

Annual Fire Protection Program Summary for Calendar Year 2011



UNITED STATES DEPARTMENT OF ENERGY

Summary Provided by:

Office of Environmental Protection, Sustainability Support
and Corporate Safety Analysis

Office of Health, Safety and Security

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Foreword

The Department of Energy (DOE) *Annual Fire Protection Program Summary for Calendar Year 2011* continues the series started in 1972.

Since May 1950, an Annual Fire Protection Program Summary (Annual Summary) has been submitted by DOE's fire protection community under the requirements of DOE's predecessor agencies: the Atomic Energy Commission (AEC) and the Energy Research Development Administration (ERDA). This report is currently required by section 4b (2) of DOE Order 231.1B, *Environment, Safety and Health Reporting* and is considered the primary source for quantifying monetary loss from fire across the DOE Complex.

In 1999, the Annual Summary reporting process was automated to streamline data collection and provide a more comprehensive look at reporting element activities. It is now 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 new process allows sites to submit their information on a real-time basis versus the submittal of an annual summary as was provided in the past. The data set being reported was reviewed in 2011 -2012 as part of the Departments' Directive Reform initiative in the update of DOE Order 231.1B, *Environment, Safety and Health Reporting*. Subject Matter Experts from across the Department agreed to maintain the existing data reporting guidance.

The report for calendar year (CY) 2011 was summarized from information sent to Headquarters by 33 reporting elements (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 information contained in this publication was extracted from the Fire Protection Reporting System for CY 2011. Although the requirement is for sites to submit this data to the Office of Health, Safety and Security (HSS) by April 30 of each year, this report was generated based on data reported into the Fire Protection Reporting System as of June 1, 2012 to allow ample time for a high percentage of sites to submit data.

The Fire Protection Reporting System can be found at: <http://www.hss.doe.gov/sesa/corporatesafety/fpdb.html>.

HSS plans on continuing to work with the DOE Fire Safety Committee to examine the data submission systems and content of the annual report to improve its benefit to both Headquarters and Field Elements, as needed.

Glossary

Headquarters Organizational Elements:

NNSA	National Nuclear Security Administration
SC	Science
FE	Fossil Energy
NE	Nuclear Energy
EM	Environmental Management
PMA	Power Marketing Administrations ¹
EE	Energy Efficiency & Renewable Energy
RW	Civilian Radioactive Waste Management
LM	Legacy Management
HSS	Health, Safety & Security

Field/Area/Site Organizational Elements:

CAO	Carlsbad Area Office
CH	Chicago Operations Office
GFO	Golden Field 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 ²
YSO	Y-12 Site Office

¹ Power Administration organizations are comprised of the Bonneville Power Administration (BPA); Southeastern Power Administration (SEPA); Southwestern Power Administration (SWPA); and the Western Area Power Administration (WAPA).

² Strategic Petroleum Reserve Office sites include: Bayou Choctaw, Big Hill, Bryan Mound and West Hackberry.

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Site abbreviations:

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 ³
INL	Idaho National Laboratory
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
MEMP	Miamisburg Environmental Management Project
NETL	National Energy Technology Laboratory
NREL	National Renewable Energy Laboratory ⁴
NRF	Naval Reactors Facilities
NTS	Nevada National Security Site ⁵
ORISE	Oak Ridge Institute for Science and Education
ORNL	Oak Ridge National Laboratory
TWPC	TRU Waste Processing Center
PX	Pantex Plant
PGDP	Paducah Gaseous Diffusion Plant ⁶
PORTS	Portsmouth Gaseous Diffusion Plant ⁶
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

The reference below is used throughout the report to identify various DOE elements:

DOE field organization (abr.)/Site (abr.)

Example: LASO/LANL

³ Hanford Site includes the Pacific Northwest National Laboratory and Office of River Protection facilities (Tank Farms, etc).

⁴ National Renewable Energy Laboratory includes the Wind Site.

⁵ Nevada National Security Site Includes: Amador Valley Operations, Las Vegas Operations, Nevada-Los Alamos Operations, Nevada-Special Technology Laboratory, Washington Aerial Measurements Operation, and Nevada-EG&G Wolburn NV.

⁶ On July 1, 1993, a lease agreement took effect between the DOE and the United States Enrichment Corporation (USEC) essentially transferring all ownership responsibilities to USEC.

Definitions

The following terms are defined in the text of archived DOE Manual M 231.1-1A, *Environment, Safety, and Health Reporting Manual*. Major definitions not included in this manual have been extracted from the archived DOE Order 5484.1 to clarify key concepts. Section references to these documents are given at the end of the 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 231.1-1A)

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 (\$5k to \$25k and greater than \$25k).

Estimated Loss: Monetary loss determination 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. Categorization of occurrences shall be by fire loss and non-fire loss events. (APPENDIX C, DOE M 231.1-1A)

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 231.1-1A)

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

Executive Summary

DOE experienced no fire-related fatalities or serious injuries during CY2011. There were 98 fire loss events (almost double the 51 events reported in CY2010) reported during the period that caused an estimated \$64.3 million in property damage. Excluding the major Las Conchas range fire (LANL) which burned for 10 days and accounted for approximately \$62 million in fire losses, the remaining DOE sites had total fire losses of approximately \$ 2.3 million during CY2011. The total amount of CY2011 fire losses increased 44% from last year's total losses of \$1.6 million. Losses from non-fire related events (leaks, spills or inadvertent releases) cost the Department \$220,344 in CY2011, which is a 29% decrease from last year's non-fire losses (\$312,033).

