Annual Fire Protection Program Summary
for Calendar Year 2014

UNITED STATES DEPARTMENT OF ENERGY

Summary Provided by:

Office of Environmental Protection, Sustainability Support and Corporate Safety Analysis

Office of Environment, Health, Safety and Security (AU)

December 2015

Table of Contents

Figures and Tables

The accompanying figures and tables (in order of appearance) are described as follows.

Foreword

This report, required by Department of Energy (DOE) Order 231.1B, *Environment, Safety and Health Reporting,* is the primary source for quantifying fire and fire-related monetary losses of properties, facilities, and equipment across the DOE Complex.

The report for calendar year (CY) 2014 was summarized from information sent to Headquarters by 27* reporting elements, representing approximately 99 percent of DOE's facility and equipment valuation (most of the significant DOE facilities have reported into this database, with the exception of the Power Marketing Administrations and Headquarters offices). Abbreviations are identified in the Glossary, as are the DOE site reporting elements and major definitions.

The fire protection data for CY2014 were extracted from the DOE Fire Protection Reporting System, with the following organizations reporting into the database.

Ames Laboratory
Argonne National Laboratory
Brookhaven National Laboratory
East Tennessee Technology Park
Fermi National Accelerator Laboratory
Idaho National Laboratory
Kansas City Plant
Lawrence Berkeley National Laboratory
Lawrence Livermore National Laboratory
Los Alamos National Laboratory
National Renewable Energy Laboratory
Nevada National Security Site
Oak Ridge National Laboratory
Office of River Protection
Pacific Northwest National Laboratory
Paducah Gaseous Diffusion Plant
Pantex Plant
Portsmouth Gaseous Diffusion Plant
Princeton Plasma Physics Laboratory
Richland Operations Office
Sandia National Laboratory
Savannah River Site
Stanford Linear Accelerator Laboratory
Strategic Petroleum Reserves
Thomas Jefferson National Accelerator Facility*
Waste Isolation Pilot Plant
West Valley Demonstration Project
Y-12 Plant

*Thomas Jefferson National Accelerator Facility did not report into PIDS or FIMS in CY2014, and therefore cannot be used in calculations based on facility valuations.

Organizations are required to report by April 30th of each year; however, the Office of Environment, Health, Safety and Security (AU) accepts data through the end of May.

In 1999, the Annual Summary reporting process was automated to streamline data collection and provide a comprehensive look at element activities, making it possible to view all responses since 1991 at the Site, Operations, Lead Program Secretarial Office, and Headquarters levels.

In 2007, a new Fire Protection Reporting System was designed by the Office of Corporate Safety Analysis and implemented across the DOE Complex. This allows sites to submit their information on a real-time basis instead of annually.

The Fire Protection Reporting System is located at:
http://energy.gov/ehss/policy-guidance-reports/databases/fire-protection-database. [Password required]

AU continues to work with the DOE Fire Safety Committee to improve the data submission system and the content of the annual report to improve its utility.

Glossary

Headquarters Organizational Elements

AU	Environment, Health, Safety and Security
EE	Energy Efficiency & Renewable Energy
EM	Environmental Management
FE	Fossil Energy
LM	Legacy Management
NE	Nuclear Energy
NNSA	National Nuclear Security Administration
PMA	Power Marketing Administrations
SC	Science

Field/Area/Site Organizational Elements

CAO	Carlsbad Area Office
CH	Chicago Operations Office
GFO	Golden Field Office
GJO	Grand Junction Office
DOE-ID	Idaho Operations Office
KCSO	Kansas City Site Office
LSO	Livermore Site Office
LASO	Los Alamos Site Office
NETL	National Energy Technology Laboratory
NPR	Naval Petroleum Reserves
NSO	Nevada Site Office
ORO	Oak Ridge Operations Office
ORP	Office of River Protection
PXSO	Pantex Site Office
RL	Richland Operations Office
SSO	Sandia Site Office
SRO	Savannah River Operations Office
SPR	Strategic Petroleum Reserve Office
YSO	Y-12 Site Office

Site Abbreviations and Acronyms

ALA	Ames Laboratory
ANL	Argonne National Laboratory
AEMP	Ashtabula Environmental Management Project
BAPL	Bettis Atomic Power Laboratory
BNL	Brookhaven National Laboratory
ETTP	East Tennessee Technology Park
FNAL	Fermi National Accelerator Laboratory
FEMP	Fernald Environmental Management Project
HAN	Hanford Site
INL	Idaho National Laboratory
ID-EM	Idaho Cleanup Project
KAPL	Knolls Atomic Power Laboratory
KCP	Kansas City Plant
KSO	Kesselring Site Operations
KAFB	Kirtland Air Force Base
LBNL	Lawrence Berkeley National Laboratory
LLNL	Lawrence Livermore National Laboratory
LANL	Los Alamos National Laboratory
MOAB	Moab Uranium Mill Tailings Remedial Action (UMTRA) Project
NBL	New Brunswick Laboratory
NETL	National Energy Technology Laboratory
NREL	National Renewable Energy Laboratory
NRF	Naval Reactors Facilities
NNSS	Nevada National Security Site
ORISE	Oak Ridge Institute for Science and Education
ORNL	Oak Ridge National Laboratory
TWPC	TRU Waste Processing Center
PTX	Pantex Plant
PGDP	Paducah Gaseous Diffusion Plant
PNNL	Pacific Northwest National Laboratory
PORTS	Portsmouth Gaseous Diffusion Plant
PPPL	Princeton Plasma Physics Laboratory
SLAC	SLAC National Accelerator Laboratory
SNL-NM	Sandia National Laboratories, New Mexico
SNL-CA	Sandia National Laboratories, California
SRS	Savannah River Site
TJNAF	Thomas Jefferson National Accelerator Facility
WIPP	Waste Isolation Pilot Plant
WVDP	West Valley Demonstration Project
Y-12	Y-12 Plant
YMP	Yucca Mountain Project

Definitions

The following terms are from the archived DOE Manual (M) 231.1-1, *Environment, Safety, and Health Reporting Manual*. Other definitions come from the archived DOE Order (O) 5484.1, *Environmental Protection, Safety and Health Protection Information Reporting Requirements*, to clarify key concepts. Section references to these documents are given at the end of each definition.

