

# Annual Fire Protection Program Summary

## Calendar Year 2023



UNITED STATES DEPARTMENT OF ENERGY

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*Summary Provided by:*

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## Executive Summary

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The Department of Energy (DOE) Order 231.1B, *Environment, Safety, and Health Reporting*, requires organizations responsible for maintaining property under the stewardship of DOE to enter reportable fire and fire protection-related incidents into the DOE Fire Protection Reporting System (FPRS). This report examines calendar year (CY) 2023, and includes information submitted by 33 DOE elements representing approximately 99 percent of DOE's facility and property valuation.

Information reported by DOE elements into the FPRS documented a total of 95 fire protection-related (fire and non-fire) events in 2023, resulting in monetary losses of \$2,435,061. Compared to 2022 data, this represents a 14 percent decrease in the number of events, but a 191 percent increase in monetary losses. Of the 95 events, 61 resulted in monetary losses while 34 had no reported monetary losses.

There were 46 fire loss events (directly attributable to fire or smoke) in 2023, resulting in monetary losses of \$1,723,711. This represents a 21 percent increase in the number of events, and a 142 percent increase in the monetary loss amounts from 2022. There were 15 non-fire loss events (leaks, spills, or inadvertent releases or actuations) related to fire protection systems in 2023, totaling \$711,350. This represents a 17 percent decrease in the number of events, and a 467 percent increase in monetary losses from 2022.

In 2023, there were 14 major fire losses at 10 sites costing \$10,000 or more, a 27 percent increase from the 11 reported in 2022. Of these, nine resulted in losses of \$50,000 or greater, compared with three in 2022, a 200 percent increase in the number of such events. The single largest fire loss event was a fire in an air compressor at Oak Ridge National Laboratory (ORNL) that resulted in a \$563,000 loss, which alone represents 33 percent of all DOE fire losses reported in 2023.

Loss comparisons among DOE sites are performed by normalizing data against total facility and property valuation as reported in the Facility Information Management System (FIMS) and the Property Information Database System (PIDS). Total DOE valuation for sites reporting into the FPRS in 2023 was \$288.6 billion, an eight percent increase from 2022. The highest calculated Fire Loss Rate was at the Fermi National Accelerator Laboratory (FNAL), at 0.77 cents per \$100 of valuation. The DOE-wide 2023 Fire Loss Rate was 0.06 cents per \$100 in total site valuation, equal to 2020 and 2021. This exhibited a 100 percent increase from 2022 which was the lowest rate since the inception of this report (1950).

DOE elements are required to report costs associated with recurring fire protection activities into the FPRS annually. In 2023, recurring costs for fire protection activities were \$328,981,959, a seven percent increase from 2022. As a ratio of cost to total valuation, DOE sites spent approximately 11 cents per \$100 of valuation for recurring fire protection activities in 2023, a one percent decrease from 2022. The Waste Isolation Pilot Plant (WIPP) had the highest rate at \$1.55 cents per \$100 of valuation.

There were 6,574 Fire Department responses in 2023 (0.14 increase) compared to 2022.

In calendar year 2023, DOE sites reported no fire or fire protection-related injuries or fatalities into the DOE Occurrence Reporting and Processing System (ORPS). There was one minor burn injury reported into FPRS by the Pantex Plant (PTX). There were 167 fire or fire protection-related occurrences reported into ORPS in 2023, a four percent decrease from 2022. The vast majority of these continue to be attributable to fire protection equipment degradation events at Pantex Plant resulting from ongoing issues associated with the Det-Tronics system. Of the 167 occurrences, 11 (seven percent) were rated High Level, 112 (67 percent) were rated Low Level, and 44 (26 percent) were rated Informational Level.

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## Site/Facility Acronyms and Abbreviations

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|            |                                                                           |
|------------|---------------------------------------------------------------------------|
| AMES       | Ames Laboratory                                                           |
| ANL        | Argonne National Laboratory                                               |
| BNL        | Brookhaven National Laboratory                                            |
| CMR        | Chemistry and Metallurgy Research                                         |
| DIR        | Directorate (Director's Office)                                           |
| DUF6       | Depleted Uranium Hexafluoride                                             |
| ETTP       | East Tennessee Technology Park                                            |
| FIRNGHELAB | Firing Sites and High Explosives Laboratory                               |
| FNAL       | Fermi National Accelerator Laboratory                                     |
| HANF       | Hanford Site                                                              |
| ICP        | Idaho Cleanup Project                                                     |
| ID         | Idaho (INL and ICP)                                                       |
| INL        | Idaho National Laboratory                                                 |
| KCNSC      | Kansas City National Security Campus                                      |
| LBNL       | Lawrence Berkeley National Laboratory                                     |
| LLNL       | Lawrence Livermore National Laboratory                                    |
| LAFD       | Los Alamos Fire Department                                                |
| LANL       | Los Alamos National Laboratory                                            |
| N3B        | Newport News Nuclear BWXT - Los Alamos                                    |
| NREL       | National Renewable Energy Laboratory                                      |
| NRF        | Naval Reactors Facility                                                   |
| NNSS       | Nevada National Security Site                                             |
| ORAU       | Oak Ridge Associated Universities                                         |
| 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                                     |
| PTX        | Pantex Plant                                                              |
| PORT       | Portsmouth Gaseous Diffusion Plant                                        |
| PPPL       | Princeton Plasma Physics Laboratory                                       |
| RL         | Richland Operations Office                                                |
| RP         | Office of River Protection                                                |
| SLAC       | SLAC (Stanford Linear Accelerator Center) National Accelerator Laboratory |
| SNL        | Sandia National Laboratories, New Mexico                                  |
| SRS        | Savannah River Site                                                       |
| SPR        | Strategic Petroleum Reserves                                              |
| SWOC       | Solid Waste Operations Complex                                            |
| TJNAF      | Thomas Jefferson National Accelerator Facility                            |
| WIPP       | Waste Isolation Pilot Plant                                               |
| WVDP       | West Valley Demonstration Project                                         |
| Y-12       | Y-12 National Security Complex                                            |

## Definitions

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### Valuation Definitions

**FIMS (Facility Information Management System):** The DOE corporate database that maintains the inventory and property values for government owned real property and any permanently affixed structures such as buildings, trailers, fences, bridges, etc.

**PIDS (Property Information Database System):** The DOE corporate database that maintains the inventory and property values for government owned accountable personal property.

**Property Value/Valuation:** The approximate replacement value of all DOE-owned buildings/facilities and equipment. Included in the value are the cost of all DOE-owned supplies and average inventory of all source and special nuclear materials. Excluded from the value are the cost of land, land improvements (such as sidewalks or roads), and below ground facilities not susceptible to damage by fire or explosion (such as major water mains and ponds).

**Total Valuation:** The combined totals from FIMS and PIDS, DOE-wide and by site.

### Loss Definitions

**Estimated Loss:** Monetary loss determination is based on all estimated or actual costs to restore DOE facility and equipment to pre-occurrence conditions irrespective of whether such restoration is performed. The estimate includes: (1) any necessary nuclear decontamination; (2) restoration in areas that received water or smoke damage; (3) any loss reductions for salvage value; and (4) any lost revenue experienced as a result of the accident. The estimate excludes: (1) downtime; and (2) any outside agency payments. Losses sustained on private property are not reportable, even if DOE is liable for the damage and loss consequences resulting from the occurrence.

**Fire Loss:** All damage or loss sustained as a direct consequence of (and following the outbreak of) a fire shall be classified as a fire loss. Exception: the burnout of electric motors and other electrical equipment through overheating from electrical causes shall be considered a fire loss only if a self-sustained combustion exists after power is shut off.

**Fire Loss Rate:** Unit of comparison in cents loss per \$100 of valuation (facilities and equipment) as a consequence of fire events.

**Fire Protection Loss:** All damage or loss sustained as a consequence of fire events, or non-fire events involving fire protection systems; including leaks, spills, and inadvertent releases.

**Non-Fire Loss:** All damage sustained as a consequence of non-fire events involving fire protection systems; including leaks, spills, and inadvertent releases.

## Introduction

The *Annual Fire Protection Summary Report*, required by the Department of Energy (DOE) Order 231.1B, *Environment, Safety and Health Reporting*, is the primary source for reporting fire and fire-related costs and monetary losses associated with facilities, property, and equipment across the DOE complex, including cost- and loss-to-valuation ratios to normalize the data for comparison purposes.

This report includes data for calendar year (CY) 2023 from information submitted by 33 DOE elements representing approximately 99 percent of DOE's facility and property valuation. DOE facilities, with the exception of the Power Marketing Administrations and Headquarters offices, are required to report costs and losses associated with fire and fire protection activities into the DOE Fire Protection Reporting System (FPRS) annually by April 30 of the following year.

The data for this 2023 report were extracted from the FPRS, with the following organizations reporting:

|                                           |                                                |
|-------------------------------------------|------------------------------------------------|
| Ames Laboratory                           | Office of Secure Transportation                |
| Argonne National Laboratory               | ORISE-ORAU                                     |
| Brookhaven National Laboratory            | ORNL/EM-Isotek                                 |
| DUF6 Paducah Site                         | ORNL-UT /Battelle                              |
| DUF6 Portsmouth Site                      | Pacific Northwest National Lab                 |
| East Tennessee Technology Park            | Paducah Gaseous Diffusion Plant                |
| Environmental Management Nevada Program   | Pantex Plant                                   |
| Fermi National Accelerator Laboratory     | Portsmouth Gaseous Diffusion Plant             |
| Hanford Site (Office of River Protection) | Princeton Plasma Physics Laboratory            |
| Idaho Cleanup Project                     | Richland Operations Office                     |
| Idaho National Laboratory                 | Sandia National Laboratories                   |
| Kansas City National Security Campus      | Savannah River Site                            |
| Lawrence Berkeley National Laboratory     | SLAC National Accelerator Laboratory           |
| Lawrence Livermore National Laboratory    | Strategic Petroleum Reserves                   |
| Los Alamos National Laboratory            | Thomas Jefferson National Accelerator Facility |
| N3B - Los Alamos                          | Waste Isolation Pilot Plant                    |
| National Renewable Energy Laboratory      | West Valley Demonstration Project              |
| Nevada National Security Site             | Y-12 National Security Site                    |
| Office of Legacy Management               |                                                |

Because some nearby reporting elements share fire department resources, throughout this report they are grouped by site, i.e., Hanford (Office of River Protection/Richland Operations Office), Paducah (Paducah Gaseous Diffusion Plant/DUF6), Portsmouth (Portsmouth Gaseous Diffusion Plant/DUF6), Idaho (Idaho National Laboratory/Idaho Cleanup Project), NNSS (Nevada National Security Site/Environmental Management Nevada Program), and LANL (Los Alamos National Laboratory/N3B-Los Alamos/EMLA).