Loss comparisons among DOE sites are performed by normalizing data against total facility and property value (or valuation). Total DOE valuation increased during CY2011 approximately 15 percent (from \$86.6 to \$101.3 Billion). The overall CY2011 fire loss rate for reporting sites, excluding the Las Conchas range fire losses (LANL), was approximately 0.24 cents for each \$100 in total site valuation.

Recurring costs for fire protection were over \$183 million in CY2011 which is approximately 8% more than was spent in CY2010. On a ratio of cost to total valuation, the DOE spent approximately 23 cents per \$100 in valuation for recurring fire protection activities for those sites reporting into the Fire Protection Program database (the same rate as was reported in CY2010).

In CY2011, Departmental facilities experienced inadvertent actuations of 32 wet-pipe systems and one dry-pipe failure due to corrosion. The majority of the wet-pipe actuations were due to weather-related events (freezing).

DOE Property Loss Experience

Property and facility value estimates serve as a common denominator for comparing annual summary fire loss rates. In CY2011, total DOE valuation increased by approximately 15 percent to a total of approximately \$101.3 billion. DOE elements reported 98 fire loss events during CY2011 which accounted for a total year-end fire loss of \$64.3 million. Excluding the Las Conchas (LANL) range fire which accounted for approximately \$62 million fire loss that significantly inflated CY2011 fire loss totals, the remaining DOE sites had a total fire loss of almost \$2.3 million during the year. This represents a near doubling of fire loss events from last year (51) and a 44% increase in total fire losses for CY2011 as compared to last year (\$1.6 million).

In addition to these fire-related losses, losses for the 35 total non-fire related events fell 29% during CY2011 to \$220,000 from last year's total of \$312,000. These events included system leaks, spills and other inadvertent releases/discharges. Weather-related damage (freezing) accounted for the majority (28) of all non-fire losses during CY2011.

Of the remaining non-fire related loss total, one significant event at LLNL involved an inadvertent sprinkler discharge in a four-story computer facility over a weekend which resulted in a \$45,000 loss.

After removing the Las Conchas range fire loss, the remaining property loss events were categorized as follows:

Fire related: Fire/Smoke (Building)	41 Events	\$1,113,592
Fire/Smoke (Brush)	22 Events	559,987
Fire/Smoke (Vehicle)	4 Events	200
Fire/Smoke (Other)	31 Events	<u>576,965</u>
		\$2,250,744
Non-Fire ¹ related: Leaks, Spills, Releases	35 Events	\$220,344

DOE's fire loss rate for CY2011, as reported into the Fire Protection Reporting System, was approximately 0.24 cents loss per \$100 valuation.

The accompanying figures are described as follows:

Table 1: DOE Loss History from 1950 to Present

Figure 1: Graphical representation of the Department's property valuation since 1950

Figure 2: Fire property loss since 1983

Figure 3: Fire loss rates since 1989

Figure 4: Number of fire events reported at the 7 sites posting greater than \$10,000 in total losses

Figure 5: The current year's fire loss amounts by those sites with greater than \$10,000 in total losses

Figure 6: The current year's fire loss rate by those sites with greater than \$10,000 in total losses

Figure 7: Distribution of recurring fire protection program costs by activity

Figure 8: The recurring fire protection program cost rate in cents per \$100 of valuation by site

Organizations not shown in Figures 4 through 6 reported either insignificant or zero losses for the year.

¹ Small subset of non-fire losses (leaks, spills, releases) attributable to automatic water-based suppression systems only.

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Trending of fire loss data continues to indicate that a small number of incidents constitute the majority of dollar losses reported to the DOE. For example, there were 16 fire and inadvertent actuation incidents this year with loss figures exceeding \$10,000 per event. These 16 incidents accounted for nearly all of the total dollar losses for the entire complex. For example, the Las Conchas range fire at LANL cost approximately \$62,000,000 and was a huge contributor to DOE fire losses accounting for approximately 96% of the annual total. Also, two range fires at Idaho cost DOE over \$500,000 in total fire losses.

A summary of three other notable and costly fire and inadvertent actuation events included:

SNL-NM: A lithium fire and explosion at the Plasma Material Test Facility in Building 6530 resulted in significant building damage due to the explosion's overpressure. No sprinkler activation occurred. The estimated cost to repair the damage to the facility was \$990,000.

TJNAF: A fire occurred when two one-ton magnets were energized and operating at full current with cooling water valves in the shut position. The magnet copper coils overheated, burned off epoxy potting material, and melted portions of the copper coils until the magnet power supply shut off from over current. Fire damage was evident on the exposed coils of the magnets; soot was deposited on the upper portions of the magnets involved and on equipment located immediately above the magnets. The accelerator tunnel in the immediate vicinity of the magnets filled with dense smoke. The estimated fire loss was \$500,000.

LLNL: An unexpected and spontaneous activation of sprinklers in the B-453 facility, a 4-story office building housing computer programmers and high performance computer users, occurred over a weekend for unknown reasons. The total loss was estimated at \$45,000.

