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U.S. DEPARTMENT  
*of* **ENERGY**

Office of Environment,  
Health, Safety and Security

# *U.S. Department of Energy* **Occupational Radiation Exposure Report for CY 2024**

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# Foreword

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The *U.S. Department of Energy Occupational Radiation Exposure Report for Calendar 2024* presents the results of analyses of occupational radiation exposures at the U.S. Department of Energy (DOE), including the National Nuclear Security Administration (NNSA) operations, during calendar year 2024. This report includes occupational radiation exposure data for over 84,000 DOE Federal employees, contractors, and subcontractors, as well as members of the public who have worked in or entered controlled areas monitored for exposure to radiation.

DOE publishes this annual report to provide DOE Management, Program Offices, workers, health physicists, and other stakeholders with an evaluation of DOE-wide performance regarding compliance with Title 10 of the *Code of Federal Regulations* (CFR) Part 835, *Occupational Radiation Protection* (10 CFR 835) radiation exposure limits and adherence to as low as reasonably achievable principles.

This report provides a discussion regarding radiation protection and exposure reporting requirements. It also includes calendar year (CY) 2024 information and analyses regarding aggregate, individual, site, DOE Program, transient individuals' dose, as well as a historical review of DOE exposure data. DOE continues to be diligent in protecting its workers and the public from exposure to radiation from DOE operations, as illustrated by the results contained in this report.

As part of our continual improvement process, you, the reader, are encouraged to provide comments and suggestions regarding this report via the User Survey included at the end of this report.

**STEPHANIE  
MARTIN**

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ACTING DIRECTOR FOR ENVIRONMENT,  
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## LIST OF ABBREVIATIONS AND ACRONYMS

ACL	Administrative Control Level
AEC	U.S. Atomic Energy Commission
AEDE	Annual Effective Dose Equivalent
AL	Action Level
ALARA	As Low As Reasonably Achievable
AMWTP	Advanced Mixed Waste Treatment Project
ANL	Argonne National Laboratory
ATR	Advanced Test Reactor
BLIP	Brookhaven Linac Isotope Producer
BNL	Brookhaven National Laboratory
BSRA	Battelle Savannah River Alliance
CEBAF	Continuous Electron Beam Accelerator Facility
CED	Committed Effective Dose
CEDE	Committed Effective Dose Equivalent
CEqD	Committed Equivalent Dose
CEqD-SK	Committed Equivalent Dose to the Skin
CFR	Code of Federal Regulations
CY	Calendar Year
DAC	Derived Air Concentration
DDE	Deep Dose Equivalent
DOE	U.S. Department of Energy
DRUM	Defense-Related Uranium Mines
DUF6	Depleted Uranium Hexafluoride project
ED	Effective Dose
EqD	Equivalent Dose
EqD-Eye	Equivalent Dose to the Lens of the Eye
EqD-Fetus	Equivalent Dose to the Fetus
EqD-ME	Equivalent Dose to the Skin of the Maximally Exposed Extremity
EqD-SkWB	Equivalent Dose to the Skin of the Whole Body
EqD-WB	Equivalent Dose to the Whole Body
EERE	Office of Energy Efficiency and Renewable Energy
EHSS	Office of Environment, Health, Safety and Security
EM	Office of Environmental Management
EPA	U.S. Environmental Protection Agency
ERDA	Energy Research and Development Administration
ETEC	Energy Technology Engineering Center
ETTP	East Tennessee Technology Park
Fermilab	Fermi National Accelerator Laboratory
FRNP	Four Rivers Nuclear Partnership
FTE	Full-Time Equivalent
ICP	Idaho Cleanup Project
ICRP	International Commission on Radiological Protection
INL	Idaho National Laboratory
ISSC	Infrastructure Support Services Contractor
KC-NSC	Kansas City National Security Campus
LANL	Los Alamos National Laboratory
LBNL	Lawrence Berkeley National Laboratory
LINAC	Linear Accelerator
LCLS	Linac Coherent Light Source

LERF	Low Energy Recirculator Facility
LLNL	Lawrence Livermore National Laboratory
LM	Office of Legacy Management
mSv	Millisievert
NCRP	National Council on Radiation Protection and Measurements
NE	Office of Nuclear Energy
NETL	National Energy Technology Laboratory
NNSA	National Nuclear Security Administration
NNSS	Nevada National Security Site
NRC	U.S. Nuclear Regulatory Commission
NREL	National Renewable Energy Laboratory
NYSERDA	New York State Energy Research and Development Authority
O	Order
OpEx	Operating Experience
ORISE	Oak Ridge Institute for Science and Education
ORNL	Oak Ridge National Laboratory
ORP	Office of River Protection
OST	Office of Secure Transportation
PGDP	Paducah Gaseous Diffusion Plant
PNNL	Pacific Northwest National Laboratory
PORTS	Portsmouth Gaseous Diffusion Plant
PPPL	Princeton Plasma Physics Laboratory
rem	Roentgen equivalent man
REMS	Radiation Exposure Monitoring System
Rh-102	Rhodium-102
Rh-102m	Rhodium-102m
RRM	Residual Radioactive Material
SC	Office of Science
SLAC	SLAC National Accelerator Laboratory
SNM	Special Nuclear Material
SNL	Sandia National Laboratories
SOC	Standard Occupational Classification
SPRU	Separations Process Research Unit
STD	Standard
Sv	Sievert
TED	Total Effective Dose
TJNAF	Thomas Jefferson National Accelerator Facility
TOD	Total Organ Dose
TRU	Transuranic
TSS	Transportation Safeguards System
U	Uranium
U-234	Uranium-234
UCOR	United Cleanup Oak Ridge
UMTRA	Uranium Mill Tailings Remedial Action Project
USEC	United States Enrichment Corporation
WIPP	Waste Isolation Pilot Plant
WTP	Waste Treatment Plant
WVDP	West Valley Demonstration Project
Y-12	Y-12 National Security Complex

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# Summary

## Executive Summary

The U.S. Department of Energy (DOE) Office of Environment, Health, Safety and Security (EHSS) publishes annual occupational radiation exposure reports to provide DOE Management, Program Offices, workers, health physicists, and other stakeholders an evaluation of DOE-wide performance regarding compliance with Title 10 of the *Code of Federal Regulations* (CFR) Part 835, *Occupational Radiation Protection* (10 CFR 835) radiation exposure limits and adherence to as low as reasonably achievable (ALARA) principles.

This report presents the results of analyses of occupational radiation exposures at DOE operations, including the National Nuclear Security Administration (NNSA), during calendar year (CY) 2024. The report includes occupational radiation exposure information for over 84,000 DOE Federal employees, contractors, and subcontractors, and members of the public monitored for radiation exposure. The 97 DOE organizations that submitted radiation exposure reports in CY 2024 have been grouped into 33 sites. The information has been analyzed to provide a measure of DOE's performance in protecting workers and individuals who have entered controlled areas.

Individuals who have the potential to be exposed to radiation at a DOE facility are required to be monitored in accordance with 10 CFR 835, Subpart E. The exposure monitoring data are used to determine the radiation dose received by the individual, which is reported to DOE through the DOE Radiation Exposure Monitoring System (REMS) in accordance with DOE Order 231.1B Admin Chg 1, *Environment, Safety and Health Reporting*.

Unless otherwise specified, the term “dose” used in this report refers to the total effective dose (TED) and is measured in units of “rem” (derived from the phrase Roentgen equivalent man). The sievert (Sv) is the international unit of effective dose, where 1 Sv is equal to 100 rem and 1 rem is, therefore, equal to 10 millisieverts (mSv). TED is the summation of the effective dose from sources of radiation that are external and internal to the body. The committed effective dose (CED) is the dose resulting from radioactive material taken into the body and is commonly referred to as internal dose. The term “collective dose” is the sum of the individual doses received by a group of individuals and is shown in units of “person-rem.”

Analysis of the collected exposure data for CY 2024 indicates that:

- ◆ DOE operations were compliant with regulatory radiation protection requirements, as no exposures were reported to have exceeded the occupational dose limit of 5 rem (50 mSv) TED; and
- ◆ Only 19 percent of the monitored individuals received a measurable dose (a detectable dose greater than zero), and, of those, the average measurable dose received was 1 percent of the 5 rem (50 mSv) TED limit.

In addition, from CY 2023 to CY 2024:

- ◆ The collective TED decreased by 2 percent to 926.8 person-rem (9,268 person-mSv);
- ◆ The number of individuals with measurable dose decreased by 12 percent from 18,473 individuals to 16,308 individuals;
- ◆ Collective CED (internal exposure) increased by 4 percent to 43.2 person-rem (432 person-mSv); and
- ◆ Collective TED for transient individuals decreased by 27 percent to 21.6 person-rem (216 person-mSv).

The collective dose at DOE facilities has decreased by 89 percent since CY 1986. This coincides with the end of the Cold War era, which shifted the DOE mission from weapons production to stabilization, waste management, and environmental remediation activities, along with the consolidation and remediation of facilities across the complex to meet the new mission.

In alignment with the change in mission, regulations and requirements have been modified (see Section 2) that reinforce DOE's focus on ALARA practices and risk reduction to lower occupational radiation dose.

Over the past 5 years, only one monitored individual, at Los Alamos National Laboratory (LANL), received a dose above the 2 rem (20 mSv) TED administrative control level [1].

- ◆ In CY 2020, an individual received a TED of 3.0 rem (30 mSv) after an airborne release of radioactive material. The individual received an internal dose during the incident in which skin contamination and positive nasal smears were detected. The source of the contamination was determined to be a breach of a protective glove inside a glovebox.

Details of this incident are available in the occurrence report NA--LASO-LANL-TA55-2020.

This report and other information regarding DOE occupational radiation exposure may be accessed at:

<https://www.energy.gov/ehss/occupational-radiation-exposure>

# Section One

## Introduction

# 1

## Introduction

The U.S. Department of Energy Occupational Radiation Exposure Report for Calendar Year 2024 presents the results of analyses of occupational radiation exposures at the U.S. Department of Energy (DOE), including the National Nuclear Security Administration (NNSA), operations during calendar year (CY) 2024. This report includes occupational radiation exposure information for DOE Federal employees, contractors, and subcontractors, and members of the public monitored for radiation exposure. The 97 DOE organizations that submitted radiation exposure reports for CY 2024 have been grouped into 33 sites.\* The information has been analyzed and trended to provide a measure of DOE's performance in protecting workers and individuals who have entered controlled areas.

This report is published by the DOE Office of Environment, Health, Safety and Security (EHSS). The purpose of this report is to provide DOE Management, Program Offices, workers, health physicists, and other stakeholders with an evaluation of DOE-wide performance regarding compliance with Title 10 of the *Code of Federal Regulations* (CFR) Part 835, *Occupational Radiation Protection* (10 CFR 835) radiation exposure limits and adherence to as low as reasonably achievable (ALARA) principles.

Individuals who have the potential to be exposed to radiation at a DOE facility are required to be monitored in accordance with 10 CFR 835, Subpart E. The exposure monitoring data are used to determine the radiation dose received by those individuals, which is reported to DOE in accordance with DOE Order (O) 231.1B, *Environment, Safety and Health Reporting*. Unless otherwise specified, the term “dose” used in this report refers to the total effective dose (TED) and is measured in units of “rem” (derived from the phrase Roentgen equivalent man). TED is the summation of the effective dose from sources of radiation that are external and internal to the body. The committed effective dose (CED) is the dose resulting from radioactive material taken into the body and is commonly referred to as internal dose.

The term “collective dose” is the sum of the individual doses received by a group of individuals and is shown in units of “person-rem.”

### 1.1 Report Organization

This report is organized into nine sections. Section 1 describes the content and organization of this report. Section 2 discusses radiation protection, radiation dose limits, and reporting requirements. Section 3 presents the CY 2024 occupational dose data along with trends over the past 5 years and includes information and analyses regarding aggregate, individual, site, DOE Program, and transient individual exposure data; a historical review; and a DOE occurrence report review. Section 4 discusses the DOE Corporate Operating Experience Program. Sections 5, 6, and 7 contain the report glossary, references, and a user survey, respectively. Section 8 contains the appendices, which have additional detail and data associated with the information presented within the report.

### 1.2 Report Availability

This report, the appendices, and all other associated information are available on the DOE Radiation Exposure Monitoring System (REMS) web site at:

<https://www.energy.gov/ehss/occupational-radiation-exposure>

The REMS web site contains additional information on occupational radiation exposure, such as:

- ◆ Annual occupational radiation exposure reports and associated appendices in pdf since CY 1974;
- ◆ Guidance on reporting radiation exposure information to the DOE REMS;
- ◆ Updated REMS-Online Query Tool;

\* For the purposes of this report, the sites and facilities are grouped by geographic location. When reported separately, the data for individual facilities at the sites are provided separately. See Section 3.4 for more information.

- ◆ Guidance on how to request a dose history for an individual;
- ◆ Statistical data since CY 1987 for analysis;
- ◆ Applicable DOE orders and manuals for the recordkeeping and reporting of occupational radiation exposure at DOE;
- ◆ Occupational Exposure Dashboard—interactive data explorer;
- ◆ Ten Year Summary—graphical comprehensive overview of the past 10 years of radiation exposure data; and
- ◆ ALARA activities at DOE.

Requests for access to the data files, or for individual dose records used to compile this report, as well as suggestions and comments, should be directed to:

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# Section Two

## Standards and Requirements

It is DOE’s mission to provide a safe and healthy workplace for all DOE Federal employees, contractors, and subcontractors as well as members of the public that visit DOE facilities. To meet this mission, the EHSS establishes comprehensive and integrated programs for the protection of workers from hazards in the workplace, including ionizing radiation. The DOE standards for occupational radiation protection include radiation exposure limits to workers. In addition, DOE is required to maintain radiation exposures as far below the limits as is reasonable through application of the ALARA process, which incorporates pre-job planning, engineering controls, and worker training.

This section identifies the radiation protection standards and requirements applicable to DOE operations in CY 2024.

### 2.1 Radiation Protection Requirements

DOE radiation protection standards are based on Federal guidance for protection against occupational radiation exposure promulgated by the U.S. Environmental Protection Agency (EPA) in CY 1987 [2]. The guidance, initially implemented by DOE in CY 1989, was based on the CY 1977 recommendations of the International Commission on Radiological Protection (ICRP) Publication 26 [3] and the CY 1987 recommendations of the National Council on Radiation Protection and Measurements (NCRP) Publication 91 [4]. EPA recommends that

internal dose be added to the external whole-body dose to determine the TED equivalent. The laws and requirements for occupational radiation protection pertaining to the information collected and presented in this report are summarized in *Exhibit 2-1*.

### 2.2 Radiation Dose Limits

Radiation dose limits are codified in 10 CFR 835, Sections 202, 206, 207, and 208 [5] and are summarized in *Exhibit 2-2*.

### 2.3 Reporting Requirements

DOE O 231.1B, *Environment, Safety and Health Reporting* [6] contains the requirements for reporting annual individual radiation exposure records to the REMS repository. Exposure records for the monitoring year are required to be reported by March 31 of the following calendar year. Specific instructions for preparing occupational exposure data for submittal to the REMS repository are contained in the REMS Data Reporting Guide [7] available online at:

<https://www.energy.gov/ehss/articles/radiation-exposure-monitoring-systems-data-reporting-guide>

**Exhibit 2-1: Regulations and Requirements Pertaining to the Collection and Reporting of Radiation Exposures.**

Title	Date	Description
10 CFR 835, Occupational Radiation Protection [5]	Issued 12/14/1993 Amended 11/4/1998 Amended 6/8/2007 Amended 4/13/2011 Amended 8/11/2017 Amended 9/11/2017 Amended 6/26/2023	Establishes radiation protection standards, exposure limits, and program requirements for protecting individuals from ionizing radiation that results from the conduct of DOE activities.
DOE O 231.1B, Environment, Safety and Health Reporting [6] REMS Reporting Guide [7]	Approved 6/27/2011 Amended 11/28/2012 Issued 2/23/2012	Requires the annual reporting of occupational radiation exposure records to the DOE REMS repository. Specifies the current format and content of the reports required by DOE O 231.1B.

**Exhibit 2-2: DOE Dose Limits from 10 CFR 835.**

<b>Personnel Category</b>	<b>Section of 10 CFR 835</b>	<b>Type of Exposure</b>	<b>Acronym</b>	<b>Annual Limit</b>
General employees	835.202	Total effective dose. The sum of the effective dose (for external exposures) and the committed effective dose.	TED	5 rem (50 mSv)
		The sum of the equivalent dose to the whole body for external exposures and the committed equivalent dose to any organ or tissue other than the skin or the lens of the eye, also referred to as the total organ dose (TOD).	EqD-WB + CEqD (TOD)	50 rem (500 mSv)
		Equivalent dose to the lens of the eye	EqD-Eye	15 rem (150 mSv)
		The sum of the equivalent dose to the skin or to any extremity for external exposures and the committed equivalent dose to the skin or to any extremity	EqD-SkWB + CEqD-SK and EqD-ME + CEqD-SK	50 rem (500 mSv)
Declared pregnant workers*	835.206	The equivalent dose to the embryo/fetus from the period of conception to birth as a result of occupational exposure of a declared pregnant worker.	EqD-Fetus	0.500 rem (5 mSv) from the period of conception to birth
Minors	835.207	Total effective dose	TED	0.100 rem (1 mSv)
Members of the public in a controlled area	835.208	Total effective dose	TED	0.100 rem (1 mSv)

\* Limit applies to the embryo/fetus.

## 2.4 Amendments to 10 CFR 835

In August 2006, DOE published a proposed amendment to 10 CFR 835 in the *Federal Register*, and, in June 2007, the amended rule was published. The amendment:

- ◆ Specified new dosimetric terminology and quantities based on ICRP 60/68 in place of ICRP 26/30;
- ◆ Specified ICRP 60 tissue weighting factors in place of ICRP 26 weighting factors;
- ◆ Specified ICRP 60 radiation weighting factors in place of ICRP 26 quality factors;
- ◆ Amended other parts of the regulation that changed as a result of adopting ICRP 60 dosimetry system;
- ◆ Used the ICRP 68 dose conversion factors to determine values for the derived air concentrations; and
- ◆ Adopted other changes intended to enhance radiation protection.

The amended rule became effective on July 9, 2007, and was required to be fully implemented by DOE sites by July 9, 2010. All terminology used in this annual report reflects that of the amendment. In addition, 10 CFR 835 was revised in April 2011 when Appendix C (Derived Air Concentration [DAC] for Workers) was updated. On August 11, 2017, Appendices C and E were amended. The amendment to Appendix C corrected the air immersion DAC for any single radionuclide not listed in the Appendix C table with a decay mode other than alpha emission or spontaneous fission and with radioactive half-life less than 2 hours, adjusted for an 8-hour workday. The amendment to Appendix E corrected the activity information of two radioisotopes of rhodium (Rh-102 and Rh-102m).

# Section Three

## Occupational Radiation Dose at DOE

# 3

### 3.1 Analysis of the Data

The following key indicators are analyzed to identify and correlate parameters that impact occupational radiation doses at DOE:

- ◆ Number of records for monitored individuals;
- ◆ Individuals who received a measurable dose;
- ◆ Collective dose;
- ◆ Average measurable dose; and
- ◆ Dose distribution.

The analysis of key indicators for individual dose data includes:

- ◆ Doses exceeding the 5 rem (50 millisievert [mSv]) DOE regulatory limit; and
- ◆ Doses exceeding the 2 rem (20 mSv) DOE administrative control level (ACL).

Additional information is provided in this report concerning activities at sites contributing to most of the collective dose.

The data for prior years contained in this report are subject to change as sites may submit corrections for previous years as required by DOE O 231.1-1B(1)(b). Corrected or updated records received after the annual March 31 deadline are included in the following year's annual report.

### 3.2 Analysis of Aggregate Data

#### 3.2.1 Number of Monitored Individuals

The data in the REMS repository are reported by each facility in the form of a record for a monitoring period for each individual. An individual may have been monitored more than once at the same facility (e.g., multiple short-term assignments) or may have been monitored at more than one facility during the year. This can result in more than one record for an individual during the year in the REMS repository. However, the impact of multiple records per person on the annual trends and aggregate analysis of the data in this report is not significant, as it occurs consistently from year to

year. An analysis of the number of individuals who are monitored at more than one location during the year is provided in Section 3.5, which supports this assertion. The term “number of monitored individuals” will be used herein with the understanding that it is determined by the number of records for monitored individuals.

#### 3.2.2 Number of Individuals with Measurable Dose

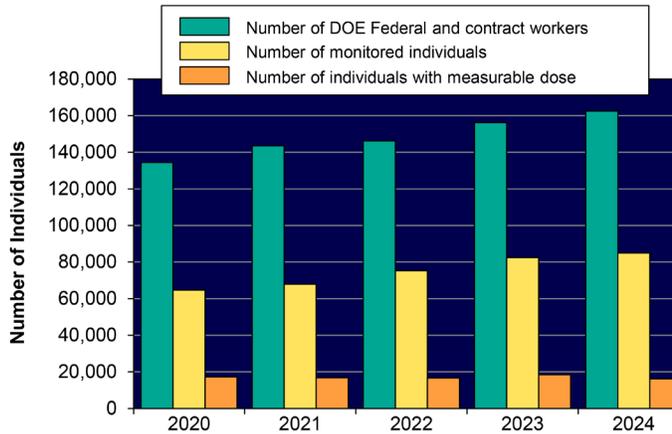
DOE uses the number of individuals with measurable dose to represent the exposed workforce size. In this context, “with measurable dose” means that a detectable value was reported for the individual.

Over the past 5-year period, measurable doses to all monitored individuals were well below the annual DOE regulatory limit of 5 rem (50 mSv) TED; however, one monitored individual received a single dose of 3.0 rem (30 mSv) TED in CY 2020. This dose exceeded the 2 rem (20 mSv) DOE ACL.

*Exhibit 3-1a* and *Exhibit 3-1b* show the number of DOE Federal and contract workers, the total number of individuals monitored for radiation dose, the number of individuals with a measurable dose, and the relative percentages of individuals with measurable dose for the past 5 years. The number of DOE Federal and contract employees was calculated by dividing the total hours worked per year by the average number of work hours per year. It is, therefore, not a true count of individuals, but is a representation of the total size of the DOE workforce as full-time equivalents (FTEs) and is included here to compare it to the number of individuals monitored.

As shown in *Exhibit 3-1b*, the number of monitored individuals increased by 3 percent from a value of 82,421 in CY 2023 to a value of 84,969 in CY 2024. Since 1989, the number of monitored individuals has been greater than 70,000. However, in CY 2020 and CY 2021, the number of monitored individuals was fewer than 65,000 due to COVID pandemic-related work restrictions.

**Exhibit 3-1a: Monitoring of the DOE Workforce, CY 2020 – 2024.**



For CY 2024, 52 percent of the DOE workforce were monitored for radiation dose, and 19 percent of monitored individuals received a measurable dose.

**Exhibit 3-1b: Monitoring of the DOE Workforce, CY 2020 – 2024.**

Year	DOE Federal & Contractor Workforce*	Number of Monitored Individuals	Percent of Monitored Individuals**	Number of Individuals with Measurable Dose	Percent of Individuals with Measurable Dose**
2020	134,298	64,728	48% ▼	17,258	27%
2021	143,518	67,793	47% ▼	16,903	25% ▼
2022	146,242	75,348	52% ▲	16,774	22% ▼
2023	156,271	82,421	53% ▲	18,473	22%
2024	162,599	84,969	52% ▼	16,308	19% ▼
<b>5-Year Average</b>	<b>148,586</b>	<b>75,052</b>	<b>51%</b>	<b>17,143</b>	<b>23%</b>

\* The number of DOE and contract workers was determined from the total annual work hours at DOE [8] converted to FTEs.  
 \*\* Up arrows indicate an increase from the previous year's value. Down arrows indicate a decrease from the previous year's value.

The number of individuals with measurable dose decreased 12 percent from a value of 18,473 in CY 2023 to a value of 16,308 in CY 2024. Although the number of monitored individuals continued to increase post-COVID, the percentage of individuals with measurable dose decreased slightly from 22 percent in CY 2023 to 19 percent in CY 2024.

### 3.2.3 Collective Dose

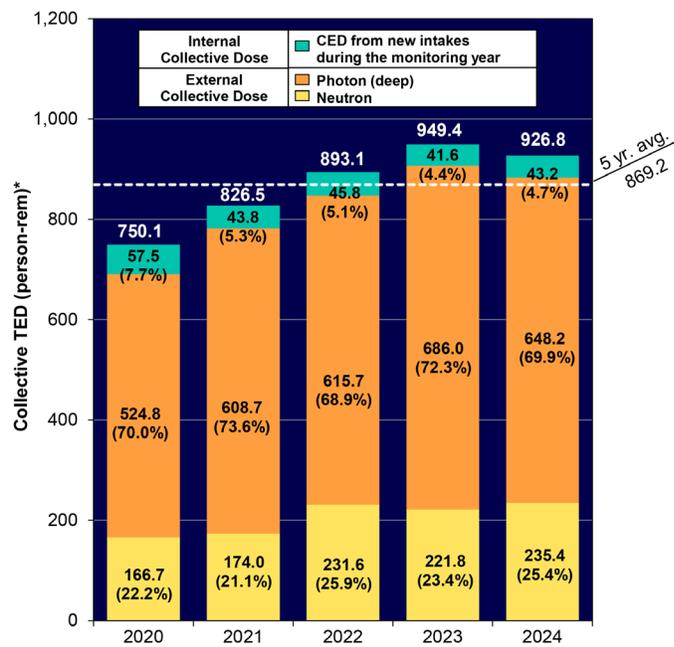
The collective dose is the sum of the dose received by all individuals with a measurable dose and is measured in units of person-rem and person-mSv. DOE monitors the collective dose as one measure of the overall performance of radiation protection

programs to keep individual exposures and collective exposures ALARA.

In this report, the term “collective dose” is also applied to various types of radiation dose, such as external or internal, and will be specified in conjunction with the term “collective” to clarify the intended meaning.

As shown in *Exhibit 3-2*, the collective TED decreased at DOE by 2 percent from 949.4 person-rem (9,494 person-mSv) in CY 2023 to 926.8 person-rem (9,268 person-mSv) in CY 2024.

**Exhibit 3-2: Components of TED, CY 2020 – 2024.**



\* The percentages in parentheses represent the percentage of each dose component to the collective TED.

The collective TED decreased by 2 percent at DOE from CY 2023 to 2024.

The collective internal dose increased by 4 percent from CY 2023 to 2024.

The collective neutron dose increased by 6 percent from CY 2023 to 2024.

The collective photon dose decreased by 6 percent from CY 2023 to 2024.

Effective dose from photons—the component of external dose from gamma or X-ray electromagnetic radiation (also includes energetic betas)

Effective dose from neutrons—the component of external dose from neutrons ejected from the nucleus of an atom during nuclear reactions

Internal dose—radiation dose resulting from radioactive material taken into the body

The internal dose is based on the 50-year CED methodology. Under this methodology, the cumulative dose received from the intake of radioactive material over the next 50 years is assigned to the individual as a one-time dose in the year of intake.

The internal dose component of the collective TED increased by 4 percent from 41.6 person-rem (416 person-mSv) in CY 2023 to 43.2 person-rem (432 person-mSv) in CY 2024 due to an increase at the Oak Ridge Y-12 National Security Complex. The collective photon dose decreased by 6 percent from 686.0 person-rem (6,860 person-mSv) in CY 2023 to 648.2 person-rem (6,482 person-mSv) in CY 2024 due to decreases at Savannah River Site and Hanford.

The neutron component of the collective TED increased by 6 percent from 221.8 person-rem (2,218 person-mSv) in CY 2023 to 235.4 person-rem (2,354 person-mSv). The increase in CY 2024 resulted primarily from an increase in collective neutron dose at LANL.

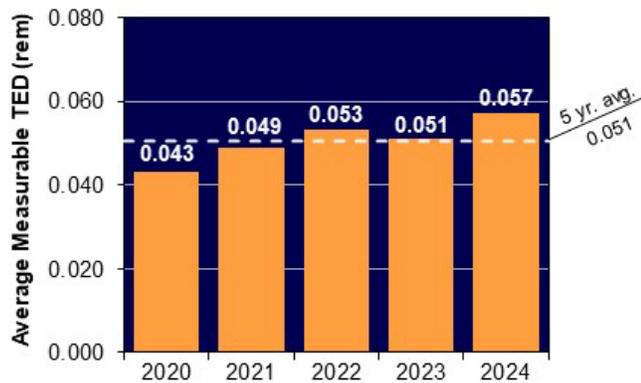
Five DOE sites contributed 86 percent of the collective TED in CY 2024. In descending order of collective TED, these were: LANL, Savannah River, Oak Ridge, Idaho, and Hanford. Idaho, LANL, and Oak Ridge had increases in collective TED in CY 2024, while collective TED decreased at Savannah River, and Hanford. (See section 3.4.3.)

### 3.2.4 Average Measurable Dose

The average measurable dose to DOE monitored individuals, a key radiation dose indicator, is calculated by dividing the collective TED by the number of individuals with measurable dose. This is the average most commonly used by radiation exposure research organizations when examining trends and comparing doses received by individuals because it excludes those individuals that did not receive a measurable dose.

Exhibit 3-3 illustrates that the average measurable TED increased by 12 percent from 0.051 rem (0.510 mSv) in CY 2023 to 0.057 rem (0.570 mSv) in CY 2024.

**Exhibit 3-3: Average Measurable TED, CY 2020 – 2024.**



While the collective dose and average measurable dose serve as measures of the magnitude of the dose accrued by DOE-monitored individuals, they do not depict the distribution of doses among the monitored individuals.

### 3.2.5 Dose Distribution

Exposure data are commonly analyzed in terms of dose intervals to depict the TED distribution among the monitored individuals. *Exhibit 3-4* shows the number

of individuals in each of 11 different dose ranges. The number of individuals receiving doses above 0.100 rem (1 mSv) is included to show the number of individuals with doses above the monitoring threshold specified in 10 CFR 835.402(a) and (c) [5].

