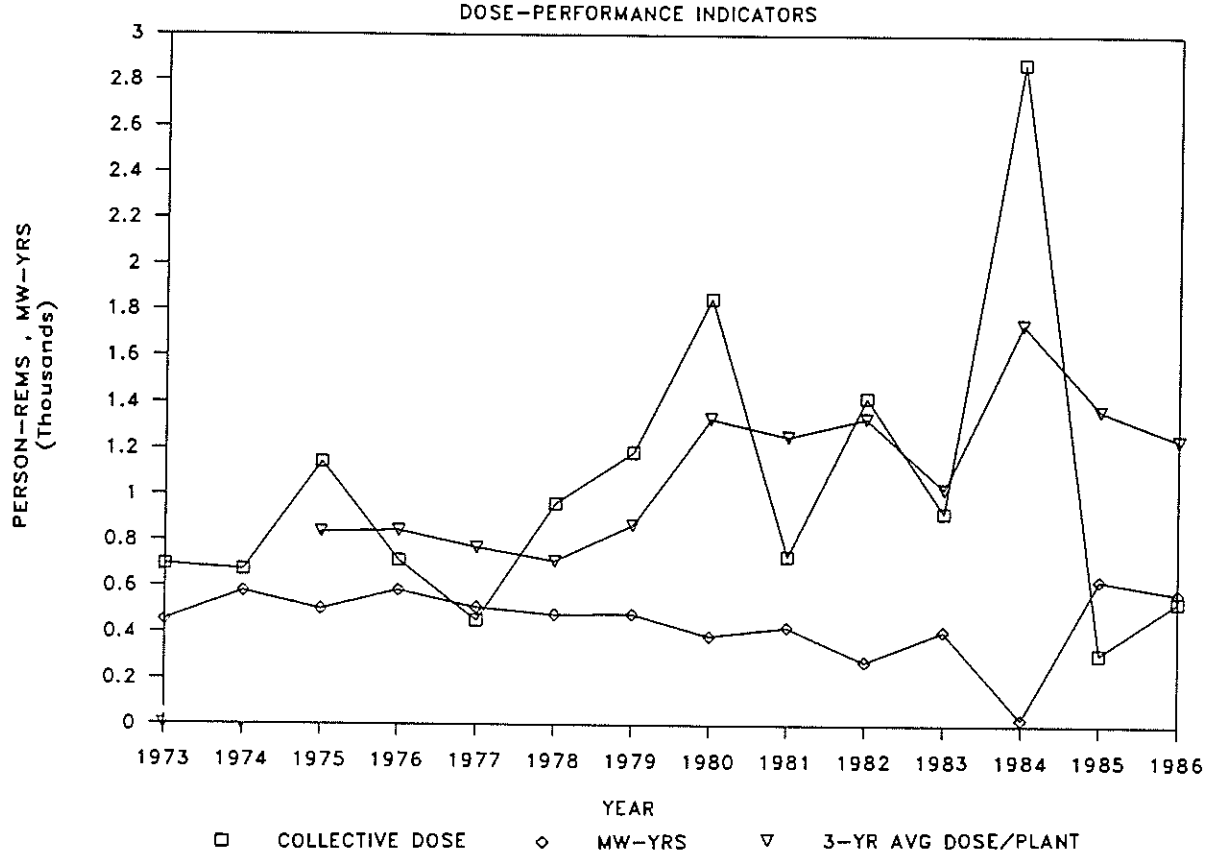
BREAKDOWN BY JOB FUNCTION 1986



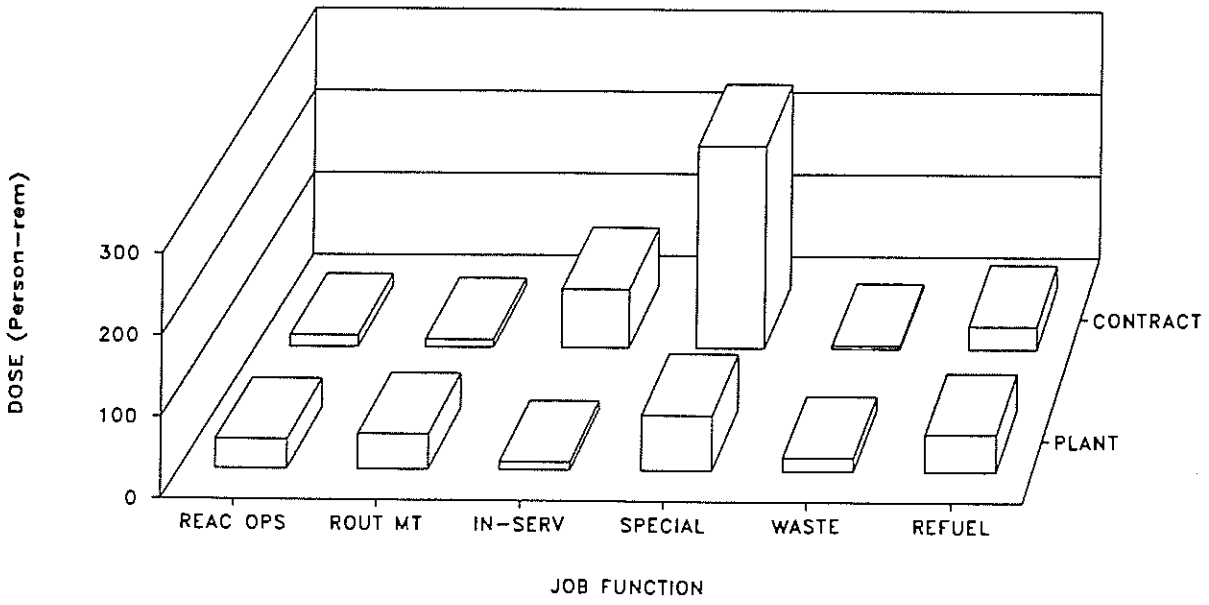
PWR

ROBINSON 2

DOSE-PERFORMANCE INDICATORS



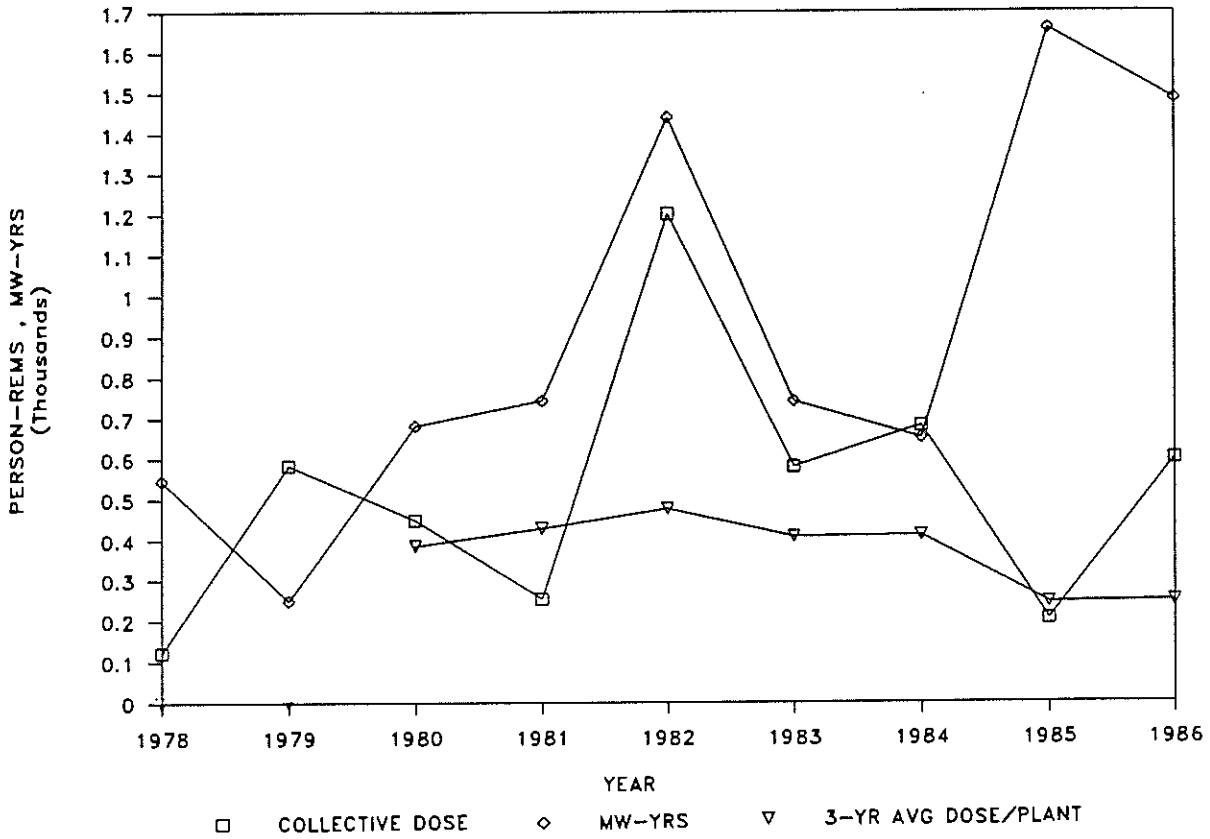
BREAKDOWN BY JOB FUNCTION 1986



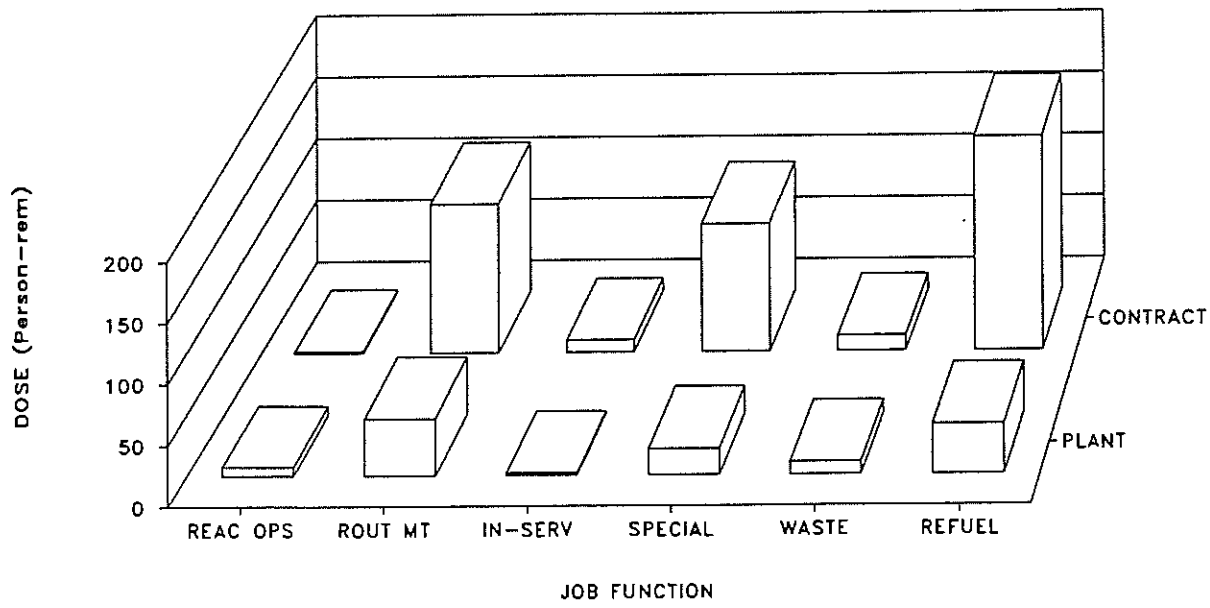
PWR

SALEM 1,2

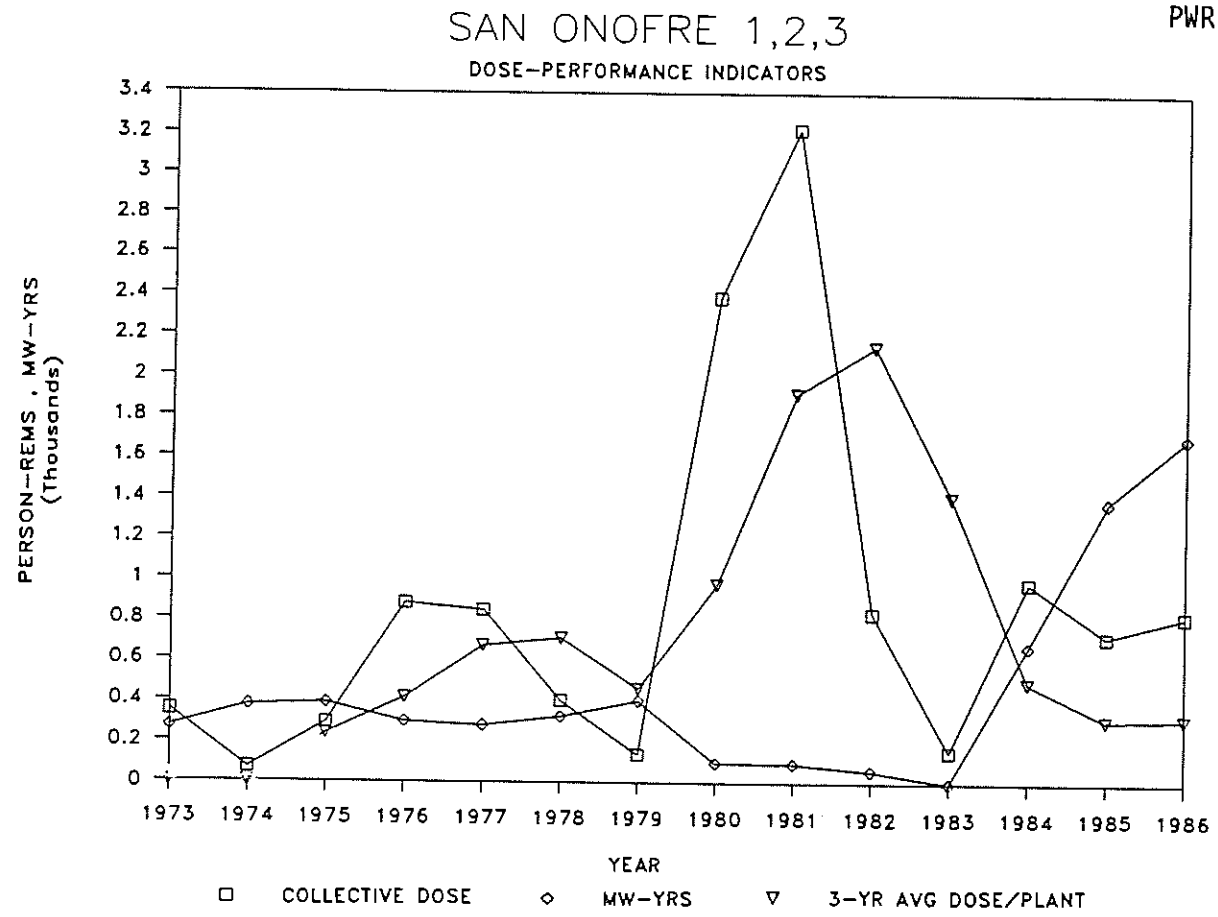
DOSE-PERFORMANCE INDICATORS

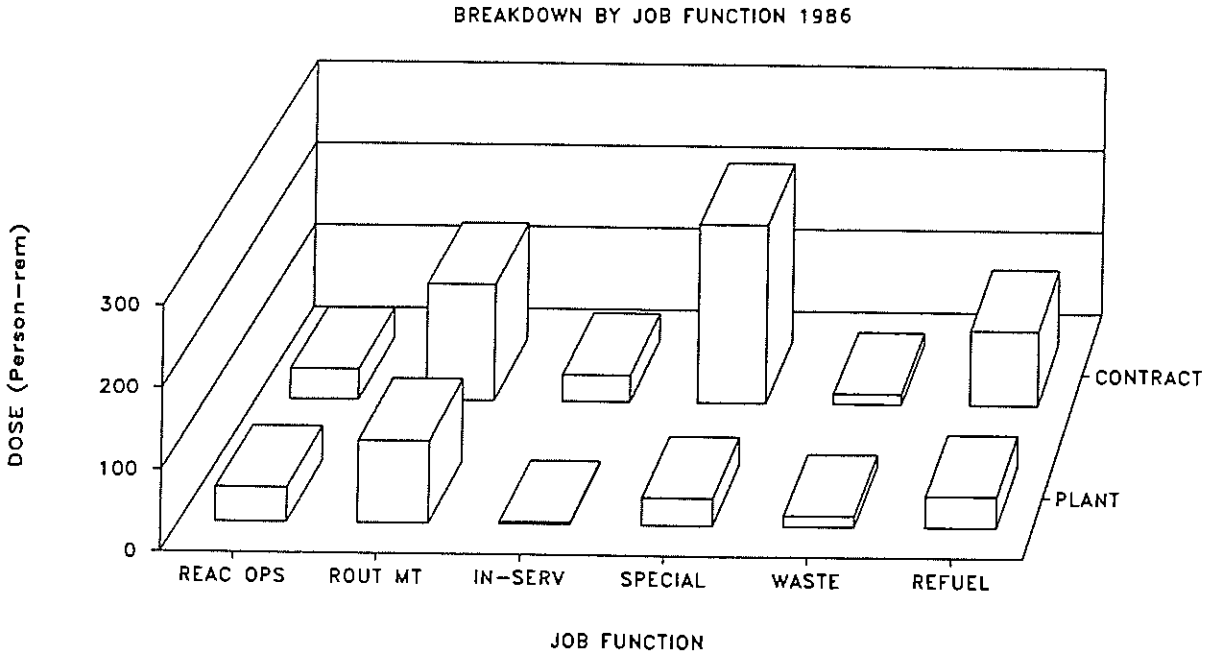