Personnel Injuries

There were no personnel injuries reported during CY2011.

Table 1

DOE Loss History from 1950 to Present

Year	Valuation (Millions of Dollars)	Fire Loss (Dollars)	Non-Fire Loss (Dollars)	Loss Rates (Cents per 100 Dollar Value)		
				Fire*	Non-Fire*	Total*
1950	1,800.00	486,389	10,050	2.70 -	0.06 -	2.76 -
1951	2,177.10	38,318	317,797	0.18 -	1.46 -	1.64 -
1952	3,055.10	449,107	356,600	1.47 -	1.17 -	2.64 -
1953	4,081.00	148,142	427,430	0.36 -	1.05 -	1.41 -
1954	6,095.90	185,438	190,436	0.30 -	0.31 -	0.62 -
1955	6,954.20	125,685	330,103	0.18 (1.00)	0.47 (0.81)	0.66 (1.81)
1956	7,364.10	2,206,478	940,945	3.00 (0.50)	1.28 (0.89)	4.27 (1.39)
1957	7,973.20	590,663	885,936	0.74 (1.06)	1.11 (0.86)	1.85 (1.92)
1958	8,102.50	275,560	476,265	0.34 (0.92)	0.59 (0.84)	0.93 (1.76)
1959	10,301.80	199,841	998,060	0.19 (0.91)	0.97 (0.75)	1.16 (1.67)
1960	10,708.60	636,228	764,823	0.59 (0.89)	0.71 (0.88)	1.31 (1.77)
1961	11,929.90	325,489	5,530,566	0.27 (0.97)	4.64 (0.93)	4.91 (1.91)
1962	12,108.80	3,020,023	293,341	2.49 (0.43)	0.24 (1.60)	2.74 (2.03)
1963	13,288.90	599,056	776,998	0.45 (0.78)	0.58 (1.43)	1.04 (2.21)
1964	14,582.80	480,519	870,516	0.33 (0.80)	0.60 (1.43)	0.93 (2.23)
1965	15,679.30	1,743,448	2,106,621	1.11 (0.83)	1.34 (1.35)	2.46 (2.18)
1966	16,669.00	158,220	698,753	0.09 (0.93)	0.42 (1.48)	0.51 (2.41)
1967	17,450.90	359,584	2,423,350	0.21 (0.90)	1.39 (0.64)	1.59 (1.53)
1968	18,611.90	155,986	713,097	0.08 (0.44)	0.38 (0.87)	0.47 (1.31)
1969	20,068.30	27,144,809	909,525	13.53 (0.37)	0.45 (0.83)	13.98 (1.19)
1970	22,004.30	89,456	1,611,336	0.04 (3.00)	0.73 (0.80)	0.77 (3.80)
1971	24,155.80	78,483	1,857,566	0.03 (2.79)	0.77 (0.68)	0.80 (3.47)
1972	26,383.50	222,590	698,061	0.08 (2.78)	0.26 (0.75)	0.35 (3.52)
1973	27,166.70	117,447	2,258,241	0.04 (2.75)	0.83 (0.52)	0.87 (3.27)
1974	28,255.50	249,111	930,766	0.09 (2.75)	0.33 (0.61)	0.42 (3.36)
1975	31,658.30	766,868	4,485,481	0.24 (0.06)	1.42 (0.59)	1.66 (0.64)
1976	35,512.70	251,849	2,040,727	0.07 (0.10)	0.57 (0.72)	0.65 (0.82)
1977	39,856.10	1,084,823	2,529,161	0.27 (0.11)	0.63 (0.68)	0.91 (0.79)
1978	47,027.10	12,976,036	4,501,943	2.76 (0.14)	0.96 (0.76)	3.72 (0.90)
1979	50,340.80	654,716	1,886,307	0.13 (0.69)	0.37 (0.78)	0.50 (1.47)
1980	54,654.70	1,385,686	7,160,249	0.25 (0.69)	1.31 (0.79)	1.56 (1.49)
1981	59,988.80	2,042,633	2,600,855	0.34 (0.70)	0.43 (0.77)	0.77 (1.47)
1982	65,360.40	948,691	3,252,277	0.15 (0.75)	0.50 (0.74)	0.64 (1.49)
1983	70,484.40	731,234	9,765,828	0.10 (0.73)	1.39 (0.71)	1.49 (1.44)
1984	82,166.90	1,549,807	4,917,513	0.19 (0.19)	0.60 (0.80)	0.79 (0.99)
1985	86,321.84	1,145,975	2,983,322	0.13 (0.21)	0.35 (0.85)	0.48 (1.05)
1986	82,787.52	805,030	4,490,262	0.10 (0.18)	0.54 (0.65)	0.64 (0.83)
1987	91,927.20	1,570,736	1,440,093	0.17 (0.13)	0.16 (0.67)	0.33 (0.81)
1988	92,998.00	466,120	7,837,000	0.05 (0.14)	0.84 (0.61)	0.89 (0.74)
1989	107,948.00	615,551	6,890,000	0.06 (0.13)	0.64 (0.50)	0.70 (0.63)
1990	115,076.00	8,392,746	9,078,000	0.73 (0.10)	0.79 (0.51)	1.52 (0.61)
1991	118,868.68	608,740	1,820,065	0.05 (0.22)	0.15 (0.59)	0.20 (0.81)
1992	118,267.06	1,166,858	2,486,696	0.10 (0.21)	0.21 (0.52)	0.31 (0.73)
1993	119,826.25	679,939	2,338,595	0.06 (0.20)	0.19 (0.53)	0.25 (0.73)
1994	124,350.29	1,533,717	1,869,933	0.12 (0.20)	0.15 (0.40)	0.27 (0.60)
1995	120,321.68	720,720	911,746	0.06 (0.21)	0.08 (0.30)	0.14 (0.51)
1996	113,471.00	2,372,482	3,653,350	0.21 (0.08)	0.32 (0.16)	0.53 (0.24)
1997	102,947.24	544,924	5,567,963	0.05 (0.11)	0.54 (0.19)	0.59 (0.30)
1998	99,127.79	316,475	1,062,313	0.03 (0.10)	0.11 (0.26)	0.14 (0.36)
1999	110,858.47	443,049	2,467,991	0.04 (0.10)	0.22 (0.24)	0.26 (0.34)