The number of individuals in each dose range below 0.250 rem (2.5 mSv) increased, and the number of individuals in the ranges above 0.250 rem (2.5 mSv) increased from CY 2023 to CY 2024. In the past 5 years (CY 2020), only one individual has received dose above 2.0 rem.

*Exhibit 3-5* presents the dose distribution of those individuals with measurable doses in terms of the percentage of individuals with measurable TED in each range. The doses received by eighty-five percent of monitored individuals who received a measurable dose were below the required monitoring threshold of 0.100 rem (1 mSv) specified in 10 CFR 835.402 (a) and (c).

These results reflect DOE’s conservative practice of monitoring more individuals than are required. This ensures adequate protection of the individual and that ALARA principles are being effectively implemented to reduce radiation exposure.

**Exhibit 3-4: Distribution of TED by Dose Range, CY 2020 – 2024.**

TED Range (rem)*		2020	2021	2022	2023	2024
Number of Individuals in Each Dose Range	Less than measurable	47,470	50,890	58,574	63,948	68,661
	Measurable <0.100	15,683	14,937	14,728	16,143	13,942
	0.100 – 0.250	1,164	1,383	1,374	1,656	1,572
	0.250 – 0.500	310	443	453	524	617
	0.500 – 0.750	64	98	137	116	128
	0.750 – 1.000	24	29	60	28	37
	1.0 – 2.0	12	13	22	6	12
	2.0 – 3.0	-	-	-	-	-
	3.0 – 4.0	1	-	-	-	-
	4.0 – 5.0	-	-	-	-	-
	>5.0	-	-	-	-	-
Total number of records for monitored individuals		64,728	67,793	75,348	82,421	84,969
Number with measurable dose		17,258	16,903	16,774	18,473	16,308
Number with dose >0.100 rem		1,575	1,966	2,046	2,330	2,366
Collective TED (person-rem)		750.096	826.474	893.125	949.385	926.843
Average measurable TED (rem)		0.043	0.049	0.053	0.051	0.057

\* Individuals with doses equal to the dose value separating the dose ranges are included in the next higher dose range.  
 - Indicates dose ranges containing no individuals.

**Exhibit 3-5: Percentage of Individuals with Measurable TED by Dose Range, CY 2020 – 2024.**

TED Range (rem)*		2020	2021	2022	2023	2024
Percentage of Individuals with Measurable TED	Measurable <0.100	90.87%	88.37%	87.80%	87.39%	85.49%
	0.100 – 0.250	6.74%	8.18%	8.19%	8.96%	9.64%
	0.250 – 0.500	1.80%	2.62%	2.70%	2.84%	3.78%
	0.500 – 0.750	0.37%	0.58%	0.82%	0.63%	0.78%
	0.750 – 1.000	0.14%	0.17%	0.36%	0.15%	0.23%
	1.0 – 2.0	0.07%	0.08%	0.13%	0.03%	0.07%
	2.0 – 3.0	-	-	-	-	-
	3.0 – 4.0	0.01%	-	-	-	-
	4.0 – 5.0	-	-	-	-	-
	>5.0	-	-	-	-	-
% of monitored individuals with measurable dose		27%	25%	22%	22%	19%
% of monitored individuals with dose > 0.100 rem		2%	3%	3%	3%	3%

\* Individuals with doses equal to the dose value separating the dose ranges are included in the next higher dose range.  
 - Indicates dose ranges containing no individuals.

### 3.3 Analysis of Individual Dose Data

The previous section’s analysis is based on aggregate data for DOE. From both the individual and regulatory perspectives, it is important to examine the doses received by individuals in the elevated dose ranges to understand the circumstances that led to these exposures and reduce or eliminate these types of exposures in the future.

#### 3.3.1 Doses in Excess of the Regulatory Limit

No individual was reported to have exceeded the TED regulatory limit (5 rem [50 mSv]) from CY 2020 – 2024. One individual exceeded the 50-rem organ dose limit in CY 2020 from an intake of plutonium-238 at LANL (see Section 3.3.2) resulting in a CEqD of 118.5 rem to the bone surface.

Eighty-five percent of monitored individuals who received a measurable dose in CY 2024 received doses below the required monitoring threshold of 0.100 rem (1 mSv) specified in 10 CFR 835.402 (a) and (c).

#### 3.3.2 Doses in Excess of the DOE Administrative Control Level

DOE Standard (STD)-1098-2017, *Radiological Control* [1] establishes a 2-rem (20-mSv) ACL for

TED per year per person for all DOE activities. The Standard states that each DOE site should establish an annual facility ACL based on historical and projected exposures and that no individual should be allowed to exceed this value without prior facility management approval.

One individual was reported to have exceeded the TED ACL (2 rem [20 mSv]) in CY 2020. In June of CY 2020, skin contamination and positive nasal smears were detected on one employee after an airborne release of radioactive material at LANL’s Plutonium Processing and Handling Facility. The source of the contamination was determined to be a breach in a protective glove inside a glovebox. The individual received a CED of 2.4 rem (24 mSv) from plutonium-238, resulting in a TED of 3.0 rem (30 mSv) for the year. This individual also exceeded the 50-rem organ dose limit in CY 2020 from an intake of plutonium-238 at LANL (see Section 3.3.2) resulting in a CEqD of 118.5 rem to the bone surface. Details of the incident are available in the occurrence report NA--LASO-LANL-TA55-2020.

#### 3.3.3 Intakes of Radioactive Material

DOE tracks the number of radionuclide intakes as a performance measure in this report. DOE emphasizes the importance of implementing measures to avoid intakes and maintain doses as low as is reasonable through the ALARA principle. Intakes involving certain radionuclides can take significant time to analyze and to determine final dose. This can result in changes to the dose totals for prior years if the updates are received after the March 31 annual reporting deadline.

Exhibit 3-6 shows the number of individuals with measurable CED, collective CED, and average measurable CED for CY 2020 – 2024. The number of individuals with measurable CED increased 6 percent from 1,333 in CY 2023 to 1,419 in CY 2024, and the collective CED increased by 4 percent. The average measurable CED per deposition decreased 3.2 percent from 0.031 rem (0.310 mSv) in CY 2023 to 0.030 rem (0.300 mSv) in CY 2024. Both the collective CED and the average measurable CED remained below the 5-year averages.

Ninety-seven percent of the collective CED in CY 2024 was from uranium intakes at Y-12 during the operation and management of Enriched Uranium Operations facilities at the site. Compared with external doses, few individuals at DOE receive measurable internal doses. Larger fluctuations may occur from year to year in the number of individuals and the collective CED compared to other components of TED.

Exhibit 3-7 shows the distribution of the CED from CY 2020 – 2024. The total number of individuals with measurable CED in each dose range is the sum of the

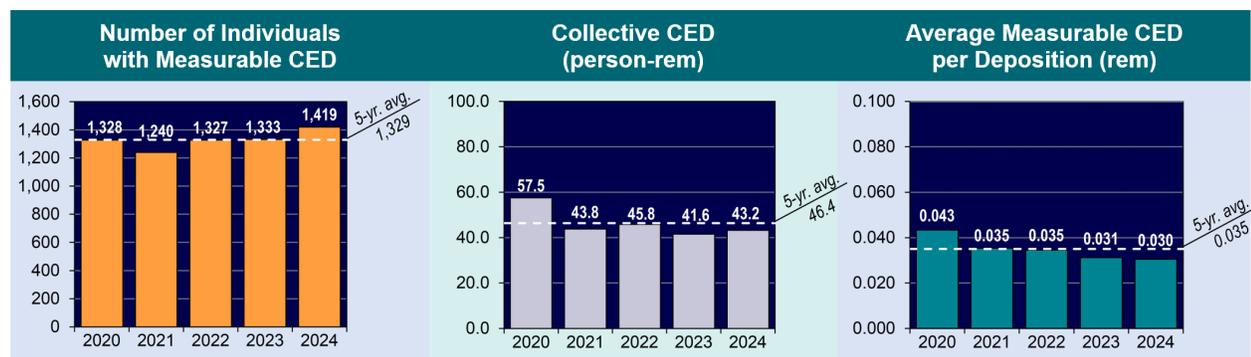
number of individuals receiving a CED in the dose range. Individuals may have had more than one intake of radioactive material, but the site would report one CED value from these intakes.

Doses below 0.020 rem (0.200 mSv) are shown as a separate dose range in order to show the large number of individuals in this low dose range.

The internal dose records indicate that the majority of the intakes resulted in relatively low doses.

In CY 2024, 52 percent of the internal dose records were for doses below 0.020 rem (0.200 mSv). Over the 5-year period, internal doses accounted for 5 percent of the collective TED; although only 5 percent of the individuals who received internal doses had estimated doses above the monitoring threshold (0.100 rem [1 mSv]) specified in 10 CFR 835.402(c) [5]. It is noted that the CED is a dose received over a 50-year period after the intake that is all credited to the individual in the year of intake, so the actual annual dose is lower.

**Exhibit 3-6: Number of Individuals with Measurable CED, Collective CED, and Average Measurable CED, CY 2020 – 2024.**



Note: The number of internal depositions represents the number of internal dose records with positive results reported for each individual.

**Exhibit 3-7: Internal Dose Distribution from Intakes, CY 2020 – 2024.**

Year	Number of Individuals with CED in the Ranges (rem)*											Total No. of Individ.	Total Collective CED (person-rem)
	Meas. <0.020	0.020–0.100	0.100–0.250	0.250–0.500	0.500–0.750	0.750–1.000	1.0–2.0	2.0–3.0	3.0–4.0	4.0–5.0	>5.0		
2020	586	592	142	7	-	-	-	1	-	-	-	1,328	57.523
2021	667	456	113	4	-	-	-	-	-	-	-	1,240	43.789
2022	685	537	104	1	-	-	-	-	-	-	-	1,327	45.805
2023	706	558	66	3	-	-	-	-	-	-	-	1,333	41.563
2024	741	607	71	-	-	-	-	-	-	-	-	1,419	43.245

\* Individuals with doses equal to the dose value separating the dose ranges are included in the next higher dose range.  
 - Indicates dose ranges containing no individuals.

### 3.3.4 Bioassay and Intake Summary Information

Exhibit 3-8 shows the breakdown of bioassay measurements by type and number of measurements. Bioassay and intake summary information are required to be reported under the REMS Reporting Guide [7].

The values shown are based on the number of measurements taken and not the number of individuals monitored. Individuals may have measurements taken more than once during the year.

**Exhibit 3-8: Bioassay Measurements, CY 2020 – 2024.**



During the past 5 years, “Urinalysis” has been reported as the most common method of bioassay measurement used to determine internal doses to the individuals. The number of “Urinalysis” measurements increased by 33% from CY 2023 to 2024.

Y-12 and LANL had the largest percentage increases in the number of “Urinalysis” measurements in CY 2024. Seventy-seven percent of the “Urinalysis” measurements in CY 2024 were performed at four sites: Y-12, LANL, Pantex Plant and Savannah River Site.

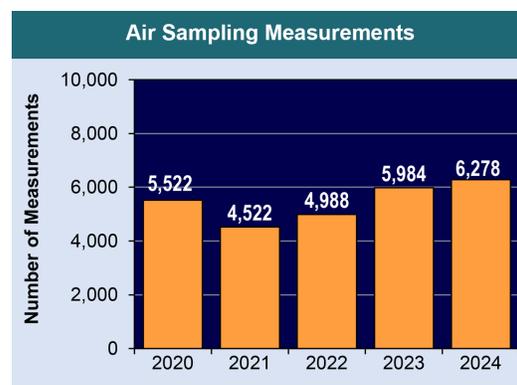
For CY2024, Pantex provided corrected bioassay data for calendar years 2018-2023. The updated data now show a decrease in urinalysis measurements at Pantex in 2020 due to COVID and an increase from 2022 to 2023 due to the ramping up of a weapons program requiring bioassay monitoring. For this reason, the bioassay data presented for 2020-2023 in this report does not match the data included in the 2023 published report.

The measurements reported as “In Vivo” include direct measurements of the radioactive material in the body of the monitored person. Examples of “In Vivo” measurements include whole-body counts and lung or thyroid counts. Four sites—Hanford Site, Office of River Protection (ORP), ORNL, and Savannah River Site—accounted for 85 percent of the “In Vivo” measurements.

Exhibit 3-8 also indicates the number of “Fecal” bioassay measurements taken. Y-12 accounted for 95 percent of the measurements in CY 2024.

Exhibit 3-9 shows the reported “Air Sampling” measurements, which are used to calculate the amount of airborne radioactive material taken into the body and the resultant internal dose.

**Exhibit 3-9: Air Sampling Measurements, CY 2020 – 2024.**

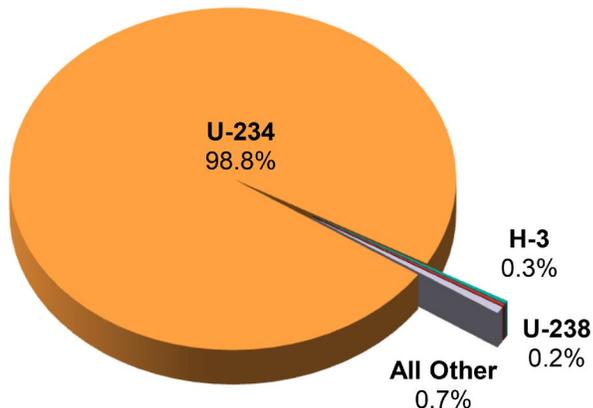


Savannah River Site performed the largest number of air sampling measurements, comprising 99 percent of the total air measurements taken in CY 2024.

Y-12 performed the largest number of bioassay and air sampling measurements combined, comprising 30 percent of the total measurements taken.

*Exhibit 3-10* shows the breakdown of the collective CED by radionuclide for CY 2024. Uranium-234 (U-234) accounted for the largest percentage of the collective CED, with 99 percent of this dose accrued at Y-12.

***Exhibit 3-10: Collective CED by Radionuclide from Internal Exposure, CY 2024.***



Appendix B contains additional information on intake data, such as Exhibits B-4, Internal Dose by Site; B-17, Internal Dose by Facility Type and Nuclide; B-19, Internal Dose by Labor Category; and B-21, Internal Dose Distribution by Site and Nuclide.

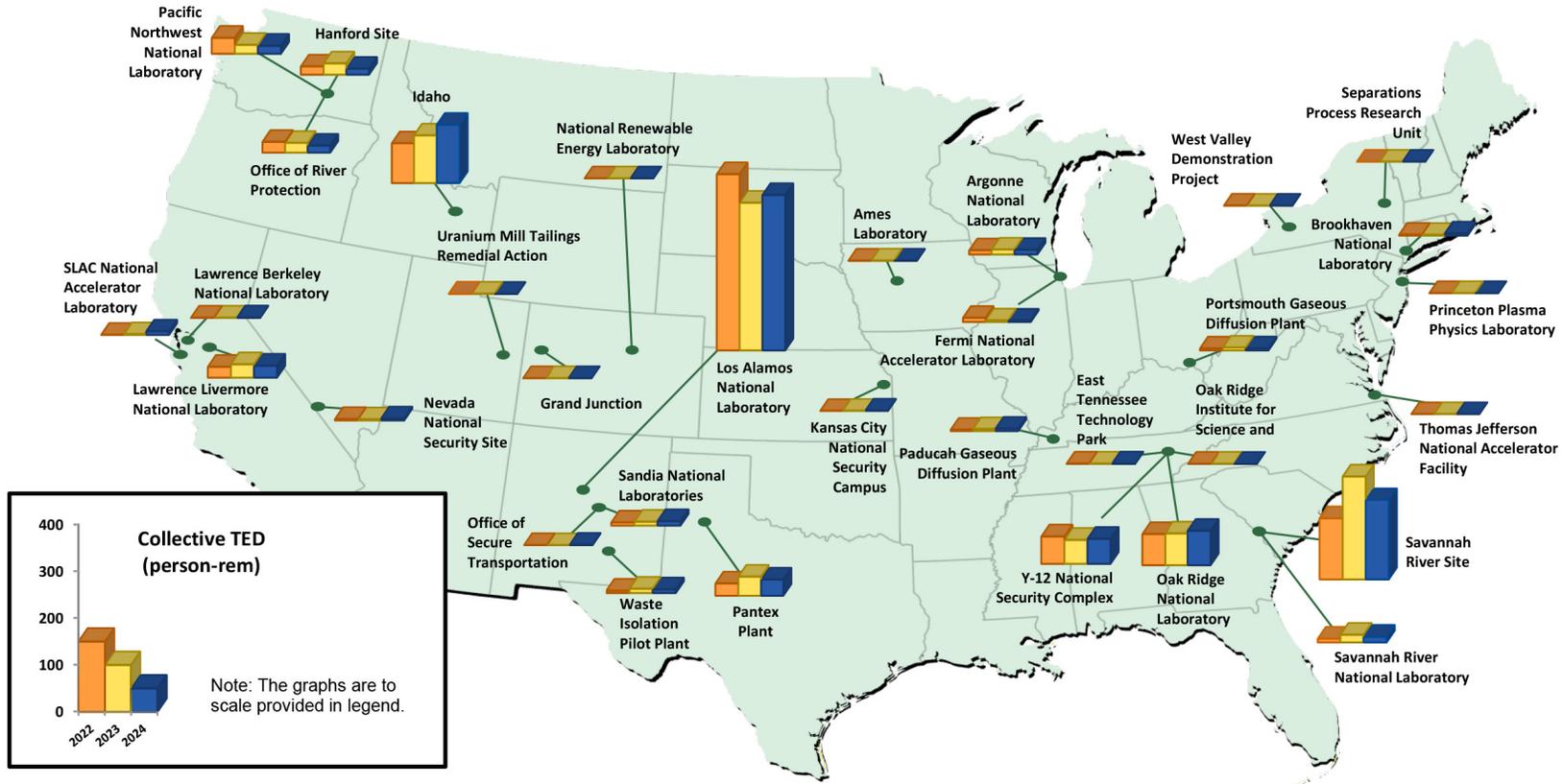
### 3.4 Analysis of Site Data

#### 3.4.1 Collective TED by Site and Other Facilities

The collective TED values for CY 2022 – 2024 for the major DOE sites and operations/field offices are shown graphically in *Exhibit 3-11*. A list of the collective TED and number of individuals with measurable TED by DOE sites is shown in *Exhibit 3-12*. For the purposes of this report, the sites and facilities are grouped by geographic location as shown in these exhibits. When reported separately, the data for individual facilities at the sites are provided separately, such as at Hanford, Oak Ridge, and Savannah River. The data for Idaho is not provided separately and includes the Idaho National Laboratory (INL), Idaho Cleanup Project (ICP), and the Advanced Mixed Waste Treatment Project (AMWTP).

The collective TED decreased by 2 percent from 949.4 person-rem (9,494 person-mSv) in CY 2023 to 926.8 person-rem (9,268 person-mSv) in CY 2024, with LANL, Savannah River, Oak Ridge, Idaho, and Hanford contributing 86 percent of the total DOE collective TED.

**Exhibit 3-11: Collective TED by DOE Site for CY 2022 – 2024.**



**Exhibit 3-12: Collective TED and Number of Individuals with Measurable TED by DOE Site, CY 2022 – 2024.**

Site	2022		2023		2024	
	Collective TED (person-rem)	Number with Meas. TED	Collective TED (person-rem)	Number with Meas. TED	Collective TED (person-rem)	Number with Meas. TED
Ames Laboratory	0.565	26	0.778	34	0.704	31
Argonne National Laboratory	8.651	115	10.225	261	9.676	221
Brookhaven National Laboratory	1.976	87	1.611	49	4.531	100
Fermi National Accelerator Laboratory	8.780	143	3.360	86	3.040	97
Grand Junction Site	0.013	4	0.003	2	0.004	4
Hanford:						
Hanford Site	17.308	555	23.745	503	12.631	442
Office of River Protection	22.637	562	20.427	523	14.672	439
Pacific Northwest National Laboratory	33.264	537	18.488	671	16.598	354
<i>Hanford Totals:</i>	<i>73.209</i>	<i>1,654</i>	<i>62.660</i>	<i>1,697</i>	<i>43.901</i>	<i>1,235</i>
Idaho	83.730	1,592	100.316	1,699	122.729	1,837
Kansas City National Security Campus	0.110	33	0.312	68	0.845	57
Lawrence Berkeley National Laboratory	0.497	12	0.434	10	1.020	14
Lawrence Livermore National Laboratory	22.621	245	27.907	333	24.999	373
Los Alamos National Laboratory	<b>371.500</b>	<b>4,467</b>	<b>311.506</b>	3,764	<b>327.736</b>	3,360
National Renewable Energy Laboratory	0.005	2	0.003	1	0.001	1
Nevada National Security Site	2.876	53	2.351	43	4.081	70
Oak Ridge:						
East Tennessee Technology Park	0.701	62	0.577	59	0.829	70
Oak Ridge Institute for Science and Education	0.129	13	0.098	6	0.063	8
Oak Ridge National Laboratory	65.393	1,096	66.688	1,220	72.198	1,171
Y-12 National Security Complex	57.144	1,571	50.006	1,567	52.164	1,603
<i>Oak Ridge Totals:</i>	<i>123.367</i>	<i>2,742</i>	<i>117.369</i>	<i>2,852</i>	<i>125.254</i>	<i>2,852</i>
Office of Secure Transportation	0.157	3	0.048	4	0.786	8
Paducah Gaseous Diffusion Plant	2.983	83	4.172	96	5.088	83
Pantex Plant	25.909	478	40.176	564	34.205	492
Portsmouth Gaseous Diffusion Plant	4.259	133	5.993	157	5.667	144
Princeton Plasma Physics Laboratory	0.255	47	0.336	48	0.280	53
Sandia National Laboratories	6.477	127	7.959	112	9.181	179
Savannah River:						
Savannah River National Laboratory	7.665	371	15.793	546	11.665	507
Savannah River Site	128.062	4,083	216.973	<b>5,701</b>	167.097	<b>4,219</b>
<i>Savannah River Totals:</i>	<i>135.727</i>	<i>4,454</i>	<i>232.766</i>	<i>6,247</i>	<i>178.762</i>	<i>4,726</i>
Separations Process Research Unit	0.016	1	0.013	1	0.011	1
SLAC National Accelerator Laboratory	-	-	0.036	2	0.045	1
Thomas Jefferson National Accelerator Facility	0.854	53	0.612	37	0.451	28
Uranium Mill Tailings Remedial Action Project	4.765	61	8.905	125	7.482	135
Waste Isolation Pilot Plant	0.449	25	0.163	9	0.268	15
West Valley Demonstration Project	12.946	119	7.734	130	8.664	133
Service Center Personnel *	0.428	15	1.637	42	7.432	58
<b>Totals</b>	<b>893.125</b>	<b>16,774</b>	<b>949.385</b>	<b>18,473</b>	<b>926.843</b>	<b>16,308</b>

Note: Bold and boxed values indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

\* Includes personnel at National Energy Technology Laboratory (NETL), NNSA Albuquerque complex, Oak Ridge, and Waste Isolation Pilot Plant (WIPP) in addition to several smaller facilities not associated with a DOE site.

### 3.4.2 Changes by Site from CY 2023 to 2024

*Exhibit 3-13* shows the collective TED, the number monitored, the number with a measurable TED, and the average measurable TED as well as the percentage change in these values from the previous year. Some of the largest percentage changes occurred at relatively small facilities where conditions may fluctuate from year to year due to changes in workload and tasks conducted.

In addition, there are several smaller organizations not associated with a DOE site that are reported to REMS. These individuals are reported under the category ‘Service Center Personnel.’ This includes personnel at NETL, NNSA Albuquerque complex, Oak Ridge, WIPP, and DOE Federal Employees. In 2024, the highest number of monitored individuals was at the three NETL facilities but still represents a relatively small number of individuals.

Changes that have the most impact on the overall values at DOE typically occur at sites with large collective TED. For example, the collective TED at LANL increased from 311.506 person-rem (3,115 person-mSv) in CY 2023 to 327.736 person-rem (3,277 person-mSv) in CY 2024. (See *Exhibit 3-12* and section 3.4.3.)

Seventeen of the 33 DOE sites reported decreases in the collective TED from the CY 2023 values, and 16 of the 33 DOE sites reported increases in the collective TED from the CY 2023 values.

Seventeen of the 33 reporting sites experienced decreases in the number of workers with a measurable TED from CY 2023 to 2024. The largest decrease in total number of individuals with a measurable TED occurred at Savannah River Site, with a decrease of 1,482 individuals or 26 percent (see *Exhibit 3-14*). The second largest decrease in the total number of individuals with a measurable TED occurred at LANL, with a decrease of 404 individuals, or 11 percent.

Sixteen of the 33 reporting sites experienced increases in the number of individuals with a measurable TED from CY 2023 to 2024. The largest increase in the number of individuals receiving a measurable TED occurred at Idaho, with an increase of 138 individuals, or 8 percent. A discussion of activities at the highest dose facilities is included in section 3.4.3.

### 3.4.3 Activities Significantly Contributing to Collective Dose in CY 2024

In an effort to identify the reasons for changes in the collective dose at DOE, the sites provided information on activities that significantly contributed to the collective dose for CY 2024 as instructed in the REMS Reporting Guide, Item 1. In *Exhibit 3-14*, these sites are presented in descending order of collective TED with a dotted line representing the site's 5-year average TED. Sites that have reported less than 5 person-rem (50 person-mSv) for CY 2024 can be found in *Exhibit 3-15*. Due to the low doses and small number of individuals with measurable dose, wider variation can occur from year to year.

#### **Site Listings of Exhibit 3-14 for > 5 Person-Rem**

Los Alamos National Laboratory (LANL) .....	3-13
Savannah River Site (SRS).....	3-13
Idaho .....	3-13
Oak Ridge: Oak Ridge National Laboratory (ORNL).....	3-14
Oak Ridge: Y-12 National Security Complex (Y-12) .....	3-14
Pantex Plant (Pantex) .....	3-14
Lawrence Livermore National Laboratory (LLNL) .....	3-15
Hanford: Pacific Northwest National Laboratory (PNNL)....	3-15
Hanford: Office of River Protection (ORP).....	3-15
Hanford: Hanford Site.....	3-16
Savannah River National Laboratory (SRNL) .....	3-16
Argonne National Laboratory (ANL).....	3-16
Sandia National Laboratories (SNL).....	3-17
West Valley Demonstration Project (WVDP).....	3-17
Uranium Mill Tailings Remedial Action Project (UMTRA) ..	3-17
Portsmouth Gaseous Diffusion Plant (PORTS) .....	3-18
Paducah Gaseous Diffusion Plant (PGDP).....	3-18

#### **Site Listings of Exhibit 3-15 for < 5 Person-Rem**

Brookhaven National Laboratory (BNL) .....	3-19
Nevada National Security Site (NNSS).....	3-19
Fermi National Accelerator Laboratory (Fermilab).....	3-19
Lawrence Berkeley National Laboratory (LBNL).....	3-20
Kansas City National Security Campus (KC-NSC) .....	3-20
Oak Ridge: East Tennessee Technology Park (ETTP).....	3-20
Office of Secure Transportation (OST).....	3-21
Ames Laboratory .....	3-21
Thomas Jefferson National Accelerator Facility (TJNAF) ....	3-21
Princeton Plasma Physics Laboratory (PPPL).....	3-22
Waste Isolation Pilot Plant (WIPP) .....	3-22
Oak Ridge: Oak Ridge Institute for Science and Education (ORISE).....	3-22
SLAC National Accelerator Laboratory (SLAC) .....	3-23
Separations Process Research Unit (SPRU).....	3-23
Grand Junction Site .....	3-23
National Renewable Energy Laboratory (NREL).....	3-24
Energy Technology Engineering Center (ETEC) .....	3-24

Exhibit 3-13: Site Dose Data, CY 2024.