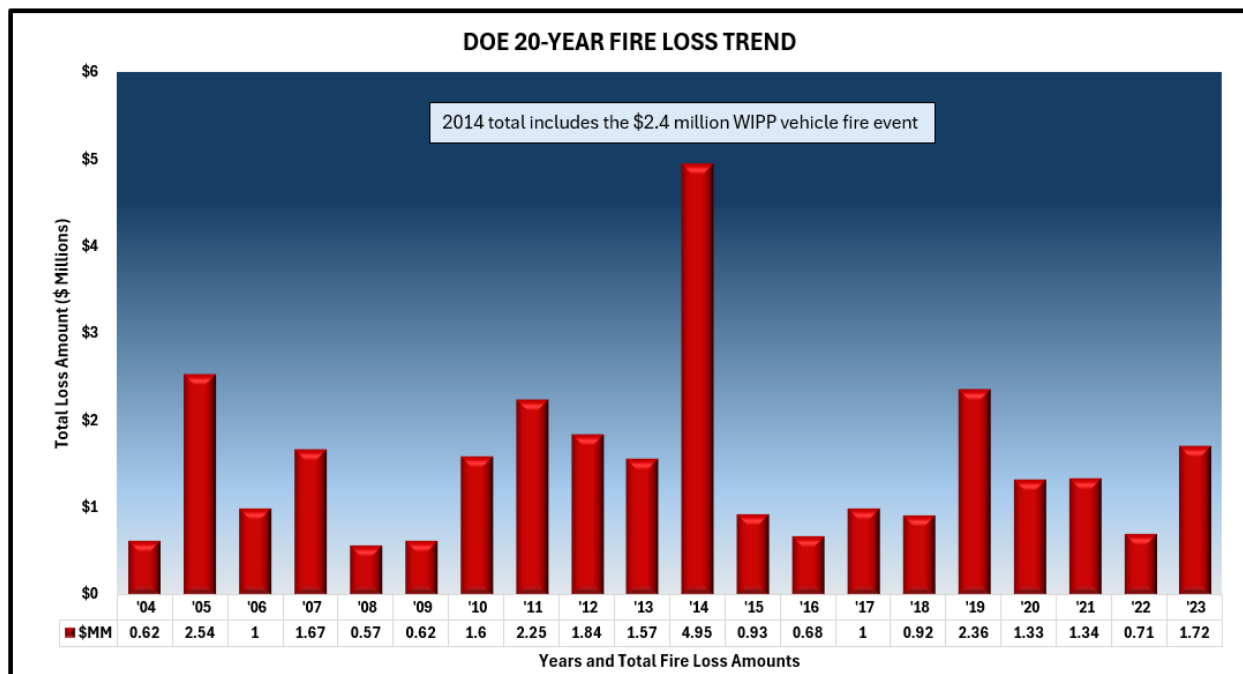
The Fire Protection Reporting System is located at: <http://energy.gov/ehss/policy-guidance-reports/databases/fire-protection-database> [password required]. EHSS continues to collaborate with the DOE Fire Safety Committee to update the data submission system and the content of the annual report to improve its utility to the DOE fire protection community and the DOE Enterprise.

Note: NRF may have property valuations in FIMS and/or PIDS, but do not report into the Fire Protection Reporting System (FPRS) as this site falls under the Naval Nuclear Propulsion Program. Therefore, this site is not included in the overall DOE fire protection calculations.



## Fire and Fire Protection Losses

Fire Losses are events that involve fire, smoke, or both, that result in monetary losses. Figure 1 displays the 20-year trend of fire losses at DOE.



*Figure 1: DOE Total Property and Facility Fire Losses 2004-2023*

In 2023, DOE elements reported 46 fire loss events totaling \$1,723,711 in fire losses. When compared with 2022, this represents a 21 percent increase in the number of events, and a 142 percent increase in loss amounts.

*DOE Annual Fire Protection Program Summary for Calendar Year 2023*

Table 1 displays the 2023 loss category, loss type, and monetary losses associated with Fire Loss events (all damage or loss sustained as a direct consequence of a fire) and Non-Fire Loss events (all damage sustained as a consequence of non-fire events involving fire protection systems; including leaks, spills, and inadvertent releases) reported into the FPRS.

*Table 1: Summary of Reported Fire and Fire Protection Events*

| FIRE AND FIRE PROTECTION EVENT SUMMARY |                                     |            |                     |
|----------------------------------------|-------------------------------------|------------|---------------------|
| Loss Category                          | Fire Loss Type                      | No. Events | Loss Amount         |
| Fire Loss Events                       | Fire/Smoke (Brush)                  | 0          | \$ -                |
|                                        | Fire/Smoke (Building)               | 17         | \$ 607,850          |
|                                        | Fire/Smoke (Other)                  | 24         | \$ 1,023,432        |
|                                        | Fire/Smoke (Vehicle)                | 5          | \$ 92,429           |
|                                        | <b>Total Fire Loss Events</b>       | <b>46</b>  | <b>\$ 1,723,711</b> |
| Non-Fire Loss Events                   | Leaks/Spills/Releases               | 15         | \$ 711,350          |
|                                        | <b>Total Monetary Losses</b>        | <b>61</b>  | <b>\$ 2,435,061</b> |
| No Reported Loss                       | Non-Monetary Events                 | 34         | \$ -                |
|                                        | <b>Total Fire Protection Events</b> | <b>95</b>  | <b>\$ 2,435,061</b> |

In 2023 there were 95 total fire protection-related events reported into the FPRS, a 14 percent decrease from 2022, resulting in \$2,435,061 in monetary losses, a 191 percent increase from 2022. Of the 95 total events, 61 resulted in monetary losses, a nine percent increase from 2022. There were 34 events with no reported costs, a 37 percent decrease from 2022. These events are typically small incidents or false alarms that are resolved quickly by local staff, or events where all costs are absorbed by the Fire Department.

Of the 61 events resulting in monetary losses in 2023, 46 were fire loss events (directly attributable to fire or smoke), a 21 percent increase from 2022; and 15 were non-fire loss events (leaks, spills, and inadvertent releases), a 17 percent decrease from 2022. Of the 15 leaks, spills, and inadvertent releases, two events involved an FM-200 clean agent fire suppression while the rest of the 13 were water-based.

The 46 fire loss events in 2023 resulted in \$1,723,711 in fire losses, a 142 percent increase from 2022. The 15 non-fire losses (leaks, spills, or inadvertent releases) resulted in \$711,350 in losses, a 467 percent increase from 2022.

Table 2 displays the causes of the 46 fire loss events reported into the FPRS in 2023.

*Table 2: Fire Loss Causes*

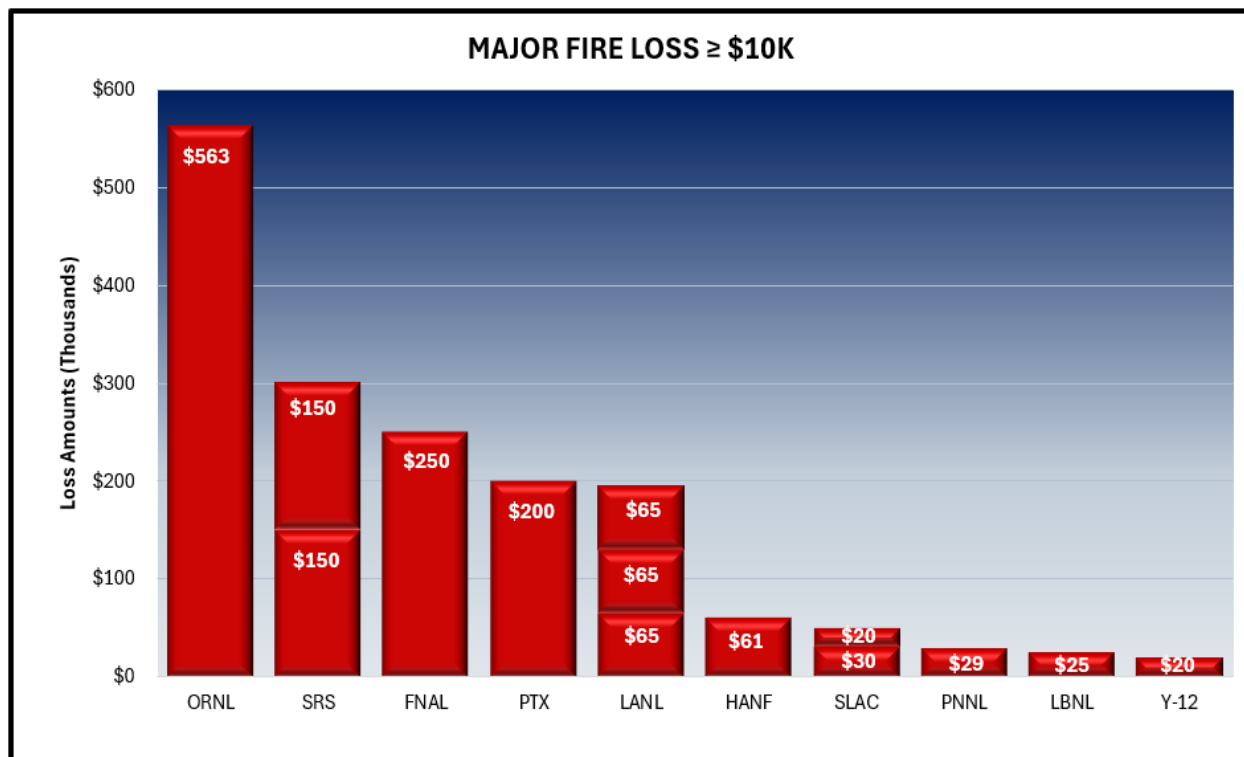
| FIRE LOSS CAUSES  |               |                    |
|-------------------|---------------|--------------------|
| Cause             | No. of Events | Cost               |
| Other             | 6             | \$1,014,350        |
| Electrical        | 18            | \$473,850          |
| Design Related    | 7             | \$137,672          |
| Employee Related  | 11            | \$67,189           |
| Unspecified       | 2             | \$26,450           |
| Procedure Related | 2             | \$4,200            |
| <b>Total</b>      | <b>46</b>     | <b>\$1,723,711</b> |

In 2023, the majority of fire losses were attributed to “Electrical” causes and “Employee Related” causes. “Other” causes showed relatively high monetary losses with lower number of events.