BREAKDOWN BY JOB FUNCTION 1986



PWR

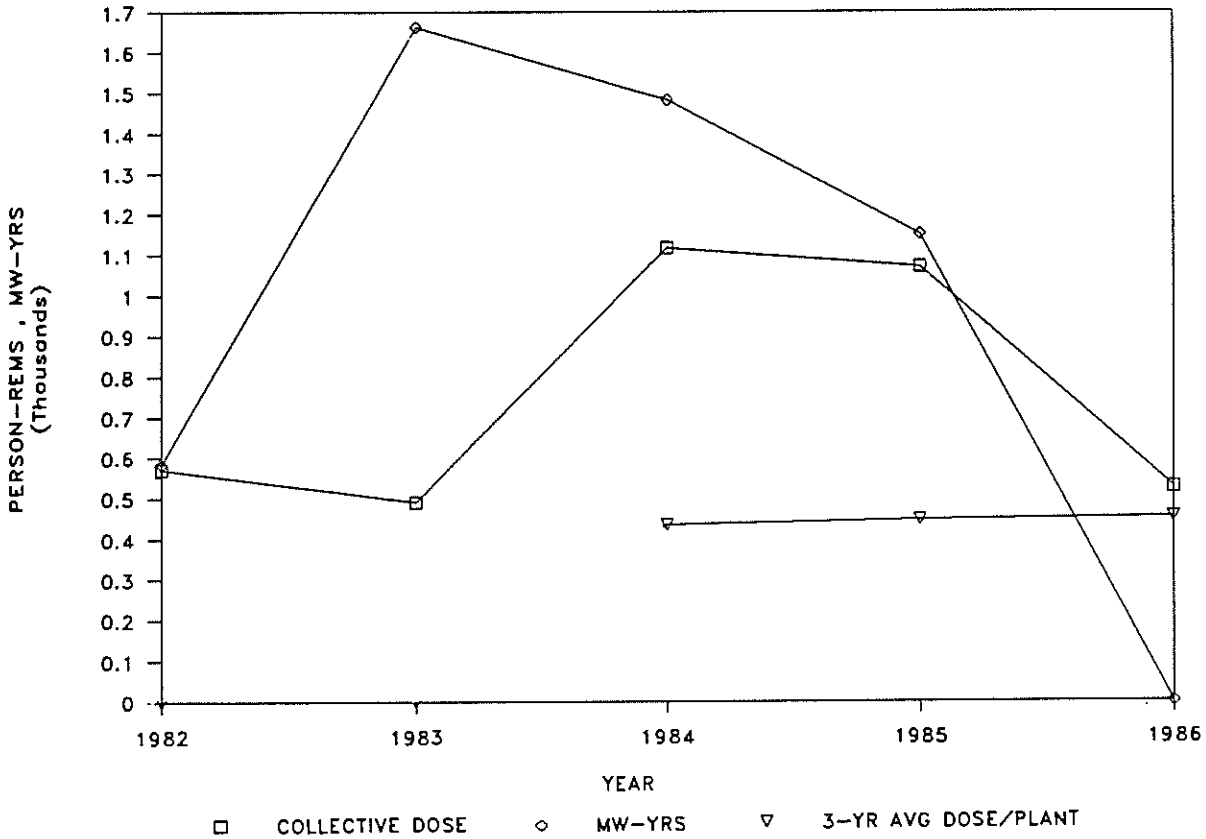

SAN ONOFRE 1,2,3
DOSE-PERFORMANCE INDICATORS
PERSON-REMS , MW-YRS (Thousands)
3.4
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986
YEAR
COLLECTIVE DOSE
MW-YRS
3-YR AVG DOSE/PLANT


BREAKDOWN BY JOB FUNCTION 1986
DOSE (Person-rem)
300
200
100
0
CONTRACT
PLANT
REAC OPS
ROUT MT
IN-SERV
SPECIAL
WASTE
REFUEL
JOB FUNCTION