Site	2024							
	Collective TED (person-rem)	Percent Change from 2023	Number of Monitored Individuals	Percent Change from 2023	Number with Meas. TED	Percent Change from 2023	Avg. Meas. TED (person-rem)	Percent Change from 2023
Ames Laboratory	0.704	◇	155	◇	31	◇	0.023	◇
Argonne National Laboratory	9.676	-5% ▼	3,223	30% ▲	221	-15% ▼	0.044	12% ▲
Brookhaven National Laboratory	4.531	181% ▲	2,929	13% ▲	100	104% ▲	0.045	38% ▲
Fermi National Accelerator Laboratory	3.040	-10% ▼	1,354	-6% ▼	97	13% ▲	0.031	-20% ▼
Grand Junction Site	0.004	◇	30	◇	4	◇	0.001	◇
Hanford:								
Hanford Site	12.631	-47% ▼	3,394	-4% ▼	442	-12% ▼	0.029	-39% ▼
Office of River Protection	14.672	-28% ▼	4,004	10% ▲	439	-16% ▼	0.033	-14% ▼
Pacific Northwest National Laboratory	16.598	-10% ▼	3,062	-6% ▼	354	-47% ▼	0.047	70% ▲
<i>Hanford Totals:</i>	43.901	-30% ▼	10,460	0%	1,235	-27% ▼	0.036	-4% ▼
Idaho	122.729	22% ▲	6,879	-5% ▼	1,837	8% ▲	0.067	13% ▲
Kansas City National Security Campus	0.845	◇	241	◇	57	◇	0.015	◇
Lawrence Berkeley National Laboratory	1.020	135% ▲	642	3% ▲	14	40% ▲	0.073	68% ▲
Lawrence Livermore National Laboratory	24.999	-10% ▼	4,548	3% ▲	373	12% ▲	0.067	-20% ▼
Los Alamos National Laboratory	327.736	5% ▲	15,000	0%	3,360	-11% ▼	0.098	18% ▲
National Renewable Energy Laboratory	0.001	◇	4	◇	1	◇	0.001	◇
Nevada National Security Site	4.081	74% ▲	735	-6% ▼	70	63% ▲	0.058	7% ▲
Oak Ridge:								
East Tennessee Technology Park	0.829	◇	219	◇	70	◇	0.012	◇
Oak Ridge Institute for Science and Education	0.063	◇	103	◇	8	◇	0.008	◇
Oak Ridge National Laboratory	72.198	8% ▲	5,885	12% ▲	1,171	-4% ▼	0.062	13% ▲
Y-12 National Security Complex	52.164	4% ▲	8,216	2% ▲	1,603	2% ▲	0.033	2% ▲
<i>Oak Ridge Totals:</i>	125.254	7% ▲	14,423	6% ▲	2,852	0%	0.044	7% ▲
Office of Secure Transportation	0.786	◇	302	◇	8	◇	0.098	◇
Paducah Gaseous Diffusion Plant	5.088	22% ▲	1,384	-5% ▼	83	-14% ▼	0.061	41% ▲
Pantex Plant	34.205	-15% ▼	4,949	5% ▲	492	-13% ▼	0.070	-2% ▼
Portsmouth Gaseous Diffusion Plant	5.667	-5% ▼	2,067	-4% ▼	144	-8% ▼	0.039	4% ▼
Princeton Plasma Physics Laboratory	0.280	◇	326	◇	53	◇	0.005	◇
Sandia National Laboratories	9.181	15% ▲	1,948	-7% ▼	179	60% ▲	0.051	-28% ▼
Savannah River:								
Savannah River National Laboratory	11.665	-26% ▼	646	5% ▲	507	-7% ▼	0.023	-20% ▼
Savannah River Site	167.097	-23% ▼	7,341	8% ▲	4,219	-26% ▼	0.040	4% ▲
<i>Savannah River Totals:</i>	178.762	-23% ▼	7,987	7% ▲	4,726	-24% ▼	0.038	2% ▲
Separations Process Research Unit	0.011	◇	18	◇	1	◇	0.011	◇
SLAC National Accelerator Laboratory	0.045	◇	2,127	◇	1	◇	0.045	◇
Thomas Jefferson National Accelerator Facility	0.451	◇	1,516	◇	28	◇	0.016	◇
Uranium Mill Tailings Remedial Action Project	7.836	-16% ▼	161	-6% ▼	65	8% ▲	0.055	69% ▲
Waste Isolation Pilot Plant	0.268	◇	828	◇	15	◇	0.018	◇
West Valley Demonstration Project	8.664	12% ▲	442	-2% ▼	133	2% ▲	0.065	9% ▲
Service Center Personnel*	7.432	354% ▲	291	-2% ▼	58	38% ▲	0.128	229% ▲
<b>Totals</b>	<b>926.843</b>	<b>-2% ▼</b>	<b>84,969</b>	<b>3% ▲</b>	<b>16,308</b>	<b>-12% ▼</b>	<b>0.057</b>	<b>11% ▲</b>

Note: Bold and boxed values indicate the greatest value in each column.

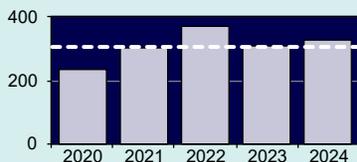
◇ The percentage change from the previous year is not shown because it is not meaningful when the site collective dose is less than 1 person-rem (10 person-mSv).

\* Includes personnel at NETL, NNSA Albuquerque complex, Oak Ridge, and WIPP in addition to several smaller facilities not associated with a DOE site.

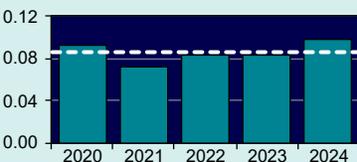
**Exhibit 3-14: Activities Significantly Contributing to Collective TED in CY 2024, for Sites Reporting Greater Than 5 Person-Rem, in Descending Order of Collective Dose.**

**Los Alamos National Laboratory (LANL)**

**Collective TED (person-rem)**



**Average Measurable TED (rem)**



**Site Description**

LANL conducts radiological operations in active facilities, storage facilities, and facilities with legacy radiological concerns, in addition to operations in inactive facilities and areas destined for decommissioning. Radiological activities include programmatic and production work; facility construction, modification, and maintenance; and research, development, and testing.

**Activities Involving Radiation Exposure**

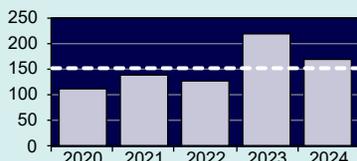
- Weapons manufacturing and related work at the TA-55 plutonium facility;
- Plutonium-238 work;
- Retrieval, repackaging, and shipping of radioactive waste; and
- Infrastructure support for radiological work and facility maintenance.

**Changes in Dose**

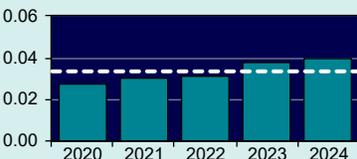
- In CY 2024, TA-55 operations accounted for the majority of occupational dose at LANL.
- TA-55 began a 24/4 shift schedule largely for construction and maintenance purposes; and
- LANL dose was accrued by workers conducting programmatic and maintenance work at the Los Alamos Neutron Science Center accelerator facility, analytical chemistry operations, and waste management activities.

**Savannah River Site (SRS)**

**Collective TED (person-rem)**



**Average Measurable TED (rem)**



**Site Description**

Savannah River Site was constructed during the early 1950s to produce the basic materials used in the fabrication of nuclear weapons, primarily tritium and plutonium-239, in support of our nation's defense programs. Five reactors were built to produce these materials. Also built were several support facilities, including two chemical separations plants, a heavy water extraction plant, a nuclear fuel and target fabrication facility, a tritium extraction facility, and waste management facilities.

**Activities Involving Radiation Exposure**

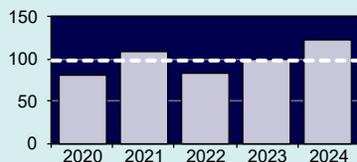
- Shipping down blended plutonium from the site to the Waste Isolation Pilot Plant; and
- The Surplus Plutonium Disposition Team received approval from the Department of Energy to expand down blending capabilities in the K Area Complex.

**Changes in Dose**

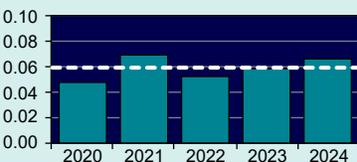
- The SRS Solid Waste Management Facility saw a large reduction of transuranic (TRU) waste in 2024, achieving the highest volume of TRU waste shipped out of state by the facility in the past 10 years; and
- Workers at the Salt Waste Processing Facility processed an additional 2.8 million gallons of salt waste, bringing the total processed to 9.9 million gallons.

**Idaho**

**Collective TED (person-rem)**



**Average Measurable TED (rem)**



**Site Description**

The primary focus of activities at the site is nuclear energy research and development at the Idaho National Laboratory. The DOE Idaho Operations Office oversees three major contracts to ensure that operations and research activities are carried out safely and in compliance with laws, regulations, and contract provisions. The Idaho Cleanup Project (ICP) focuses on addressing legacy wastes resulting from decades of widely varied work, including conventional weapons testing, government-owned research and power reactor development and testing, spent nuclear fuel reprocessing, laboratory research, and defense missions.

**Activities Involving Radiation Exposure**

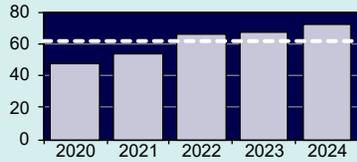
- Work at the Advanced Test Reactor (ATR) Complex, including preparations for installation of I-loop components, experiment modifications, maintenance, and operations, and research and development operations/laboratory support;
- Activities at the Materials and Fuel Complex, including maintenance and upgrades, treatment and storage for waste repackaging, benchtop and glovebox operations, and decontamination efforts; and
- Waste handling, consolidation and shipment, decontamination work, and radiography operations.

**Changes in Dose**

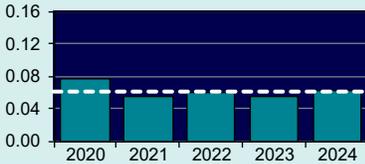
- The increased dose was a result of completing several significant tasks in high dose rate areas.

## Oak Ridge: Oak Ridge National Laboratory (ORNL)

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

ORNL is a multiprogramming science and technology laboratory. ORNL's mission is to deliver scientific discoveries and technical breakthroughs that will accelerate the development and deployment of solutions in clean energy and global security, and, in doing so, create economic opportunity for the nation. ORNL also performs other work for DOE, including isotope production, information management, and technical program management, and provides research and technical assistance to other organizations.

### Activities Involving Radiation Exposure

- Medical radioisotope production;
- Processing low-level and transuranic (TRU) waste at the TRU Waste Processing Center;
- Extracting thorium and down-blending uranium oxide at ISOTEK;
- Providing materials for National Aeronautics and Space Administration (NASA); and
- Facility maintenance.

### Changes in Dose

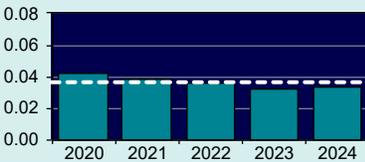
- The increase in collective TED is primarily attributed to increases in operations activities and radioisotope production, particularly radioisotope production for industrial sponsors. Additionally, the number of ORNL monitored individuals increased by twelve percent over CY 2023.

## Oak Ridge: Y-12 National Security Complex (Y-12)

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

Y-12 is one of four production facilities in the National Nuclear Security Agency (NNSA) Nuclear Security Enterprise. The facility's emphasis is the processing and storage of uranium and development of technologies associated with those activities. Y-12 maintains the safety, security, and effectiveness of the U.S. nuclear weapons stockpile and processes highly enriched uranium for the Naval Nuclear Propulsion Program.

### Activities Involving Radiation Exposure

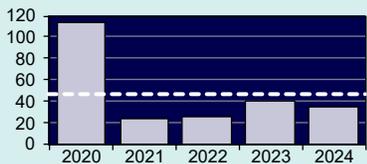
- Manufacture, processing, and storage of special nuclear materials;
- Characterization and hazardous waste removal at Y-12 Biology Complex; and
- Maintenance of equipment and facilities.

### Changes in Dose

- In CY 2024, there was an increase in personnel performing work that required internal monitoring as evidenced by the number of entries on bioassay-requiring Radiological Work Permits.

## Pantex Plant (Pantex)

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

Pantex is the nation's primary facility for the final assembly, disassembly, and maintenance of nuclear weapons. The last new nuclear weapon was completed in CY 1991. Since then, the plant has safely dismantled thousands of weapons retired from the stockpile by the military and placed the resulting plutonium pits in interim storage. Pantex has approximately 650 buildings, including specialized facilities in which maintenance, modification, disassembly, and assembly operations are conducted.

### Activities Involving Radiation Exposure

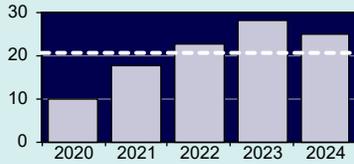
- Operations that expose individuals to large numbers of bare weapon pits containing significant quantities of special nuclear material (SNM).
- Nuclear explosive assembly/disassembly operations, weapon dismantlement programs, life-extension programs, SNM Component Re-qualification, and SNM staging.

### Changes in Dose

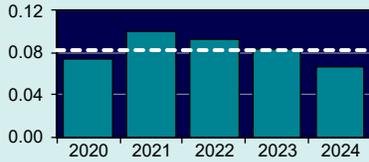
- The decrease in CY 2024 is the result of the continued awareness of ALARA by employees, workers gaining experience in radiological areas and becoming more efficient, and an increase in protection controls.

**Lawrence Livermore National Laboratory (LLNL)**

**Collective TED (person-rem)**



**Average Measurable TED (rem)**



**Site Description**

LLNL is a DOE facility operated by the Lawrence Livermore National Security, LLC management team, which includes Bechtel, the University of California, BWX Technologies, Washington Group, and Battelle. The site serves as a national resource of scientific, technical, and engineering capability with a special focus on national security. LLNL's mission encompasses such areas as: strategic defense, energy, the environment, biomedicine, technology transfer, education, counterterrorism, and emergency response. The types of radioactive materials range from tritium to TRU; the quantities of each range from nanocuries (i.e., normal environmental background values) to kilocuries.

**Activities Involving Radiation Exposure**

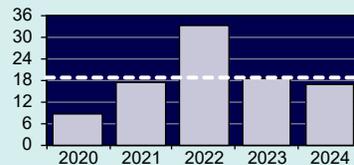
- Radiation-producing devices, such as X-ray machines, accelerators, and electron-beam welders; and
- Handling a wide range and quantity of radioactive materials.

**Changes in Dose**

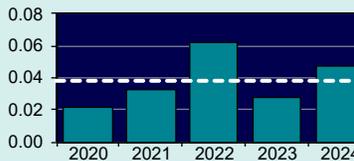
- The decrease in TED for CY 2024 is primarily due to a work pause impacting individuals expected to receive high doses.

**Hanford: Pacific Northwest National Laboratory (PNNL)**

**Collective TED (person-rem)**



**Average Measurable TED (rem)**



**Site Description**

Located in Richland, Washington, PNNL is 1 of 10 national laboratories managed by DOE's Office of Science (SC). The laboratory provides the facilities, unique scientific equipment, and world-renowned scientists and engineers to strengthen U.S. scientific foundations through fundamental research and innovation. The lab also supports Hanford site cleanup efforts by performing scientific and technical evaluations and reviews and developing and advancing new technologies to address site cleanup challenges.

**Activities Involving Radiation Exposure**

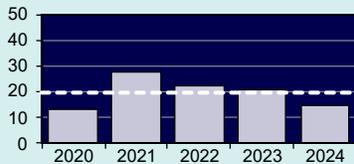
- Work at the Radiochemical Processing Laboratory;
- Radiation detection research; and
- Implementation of security measures for radiological materials of concern.

**Changes in Dose**

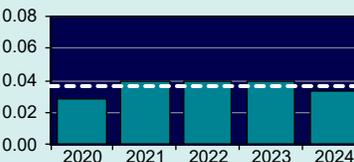
- The decrease in CY 2024 is primarily driven by a decrease in planned radiological work activities.

**Hanford: Office of River Protection (ORP)**

**Collective TED (person-rem)**



**Average Measurable TED (rem)**



**Site Description**

The ORP's mission is to retrieve and treat Hanford's waste and close the tank farms to protect the Columbia River. Chemical and radioactive waste, resulting from more than four decades of plutonium production, is currently stored in 177 large underground tanks. ORP is responsible for the retrieval, treatment, and disposal of this waste. The cornerstone of the tank waste cleanup project is the Waste Treatment Plant (WTP). The WTP will use a technology called vitrification to immobilize chemical and radioactive waste in an exceptionally sturdy form of glass to isolate it from the environment.

**Activities Involving Radiation Exposure**

- Removal and transfer of waste from older single-shell tanks to newer, double-shell tanks;
- Maintenance and support of the evaporator, which reduces the volume of stored liquid waste by concentrating radioactive waste solutions;
- Work at the 222-S laboratory; and
- Well logging activities using an americium-beryllium source.

**Changes in Dose**

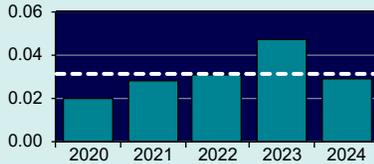
- The significant dose reduction is due primarily to a technology change introduced in tank farm activities, continued efforts under the ALARA program, and changes in work scope.

## Hanford: Hanford Site

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

DOE's Hanford Site sits on 586 square miles in the desert of southeastern Washington State. The area is home to nine former nuclear reactors and their associated processing facilities that were built beginning in CY 1943. Hanford reactors produced plutonium from CY 1944 until 1987. Today, Hanford workers are involved in an environmental cleanup project and remediation of the site.

### Activities Involving Radiation Exposure

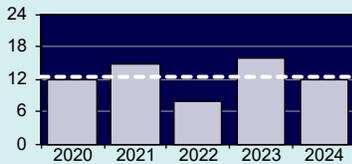
- Work activities at the plutonium finishing plant facility;
- Material handling and waste transfer; and
- Facility demolition and site remediation.

### Changes in Dose

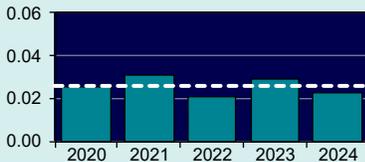
- The CY 2024 decrease can be attributed to a decrease in the number of personnel entries into various high dose rate facilities.

## Savannah River National Laboratory (SRNL)

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

Savannah River National Laboratory (SRNL) began reporting separately from the Savannah River Site (SRS) effective CY 2016. The laboratory supports DOE in its environmental management and nuclear security missions and applies its expertise in nuclear chemical manufacturing to assist DOE in meeting its objectives in areas, such as nuclear waste cleanup and defense nonproliferation.

### Activities Involving Radiation Exposure

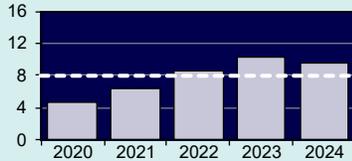
- Currently, most SRNL programs support the SRS tritium mission. This includes applying hydrogen technologies used in processing tritium; extraction, purification, and storage of tritium; and
- SRNL has begun facility preparations for the Mark 18 Processing Project.

### Changes in Dose

- The dose decreased during CY 2024 as SRNL continued to support SRS by processing samples from all facilities on site.

## Argonne National Laboratory (ANL)

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

ANL is one of DOE's largest national laboratories for scientific and engineering research. ANL's mission is to apply a unique mix of world-class science, engineering, and user facilities to deliver innovative research and technologies. The principal radiological facilities at the laboratory are the Advanced Photon Source, a superconducting heavy-ion linear accelerator (LINAC), a 22-MeV pulsed electron LINAC, and several other charged-particle accelerators.

### Activities Involving Radiation Exposure

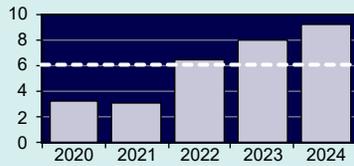
- Work supporting the lab's radiological facilities;
- Programmatic activities resulting primarily from research activities in the Irradiated Materials Laboratory; and
- Material handling, management, storage, and disposition activities associated with the Alpha Gamma Hot Cell Facility, the Waste Management Operations Facility, and the Radioactive Waste Storage Facility.

### Changes in Dose

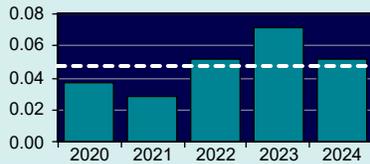
- In CY 2024, there was a slight decrease in collective TED consistent with year-to-year variation.

**Sandia National Laboratories (SNL)**

**Collective TED (person-rem)**



**Average Measurable TED (rem)**



**Site Description**

SNL's primary mission is ensuring the U.S. nuclear arsenal is safe, secure, and reliable and can fully support our nation's deterrence policy. SNL is the engineering arm of the U.S. nuclear weapons enterprise. SNL's foundation is science-based engineering in which fundamental science, computer models, and unique experimental facilities come together so that researchers can understand, predict, and verify weapon systems performance.

**Activities Involving Radiation Exposure**

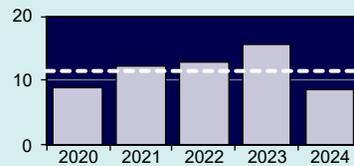
- Operation of a research reactor, gamma irradiation facilities, hot cell facilities, and several pulsed power accelerators;
- Performance of light laboratory work involving X-ray machines and tracer radionuclides; and
- Waste operations.

**Changes in Dose**

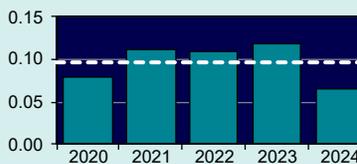
- The increase in dose in CY 2024 is attributable to measurable dose output from experimentation at the Z machine pulsed-power facility.

**West Valley Demonstration Project (WVDP)**

**Collective TED (person-rem)**



**Average Measurable TED (rem)**



**Site Description**

WVDP is a unique operation within DOE and came into being through the WVDP Act of 1980. The Act requires DOE to be responsible for solidifying the high-level waste and disposing of waste created by the solidification and decommissioning of the facilities used in the process. The land and facilities are not owned by DOE; rather, the project premises are the property of the New York State Energy Research and Development Authority (NYSERDA) and represent only 200 acres of the larger Western New York Service Center, which is approximately 3,300 acres, also owned by NYSERDA. After DOE's responsibilities under the Act are complete, the Act requires that the premises be returned to New York State.

**Activities Involving Radiation Exposure**

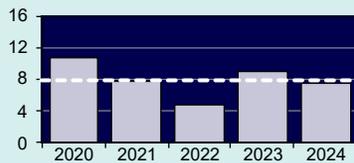
- Equipment operators and waste management personnel supporting facility demolition and waste loadout;
- Facility disposition;
- Waste container packaging and handling; and
- Non-demolition monitoring and support activities.

**Changes in Dose**

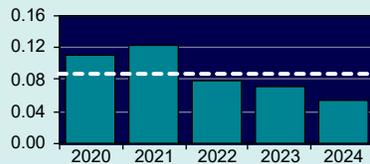
- During CY 2024, nearly half of the total dose incurred was attributed to the demolition of the Main Plant Process Building.

**Uranium Mill Tailings Remedial Action Project (UMTRA)**

**Collective TED (person-rem)**



**Average Measurable TED (rem)**



**Site Description**

The UMTRA site is located approximately 3 miles northwest of Moab in Grand County, Utah, and includes a former uranium-ore processing facility. The site encompasses 480 acres, of which approximately 130 acres are covered by a uranium mill tailings pile. The UMTRA Project ships four trainloads of tailings to the Crescent Junction Disposal Site each week. As of October 14, 2024, 15 million tons of uranium mill tailings have been removed. Tailing shipments began in April 2009 and are expected to continue through CY 2034.

**Activities Involving Radiation Exposure**

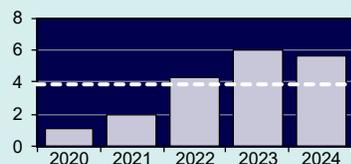
- The Moab UMTRA site is entering the final stages of moving residual radioactive material (RRM) from the Moab site and placing it in the final holding cell 30 miles north, near Crescent Junction, Utah. The source term has been significantly reduced and, as a result, the site has moved to the use of annual dosimeters.

**Changes in Dose**

- Using the annual dosimeters did increase readings in our 5–10 mrem numbers, but that is attributed to the longer time of exposure and background. We are currently on track to have all 16 million tons of RRM placed in Crescent Junction by end of Fiscal Year 2024. At that time, we will reevaluate the necessity of and/or reduction of monitoring our workers going forward.

## Portsmouth Gaseous Diffusion Plant (PORTS)

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

PORTS is located in Pike County, Ohio. PORTS was one of three large gaseous diffusion plants initially constructed to produce enriched uranium to support the nation's nuclear weapons program and later enrich uranium for commercial nuclear reactors. The plant has been shut down and is currently undergoing decontamination and decommissioning.

### Activities Involving Radiation Exposure

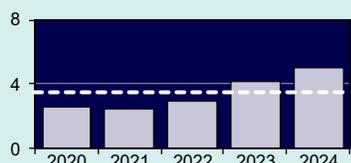
- Continued support of plant operations and maintenance of the Depleted Uranium Hexafluoride project (DUF6) as a nuclear facility;
- Waste processing, handling and shipment of uranium bearing materials and processing of uranium (UF6) cylinders; and
- Radiation protection efforts involved protection of plant personnel, the public, and the environment.

### Changes in Dose

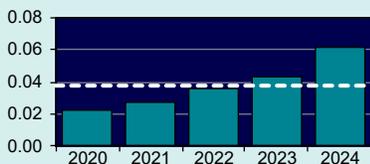
- The slight decrease in the collective TED was due to the Portsmouth DUF6 facility operational status changes between the two periods. Portsmouth DUF6 facility has three (3) operational lines, and maintenance and planned/unplanned outages can affect the number of lines which are operational at any given time. Although not directly related, the plant's operational status does play a role in changes (increases and decreases) in personnel exposures over the calendar year. The calendar year dose for CY 2024 is as expected and typical for three lines with varying operability.

## Paducah Gaseous Diffusion Plant (PGDP)

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

PGDP is located 3 miles south of the Ohio River and is 12 miles west of Paducah, Kentucky. The plant began enriching uranium in CY 1952, first for the nation's nuclear weapons program and then for nuclear fuel for commercial power plants. In CY 1994, the enrichment facilities were leased to United States Enrichment Corporation (USEC). In August 2013, USEC notified DOE that they were discontinuing enrichment operations and planning to de-lease the enrichment facilities.

### Activities Involving Radiation Exposure

- Activities during the reporting period that involved radiation exposure were for continued support of plant operations and maintenance of the Depleted Uranium Hexafluoride project (DUF6) as a nuclear facility. The project's main goal is to convert uranium hexafluoride into a more stable form for the sole purpose of minimizing environmental hazards. Radiation protection efforts involved protection of plant personnel, the public, and the environment; and
- The Infrastructure Support Services Contractor (ISSC) performs mowing and maintenance activities in radiological areas, such as contamination and high contamination areas, but does not perform work in radiation areas.

### Changes in Dose

- The increase in the collective TED was due to the Paducah facility maintaining four lines of operation for an extended period. With four potential operating lines, personnel exposures increase the more lines that are operating and the length of time they are operating. This number is expected to remain fairly consistent through the coming calendar year 2025; and
- There was a slight increase in dose with no changes in the ISSC work scope from the previous year.

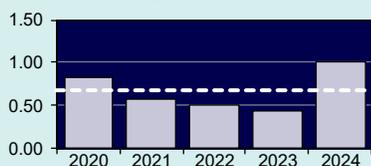
As seen in *Exhibit 3-11*, most of the collective TED is associated with just a few DOE sites. For sites with relatively low collective dose or with fewer monitored individuals, wider variation can occur from year to year. These year-to-year variations are often due to changes in funding or mission priorities that can significantly impact the relatively small amount of work involving radiation exposure. In CY 2024, 16 DOE sites reported less than 5 person-rem (50 person-mSv) collective TED for their respective site. One of these sites, Energy Technology Engineering Center, ceased all work in radiological areas in CY 2020 and is no longer monitoring personnel for occupational exposure. These sites and the activities contributing to collective TED can be found in *Exhibit 3-15*.

**Exhibit 3-15: Activities Significantly Contributing to Collective TED in CY 2024, for Sites Reporting Less Than 5 Person-Rem, in Descending Order of Collective Dose.**

Brookhaven National Laboratory (BNL)	
<p><b>Collective TED (person-rem)</b></p>	<p><b>Site Description</b></p> <p>BNL conducts research in the physical, biomedical, and environmental sciences as well as in energy technologies and national security. BNL also builds and operates major scientific facilities that are available to university, industry, and government researchers.</p>
<p><b>Average Measurable TED (rem)</b></p>	<p><b>Activities Involving Radiation Exposure</b></p> <ul style="list-style-type: none"> <li>• Accelerator facility maintenance and repair activities; and</li> <li>• Radioactive waste handling performed at BNL facilities.</li> </ul>
<p><b>Changes in Dose</b></p> <ul style="list-style-type: none"> <li>• The 64 percent increase in dose for CY 2024 was primarily due to the change-out of the Brookhaven Linac Isotope Producer (BLIP) spur beam window. This requires workers and support staff to be in close proximity to activated material. There was significant job planning, work controls, and use of mock-ups to keep personnel doses ALARA for the evolution.</li> </ul>	
Nevada National Security Site (NNSS)	
<p><b>Collective TED (person-rem)</b></p>	<p><b>Site Description</b></p> <p>NNSS is located approximately 65 miles northwest of Las Vegas. It is a remote facility that covers approximately 1,375 square miles of land. NNSS has been the primary location for testing nuclear experiments in the continental United States since CY 1951.</p>
<p><b>Average Measurable TED (rem)</b></p>	<p><b>Activities Involving Radiation Exposure</b></p> <ul style="list-style-type: none"> <li>• Operating low-level radioactive and mixed-waste disposal facilities;</li> <li>• Assembling/executing national-level subcritical experiments, confined critical experiments, and special experiments in support of the national laboratories;</li> <li>• Operating pulsed X-ray machines, neutron generators, and linear accelerators;</li> <li>• Developing, testing, and evaluating radiation detectors, equipment, and systems;</li> <li>• Developing/providing nuclear and radiological emergency response capabilities/training;</li> <li>• Conducting surface cleanup and site characterization of contaminated land; and</li> <li>• Managing environmental activity of the University of Nevada system.</li> </ul>
<p><b>Changes in Dose</b></p> <ul style="list-style-type: none"> <li>• In CY 2024, the increase in dose was attributed to the increase in monitored individuals involved in activities associated with critical and special national laboratories experiments, the increase in emergency response training, and the increase in radiological work at the NNSS.</li> </ul>	
Fermi National Accelerator Laboratory (Fermilab)	
<p><b>Collective TED (person-rem)</b></p>	<p><b>Site Description</b></p> <p>Fermilab provides leadership and resources for qualified researchers to conduct basic research at the frontiers of high-energy particle physics and related disciplines. The primary features of the site include the accelerator complex and associated building infrastructure, an interconnected industrial cooling water system, a housing complex for visiting researchers, row crop agriculture, and natural areas in various states of restoration.</p>
<p><b>Average Measurable TED (rem)</b></p>	<p><b>Activities Involving Radiation Exposure</b></p> <ul style="list-style-type: none"> <li>• Recycler alignment work at RR-301 &amp; RR-302, Mu-metal removal from RR-301 &amp; RR-302, Booster RF station ion pump replacement, MI-30 collimator area decontamination, MI-8 collimator area decontamination, and MI-12B RAW system repairs; and</li> <li>• MI-30 kicker replacement, Ion pump cable repair in MI-30 region, and Booster RF station 16 repairs were performed outside of the 2024 shutdown period but also contributed to the change in dose.</li> </ul>
<p><b>Changes in Dose</b></p> <ul style="list-style-type: none"> <li>• Most of the dose resulted from work performed during shutdowns. Fermilab's 2024 shutdown began on 15 July 2024 and ended on 18 November 2024, a duration of 18 weeks. The TED for CY 2024 is within the expected range for a year with a shutdown of this duration; and</li> <li>• The completion of 6 ALARA jobs resulted in activities contributing to the collective dose during the shutdown.</li> </ul>	

## Lawrence Berkeley National Laboratory (LBNL)

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

LBNL is a member of the national laboratory system supported by DOE through its Office of Science (SC) and is charged with conducting unclassified research across a wide range of scientific disciplines. LBNL employs approximately 4,200 scientists, engineers, support staff, and students.