* Numbers shown in parentheses represent the previous 5-year running average.

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Year	Valuation (Millions of Dollars)	Fire Loss (Dollars)	Non-Fire Loss (Dollars)	Loss Rates (Cents per 100 Dollar Value)		
				Fire*	Non-Fire*	Total*
2000	102,514.01	102,861,283	312,839	10.03 (0.08)	0.03 (0.25)	10.06 (0.33)
2001	103,215.56	287,263	218,323	0.03 (2.07)	0.02 (0.25)	0.05 (2.32)
2002	98,779.44	1,541,174	920,673	0.16 (2.04)	0.09 (0.19)	0.25 (2.23)
2003	70,812.80	1,075,309	NC	0.15 (2.06)	NC NC	NC NC
2004	72,601.95	622,613	NC	0.09 (2.08)	NC NC	NC NC
2005	74,951.25	2,537,565	NC	0.34 (2.09)	NC NC	NC NC
2006	64,547.05	997,805	NC	0.15 (0.15)	NC NC	NC NC
2007	67,382.01	1,674,515	NC	0.25 (0.18)	NC NC	NC NC
2008	60,576.55	573,161	NC	0.10 (0.20)	NC NC	NC NC
2009	63,569.89	623,299	NC	0.10 (0.19)	NC NC	NC NC
2010	74,417.99	1,608,762	NC	0.22 (0.19)	NC NC	NC NC
2011	101,351.17	2,471,088	NC	0.24 (0.16)	NC NC	NC NC

* Numbers shown in parentheses represent the previous 5-year running average.

NC – The data is no longer collected

The CY2000 fire loss increase was primarily due to the Cerro Grande fire at LANL.