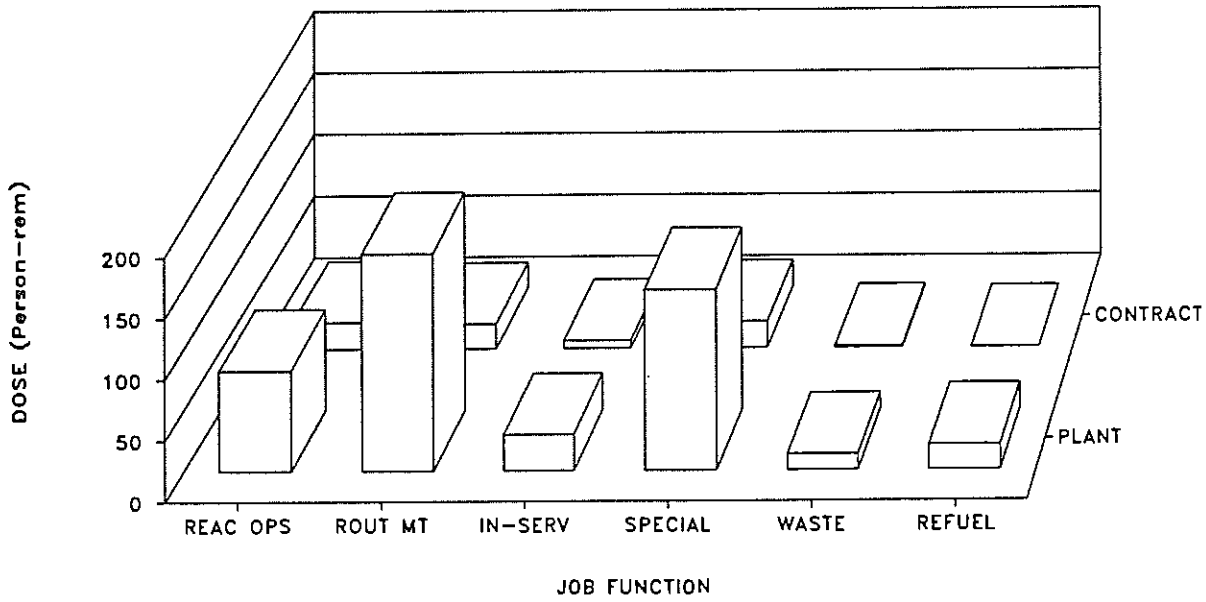
PWR

SEQUOYAH 1,2

DOSE-PERFORMANCE INDICATORS



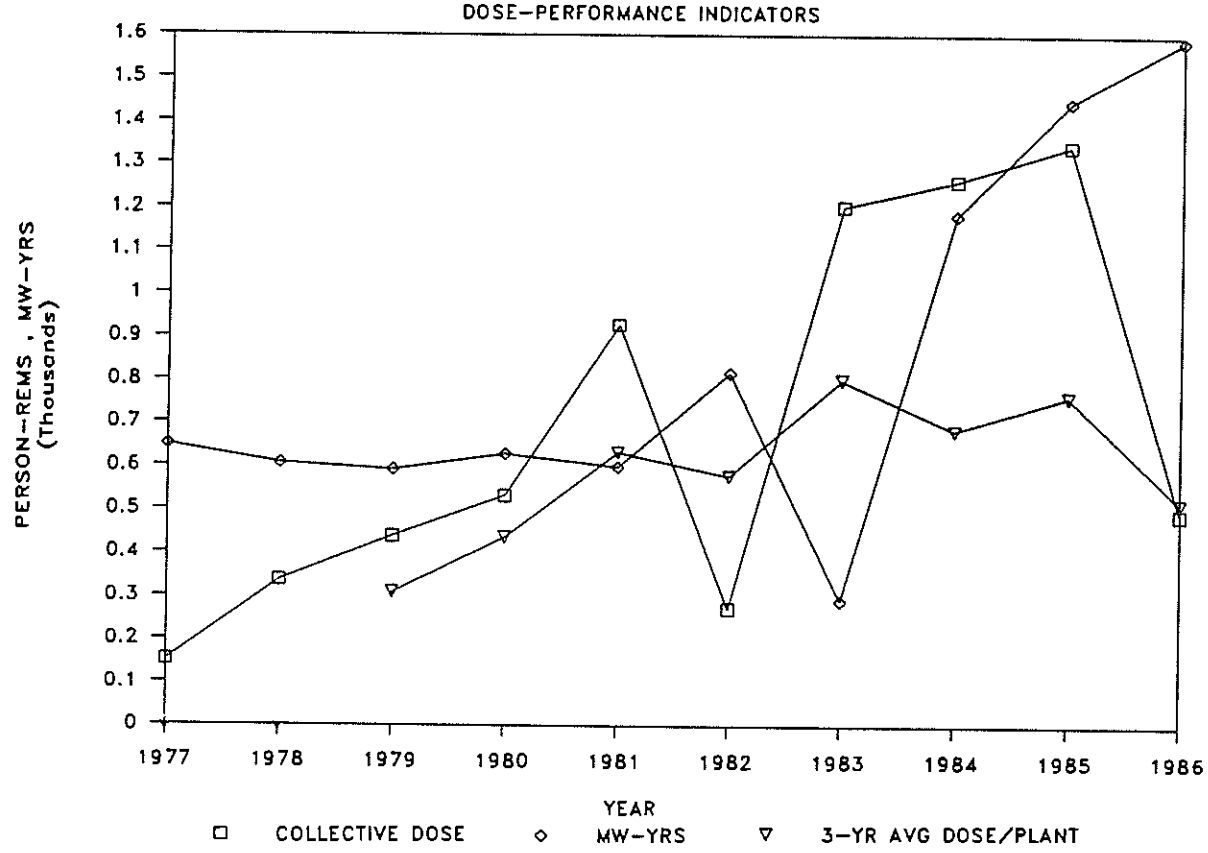
BREAKDOWN BY JOB FUNCTION 1986



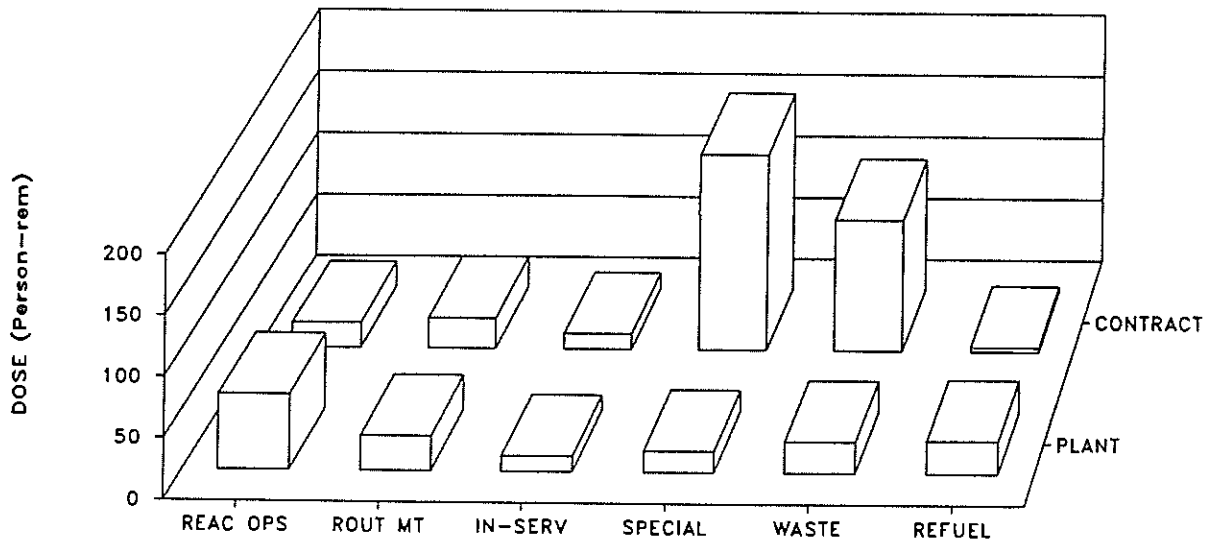
PWR

ST. LUCIE 1,2

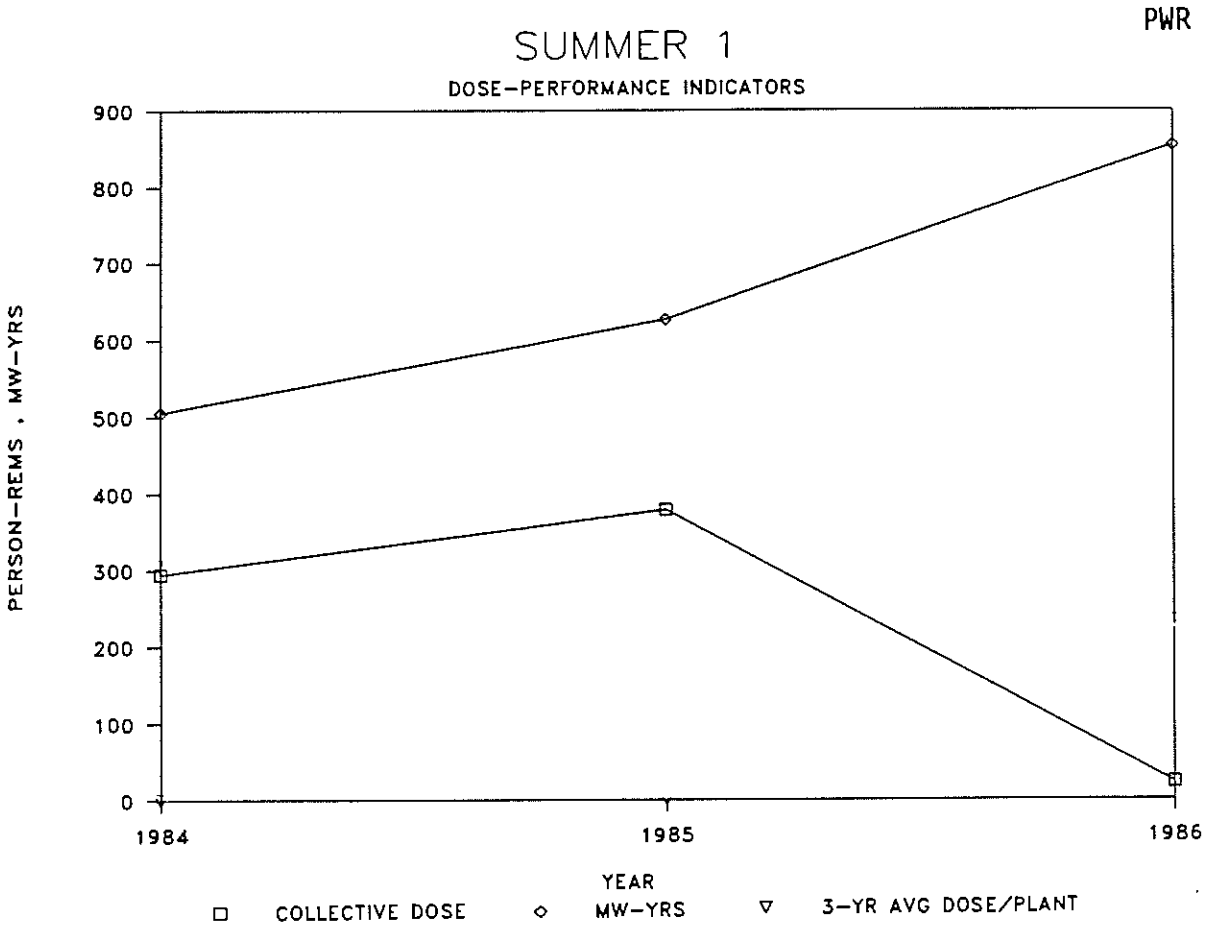
DOSE-PERFORMANCE INDICATORS

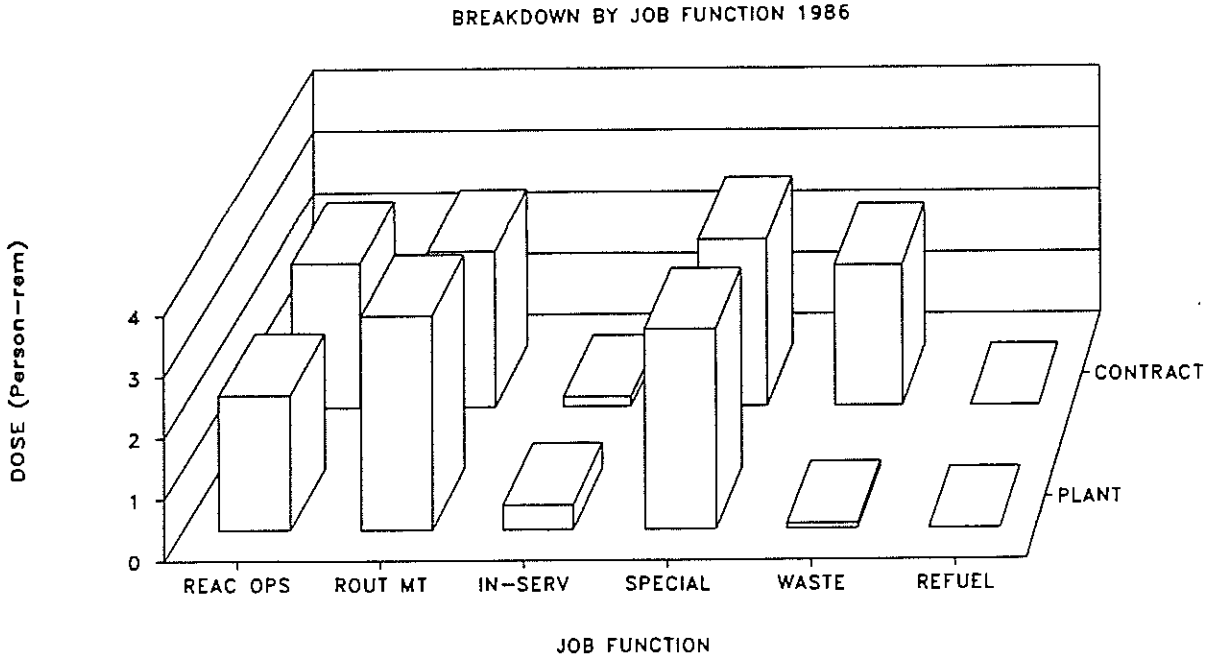


BREAKDOWN BY JOB FUNCTION 1986



PWR

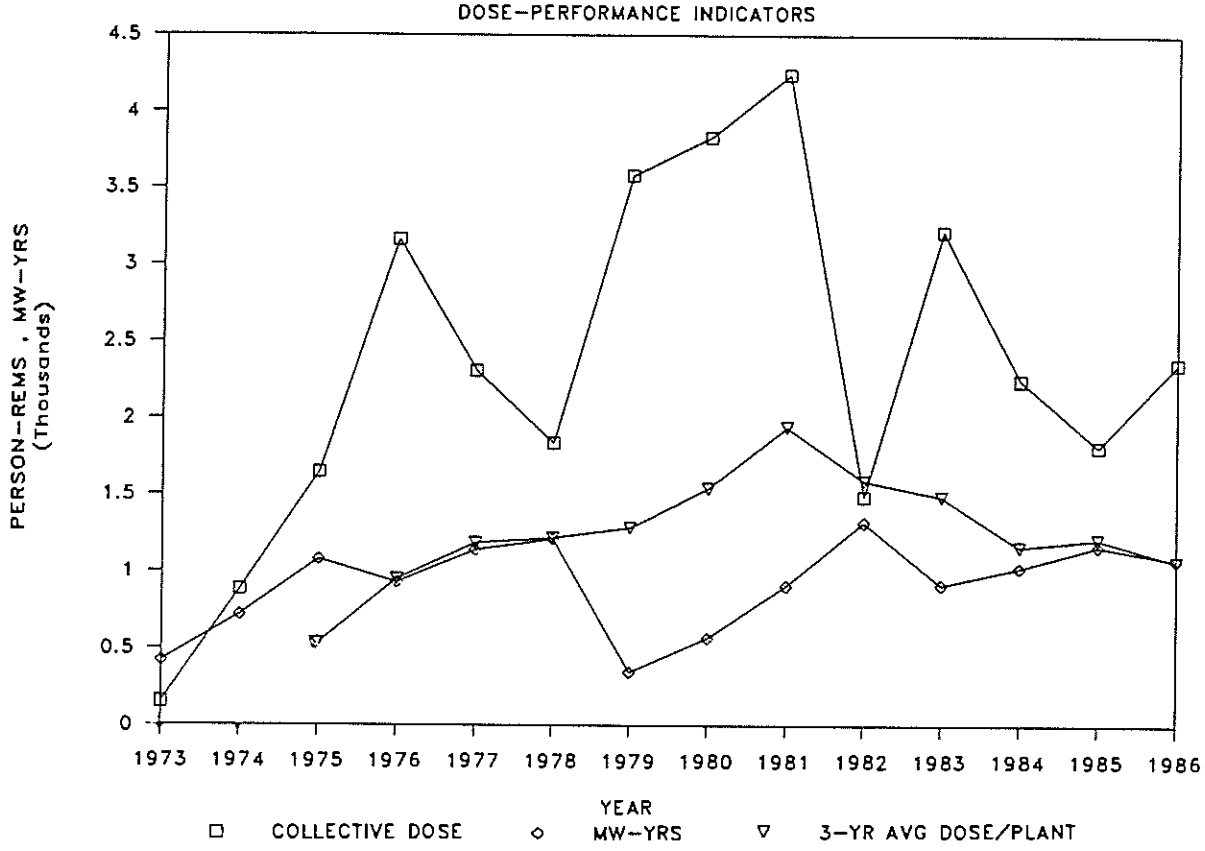

SUMMER 1
DOSE-PERFORMANCE INDICATORS
PERSON-REMS . MW-YRS
900
800
700
600
500
400
300
200
100
0
1984
1985
1986
YEAR
COLLECTIVE DOSE
MW-YRS
3-YR AVG DOSE/PLANT