### Activities Involving Radiation Exposure

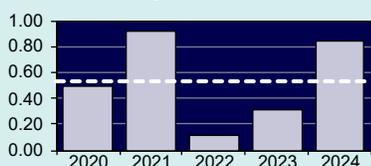
- Fluorine-18 research;
- Antineutrino research and experiments; and
- Site inventory of radioactive and nuclear material activities.

### Changes in Dose

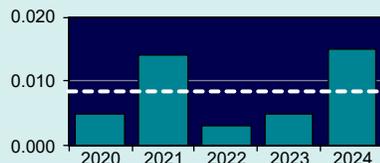
- Two maintenance sessions were performed at the Cyclotron. The maintenance sessions in CY 2024 involved extended work periods to repair a water leak and perform scanning of components; and
- There was also an increase in personnel dose from radiochemistry work in Building 70A. The Building 70A laboratories reported an increase in the use of Bk-249 and Cf-249 in CY 2024 compared to CY 2023.

## Kansas City National Security Campus (KC-NSC)

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

KC-NSC is responsible for manufacturing and procuring non-nuclear components for nuclear weapons, including electronic, mechanical, and engineered material components. It supports national laboratories, universities, and U.S. industry and is located in Kansas City, Missouri.

### Activities Involving Radiation Exposure

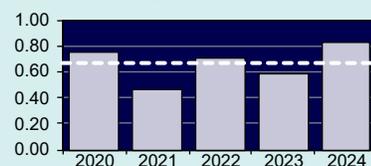
- Non-destructive testing and development projects;
- Telemetry component production and testing with neutron generators;
- Security operations;
- Small scale depleted uranium operations; and
- Legacy part refurbishment departments, and waste management.

### Changes in Dose

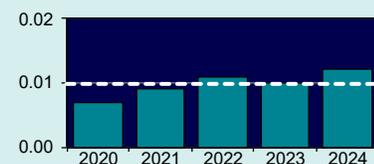
- The increase in TED is primarily attributed to a single X-ray operator receiving 40 percent of the TED and an increase in the total number of radiation workers; and
- Continued to maintain an ACL of 100 mrem per year, 1/50th of DOE's 5 rem/year threshold, and an Action Level (AL) of 50 mrem/year. Four radiation workers exceeded the AL and effort to further reduce all exposure going forward continues.

## Oak Ridge: East Tennessee Technology Park (ETTP)

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

ETTP was originally named the Oak Ridge Gaseous Diffusion Plant. As part of the Manhattan Project, the plant was designed to produce enriched uranium for use in atomic weapons operations during World War II. After the war, the plant was renamed the Oak Ridge K-25 Site and produced enriched uranium for the commercial nuclear power industry from CY 1945 to 1985. In CY 1987, DOE renamed the site ETTP and began a major environmental cleanup project with the long-term goal of converting ETTP into a private industrial park.

### Activities Involving Radiation Exposure

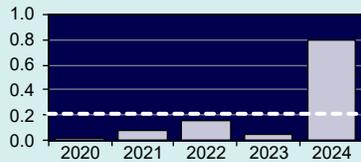
- Continuation of ongoing cleanup activities.

### Changes in Dose

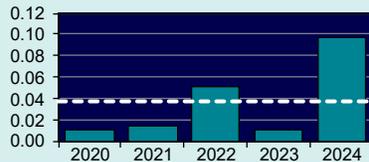
- The change in dose resulted from participation in routine cleanup and demolition activities.

## Office of Secure Transportation (OST)

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

OST is the NNSA organization tasked to provide secure ground transportation of nuclear weapons, special nuclear material (SNM), nuclear weapon components, and nuclear explosive-like assemblies. OST operates both secure ground transporters and Federal aircraft, which make up the Transportation Safeguards System (TSS). The TSS federal agent and vehicle maintenance facilities are located in Oak Ridge, Tennessee; Amarillo, Texas; and Albuquerque, New Mexico. The OST Administrative Headquarters are located at Kirtland Air Force Base in Albuquerque, New Mexico.

### Activities Involving Radiation Exposure

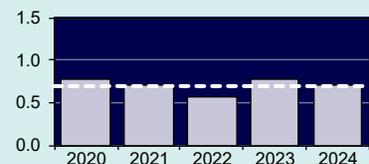
- Providing secure ground transportation of nuclear weapons, SNM, nuclear weapon components, and nuclear explosive-like assemblies; and
- Tracking and directing cargo loading revisions to minimize radiation exposure.

### Changes in Dose

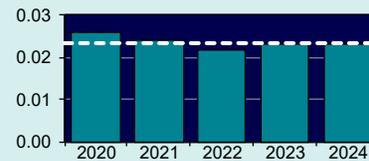
- Differences may be attributed to the small number of individuals (less than 10 for each year).

## Ames Laboratory

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

Ames Laboratory is a government-owned, contractor-operated research facility of the DOE. For over 65 years, the Ames Laboratory has sought solutions to energy-related problems through the exploration of chemical, engineering, materials, mathematical, and physical sciences.

### Activities Involving Radiation Exposure

- Limited radioactive material work;
- Operation of 24 X-ray systems and 1 Mossbauer spectroscopy system; and
- Ongoing remediation of radiological legacy contamination.

### Changes in Dose

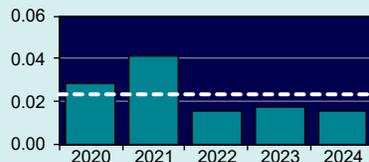
- The collective dose reflects normal routine operations and normal variations given the limited number of individuals with measurable dose and the very low doses.

## Thomas Jefferson National Accelerator Facility (TJNAF)

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

TJNAF is one of 17 national laboratories funded by DOE. TJNAF's primary mission is to conduct basic research of the atom's nucleus using the unique particle accelerator known as the Continuous Electron Beam Accelerator Facility (CEBAF).

### Activities Involving Radiation Exposure

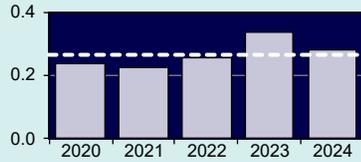
- Maintenance, modification, and repair of activated components associated with the Continuous Electron Beam Accelerator Facility (CEBAF), Low Energy Recirculator Facility (LERF), and other ancillary activities (e.g., transport, storage, and disposal of radioactive materials). Typically, collective TED fluctuates up or down from year to year, depending on maintenance associated with unique experimental set-ups performed in radiological areas.

### Changes in Dose

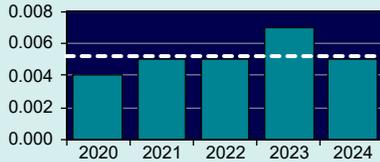
- The CY 2024 collective TED was primarily related to maintenance on beam dump systems, and routine radiological protection support work.
- Dose can be attributed primarily to the need to perform work in the vicinity of activated cryo-modules in the CEBAF accelerator, and radiation surveys that supported experiments with significant residual radioactivity in experimental Halls.

## Princeton Plasma Physics Laboratory (PPPL)

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

PPPL is a collaborative national center for fusion energy research. The laboratory advances the coupled fields of fusion energy and plasma physics research and enhances the scientific understanding and key innovations needed to realize fusion as an energy source for the world. Additional focus is on next-generation computing and microelectronics while partnering with industries shaping these fields to accelerate the development of fusion energy.

### Activities Involving Radiation Exposure

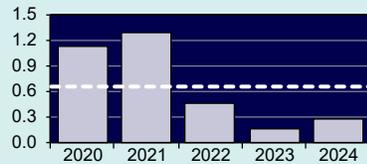
- Research work involving radioactive sources and x-ray generating devices; and
- Continued gradual increase in specific work focused on experimental machine upgrades while tritium system demolition and disposal activities are wrapping up.

### Changes in Dose

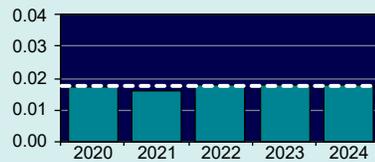
- For CY 2024, the collective total effective dose (TED) to PPPL employees decreased from the previous year due to an overall reduction in areas requiring dosimetry and consequently a reduced number of dosimeter wear.

## Waste Isolation Pilot Plant (WIPP)

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

WIPP is located in the Chihuahuan Desert near Carlsbad, New Mexico. This DOE facility safely disposes of the nation's defense-related transuranic (TRU) radioactive waste. WIPP began disposal operations in March 1999.

### Activities Involving Radiation Exposure

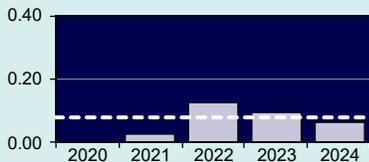
- Handling and processing of TRU waste for storage; and
- Managing long-term repository operations.

### Changes in Dose

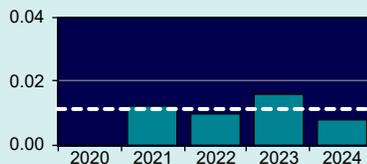
- The collective TED for CY 2024 increased slightly (64%) to 0.268 person-rem (2.680 person-mSv), from 0.163 person-rem [1.630 person-mSv] in 2023. All doses received were from routine activities associated with the disposal of transuranic waste and transportation operations.
- A total of 470 shipments were completed in 2024, compared to 323 in 2023. Although operational tempo increased, the overall TED levels remained well below regulatory limits.

## Oak Ridge: Oak Ridge Institute for Science and Education (ORISE)

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

ORISE is a DOE institute focusing on scientific initiatives to research health risks from occupational hazards, assess environmental cleanup, respond to radiation medical emergencies, support national security and emergency preparedness, and educate the next generation of scientists.

### Activities Involving Radiation Exposure

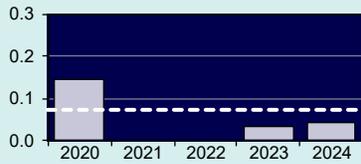
- Independent verification activities involving radiological surveys at sites undergoing decommissioning; and
- Environmental sample processing and radiological protection.

### Changes in Dose

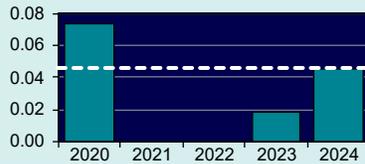
- Dose to radiological workers remained low in CY 2024. Only eight individuals received a measurable dose in conjunction with health physics training activities.

## SLAC National Accelerator Laboratory (SLAC)

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

SLAC, which opened in CY 1962, is one of 10 DOE SC laboratories and is operated by Stanford University on behalf of DOE. Originally a premier, high-energy particle accelerator laboratory, SLAC has grown into a state-of-the-art photon science laboratory. SLAC's scientific mission has diversified from an original focus on particle physics and accelerator science to include cosmology, materials and environmental sciences, biology, chemistry, and alternative energy research.

### Activities Involving Radiation Exposure

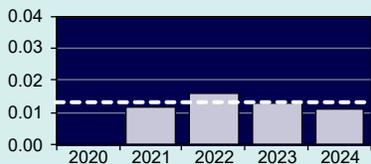
- Linac Coherent Light Source (LCLS and LCLS-II);
- Stanford Synchrotron Radiation Lightsource (SSRL);
- Photon Science: Photon Ultrafast Laser Science and Engineering (PULSE), and Stanford Institute for Material and Energy Sciences (SIMES);
- Particle Physics and Astrophysics: Experimental Particle Physics, Kavli Institute for Particle Astrophysics and Cosmology (KIPAC), and Accelerator Research and Development;
- Facilities for Accelerator Science and Experimental Test Beams (FACET-II); and
- Test Facilities: Next Linear Collider Test Accelerator (NLCTA) and Accelerator Structure Test Area – Ultrafast Electron Diffraction (ASTA-UED).

### Changes in Dose

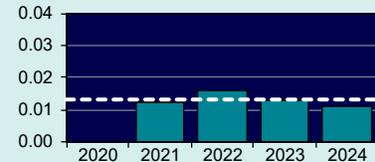
- The CY 2024 collective TED of 0.045 person-rem primarily reflects doses received by workers supporting the LCLS-II activities during routine operations.

## Separations Process Research Unit (SPRU)

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

SPRU is located at Knolls Atomic Power Laboratory based in upstate New York. Built in the 1940s, the buildings supported the SPRU mission to research the chemical process to extract plutonium from irradiated materials. Although the equipment was flushed and drained and bulk waste was removed following the shutdown of the facilities in CY 1953, residual materials are present in the tanks, buildings H2 and G2, and interconnecting pipe tunnels. The site is currently undergoing a variety of cleanup activities, including demolition, decontamination, and remediation.

### Activities Involving Radiation Exposure

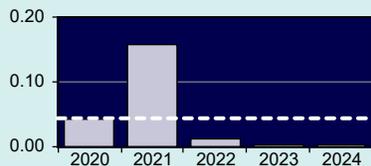
- Repackaging TRU waste;
- Processing and shipping low activity water and waste; and
- Surveillance and maintenance of site condition activities.

### Changes in Dose

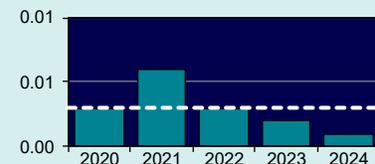
- Collective dose remained low due to maintaining proper ALARA controls during quarterly inspections of the TRU waste storage area.

## Grand Junction Site

### Collective TED (person-rem)



### Average Measurable TED (rem)



### Site Description

The Grand Junction Site was transferred to the Office of Legacy Management (LM) in CY 2003. LM manages the site according to a site-specific Long-Term Surveillance and Maintenance Plan.

### Activities Involving Radiation Exposure

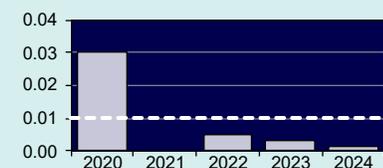
- Walk-over radiological surveys;
- Environmental/geological soil sampling; and
- Abandoned mine site inspections.

### Changes in Dose

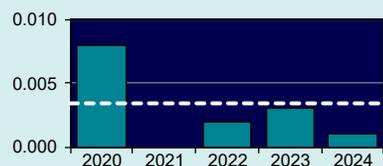
- All doses received were from routine field activities performed by LM personnel as they worked to develop a record of all locations and current conditions of legacy uranium mines under the Defense-Related Uranium Mines (DRUM) Program. The DRUM Program, through its verification and validation work, determined the location, status, and current environmental, human health, and safety conditions of legacy uranium mines throughout the country.
- Only four individuals received a measurable dose in conjunction with surveillance activities.

### National Renewable Energy Laboratory (NREL)

#### Collective TED (person-rem)



#### Average Measurable TED (rem)



#### Site Description

NREL focuses on creative answers to today's energy challenges. From fundamental science and energy analysis to validating new products for the commercial market, NREL researchers are dedicated to transforming the way the world uses energy. With more than 35 years of successful innovation in energy efficiency and renewable energy, NREL discoveries provide sustainable alternatives for powering homes, businesses, and transportation systems.

#### Activities Involving Radiation Exposure

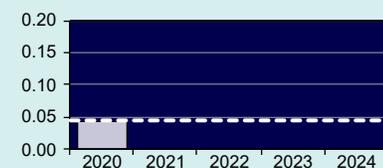
- Radiological activities were limited to periodic wipe and dose surveys of sealed sources by the Radiological Safety Officer and routine use of commercial "off the shelf" X-ray generating devices.

#### Changes in Dose

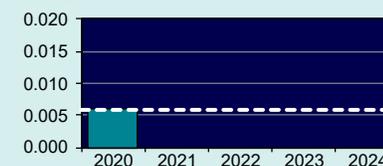
- The primary reason for the decrease in dose was a decrease in work time involving radiation exposure surrounding X-ray-generating equipment.

### Energy Technology Engineering Center (ETEC)

#### Collective TED (person-rem)



#### Average Measurable TED (rem)



#### Site Description

ETEC is located within Area IV of the Santa Susana Field Laboratory. The laboratory comprises four discrete operational areas with two adjacent undeveloped properties. In CY 1988, DOE decided to close the remaining ETEC operations. ETEC is currently in a safe shutdown mode, pending the completion of the Environmental Impact Statement.

#### Activities Involving Radiation Exposure

- ETEC eliminated personnel dosimeters in CY 2020 due to no accessible radiological areas present onsite.

**Note:** Although dosimeters are not currently used at ETEC, the data is included for completeness. Throughout the report, the site is included in exhibits that represent 5-year data rolls and will drop off after this calendar year.

### 3.4.4 Summary by Program Office

DOE has divided the responsibility of managing its missions among specific program offices. A site may include facilities or project areas that perform work in support of the mission of multiple program offices. In these cases, the dose records are separated by the reporting organization and assigned to the corresponding program office. For this reason, some sites will have portions of the collective dose shown under more than one program office.

*Exhibit 3-16* shows the collective TED, number of individuals with measurable TED, and the average

measurable TED by DOE program office. NNSA and the Office of Environmental Management (EM) account for 85 percent of the collective TED (32 and 53 percent, respectively).

The primary sites contributing to the collective TED within EM are Savannah River Site and Idaho. For NNSA, the primary contributors are LANL, Y-12 National Security Complex, and Savannah River Site.

A more detailed breakdown of the exposure information by site, program office, and contractor is included in the Appendices of this report.

Exhibit 3-16: Program Office Dose Data, CY 2024.

Program Office	Collective TED (person-rem)	Percent Change from 2023	Number with Meas. Dose (TED)	Percent Change from 2023	Avg. Meas. TED (rem)	Percent Change from 2023
<b>Office of Energy Efficiency and Renewable Energy (EERE)</b>						<b>Total Monitored = 4*</b>
National Renewable Energy Laboratory	0.001	◇	1	◇	0.001	◇
<b>EE Totals</b>	<b>0.001</b>	◇	<b>1</b>	◇	<b>0.001</b>	◇
<b>Office of Environmental Management (EM)</b>						<b>Total Monitored = 22,329*</b>
East Tennessee Technology Park	0.829	◇	70	◇	0.012	◇
Hanford Site	12.631	-47% ▼	442	-12% ▼	0.029	-39% ▼
Idaho (ICP, AMWTP and DOE IOO)	71.800	49% ▲	855	-4% ▼	0.084	55% ▲
Los Alamos National Laboratory	2.916	56% ▲	82	8% ▲	0.036	45% ▲
Oak Ridge National Laboratory	20.453	2% ▲	731	-5% ▼	0.028	7% ▲
Office of River Protection	14.672	-28% ▼	439	-16% ▼	0.033	-14% ▼
Paducah Gaseous Diffusion Plant	5.088	22% ▲	83	-14% ▼	0.061	41% ▲
Portsmouth Gaseous Diffusion Plant	5.667	-5% ▼	144	-8% ▼	0.039	3% ▼
Savannah River National Laboratory	11.665	-26% ▼	507	-7% ▼	0.023	-20% ▼
Savannah River Site	<b>127.220</b>	-18% ▼	<b>2,973</b>	-22% ▼	0.043	5% ▲
Separations Process Research Unit	0.011	◇	1	◇	0.011	◇
Service Center Personnel*	7.432	<b>362% ▲</b>	58	<b>45% ▲</b>	<b>0.128</b>	<b>218% ▲</b>
Uranium Mill Tailings Remedial Action Project	7.482	-16% ▼	135	8% ▲	0.055	-22% ▼
Waste Isolation Pilot Plant	0.268	◇	15	◇	0.018	◇
West Valley Demonstration Project	8.664	12% ▲	133	2% ▲	0.065	9% ▲
<b>EM Totals</b>	<b>296.798</b>	<b>-6% ▼</b>	<b>6,668</b>	<b>-14% ▼</b>	<b>0.041</b>	<b>10% ▲</b>
<b>Office of Fossil Energy (FE)</b>						<b>Total Monitored = 85*</b>
Service Center Personnel*	0.000	◇	0	◇	0.000	◇
<b>FE Totals</b>	<b>0.000</b>	◇	<b>0</b>	◇	<b>0.000</b>	◇
<b>Office of Legacy Management (LM)</b>						<b>Total Monitored = 30*</b>
Grand Junction Site	0.004	◇	4	◇	0.001	◇
<b>LM Totals</b>	<b>0.004</b>	◇	<b>4</b>	◇	<b>0.001</b>	◇
<b>National Nuclear Security Administration (NNSA)</b>						<b>Total Monitored = 37,748*</b>
Kansas City National Security Campus	0.845	◇	57	◇	0.015	◇
Lawrence Livermore National Laboratory	24.999	-10% ▼	373	12% ▲	0.067	-20% ▼
Los Alamos National Laboratory	<b>324.820</b>	5% ▲	<b>3,278</b>	-11% ▼	<b>0.099</b>	<b>18% ▲</b>
Nevada National Security Site	4.081	<b>74% ▲</b>	70	<b>63% ▲</b>	0.058	7% ▲
Office of Secure Transportation	0.786	◇	8	◇	0.098	◇
Pantex Plant	34.205	-15% ▼	492	-13% ▼	0.070	-2% ▼
Sandia National Laboratories	9.181	15% ▲	179	60% ▲	0.051	-28% ▼
Savannah River Site	39.877	-35% ▼	1,246	-34% ▼	0.032	-2% ▼
Y-12 National Security Complex	52.164	4% ▲	1,603	2% ▲	0.033	2% ▲
<b>NNSA Totals</b>	<b>490.958</b>	<b>-2% ▼</b>	<b>7,306</b>	<b>-12% ▼</b>	<b>0.067</b>	<b>11% ▲</b>
<b>Office of Nuclear Energy (NE)</b>						<b>Total Monitored = 4,716*</b>
Idaho National Laboratory	50.929	-2% ▼	982	22% ▲	0.052	-20% ▼
<b>NE Totals</b>	<b>50.929</b>	<b>-2% ▼</b>	<b>982</b>	<b>22% ▲</b>	<b>0.052</b>	<b>-20% ▼</b>
<b>Office of Science (SC)</b>						<b>Total Monitored = 20,043*</b>
Ames Laboratory	0.704	◇	31	◇	0.023	◇
Argonne National Laboratory	9.652	-6% ▼	219	-16% ▼	0.044	12% ▲
Brookhaven National Laboratory	4.531	<b>181% ▲</b>	100	<b>104% ▲</b>	0.045	38% ▲
Fermi National Accelerator Laboratory	3.040	-10% ▼	97	13% ▲	0.031	-20% ▼
Lawrence Berkeley National Laboratory	1.020	135% ▲	14	40% ▲	0.073	68% ▲
Oak Ridge Institute for Science and Education	0.063	◇	8	◇	0.008	◇
Oak Ridge National Laboratory	<b>51.745</b>	11% ▲	<b>440</b>	-3% ▼	<b>0.118</b>	14% ▲
Pacific Northwest National Laboratory	16.598	-10% ▼	354	-47% ▼	0.047	<b>70% ▲</b>
Princeton Plasma Physics Laboratory	0.280	◇	53	◇	0.005	◇
Service Center Personnel*	0.000	◇	0	◇	0.000	◇
SLAC National Accelerator Laboratory	0.045	◇	1	◇	0.045	◇
Thomas Jefferson National Accelerator Facility	0.451	◇	28	◇	0.016	◇
<b>SC Totals</b>	<b>88.129</b>	<b>7% ▲</b>	<b>1,345</b>	<b>-19% ▼</b>	<b>0.066</b>	<b>31% ▲</b>

Note: Bold and boxed values indicate the greatest value in each category.

◇ The percentage change from the previous year is not shown because it is not meaningful when the site collective dose is less than 1 person-rem (10 person-mSv).

\* Individuals who worked at more than one program office are represented within each grouping; therefore, the total monitored values will not match the annual number of individuals monitored.

### 3.5 Transient Individuals

For this report, a DOE site is defined as a geographic location. Transient individuals, or transients, are defined as individuals who are monitored at more than one DOE site during the calendar year and, therefore, had more than one monitoring record reported to the REMS repository. This section presents information on transient individuals to determine the extent to which individuals traveled from site to site and to examine the doses received by these individuals.

The tracking and analysis of transient individuals are important aspects of the REMS Program. While each site is responsible for monitoring individuals during their work at that site, the REMS Program collects dose records from all sites and verifies that individuals do not exceed regulatory limits by accruing doses at multiple facilities. Although the number of transient individuals and average doses have been low, the examination of these records remains an important function in assessing performance of DOE radiation protection programs.

*Exhibit 3-17* shows the dose distribution and total number of transient individuals from CY 2020 to 2024. Over the past 5 years, the records of transient individuals have averaged between 2 and 4 percent of the total records for all monitored individuals.

These individuals received 2 percent of the collective TED in CY 2024. The collective TED for transients decreased from 29.61 person-rem (296.1 mSv) in CY 2023 to 21.62 person-rem (216.2 person-mSv) in CY 2024. The average measurable TED decreased from 0.041 rem (0.410 mSv) in CY 2023 to 0.037 rem (0.370 mSv) in CY 2024.

### 3.6 Historical Data

To provide historical context for radiation exposure data at DOE, it is useful to include information prior to the past 5 years. *Exhibit 3-18* and *Exhibit 3-19* show a summary of occupational exposures starting in CY 1974, when the U.S. Atomic Energy Commission (AEC) split into the U.S. Nuclear Regulatory Commission (NRC) and the Energy Research and Development Administration (ERDA), which subsequently became DOE. *Exhibit 3-18* and *Exhibit 3-19* show the collective dose, average measurable dose, and number of individuals with a measurable dose from CY 1974 to CY 2024. All three parameters decreased dramatically between CY 1986 and CY 1993 due to the shutdown of facilities within the weapons complex and the end of the Cold War era. After this time, the DOE mission shifted from weapons production to shutdown, stabilization, and decontamination and decommissioning activities.

**Exhibit 3-17: Dose Distribution of Transient Individuals, CY 2020 – 2024.**

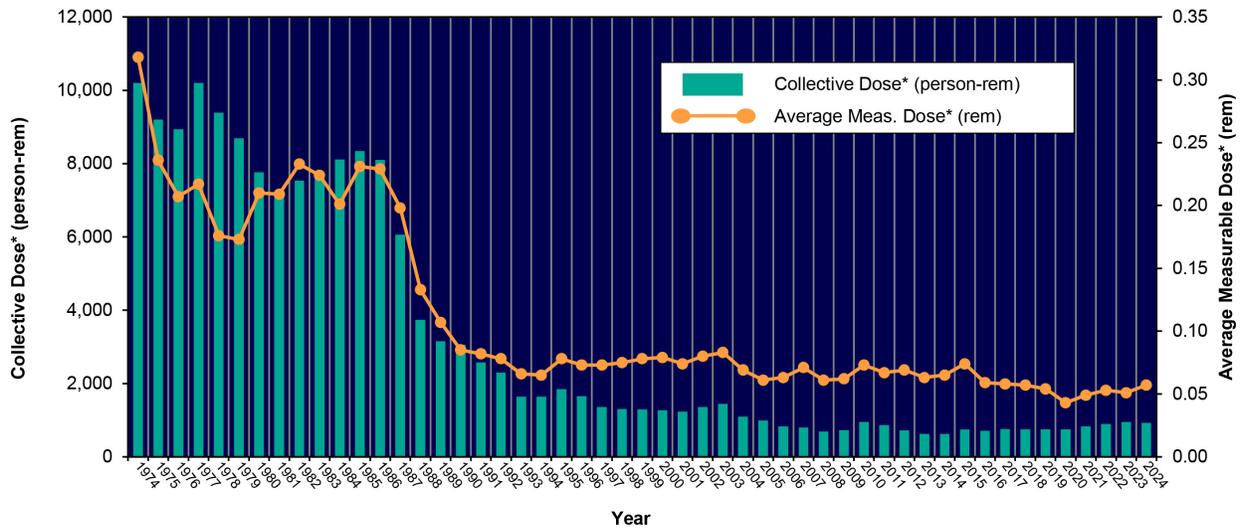
Dose Ranges (TED in rem) *		2020	2021	2022	2023	2024
Transients	Less than measurable	523	1,045	1,712	2,175	2,129
	Measurable <0.100	324	404	562	648	542
	0.100 – 0.250	13	18	34	47	30
	0.250 – 0.500	2	4	9	19	10
	0.500 – 0.750	-	1	3	1	-
	0.750 – 1.000	-	-	3	1	1
	1.0 – 2.0	-	1	5	1	-
	>2.0	-	-	-	-	-
	Total number of individuals monitored**	862	1,473	2,328	2,892	2,712
	Number with measurable dose	339	428	616	717	583
% with measurable dose	39%	29%	26%	25%	21%	
Collective TED (person-rem)	10.605	15.316	30.809	29.613	21.624	
Average measurable TED (rem)	0.031	0.036	0.050	0.041	0.037	
All DOE	Total number of records for monitored individuals	64,728	67,793	75,348	82,421	84,969
	Number of individuals with measurable dose	17,258	16,903	16,774	18,473	16,308
	% of total monitored individuals who are transient	1.3%	2.2%	3.1%	3.5%	3.2%
	% of the number of individuals with measurable dose who are transient	2.0%	2.5%	3.7%	3.9%	3.6%

\* Individuals with doses equal to the dose value separating the dose ranges are included in the next higher dose range.