Figure 1
DOE Valuation

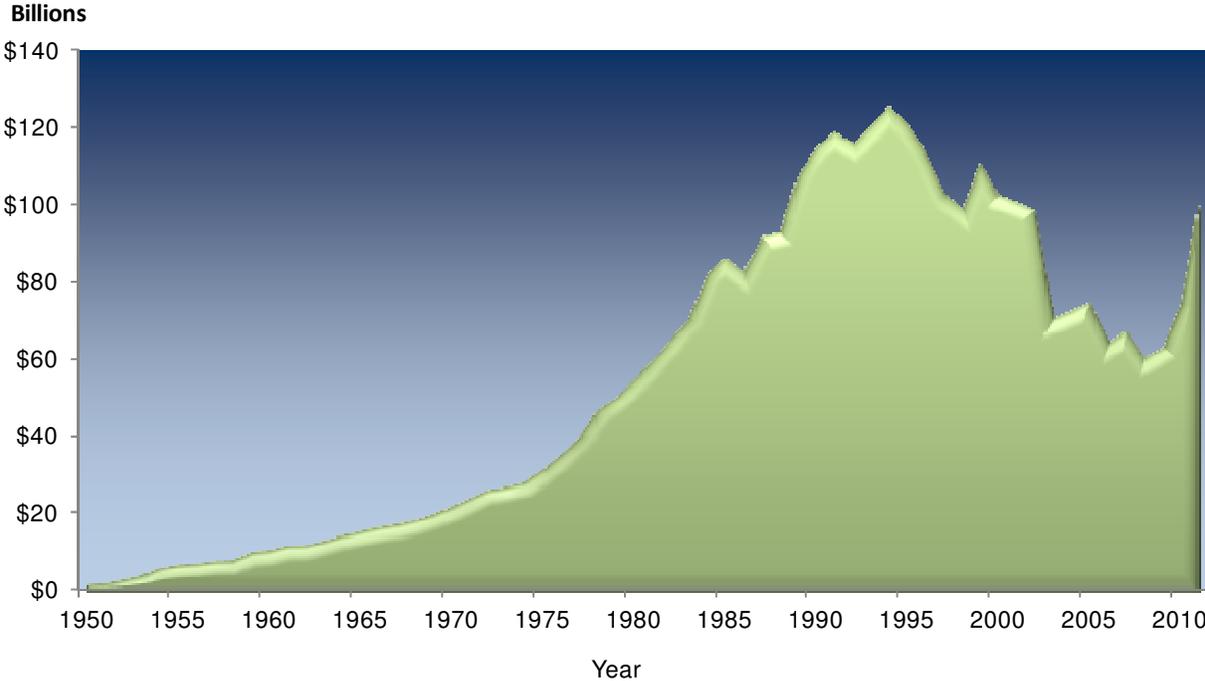
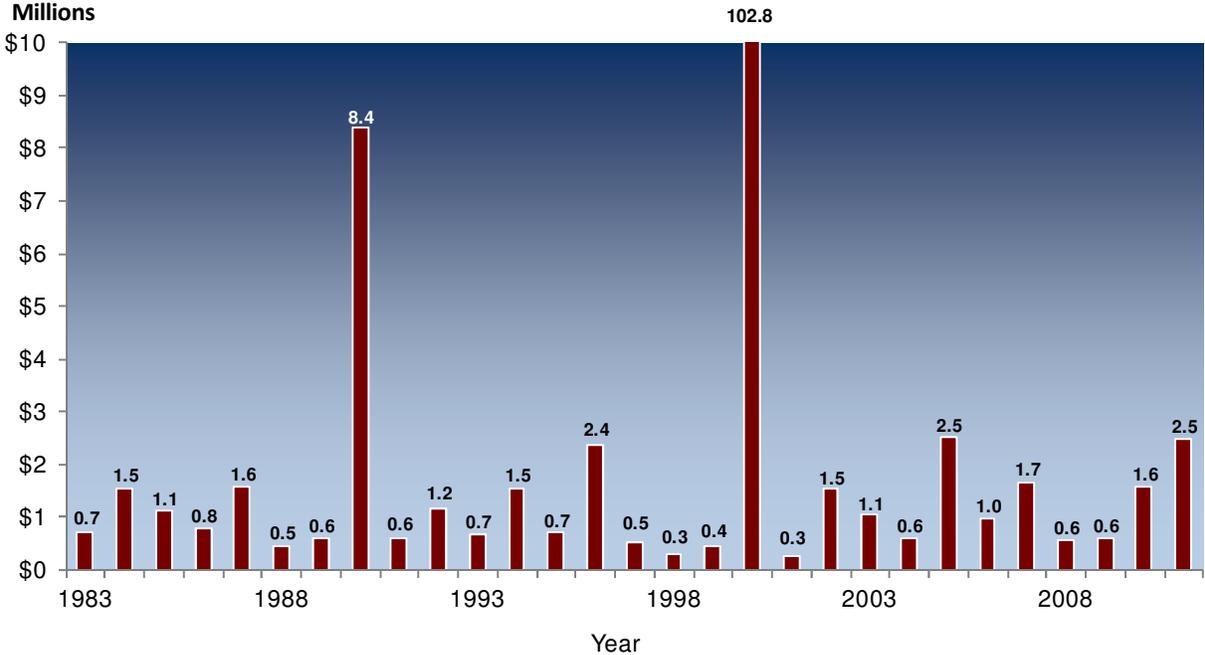


Figure 2
Property and Facility Losses Due to Fires



Note: CY2011 total DOE fire losses exclude LANL range fire; CY2000 total DOE fire losses included \$100 million LANL range fire loss.