Property Value/Valuation: The approximate replacement value of all DOE-owned buildings/facilities and equipment. Included are the cost of all DOE-owned supplies and average inventory of all source and special nuclear materials. Excluded 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). (APPENDIX C, DOE M 231.1-1)

Total valuation is obtained by combining information from the Facility Information Management System (FIMS) and the Property Information Database System (PIDS). FIMS is the Department's official repository of real property data, whereas PIDS provides the means for reporting DOE and contractor held property for sensitive items and equipment ($5– $25K and greater than $25K).

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 this is in fact 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) down time; and (2) any outside agency payments. Losses sustained on private property are not reportable, even if DOE is liable for damage and loss consequences resulting from the occurrence. (APPENDIX C, DOE M 231.1-1)

Fire Loss: All damage or loss sustained as a consequence of (and following the outbreak of) fire shall be classified as a fire loss. Exceptions are as follows: (1) burnout of electric motors and other electrical equipment through overheating from electrical causes shall be considered a fire loss only if self-sustained combustion exists after power is shut off. (APPENDIX C, DOE M 231.1-1)

Loss Rate: Unit of comparison in *cents* loss per $100 of valuation (facilities and equipment).

Notes:

- TJNAF reported $435,400 in fire protection program costs (but no fire losses) for CY2014, but does not have any property valuation data reported in FIMS and PIDS and is not included in the overall DOE fire protection calculations.
- GJO, KAPL, MOAB, and NBL have property valuations in FIMS and/or PIDS, but do not report into the Fire Protection Database and are not included in the overall DOE fire protection calculations.

Executive Summary

In 2014, DOE experienced no fire-related fatalities, and one injury at the Nevada National Security Site when a 55-gallon drum containing isopropyl alcohol exploded, projecting a subcontractor worker eight feet and causing shrapnel lacerations, contusions, and minor burns. Another worker suffered ringing in one ear, but was otherwise not injured.

There were 93 fire-related loss events in CY2014, of which 69 were directly attributable to fire or smoke and 24 were non-fire related (leaks, spills, and inadvertent releases). The total cost associated with the 93 events was $5.1 million, which is a 130% increase over last year's $2.2 million. However, $2.4 million (47%) of the total resulted from one event – the underground vehicle fire at WIPP. Excluding that event, 2014 fire-related losses were closer to $2.7 million, which is still a 22% increase over last year. The additional increase is largely attributable to several costly events at Fermi, Idaho, LANL, ORNL, and SLAC. These events are detailed later in this report. There were an additional 33 events with no associated costs reported in the database. These are typically small events that were resolved quickly by local staff are not included in the counts presented in this report, except as part of the number of water-based and non-water-based system actuations.

Loss comparisons among DOE sites are performed by normalizing data against total facility and property valuation as reported in the FIMS and PIDS databases. Total DOE valuation for sites reporting into the Fire Protection Database decreased slightly (0.5%) in CY2014 to approximately $101.4 billion. The overall CY2014 fire loss rate for reporting sites was approximately 0.50 cents for each $100 in total site valuation, a 127% increase from CY2013. Again, this reflects the larger number of costly fire loss events noted above.

Recurring costs for fire protection were roughly $207 million in CY2014, which is 6.5% more than in CY2013. As a ratio of cost to total valuation, in CY2014 the DOE spent approximately 20 cents per $100 of valuation for recurring fire protection activities at the sites reporting into the Fire Protection Program database, compared with 19 cents in CY2013.

Personnel Injuries

There was one fire protection-related personnel injury reported by DOE during CY2014. On June 13, 2014, at the Nevada National Security Site, a 55-gallon drum containing isopropyl alcohol exploded, projecting a subcontractor worker eight feet and causing shrapnel lacerations, contusions, and minor burns. Another worker suffered ringing in one ear, but was otherwise not injured.

Notable Occurrences as Reported in ORPS

There were 91 fire-related occurrences reported into the DOE Occurrence Reporting and Processing System (ORPS) in CY2014. Of these, 10 were rated as Significance Category 2 (Moderate) occurrences, and none were rated as Significance Category 1, Operating Emergencies, or Recurring Events. Below are summaries of the 10 Significance Category 2 occurrences.