BREAKDOWN BY JOB FUNCTION 1986
DOSE (Person-rem)
4
3
2
1
0
CONTRACT
PLANT
REAC OPS
ROUT MT
IN-SERV
SPECIAL
WASTE
REFUEL
JOB FUNCTION

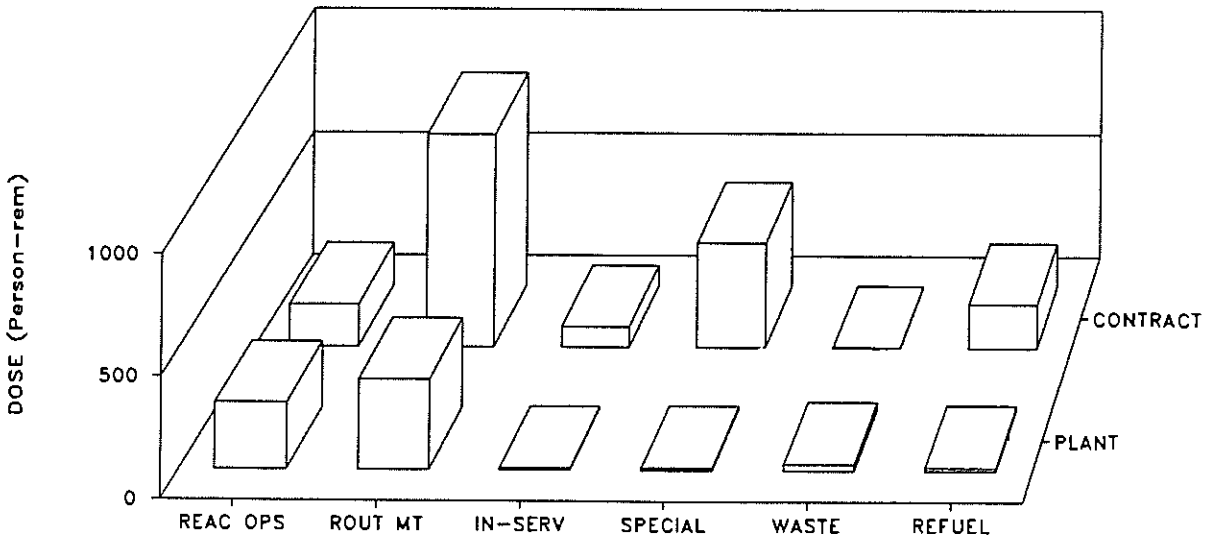
PWR

SURRY 1,2

DOSE-PERFORMANCE INDICATORS



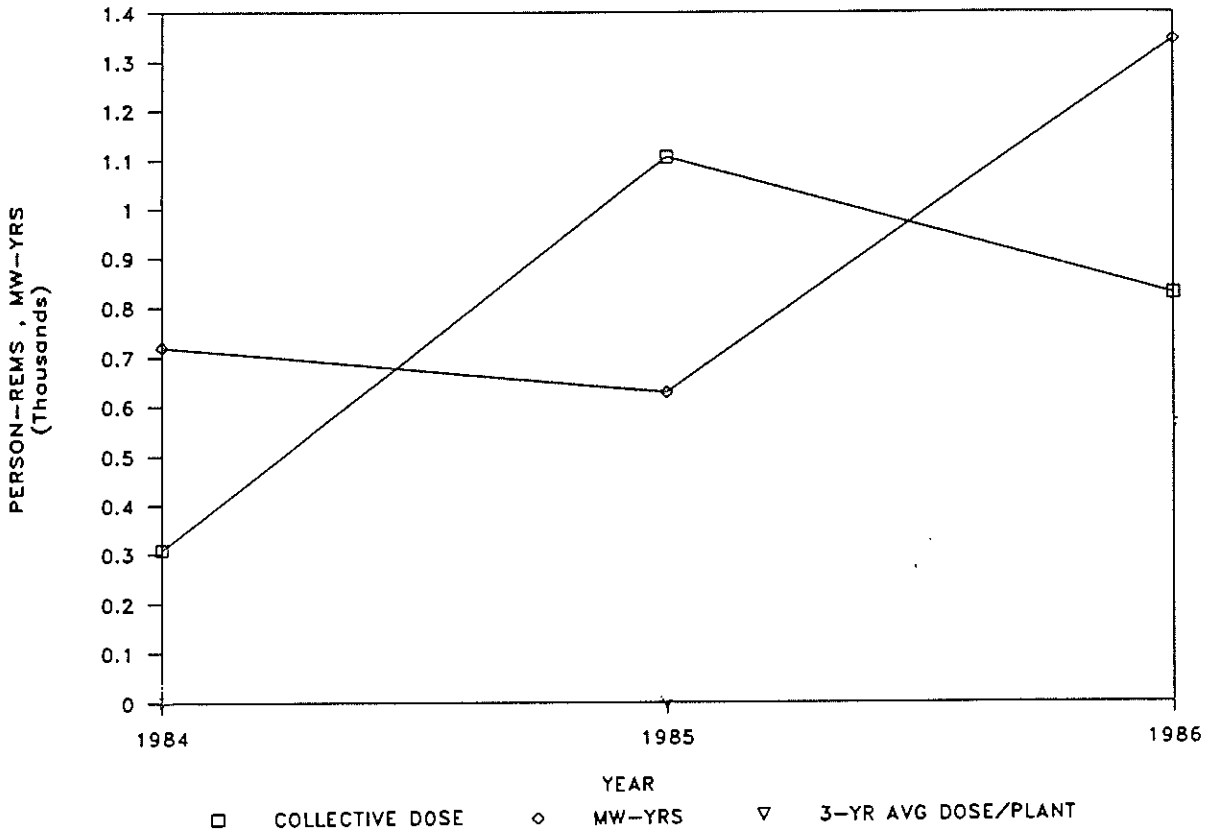
BREAKDOWN BY JOB FUNCTION 1986



BWR

SUSQUEHANNA 1,2

DOSE-PERFORMANCE INDICATORS



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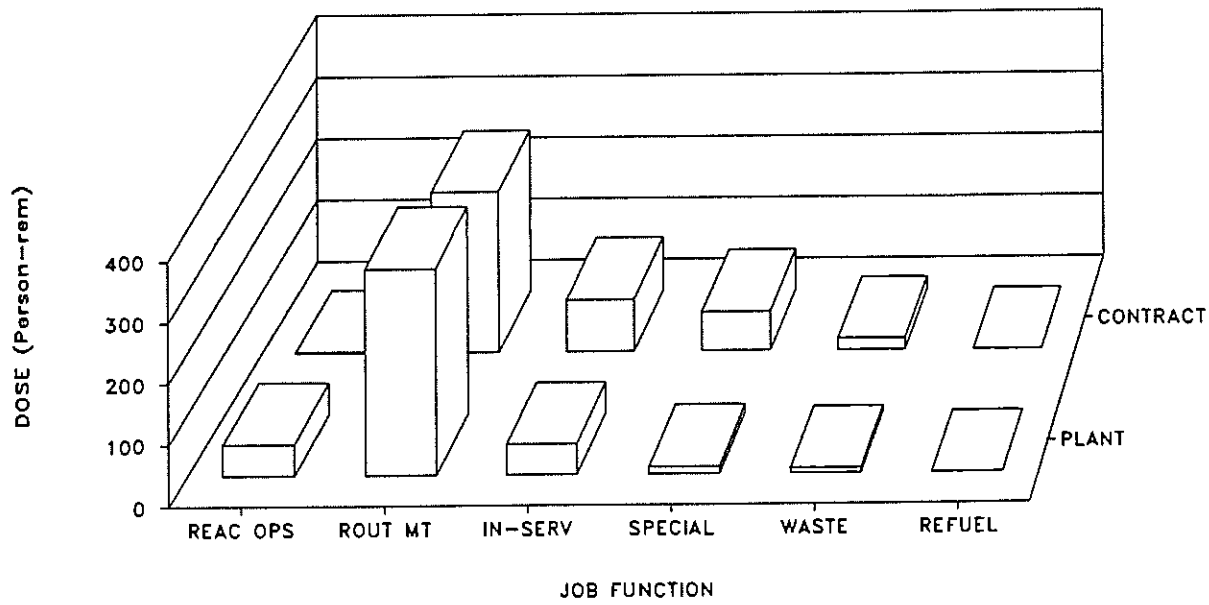
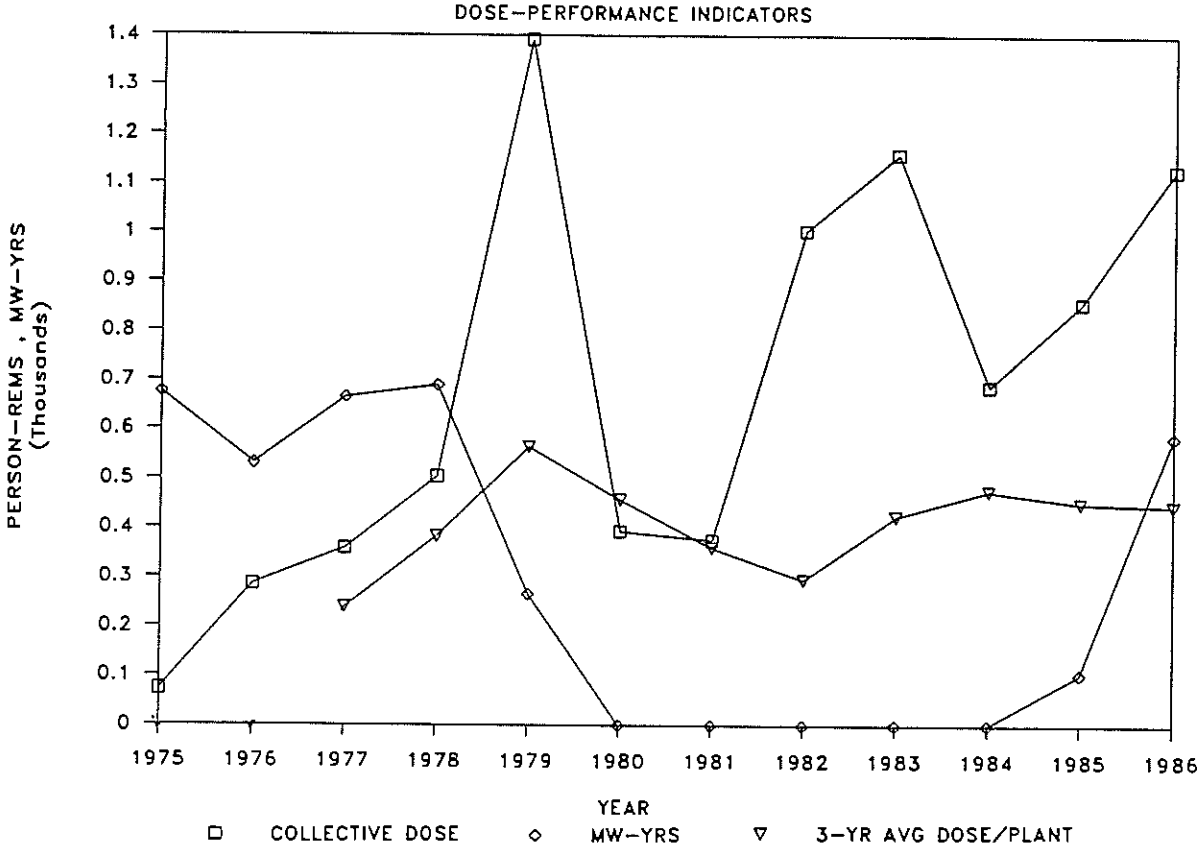