Note: “Other” refers to fire loss causes that do not align with those listed in the table above, such as a fuel leak or a rodent nest. “Unspecified” refers to events where the official cause of the fire is undetermined.

## Major Fire Loss Events (\$10,000 or greater)

A small proportion of the fire events constitute the majority of the total fire losses reported by DOE sites. Figure 2 displays the distribution of major (\$10,000+) fire loss events at DOE sites.



*Figure 2: Major Fire Losses by Site*

In 2023, there were 14 major fire losses at 10 sites costing \$10,000 or more, a 27 percent increase from 2022. The 14 major loss events (30 percent of the 46 total events) represented \$1,693,579 or 98 percent of all reported fire losses in 2023. Of the 14 events, nine resulted in losses of \$50,000 or greater, a 200 percent increase from 2022. The single largest event was a fire that damaged two air compressors beyond repair at Oak Ridge National Laboratory (ORNL) resulting in a \$563,000 loss, which alone represents 31 percent of all DOE fire losses reported in 2023.

Additionally, there were seven non-fire losses costing \$10,000 or greater involving leaks, spills, and releases in 2023. These non-fire losses occurred at Los Alamos National Laboratory, Oak Ridge National Laboratory, Pantex Plant, and Y-12, the largest of which was a \$270,000 loss resulting from a frozen fire sprinkler line causing water damage.

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Table 3 provides information and site descriptions for the nine costliest fire losses (\$50,000 or greater). These nine events represent \$1,569,579, or 91 percent of all DOE fire protection losses for 2023.

*Table 3: Summary of Fire Events with Losses of \$50,000 or Greater*

| SUMMARY OF FIRE LOSS EVENTS > \$50,000 |             |                       |       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|----------------------------------------|-------------|-----------------------|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Site                                   | Loss Amount | Loss Type             | Cause | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| ORNL                                   | \$563,000   | Fire/Smoke (Other)    | Other | Summarized: On June 16, 2023, a diesel-driven air compressor was started and placed under load to simulate supplying instrument air to the steam plant. Shortly thereafter, "white smoke" was discovered coming from the area. Further investigation revealed that atomized air compressor oil was being discharged and a large discharge of compressor oil had spilled onto the ground. Immediately after shutting down the air compressor, flames were observed inside the compressor housing and propagating outside of the equipment. Before being extinguished, the fire spread on the ground and directly impinged on a second air compressor located within five feet of the first. Both air compressors were damaged beyond repair by the fire. |
| FNAL                                   | \$250,000   | Fire/Smoke (Other)    | Other | Hot work welding the cryostat plate for the Mu2e experiment, during the fire watch, noticed the cryostat smoldering. The Fire Department was called and used a total of 8 CO2 fire extinguishers internally into the cryostat.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| PTX                                    | \$200,000   | Fire/Smoke (Building) | Other | Fire on the discharge of the drum dry while formulating inert mock material. The injury was a slightly burnt hand. Extinguished by fire extinguisher. Dollar loss value does not include processed downtime.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

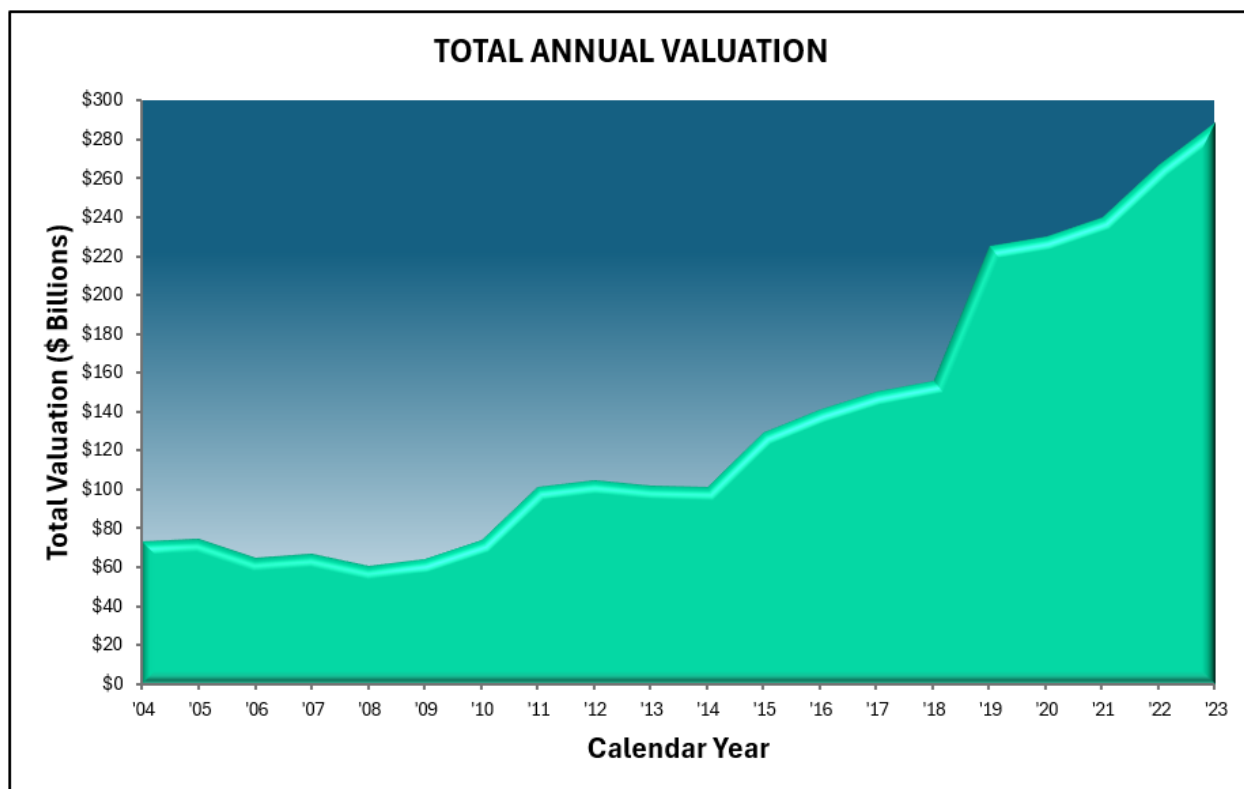
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|      |           |                       |                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|------|-----------|-----------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SRS  | \$150,000 | Fire/Smoke (Building) | Electrical     | Summarized: On April 20, 2023, a fire ignited on a bus duct connected to building 221-J in the Salt Waste Processing Facility. The facility entered the response procedure for a fire in the area and the SRSFD was dispatched to the scene. The fire extinguished when the bus duct was de-energized. No fixed suppression systems were activated, or personnel injuries occurred during the event.                                                                                                                                                                                                                                                                                                       |
| SRS  | \$150,000 | Fire/Smoke (Other)    | Electrical     | Summarized: On November 4, 2023, a blown 480-volt electrical bus duct resulted in partial loss of “Normal Power” to some process equipment. Shortly after, smoke and visible arcing was discovered coming from the bus duct. An electrician immediately removed power from the transformer, switchgear and bus duct which stopped the arcing, burning and fire. The facility entered the response procedure for a fire in the area and the SRSFD was dispatched to the scene. The Fire Department determined there were no further indications of hot spots or fires and declared the area as “All Clear”. No fixed suppression systems were activated nor were there personnel injuries during the event. |
| LANL | \$65,000  | Fire/Smoke (Building) | Design Related | A fire occurred in a capacitor room. Smoke and scorch marks were identified by staff and fire department.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| LANL | \$65,000  | Fire/Smoke (Building) | Electrical     | Electrical fire in a capacitor room.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| LANL | \$65,000  | Fire/Smoke (Building) | Design Related | A failed dump resistor caught fire in a capacitor room. Fire had self-extinguished prior to fire department arrival.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| HANF | \$61,579  | Fire/Smoke (Vehicle)  | Electrical     | Vehicle Fire – Cause assumed to be electrical in nature.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

NOTE: Major losses associated with leaks, spills, releases, and actuations are detailed in the Water-Based Fire Suppression System Actuations and Non-Water-Based Fire Suppression System Actuations sections of this report.

## Facility/Property Valuation and Calculated Fire Loss Rates

Facility/property valuation is calculated by combining data from the Facility Information Management System (FIMS) and Property Information Database System (PIDS). The combined totals serve as a common denominator for calculating and normalizing Fire Loss Rates and Fire Protection Program Cost Rates (discussed later in this report). For historical context, Figure 3 displays the total DOE valuation trend over the past 20 years.



*Figure 3: DOE Total Valuation from FIMS and PIDS 2004-2023*

In 2023, total DOE valuation for sites reporting into the FPRS was \$288.6 billion, an eight percent increase from 2022.

Fire Loss Rates are calculated using monetary losses and total valuation. Figure 4 displays the DOE Fire Loss Rates over the past 20 years.