Table 1
Summaries of Significant Fire-Related Events Reported into ORPS in CY2014

Site	Description
ID-EM	A small fire was observed inside a Hot Cell in the Idaho Nuclear Technology Center. Operators were using a grinding wheel to size-reduce drum rings when they noticed the fire on a small piece of terry cloth which they extinguished using a remote manipulator. The terry cloth was behind some hot cell equipment and was not seen during inspections that occurred prior to the hot work. The Idaho National Laboratory Fire Department was notified and confirmed the fire was out. There were no personnel injuries, contamination, or equipment damage.
ID-EM	While performing routine activities, an Excavator developed a significant hydraulic leak. When the operator attempted to move it into the service bay, a low hydraulic level alarm was received. Upon entering the threshold of the service bay for repairs, EcoSafe fluid spilled on the turbo exhaust and ignited. Personnel observed flames approximately 6-inches high and 4-inches wide on the turbo exhaust and a trained worker extinguished the fire with an extinguisher. Workers were evacuated from the facility. The fire department responded to the scene where they declared the fire was out.
LANL	The Facility Operations Director at the LANL Weapons Engineering Tritium Facility (WETF) declared a Potential Inadequacy in the Existing Safety Analysis (PISA) on the Wet Pipe Fire Protection System (FPS) riser pressure and whether it supports the required flow rate. The calculation used for the basis of the Technical Safety Requirement (TSR) was incorrect. Upon declaration of the PISA, a twenty-four hour, hourly fire watch was established. The fire watch will remain in effect until removal of operational restrictions is authorized. There was no impact to the health and safety of personnel, the environment, or the Program as a result of this event.
LANL	The Tritium Operations Team Leader observed that a louver on the Halon Fire Suppression System (HFSS) damper was open approximately one inch when it was expected to be closed. The HFSS, a Safety Significant Structure/System/Component was declared inoperable, and the Limiting Condition of Operation (LCO) and related action statements were entered. A sheet metal barrier was installed in the ductwork that contains the damper, which restored the intended safety function of the damper to the HFSS.
NNSS	An occupational accident occurred at the Nonproliferation Test and Evaluation Complex when an open 55-gallon drum containing a small amount of what is believed to be isopropyl alcohol ignited, causing an explosion that projected a subcontractor worker eight feet and caused shrapnel lacerations, contusions, and minor burns. Another worker suffered ringing in one ear, but was otherwise not injured

Site	Description
PAD	The Plant Shift Supervisor (PSS) was notified that there was smoke in the Unit 3 battery room. The PSS notified the fire department who made entry and suppressed the fire using two carbon dioxide wheeled unit extinguishers.
PTX	Technical Safety Requirement violation was declared because task exhaust ducting, which penetrates the exterior walls in two locations of a nuclear facility, did not have the required fire dampers. The Design Feature listed in the Documented Safety Analysis credits the walls as 2-hour fire barriers. All penetrations are required to contain fire-rated seals, dampers, or doors.
PTX	A Potentially Inadequate Safety Analysis was declared following the discovery of degraded fire penetration seal material in nuclear facilities in one building. The degraded seals, which appear to be caused by new shrinkage of the fire seal material, were discovered by Fire Protection Engineers (FPEs) conducting walk-downs to investigate a non-compliant design and installation of a fire penetration seal. Additional extent of condition reviews and walk-downs were conducted by FPEs and three other suspect penetration seals were identified.
PTX	A Management Concern was declared following the improper response to a supervisory alarm trouble signal received through the Mastermind Monitoring Alarm System (MAS). The first concern is the response to the initial trouble signal received in the Emergency Service Dispatch Center (ESDC), and the second is the failure to initiate a Fire Department response when the issue was later discovered by the CNS Facility Representative (FR). The signal was received for a Supervisory Valve Outside Stem Yoke (OSY) Deluge Tamper Trouble signal. Maintenance was requested to repair the OSY tamper switch.
WIPP	A Salt Haul Truck located in the Waste Isolation Pilot Plant (WIPP) underground caught fire during normal operation. The truck operator observed something unusual (orange-possible flame) from under the front portion of the truck, secured the truck, and exited the operator's compartment to investigate. The operator utilized a portable fire extinguisher in an attempt to extinguish the fire, then returned to the operator's compartment and activated the installed fire suppression system. The operator made notification of a fire via the mine pager phone to a nearby maintenance shop and his supervisor. Co-workers nearby heard the information on the phone and also responded to assist with additional portable fire extinguishers and air monitoring equipment. However upon approaching the immediate area, the air quality readings required all workers in the immediate area to exit the area in search of better air quality. The Facility Shift Manager (FSM) activated the Operations Assistance Team, Emergency Operations Center/Joint Information Center, and Mine Rescue Team. Based on conditions reported, the FSM ordered the evacuation of all 86 personnel from underground; all personnel were accounted for. The FSM suspended surface waste handling activities and the release of any transuranic waste shipments not already en route to the WIPP.

Fire-Related Property Losses

There were 93 fire-related loss events in CY2014, of which 69 were directly attributable to fire or smoke (fire loss events) and 24 were non-fire related (leaks, spills, and inadvertent releases). The total cost associated with the 93 events was roughly $5.1 million, which is a 130% increase over last year's $2.2 million. (This total loss figure is the highest since the Cerro Grande fire at LANL in CY2000.) However, $2.4 million (47%) of the total resulted from one event – the underground vehicle fire at WIPP. If that event is excluded, 2014 fire-related losses were closer to $2.7 million, which is still a 22% increase over last year. The additional increase is largely attributable to several costly events at Fermi, Idaho, LANL, ORNL, and SLAC detailed later in this report.

For comparison, the National Fire Protection Association's (NFPA) *Fire Loss in the United States During 2014* reports that the number of loss events at industry, utility, and defense properties last year increased 17.6% from CY2013, with the dollar losses decreasing by 1.7%. (These figures do not include responses solely by private fire brigades).

The 69 fire loss events in CY2014 were a 25% increase over last year. These events resulted in an estimated $4,953,200 in fire losses, which is a 240% increase over CY2013. There were 24 non-fire related losses (leaks, spills or inadvertent releases) in CY2014, a 13% increase from last year. The 24 events resulted in $163,249 in losses, a 78% decrease from CY2013.