PWR

THREE MILE ISLAND 1,2

DOSE-PERFORMANCE INDICATORS



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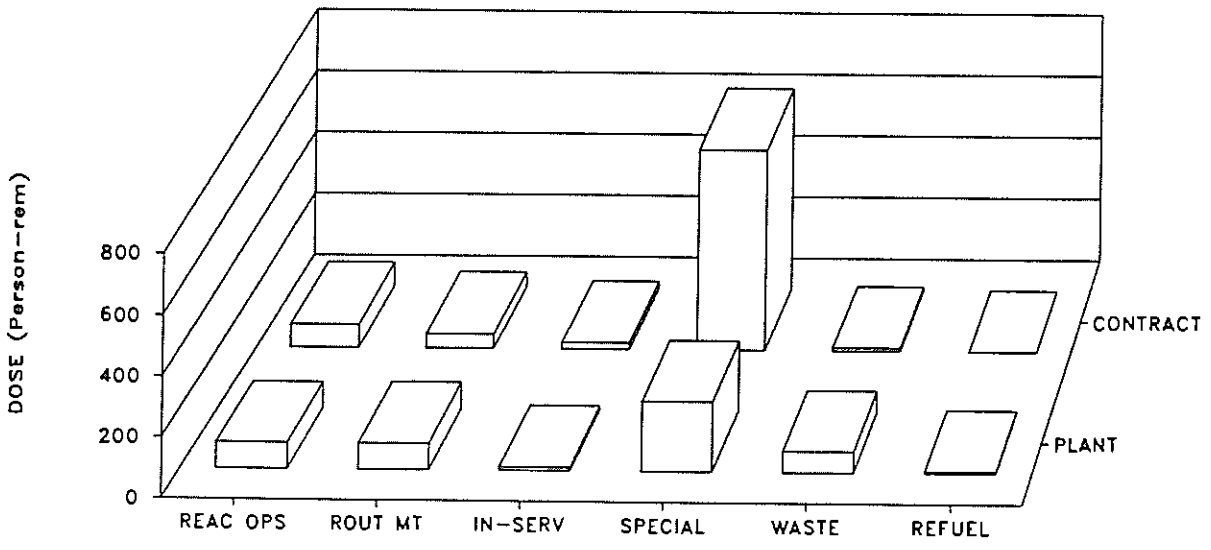
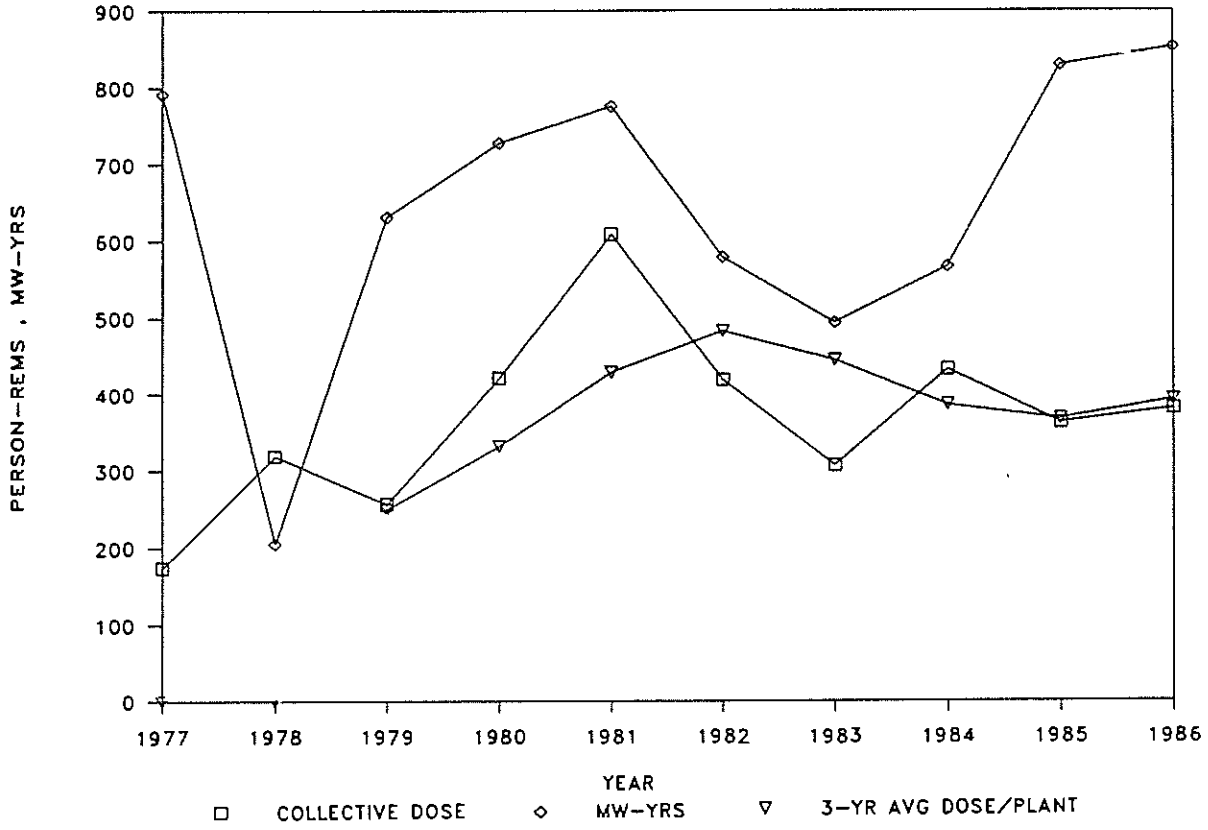


PWR

TROJAN

DOSE-PERFORMANCE INDICATORS



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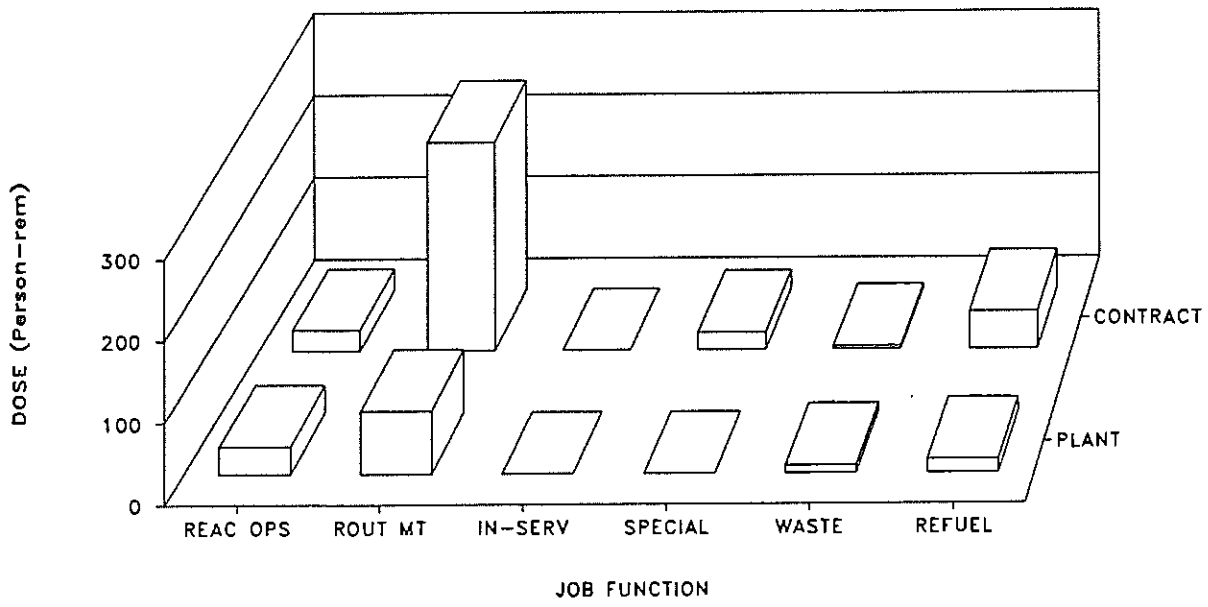
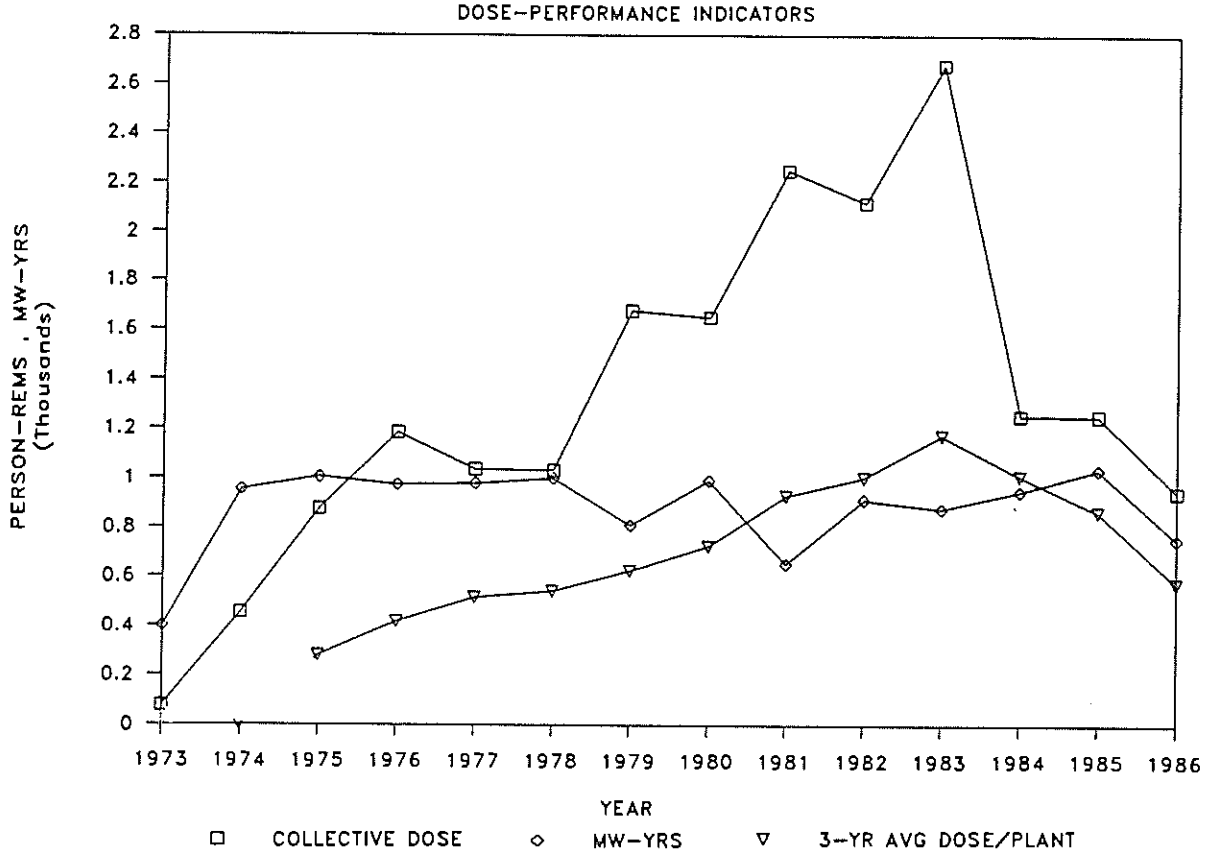


PWR

TURKEY POINT 3,4

DOSE-PERFORMANCE INDICATORS



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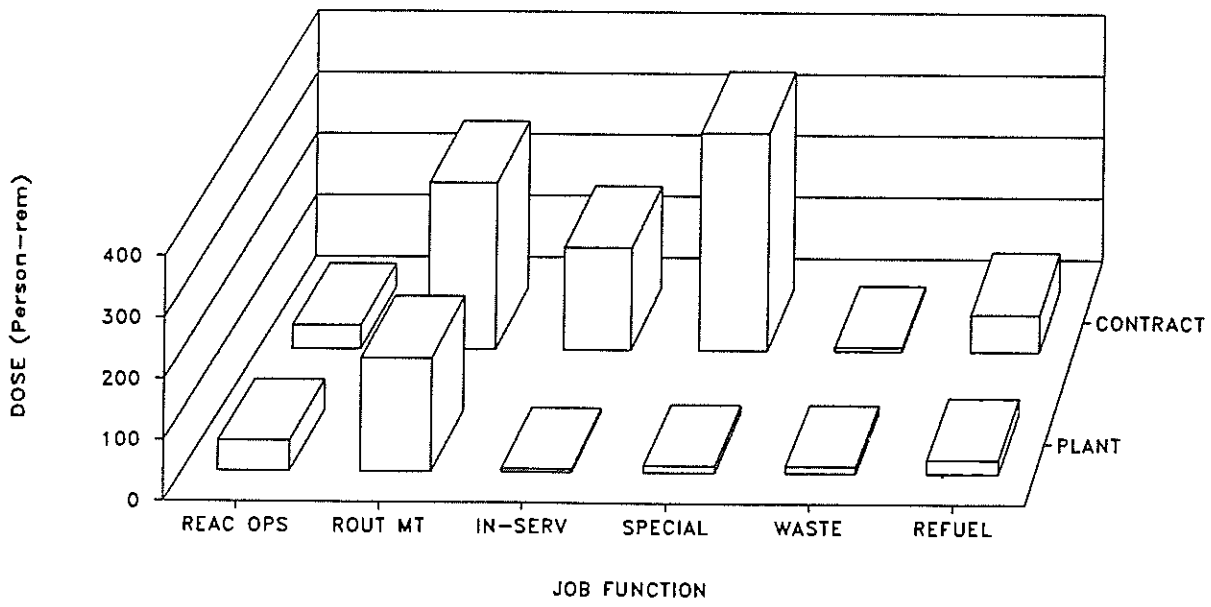
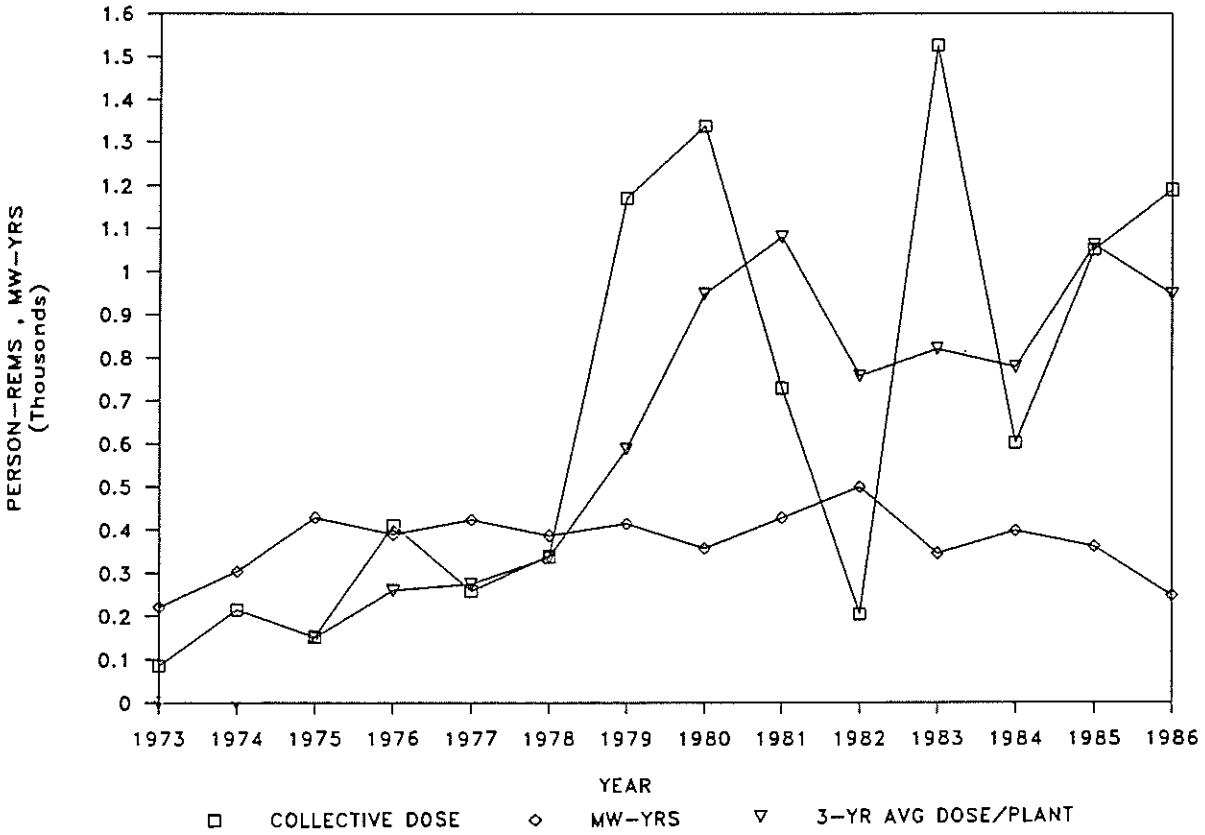