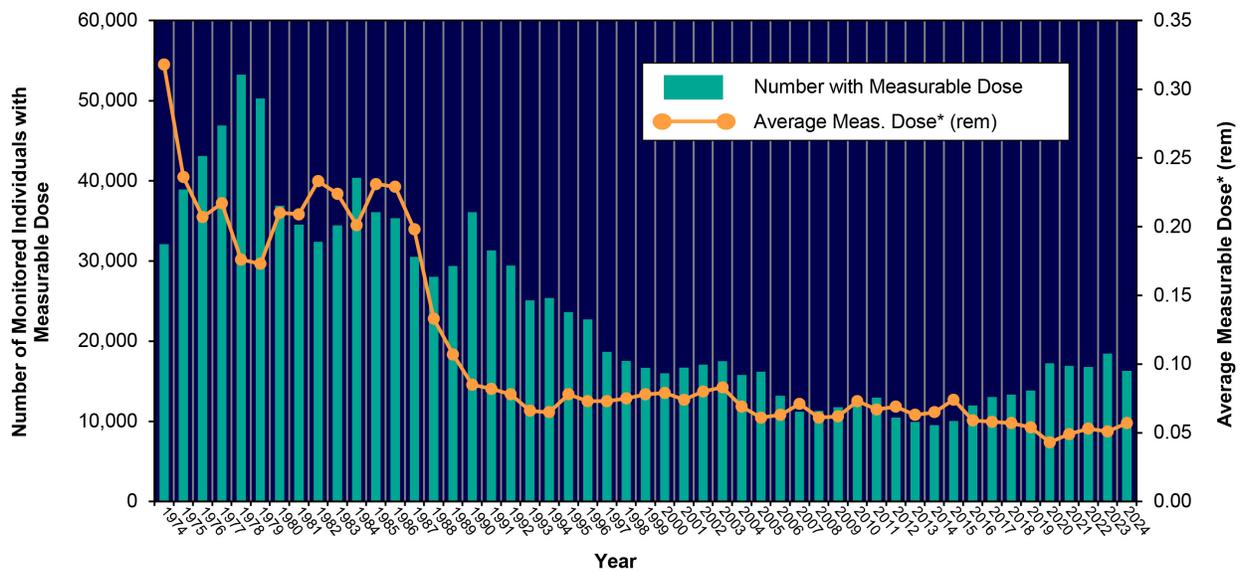
\*\* Total number of individuals represents the number of individuals monitored and not the number of records.

- Indicates dose ranges containing no individuals.

**Exhibit 3-18: Collective Dose and Average Measurable Dose, CY 1974 – 2024.**



**Exhibit 3-19: Number of Individuals with Measurable Dose and Average Measurable Dose, CY 1974 – 2024.**



\* COLLECTIVE DOSE  
 1974 – 1989 collective dose = Deep Dose Equivalent (DDE)  
 1990 – 1992 collective dose = DDE + Annual Effective Dose Equivalent (AEDE)  
 1993 – 2009 collective dose = DDE + Committed Effective Dose Equivalent (CEDE)  
 2010 – Present collective dose = Effective Dose (from external sources) (ED) + Committed Effective Dose (CED)

AGENCIES  
 1946 – 1974 U.S. Atomic Energy Commission (AEC)  
 1974 – 1977 Energy Research and Development Administration (ERDA)  
 1977 – Present U.S. Department of Energy (DOE).



# Section Four

## Operating Experience Program

DOE has a mature OpEx program, which has been enhanced from the lessons learned program that was initially developed in CY 1994. The OpEx program is described in DOE O 210.2A, *DOE Corporate Operating Experience Program* [9].

The objectives of the OpEx program are to institute a DOE-wide program for the management of operating experience to prevent adverse operating incidents and to expand the sharing of good work practices among DOE sites. The program provides a systematic review, identification, collection, screening, evaluation, and dissemination of operating experience from U.S. and foreign government agencies and industry, professional societies, trade associations, national academies, universities, and DOE and its contractors. DOE Headquarters takes corporate responsibility for identifying, analyzing, and sharing operating experience information through OpEx documents and trending reports. DOE field sites share individual lessons learned from their operations that are communicated through the DOE corporate database, DOE OPEXShare.

DOE operating experience information and links to other operating experience resources is available on DOE OPEXShare through a user account so that DOE and external entities may improve the health and safety aspects of operations within their facilities, including reducing the number of accidents and injuries.

For further information contact:

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<https://www.energy.gov/ehss/corporate-operating-experience-program>

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# Section Five

## Conclusions

Analysis of the collected exposure data for CY 2024 indicates that:

- ◆ DOE operations were in compliance with regulatory radiation protection requirements, as no exposures were reported to have exceeded the occupational dose limit of 5 rem (50 mSv) TED; and
- ◆ Only 19 percent of the monitored individuals received a measurable dose, and, of those, the average measurable dose received was 1 percent of the 5 rem (50 mSv) TED limit.

In addition, from CY 2023 to CY 2024:

- ◆ The collective TED decreased by 2 percent to 926.8 person-rem (9,268 person-mSv);
- ◆ Number of individuals with measurable dose decreased by 12 percent from 18,473 individuals to 16,308 individuals;
- ◆ Collective CED (internal exposure) increased by 4 percent to 43.2 person-rem (432 person-mSv); and
- ◆ Collective TED for transient individuals decreased by 27 percent to 21.6 person-rem (216 person-mSv).

The collective dose at DOE facilities has decreased by 89 percent since CY 1986. This coincides with the end of the Cold War era, which shifted the DOE mission from weapons production to stabilization, waste management, and environmental remediation activities, along with the consolidation and remediation of facilities across the complex to meet the new mission.

In alignment with the change in mission, regulations and requirements have been modified (see Section 2) that reinforce DOE's focus on ALARA practices and risk reduction to lower occupational radiation dose.

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### **Administrative Control Level (ACL)**

A dose level that is established below the DOE dose limit to administratively control exposures. ACLs are multi-tiered, with increasing levels of authority required to approve a higher level of exposure.

### **As Low As Reasonably Achievable (ALARA)**

The approach to radiation protection to manage and control exposures (both individual and collective) to the work force and to the general public to as low as is reasonable, taking into account social, technical, economic, practical, and public policy considerations. As used in this part, ALARA is not a dose limit but a process which has the objective of attaining doses as far below the applicable limits of this part as is reasonably achievable.

[10 CFR 835.2]

### **Average Measurable Dose**

The dose obtained by dividing the collective dose by the number of individuals who received a measurable dose. This is the average most commonly used when examining trends and comparing doses received by individuals because it reflects the exclusion of those individuals receiving a less than measurable dose. In this report, average measurable dose is calculated for total effective dose (TED) and committed effective dose (CED).

### **Bioassay Measurements**

As presented in Section 3.3.4, the number of bioassay measurements is the number of measurements taken to determine the kinds, quantities, or concentrations of radioactive material in the human body, whether by direct measurement or by analysis and evaluation of materials excreted or removed from the human body. Types of bioassay include:

- ◆ **In Vivo bioassay:** From the Latin for "in one that is living," occurring within the living. The direct measurement of radioactive material in the human body. The number of in vivo measurements represents the number of measurements performed for all individuals during the year.
- ◆ **Fecal bioassay:** The evaluation of radioactive material excreted in feces from the human body. The number of fecal bioassay measurements is the number of fecal samples analyzed for all individuals during the year.
- ◆ **Urinalysis bioassay:** The evaluation of radioactive material excreted in urine from the human body. The number of urinalysis bioassay measurements is the number of urine samples analyzed for all individuals during the year.

### **Collective Dose**

The sum of doses to all individuals in a population for a period of time and is used whenever the dose may refer to more than one type of dose. In cases where the type of dose is specified, the term "collective" is followed by the type of dose, such as the TED, CED, or photon. In all cases, the population is the group of DOE individuals that were monitored for occupational radiation exposure, and the period of time is the monitoring year. Collective dose is expressed in units of person-rem.

### **Committed Effective Dose (CED) or ( $E_{50}$ )**

Means the sum of the committed equivalent doses to various tissues or organs in the body ( $H_{T,50}$ ), each multiplied by the appropriate tissue weighting factor ( $w_T$ )—that is,  $E_{50} = \sum w_T H_{T,50} + w_{\text{Remainder}} H_{\text{Remainder},50}$ . Where  $w_{\text{Remainder}}$  is the tissue weighting factor assigned to the remainder organs and tissues and  $H_{\text{Remainder},50}$  is the committed equivalent dose to the remainder organs and tissues. Committed effective dose is expressed in units of rem (or Sv). [10 CFR 835.2]

**Committed Equivalent Dose (CEqD) or ( $H_{T,50}$ )**

Means the equivalent dose calculated to be received by a tissue or organ over a 50-year period after the intake of a radionuclide into the body. It does not include contributions from radiation sources external to the body. Committed equivalent dose is expressed in units of rem (or Sv). [10 CFR 835.2]

**Dose**

A general term for absorbed dose, equivalent dose, effective dose, committed equivalent dose, committed effective dose, or total effective dose as defined in this part. [10 CFR 835.2]

**Effective Dose**

Means the summation of the products of the equivalent dose received by specified tissues or organs of the body ( $H_T$ ) and the appropriate tissue weighting factor ( $w_T$ )—that is,  $E = \sum w_T H_T$ . It includes the dose from radiation sources internal and/or external to the body. For purposes of compliance with this part, equivalent dose to the whole body may be used as effective dose for external exposures. The effective dose is expressed in units of rem (or Sv). [10 CFR 835.2]

**Equivalent Dose (EqD)**

Means the product of average absorbed dose ( $D_{T,R}$ ) in rad (or gray) in a tissue or organ (T) and a radiation (R) weighting factor ( $w_R$ ). For external dose, the equivalent dose to the whole body is assessed at a depth of 1 cm in tissue; the equivalent dose to the lens of the eye is assessed at a depth of 0.3 cm in tissue, and the equivalent dose to the extremity and skin is assessed at a depth of 0.007 cm in tissue. Equivalent dose is expressed in units of rem (or Sv). [10 CFR 835.2]

**Measurable Dose**

A dose greater than zero rem (not including doses reported as “not detectable”).

**Member of the Public**

Means an individual who is not a general employee. An individual is not a “member of the public” during any period in which the individual receives an occupational dose. [10 CFR 835.2] The definition of general employee is specified in 10 CFR 835.

**Number of Individuals with Measurable Dose**

The subset of all monitored individuals who receive a measurable dose (greater than the limit of detection for the monitoring system). Many personnel are monitored as a matter of prudence and may not receive a measurable dose. For this reason, the number of individuals with measurable dose is presented in this report as a more accurate indicator of the exposed workforce. The number of individuals represents the number of dose records reported. Some individuals may be counted more than once if multiple dose records are reported for the individual during the year.

**Occupational Exposure**

An individual's exposure to ionizing radiation (external and internal) as a result of that individual's work assignment. Occupational exposure does not include planned special exposures, exposure received as a medical patient, background radiation, or voluntary participation in medical research programs.

**Person-rem**

The unit of measurement used for the collective dose to all DOE Federal, contractor, and subcontractor employees.

**Rem**

A unit of dose derived from the phrase roentgen equivalent man. The rem is equal to 0.010 Sv, which is the international unit of measurement for radiation exposure.

**Total Effective Dose (TED)**

Means the sum of the effective dose (for external exposures) and the committed effective dose. [10 CFR 835.2]

**Total Organ Dose (TOD)**

The sum of the equivalent dose to the whole body for external exposures and the committed equivalent dose to any organ or tissue other than the skin or the lens of the eye.

**Transient Individual**

As used in this report, a transient individual is an individual monitored for radiation exposure at more than one DOE site during the calendar year.

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# Section Seven

## References

# 7

## References

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# Section Eight

## User Survey

### U.S. Department of Energy Occupational Radiation Exposure Report for Calendar Year 2024

DOE, striving to meet the needs of its stakeholders, is looking for suggestions on ways to improve the *U.S. Department of Energy Occupational Radiation Exposure Report for Calendar Year 2024*. **Your feedback is important.** Constructive feedback will ensure this report can continue to meet user needs. Please fill out the attached survey form and return it to:

Kali Crosby  
Office of Data Strategy and Performance (EH-23)  
DOE REMS Program Manager  
U.S. Department of Energy  
1000 Independence Avenue, SW  
Washington, D.C. 20585-1290  
Kali.Crosby@hq.doe.gov

Questions concerning this survey should be directed to Ms. Crosby.

1. Identification:

Name: \_\_\_\_\_

Title: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

2. Distribution:

2.1 Do you wish to remain on the distribution for this report? \_\_\_\_ yes \_\_\_\_ no

2.2 Do you wish to be added to the distribution? \_\_\_\_ yes \_\_\_\_ no

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# Section Nine

## Appendices

### Appendix A: DOE Reporting Sites and Reporting Codes

The following is a list of the Occupation Codes that are reported with each individual's dose record to the DOE Radiation Exposure Monitoring System (REMS) in accordance with Order 231.1B. Occupation Codes are grouped into Labor Categories for the purposes of analysis and summary in this report. The occupation codes are listed in the REMS Reporting Guide, Table G-7, and represent a subset of the occupations listed in the Department of Commerce's Standard Occupational Classification (SOC) Manual (1980).

*Exhibit A-1: Labor Categories and Occupation Codes.*

Labor Category	Occupation Code	Occupation Name
Agriculture	562	Groundskeepers
	570	Forest Workers
	580	Misc. Agriculture
Construction/Repair	610	Mechanics/Repairers
	641	Masons
	642	Carpenters
	643	Electricians
	644	Painters
	645	Pipe Fitter
	650	Miners/Drillers
	660	Misc. Repair/Construction
Laborers	850	Handlers/Laborers/Helpers
Management	110	Manager - Administrator
	400	Sales
	450	Admin. Support and Clerical
Misc.	910	Military
	990	Miscellaneous
Production	681	Machinists
	682	Sheet Metal Workers
	690	Operators, Plant/System/Utility
	710	Machine Setup/Operators
	771	Welders and Solderers
	780	Misc. Precision/Production
Professional	160	Engineer
	170	Scientist
	184	Health Physicist
	200	Misc. Professional
	260	Doctors and Nurses
Service Workers	512	Firefighters
	513	Security Guards

**Exhibit A-1: Labor Categories and Occupation Codes.**

Labor Category	Occupation Code	Occupation Name
Service Workers (continued)	521	Food Service Employees
	524	Janitors
	525	Misc. Service
Technicians	350	Technicians
	360	Health Technicians
	370	Engineering Technicians
	380	Science Technicians
	383	Radiation Monitors/Techs.
	390	Misc. Technicians
Transport Workers	820	Truck Drivers
	821	Bus Drivers
	825	Pilots
	830	Equipment Operators
	840	Misc. Transport
Unknown	001	Unknown

The following is a list of all organizations reporting to the DOE REMS from CY 2020–2024. The list provides the Site groupings used in this report as well as the organization reporting code and name.

**Exhibit A-2: Organizations Reporting to DOE REMS, CY 2020–2024.**

Site	Org. Code	Organization Name	2020	2021	2022	2023	2024
Albuquerque	OST3100	Office of Secure Transportation	•	•	•	•	•
Ames Laboratory	1000503	Ames Laboratory (Iowa State)	•	•	•	•	•
Argonne National Laboratory (ANL)	1000703	Argonne National Laboratory	•	•	•	•	•
	1000710	ANL-Radiological Assistance Program	-	-	-	-	•
Brookhaven National Laboratory (BNL)	1001003	Brookhaven National Laboratory	•	•	•	•	•
Energy Technology Engineering Center (ETEC)	8002001	Cabrera Services	•	-	-	-	-
Fermi National Accelerator Lab. (FERMI)	1002503	Fermilab	•	•	•	•	•
Grand Junction Site	3260615	Navarro Research and Engineering	•	•	•	•	•
Hanford	4700805	Bechtel National Corporation	•	•	•	•	•
	4701001	DOE, Office of River Protection	•	•	•	•	•
	4702004	Advanced Technologies and Laboratories Int'l	-	-	-	-	•
	4702005	Wastren Advantage, Inc.	•	•	-	-	-
	4706104	Hanford Laboratory Management Integration	-	•	•	•	•
	4707104	Washington River Protection Solutions, LLC	•	•	•	•	•
	NA-2000	NNSA - Visitors	•	-	-	•	•
	NA-2100	NNSA - Management and Support Personnel	•	•	•	•	•
	NA-2101	NNSA - Mgmt. & Support Personnel: MELE Assoc.	•	•	•	•	•
	NA-2110	NNSA - North and South America	•	-	-	-	-
	NA-2120	NNSA - Europe, Africa and the Middle East	•	-	-	•	•
	7500503	Battelle - PNNL	•	•	•	•	•
	7500504	Battelle -PNNL- Subs	•	•	•	•	•
	7500521	Pacific Northwest Site Office	•	•	•	•	•

**Exhibit A-2: Organizations Reporting to DOE REMS, CY 2020–2024.**

Site	Org. Code	Organization Name	2020	2021	2022	2023	2024
Hanford (continued)	7502504	HPMC Occupational Medical Services	•	•	•	•	-
	7504204	Hanford Mission Integration Solutions (HMIS)	-	•	•	•	•
	7504304	Central Plateau Cleanup Company	-	•	•	•	•
	7505214	Mission Support Alliance (MSA)	•	•	-	-	-
	7502514	Inomedic Health Applications	-	-	-	-	•
	7505304	CH2M Hill Plateau Remediation Company	•	•	-	-	-
	7506001	DOE-Richland Field Office	•	•	•	•	•
Idaho	3004001	Idaho Field Office	•	•	•	•	•
	3005003	INL - BEA, LLC - Research	•	•	•	•	•
	3005004	INL - BEA, LLC - Services	•	•	•	•	•
	3005009	INL - BEA, LLC - Security	•	•	•	•	•
	3005012	INL - BEA, LLC - Production	•	•	•	•	•
	3006002	INL - Fluor- Projects	•	•	•	•	•
	3006004	ICP - Fluor - Subcontractors	•	•	•	•	•
	3006005	ICP - Fluor - Support	•	•	•	•	•
Kansas City National Security Campus	0531002	Honeywell FM & T	•	•	•	•	•
Lawrence Berkeley National Lab. (LBNL)	8003003	Lawrence Berkeley National Laboratory	•	•	•	•	•
Lawrence Livermore National Lab. (LLNL)	0580403	Lawrence Livermore National Laboratory	•	•	•	•	•
	0580414	LLNL - Service Subcontractors	-	•	•	•	•
	0580416	LLNL - Construction Subcontractors	•	-	-	-	-
	0580503	LLNL - Nevada	•	•	•	•	•
	0580701	LLNL - DOE Site Office	•	-	•	•	•
Los Alamos National Lab. (LANL)	0540001	NNSA Los Alamos Site Office	•	•	•	•	•
	0544003	Los Alamos National Laboratory	•	•	•	•	•
	0544006	Los Alamos National Lab Construction Subs	•	•	•	•	•
	544809	Protection Technologies Los Alamos	-	-	-	•	-
	544904	Johnson Controls, Inc.	-	-	-	•	-
	1530001	Newport News Nuclear BWXT Los Alamos (N3B)	•	•	•	•	•
National Renewable Energy Laboratory	2806003	National Renewable Energy Laboratory	•	•	•	•	•
Nevada National Security Site	0501001	NNSA Service Center	-	-	•	•	-
	0520001	NNSA Nevada Site Office	•	•	•	-	•
	0521104	MSTS - Livermore Operations	•	-	-	•	-
	0521204	MSTS - Las Vegas	•	•	•	-	•
	0521304	MSTS - Los Alamos	•	•	•	•	•
	0521314	NSTec - Sandia	-	-	-	-	-
	0521405	MSTS - NTS	•	•	•	•	•
	0521416	MSTS - NTS subcontractors	•	•	-	-	-
	0521503	MSTS - Special Tech. Lab	•	•	•	•	•
	0529004	Nevada	-	-	-	-	-
	0529009	Wackenhut Services Inc. - NV	•	•	•	•	-
	3505104	Navarro-Intera LLC	•	•	-	-	-
	3508703	SAIC - NV	-	-	•	•	•
	Oak Ridge Site	4004203	Oak Ridge Inst. For Science & Educ. (ORISE)	•	•	•	•
4004602		Tru Waste Processing Center - ORNL	•	•	•	•	•
4006002		UCOR - ETPP	•	•	•	•	•
4006503		UT-Battelle - ORNL	•	•	•	•	•

**Exhibit A-2: Organizations Reporting to DOE REMS, CY 2020–2024.**

Site	Org. Code	Organization Name	2020	2021	2022	2023	2024
Oak Ridge Site (continued)	4006510	UCOR - ORNL	•	•	•	•	•
	4008010	UCOR - Y-12	•	•	•	•	•
	4018102	CNS, LLC, Y-12	•	•	•	•	•
Paducah Gaseous Diff. Plant (PGDP)	4007002	Swift & Staley Team	•	•	•	•	•
	6203106	DUF6 Paducah Construction Subs - MACS	•	•	•	•	•
	6503304	Four Rivers Nuclear Partnership	•	•	•	•	•
Pantex Plant	0510001	CNS Pantex - NNSA and DOE Couriers	•	-	-	-	-
	0514004	Battelle - Pantex	•	•	•	•	•
	0515002	CNS Pantex	•	•	•	•	•
	0515006	CNS Pantex - Construction Subs	•	-	-	-	-
Portsmouth Gaseous Diff. Plant (PORTS)	6202106	Mid-America Conversion Services (MCS)	•	•	•	•	•
	6202204	Portsmouth Mission Alliance (PMA)	•	•	•	•	•
	6202304	Fluor B & W Portsmouth	•	•	•	•	•
Princeton Plasma Physics Laboratory (PPPL)	1005003	Princeton Plasma Physics Laboratory	•	•	•	•	•
Sandia National Laboratories (SNL)	0578003	Sandia National Laboratories	•	•	•	•	•
Savannah River	0595112	Tritium Extraction Facility	•	•	•	•	•
	8500000	Savannah River Operations	-	•	•	•	•
	8500505	Bechtel Construction - SR	-	•	•	•	•
	8500516	Miscellaneous SRS Construction Subs	•	•	•	•	•
	8501042	SRR Operations	•	•	•	•	•
	8501044	SRR Service Subs	•	•	•	•	•
	8502042	SR Mission Completion Operations	-	-	•	-	-
	8505001	SR Forest Station	-	-	•	-	-
	8505501	Savannah River Field Office	•	•	•	•	•
	8505504	Misc. DOE Contractors - SR	•	•	•	•	•
	8505525	Savannah River Nuclear Solutions, Inc.	-	•	-	•	•
	8505526	SR Construction - Parsons Subcontractors	•	•	•	-	-
	8509003	Univ. of Georgia Ecology Laboratories	•	•	•	•	•
	8509509	Centerra - SR	•	•	•	•	•
	8511002	Savannah River Nuclear Solutions, Inc.	•	•	•	•	•
	8511003	Savannah River National Laboratory	•	-	•	•	•
	8511004	SRNS Service Subs	•	•	•	•	•
	8511005	SRNS Construction	•	•	•	•	•
	8511006	SRNS Construction Subs	•	•	•	•	•
	8512003	BSRA - SR National Laboratory	-	•	•	•	•
	8512004	BSRA - Service Subs	-	•	•	•	•
Separations Process Research Unit	1523016	NY SPRU	•	•	•	•	•
Service Center Personnel	0501001	NNSA Albuquerque Complex	•	-	-	•	•
	0701001	Carlsbad Field Office	•	•	•	•	•
	0702003	Los Alamos National Lab - WIPP	•	•	-	-	-
	1504001	DOE Headquarters	•	•	•	•	•
	2041001	NETL Morgantown	•	•	•	•	•
	2042001	NETL Pittsburgh	•	•	•	•	•
	2045001	NETL Albany	•	•	•	•	•
	4003602	Isotek (Bldg. 3019)	•	•	•	•	•
	9900002	DOE Federal Employees	-	-	-	•	-

**Exhibit A-2: Organizations Reporting to DOE REMS, CY 2020–2024.**

Site	Org. Code	Organization Name	2020	2021	2022	2023	2024
SLAC National Accelerator Facility	8008003	Stanford Linear Accelerator Center	•	•	•	•	•
Thomas Jefferson National Accelerator Facility	1509503	Thomas Jefferson National Accelerator Facility	•	•	•	•	•
	1509521	Jefferson Laboratory - DOE Employees	-	•	•	•	•
Uranium Mill Tailings Remediation Action Project	3260645	Uranium Mill Tailings Remedial Action - Moab	•	•	•	•	•
Waste Isolation Pilot Plant	0701001	Carlsbad Field Office	-	-	•	•	-
	0703104	Washington TRU Solutions LLC-WIPP	•	•	•	•	•
	0703109	Santa Fe Protective Services - WIPP	•	•	-	-	-
	0703114	WTS Subcontractors - WIPP	•	•	-	-	-
West Valley Project	4539004	West Valley Nuclear Services, Inc. (WVNS)	•	•	•	•	•
Pittsburg Naval Reactor Office	6007504	PNR - BAPL & BPML-P	•	•	•	•	•
	6008003	PNR - BAPL & BPML-P	•	•	•	•	•
	6009003	Naval Reactors - Idaho	•	•	•	•	•
Schenectady Naval Reactor Office	9004003	Knolls Atomic Power Laboratory	•	•	•	•	•
	9005003	Knolls Atomic Power Laboratory	•	•	•	•	•
	9005004	Knolls Atomic Power Laboratory	•	•	•	•	•

The following is a list of Facility Type Codes reported to REMS in accordance with the REMS Reporting Guide. A facility type code is reported with each individual's dose record and indicates the facility type where the majority of the individual's dose was accrued during the monitoring year.

**Exhibit A-3: Facility Type Codes.**

Facility Type Code	Description
10	Accelerator
21	Fuel/Uranium Enrichment
22	Fuel Fabrication
23	Fuel Processing
40	Maintenance and Support (Site-Wide)
50	Reactor
61	Research, General
62	Research, Fusion
70	Waste Processing/Mgmt.
80	Weapons Fab. and Testing
99	Other

## Appendix B: Additional Data

*Exhibit B-1: Site Dose Data, CY 2022.*

Site	Collective TED (person-rem)	Percent Change – Coll. TED	Number with Meas. Dose	Percent Change – # with Meas. Dose	Avg. Meas. TED (rem)	Percent Change – Avg. Meas. TED	Percentage of Coll. TED above 0.500 rem	Percent Change – Coll. TED above 0.500 rem
Ames Laboratory	0.565	◇	26	◇	0.022	◇	–	◇
Argonne National Laboratory	8.651	35% ▲	115	20% ▲	0.075	13% ▲	32%	295% ▲
Brookhaven National Laboratory	1.976	102% ▲	87	45% ▲	0.023	39% ▲	–	–
Fermi National Accelerator Laboratory	8.780	44% ▲	143	–27% ▼	0.061	96% ▲	6%	–
Grand Junction Site	0.013	◇	4	◇	0.003	◇	–	◇
Hanford: Hanford Site	17.308	14% ▲	555	4% ▲	0.031	10% ▲	–	–
Hanford: Office of River Protection	22.637	–18% ▼	562	–20% ▼	0.040	3% ▲	–	–
Hanford: Pacific Northwest National Laboratory	33.264	94% ▲	537	1% ▲	0.062	93% ▲	50%	–
Idaho	84.730	–23% ▼	1,592	2% ▲	0.053	–24% ▼	1%	–89% ▼
Kansas City National Security Campus	0.110	◇	33	◇	0.003	◇	–	◇
Lawrence Berkeley National Laboratory	0.497	◇	12	◇	0.041	◇	–	◇
Lawrence Livermore National Laboratory	22.621	28% ▲	245	40% ▲	0.092	–9% ▼	29%	–20% ▼
Los Alamos National Laboratory	371.500	23% ▲	4,467	6% ▲	0.083	15% ▲	31%	37% ▲
National Renewable Energy Laboratory	0.005	◇	2	◇	0.002	◇	–	◇
Nevada National Security Site	2.876	58% ▲	53	39% ▲	0.054	13% ▲	–	–
Oak Ridge: East Tennessee Technology Park	0.701	◇	62	◇	0.011	◇	–	◇
Oak Ridge: Oak Ridge Institute for Science and Education	0.129	◇	13	◇	0.010	◇	–	◇
Oak Ridge: Oak Ridge National Laboratory	65.393	22% ▲	1,096	12% ▲	0.060	9% ▲	24%	35% ▲
Oak Ridge: Y–12 National Security Complex	57.144	5% ▲	1,571	9% ▲	0.036	–4% ▼	–	–
Office of Secure Transportation	0.157	◇	3	◇	0.052	◇	–	◇
Paducah Gaseous Diffusion Plant	2.983	21% ▲	83	–10% ▼	0.036	34% ▲	–	–
Pantex Plant	25.909	9% ▲	478	19% ▲	0.054	–8% ▼	–	–
Portsmouth Gaseous Diffusion Plant	4.259	110% ▲	133	93% ▲	0.032	9% ▲	–	–
Princeton Plasma Physics Laboratory	0.255	◇	47	◇	0.005	◇	–	◇
Sandia National Laboratories	6.477	109% ▲	127	21% ▲	0.051	73% ▲	–	–
Savannah River National Lab	7.665	–49% ▼	371	–23% ▼	0.021	–33% ▼	–	–
Savannah River Site	128.062	–7% ▼	4,083	–12% ▼	0.031	6% ▲	3%	–
Separations Process Research Unit	0.016	◇	1	◇	0.016	◇	–	◇
Thomas Jefferson National Accelerator Facility	0.854	◇	53	◇	0.016	◇	–	◇
Uranium Mill Tailings Remedial Action Project	4.765	–39% ▼	61	–6% ▼	0.078	–35% ▼	–	–
Waste Isolation Pilot Plant	0.449	◇	25	◇	0.018	◇	–	◇
West Valley Demonstration Project	12.946	7% ▲	119	10% ▲	0.109	–3% ▼	–	–
Service Center Personnel*	0.428	◇	15	◇	0.029	◇	–	◇
<b>Totals</b>	<b>893.125</b>	<b>8% ▲</b>	<b>16,774</b>	<b>–1% ▼</b>	<b>0.053</b>	<b>9% ▲</b>	<b>18%</b>	<b>53% ▲</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

◇ The percentage change from the previous year is not shown because it is not meaningful when the site collective dose is less than 1 person-rem (10 person-mSv).