There were an additional 33 events with no associated costs reported in the database. These were typically small events that were resolved quickly by local staff are not included in the counts presented in this report, except as part of the number of water-based and non-water-based system actuations.

Table 2

CY2014 DOE Fire Loss Events

Loss Category	Fire Loss Type	Number of Events*	Property Loss Amount
Fire-Related	Fire/Smoke – Vehicle	11 Events	$ 2,482,229
	Fire/Smoke – Building	31 Events	$1,734,241
	Fire/Smoke – Other	18 Events	$ 720,830
	Fire/Smoke – Brush	9 Events	$ 15,900
	Total Fire-Related:	**69 Events**	**$4,953,200**
Non-Fire-Related	Leaks, Spills, Releases	24 Events	$163,249
	Total Fire Protection Losses:	**93 Events**	**$5,116,449**

* Fire events recorded in the database with no associated costs are not counted in the number of events

Major Fire-Related Events

Trending of fire loss data indicates that a fairly small proportion of incidents constitute the majority of dollar losses reported to the DOE. Twenty-two (24%) of the 93 fire and non-fire incidents in CY2014 resulted in losses of $10,000 or more per event. These 22 incidents accounted for $4,924,110 (96%) of the total dollar losses for the entire DOE Complex. Table 3 provides a description of the seven most costly fire losses at DOE during CY2014, which represent 89% of the total fire losses for the year.

Table 3

Summaries of Major Fire Loss Events

Loss Type	Location	Description	Dollar Loss
Fire/Smoke (Vehicle)	WIPP	On February 5 2014 a salt haul truck caught fire in the underground. The loss amount includes: equipment replacement cost, clean up cost, recharging the mine rescue truck and the accident investigation.	$2,387,603
Fire/Smoke (Building)	LANL	Current inadvertently applied to a linear accelerator bending magnet with no cooling water flow resulted in magnet fire, sprinkler system activation, and fire department response. Accelerator was not in operation at the time of the event. Restoration included the use of two spare bending magnets in series.	$763,000
Fire/Smoke (Building)	LANL	Explosives containment vessel suffered a failed port, which vented into the firing chamber room and activated smoke detector(s) and resulted in fire department response. Extensive damage to experimental and data acquisition equipment occurred.	$500,000
Fire/Smoke (Other)	SLAC	A high voltage switchgear cabinet that supplied Klystron Modulators for the linac beamline caught on fire underneath the I-280 overpass. The fire was put out using about 300 pounds of CO2. Traffic on I-280 was temporarily affected due to the rising smoke.	$500,000
Fire/Smoke (Other)	FNAL	Transformer serving village and backup power for an industrial cooling pumping station failure and fire. Fire Department (FD) responded to transformer fire and wire down. High Voltage personnel cut power to transformer and FD extinguished the remaining fire using one dry chemical extinguisher. FD then placed absorbent pads, pigs and oil dry to absorb oil.	$171,000
Fire/Smoke (Building)	ORNL	A hot plate failed inside of a laboratory hood causing chemicals inside the hood to heat up and ignite. The fire was contained to the laboratory hood, hood counter, and base cabinets. The fire self extinguished and was detected some time later by building occupants. Fire detection system or fire suppression systems were present in the building but fire event not large enough to activate.	$124,000
Fire/Smoke (Building)	ID-EM	Fire and smoke were observed in the vicinity of a water cooler. The INL FD arrived and applied water to the affected area extinguishing the fire. Investigation concluded that the most likely cause of ignition was a malfunction of a water cooler. All makes and models matching the suspect water cooler were removed from service.	$94,441

Figure 1

CY1014 Major Fire Loss Events by Site

Twelve DOE sites posting 22 major fire loss events resulting in losses greater than $10,000