BWR

VERMONT YANKEE 1

DOSE-PERFORMANCE INDICATORS



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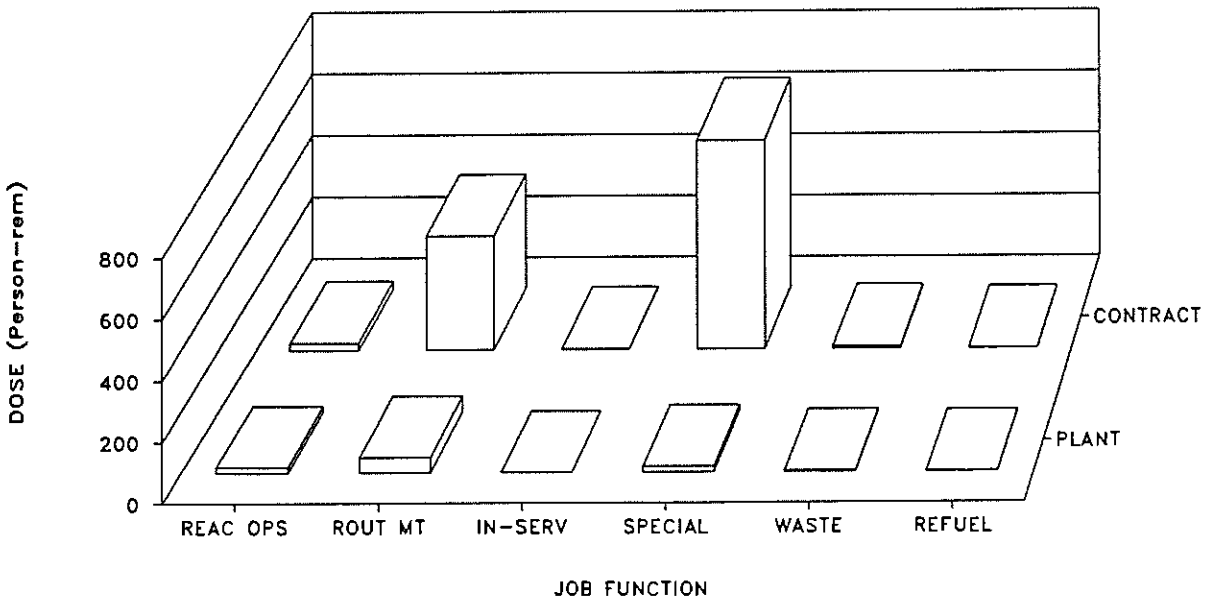
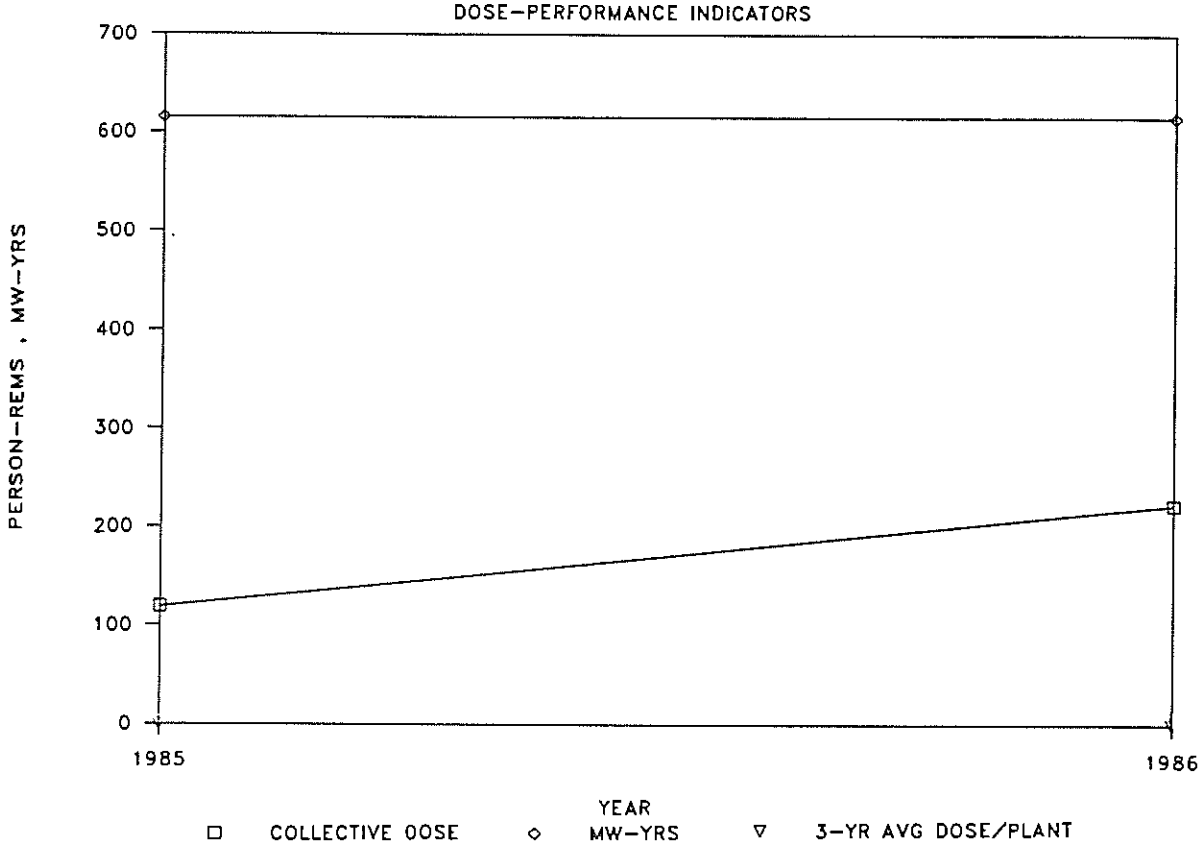


BWR

WASHINGTON NUCLEAR 2

DOSE-PERFORMANCE INDICATORS



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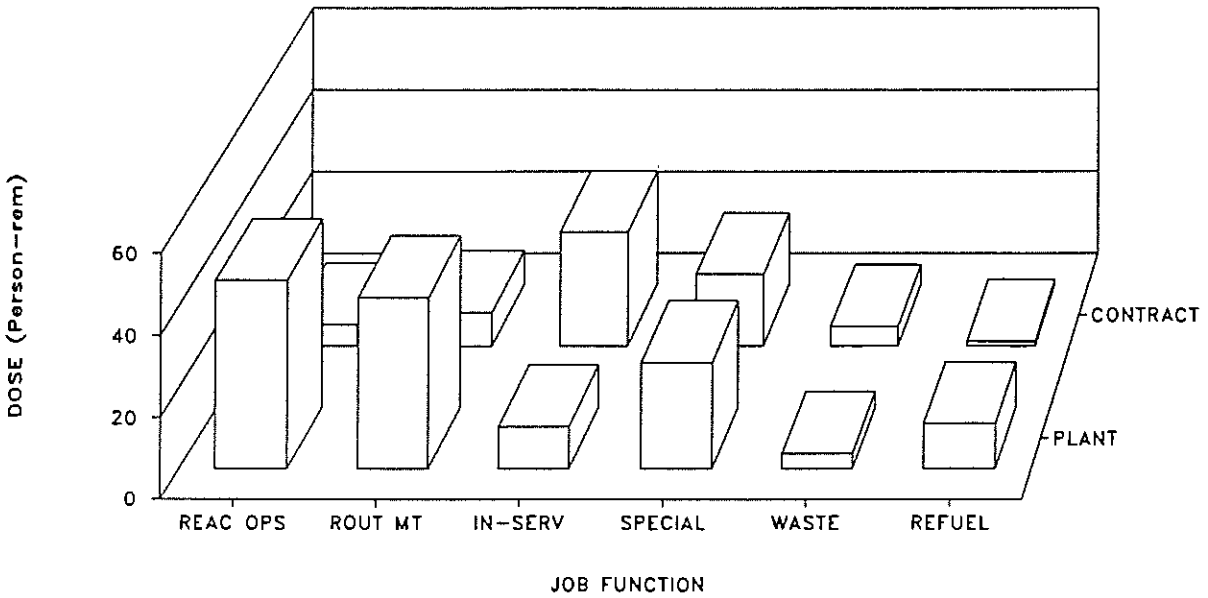
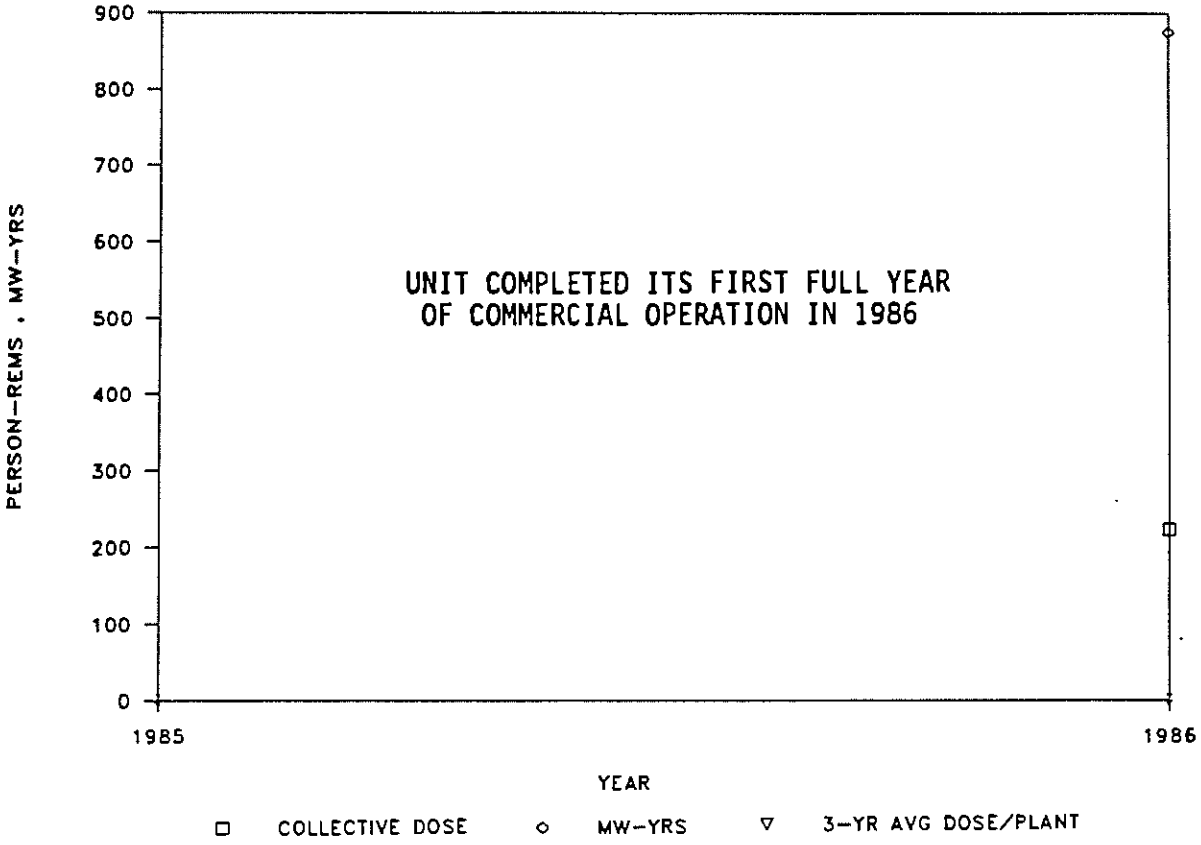