\* Includes personnel at NNSA Albuquerque complex, Oak Ridge, and WIPP, in addition to several smaller facilities not associated with a DOE site.

**Exhibit B-2: Site Dose Data, CY 2023.**

Site	Collective TED (person-rem)	Percent Change – Coll. TED	Number with Meas. Dose	Percent Change – # with Meas. Dose	Avg. Meas. TED (rem)	Percent Change – Avg. Meas. TED	Percentage of Coll. TED above 0.500 rem	Percent Change – Coll. TED above 0.500 rem
Ames Laboratory	0.778	–	34	–	0.023	–	–	–
Argonne National Laboratory	10.225	18% ▲	261	127% ▲	0.039	–48% ▼	17%	–47% ▼
Brookhaven National Laboratory	1.611	–18% ▼	49	–44% ▼	0.033	45% ▲	–	–
Fermi National Accelerator Laboratory	3.36	–62% ▼	86	–40% ▼	0.039	–36% ▼	–	–
Grand Junction Site	0.003	–	2	–	0.002	–	–	–
Hanford: Hanford Site	23.745	37% ▲	503	–9% ▼	0.047	51% ▲	–	–
Hanford: Office of River Protection	20.427	–10% ▼	523	–7% ▼	0.039	–3% ▼	–	–
Hanford: Pacific Northwest National Laboratory	18.488	–44% ▼	671	25% ▲	0.028	–56% ▼	9%	–82% ▼
Idaho	100.316	20% ▲	1,699	6% ▲	0.059	12% ▲	3%	147% ▲
Kansas City National Security Campus	0.312	–	68	–	0.005	–	–	–
Lawrence Berkeley National Laboratory	0.434	–	10	–	0.043	–	–	–
Lawrence Livermore National Laboratory	27.907	1% ▲	333	46% ▲	<b>0.084</b>	–1% ▼	<b>24%</b>	–15% ▼
Los Alamos National Laboratory	<b>311.506</b>	–1% ▼	3,764	–16% ▼	0.083	0%	18%	–41% ▼
National Renewable Energy Laboratory	0.003	–	1	–	0.003	–	–	–
Nevada National Security Site	2.351	–1% ▼	43	–19% ▼	0.055	1% ▲	–	–
Oak Ridge: East Tennessee Technology Park	0.577	–	59	–	0.010	–	–	–
Oak Ridge: Oak Ridge Institute for Science and Education	0.098	–	6	–	0.016	–	–	–
Oak Ridge: Oak Ridge National Laboratory	66.688	1% ▲	1,220	11% ▲	0.055	–8% ▼	14%	–41% ▼
Oak Ridge: Y–12 National Security Complex	50.006	–12% ▼	1,567	0%	0.032	–12% ▼	–	–
Office of Secure Transportation	0.048	–	4	–	0.012	–	–	–
Paducah Gaseous Diffusion Plant	4.172	1% ▲	96	16% ▲	0.043	21% ▲	–	–
Pantex Plant	40.176	55% ▲	564	18% ▲	0.071	31% ▲	–	–
Portsmouth Gaseous Diffusion Plant	5.993	41% ▲	157	18% ▲	0.038	19% ▲	–	–
Princeton Plasma Physics Laboratory	0.336	–	48	–	0.007	–	–	–
Sandia National Laboratories	7.959	1% ▲	112	–12% ▼	0.071	39% ▲	10%	0%
Savannah River National Lab	15.793	106% ▲	546	47% ▲	0.029	40% ▲	–	–
Savannah River Site	216.973	69% ▲	<b>5,701</b>	40% ▲	0.038	21% ▲	8%	<b>154% ▲</b>
Separations Process Research Unit	0.013	–	1	–	0.013	–	–	–
SLAC National Accelerator Laboratory	0.036	–	2	–	0.018	–	–	–
Thomas Jefferson National Accelerator Facility	0.622	–	38	–	0.016	–	–	–
Uranium Mill Tailings Remedial Action Project	8.905	1% ▲	125	105% ▲	0.071	–9% ▼	–	–
Waste Isolation Pilot Plant	0.163	–	9	–	0.018	–	–	–
West Valley Demonstration Project	7.734	–40% ▼	130	9% ▲	0.059	–45% ▼	–	–
Service Center Personnel*	1.627	<b>280% ▲</b>	41	<b>173% ▲</b>	0.040	<b>39% ▲</b>	–	–
<b>Totals</b>	<b>949.385</b>	<b>6% ▲</b>	<b>18,473</b>	<b>10% ▲</b>	<b>0.051</b>	<b>–3% ▼</b>	<b>10%</b>	<b>–43% ▼</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

◇ The percentage change from the previous year is not shown because it is not meaningful when the site collective dose is less than 1 person-rem (10 person-mSv).

\* Includes personnel at NETL, NNSA Albuquerque complex, Oak Ridge, and WIPP, in addition to several smaller facilities not associated with a DOE site.

**Exhibit B-3: Site Dose Data, CY 2024.**

Site	Collective TED (person-rem)	Percent Change – Coll. TED	Number with Meas. Dose	Percent Change – # with Meas. Dose	Avg. Meas. TED (rem)	Percent Change – Avg. Meas. TED	Percentage of Coll. TED above 0.500 rem	Percent Change – Coll. TED above 0.500 rem
Ames Laboratory	0.704	–	31	–	0.023	–	–	–
Argonne National Laboratory	9.676	–5% ▼	221	–15% ▼	0.044	12% ▲	31%	1%
Brookhaven National Laboratory	4.531	181% ▲	100	104% ▲	0.045	38% ▲	–	–
Fermi National Accelerator Laboratory	3.040	–10% ▼	97	13% ▲	0.031	–20% ▼	–	–
Grand Junction Site	0.004	–	4	–	0.001	–	–	–
Hanford: Hanford Site	12.631	–47% ▼	442	–12% ▼	0.029	–39% ▼	–	–
Hanford: Office of River Protection	14.672	–28% ▼	439	–16% ▼	0.033	–14% ▼	–	–
Hanford: Pacific Northwest National Laboratory	16.598	–10% ▼	354	–47% ▼	0.047	70% ▲	–	–
Idaho	122.729	22% ▲	1,837	8% ▲	0.067	13% ▲	4%	1%
Kansas City National Security Campus	0.845	–	57	–	0.015	–	–	–
Lawrence Berkeley National Laboratory	1.020	135% ▲	14	40% ▲	0.073	68% ▲	–	–
Lawrence Livermore National Laboratory	24.999	–10% ▼	373	12% ▲	0.067	–20% ▼	3%	–87%
Los Alamos National Laboratory	327.736	5% ▲	3,360	–11% ▼	0.098	18% ▲	24%	30%
National Renewable Energy Laboratory	0.001	–	1	–	0.001	–	–	–
Nevada National Security Site	4.081	74% ▲	70	63% ▲	0.058	7% ▲	–	–
Oak Ridge: East Tennessee Technology Park	0.829	–	70	–	0.012	–	–	–
Oak Ridge: Oak Ridge Institute for Science and Education	0.063	–	8	–	0.008	–	–	–
Oak Ridge: Oak Ridge National Laboratory	72.198	8% ▲	1,171	–4% ▼	0.062	13% ▲	18%	26%
Oak Ridge: Y–12 National Security Complex	52.164	4% ▲	1,603	2% ▲	0.033	2% ▲	–	–
Office of Secure Transportation	0.786	–	8	–	0.098	–	–	–
Paducah Gaseous Diffusion Plant	5.088	22% ▲	83	–14% ▼	0.061	41% ▲	–	–
Pantex Plant	34.205	–15% ▼	492	–13% ▼	0.070	–2% ▼	–	–
Portsmouth Gaseous Diffusion Plant	5.667	–5% ▼	144	–8% ▼	0.040	3% ▲	–	–
Princeton Plasma Physics Laboratory	0.28	–	53	–	0.005	–	–	–
Sandia National Laboratories	9.181	15% ▲	179	60% ▲	0.051	–28% ▼	–	–
Savannah River National Lab	11.665	–26% ▼	507	–7% ▼	0.023	–20% ▼	–	–
Savannah River Site	167.097	–23% ▼	4,219	–26% ▼	0.040	4% ▲	–	–
Separations Process Research Unit	0.011	–	1	–	0.011	–	–	–
SLAC National Accelerator Laboratory	0.045	–	1	–	0.045	–	–	–
Thomas Jefferson National Accelerator Facility	0.451	–	28	–	0.016	–	–	–
Uranium Mill Tailings Remedial Action Project	7.482	–16% ▼	135	8% ▲	0.055	–22% ▼	–	–
Waste Isolation Pilot Plant	0.268	–	15	–	0.018	–	–	–
West Valley Demonstration Project	8.664	12% ▲	133	2% ▲	0.065	9% ▲	–	–
Service Center Personnel*	7.432	357% ▲	58	41% ▲	0.128	223% ▲	–	–
<b>Totals</b>	<b>926.843</b>	<b>–2% ▼</b>	<b>16,308</b>	<b>–12% ▼</b>	<b>0.057</b>	<b>11% ▲</b>	<b>13%</b>	<b>26%</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.  
 ◊ The percentage change from the previous year is not shown because it is not meaningful when the site collective dose is less than 1 person-rem (10 person-mSv).

\* Includes personnel at NETL, NNSA Albuquerque complex, Oak Ridge, and WIPP, in addition to several smaller facilities not associated with a DOE site.

**Exhibit B-4: Internal Dose by Site, CY 2022–2024.**

Site	No. of Individuals with Measurable CED* 2022	No. of Individuals with Measurable CED* 2023	No. of Individuals with Measurable CED* 2024	Collective CED Dose (person-rem) 2022	Collective CED Dose (person-rem) 2023	Collective CED Dose (person-rem) 2024	Average Measurable CED 2022	Average Measurable CED 2023	Average Measurable CED 2024
Hanford: Hanford Site	1	5	1	0.004	0.008	0.003	0.004	0.002	0.003
Idaho	1	–	1	0.032	–	0.069	0.032	–	0.069
Lawrence Livermore National Laboratory	2	1	–	0.062	0.011	–	0.031	0.011	–
Los Alamos National Laboratory	32	27	39	0.103	0.117	0.150	0.003	0.004	0.004
Oak Ridge: Oak Ridge National Laboratory	1	2	1	0.019	0.070	0.039	0.019	0.035	0.039
Oak Ridge: Y-12 National Security Complex	<b>1,201</b>	<b>1,226</b>	<b>1,314</b>	<b>43.806</b>	<b>38.757</b>	<b>41.853</b>	0.036	0.032	0.032
Paducah Gaseous Diffusion Plant	10	10	9	0.261	0.212	0.224	0.026	0.021	0.025
Princeton Plasma Physics Laboratory	14	–	–	0.035	–	–	0.003	–	–
Sandia National Laboratories	9	2	9	0.027	0.024	0.072	0.003	0.012	0.008
Savannah River National Laboratory	3	–	–	0.191	–	–	<b>0.064</b>	–	–
Savannah River Site	5	2	6	0.044	0.018	0.021	0.009	0.009	0.004
Uranium Mill Tailings Remedial Action Project	47	58	38	1.185	2.346	0.660	0.025	<b>0.040</b>	0.017
West Valley Demonstration Project	–	–	1	–	–	0.154	–	–	<b>0.154</b>
Service Center Personnel**	1	–	–	0.036	–	–	0.036	–	–
<b>Totals</b>	<b>1,327</b>	<b>1,333</b>	<b>1,419</b>	<b>45.805</b>	<b>41.563</b>	<b>43.245</b>	<b>0.035</b>	<b>0.031</b>	<b>0.030</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no individuals with measurable CED for the year shown. Dashes indicate no data reported for the year shown.

\* The number of internal depositions represents the number of internal dose records with positive results reported for each individual.

\*\* Includes personnel at NETL, NNSA Albuquerque complex, Oak Ridge, and WIPP, in addition to several smaller facilities not associated with a DOE site.

**Exhibit B-5: Neutron Dose Distribution by Site, CY 2024.**

Site	No Meas. Dose	Meas. < 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.00	1.0 – 2.0	> 2.0	Total Monitored*	No. of Individuals with Meas. Dose	% of Individuals with Meas. Dose	Collective Neutron Dose (person-rem)	Avg. Meas. Neutron Dose (rem)
Ames Laboratory	155	–	–	–	–	–	–	–	155	–	–	–	–
Argonne National Laboratory	3,223	–	–	–	–	–	–	–	3,223	–	–	–	–
Brookhaven National Laboratory	2,929	–	–	–	–	–	–	–	2,929	–	–	–	–
Fermi National Accelerator Laboratory	1,354	–	–	–	–	–	–	–	1,354	–	–	–	–
Grand Junction Site	30	–	–	–	–	–	–	–	30	–	–	–	–
Hanford: Hanford Site	3,197	197	–	–	–	–	–	–	3,394	197	6%	2.194	0.011
Hanford: Office of River Protection	3,994	10	–	–	–	–	–	–	4,004	10	0%	0.180	0.018
Hanford: Pacific Northwest National Laboratory	3,062	–	–	–	–	–	–	–	3,062	–	–	–	–
Idaho	6,860	19	–	–	–	–	–	–	6,879	19	0%	0.492	0.026
Kansas City National Security Campus	241	–	–	–	–	–	–	–	241	–	–	–	–
Lawrence Berkeley National Laboratory	642	–	–	–	–	–	–	–	642	–	–	–	–
Lawrence Livermore National Laboratory	4,488	44	14	2					4,548	60	1%	4.434	0.074
Los Alamos National Laboratory	12,787	1,665	366	150	24	6	2		<b>15,000</b>	<b>2,213</b>	<b>15%</b>	<b>183.118</b>	<b>0.083</b>
National Renewable Energy Laboratory	4	–	–	–	–	–	–	–	4	–	–	–	–
Nevada National Security Site	732	3	–	–	–	–	–	–	735	3	0%	0.098	0.033
Oak Ridge: East Tennessee Technology Park	219	–	–	–	–	–	–	–	219	–	–	–	–
Oak Ridge: Oak Ridge Institute for Science and Education	103	–	–	–	–	–	–	–	103	–	–	–	–
Oak Ridge: Oak Ridge National Laboratory	5,782	73	27	3					5,885	103	2%	8.055	0.078
Oak Ridge: Y-12 National Security Complex	8,211	5	–	–	–	–	–	–	8,216	5	0%	0.123	0.025
Office of Secure Transportation	302	–	–	–	–	–	–	–	302	–	–	–	–
Paducah Gaseous Diffusion Plant	1,384	–	–	–	–	–	–	–	1,384	–	–	–	–
Pantex Plant	4,582	321	40	6					4,949	367	7%	20.416	0.056
Portsmouth Gaseous Diffusion Plant	2,067	–	–	–	–	–	–	–	2,067	–	–	–	–
Princeton Plasma Physics Laboratory	326	–	–	–	–	–	–	–	326	–	–	–	–
Sandia National Laboratories	1,882	59	7						1,948	66	3%	2.951	0.045
Savannah River National Laboratory	631	15	–	–	–	–	–	–	646	15	2%	0.510	0.034
Savannah River Site	7,020	312	8	1					7,341	321	4%	12.860	0.040
Separations Process Research Unit	18	–	–	–	–	–	–	–	18	–	–	–	–

**Exhibit B-5: Neutron Dose Distribution by Site, CY 2024.**

Site	No Meas. Dose	Meas. < 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.00	1.0 – 2.0	> 2.0	Total Monitored*	No. of Individuals with Meas. Dose	% of Individuals with Meas. Dose	Collective Neutron Dose (person-rem)	Avg. Meas. Neutron Dose (rem)
SLAC National Accelerator Laboratory	2,127	–	–	–	–	–	–	–	2,127	–	–	–	–
Thomas Jefferson National Accelerator Facility	1,526	–	–	–	–	–	–	–	1,526	–	–	–	–
Uranium Mill Tailings Remedial Action Project	161	–	–	–	–	–	–	–	161	–	–	–	–
Waste Isolation Pilot Plant	827	1	–	–	–	–	–	–	828	1	0%	0.010	0.010
West Valley Demonstration Project	442	–	–	–	–	–	–	–	442	–	–	–	–
Service Center Personnel*	281	–	–	–	–	–	–	–	281	–	–	–	–
<b>Totals</b>	<b>81,589</b>	<b>2,724</b>	<b>462</b>	<b>162</b>	<b>24</b>	<b>6</b>	<b>2</b>	<b>–</b>	<b>84,969</b>	<b>3,380</b>	<b>4%</b>	<b>235.441</b>	<b>0.070</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

\*Represents the total number of monitoring records. The number of individuals specifically monitored for neutron radiation cannot be determined.

\*\*Includes personnel at NETL, NNSA Albuquerque complex, Oak Ridge, and WIPP, in addition to several smaller facilities not associated with a DOE site.

**Exhibit B-6a: Distribution of TED by Facility Type, CY 2022.**

**TOTAL EFFECTIVE DOSE (TED)**

**Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)**

Facility Type	Less than Meas.	Meas. To 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (person-rem)	Avg. Meas. TED (rem)
Accelerator	6,714	461	46	14	5	5	–	–	–	–	–	7,245	7%	531	29.304	0.055
Fuel Processing	285	301	7	–	–	–	–	–	–	–	–	593	<b>52%</b>	308	6.576	0.021
Fuel/Uranium Enrichment	2,343	190	5	–	–	–	–	–	–	–	–	2,538	8%	195	4.960	0.025
Maintenance and Support	5,486	868	64	15	–	–	–	–	–	–	–	6,433	15%	947	34.392	0.036
Other	5,277	959	57	15	1	–	–	–	–	–	–	6,309	16%	1,032	35.026	0.034
Reactor	146	21	5	–	–	–	–	–	–	–	–	172	15%	26	1.674	0.064
Research, Fusion	368	50	–	–	–	–	–	–	–	–	–	418	12%	50	0.357	0.007
Research, General	21,988	5,210	384	134	29	18	10	–	–	–	–	<b>27,773</b>	21%	<b>5,785</b>	278.012	0.048
Waste Processing/Management	4,975	3,660	275	81	10	2	–	–	–	–	–	9,003	45%	4,028	161.913	0.040
Weapons Fabrication and Testing	10,993	3,008	531	194	92	35	12	–	–	–	–	14,865	26%	3,872	<b>340.911</b>	<b>0.088</b>
<b>Totals</b>	<b>58,574</b>	<b>14,728</b>	<b>1,374</b>	<b>453</b>	<b>137</b>	<b>60</b>	<b>22</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>75,348</b>	<b>22%</b>	<b>16,774</b>	<b>893.125</b>	<b>0.053</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

*Exhibit B-6b: Distribution of TED by Facility Type, CY 2023.*

**TOTAL EFFECTIVE DOSE (TED)  
Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)**

Facility Type	Less than Meas.	Meas. To 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (person-rem)	Avg. Meas. TED (rem)
Accelerator	7,991	342	38	2	–	–	–	–	–	–	–	8,373	5%	382	14.434	0.038
Fuel Processing	110	499	16	–	–	–	–	–	–	–	–	625	<b>82%</b>	515	13.023	0.025
Fuel/Uranium Enrichment	2,176	202	14	–	–	–	–	–	–	–	–	2,392	9%	216	6.570	0.030
Maintenance and Support	5,595	746	91	16	–	–	–	–	–	–	–	6,448	13%	853	37.795	0.044
Other	6,223	891	59	8	1	–	–	–	–	–	–	7,182	13%	959	31.637	0.033
Reactor	178	20	6	1	–	–	–	–	–	–	–	205	13%	27	2.188	<b>0.081</b>
Research, Fusion	359	50	1	–	–	–	–	–	–	–	–	410	12%	51	0.588	0.012
Research, General	24,231	5,378	453	163	22	9	2					<b>30,258</b>	20%	<b>6,027</b>	281.108	0.047
Waste Processing/Management	4,236	4,814	384	91	29	2	–	–	–	–	–	9,556	56%	5,320	236.665	0.044
Weapons Fabrication and Testing	12,849	3,201	594	243	64	17	4	–	–	–	–	16,972	24%	4,123	<b>325.377</b>	0.079
<b>Totals</b>	<b>63,948</b>	<b>16,143</b>	<b>1,656</b>	<b>524</b>	<b>116</b>	<b>28</b>	<b>6</b>	–	–	–	–	<b>82,421</b>	<b>22%</b>	<b>18,473</b>	<b>949.385</b>	<b>0.051</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

*Exhibit B-6c: Distribution of TED by Facility Type, CY 2024.*

**TOTAL EFFECTIVE DOSE (TED)**  
 Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)

Facility Type	Less than Meas.	Meas. To 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (person-rem)	Avg. Meas. TED (rem)
Accelerator	9,144	345	29	3	–	–	–	–	–	–	–	9,521	4%	377	13.954	0.037
Fuel Processing	349	353	3	–	–	–	–	–	–	–	–	705	<b>50%</b>	356	7.326	0.021
Fuel/Uranium Enrichment	2,072	197	17	–	–	–	–	–	–	–	–	2,286	9%	214	6.496	0.030
Maintenance and Support	5,419	724	61	14	–	–	–	–	–	–	–	6,218	13%	799	29.643	0.037
Other	6,487	642	48	11	–	–	–	–	–	–	–	7,188	10%	701	25.372	0.036
Reactor	147	30	11	–	–	–	–	–	–	–	–	188	22%	41	2.615	0.064
Research, Fusion	334	60	1	–	–	–	–	–	–	–	–	395	15%	61	0.648	0.011
Research, General	25,432	4,773	470	248	19	11	1	–	–	–	–	<b>30,954</b>	18%	<b>5,522</b>	295.286	0.053
Waste Processing/Management	5,727	3,820	325	96	38	1	–	–	–	–	–	10,007	43%	4,280	199.201	0.047
Weapons Fabrication and Testing	13,550	2,998	607	245	71	25	11	–	–	–	–	17,507	23%	3,957	<b>346.302</b>	<b>0.088</b>
<b>Totals</b>	<b>68,661</b>	<b>13,942</b>	<b>1,572</b>	<b>617</b>	<b>128</b>	<b>37</b>	<b>12</b>	–	–	–	–	<b>84,969</b>	<b>19%</b>	<b>16,308</b>	<b>926.843</b>	<b>0.057</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

**Exhibit B-7a: Collective TED by Site and Facility Type, CY 2022.**

Site	Accelerator	Fuel/ Uranium Enrichment	Fuel Processing	Maintenance and Support	Reactor	Research, General	Research, Fusion	Waste Processing/ Management	Weapons Fabrication and Testing	Other	Totals
Ames Laboratory	–	–	–	–	–	0.565	–	–	–	–	0.565
Argonne National Laboratory	0.980	–	–	0.443	–	2.816	–	4.412	–	–	8.651
Brookhaven National Laboratory	1.468	–	–	0.498	–	–	–	0.010	–	–	1.976
Fermi National Accelerator Laboratory	8.780	–	–	–	–	–	–	–	–	–	8.780
Grand Junction Site	–	–	–	–	–	–	–	–	–	0.013	0.013
Hanford: Hanford Site	–	–	–	<b>14.186</b>	–	–	–	–	–	3.122	17.308
Hanford: Office of River Protection	–	–	–	–	–	–	–	15.166	–	7.471	22.637
Hanford: Pacific Northwest National Laboratory	–	–	–	0.057	–	33.207	–	–	–	–	33.264
Idaho	–	–	–	–	–	<b>83.730</b>	–	–	–	–	83.730
Kansas City National Security Campus	–	–	–	–	–	–	–	–	0.110	–	0.110
Lawrence Berkeley National Laboratory	–	–	–	–	–	0.497	–	–	–	–	0.497
Lawrence Livermore National Laboratory	–	–	–	0.955	–	21.666	–	–	–	–	22.621
Los Alamos National Laboratory	<b>16.118</b>	–	–	10.938	–	61.117	–	9.646	<b>254.802</b>	<b>18.879</b>	<b>371.500</b>
National Renewable Energy Laboratory	–	–	–	–	–	0.005	–	–	–	–	0.005
Nevada National Security Site	–	–	–	2.876	–	–	–	–	–	–	2.876
Oak Ridge: East Tennessee Technology Park	–	0.701	–	–	–	–	–	–	–	–	0.701
Oak Ridge: Oak Ridge Institute for Science and Education	–	–	–	–	–	0.129	–	–	–	–	0.129
Oak Ridge: Oak Ridge National Laboratory	–	–	–	–	–	59.298	–	6.095	–	–	65.393
Oak Ridge: Y-12 National Security Complex	–	–	–	–	–	–	–	–	57.144	–	57.144
Office of Secure Transportation	–	–	–	–	–	–	–	–	0.157	–	0.157
Paducah Gaseous Diffusion Plant	–	–	–	–	–	0.295	–	2.688	–	–	2.983
Pantex Plant	–	–	–	–	–	–	–	–	25.909	–	25.909
Portsmouth Gaseous Diffusion Plant	–	<b>4.259</b>	–	–	–	–	–	–	–	–	4.259
Princeton Plasma Physics Laboratory	–	–	–	–	–	–	0.255	–	–	–	0.255
Sandia National Laboratories	1.104	–	–	0.732	<b>1.674</b>	1.491	0.102	0.078	0.292	1.004	6.477
Savannah River National Laboratory	–	–	0.010	0.020	–	7.381	–	0.191	0.026	0.037	7.665
Savannah River Site	–	–	<b>6.566</b>	3.687	–	5.815	–	<b>105.451</b>	2.471	4.072	128.062
Separations Process Research Unit	–	–	–	–	–	–	–	0.016	–	–	0.016
SLAC National Accelerator Laboratory	–	–	–	–	–	–	–	–	–	–	–
Thomas Jefferson National Accelerator Facility	0.854	–	–	–	–	–	–	–	–	–	0.854
Uranium Mill Tailings Remedial Action Project	–	–	–	–	–	–	–	4.765	–	–	4.765
Waste Isolation Pilot Plant	–	–	–	–	–	–	–	0.449	–	–	0.449
West Valley Demonstration Project	–	–	–	–	–	–	–	12.946	–	–	12.946
Service Center Personnel*	–	–	–	–	–	–	–	–	–	0.428	0.428
<b>Totals</b>	<b>29.304</b>	<b>4.960</b>	<b>6.576</b>	<b>34.392</b>	<b>1.674</b>	<b>278.012</b>	<b>0.357</b>	<b>161.913</b>	<b>340.911</b>	<b>35.026</b>	<b>893.125</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data for this facility type.

\* Includes personnel at NNSA Albuquerque complex, Oak Ridge, and WIPP.

**Exhibit B-7b: Collective TED by Site and Facility Type, CY 2023.**

Site	Accelerator	Fuel/ Uranium Enrichment	Fuel Processing	Maintenance and Support	Reactor	Research, General	Research, Fusion	Waste Processing/ Management	Weapons Fabrication and Testing	Other	Totals
Ames Laboratory	–	–	–	–	–	0.778	–	–	–	–	0.778
Argonne National Laboratory	1.110	–	–	0.597	–	4.490	–	4.028	–	–	10.225
Brookhaven National Laboratory	1.009	–	–	0.521	–	–	–	0.081	–	–	1.611
Fermi National Accelerator Laboratory	3.360	–	–	–	–	–	–	–	–	–	3.360
Grand Junction Site	–	–	–	–	–	–	–	–	–	0.003	0.003
Hanford: Hanford Site	–	–	–	<b>17.837</b>	–	–	–	–	–	5.908	23.745
Hanford: Office of River Protection	–	–	–	–	–	–	–	15.649	–	4.778	20.427
Hanford: Pacific Northwest National Laboratory	–	–	–	–	–	18.488	–	–	–	–	18.488
Idaho	–	–	–	–	–	<b>100.316</b>	–	–	–	–	100.316
Kansas City National Security Campus	–	–	–	–	–	–	–	–	0.312	–	0.312
Lawrence Berkeley National Laboratory	–	–	–	–	–	0.434	–	–	–	–	0.434
Lawrence Livermore National Laboratory	–	–	–	0.935	–	26.972	–	–	–	–	27.907
Los Alamos National Laboratory	<b>6.981</b>	–	–	8.124	–	46.482	–	9.507	<b>229.611</b>	<b>10.801</b>	<b>311.506</b>
National Renewable Energy Laboratory	–	–	–	–	–	0.003	–	–	–	–	0.003
Nevada National Security Site	–	–	–	2.351	–	–	–	–	–	–	2.351
Oak Ridge: East Tennessee Technology Park	–	0.577	–	–	–	–	–	–	–	–	0.577
Oak Ridge: Oak Ridge Institute for Science and Education	–	–	–	–	–	0.098	–	–	–	–	0.098
Oak Ridge: Oak Ridge National Laboratory	–	–	–	–	–	58.491	–	8.197	–	–	66.688
Oak Ridge: Y-12 National Security Complex	–	–	–	–	–	–	–	–	50.006	–	50.006
Office of Secure Transportation	–	–	–	–	–	–	–	–	0.036	0.012	0.048
Paducah Gaseous Diffusion Plant	–	–	–	–	–	0.234	–	3.938	–	–	4.172
Pantex Plant	–	–	–	–	–	–	–	–	40.176	–	40.176
Portsmouth Gaseous Diffusion Plant	–	<b>5.993</b>	–	–	–	–	–	–	–	–	5.993
Princeton Plasma Physics Laboratory	–	–	–	–	–	–	<b>0.336</b>	–	–	–	0.336
Sandia National Laboratories	1.316	–	–	0.960	<b>2.188</b>	1.355	0.252	0.065	1.503	0.320	7.959
Savannah River National Laboratory	–	–	0.032	0.030	–	15.371	–	0.279	0.028	0.053	15.793
Savannah River Site	–	–	<b>12.991</b>	6.423	–	7.596	–	<b>178.106</b>	3.705	8.152	216.973
Separations Process Research Unit	–	–	–	–	–	–	–	0.013	–	–	0.013
SLAC National Accelerator Laboratory	0.036	–	–	–	–	–	–	–	–	–	0.036
Thomas Jefferson National Accelerator Facility	0.622	–	–	–	–	–	–	–	–	–	0.622
Uranium Mill Tailings Remedial Action Project	–	–	–	–	–	–	–	8.905	–	–	8.905
Waste Isolation Pilot Plant	–	–	–	–	–	–	–	0.163	–	–	0.163
West Valley Demonstration Project	–	–	–	–	–	–	–	7.734	–	–	7.734
Service Center Personnel*	–	–	–	0.017	–	–	–	–	–	1.610	1.627
<b>Totals</b>	<b>14.434</b>	<b>6.570</b>	<b>13.023</b>	<b>37.795</b>	<b>2.188</b>	<b>281.108</b>	<b>0.588</b>	<b>236.665</b>	<b>325.377</b>	<b>31.637</b>	<b>949.385</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data for this facility type.