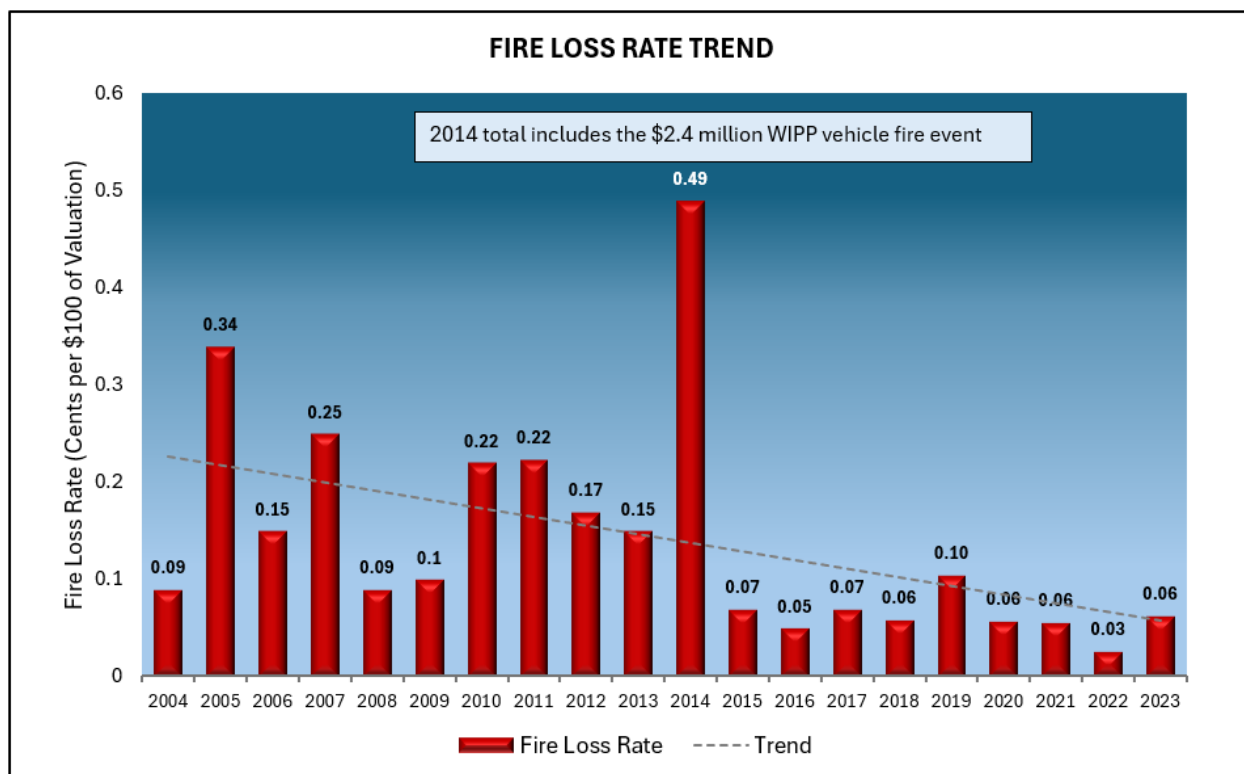


Figure 4: DOE Fire Loss Rates 2004-2023

DOE's calculated 2023 Fire Loss Rate for sites reporting into FIMS, PIDS, and the FPRS was approximately 0.06 cents per \$100 of total valuation, a 100 percent increase from 2022. This follows a significant one-year decrease in 2022 with the average of 0.06 cents per \$100 of total valuation for the previous five years.

Figure 5 displays the Fire Loss Rates for sites that reported monetary fire losses into the FPRS in 2023.

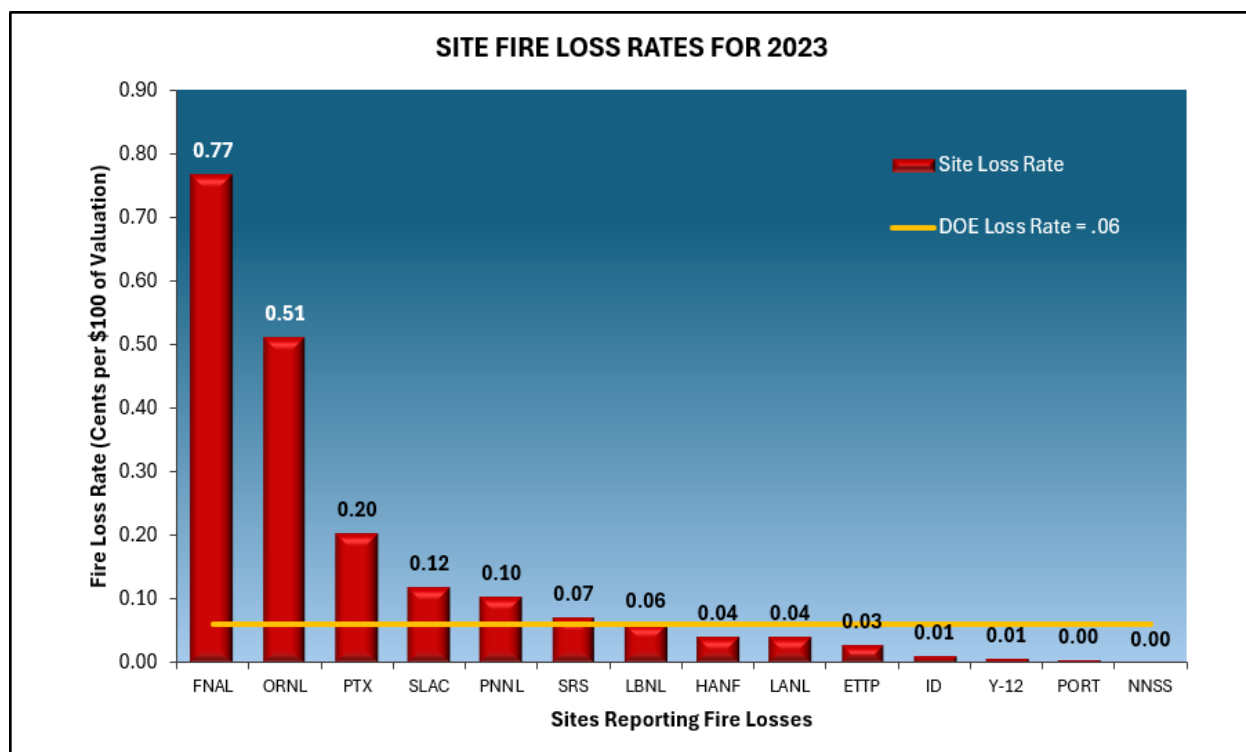


Figure 5: Fire Loss Rates by Site

Fourteen sites reported fire losses in 2023, a 27 percent increase from 2022. The DOE-wide 2023 Fire Loss Rate of 0.06 cents per \$100 is displayed as an orange line in the figure above. FNAL had the highest Fire Loss Rate of 0.77 cents per \$100 of valuation, followed by ORNL at 0.51, PTX at 0.20, SLAC at 0.12, PNNL at 0.10, and SRS at 0.07. All other sites were at or below the DOE-wide rate, with some rounding down to zero.



## DOE Fire Loss History

Table 4 displays DOE historical fire loss information, including valuations, monetary losses, and calculated Fire Loss Rates since 1950.

*Table 4: DOE Fire Loss History*

| Year | Valuation<br>(Millions) | Fire Loss<br>(Dollars) | Fire Loss Rate<br>(Cents per \$100 Valuation) | Previous 5-Year Average<br>(Cents per \$100 Valuation) |
|------|-------------------------|------------------------|-----------------------------------------------|--------------------------------------------------------|
| 1950 | 1,800.00                | 496,439                | 2.76                                          | —                                                      |
| 1951 | 2,177.10                | 356,115                | 1.64                                          | —                                                      |
| 1952 | 3,055.10                | 805,707                | 2.64                                          | —                                                      |
| 1953 | 4,081.00                | 575,572                | 1.41                                          | —                                                      |
| 1954 | 6,095.90                | 375,874                | 0.62                                          | —                                                      |
| 1955 | 6,954.20                | 455,788                | 0.66                                          | 1.81                                                   |
| 1956 | 7,364.10                | 3,147,423              | 4.27                                          | 1.39                                                   |
| 1957 | 7,973.20                | 1,476,599              | 1.85                                          | 1.92                                                   |
| 1958 | 8,102.50                | 751,825                | 0.93                                          | 1.76                                                   |
| 1959 | 10,301.80               | 1,197,901              | 1.16                                          | 1.67                                                   |
| 1960 | 10,708.60               | 1,401,051              | 1.31                                          | 1.77                                                   |
| 1961 | 11,929.90               | 5,856,055              | 4.91                                          | 1.91                                                   |
| 1962 | 12,108.80               | 3,313,364              | 2.74                                          | 2.03                                                   |
| 1963 | 13,288.90               | 1,376,054              | 1.04                                          | 2.21                                                   |
| 1964 | 14,582.80               | 1,351,035              | 0.93                                          | 2.23                                                   |
| 1965 | 15,679.30               | 3,850,069              | 2.46                                          | 2.18                                                   |
| 1966 | 16,669.00               | 856,973                | 0.51                                          | 2.41                                                   |
| 1967 | 17,450.90               | 2,782,934              | 1.59                                          | 1.53                                                   |
| 1968 | 18,611.90               | 869,083                | 0.47                                          | 1.31                                                   |
| 1969 | 20,068.30               | 28,054,334             | 13.98                                         | 1.19                                                   |
| 1970 | 22,004.30               | 1,700,792              | 0.77                                          | 3.80                                                   |
| 1971 | 24,155.80               | 1,936,049              | 0.80                                          | 3.47                                                   |
| 1972 | 26,383.50               | 920,651                | 0.35                                          | 3.52                                                   |
| 1973 | 27,166.70               | 2,375,688              | 0.87                                          | 3.27                                                   |
| 1974 | 28,255.50               | 1,179,877              | 0.42                                          | 3.36                                                   |
| 1975 | 31,658.30               | 5,252,349              | 1.66                                          | 0.64                                                   |
| 1976 | 35,512.70               | 2,292,576              | 0.65                                          | 0.82                                                   |
| 1977 | 39,856.10               | 3,613,984              | 0.91                                          | 0.79                                                   |
| 1978 | 47,027.10               | 17,477,979             | 3.72                                          | 0.90                                                   |
| 1979 | 50,340.80               | 2,541,023              | 0.50                                          | 1.47                                                   |
| 1980 | 54,654.70               | 8,545,935              | 1.56                                          | 1.49                                                   |
| 1981 | 59,988.80               | 4,643,488              | 0.77                                          | 1.47                                                   |
| 1982 | 65,360.40               | 4,200,968              | 0.64                                          | 1.49                                                   |
| 1983 | 70,484.40               | 10,497,062             | 1.49                                          | 1.44                                                   |
| 1984 | 82,166.90               | 6,467,320              | 0.79                                          | 0.99                                                   |

