Office of Environment, Health, Safety and Security
Operating Experience Summary

OES 2026-02 March 2026

# DOE Occupational Radiation Exposure Monitoring for CY 2024

## Purpose

This Operating Experience Summary (OES) document provides an overview of occupational radiation doses at Department of Energy (DOE) sites, including the National Nuclear Security Administration (NNSA), for calendar year (CY) 2024. The *U.S. Department of Energy (DOE) Occupational Radiation Exposure Report for CY 2024* provides an analysis of the collective total effective dose (TED), including the effective dose from external radiation sources and the committed effective dose (CED) from the internal intake of radioactive material during work activities. It contains a description of work activities in relation to occupational radiation doses for each DOE facility.

The purpose of the OES is to provide DOE line managers with key highlights from the CY 2024 report for awareness, evaluation, and potential site-specific action. The OES provides high-level DOE-wide summary information. Line managers are encouraged to review the CY 2024 report for detailed information about the distribution of radiological dose across DOE, including at a program- and site-specific level.

## Background

DOE Order 231.1B, *Environment Safety and Health Reporting,* requires DOE sites to annually report radiation exposure monitoring data to the Radiation Exposure Monitoring System (REMS) database before March 31 of the following year. The Office of Environment, Health, Safety and Security (EHSS) uses the consolidated REMS information to develop a DOE-wide annual report.

The *U.S. Department of Energy Occupational Radiation Exposure Report for CY 2024* provides a detailed evaluation of DOE-wide performance in compliance with Title 10, Code of Federal Regulations, Part 835, *Occupational Radiation Protection.* The regulation includes occupational dose limits, as well as the principle of reducing radiation doses to levels *as low as reasonably achievable* (ALARA). The report provides data to DOE organizations responsible for developing policies for protecting individuals from the adverse health effects of radiation. The occupational radiation dose information over the past 5-year period is analyzed in terms of dose to individuals, dose by site, and aggregate data. This analysis represents the current data and any updated or changed data reported to REMS as of July 31, 2025.

## Discussion

The occupational radiation dose records for CY 2024 show that DOE facilities complied with DOE dose limits and administrative control levels (ACLs) and worked to minimize doses to individuals.

Collective TED is an indicator of the overall amount of radiation dose received during the conduct of work activities at DOE. It is made up of the effective dose from external sources (which includes neutron and photon radiation) and the internal CED, which results from the intake of radioactive material into the body.

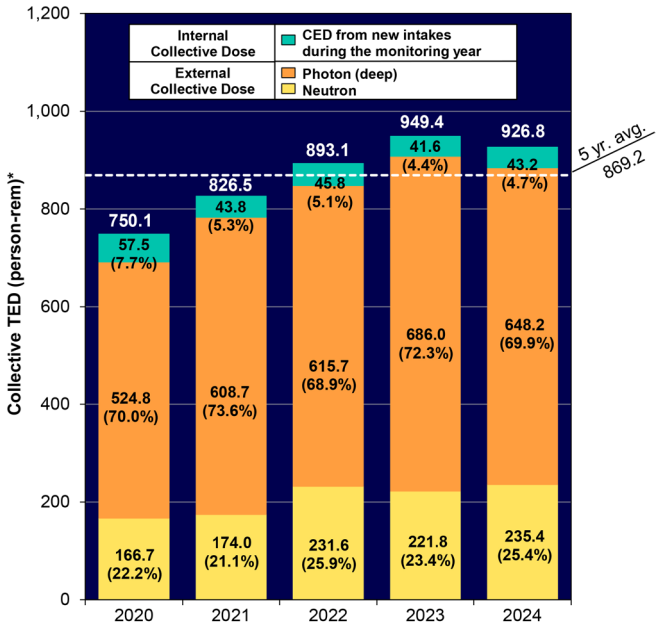
Highlights between CY 2023 and CY 2024:

- 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.
- The number of individuals with measurable TED decreased 12 percent from a value of 18,473 in CY 2023 to a value of 16,308 in CY 2024.
- 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.
- The collective CED 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.
- The number of individuals with measurable CED increased 6 percent from 1,333 in CY 2023 to 1,419 in CY 2024.
- No individual was reported to have exceeded the TED regulatory limit (5 rem [50 mSv]) from CY 2020 through 2024.
- No individual was reported to have exceeded the TED ACL (2 rem [20 mSv]) in CY 2024. Previously, one monitored individual received a CED of 2.4 rem (24 mSv) from plutonium-238, resulting in a TED of 3.0 rem (30 mSv) for CY 2020.
- 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.
- 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) in CY 2024.