\* Includes personnel at NETL, NNSA Albuquerque complex, Oak Ridge, and WIPP.

*Exhibit B-7c: Collective TED by Site and Facility Type, CY 2024.*

Site	Accelerator	Fuel/ Uranium Enrichment	Fuel Processing	Maintenance and Support	Reactor	Research, General	Research, Fusion	Waste Processing/ Management	Weapons Fabrication and Testing	Other	Totals
Ames Laboratory	–	–	–	–	–	0.704	–	–	–	–	0.704
Argonne National Laboratory	0.623	–	–	0.609	–	5.798	–	2.646	–	–	9.676
Brookhaven National Laboratory	3.367	–	–	0.933	–	–	–	0.231	–	–	4.531
Fermi National Accelerator Laboratory	3.040	–	–	–	–	–	–	–	–	–	3.040
Grand Junction Site	–	–	–	–	–	–	–	–	–	0.004	0.004
Hanford: Hanford Site	–	–	–	<b>10.514</b>	–	–	–	–	–	2.117	12.631
Hanford: Office of River Protection	–	–	–	–	–	–	–	12.847	–	1.825	14.672
Hanford: Pacific Northwest National Laboratory	–	–	–	–	–	16.598	–	–	–	–	16.598
Idaho	–	–	–	–	–	<b>122.729</b>	–	–	–	–	122.729
Kansas City National Security Campus	–	–	–	–	–	–	–	–	0.845	–	0.845
Lawrence Berkeley National Laboratory	–	–	–	–	–	1.020	–	–	–	–	1.020
Lawrence Livermore National Laboratory	–	–	–	1.030	–	23.969	–	–	–	–	24.999
Los Alamos National Laboratory	<b>3.816</b>	–	–	7.074	–	42.394	–	10.645	<b>255.876</b>	<b>7.931</b>	<b>327.736</b>
National Renewable Energy Laboratory	–	–	–	–	–	0.001	–	–	–	–	0.001
Nevada National Security Site	–	–	–	4.081	–	–	–	–	–	–	4.081
Oak Ridge: East Tennessee Technology Park	–	0.829	–	–	–	–	–	–	–	–	0.829
Oak Ridge: Oak Ridge Institute for Science and Education	–	–	–	–	–	0.063	–	–	–	–	0.063
Oak Ridge: Oak Ridge National Laboratory	–	–	–	–	–	64.924	–	7.274	–	–	72.198
Oak Ridge: Y-12 National Security Complex	–	–	–	–	–	–	–	–	52.164	–	52.164
Office of Secure Transportation	–	–	–	–	–	–	–	–	0.676	0.110	0.786
Paducah Gaseous Diffusion Plant	–	–	–	0.064	–	0.224	–	4.800	–	–	5.088
Pantex Plant	–	–	–	–	–	–	–	–	34.205	–	34.205
Portsmouth Gaseous Diffusion Plant	–	<b>5.667</b>	–	–	–	–	–	–	–	–	5.667
Princeton Plasma Physics Laboratory	–	–	–	–	–	–	0.280	–	–	–	0.280
Sandia National Laboratories	2.612	–	–	0.786	<b>2.615</b>	1.308	<b>0.368</b>	0.143	0.145	1.204	9.181
Savannah River National Laboratory	–	–	0.013	0.015	–	11.245	–	0.210	0.046	0.136	11.665
Savannah River Site	–	–	<b>7.313</b>	4.537	–	4.309	–	<b>143.980</b>	2.345	4.613	167.097
Separations Process Research Unit	–	–	–	–	–	–	–	0.011	–	–	0.011
SLAC National Accelerator Laboratory	0.045	–	–	–	–	–	–	–	–	–	0.045
Thomas Jefferson National Accelerator Facility	0.451	–	–	–	–	–	–	–	–	–	0.451
Uranium Mill Tailings Remedial Action Project	–	–	–	–	–	–	–	7.482	–	–	7.482
Waste Isolation Pilot Plant	–	–	–	–	–	–	–	0.268	–	–	0.268
West Valley Demonstration Project	–	–	–	–	–	–	–	8.664	–	–	8.664
Service Center Personnel*	–	–	–	–	–	–	–	–	–	7.432	7.432
<b>Totals</b>	<b>13.954</b>	<b>6.496</b>	<b>7.326</b>	<b>29.643</b>	<b>2.615</b>	<b>295.286</b>	<b>0.648</b>	<b>199.201</b>	<b>346.302</b>	<b>25.372</b>	<b>926.843</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

\* Includes personnel at NETL, NNSA Albuquerque complex, Oak Ridge, and WIPP.

*Exhibit B-8: Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Accelerator Facilities, CY 2024.*

**ACCELERATORS**

Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)

Site/Contractor	Less than Meas.	Meas. To 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (person-rem)	Avg. Meas. TED (rem)
Sandia National Laboratories	372	43	6	–	–	–	–	–	–	–	–	421	12%	49	2.612	<b>0.053</b>
SLAC National Accelerator Laboratory	2,126	1	–	–	–	–	–	–	–	–	–	<b>2,127</b>	0%	1	0.045	0.045
Brookhaven National Laboratory	1,881	66	9	1	–	–	–	–	–	–	–	1,957	4%	76	3.367	0.044
Los Alamos National Laboratory	603	85	7	2	–	–	–	–	–	–	–	697	13%	94	<b>3.804</b>	0.040
Fermi National Accelerator Lab	1,257	90	7	–	–	–	–	–	–	–	–	1,354	7%	<b>97</b>	3.040	0.031
Argonne National Laboratory	1,404	31	–	–	–	–	–	–	–	–	–	1,435	2%	31	0.623	0.020
Thomas Jefferson Natl. Accel. Facil.	1,488	28	–	–	–	–	–	–	–	–	–	1,516	2%	28	0.451	0.016
LANL N3B	2	1	–	–	–	–	–	–	–	–	–	3	<b>33%</b>	1	0.012	0.012
NNSA Los Alamos Site Office	1	–	–	–	–	–	–	–	–	–	–	1	0%	0	0.000	0.000
Thomas Jefferson Site Office-DOE Employees	10	–	–	–	–	–	–	–	–	–	–	10	0%	0	0.000	0.000
<b>Totals</b>	<b>9,144</b>	<b>345</b>	<b>29</b>	<b>3</b>	–	–	–	–	–	–	–	<b>9,521</b>	<b>4%</b>	<b>377</b>	<b>13.954</b>	<b>0.037</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

**Exhibit B-9: Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Fuel Facilities, CY 2024.**

**FUEL FACILITIES**  
**Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)**

Site/Contractor	Less than Meas.	Meas. To 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (person–rem)	Avg. Meas. TED (rem)
<b>ENRICHMENT</b>																
Mid-America Conversion Services (MCS)	159	62	17	–	–	–	–	–	–	–	–	238	33%	79	4.54	0.057
Fluor/B&W - Portsmouth	1,680	63	–	–	–	–	–	–	–	–	–	1,743	4%	63	1.101	0.017
Portsmouth Mission Alliance (PMA)	84	2	–	–	–	–	–	–	–	–	–	86	2%	2	0.026	0.013
URS/CH2MHill - Oak Ridge (UCOR): ETPP	149	70	–	–	–	–	–	–	–	–	–	219	32%	70	0.829	0.012
<b>Totals</b>	<b>2,072</b>	<b>197</b>	<b>17</b>	–	–	–	–	–	–	–	–	<b>2,286</b>	<b>9%</b>	<b>214</b>	<b>6.496</b>	<b>0.030</b>
<b>PROCESSING</b>																
SR Mission Completion Operations	–	1	–	–	–	–	–	–	–	–	–	1	100%	1	0.045	0.045
Savannah River Nuclear Solutions	263	240	3	–	–	–	–	–	–	–	–	506	48%	243	5.556	0.023
Savannah River Field Office	8	7	–	–	–	–	–	–	–	–	–	15	47%	7	0.117	0.017
SRNS Construction	44	28	–	–	–	–	–	–	–	–	–	72	39%	28	0.452	0.016
Centerra Services Inc. - SR	26	73	–	–	–	–	–	–	–	–	–	99	74%	73	1.127	0.015
Misc. DOE Contractors - SR	–	1	–	–	–	–	–	–	–	–	–	1	100%	1	0.011	0.011
BSRA - SR National Laboratory	1	2	–	–	–	–	–	–	–	–	–	3	67%	2	0.013	0.007
SRNS Construction Subs	3	1	–	–	–	–	–	–	–	–	–	4	25%	1	0.005	0.005
SRNS Service Subs	2	–	–	–	–	–	–	–	–	–	–	2	0%	0	0.000	0.000
SRR Operations	2	–	–	–	–	–	–	–	–	–	–	2	0	0	0.000	0.000
<b>Totals</b>	<b>349</b>	<b>353</b>	<b>3</b>	–	–	–	–	–	–	–	–	<b>705</b>	<b>0.5</b>	<b>356</b>	<b>7.326</b>	<b>0.021</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

**Exhibit B-10: Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Maintenance and Support, CY 2024.**

**MAINTENANCE AND SUPPORT  
Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)**

Site/Contractor	Less than Meas.	Meas. To 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (person-rem)	Avg. Meas. TED (rem)
SRR Operations	3	5	6	6	–	–	–	–	–	–	–	20	85%	17	3.190	<b>0.188</b>
MSTS - Las Vegas	111	19	5	–	–	–	–	–	–	–	–	135	18%	24	1.479	0.062
Sandia National Laboratories	331	10	3	–	–	–	–	–	–	–	–	344	4%	13	0.786	0.060
MSTS - NTS	426	39	5	2	–	–	–	–	–	–	–	472	10%	46	2.602	0.057
Lawrence Livermore National Laboratory Nevada	117	18	3	–	–	–	–	–	–	–	–	138	15%	21	1.030	0.049
Brookhaven National Laboratory	927	17	3	–	–	–	–	–	–	–	–	947	2%	20	0.933	0.047
Los Alamos National Laboratory	781	144	12	4	–	–	–	–	–	–	–	941	17%	160	7.074	0.044
Argonne National Laboratory	191	14	–	1	–	–	–	–	–	–	–	206	7%	15	0.609	0.041
Central Plateau Cleanup Company	1,024	210	19	1	–	–	–	–	–	–	–	<b>1,254</b>	18%	<b>230</b>	<b>7.758</b>	0.034
Swift and Staley Team	185	3	–	–	–	–	–	–	–	–	–	188	2%	3	0.064	0.021
Hanford Mission Integration Solutions	1,059	142	5	–	–	–	–	–	–	–	–	1,206	12%	147	2.756	0.019
Univ. of Georgia Ecology Laboratory	5	15	–	–	–	–	–	–	–	–	–	20	75%	15	0.245	0.016
SRNL	–	1	–	–	–	–	–	–	–	–	–	1	<b>100%</b>	1	0.015	0.015
SRNS Service Subs	–	4	–	–	–	–	–	–	–	–	–	4	<b>100%</b>	4	0.061	0.015
Savannah River Nuclear Solutions	32	67	–	–	–	–	–	–	–	–	–	99	68%	67	0.862	0.013
SRNS Construction	12	15	–	–	–	–	–	–	–	–	–	27	56%	15	0.169	0.011
Savannah River Field Office	–	1	–	–	–	–	–	–	–	–	–	1	<b>100%</b>	1	0.010	0.010
Battelle - Pantex	14	–	–	–	–	–	–	–	–	–	–	14	0%	0	0.000	0.000
Battelle - PNNL	19	–	–	–	–	–	–	–	–	–	–	19	0%	0	0.000	0.000
DOE Headquarters	14	–	–	–	–	–	–	–	–	–	–	14	0%	0	0.000	0.000
DOE-Richland Field Office	3	–	–	–	–	–	–	–	–	–	–	3	0%	0	0.000	0.000
Hanford Laboratory Management Integration	1	–	–	–	–	–	–	–	–	–	–	1	0%	0	0.000	0.000
LLNL Service Subcontractors	1	–	–	–	–	–	–	–	–	–	–	1	0%	0	0.000	0.000
Los Alamos National Lab Construction Subs	5	–	–	–	–	–	–	–	–	–	–	5	0%	0	0.000	0.000
MSTS - Los Alamos	19	–	–	–	–	–	–	–	–	–	–	19	0%	0	0.000	0.000
MSTS - Special Tech. Lab	4	–	–	–	–	–	–	–	–	–	–	4	0%	0	0.000	0.000

*Exhibit B-10: Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Maintenance and Support, CY 2024.*

**MAINTENANCE AND SUPPORT**  
**Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)**

Site/Contractor	Less than Meas.	Meas. To 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (person-rem)	Avg. Meas. TED (rem)
LANL N3B	2	–	–	–	–	–	–	–	–	–	–	2	0%	0	0.000	0.000
NETL Pittsburgh	11	–	–	–	–	–	–	–	–	–	–	11	0%	0	0.000	0.000
NNSA Albuquerque Complex	1	–	–	–	–	–	–	–	–	–	–	1	0%	0	0.000	0.000
NNSA Nevada Site Office	60	–	–	–	–	–	–	–	–	–	–	60	0%	0	0.000	0.000
Savannah River Operations	2	–	–	–	–	–	–	–	–	–	–	2	0%	0	0.000	0.000
Science Applications Intl Corp. -NV	45	–	–	–	–	–	–	–	–	–	–	45	0%	0	0.000	0.000
UT-Batelle ORNL	10	–	–	–	–	–	–	–	–	–	–	10	0%	0	0.000	0.000
Washington River Protection Solutions	4	–	–	–	–	–	–	–	–	–	–	4	0%	0	0.000	0.000
<b>Totals</b>	<b>5,419</b>	<b>724</b>	<b>61</b>	<b>14</b>	–	–	–	–	–	–	–	<b>6,218</b>	<b>13%</b>	<b>799</b>	<b>29.643</b>	<b>0.037</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

*Exhibit B-11: Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Reactor Facilities, CY 2024.*

**REACTOR FACILITIES**

**Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)**

Site/Contractor	Less than Meas.	Meas. To 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (person–rem)	Avg. Meas. TED (rem)
Sandia National Laboratories	141	30	11	–	–	–	–	–	–	–	–	182	22%	41	2.615	0.064
Brookhaven National Laboratory	6	–	–	–	–	–	–	–	–	–	–	6	0%	0	0.000	0.000
<b>Totals</b>	<b>147</b>	<b>30</b>	<b>11</b>	–	–	–	–	–	–	–	–	<b>188</b>	<b>22%</b>	<b>41</b>	<b>2.615</b>	<b>0.064</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

**Exhibit B-12: Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Research, General, CY 2024.**

**RESEARCH, GENERAL**

**Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)**

Site/Contractor	Less than Meas.	Meas. To 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (person–rem)	Avg. Meas. TED (rem)
UT-Batelle ORNL	4,179	298	66	60	10	5	1	–	–	–	–	4,619	10%	440	51.745	<b>0.118</b>
ICP - Fluor Service Sub (ICP/AMWTP)	858	501	105	77	1	–	–	–	–	–	–	1,542	44%	684	<b>57.955</b>	0.085
ICP - Fluor Projects (ICP and AMWTP)	255	110	23	16	–	–	–	–	–	–	–	404	37%	149	12.571	0.084
Lawrence Berkeley Laboratory	628	11	2	1	–	–	–	–	–	–	–	642	2%	14	1.020	0.073
ICP - Fluor - Support	14	14	–	2	–	–	–	–	–	–	–	30	53%	16	1.104	0.069
Lawrence Livermore National Laboratory	3,952	281	52	12	–	1	–	–	–	–	–	4,298	8%	346	23.827	0.069
INL - BEA LLC - Research	154	39	4	–	–	1	–	–	–	–	–	198	22%	44	2.588	0.059
INL - BEA LLC - Security	38	7	–	1	–	–	–	–	–	–	–	46	17%	8	0.472	0.059
INL - BEA LLC - Services	3,301	780	63	40	2	2	–	–	–	–	–	4,188	21%	887	45.817	0.052
Battelle - PNNL	2,415	281	36	14	–	–	–	–	–	–	–	2,746	12%	331	16.395	0.050
INL - BEA LLC - Production	241	39	1	3	–	–	–	–	–	–	–	284	15%	43	2.052	0.048
Los Alamos National Laboratory	4,887	952	78	18	2	–	–	–	–	–	–	<b>5,937</b>	18%	<b>1,050</b>	41.713	0.040
Argonne National Laboratory	1,332	144	6	–	1	2	–	–	–	–	–	1,485	10%	153	5.774	0.038
Sandia National Laboratories	377	32	3	–	–	–	–	–	–	–	–	412	8%	35	1.308	0.037
SRNL	16	69	7	1	–	–	–	–	–	–	–	93	83%	77	2.872	0.037
LANL N3B	152	17	1	–	–	–	–	–	–	–	–	170	11%	18	0.600	0.033
Idaho Field Office	181	6	–	–	–	–	–	–	–	–	–	187	3%	6	0.170	0.028
Savannah River Nuclear Solutions	50	110	5	–	–	–	–	–	–	–	–	165	70%	115	3.175	0.028
Four Rivers Nuclear Partnership (FRNP)	936	9	–	–	–	–	–	–	–	–	–	945	1%	9	0.224	0.025
UCOR: ORNL	477	513	10	2	3	–	–	–	–	–	–	1,005	53%	528	13.179	0.025
Lawrence Livermore National Laboratories	105	6	–	–	–	–	–	–	–	–	–	111	5%	6	0.142	0.024
Ames Laboratory (Iowa State)	122	31	–	–	–	–	–	–	–	–	–	153	20%	31	0.704	0.023
BSRA - SR National Laboratory	111	390	8	1	–	–	–	–	–	–	–	510	78%	399	8.373	0.021
NNSA Los Alamos Site Office	75	5	–	–	–	–	–	–	–	–	–	80	6%	5	0.081	0.016
Savannah River Field Office	2	7	–	–	–	–	–	–	–	–	–	9	78%	7	0.109	0.016
SRNS Service Subs	19	22	–	–	–	–	–	–	–	–	–	41	54%	22	0.350	0.016
Argonne-Radiological Assistance Program	31	2	–	–	–	–	–	–	–	–	–	33	6%	2	0.024	0.012

*Exhibit B-12: Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Research, General, CY 2024.*

**RESEARCH, GENERAL**

**Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)**

Site/Contractor	Less than Meas.	Meas. To 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (person-rem)	Avg. Meas. TED (rem)
SRNS Construction	36	44	–	–	–	–	–	–	–	–	–	80	55%	44	0.483	0.011
BSRA - Service Subs	–	3	–	–	–	–	–	–	–	–	–	3	<b>100%</b>	3	0.029	0.010
Misc. DOE Contractors - SR	1	2	–	–	–	–	–	–	–	–	–	3	67%	2	0.019	0.010
Battelle -PNNL- Subs	242	23	–	–	–	–	–	–	–	–	–	265	9%	23	0.203	0.009
Centerra Services Inc. - SR	41	16	–	–	–	–	–	–	–	–	–	57	28%	16	0.144	0.009
Oak Ridge Institute for Science & Education	95	8	–	–	–	–	–	–	–	–	–	103	8%	8	0.063	0.008
National Renewable Energy Laboratory	3	1	–	–	–	–	–	–	–	–	–	4	25%	1	0.001	0.001
Brookhaven National Laboratory	2	–	–	–	–	–	–	–	–	–	–	2	0%	–	0.000	0.000
NETL Albany	30	–	–	–	–	–	–	–	–	–	–	30	0%	–	0.000	0.000
NETL Morgantown	23	–	–	–	–	–	–	–	–	–	–	23	0%	–	0.000	0.000
NETL Pittsburgh	21	–	–	–	–	–	–	–	–	–	–	21	0%	–	0.000	0.000
Pacific Northwest Site Office	29	–	–	–	–	–	–	–	–	–	–	29	0%	–	0.000	0.000
SRNS Construction Subs	1	–	–	–	–	–	–	–	–	–	–	1	0%	–	0.000	0.000
<b>Totals</b>	<b>25,432</b>	<b>4,773</b>	<b>470</b>	<b>248</b>	<b>19</b>	<b>11</b>	<b>1</b>	–	–	–	–	<b>30,954</b>	<b>18%</b>	<b>5,522</b>	<b>295.286</b>	<b>0.053</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

*Exhibit B-13: Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Research, Fusion, CY 2024.*

**RESEARCH, FUSION**

**Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)**

Site/Contractor	Less than Meas.	Meas. To 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (Person-rem)	Avg. Meas. TED (rem)
Sandia National Laboratories	59	7	1	–	–	–	–	–	–	–	–	67	12%	8	<b>0.368</b>	<b>0.046</b>
Princeton Plasma Physics Laboratory	273	53	–	–	–	–	–	–	–	–	–	<b>326</b>	<b>16%</b>	<b>53</b>	0.280	0.005
Ames Laboratory (Iowa State)	2	–	–	–	–	–	–	–	–	–	–	2	0%	0	0.000	0.000
<b>Totals</b>	<b>334</b>	<b>60</b>	<b>1</b>	–	–	–	–	–	–	–	–	<b>395</b>	<b>15%</b>	<b>61</b>	<b>0.648</b>	<b>0.011</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

*Exhibit B-14: Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Waste Processing, CY 2024.*

**WASTE PROCESSING**

**Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)**

Site/Contractor	Less than Meas.	Meas. To 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (person–rem)	Avg. Meas. TED (rem)
Argonne National Laboratory	44	12	6	1	–	1	–	–	–	–	–	64	31%	20	2.646	<b>0.132</b>
SR Mission Completion Operations	312	381	54	42	28	–	–	–	–	–	–	817	62%	505	48.797	0.097
Sandia National Laboratories	26	1	1	–	–	–	–	–	–	–	–	28	7%	2	0.143	0.072
DUF6 Conversion Project - Paducah Subs	180	54	17	–	–	–	–	–	–	–	–	251	28%	71	4.800	0.068
West Valley Nuclear Services Inc.	309	113	15	5	–	–	–	–	–	–	–	442	30%	133	8.664	0.065
Los Alamos National Laboratory	266	147	25	3	1	–	–	–	–	–	–	442	40%	176	10.645	0.060
Brookhaven National Laboratory	13	3	1	–	–	–	–	–	–	–	–	17	24%	4	0.231	0.058
Northwind Portage - UMTRA Project - Moab	26	110	20	5	–	–	–	–	–	–	–	161	84%	135	7.482	0.055
Savannah River Nuclear Solutions	312	476	28	18	7	–	–	–	–	–	–	841	63%	529	25.726	0.049
Hanford Laboratory Management Integration	272	91	5	–	–	–	–	–	–	–	–	368	26%	96	3.854	0.040
SRR Operations	846	1,478	126	22	2	–	–	–	–	–	–	<b>2,474</b>	66%	<b>1,628</b>	<b>61.518</b>	0.038
Tru Waste Processing Center - ORNL	48	192	11	–	–	–	–	–	–	–	–	251	81%	203	7.274	0.036
Washington River Protection Solutions	1,818	275	14	–	–	–	–	–	–	–	–	2,107	14%	289	8.993	0.031
Parsons	–	1	–	–	–	–	–	–	–	–	–	1	<b>100%</b>	1	0.030	0.030
SRNS Construction	155	153	1	–	–	–	–	–	–	–	–	309	50%	154	3.255	0.021
Centerra Services Inc. - SR	126	141	1	–	–	–	–	–	–	–	–	268	53%	142	2.793	0.020
Washington TRU Solutions LLC-WIPP	813	15	–	–	–	–	–	–	–	–	–	828	2%	15	0.268	0.018
BSRA - Service Subs	–	1	–	–	–	–	–	–	–	–	–	1	<b>100%</b>	1	0.014	0.014
BSRA - SR National Laboratory	2	13	–	–	–	–	–	–	–	–	–	15	87%	13	0.188	0.014
Misc. DOE Contractors - SR	20	33	–	–	–	–	–	–	–	–	–	53	62%	33	0.446	0.014
SRR Service Subs	11	13	–	–	–	–	–	–	–	–	–	24	54%	13	0.151	0.012
Savannah River Field Office	36	32	–	–	–	–	–	–	–	–	–	68	47%	32	0.360	0.011
SPRU-NY (Building remediation)	17	1	–	–	–	–	–	–	–	–	–	18	6%	1	0.011	0.011
SRNL	–	2	–	–	–	–	–	–	–	–	–	2	<b>100%</b>	2	0.022	0.011
SRNS Service Subs	52	71	–	–	–	–	–	–	–	–	–	123	58%	71	0.783	0.011

*Exhibit B-14: Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Waste Processing, CY 2024.*

**WASTE PROCESSING**

**Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)**

Site/Contractor	Less than Meas.	Meas. To 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (person-rem)	Avg. Meas. TED (rem)
SRS Tritium Facilities	6	7	–	–	–	–	–	–	–	–	–	13	54%	7	0.077	0.011
Misc. S.R.S. Const. Subcontractors	3	4	–	–	–	–	–	–	–	–	–	7	57%	4	0.030	0.008
Bechtel Construction - SR	1	–	–	–	–	–	–	–	–	–	–	1	0%	0	0.000	0.000
Carlsbad Field Office	8	–	–	–	–	–	–	–	–	–	–	8	0%	0	0.000	0.000
Central Plateau Cleanup Company	1	–	–	–	–	–	–	–	–	–	–	1	0%	0	0.000	0.000
LANL N3B	4	–	–	–	–	–	–	–	–	–	–	4	0%	0	0.000	0.000
<b>Totals</b>	<b>5,727</b>	<b>3,820</b>	<b>325</b>	<b>96</b>	<b>38</b>	<b>1</b>	–	–	–	–	–	<b>10,007</b>	<b>0.43</b>	<b>4,280</b>	<b>199.201</b>	<b>0.047</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

**Exhibit B-15: Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Weapons Fabrication, CY 2024.**

**WEAPONS FABRICATION**  
**Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)**

Site/Contractor	Less than Meas.	Meas. To 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (person–rem)	Avg. Meas. TED (rem)
Los Alamos National Laboratory	1,593	852	422	223	70	25	11	–	–	–	–	3,196	50%	1,603	255.574	0.159
Office of Secure Transportation	171	1	4	–	–	–	–	–	–	–	–	176	3%	5	0.676	0.135
LANL N3B	9	1	1	–	–	–	–	–	–	–	–	11	18%	2	0.218	0.109
NNSA Los Alamos Site Office	4	1	–	–	–	–	–	–	–	–	–	5	20%	1	0.084	0.084
CNS, LLC - Pantex	4,443	383	87	21	1	–	–	–	–	–	–	4,935	10%	492	34.205	0.070
CNS, LLC - Y-12	6,491	1,471	89	–	–	–	–	–	–	–	–	8,051	19%	1,560	51.758	0.033
Sandia National Laboratories	145	7	–	–	–	–	–	–	–	–	–	152	5%	7	0.145	0.021
Kansas City National Security Campus	184	56	–	1	–	–	–	–	–	–	–	241	24%	57	0.845	0.015
Savannah River Nuclear Solutions	289	123	3	–	–	–	–	–	–	–	–	415	30%	126	1.744	0.014
BSRA - SR National Laboratory	8	4	–	–	–	–	–	–	–	–	–	12	33%	4	0.046	0.012
SRNS Construction	84	50	1	–	–	–	–	–	–	–	–	135	38%	51	0.553	0.011
SRR Operations	1	1	–	–	–	–	–	–	–	–	–	2	50%	1	0.010	0.010
URS/CH2MHill - Oak Ridge (UCOR): Y-12	122	43	–	–	–	–	–	–	–	–	–	165	26%	43	0.406	0.009
SRS Tritium Facilities	6	5	–	–	–	–	–	–	–	–	–	11	45%	5	0.038	0.008
<b>Totals</b>	<b>13,550</b>	<b>2,998</b>	<b>607</b>	<b>245</b>	<b>71</b>	<b>25</b>	<b>11</b>	–	–	–	–	<b>17,507</b>	<b>23%</b>	<b>3,957</b>	<b>346.302</b>	<b>0.088</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

*Exhibit B-16: Distribution of TED by Facility Type Listed in Descending Order of Average Measurable TED for Other, CY 2024.*