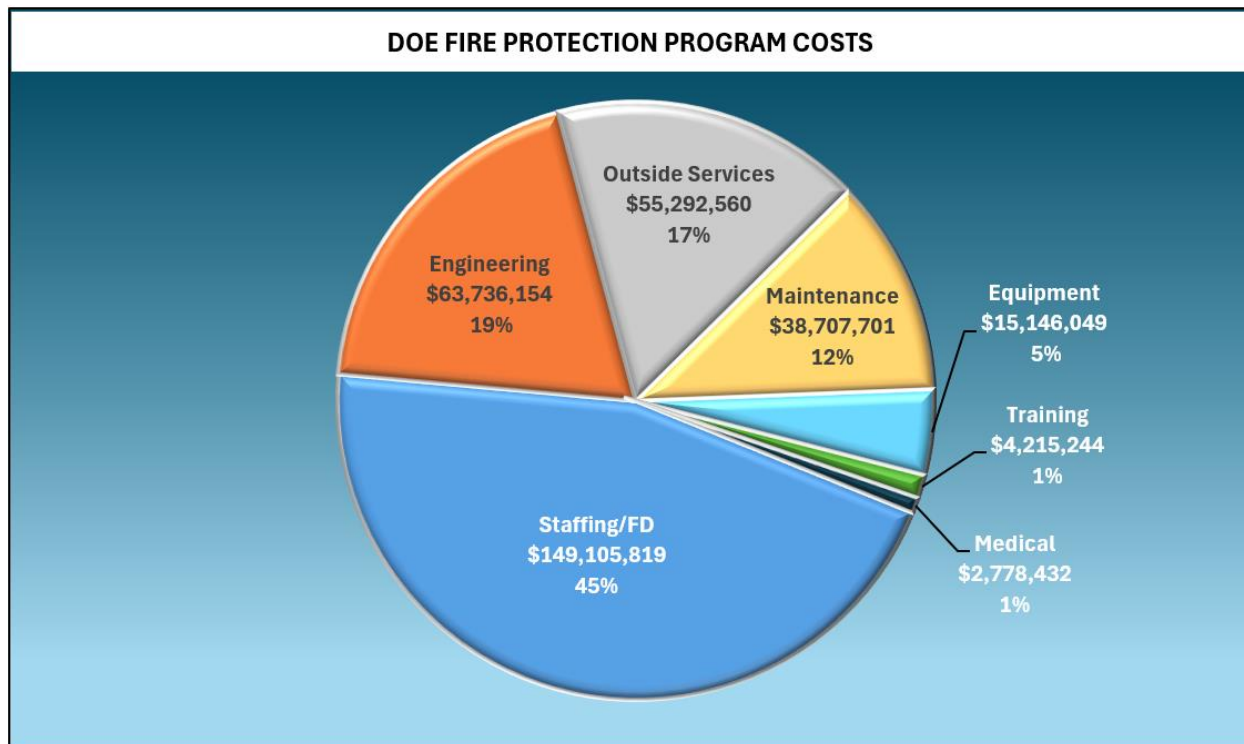
**DOE Fire Loss History (continued)**

| Year  | Valuation<br>(Millions) | Fire Loss<br>(Dollars) | Fire Loss Rate<br>(Cents per \$100 Valuation) | Previous 5-Year Average<br>(Cents per \$100 Valuation) |
|-------|-------------------------|------------------------|-----------------------------------------------|--------------------------------------------------------|
| 1985  | 86,321.84               | 4,129,297              | 0.48                                          | 1.05                                                   |
| 1986  | 82,787.52               | 5,295,292              | 0.64                                          | 0.83                                                   |
| 1987  | 91,927.20               | 3,010,829              | 0.33                                          | 0.81                                                   |
| 1988  | 92,998.00               | 8,303,120              | 0.89                                          | 0.74                                                   |
| 1989  | 107,948.00              | 7,505,551              | 0.70                                          | 0.63                                                   |
| 1990  | 115,076.00              | 17,470,746             | 1.52                                          | 0.61                                                   |
| 1991  | 118,868.68              | 2,428,805              | 0.20                                          | 0.81                                                   |
| 1992  | 118,267.06              | 3,653,554              | 0.31                                          | 0.73                                                   |
| 1993  | 119,826.25              | 3,018,534              | 0.25                                          | 0.72                                                   |
| 1994  | 124,350.29              | 3,403,650              | 0.27                                          | 0.60                                                   |
| 1995  | 120,321.68              | 1,632,466              | 0.14                                          | 0.51                                                   |
| 1996  | 113,471.00              | 6,025,832              | 0.53                                          | 0.23                                                   |
| 1997  | 102,947.24              | 6,112,887              | 0.59                                          | 0.30                                                   |
| 1998  | 99,127.79               | 1,378,788              | 0.14                                          | 0.36                                                   |
| 1999  | 110,858.47              | 2,911,040              | 0.26                                          | 0.33                                                   |
| 2000  | 102,514.01              | 103,174,122            | 10.06                                         | 0.33                                                   |
| 2001  | 103,215.56              | 505,586                | 0.05                                          | 2.32                                                   |
| 2002  | 98,779.44               | 2,461,847              | 0.25                                          | 2.22                                                   |
| 2003  | 70,812.80               | 1,075,309              | 0.15                                          | 2.15                                                   |
| 2004  | 72,601.95               | 622,613                | 0.09                                          | 2.16                                                   |
| 2005  | 74,951.25               | 2,537,565              | 0.34                                          | 2.12                                                   |
| 2006  | 64,547.05               | 997,805                | 0.15                                          | 0.17                                                   |
| 2007  | 67,382.01               | 1,674,515              | 0.25                                          | 0.20                                                   |
| 2008  | 60,576.55               | 573,161                | 0.09                                          | 0.20                                                   |
| 2009  | 63,569.89               | 623,299                | 0.10                                          | 0.18                                                   |
| 2010  | 74,417.99               | 1,608,762              | 0.22                                          | 0.19                                                   |
| 2011* | 101,351.17              | 2,250,744              | 0.22                                          | 0.16                                                   |
| 2012* | 105,238.57              | 1,840,121              | 0.17                                          | 0.18                                                   |
| 2013* | 101,940.69              | 1,572,342              | 0.15                                          | 0.16                                                   |
| 2014* | 101,437.21              | 4,953,200              | 0.49                                          | 0.17                                                   |
| 2015  | 129,041.10              | 929,879                | 0.07                                          | 0.25                                                   |
| 2016  | 141,386.52              | 679,619                | 0.05                                          | 0.22                                                   |
| 2017  | 150,206.75              | 1,008,295              | 0.07                                          | 0.19                                                   |
| 2018  | 156,161.05              | 917,936                | 0.06                                          | 0.17                                                   |
| 2019  | 225,242.45              | 2,360,843              | 0.10                                          | 0.15                                                   |
| 2020  | 229,570.58              | 1,328,871              | 0.06                                          | 0.07                                                   |
| 2021  | 239,970.22              | 1,336,492              | 0.06                                          | 0.07                                                   |
| 2022  | 267,078.63              | 711,619                | 0.03                                          | 0.07                                                   |
| 2023  | 288,634.74              | 1,723,711              | 0.06                                          | 0.06                                                   |

\* Fire Loss Amounts from 2011-2014 (column 3) include both fire and non-fire losses such as system leaks, spills, and releases.

## Recurring Fire Protection Program Costs

DOE elements are required to report costs associated with recurring fire protection activities into the FRPS annually. Figure 6 displays the DOE recurring cost distribution by activity type in 2023.



*Figure 6: Fire Protection Program Costs by Activity in 2023*

DOE total recurring fire protection costs for 2023 were \$328,981,959, a seven percent increase from 2022. Staffing/Fire Department Costs represented 45 percent of all fire protection costs.

A Fire Protection Program Cost Rate may be calculated the same way as Fire Loss Rates, using facility and property valuations. Figure 7 displays the Fire Protection Program Cost Rates for the sites in 2023.

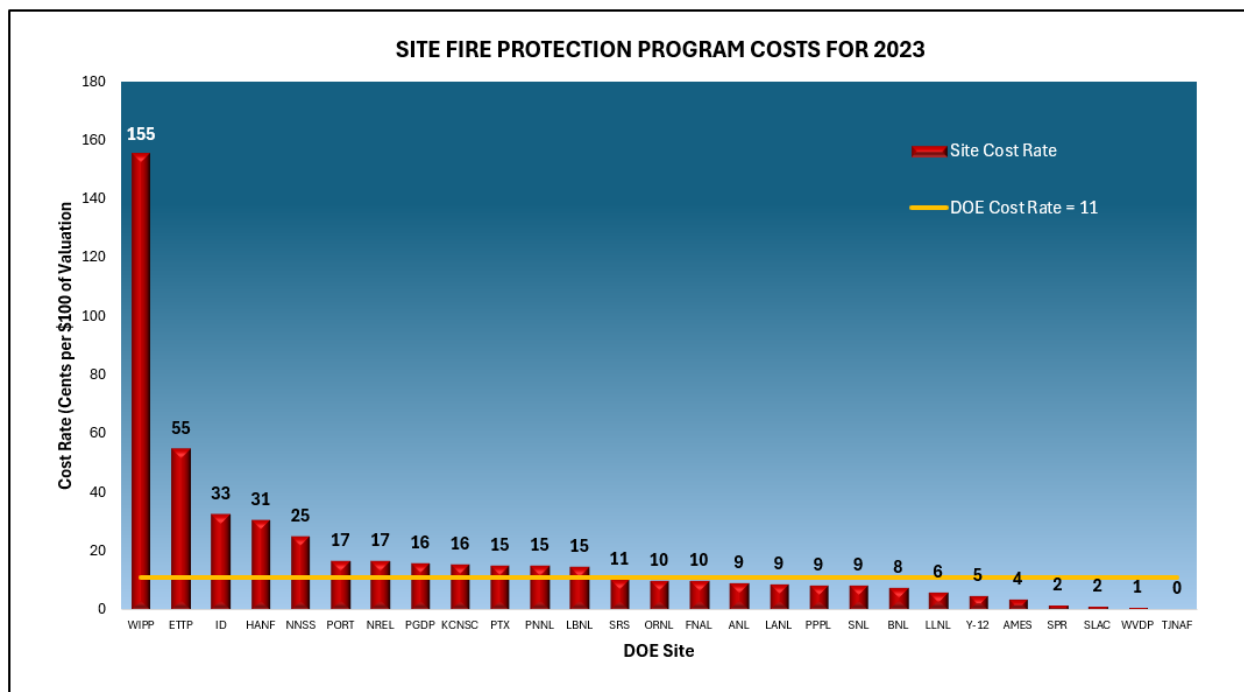


Figure 7: Fire Protection Program Cost Rates by Site

In 2023, the DOE Fire Protection Program Cost Rate was approximately 11 cents per \$100 (dollars) of property valuation for recurring fire protection activities, displayed as the orange line on the chart; a one percent decrease from 2022.