Figure 3
DOE Fire Loss Rate
 Rate in cents per \$100 of valuation

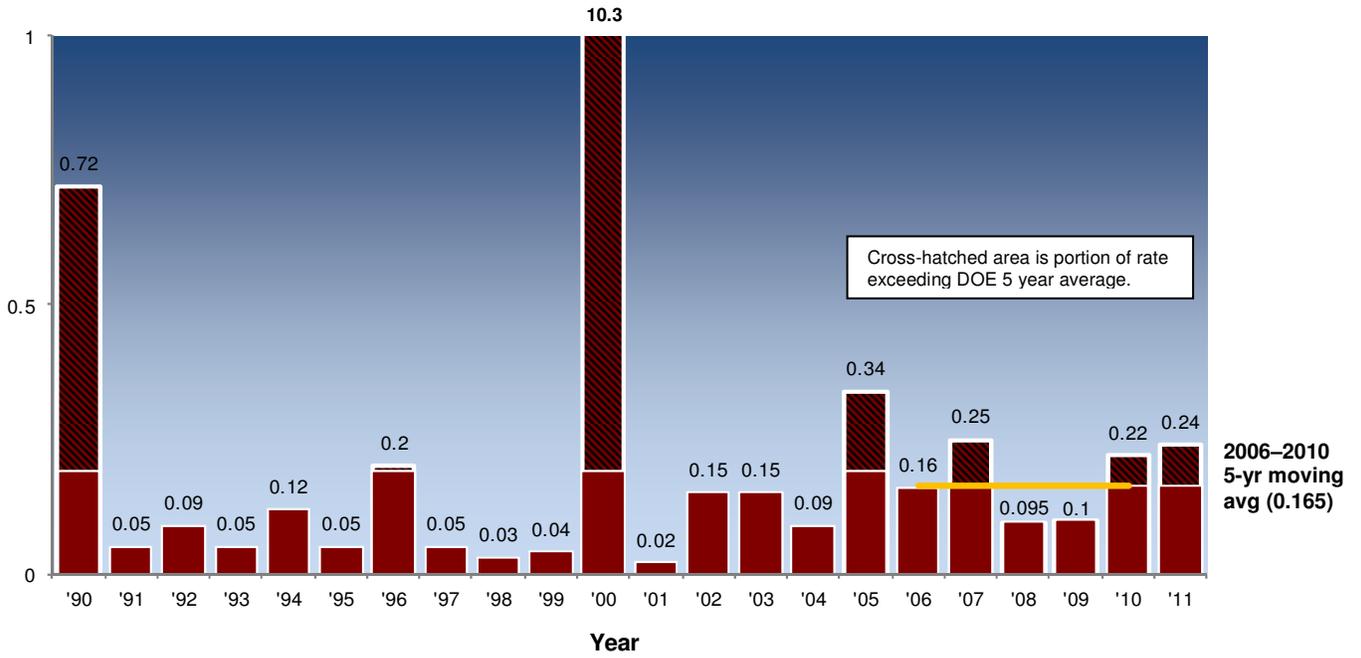


Figure 4
Fire Events

Number of fire events reported at the 7 sites (LANL, SNL, INL, SRS, TJNAF, LLNL, and Y-12) posting greater than \$10,000 in total losses in CY2011

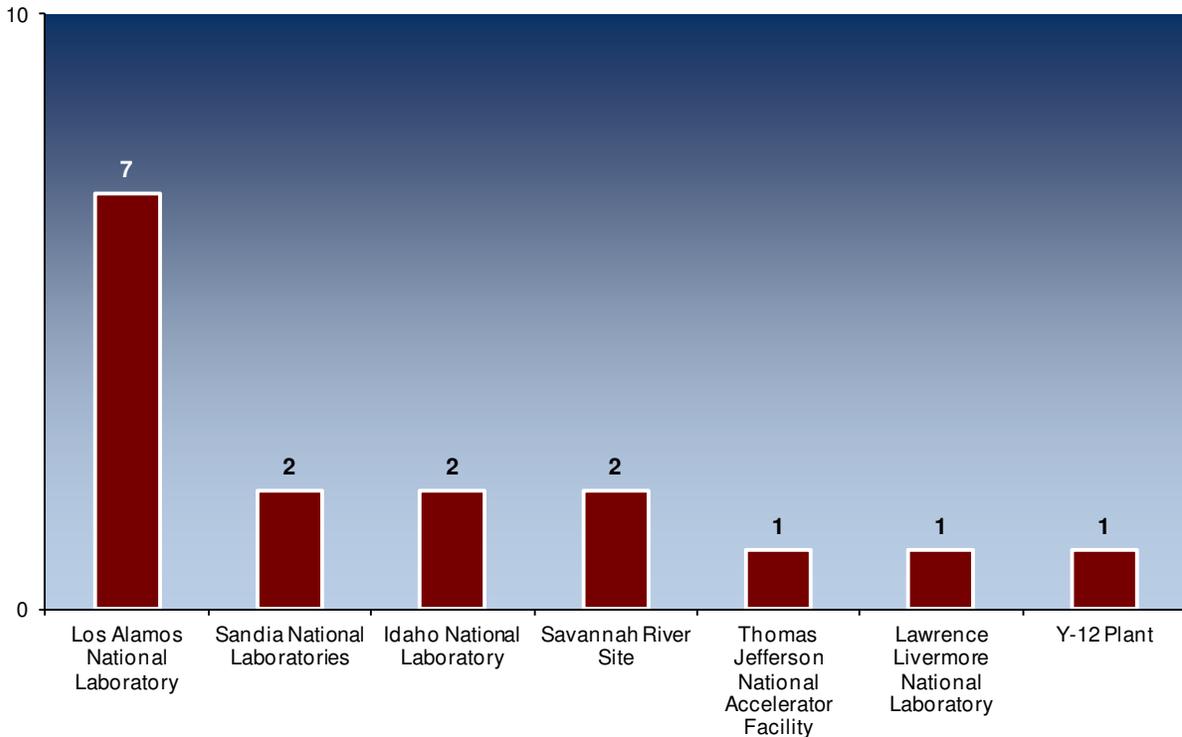


Figure 5
Fire Loss Amount

Total losses in CY2011 for those sites posting greater than a \$10,000 loss per event (excluding Las Conchas range fire)