**OTHER**

**Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)**

Site/Contractor	Less than Meas.	Meas. To 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (person–rem)	Avg. Meas. TED (rem)
Isotek (Bldg. 3019)	115	28	21	9	–	–	–	–	–	–	–	173	34%	58	<b>7.432</b>	<b>0.128</b>
Hanford Laboratory Management Integration	99	7	2	–	–	–	–	–	–	–	–	108	8%	9	0.877	0.097
Hanford Mission Integration Solutions	143	1	–	–	–	–	–	–	–	–	–	144	1%	1	0.052	0.052
Sandia National Laboratories	318	21	3	–	–	–	–	–	–	–	–	342	7%	24	1.204	0.050
Office of Secure Transportation	123	3	–	–	–	–	–	–	–	–	–	126	2%	3	0.110	0.037
SRNS Service Subs	30	26	2	–	–	–	–	–	–	–	–	58	48%	28	1.024	0.037
LANLN3B	401	57	4	–	–	–	–	–	–	–	–	462	13%	61	2.086	0.034
DOE-Richland Field Office	399	24	2	–	–	–	–	–	–	–	–	425	6%	26	0.849	0.033
Central Plateau Cleanup Company	318	36	2	–	–	–	–	–	–	–	–	356	11%	38	1.216	0.032
Los Alamos National Laboratory	2,804	174	11	2	–	–	–	–	–	–	–	<b>2,991</b>	6%	<b>187</b>	5.820	0.031
SRNS Construction Subs	1	4	–	–	–	–	–	–	–	–	–	5	80%	4	0.107	0.027
Washington River Protection Solutions	324	33	–	–	–	–	–	–	–	–	–	357	9%	33	0.776	0.024
Centerra Services Inc. - SR	8	12	–	–	–	–	–	–	–	–	–	20	60%	12	0.271	0.023
Savannah River Field Office	3	4	–	–	–	–	–	–	–	–	–	7	57%	4	0.081	0.020
Savannah River Nuclear Solutions	237	153	1	–	–	–	–	–	–	–	–	391	39%	154	2.699	0.018
Univ. of Georgia Ecology Laboratory	2	3	–	–	–	–	–	–	–	–	–	5	60%	3	0.047	0.016
BSRA - SR National Laboratory	1	9	–	–	–	–	–	–	–	–	–	10	90%	9	0.136	0.015
Bechtel National Corporation	1,006	12	–	–	–	–	–	–	–	–	–	1,018	1%	12	0.172	0.014
SRNS Construction	23	25	–	–	–	–	–	–	–	–	–	48	52%	25	0.352	0.014
NNSA Los Alamos Site Office	51	2	–	–	–	–	–	–	–	–	–	53	4%	2	0.025	0.013
Misc. DOE Contractors - SR	1	1	–	–	–	–	–	–	–	–	–	2	50%	1	0.011	0.011
SRR Operations	4	1	–	–	–	–	–	–	–	–	–	5	20%	1	0.008	0.008
SR Mission Completion Operations - Other	–	2	–	–	–	–	–	–	–	–	–	2	<b>100%</b>	2	0.013	0.007
Navarro Research & Engineering	26	4	–	–	–	–	–	–	–	–	–	30	13%	4	0.004	0.001
Advanced Technologies and Laboratories Int'l	1	–	–	–	–	–	–	–	–	–	–	1	0%	0	0.000	0.000
Batelle - PNNL	3	–	–	–	–	–	–	–	–	–	–	3	0%	0	0.000	0.000
Inomedic Health Applications	5	–	–	–	–	–	–	–	–	–	–	5	0%	0	0.000	0.000
Office of River Protection	40	–	–	–	–	–	–	–	–	–	–	40	0%	0	0.000	0.000
SRR Service Subs	1	–	–	–	–	–	–	–	–	–	–	1	0%	0	0.000	0.000
<b>Totals</b>	<b>6,487</b>	<b>642</b>	<b>48</b>	<b>11</b>	–	–	–	–	–	–	–	<b>7,188</b>	<b>10%</b>	<b>701</b>	<b>25.372</b>	<b>0.036</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

**Exhibit B-17: Internal Dose by Facility Type and Nuclide, CY 2022–2024.**

Facility	Nuclide*	No. of Individuals with Measurable CED** 2022	No. of Individuals with Measurable CED** 2023	No. of Individuals with Measurable CED** 2024	Collective CED Dose (person–rem) 2022	Collective CED Dose (person–rem) 2023	Collective CED Dose (person–rem) 2024	Average Measurable CED (rem) 2022	Average Measurable CED (rem) 2023	Average Measurable CED (rem) 2024
Accelerator	Other	–	–	1	–	–	0.002	–	–	0.002
	<b>Total</b>	–	–	<b>1</b>	–	–	<b>0.002</b>	–	–	<b>0.002</b>
Fuel Fabrication	Total	–	–	–	–	–	–	–	–	–
	Plutonium	1	–	–	0.031	–	–	0.031	–	–
	<b>Total</b>	<b>1</b>	–	–	<b>0.031</b>	–	–	<b>0.031</b>	–	–
Fuel/Uranium Enrichment	Total	–	–	–	–	–	–	–	–	–
Maintenance and Support	Hydrogen-3	–	–	1	–	–	0.003	–	–	0.003
	Other	–	–	1	–	–	0.009	–	–	0.009
	Plutonium	1	5	1	0.004	0.008	0.003	0.004	0.002	0.003
	<b>Total</b>	<b>1</b>	<b>5</b>	<b>3</b>	<b>0.004</b>	<b>0.008</b>	<b>0.015</b>	<b>0.004</b>	<b>0.002</b>	<b>0.005</b>
Other	Americium	1	–	–	0.036	–	–	0.036	–	–
	Hydrogen-3	5	–	–	0.021	–	–	0.004	–	–
	Other	–	2	2	–	0.024	0.011	–	0.012	0.006
	Plutonium	–	–	1	–	–	0.034	–	–	0.034
	<b>Total</b>	<b>6</b>	<b>2</b>	<b>3</b>	<b>0.057</b>	<b>0.024</b>	<b>0.045</b>	<b>0.010</b>	<b>0.012</b>	<b>0.015</b>
Reactor	Hydrogen-3	2	–	–	0.003	–	–	0.002	–	–
	Other	–	–	2	–	–	0.003	–	–	0.002
	<b>Total</b>	<b>2</b>	–	<b>2</b>	<b>0.003</b>	–	<b>0.003</b>	<b>0.002</b>	–	<b>0.002</b>
Research, Fusion	Hydrogen-3	14	–	–	0.035	–	–	0.003	–	–
	Other	–	–	1	–	–	0.008	–	–	0.008
	<b>Total</b>	<b>14</b>	–	<b>1</b>	<b>0.035</b>	–	<b>0.008</b>	<b>0.003</b>	–	<b>0.008</b>
Research, General	Americium	2	–	1	0.214	–	0.069	<b>0.107</b>	–	<b>0.069</b>
	Hydrogen-3	1	3	1	0.002	0.013	0.001	0.002	0.004	0.001
	Mixed	1	1	–	0.019	0.059	–	0.019	<b>0.059</b>	–
	Other	1	–	–	0.025	–	–	0.025	–	–
	Plutonium	–	2	1	–	0.078	0.039	–	0.039	0.039
	Uranium	19	16	25	0.312	0.232	0.301	0.016	0.015	0.012
	<b>Total</b>	<b>25</b>	<b>22</b>	<b>28</b>	<b>0.609</b>	<b>0.382</b>	<b>0.410</b>	<b>0.024</b>	<b>0.017</b>	<b>0.015</b>
Waste Processing/Mgmt.	Hydrogen-3	1	–	–	0.001	–	–	0.001	–	–
	Mixed	1	–	–	0.002	–	–	0.002	–	–
	Other	–	–	2	–	–	0.159	–	–	0.080

**Exhibit B-17: Internal Dose by Facility Type and Nuclide, CY 2022–2024.**

Facility	Nuclide*	No. of Individuals with Measurable CED** 2022	No. of Individuals with Measurable CED** 2023	No. of Individuals with Measurable CED** 2024	Collective CED Dose (person-rem) 2022	Collective CED Dose (person-rem) 2023	Collective CED Dose (person-rem) 2024	Average Measurable CED (rem) 2022	Average Measurable CED (rem) 2023	Average Measurable CED (rem) 2024
Weapons Fab and Testing	Uranium	48	58	38	1.196	2.346	0.660	0.025	0.040	0.017
	<b>Total</b>	<b>50</b>	<b>58</b>	<b>40</b>	<b>1.199</b>	<b>2.346</b>	<b>0.819</b>	<b>0.024</b>	<b>0.040</b>	<b>0.020</b>
	Carbon	–	–	1	–	–	0.035	–	–	0.035
	Hydrogen-3	27	20	25	0.061	0.046	0.052	0.002	0.002	0.002
	Mixed	–	3	3	–	0.035	0.030	–	0.012	0.010
	Plutonium	–	–	1	–	–	0.003	–	–	0.003
	Uranium	<b>1,201</b>	<b>1,223</b>	<b>1,311</b>	<b>43.806</b>	<b>38.722</b>	<b>41.823</b>	0.036	0.032	0.032
<b>Total</b>	<b>1,228</b>	<b>1,246</b>	<b>1,341</b>	<b>43.867</b>	<b>38.803</b>	<b>41.943</b>	<b>0.036</b>	<b>0.031</b>	<b>0.031</b>	
<b>Totals</b>	<b>1,326</b>	<b>1,333</b>	<b>1,410</b>	<b>45.768</b>	<b>41.563</b>	<b>43.245</b>	<b>0.035</b>	<b>0.031</b>	<b>0.030</b>	

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for this facility type and nuclide. Dashes indicate no data reported for the year shown.

\*Intakes grouped by nuclide. Intakes involving multiple nuclides were grouped into "mixed." Nuclides where fewer than 10 individuals had intakes were grouped as "other."

\*\*The number of internal depositions represents the number of internal dose records with positive results reported for each individual.

*Exhibit B-18a: Distribution of TED by Labor Category, CY 2022.*

**TOTAL EFFECTIVE DOSE (TED)**

**Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)**

Site/Contractor	Less than Meas.	Meas. To 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (person–rem)	Avg. Meas. TED (rem)
Agriculture	28	6	–	–	–	–	–	–	–	–	–	34	18%	6	0.121	0.020
Construction/Repair	3,314	1,765	166	56	11	2	3	–	–	–	–	5,317	38%	2,003	101.394	0.051
Laborers	937	405	45	9	–	–	–	–	–	–	–	1,396	33%	459	19.745	0.043
Management	5,723	1,578	105	18	10	1	4	–	–	–	–	7,439	23%	1,716	68.214	0.040
Miscellaneous	5,796	906	38	17	2	–	–	–	–	–	–	6,759	14%	963	34.512	0.036
Production	2,613	1,504	213	68	20	2	–	–	–	–	–	4,420	41%	1,807	114.404	0.063
Professional/Scientists	17,965	4,262	307	83	13	10	5	–	–	–	–	22,645	21%	4,680	190.264	0.041
Service	4,803	1,231	83	31	3	–	–	–	–	–	–	6,151	22%	1,348	53.679	0.040
Technicians	6,249	2,151	367	162	78	45	10	–	–	–	–	9,062	31%	2,813	278.279	0.099
Transport	786	119	20	4	–	–	–	–	–	–	–	929	15%	143	6.388	0.045
Unknown	10,360	802	30	4	–	–	–	–	–	–	–	11,196	7%	836	25.767	0.031
<b>Totals</b>	<b>58,574</b>	<b>14,728</b>	<b>1,374</b>	<b>453</b>	<b>137</b>	<b>60</b>	<b>22</b>	–	–	–	–	<b>75,348</b>	<b>22%</b>	<b>16,774</b>	<b>893.125</b>	<b>0.053</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

**Exhibit B-18b: Distribution of TED by Labor Category, CY 2023.**

**TOTAL EFFECTIVE DOSE (TED)**

**Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)**

Site/Contractor	Less than Meas.	Meas. To 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (person-rem)	Avg. Meas. TED (rem)
Agriculture	26	5	–	–	–	–	–	–	–	–	–	31	16%	5	0.083	0.017
Construction	3,357	2,106	232	57	11	1	–	–	–	–	–	5,764	42%	2,407	119.494	0.050
Laborers	1,043	369	63	6	–	1	–	–	–	–	–	1,482	30%	439	22.738	0.052
Management	6,110	1,746	104	31	9	2	2	–	–	–	–	8,004	24%	1,894	73.147	0.039
Miscellaneous	6,865	844	47	14	2	1	–	–	–	–	–	7,773	12%	908	33.183	0.037
Production	2,559	1,837	259	80	15	–	–	–	–	–	–	4,750	46%	2,191	131.779	0.060
Scientists	19,523	4,594	318	79	13	4	2	–	–	–	–	24,533	20%	5,010	193.548	0.039
Service	5,093	1,406	115	52	1	–	–	–	–	–	–	6,667	24%	1,574	70.171	0.045
Technicians	6,601	2,296	447	185	64	19	2	–	–	–	–	9,614	31%	3,013	262.628	0.087
Transport	848	85	14	13	–	–	–	–	–	–	–	960	12%	112	8.576	0.077
Unknown	11,923	855	57	7	1	–	–	–	–	–	–	12,843	7%	920	34.038	0.037
<b>Totals</b>	<b>63,948</b>	<b>16,143</b>	<b>1,656</b>	<b>524</b>	<b>116</b>	<b>28</b>	<b>6</b>	–	–	–	–	<b>82,421</b>	<b>22%</b>	<b>18,473</b>	<b>949.385</b>	<b>0.051</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

*Exhibit B-18c: Distribution of TED by Labor Category, CY 2024.*

**TOTAL EFFECTIVE DOSE (TED)**

**Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)**

Site/Contractor	Less than Meas.	Meas. To 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (person-rem)	Avg. Meas. TED (rem)
Agriculture	23	4	–	–	–	–	–	–	–	–	–	27	14.81%	4	0.058	0.015
Construction	3,786	1,787	190	39	17	1	–	–	–	–	–	5,820	34.95%	2,034	95.009	0.047
Laborers	1,048	328	30	2	–	1	–	–	–	–	–	1,409	25.62%	361	14.638	0.041
Management	6,386	1,303	83	20	9	5	3	–	–	–	–	7,809	18.22%	1,423	60.387	0.042
Miscellaneous	7,531	640	44	5	1	–	–	–	–	–	–	8,221	8.39%	690	22.952	0.033
Production	2,750	1,691	222	115	14	–	–	–	–	–	–	4,792	<b>42.61%</b>	2,042	133.146	0.065
Scientists	21,230	3,794	306	87	9	3	2	–	–	–	–	<b>25,431</b>	16.52%	<b>4,201</b>	170.964	0.041
Service	5,061	1,387	125	76	1	1	–	–	–	–	–	6,651	23.91%	1,590	78.556	0.049
Technicians	6,931	2,104	466	258	77	26	7	–	–	–	–	9,869	29.77%	2,938	<b>306.037</b>	<b>0.104</b>
Transport	773	85	19	7	–	–	–	–	–	–	–	884	12.56%	111	7.819	0.070
Unknown	13,142	819	87	8	–	–	–	–	–	–	–	14,056	6.50%	914	37.277	0.041
<b>Totals</b>	<b>68,661</b>	<b>13,942</b>	<b>1,572</b>	<b>617</b>	<b>128</b>	<b>37</b>	<b>12</b>	–	–	–	–	<b>84,969</b>	<b>19.19%</b>	<b>16,308</b>	<b>926.843</b>	<b>0.057</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

**Exhibit B-19: Internal Dose by Labor Category, CY 2022–2024.**

Labor Category	No. of Individuals with Measurable CED* 2022	No. of Individuals with Measurable CED* 2023	No. of Individuals with Measurable CED* 2024	Collective CED Dose (person-rem) 2022	Collective CED Dose (person-rem) 2023	Collective CED Dose (person-rem) 2024	Average Measurable CED (rem) 2022	Average Measurable CED (rem) 2023	Average Measurable CED (rem) 2024
Construction	268	236	252	9.458	7.576	8.458	0.035	0.032	<b>0.034</b>
Laborers	74	78	78	2.931	3.125	2.627	<b>0.040</b>	0.040	<b>0.034</b>
Management	110	114	127	4.191	3.600	3.532	0.038	0.032	0.028
Miscellaneous	8	7	5	0.153	0.197	0.063	0.019	0.028	0.013
Production	<b>349</b>	<b>390</b>	<b>432</b>	<b>12.296</b>	<b>11.145</b>	<b>12.841</b>	0.035	0.029	0.030
Scientists	217	219	234	7.139	6.782	7.593	0.033	0.031	0.032
Service	36	21	27	1.335	0.494	0.716	0.037	0.024	0.027
Technicians	130	127	163	3.992	4.096	4.337	0.031	0.032	0.027
Transport	24	21	13	0.772	1.452	0.313	0.032	<b>0.069</b>	0.024
Unknown	111	120	88	3.538	3.096	2.765	0.032	0.026	0.031
<b>Totals</b>	<b>1,327</b>	<b>1,333</b>	<b>1,419</b>	<b>45.805</b>	<b>41.563</b>	<b>43.245</b>	<b>0.035</b>	<b>0.031</b>	<b>0.030</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

\*The number of internal depositions represents the number of internal dose records with positive results reported for each individual.

**Exhibit B-20: Dose Distribution by Labor Category and Occupation, CY 2024.**

Labor Category	Occupation	Less than Meas.	Meas. To 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Monitored	Percent of Monitored with Meas. TED	No. with Meas. TED	Collective TED (person–rem)	Avg. Meas. TED (rem)
Agriculture	Groundskeepers	22	4	–	–	–	–	–	–	–	–	–	26	15%	4	0.058	0.015
	Misc. Agriculture	1	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–
Construction	Carpenters	336	212	44	10	–	–	–	–	–	–	–	602	44%	266	15.706	0.059
	Electricians	1,362	444	45	7	1	1	–	–	–	–	–	1,860	27%	498	20.280	0.041
	Masons	38	22	–	–	–	–	–	–	–	–	–	60	37%	22	0.442	0.020
	Mechanics/Repairers	544	242	29	11	13	–	–	–	–	–	–	839	35%	295	21.720	0.074
	Miners/Drillers	41	2	1	–	–	–	–	–	–	–	–	44	7%	3	0.113	0.038
	Misc. Repair/Construction	821	554	35	4	1	–	–	–	–	–	–	1,415	42%	594	20.115	0.034
	Painters	146	75	6	–	–	–	–	–	–	–	–	227	36%	81	2.415	0.030
	Pipe Fitter	498	236	30	7	2	–	–	–	–	–	–	773	36%	275	14.218	0.052
Laborers	Handlers/Laborers/Helpers	1,048	328	30	2	–	1	–	–	–	–	–	1,409	26%	361	14.638	0.041
Management	Admin. Support & Clerical Sec.	656	78	1	–	–	–	–	–	–	–	–	735	11%	79	1.600	0.020
	Manager - Administrator	5,710	1,225	82	20	9	5	3	–	–	–	–	7,054	19%	1,344	58.787	0.044
	Sales	20	–	–	–	–	–	–	–	–	–	–	20	–	–	–	–
Miscellaneous	Military	24	2	–	–	–	–	–	–	–	–	–	26	8%	2	0.013	0.007
	Miscellaneous	7,507	638	44	5	1	–	–	–	–	–	–	8,195	8%	688	22.939	0.033
Production	Machine Setup/Operators	466	454	72	15	1	–	–	–	–	–	–	1,008	54%	542	31.130	0.057
	Machinists	104	23	11	11	2	–	–	–	–	–	–	151	31%	47	7.897	0.168
	Misc. Precision/Production	617	275	32	8	–	–	–	–	–	–	–	932	34%	315	15.076	0.048
	Operators, Plant/ System/Util.	1,232	814	88	75	11	–	–	–	–	–	–	2,220	45%	988	70.722	0.072
	Sheet Metal Workers	306	119	19	6	–	–	–	–	–	–	–	450	32%	144	8.246	0.057
	Welders and Solderers	25	6	–	–	–	–	–	–	–	–	–	31	19%	6	0.075	0.013
Scientists	Doctors and Nurses	25	2	–	–	–	–	–	–	–	–	–	27	7%	2	0.017	0.009
	Engineer	7,160	1,098	102	32	3	1	2	–	–	–	–	8,398	15%	1,238	56.588	0.046
	Health Physicist	348	67	6	1	–	–	–	–	–	–	–	422	18%	74	2.925	0.040
	Misc. Professional	9,182	2,005	132	34	6	–	–	–	–	–	–	11,359	19%	<b>2,177</b>	77.055	0.035
	Scientist	4,515	622	66	20	–	2	–	–	–	–	–	5,225	14%	710	34.379	0.048
Service	Firefighters	375	41	1	–	–	–	–	–	–	–	–	417	10%	42	0.731	0.017
	Food Service Employees			1	–	–	–	–	–	–	–	–	1	<b>100%</b>	1	0.110	0.110
	Janitors	261	15	3	–	–	–	–	–	–	–	–	279	6%	18	0.644	0.036
	Misc. Service	3,262	994	119	76	1	1	–	–	–	–	–	4,453	27%	1,191	71.267	0.060
	Security Guards	1,163	337	1	–	–	–	–	–	–	–	–	1,501	23%	338	5.804	0.017
Technicians	Engineering Technicians	1,766	265	33	9	–	–	–	–	–	–	–	2,073	15%	307	15.377	0.050
	Health Technicians	145	28	3	2	–	–	–	–	–	–	–	178	19%	33	1.755	0.053
	Misc. Technicians	1,867	397	75	23	3	8	–	–	–	–	–	2,373	21%	506	39.506	0.078
	Radiation Monitors/Techs.	1,139	883	197	103	22	1	–	–	–	–	–	2,345	51%	1,206	110.425	0.092
	Science Technicians	862	407	135	110	51	16	7	–	–	–	–	1,588	46%	726	<b>126.380</b>	<b>0.174</b>
	Technicians	1,152	124	23	11	1	1	–	–	–	–	–	1,312	12%	160	12.594	0.079
Transport	Bus Drivers	2	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–
	Equipment Operators	93	26	10	6	–	–	–	–	–	–	–	135	31%	42	4.788	0.114
	Misc. Transport	306	15	4	–	–	–	–	–	–	–	–	325	6%	19	1.120	0.059
	Truck Drivers	372	44	5	1	–	–	–	–	–	–	–	422	12%	50	1.911	0.038
Unknown	Unknown	13,142	819	87	8	–	–	–	–	–	–	<b>14,056</b>	7%	914	37.277	0.041	
<b>Totals</b>		<b>68,661</b>	<b>13,942</b>	<b>1,572</b>	<b>617</b>	<b>128</b>	<b>37</b>	<b>12</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>–</b>	<b>84,969</b>	<b>19%</b>	<b>16,308</b>	<b>926.843</b>	<b>0.057</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

**Exhibit B-21: Internal Dose Distribution by Site and Nuclide, CY 2024.**

Number of Individuals Receiving Radiation Doses in Each Dose Range (rem)

Site	Nuclide*	Meas. To 0.020	0.020 – 0.100	0.100 – 0.250	0.250 – 0.500	0.500 – 0.750	0.750 – 1.000	1.0 – 2.0	2.0 – 3.0	3.0 – 4.0	4.0 – 5.0	>5.0	Total Indiv. With Meas. CED	Collective CED (person–rem)	Avg. CED (rem)
Hanford: Hanford Site	Plutonium	1	–	–	–	–	–	–	–	–	–	–	1	0.003	0.003
Idaho	Americium	–	1	–	–	–	–	–	–	–	–	–	1	0.069	0.069
Los Alamos National Laboratory	Carbon	–	1	–	–	–	–	–	–	–	–	–	1	0.035	0.035
	Hydrogen-3	21	–	–	–	–	–	–	–	–	–	–	21	0.035	0.002
	Plutonium	1	–	–	–	–	–	–	–	–	–	–	1	0.003	0.003
	Uranium	15	1	–	–	–	–	–	–	–	–	–	16	0.077	0.005
Oak Ridge: Oak Ridge National Laboratory	Plutonium	–	1	–	–	–	–	–	–	–	–	–	1	0.039	0.039
Oak Ridge: Y-12 National Security Complex	Mixed	2	1	–	–	–	–	–	–	–	–	–	3	0.030	0.010
	Uranium	660	581	70	–	–	–	–	–	–	–	–	1,311	41.823	0.032
Paducah Gaseous Diffusion Plant	Uranium	4	5	–	–	–	–	–	–	–	–	–	9	0.224	0.025
Sandia National Laboratories	Other	8	–	–	–	–	–	–	–	–	–	–	8	0.038	0.005
	Plutonium	–	1	–	–	–	–	–	–	–	–	–	1	0.034	0.034
Savannah River Site	Hydrogen-3	6	–	–	–	–	–	–	–	–	–	–	6	0.021	0.004
Uranium Mill Tailings Remedial Action Project	Uranium	23	15	–	–	–	–	–	–	–	–	–	38	0.660	0.017
West Valley Demonstration Project	Other	–	–	1	–	–	–	–	–	–	–	–	1	0.154	0.154
<b>Totals</b>		<b>741</b>	<b>607</b>	<b>71</b>	–	–	–	–	–	–	–	–	<b>1,419</b>	<b>43.245</b>	<b>0.030</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

**Exhibit B-22: Extremity Dose Distribution by Site, CY 2024.**

Site	No. Meas. Dose	Meas. to 0.100	0.100 – 1.0	1.0 – 5.0	5.0 – 10.0	10.0 – 20.0	20.0 – 30.0	>30.0	Total Monitored*	No. with Meas.	No. Above Monitoring Threshold (5 rems)**	Collective Extremity Dose (person-rem)	Avg. Meas. Extremity Dose (rem)
Ames Laboratory	72	83	–	–	–	–	–	–	155	83	–	2.002	0.024
Argonne National Laboratory	3,096	106	15	5	1	–	–	–	3,223	127	1	23.417	0.184
Brookhaven National Laboratory	2,894	13	21	1	–	–	–	–	2,929	35	–	7.836	0.224
Fermi National Accelerator Laboratory	1,344	10	–	–	–	–	–	–	1,354	10	–	0.270	0.027
Grand Junction Site	30	–	–	–	–	–	–	–	30	–	–	–	–
Hanford: Hanford Site	3,350	22	21	1	–	–	–	–	3,394	44	–	6.844	0.156
Hanford: Office of River Protection	3,622	183	188	10	1	–	–	–	4,004	382	1	84.355	0.221
Hanford: Pacific Northwest National Laboratory	2,669	307	67	19	–	–	–	–	3,062	393	–	70.467	0.179
Idaho	4,828	1,403	524	117	7	–	–	–	6,879	2,051	7	479.944	0.234
Kansas City National Security Campus	198	42	1	–	–	–	–	–	241	43	–	1.986	0.046
Lawrence Berkeley National Laboratory	592	31	16	3	–	–	–	–	642	50	–	10.104	0.202
Lawrence Livermore National Laboratory	4,465	27	53	2	1	–	–	–	4,548	83	1	25.627	0.309
Los Alamos National Laboratory	11,606	2,291	871	211	20	1	–	–	<b>15,000</b>	<b>3,394</b>	<b>21</b>	<b>902.575</b>	0.266
National Renewable Energy Laboratory	4	–	–	–	–	–	–	–	4	–	–	–	–
Nevada National Security Site	732	3	–	–	–	–	–	–	735	3	–	0.055	0.018
Oak Ridge: East Tennessee Technology Park	219	–	–	–	–	–	–	–	219	–	–	–	–
Oak Ridge: Oak Ridge Institute for Science and Education	103	–	–	–	–	–	–	–	103	–	–	–	–
Oak Ridge: Oak Ridge National Laboratory	5,651	91	80	51	10	2	–	–	5,885	234	12	246.228	<b>1.052</b>
Oak Ridge: Y-12 National Security Complex	8,133	35	31	17	–	–	–	–	8,216	83	–	42.463	0.512
Office of Secure Transportation	302	–	–	–	–	–	–	–	302	–	–	–	–
Paducah Gaseous Diffusion Plant	1,384	–	–	–	–	–	–	–	1,384	–	–	–	–
Pantex Plant	4,481	183	225	60	–	–	–	–	4,949	468	–	197.238	0.421
Portsmouth Gaseous Diffusion Plant	2,067	–	–	–	–	–	–	–	2,067	–	–	–	–
Princeton Plasma Physics Laboratory	326	–	–	–	–	–	–	–	326	–	–	–	–
Sandia National Laboratories	1,842	72	30	4	–	–	–	–	1,948	106	–	17.942	0.169

**Exhibit B-22: Extremity Dose Distribution by Site, CY 2024.**

Site	No. Meas. Dose	Meas. to 0.100	0.100 – 1.0	1.0 – 5.0	5.0 – 10.0	10.0 – 20.0	20.0 – 30.0	>30.0	Total Monitored*	No. with Meas.	No. Above Monitoring Threshold (5 rems)**	Collective Extremity Dose (person–rem)	Avg. Meas. Extremity Dose (rem)
Savannah River National Laboratory	529	69	42	6	–	–	–	–	646	117	–	25.308	0.216
Savannah River Site	6,492	363	420	49	12	5	–	–	7,341	849	17	398.924	0.470
Separations Process Research Unit	18	–	–	–	–	–	–	–	18	–	–	–	–
Service Center Personnel***	210	40	20	11	–	–	–	–	281	71	–	23.904	0.337
SLAC National Accelerator Laboratory	2,127	–	–	–	–	–	–	–	2,127	–	–	–	–
Thomas Jefferson National Accelerator Facility	1,526	–	–	–	–	–	–	–	1,526	–	–	–	–
Uranium Mill Tailings Remedial Action Project	161	–	–	–	–	–	–	–	161	–	–	–	–
Waste Isolation Pilot Plant	828	–	–	–	–	–	–	–	828	–	–	–	–
West Valley Demonstration Project	439	3	–	–	–	–	–	–	442	3	–	0.056	0.019
<b>Totals</b>	<b>76,340</b>	<b>5,377</b>	<b>2,625</b>	<b>567</b>	<b>52</b>	<b>8</b>	<b>–</b>	<b>–</b>	<b>84,969</b>	<b>8,629</b>	<b>60</b>	<b>2,567.545</b>	<b>0.298</b>

Note: Boxed values (gray background) indicate the greatest value in each column. Dashes indicate no data reported for the year shown.

\* Represents the total number of monitoring records. The number of individuals provided extremity monitoring cannot be determined.

\*\* All extremity doses above 5 rems were for the upper extremities (hands and forearms). DOE annual limit for extremities is 50 rems.

10 CFR 835.402(a)(1)(ii) requires extremity monitoring for a shallow dose equivalent to the skin or extremity of 5 rems or more in a year.

\*\*\* Includes personnel at NETL, NNSA Albuquerque complex, Oak Ridge, and WIPP in addition to several smaller facilities not associated with a DOE site.



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