The Waste Isolation Pilot Plant (WIPP) had the highest rate at \$1.55 cents per \$100 of valuation, a 107 percent increase from 2022. This was followed by the East Tennessee Technology Park (ETTP) at 55 cents. DOE-wide, 12 sites had cost rates higher than the DOE rate, while 15 sites were at or below the DOE rate.

It should be noted that recurring cost activities are not reported consistently across the DOE Enterprise. Some sites maintain their own fire departments, while other sites contract with local municipal or volunteer fire departments for fire protection activities. This can result in differing cost levels and/or distributions for “Staffing/FD,” “Outside Services,” “Engineering” and “Maintenance” activities.

Note: WIPP, by comparison to the other sites/facilities, reported one of the lowest valuations from FIMS and PIDS in 2023, however, WIPP also reported higher program costs for the year, resulting in a high rate when normalizing for Fire Protection Program Cost rate.

## Water-Based Fire Suppression System Actuations

When a water-based fire suppression system is actuated, whether by fire, equipment malfunction, or human or environmental influence, there are costs associated with the event. These costs may include damage or loss of facilities and equipment, replacement or repair costs, fire department response costs, recharging fire suppression systems, cleanup costs, etc.. Table 5 displays the distribution of DOE Water-Based Fire Suppression System Actuations by cause in 2023.

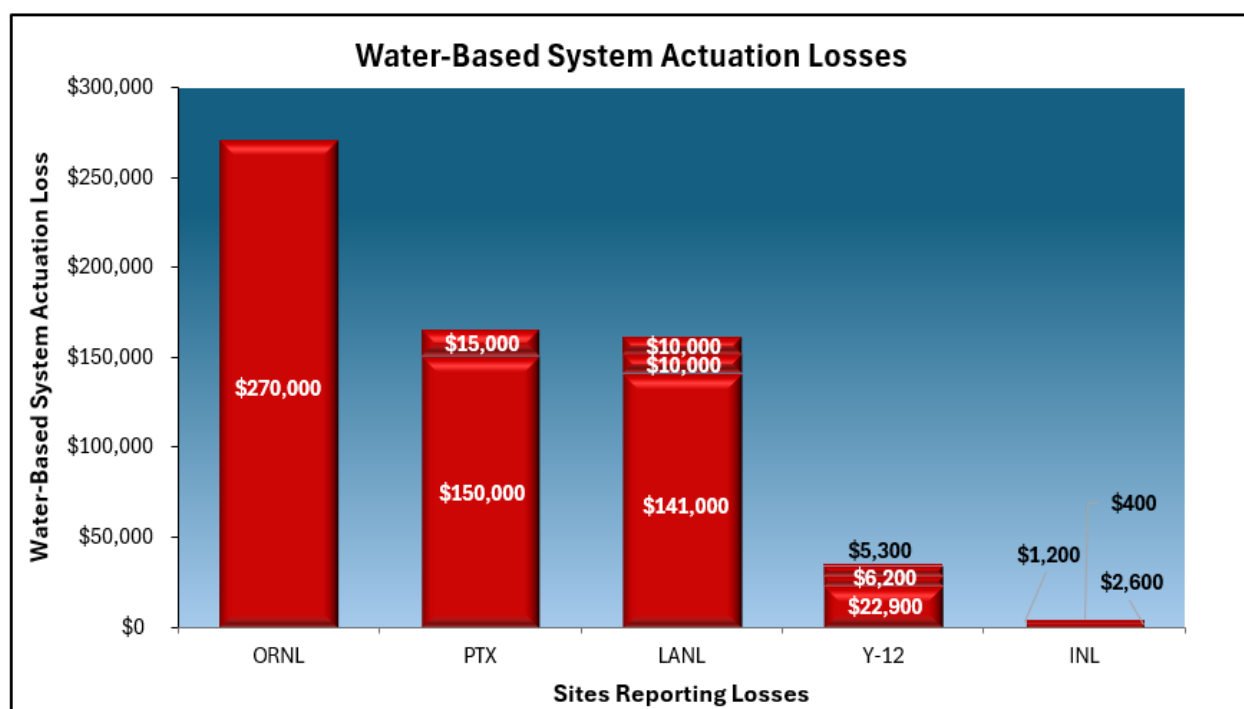
*Table 5: Water-Based Fire Suppression System Actuation Causes*

| WATER-BASED SYSTEM ACTUATION CAUSES |               |                  |
|-------------------------------------|---------------|------------------|
| Cause                               | No. of Events | Cost             |
| Weather Related                     | 5             | \$293,350        |
| Employee Related                    | 3             | \$291,400        |
| Other                               | 3             | \$39,100         |
| Unspecified                         | 2             | \$11,500         |
| <b>TOTAL</b>                        | <b>13</b>     | <b>\$635,350</b> |

In 2023, DOE facilities reported actuations of 13 wet-pipe suppression systems, all of which resulted in financial losses totaling \$635,350, a 448 percent increase from 2022.

Figure 8 displays the 13 water-based fire suppression actuation loss amounts for each event in 2023.

*Figure 8: Water-Based Fire Suppression System Actuation Losses*



The increase in financial losses in 2023 was attributed to three events, together costing \$561,000, 88 percent of total water-based system actuation losses. Of these three events, two were employee related while the third was weather related.

Table 6 displays the Water-Based Fire Suppression Actuation events resulting in costs of \$10,000 or greater. These seven events cost \$618,900 and represent 97 percent of the total costs associated with DOE Water-Based Fire Suppression Actuators in 2023.

*Table 6: Costliest Water-Based Fire Suppression System Actuators*

| <b>COSTLIEST WATER-BASED SUPPRESSION SYSTEM ACTUATIONS (≥\$10K)</b> |                    |                         |                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|---------------------------------------------------------------------|--------------------|-------------------------|----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Site</b>                                                         | <b>Loss Amount</b> | <b>Loss Type</b>        | <b>Cause &amp; Other Factors</b> | <b>Description</b>                                                                                                                                                                                                                                                                                                                                                                                                                             |
| ORNL                                                                | \$270,000          | Leaks, Spills, Releases | Weather related                  | Very low temperatures froze and broke a fire sprinkler line in Building 7009. Water damage was extensive and resulted in a disruption to building operations for an extended period.                                                                                                                                                                                                                                                           |
| PTX                                                                 | \$150,000          | Leaks, Spills, Releases | Employee related                 | While performing a Preventative Maintenance on the fire system in 12-044 Cell 2, which was impaired, the technician inadvertently activated the deluge suppression system in 12-044 Cell 3 releasing approximately 8,000 gallons of water in the facility. Various equipment and weapons tooling were damaged in the facility due to the significant amount of water. This event was not fire related but human error during a fire system PM. |
| LANL                                                                | \$141,000          | Leaks, Spills, Releases | Employee related                 | While electrical wiring work was being conducted in a cable tray, wires were crossed that actuated a sprinkler head in a plenum.                                                                                                                                                                                                                                                                                                               |
| Y-12                                                                | \$22,900           | Leaks, Spills, Releases | Other/Equipment Degradation      | Sprinkler fused due to steam leak in Fan House SF-004.                                                                                                                                                                                                                                                                                                                                                                                         |
| PTX                                                                 | \$15,000           | Leaks, Spills, Releases | Other                            | Manual release on riser was not fully closed.                                                                                                                                                                                                                                                                                                                                                                                                  |
| LANL                                                                | \$10,000           | Leaks, Spills, Releases | Weather related                  | Broken sprinkler head likely due to a frozen pipe.                                                                                                                                                                                                                                                                                                                                                                                             |
| LANL                                                                | \$10,000           | Leaks, Spills, Releases | Weather related                  | A frozen pipe caused a sprinkler head to break. Water caused damage to stored equipment in adjacent area.                                                                                                                                                                                                                                                                                                                                      |

## Non-Water-Based Fire Suppression System Actuations

Non-water-based fire suppression system actuations include wet chemical (including halon), dry chemical, and clean agent extinguishing systems. Chlorofluorocarbons (including halon) are regulated under the 1991 Clean Air Act due to their detrimental impact on the ozone layer. The Environmental Protection Agency has published regulations to 1) prohibit halon production; 2) establish container labeling requirements; 3) impose Federal procurement restrictions and halon taxes; 4) issue requirements for the approval of alternative agents; and 5) identify essential areas where halon protection is considered acceptable.

DOE policy, as stated in Memorandum DOE F 132S.8, *Managed Phase Out of Halon Fixed Fire Suppression Systems*, prohibits the installation of any new halon systems. Field organizations have been requested to aggressively pursue alternative fire suppression agents to replace existing halon systems, and to effectively manage halon inventories. The Department's long-term goal is the eventual elimination of all halon systems.

In 2023, 120 active halon systems were reported in use at DOE sites, a 2 percent decrease from 2022. Eighty-one of the 120 active halon systems (68 percent) were at the Savannah River Site, 19 systems (16 percent) were at the Fermi National Laboratory, and 12 systems (10 percent) were at the Thomas Jefferson National Accelerator Facility.

There were two loss events associated with Non-Water-Based Suppression Systems resulting in losses of \$76,000, a 704 percent increase from 2022. Table 7 provides information regarding both events.

*Table 7: Non-Water-Based Fire Suppression System Actuation*

| NON-WATER-BASED SYSTEM ACTUATIONS |             |                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-----------------------------------|-------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Site                              | Loss Amount | Cause            | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| INL                               | \$26,000    | Employee Related | On July 31, 2023, the fire alarm and suppression (FM-200) system at Howe Peak functioned as expected and discharged following an electrical arc (due to the subcontractor cutting into energized electrical not identified on the outage) during work on a UPS system (Outage # LMR-009). At 1519 the first smoke detector (SD-6) in the battery room went into alarm. Within seconds, the second smoke detector (SD-5) also went into alarm. The combination of 2 smoke detector alarms triggered the FM-200 suppression system to release which it did at 1521. The subsequent smoke detector alarms (SD-4, SD-7, and SD-2) activated as the agent filled the building and the detector's sense particulate in the air. No injuries, fire, or significant damage was created resulting from the incident. |
| PTX                               | \$50,000    | Other            | Equipment failure immediately following Preventative Maintenance on the fire system. The Annual Mechanical PM was being performed. After the system was restored, the electronic control head failed causing a release and expelled 531 pounds of FM-200 clean agent within the facility. This release was a mechanical failure, not fire related.                                                                                                                                                                                                                                                                                                                                                                                                                                                          |

## Fire Department Responses

Table 8 displays the distribution of 2023 fire department emergency and non-emergency responses at DOE sites by call category.