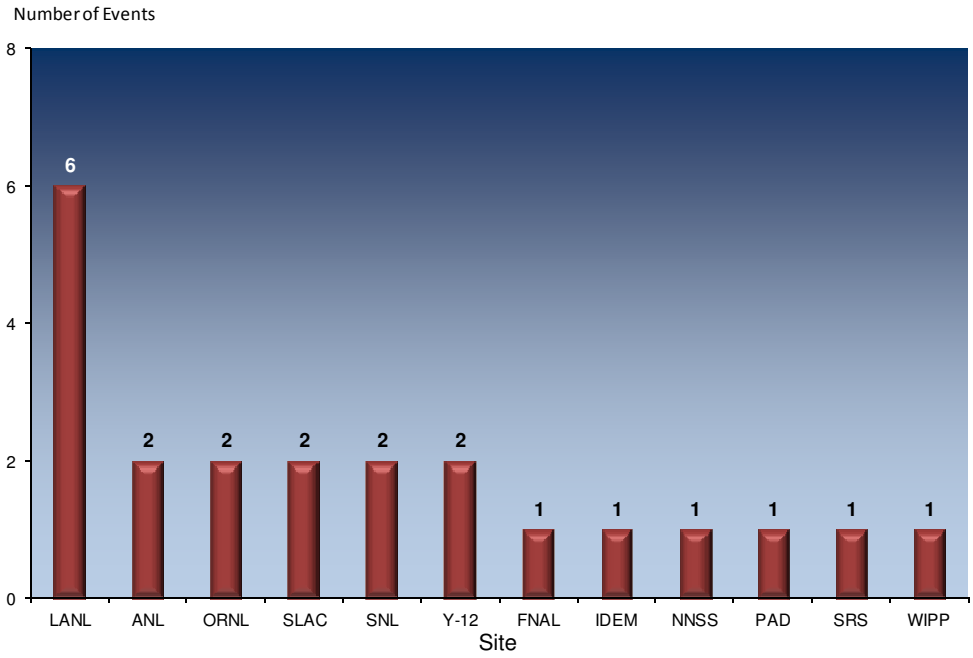


Figure 2

CY2014 Major Fire Loss Amounts by Site

Losses from fire or fire-related events resulting in a $10,000 or greater loss

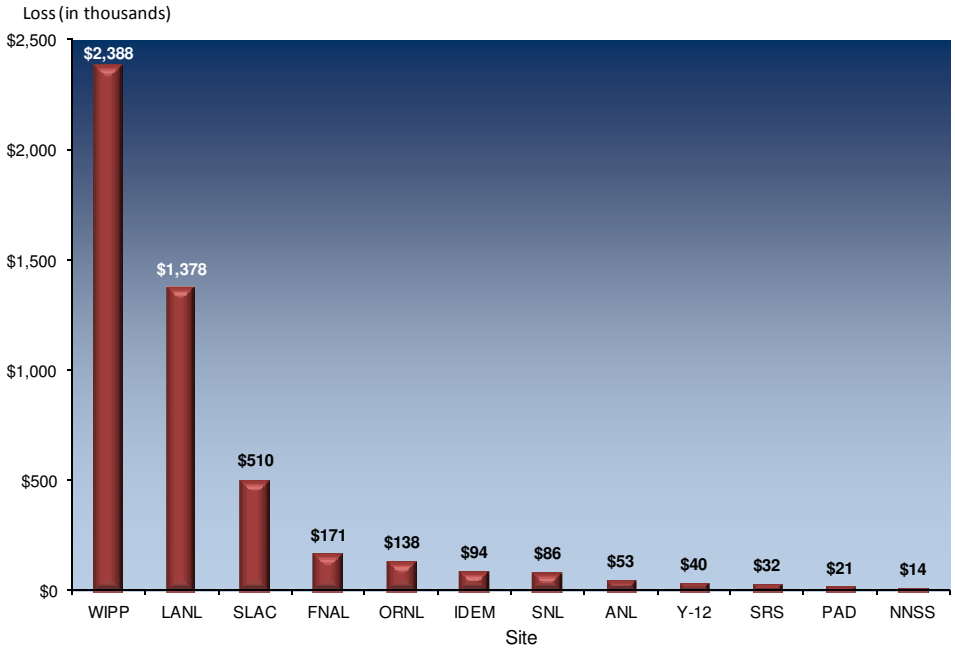
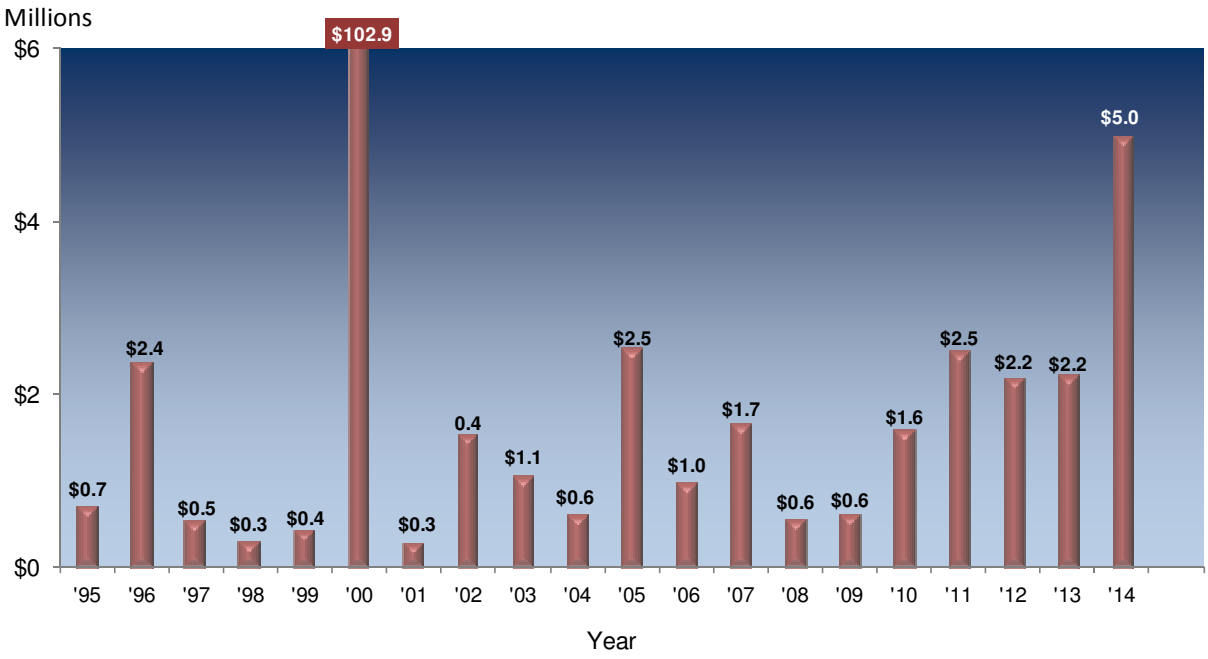


Figure 3

DOE Property and Facility Fire Loss Amounts since 1995



Note: CY2000 total includes the $100 million LANL range fire loss.

Fire Loss Rates

Facility and property valuation estimates serve as a common denominator for comparing annual fire loss rates, which include actual fire events and fire suppression system actuations. In CY2014, the total DOE valuation decreased approximately 0.5% to $101.4 billion.

DOE's calculated fire loss rate for CY2014, from data reported into FIMS, PIDS, and the Fire Protection Reporting System, was approximately 0.50 *cents* per $100 of total valuation. This is an increase of 127% over the CY2013 rate. Again, this reflects several costly events detailed elsewhere in this report.