**Figure 1** shows the components of the collective TED from CY 2020–2024, including the external dose contributions from photon and neutron, as well as the internal dose from intakes.

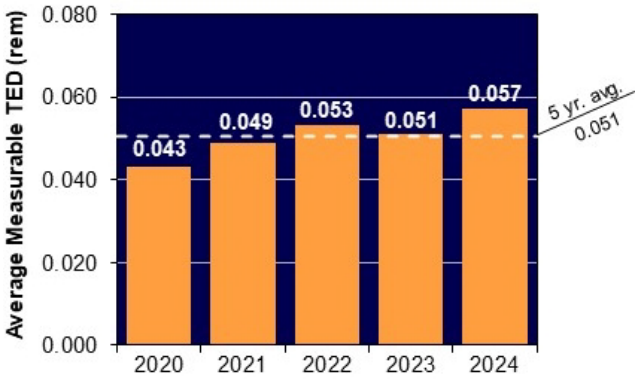
**Figure 2** shows the average measurable TED, which normalizes the collective dose over the population of workers who received a measurable dose from CY 2020–2024. The average measurable TED increased by 12 percent from 0.051 rem (0.510 mSv) in CY 2023 to 0.057 rem (0.570 mSv) in CY 2024. In CY 2024, the five sites that contributed significantly (86 percent) to the collective TED in descending order were Los Alamos National Laboratory (LANL), Savannah River, Oak Ridge, Idaho, and Hanford.