*Table 8: Fire Department Responses*

| FIRE DEPARTMENT RESPONSES |            |              |                       |                     |               |             | Percentage Difference<br>2022 to 2023 |
|---------------------------|------------|--------------|-----------------------|---------------------|---------------|-------------|---------------------------------------|
| Site                      | Fire Calls | HazMat Calls | Other Emergency Calls | Non-Emergency Calls | Medical Calls | TOTAL CALLS |                                       |
| AMES                      | 5          | 0            | 0                     | 0                   | 0             | 5           | 0 to 5 calls in 2023                  |
| ANL                       | 7          | 35           | 20                    | 447                 | 144           | 653         | 2%                                    |
| BNL                       | 18         | 36           | 144                   | 58                  | 111           | 367         | 11%                                   |
| ETTP                      | 4          | 0            | 0                     | 1                   | 4             | 9           | -40%                                  |
| FNAL                      | 1          | 5            | 62                    | 169                 | 27            | 264         | 34%                                   |
| HANF                      | 34         | 0            | 109                   | 386                 | 214           | 743         | -2%                                   |
| INL                       | 80         | 3            | 2                     | 15                  | 186           | 286         | 3%                                    |
| KCNCS                     | 7          | 0            | 0                     | 0                   | 19            | 26          | 86%                                   |
| LBNL                      | 3          | 1            | 51                    | 0                   | 19            | 74          | 118%                                  |
| LLNL                      | 9          | 18           | 615                   | 10                  | 65            | 717         | 1%                                    |
| LANL                      | 18         | 29           | 179                   | 173                 | 76            | 475         | 29%                                   |
| NREL                      | 0          | 1            | 6                     | 38                  | 6             | 51          | 65%                                   |
| NNSS                      | 3          | 0            | 7                     | 41                  | 53            | 104         | -25%                                  |
| OST                       | 0          | 0            | 0                     | 2                   | 0             | 2           | -60%                                  |
| ORNL                      | 21         | 1            | 53                    | 225                 | 95            | 395         | -13%                                  |
| PNNL                      | 0          | 0            | 0                     | 12                  | 10            | 22          | 83%                                   |
| PGDP                      | 10         | 0            | 147                   | 17                  | 33            | 207         | 16%                                   |
| PTX                       | 5          | 21           | 114                   | 127                 | 108           | 375         | -9%                                   |
| PORT                      | 7          | 7            | 141                   | 0                   | 138           | 293         | -9%                                   |
| PPPL                      | 3          | 9            | 25                    | 14                  | 18            | 69          | -83%                                  |
| SNL                       | 2          | 9            | 17                    | 72                  | 29            | 129         | 68%                                   |
| SRS                       | 15         | 6            | 136                   | 23                  | 291           | 471         | -10%                                  |
| SLAC                      | 3          | 0            | 0                     | 48                  | 15            | 66          | 288%                                  |
| SPR                       | 2          | 8            | 0                     | 0                   | 156           | 166         | 191%                                  |
| TJNAF                     | 1          | 0            | 1                     | 0                   | 3             | 5           | -17%                                  |
| WIPP                      | 50         | 5            | 3                     | 4                   | 58            | 120         | 114%                                  |
| WVDP                      | 4          | 0            | 0                     | 2                   | 2             | 8           | 33%                                   |
| Y-12                      | 6          | 17           | 201                   | 29                  | 219           | 472         | -10%                                  |
| <b>TOTAL</b>              | <b>318</b> | <b>211</b>   | <b>2033</b>           | <b>1913</b>         | <b>2099</b>   | <b>6574</b> | <b>0.14%</b>                          |

There were 6,574 Fire Department responses in 2023, a 0.14 percent increase from 2022.



## Fire Protection Occurrences Reported in ORPS

Fire and fire protection events that meet the reportability thresholds described in DOE O 232.2A, *Occurrence Reporting and Processing of Operations Information*, are required to be input into the Occurrence Reporting and Processing System (ORPS) database.

There were no ORPS-reportable fire or fire protection-related injuries or fatalities reported in 2023. There were 167 fire or fire protection-related occurrences reported in ORPS in 2023, a 4 percent decrease from 2022. Of the 167 occurrences, 11 (7 percent) were rated High Level, 112 (67 percent) were rated Low Level, and 44 (26 percent) were rated Informational Level.

Table 9 displays the distribution of Fire Protection ORPS keywords. Note: The 167 fire protection occurrences resulted in 169 assigned keywords because two occurrences were assigned two keywords each.

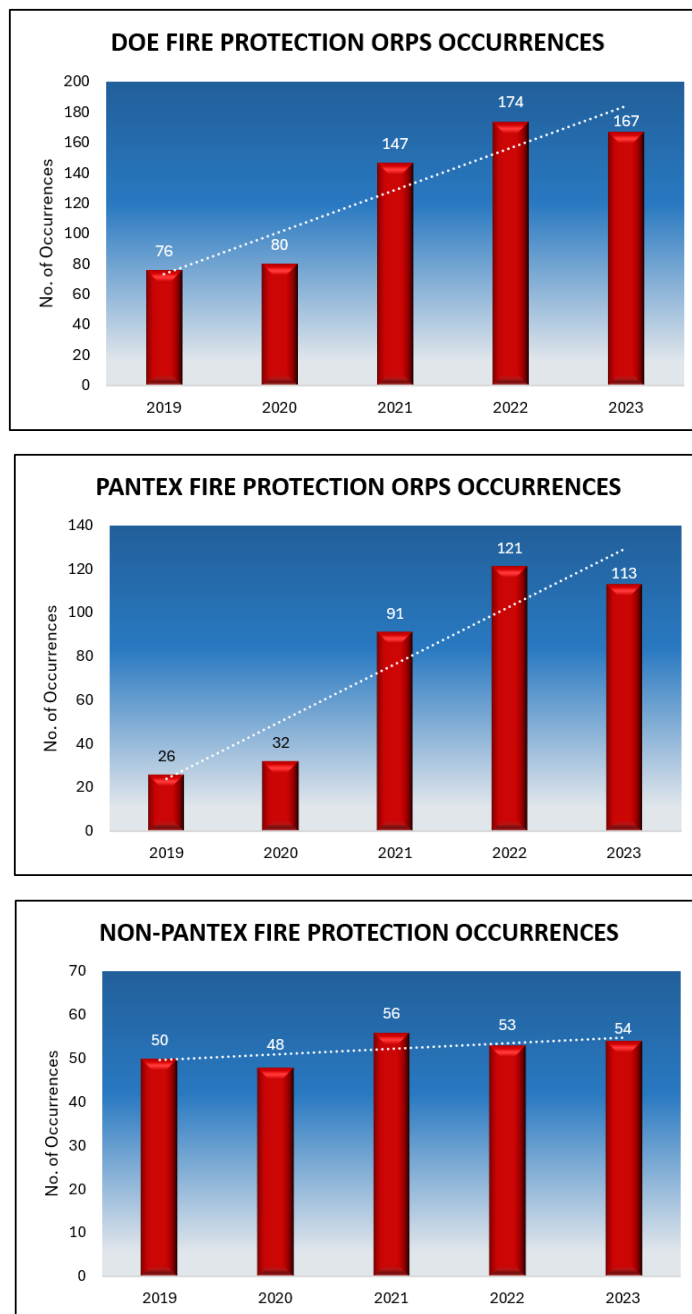
*Table 9: Distribution of Fire Protection ORPS Keywords*

| FIRE PROTECTION ORPS OCCURRENCES |                                                                        |             |
|----------------------------------|------------------------------------------------------------------------|-------------|
| Code                             | Keyword Name                                                           | Occurrences |
| 03A                              | Fire Protection Equip Degradation                                      | 120         |
| 03B                              | Fire Suppression Actuation                                             | 4           |
| 03C                              | Facility Fire                                                          | 31          |
| 03D                              | Explosives Safety Issue                                                | 1           |
| 03E                              | National Fire Protection Association (NFPA) Code/Fire Protection Issue | 4           |
| 03F                              | Explosion                                                              | 1           |
| 03G                              | Wildland Fire                                                          | 8           |
|                                  | <b>TOTAL</b>                                                           | <b>169</b>  |

In 2023, *Fire Protection Equipment Degradation* was identified in 72 percent of all fire protection ORPS reports, followed by *Facility Fire* at 19 percent.

## DOE Annual Fire Protection Program Summary for Calendar Year 2023

Over the past 5 years, Pantex Plant occurrences reported into ORPS have increased from 34 percent to 68 percent of all DOE fire protection occurrences. The vast majority of these continue to be attributable to fire protection equipment degradation events at Pantex Plant resulting from ongoing issues associated with the Det-Tronics system. Figure 9 displays the 5-year trend of DOE fire protection ORPS occurrences, with and without Pantex Plant.



*Figure 9: Fire Protection Occurrence Trend from ORPS*

While DOE fire protection ORPS occurrences continue to trend upward, the trendline is much flatter when Pantex Plant occurrences are removed. The equipment degradation events at Pantex Plant accounted for 81 percent (92 occurrences) of all Pantex fire protection occurrences and 55 percent of total DOE fire protection occurrences.

*DOE Annual Fire Protection Program Summary for Calendar Year 2023*

Table 10 displays summaries of the 11 fire protection ORPS occurrences rated as High Level in 2023.