WATERFORD 3

PWR

DOSE-PERFORMANCE INDICATORS



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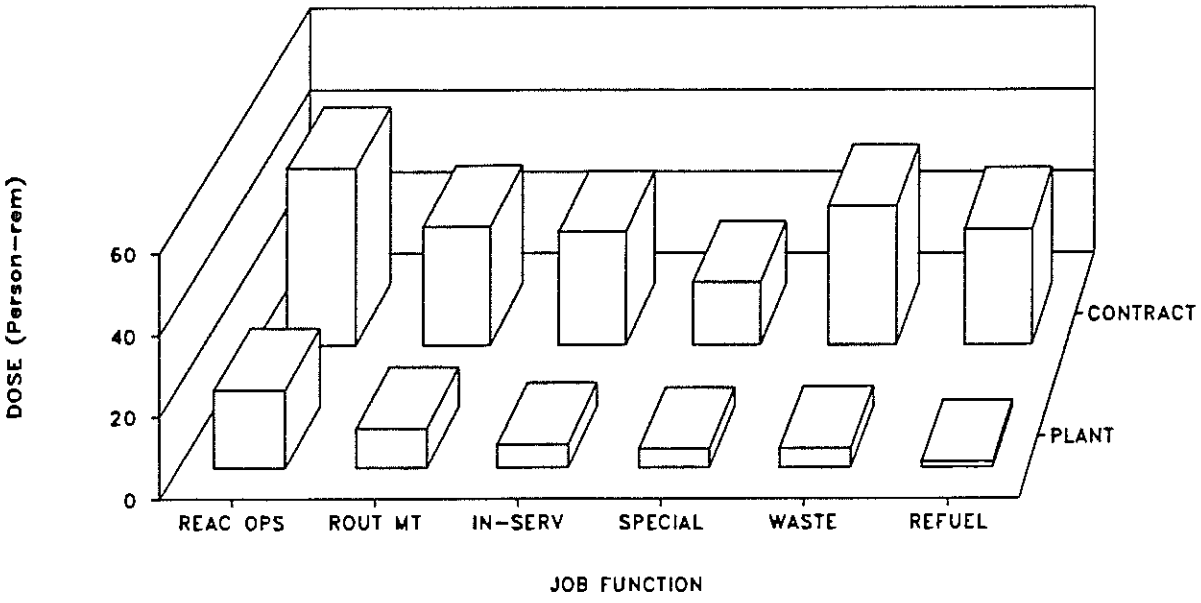
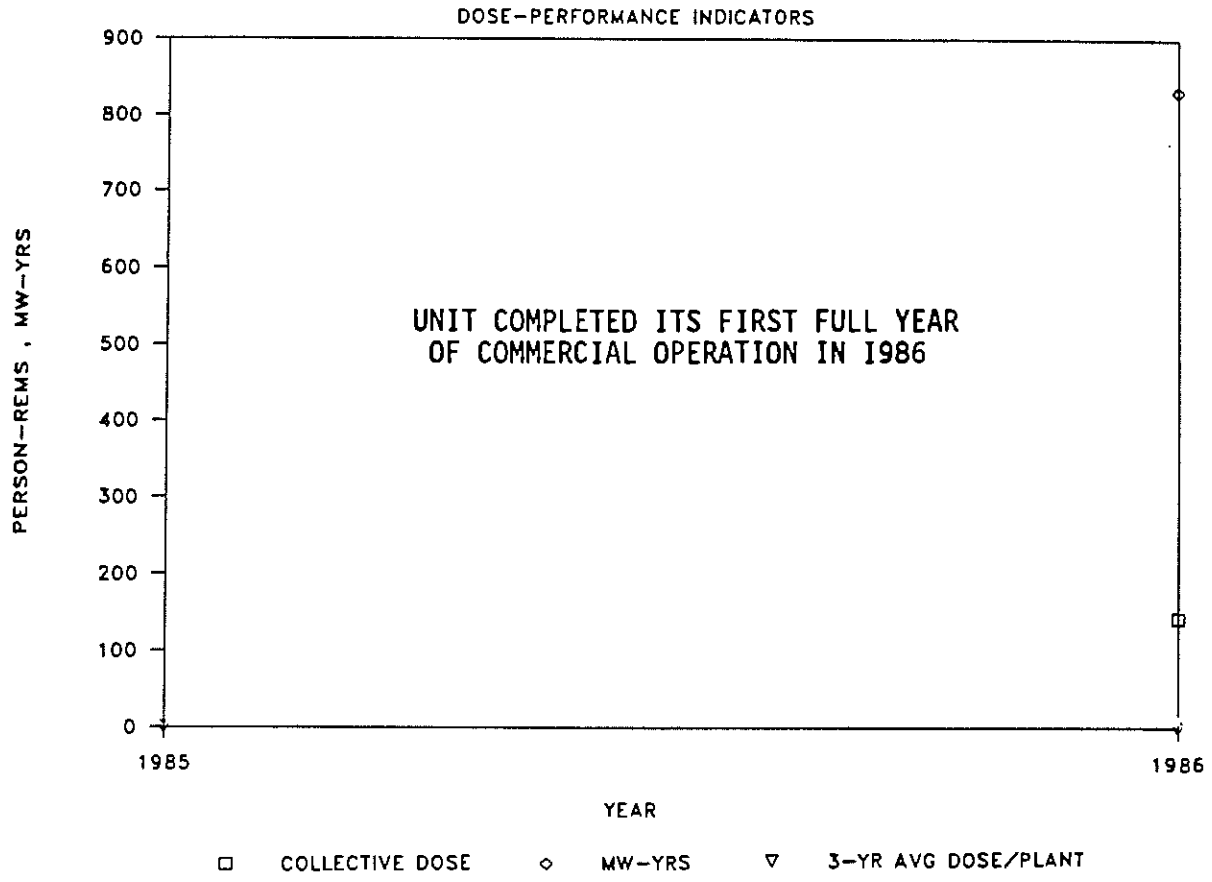
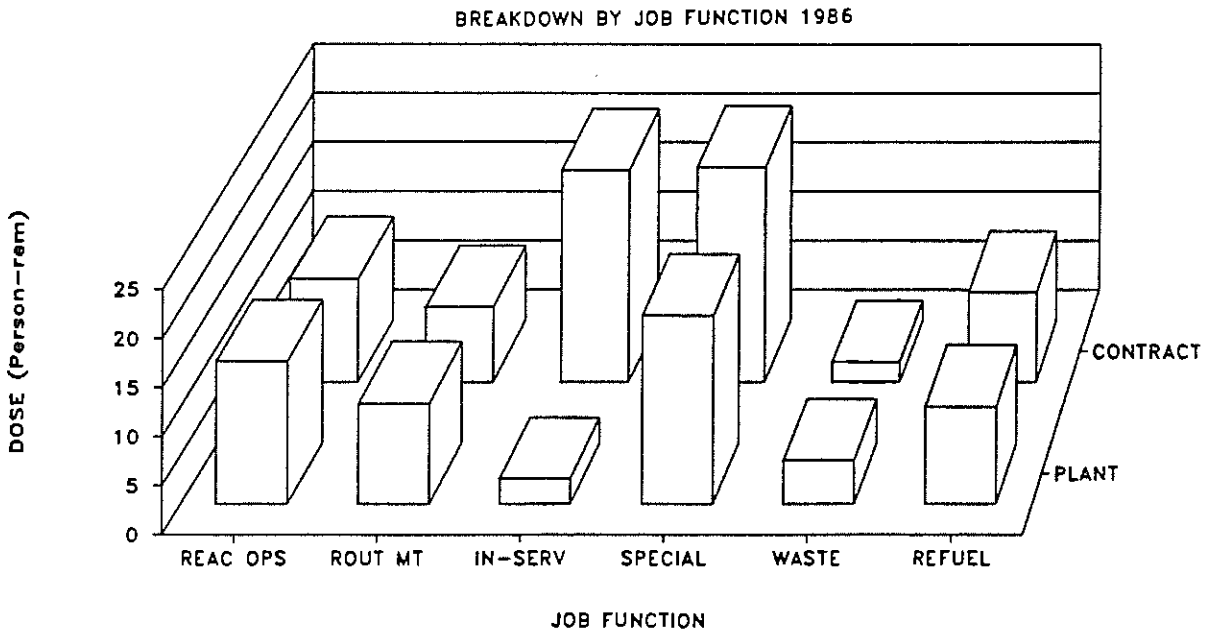