**Figure 1:** Components of TED, CY 2020–2024.




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

**Figure 2:** Average Measurable TED, CY 2020–2024

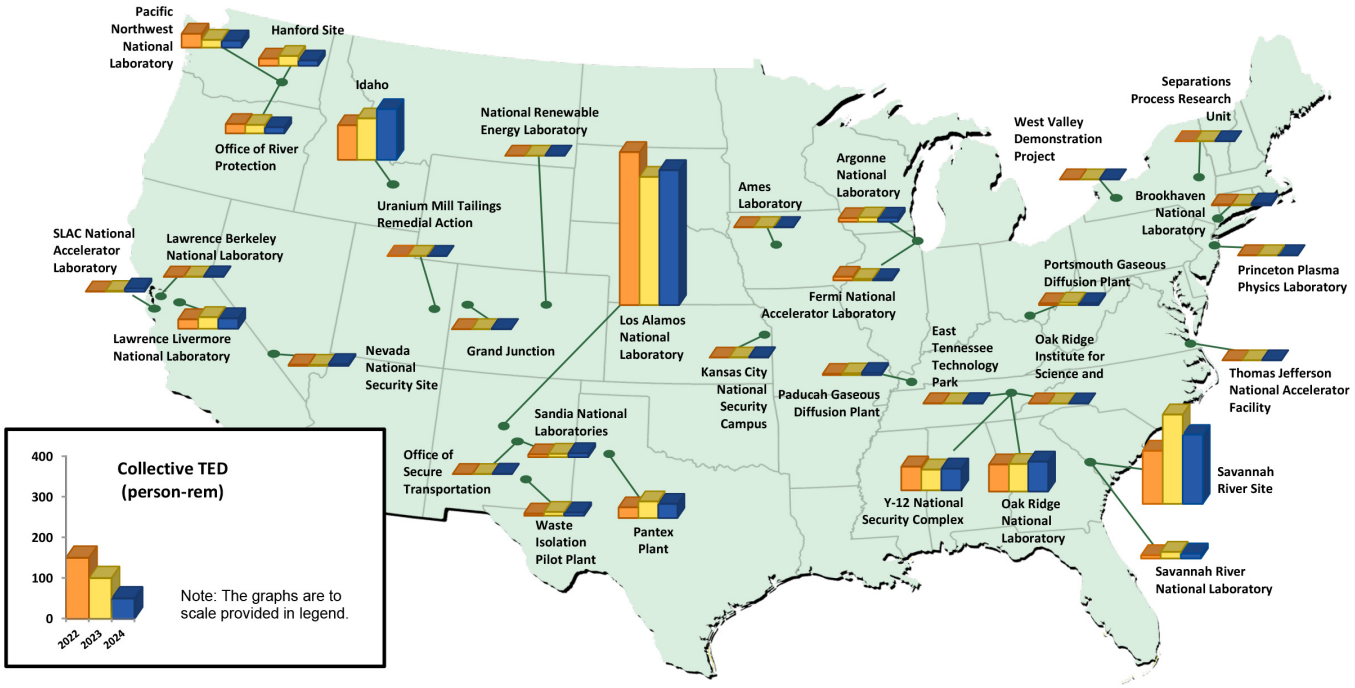


Idaho, LANL, and Oak Ridge had increases in collective TED in CY 2024, while collective TED decreased at Savannah River, and Hanford.

The increased dose at Idaho was the result of completing several significant tasks in high dose rate areas. The plutonium facility operations at LANL accounted for the majority of occupational dose after switching to a 24/4 shift schedule largely for construction and maintenance purposes. The increased dose at Oak Ridge for CY 2024 can be attributed to a 12 percent increase in the number of monitored individuals at ORNL, and an increase in personnel performing cleanup work in radiological areas and the downsizing of the contamination area footprint at the site. Savannah River 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. Hanford experienced a decrease in dose during CY 2024 due primarily to a technology change introduced in tank farm activities, continued efforts under the ALARA program, and changes in work scope. Decrease in dose can also be attributed to a decrease in the number of personnel entries into various high dose rate facilities.

**Figure 3** illustrates the collective TED at DOE sites that are required to report the results of occupational radiation monitoring to the DOE REMS Program.

**Figure 3:** Collective TED by DOE Site for CY 2022–2024



## Conclusion

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 individual received a single dose of 3.0 rem (30 mSv) TED in CY 2020 which exceeded the 2 rem (20 mSv) DOE ACL.

Only 19 percent of the monitored individuals in CY 2024 received a measurable dose, and of those, the average measurable dose received was less than 1 percent of the 5 rem (50 mSv) TED limit.

## Reference

The *U.S. Department of Energy Occupational Radiation Exposure Report for CY 2024* contains a description of work activities in relation to occupational radiation dose for each DOE facility. The annual report is located at:

**https://www.energy.gov/ehss/occupational radiation exposure publications**

## Additional Sources of Information

REMS System Tools: REMS includes a database with 5.1 million exposure records. REMS system tools below provide access to summary data for research and interactive data visualization products.

- Occupational Exposure Dashboard - Provides an Illustrated and Interactive Overview of Radiation Exposure at DOE Sites.
- REMS Query Tool - Provides access to REMS summary data for analysis.
- 10 Year Summary - Provides descriptions and trends of dose data over the last 10 years.

To access annual reports from CY 1974 to CY 2024, ALARA activities at DOE, REMS Query Tool, and other information on occupational radiation doses at DOE, visit the DOE ES&H website at:

**https://www.energy.gov/ehss/occupational radiation exposure**

### Operating Experience Summary

**Operating Experience Summaries** are informative operating experience-based articles published by the Office of Environment, Health, Safety, and Security (EHSS) and distributed across the DOE complex through the DOE Corporate Operating Experience Program to promote safety and mission success through the open exchange of valuable experiences and good practices.

*For further information or assistance related to this OES, please contact Kali Crosby, REMS Program Manager, at kali.crosby@hq.doe.gov.*

*Questions regarding the Operating Experience program or OpEx documents, in general, can be directed to oec@hq.doe.gov or Maria Dikeakos at (631) 574-0220 or Maria.Dikeakos@hq.doe.gov*