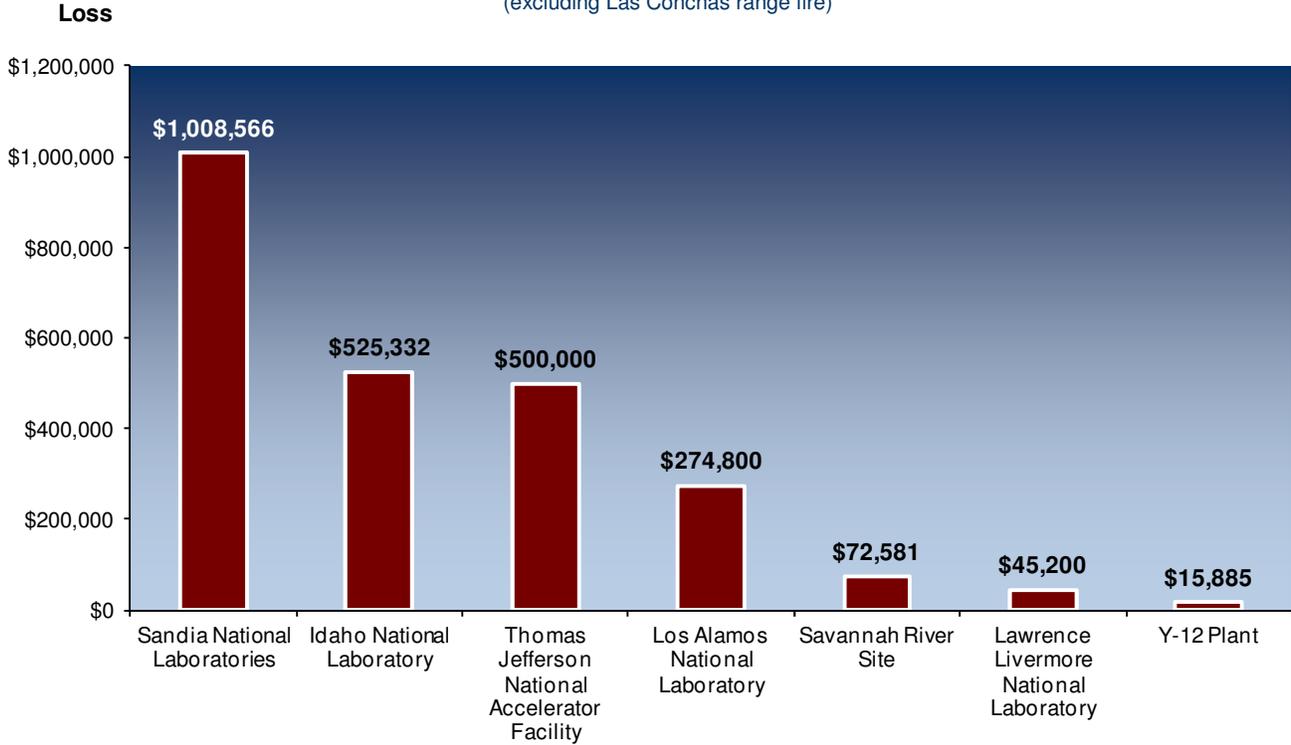
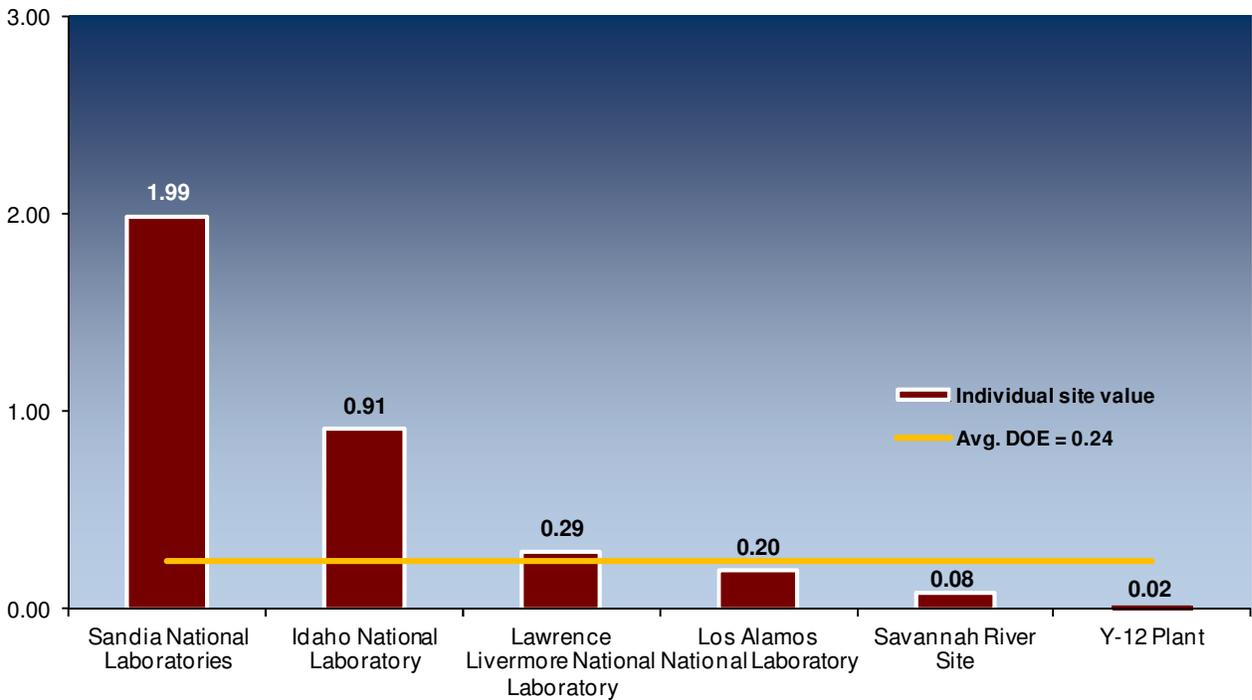


Figure 6
Fire Loss Rate

Rate in cents per \$100 of valuation during CY2011 for those sites posting greater than a \$10,000 loss per event *



* No facility valuation data available for TJNAF

Summary of Major Fire Damage Incidents

Table 2 provides a description of the three most significant of individual major (dollar loss greater than \$10,000 per event) DOE fire losses during CY2011. Seven different sites posted 16 major fire events resulting in losses greater than \$10,000 per event. The three most significant events are provided below and account for about 99% of the total losses. See Table 3 for significant non-fire events involving fixed automatic fire suppression systems.