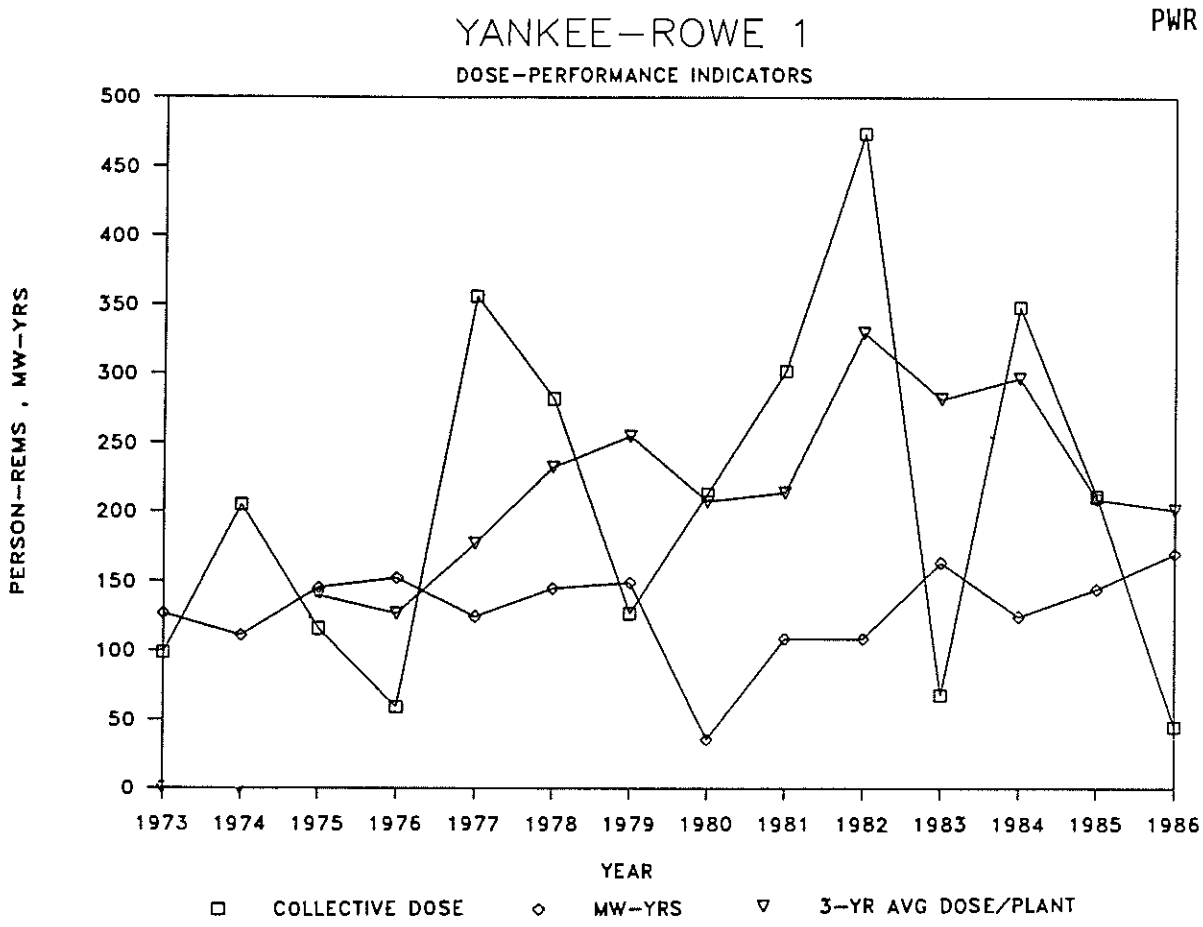
WOLF CREEK 1

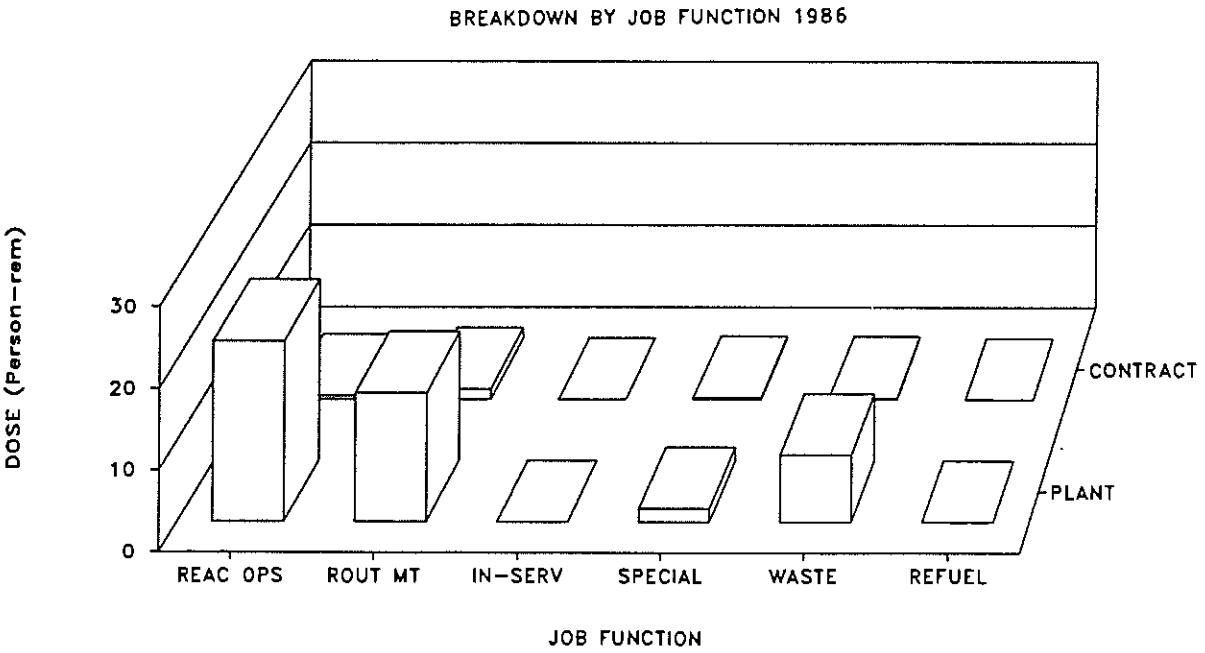
PWR





PWR

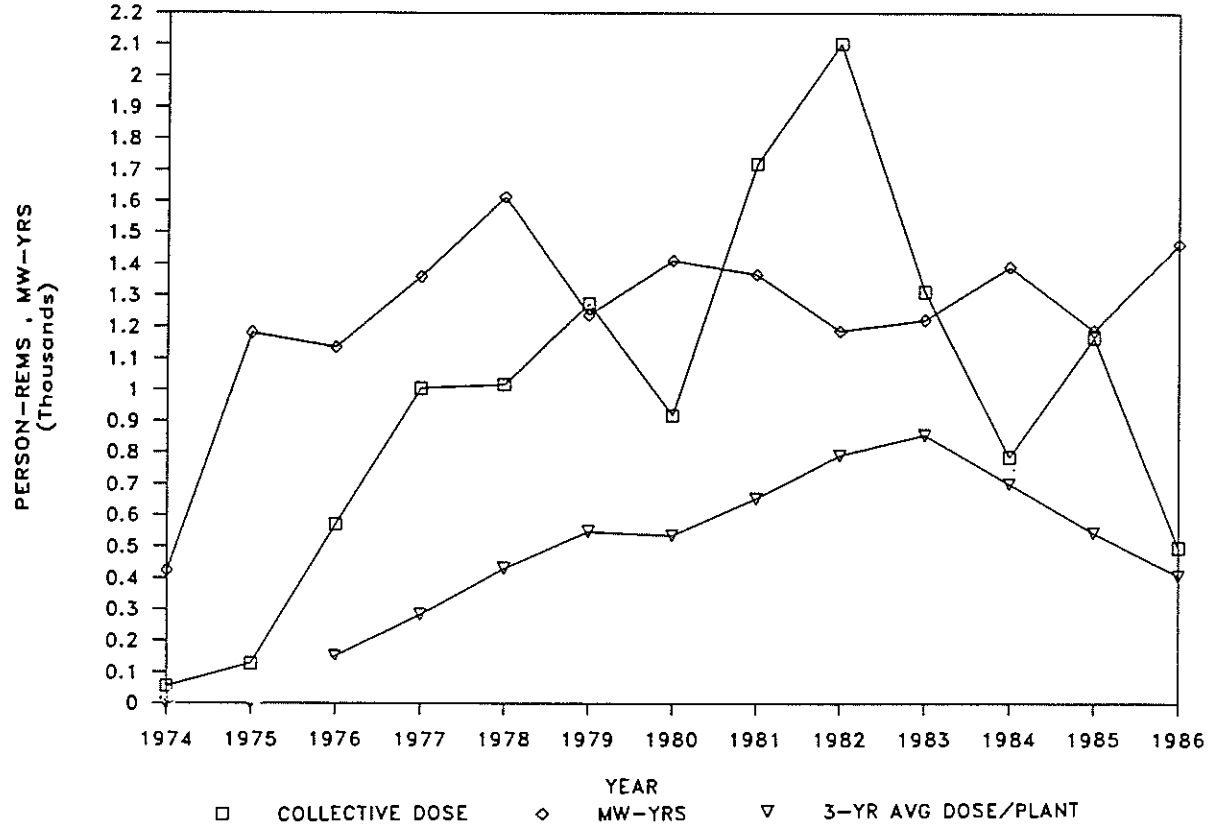

YANKEE–ROWE 1
DOSE–PERFORMANCE INDICATORS
PERSON–REMS , MW–YRS
500
450
400
350
300
250
200
150
100
50
0
1973 1974 1975 1976 1977 1978 1979 1980 1981 1982 1983 1984 1985 1986
YEAR
COLLECTIVE DOSE
MW–YRS
3–YR AVG DOSE/PLANT


BREAKDOWN BY JOB FUNCTION 1986
DOSE (Person–rem)
30
20
10
0
CONTRACT
PLANT
REAC OPS
ROUT MT
IN–SERV
SPECIAL
WASTE
REFUEL
JOB FUNCTION

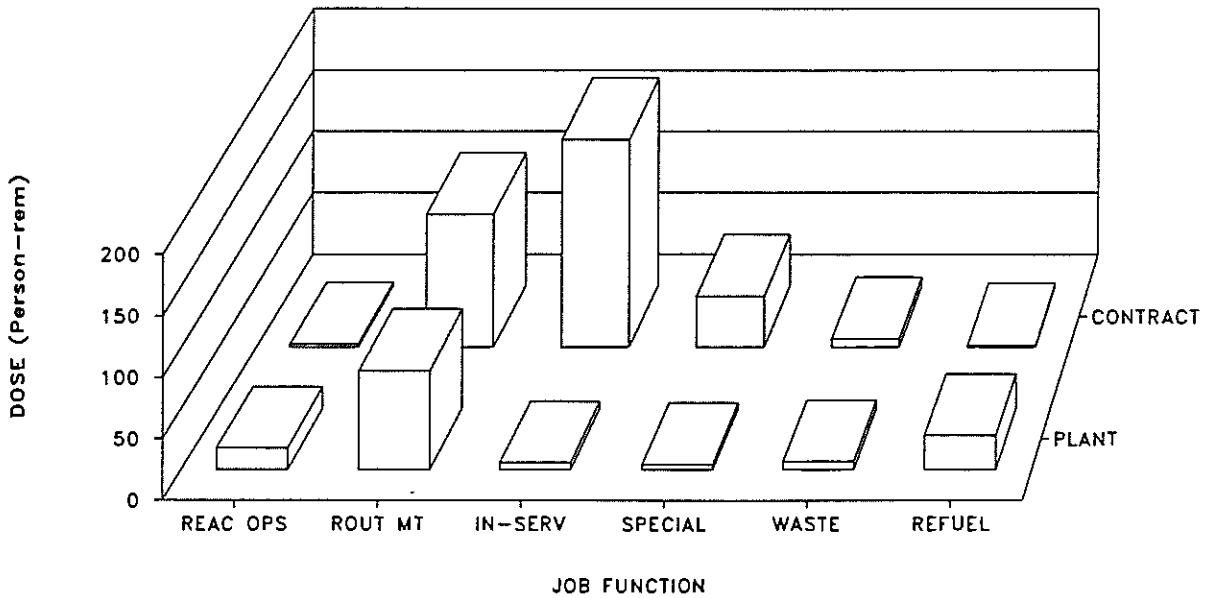
PWR

ZION 1,2

DOSE-PERFORMANCE INDICATORS



BREAKDOWN BY JOB FUNCTION 1986



APPENDIX F

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

1981-1986

APPENDIX F*
SUMMARY OF ANNUAL WHOLE BODY DOSE DISTRIBUTIONS BY YEAR AND REACTOR TYPE
1981-1986

YEAR AND REACTOR TYPE	Number of Individuals with Whole Body Doses in the Ranges (rems or cSv)																	TOTAL NUMBER MONI-TORED	NUMBER WITH MEAS. EXPOSURE	TOTAL COLLEC-TIVE DOSE
	No Meas-urable	Meas. <0.10	0.10-0.25	0.25-0.50	0.50-0.75	0.75-1.00	1.00-2.00	2.00-3.00	3.00-4.00	4.0-5.0	5-6.0	6-7.0	7-8.0	8-9.0	9-10	10-12	>12			
1986 - PWRs	44,365	29,754	10,131	8,160	4,784	3,058	5,594	1,244	239	30								107,359	62,994	23,008
1986 - BWRs	29,232	15,075	5,865	4,962	2,996	2,121	5,084	1,426	354	45								67,160	37,928	19,515
1986 - LWRs	73,597	44,829	15,996	13,122	7,780	5,179	10,678	2,670	593	75								174,519	100,922	42,523
1985 - BWRs	22,061	14,446	5,957	5,218	3,107	2,295	4,973	1,731	468	42								60,298	38,237	20,572
1985 - PWRs	42,409	25,545	8,158	6,761	4,107	2,602	5,584	1,586	248	42								97,042	54,633	22,470
1985 - LWRs	64,470	39,991	14,115	11,979	7,214	4,897	10,557	3,317	716	84								157,340	92,870	43,042
1984 - BWRs	21,741	14,997	6,165	4,907	3,033	2,398	5,679	2,714	994	218								62,846	41,105	27,074
1984 - PWRs	37,875	24,887	8,599	6,585	4,133	2,998	6,774	2,253	681	77								94,862	56,987	28,140
1984 - LWRs	59,616	39,884	14,764	11,492	7,166	5,396	12,453	4,967	1,675	295								157,708	98,092	55,214
1983 - BWRs	17,721	10,475	4,317	4,036	2,607	1,925	5,659	2,890	1,252	299	63	16	4					51,264	33,543	27,455
1983 - PWRs	33,350	21,425	7,894	6,260	3,863	2,783	6,512	2,421	698	315	2							85,523	52,173	29,016
1983 - LWRs	51,071	31,900	12,211	10,296	6,470	4,708	12,171	5,311	1,950	544	65	16	4					136,717	85,646	56,471
1982 - BWRs	15,661	9,944	4,431	4,403	2,839	2,046	4,794	2,358	1,183	230	7							47,896	32,235	24,437
1982 - PWRs	29,232	21,536	8,262	6,411	3,900	2,749	6,061	2,328	631	202	49	13	4	0	1			81,379	52,147	27,753
1982 - LWRs	44,893	31,480	12,693	10,814	6,739	4,795	10,855	4,686	1,814	432	56	13	4	0	1			129,275	84,382	52,190
1981 - BWRs	15,345	11,130	4,869	4,536	2,939	2,326	5,373	2,485	911	224	32	4	2	0	0	0	1	50,177	34,832	25,471
1981 - PWRs	26,978	18,202	7,348	5,790	3,686	2,577	6,393	2,061	882	262	61	77	9	2	1			74,329	47,351	28,671
1981 - LWRs	42,323	29,332	12,217	10,326	6,625	4,903	11,766	4,546	1,793	486	93	81	11	2	1	0	1	124,506	82,183	54,142

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

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10. SUPPLEMENTARY NOTES

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11. ABSTRACT *(200 words or less)*

This report summarizes the occupational radiation exposure information that has been reported to the NRC's Radiation Exposure Information Reporting System (REIRS) by nuclear power facilities and certain other categories of NRC licensees during the years 1969 through 1986. The bulk of the data presented in the report was obtained from annual radiation exposure reports submitted in accordance with the requirements of 10 CFR 20.407. Data on workers terminating their employment at certain NRC licensed facilities were obtained from reports submitted pursuant to 10 CFR 20.408. The 1986 annual reports submitted by about 500 licensees indicated that approximately 225,000 individuals were monitored, 207,000 of whom were monitored by nuclear power facilities. They incurred an average individual dose of 0.20 rem (cSv) and an average measurable dose of 0.40 rem (cSv). Termination radiation exposure reports were analyzed to reveal that about 77,600 individuals completed their employment with one or more of the 500 covered licensees during 1985. Some 75,500 of these individuals terminated from power reactor facilities, and about 6,700 of them were considered to be transient workers who received an average dose of 0.75 rem (cSv).

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

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power reactors
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average dose
transient workers
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