Figure 4

DOE Total Valuation since 1965

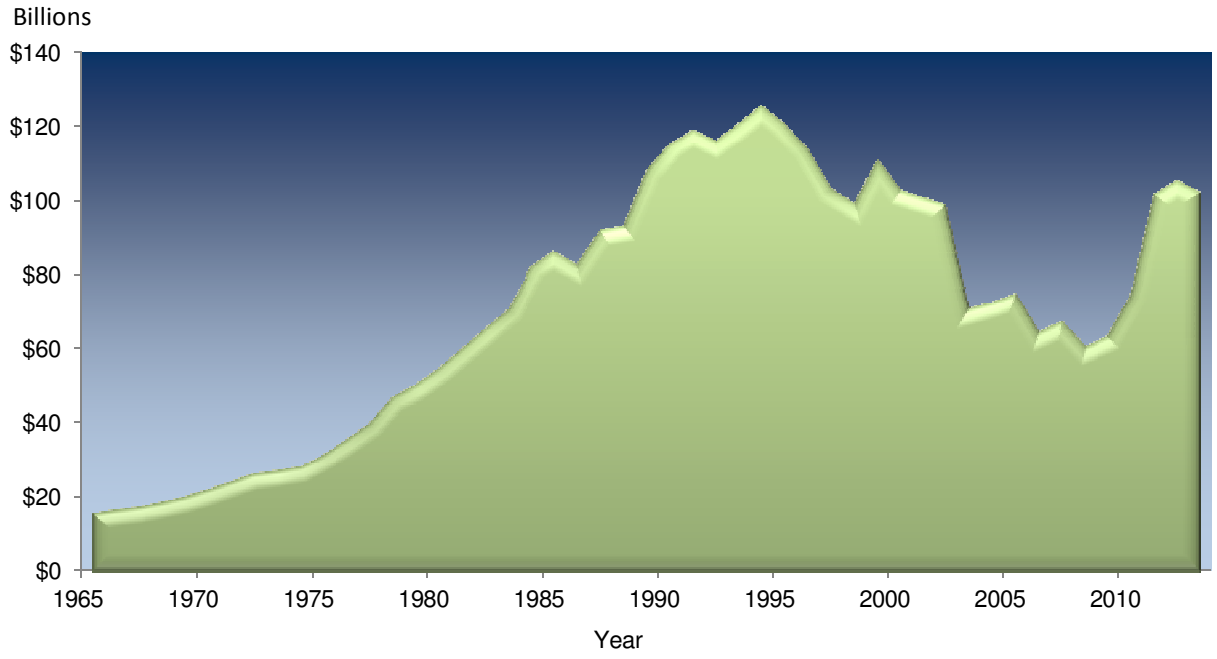


Figure 5

DOE Fire Loss Rates for the Past 20 Years

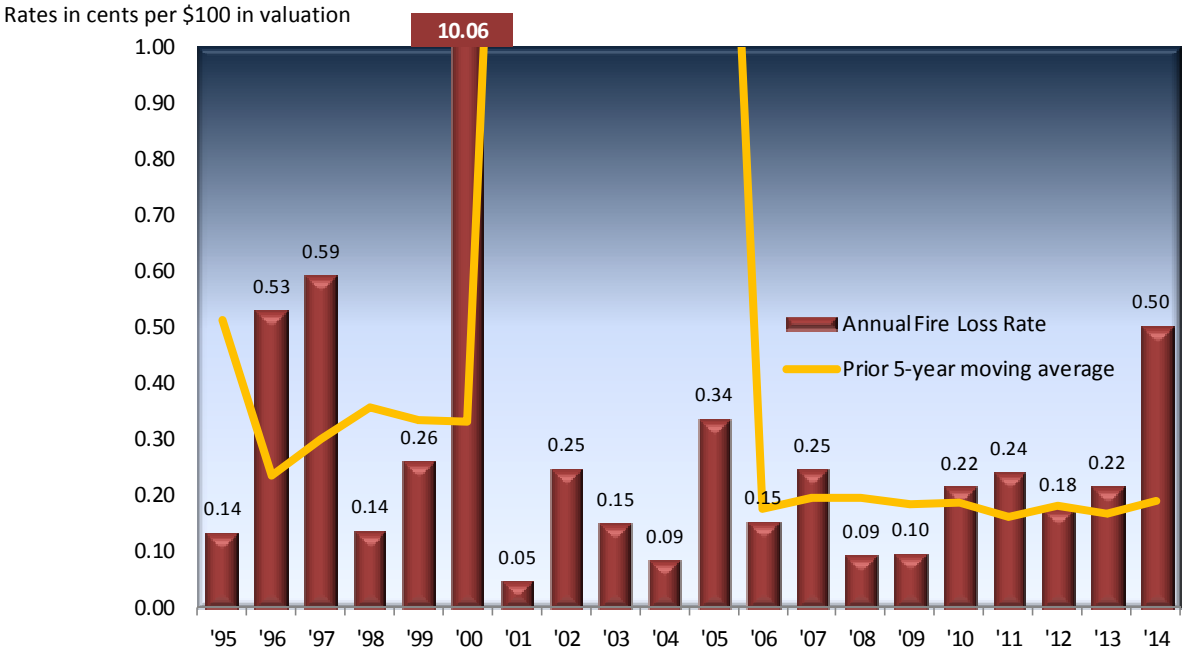


Figure 6

CY2014 Fire Loss Rates by Site

Sites posting losses greater than $10,000

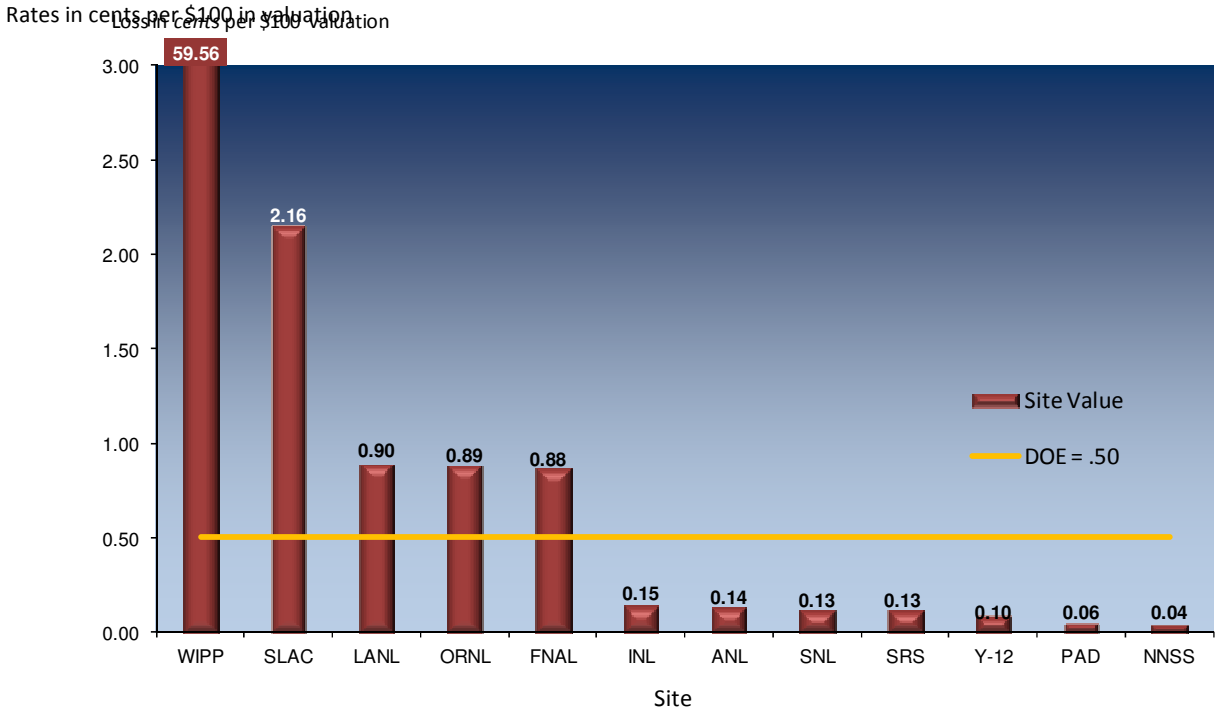


Table 4
DOE Fire Loss History from 1950 to Present

Year	Valuation (Millions of Dollars)	Fire Loss (Dollars)	Fire Loss Rates (Cents per $100 Valuation)	Previous 5 year average (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
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	2,471,088	0.24	0.16
2012	105,238.57	1,872,860	0.18	0.18
2013	101,940.69	2,223,526	0.22	0.17
2014	101,437.21	5,116,149	0.50	0.19

Recurring Fire Protection Program Costs

Yearly recurring fire protection costs for CY2014 were $206,614,935 for those sites reporting into the Fire Protection Program database. As a ratio of cost to replacement property value (recurring cost rate), DOE spent approximately 0.20 cents per $100 valuation for recurring fire protection activities at those sites compared with 0.19 cents in CY2013. Figure 7 shows the CY2014 recurring cost distribution by activity type.