*Table 10: Summaries of High Level Fire Protection ORPS Occurrences*

| HIGH-LEVEL FIRE PROTECTION ORPS OCCURRENCES |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Site                                        | Occurrence Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| LANL                                        | Summarized: On March 28, 2023, an employee (E1) with LANL Logistics Central Shops group was performing the annual Technical Safety Requirement (TSR) 304 Sprinkler Head and Tile Surveillance when they noticed a portion of a sprinkler deflector was damaged, resulting in a TSR violation. E1 contacted a Cognizant Systems Engineer (CSE) to help evaluate the sprinkler's status. In addition, documentation was submitted for the sprinkler head, however the Shift Operations Supervisor (SOS) was not clearly informed of the as-found condition of the sprinkler. The CSE and E1 placed a Facility Service Request required to replace the sprinkler. On March 29, the On-Shift SOS initiated "Limited Conditions of Operation" (LCO) status and required actions. The CSE recommended to facility management that the sprinkler was operable but degraded. The Facility Operations Manager concurred and declared the sprinkler operable, allowing an exit from LCO actions. The CSE evaluated the sprinkler and made recommendations on its operability until a replacement could be made. (NA--LASO-LANL-CMR-2023-0002) |
| LANL                                        | Summarized: On June 15, 2023, the firing site leader (E1) with LANL's Explosives Applications and Special Projects (M-6) group discovered a fire at the high explosives firing site immediately after a planned explosives test. The LAFD were notified and extinguished the fire. E1 radioed Access Control who notified the Emergency Operations Support Center and Weapons Facility Operations (WFO) Facility Operations Director (FOD) Duty Officer. High explosives operations at TA-39-0006 are paused until LAFD releases the site to the FOD. The WFO FOD will schedule a fact finding and a causal analysis will be conducted. The event is being tracked as Issues Management Record Number: 2023-9458. (NA--LASO-LANL-FIRNGHELAB-2023-0001)                                                                                                                                                                                                                                                                                                                                                                              |
| LBNL                                        | Summarized: On January 24, 2023, an air compressor caught on fire in Building 43. The adjacent occupied building (Building 48) was evacuated. The fire was fully extinguished and there were no injuries. The cause of the fire is unknown and under investigation. Compressed air to the main hill site was impacted. Facilities restored the compressed air system using portable air compressors on January 25. Normal operation to the main hill site was restored when the electric primary air compressor was started and placed online; however, no electric backups will be available until the damaged and aging compressors are replaced. (SC--BSO-LBL-DIR-2023-0001)                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| PTX                                         | Summarized: On November 13, 2023, there was a fire on the discharge of the drum dryer while formulating inert mock material. Engineering Technicians (ET) used fire extinguishers to put out the fire and activated the facility fire alarms utilizing the manual pull box. High Explosives Manufacturing personnel evacuated the facility. An employee sustained minor burns to the hand without redness or blistering. The employee was evaluated at medical, treated with first aid, and returned to work. TOPIC event E-6178 was initiated in the Issues Management system. (NA--NPO-CNS-PANTEX-2023-0185)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| RL                                          | Summarized: On January 18, 2023, after performing fire suppression dry pipe system internal inspections at 2402-WF building, an F.E. Moran subcontractor worker arrived at the Central Waste Complex (CWC) Shift Office to report excess sediment that was identified in the branch lines. An emergency impairment was declared in accordance with CPCC-PRO-FP-40426, Fire Protection System Discrepancies, and the fire suppression system was subsequently determined to be inoperable. The facility remains in Limiting Condition for Operation 3.2.1, Fire Suppression Systems. A flush was scheduled on January 19 in order to restore operability to the system. (EM-RL--CPCC-SWOC-2023-0002)                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| RP                                          | Summarized: On May 2, 2023, an installed instrument (flow indicator transmitter) in the Tank-Side Cesium Removal system was missing expected hazardous area classification markings. The instrument did not include the necessary NFPA 70E NEC symbolic mark required to be visible on the instrument. The instrument was also not procured with the certifications that meet Specific Administrative Control 5.8.2 Flammable Gas Controls. At the time, a provision in the electrical code NFPA 70 was cited to allow use of the existing instrument. It was later determined the NFPA 70 code provision was misinterpreted, and the instrument did not meet the required hazardous area classification ignition controls. Recent assessments and evaluations by the DOE Office of River Protection and Washington River Protection Solutions Engineering confirms this instrument does not meet ignition controls. Access restriction was placed on the facility until the system is de-energized. (EM-RP--WRPS-TANKFARM-2023-0007)                                                                                               |
| SNLA                                        | Summarized: On August 2, 2023, an explosive test was conducted at the Terminal Ballistics Facility (TBF) Building 6750, which initiated several small brush fires that were observed on the control room cameras. Kirtland Fire Emergency Services (KFES) were immediately dispatched and extinguished the fires. Radiation Protection support surveys were conducted on TBF and KFES personnel for potential radiation with no detectable readings. The burn area included seven acres of Environmental Restoration Site 83 which has active soil contamination areas that may have been impacted by the fire and potential aerosolization of depleted uranium. Surface soil samples were taken by Radiation Protection for characterization. The TBF team will resume operations, including testing several devices in the remaining test series that are well characterized with minimal fire danger. (NA--SS-SNL-7000-2023-0002)                                                                                                                                                                                                |

*DOE Annual Fire Protection Program Summary for Calendar Year 2023*

|      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Y-12 | Summarized: On January 4, 2023, a sprinkler head activated while restoring water pressure to Wet Pipe System 002 after having it isolated due to a freeze event. This resulted in water rapidly entering the uranium vault area. The area was immediately evacuated, and a 15-foot boundary was established per Y56-001, Abnormal Condition Involving Fissile Material. The Shift Manager notified Nuclear Criticality Safety (NCS) who arrived on scene and discovered concerning conditions including standing water, a cart with sample bottles fully submerged and floating, a wet car work-surface, two carts touching, and multiple plastic bags full of contaminated material sitting on the floor surrounded by floodwater. NCS spaced out the touching carts and is waiting for guidance on how to resolve the remaining concerns. The area was left in a safe and secure state. This occurrence is being tracked to resolution in TOPIC E-5697. (NA--NPO-CNS-Y12NSC-2023-0001) |
| Y-12 | Summarized: On February 8, 2023, a Radiological Control Technician (RCT) experienced tingling in their right thumb and smoke residue on their right hand when plugging in a portable heater to a wall receptacle; however, the cord arc faulted after the attachment plug was fully seated into the electrical receptacle. The RCT grabbed the cord and unplugged the cord to stop the arc fault. The cord smoked and a small flame came from behind the cord strain relief of the attachment plug, which self-extinguished upon being removed. There was no visible damage to the electrical receptacle. The RCT was released without restrictions and no further instructions for follow-up. Appropriate notifications were made. (NA--NPO-CNS-Y12NSC-2023-0010)                                                                                                                                                                                                                       |
| Y-12 | Summarized: On February 22, 2023, uranium metal chips had been pressed into a briquette and were being weighed when the briquette began to smolder and glow red with heat. The Operators covered the item with coke and called 911. The Fire Department arrived and added additional coke to the still smoldering material including capping the metal coke can over the pile. The material continued to smolder for over an hour before the temperature began to lower. There was no fire or damage outside of the small hood that the briquette was contained in. The material was monitored by the Fire Department as it cooled. A Re-entry Plan was established and executed. A Recovery Plan was prepared and briefed. The site area emergency was terminated later that day. (NA--NPO-CNS-Y12NSC-2023-0021)                                                                                                                                                                        |
| Y-12 | Summarized: On June 14, 2023, a fire occurred in Building 9202, Weld Booth 197. An employee had been using a plasma torch to cut a piece of carbon steel. Shortly after, two small areas with flames were noticed. A fire extinguisher was used to put out the fires. The Y-12 Fire Department arrived on scene, checked the area, began ventilating the room, and incident command issued a precautionary order to evacuate Building 9202. There were no injuries or obvious damage to the facility that was visible at the time. It was discovered that a plastic cart immediately to the left of the Weld Booth door had melted and collapsed, resulting in the crash of items to the floor and the displacement of two packages of burning paper towels and wipes near the entrance of the door. Affected employees were accompanied by their supervisor to Methodist Medical Center for evaluation as a precautionary measure. (NA--NPO-CNS-Y12NSC-2023-0034)                       |

## Enhancements to Fire Protection Equipment

In 2023, there were three new apparatus introduced across two sites. One apparatus was introduced at SRS and two at Pantex.

SRS inaugurated the Pierce Velocity hazmat truck with command cab in 2023, which replaces an older 1990's model, introducing 21<sup>st</sup> century technology. Designed primarily for hazardous material mitigation, the truck also serves as a command cab or rehabilitation station for prolonged incidents. Key features include a dual-lens camera with thermal and optical capabilities mounted on a 45-foot telescoping mast for situational awareness, a command cab with internet, a weather station, and multiple screens for camera feeds, television, and drone footage. Additionally, the apparatus has an industrial compressor for liquid offloading, a powerful generator to run equipment and charge the 12-volt system, and fold-down doors that double as seating for responders donning personal protective equipment.



Pantex also introduced two new apparatus, a Rosenbauer Avenger Chassis 1500 Gallons Per Minute (GPM) pumper and a Lifeline type 3 ambulance in 2023.



The Rosenbauer Avenger Chassis 1500 GPM pumper features a durable and customizable chassis with a 1500 GPM pump, water/foam tanks, and advanced safety systems. The apparatus also offers flexible body configurations, powerful Cummins diesel engine options, integrated Light Emitting Diode lighting, and smart technology for efficient firefighting and ease of maintenance.



The Lifeline type 3 ambulance is built on a van chassis, offering a durable and customizable design with spacious medical equipment storage, a well-organized patient compartment, advanced electrical systems, and high-visibility emergency lighting. The ambulance also features strong safety measures and is easily serviceable, making it ideal for emergency medical services.

## **Key Observations for Calendar Year 2023**

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- The DOE-wide 2023 Fire Loss Rate was 0.06 cents per \$100 in total site valuation, equal to 2020 and 2021. This exhibited a 100 percent increase from 2022 which was the lowest rate since the inception of this report (1950).
- DOE elements reported 95 fire protection-related (fire and non-fire) events resulting in monetary losses of \$2,435,061. Compared with 2022 data, this represents a 14 percent decrease in the number of events, but a 191 percent increase in monetary losses.
- There were 46 fire loss events (directly attributable to fire or smoke) in 2023, resulting in monetary losses of \$1,723,711. This represents a 21 percent increase in the number of events, and a 142 percent increase in the monetary loss amounts from 2022.
- There were 14 major fire losses at 10 sites costing \$10,000 or more, a 27 percent increase from the 11 reported in 2022. Of these major fire losses, nine resulted in losses of \$50,000 or greater, compared with three in 2022, a 200 percent increase in the number of such events.
- There were 13 water-based system actuations in 2023, costing \$635,350 in monetary losses, a 448 percent increase from 2022. Three of those events represented 88 percent (\$561,000) of total water-based system actuation losses.
- There were 167 fire or fire protection-related occurrences reported into ORPS, a four percent decrease over 2022. The vast majority of these continue to be attributable to fire protection equipment degradation events at Pantex Plant resulting from ongoing issues associated with the Det-Tronics system.

*Summary provided by:*

Office of ES&H Reporting and Analysis