Figure 7

CY2014 Recurring DOE Fire Protection Program Costs by Activity

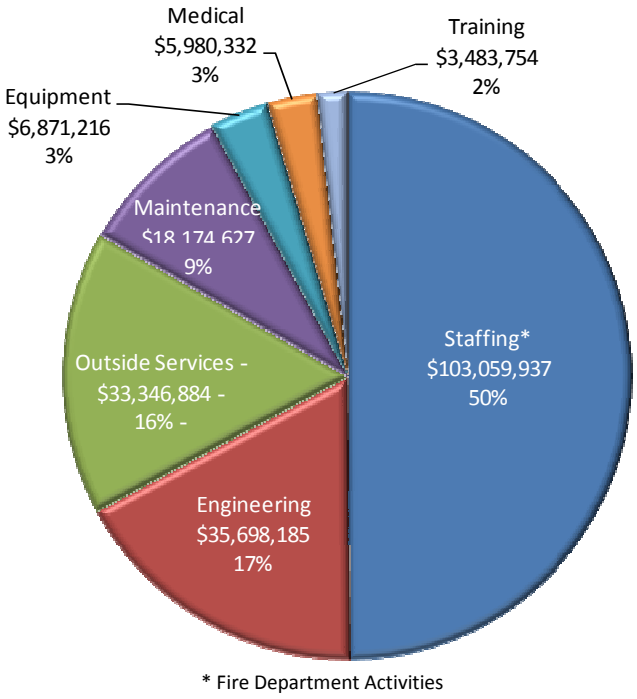
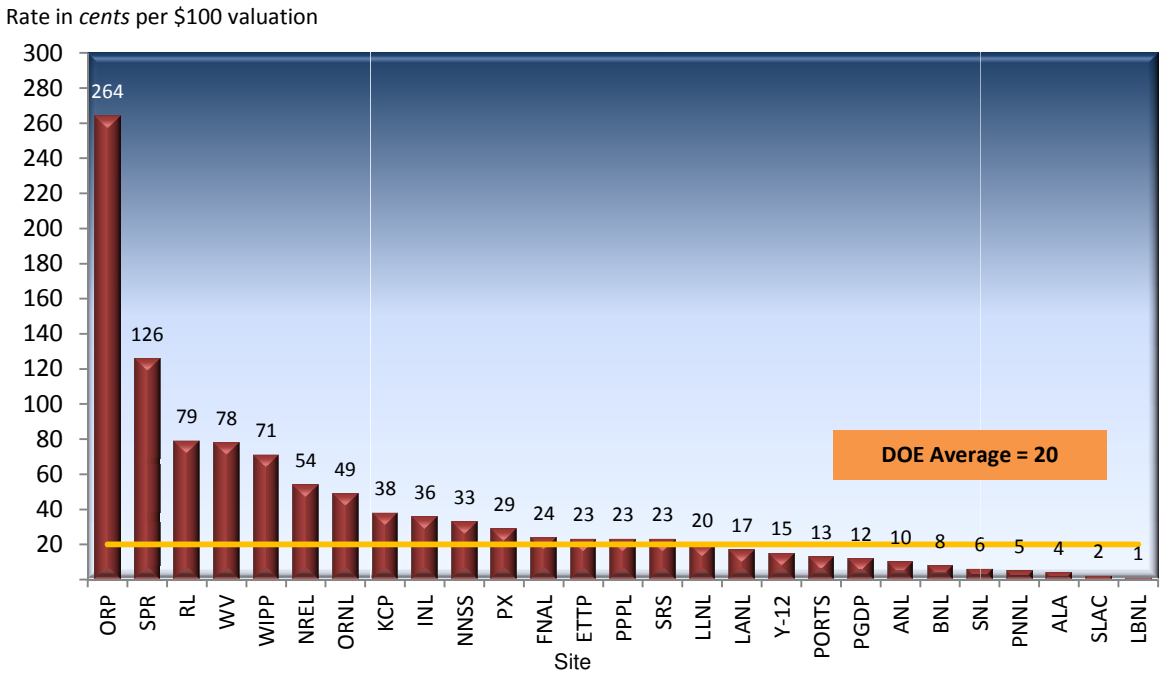


Figure 8 displays the recurring cost rates in cents per $100 of valuation at DOE sites. It should be noted that not all recurring cost activities are consistently reported, such as outside contracts and maintenance activities.

Figure 8

CY2014 Recurring Fire Protection Program Cost Rates by Site



Automatic Water-Based Suppression System Performance

In CY2014, Departmental facilities experienced inadvertent actuations of 26 wet-pipe suppression systems resulting in $140,749 in losses. Of these, 20 were due to weather-related events (freezing), 2 were due to electrical issues, 1 was due to design/material issues, and 3 were attributed to other or unspecified problems.

The three most costly events (exceeding $10,000) represented 38% of the water-based suppression system reports and are noted below.

Table 5

Major Water-Based Fire System Inadvertent Actuations

Loss Type	Location	Description	Dollar Loss
Leaks/Spills/Releases	Y-12	Weather-related: Pipe on dry pipe system burst.	$28,531
Fire/Smoke (Building)	ORNL	Weather-related: During a period of below freezing temperatures a sprinkler pipe froze and broke discharging water in the structure. The system was isolated and repaired.	$14,000
Leaks/Spills/Releases	Y-12	Weather-related: Drum drip burst in dry pipe system.	$11,309

Non-Water-Based Fire Suppression System Performance

Chlorofluorocarbons, including Halon, are regulated under the 1991 Clean Air Act because of their detrimental impact on the ozone layer. The Environmental Protection Agency has published implementation regulations to prohibit Halon production, establish container labeling requirements, impose Federal procurement restrictions and Halon taxes, issue requirements for the approval of alternative agents, and list essential areas where Halon protection is considered acceptable.

DOE policy, as stated in the May 5, 1993 Memorandum, DOE F 132S.8, *Managed Phase Out of Halon Fixed Fire Suppression Systems*, does not allow the installation of any new Halon systems. Field organizations have been requested to aggressively pursue alternative fire suppression agents to replace existing systems and to effectively manage expanding Halon inventories. The long-term goal is the gradual replacement of all Halon systems.

In CY2014, DOE maintained 142 active Halon systems in operation containing approximately 49,932 pounds of Halon. The number of active Halon systems decreased 9% from CY2013, while Halon inventory amounts decreased by 4%.

There was one inadvertent actuation of a non-water-based suppression system reported at PPPL, but no costs or additional details were recorded.

Table 6

Automatic Non-Water-Based System Actuations

Loss Type	Location	Description	Dollar Loss
Leaks/Spills/Releases	PPPL	None recorded	None recorded

Fire Department Responses

In CY2014, DOE experienced 5,207 Fire Department responses. This represents an 87% increase from CY2013. All categories of calls increased significantly from last year. The distribution of Fire Department response types is displayed below.

Table 7

Fire Department Responses

Call Category	2014 Responses
Fire Calls	327
Hazardous Materials Calls	230
Other Emergency Calls	1,215
Non-Emergency Calls	1,967
Medical Calls	1,468

Comparing these data to the actual type of response is difficult since sites do not report incident responses in a consistent fashion. The Fire Protection Committee continues to examine the use of a standard reporting format which complies with the National Fire Protection Association's Guide 901, *Uniform Coding for Fire Protection*, which could be linked to other DOE incident reporting programs.

Summary provided by:

Office of Environmental Protection, Sustainability Support
and Corporate Safety Analysis