Table 2
Summary of Three Major Fire Loss Events

Loss Type	Location	Description	Dollar Loss
Fire/Smoke (Brush)	LANL Las Conchas Range Fire	A range fire initiated near Las Conchas on June 26, 2011. The Laboratory was closed for a week and the town of Los Alamos was evacuated as precaution. One acre of LANL property at TA-49 was burned and the fire consumed 156,600 acres. The total estimated losses including direct fire costs and lost Laboratory employee wages was \$62,000,000. There were no personnel injuries.	\$62,000,000
Fire/Smoke (Building)	SNL-NM	A lithium fire and explosion at the Plasma Material Test Facility in Building 6530 on August 26, 2011 caused overpressure structural damage to the building. No sprinkler activation occurred. The estimated cost to repair the damage to the facility is \$990,000. There were no personnel injuries.	\$990,000
Fire/Smoke (Other)	TJNAF	A fire occurred when two one-ton magnets were energized and operating at full current with cooling water valves in the shut position. The magnet copper coils overheated, burned off epoxy potting material, and melted portions of the copper coils until the magnet power supply shut off from over current. Fire damage was evident on the exposed coils of the magnets; soot was deposited on the upper portions of the magnets involved and on equipment located immediately above the magnets. The accelerator tunnel in the immediate vicinity of the magnets filled with dense smoke. The estimated fire loss was \$500,000. There were no personnel injuries.	\$500,000

Automatic Water-Based Suppression System Performance

There were 32 inadvertent actuations of wet-pipe suppression systems: 28 were due to weather-related events (freezing), one was caused by steam initiating actuation, and three actuations were due to unknown causes. There was one dry-pipe failure due to air leakage.

The two significant (exceeding \$10,000 per incident) events are noted below in Table 3.

Table 3
Summary of Two Water-Based Fire System Inadvertent Actuations

Loss Type	Location	Description	Dollar Loss
Leaks/Spills/Releases Water-Based Suppression System Actuations	LLNL	An unexpected and spontaneous activation of sprinklers in the B- 453 facility, a 4-story office building housing computer equipment and servers occurred over a weekend for unknown reasons. The total loss was estimated at \$45,000..	\$45,000
Leaks/Spills/Releases Water-Based Suppression System Actuations	LANL	Extreme cold weather led to freezing of a sprinkler system in the TA-46-535 Facility. The total loss was estimated at \$10,000.	\$10,000

Non-Water Based Fire Suppression System Performance

Concerns regarding the effect of chlorofluorocarbons, including Halon, on the ozone layer have led to their regulation under the 1991 Clean Air Act. The Environmental Protection Agency has subsequently published implementing regulations to include prohibiting new Halon production, establishing container labeling requirements, imposing Federal procurement restrictions, imposing significant Halon taxes, issuing requirements for the approval of alternative agents, and listing essential areas where Halon protection is considered acceptable.

DOE's current policy 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 CY2011, DOE maintained 154 active Halon-1301 systems in operation containing approximately 52,430 pounds of Halon. Stored Halon-1301 inventory was reported at approximately 66,340 pounds¹, a 10% decrease over CY2010. The number of active Halon-1301 systems is down 8% from the 167 systems active in CY2010 while active inventory decreased slightly from CY2010 levels of 53,614 pounds of agent.

Operational and stored inventory amounts for Halon-1211 (for hand held extinguishers) were reported at 32,495 and 62,251 pounds respectively. This represents a doubling in the amount of operational Halon-1211 reported in CY2010 (14, 944 pounds) while the amount in stored inventory increased 63% from CY2010 levels (38, 396 pounds).

Additionally, approximately 152 pounds² of Halon-1301 were reported to be released to the environment in non-fire related events (SRS reported 27 pounds released via recycling activities and 125 pounds from incidental discharges).

A total of two incidents involving automatic actuation of Halon-1301 or other non-water based suppression systems occurred in CY2011. The first event was actually a compilation of three recurring CO₂ discharges attributed to equipment failures in Building 8330/8340 at ORNL in contrast to the four recurring events at the facility last year. The second event involved an inadvertent actuation of a non-water based suppression system at Los Alamos National Laboratory due to personnel error. A FM-200 automatic non-water based system actuated at TA-54 after an employee activated a manual discharge station and released the system's contents. There was a total cost of \$5,000 to replace the system's agent.

The inadvertent LANL discharge event, the SPR propane leak, and the recurring CO₂ events at ORNL are listed in Table 4 on the following page.

¹ SRS continues to maintain a legacy Halon repository for the DOE complex, which includes clean Halon 1301 in bulk storage tanks and cylinders of various sizes and weights. There is no Halon 1211. SRS reports that the Halon bank is no longer accepting Halon inventory from the sites.

² The above figure does not consider system leakage in a stable condition.

Table 4
Automatic Non-Water Based System Actuations

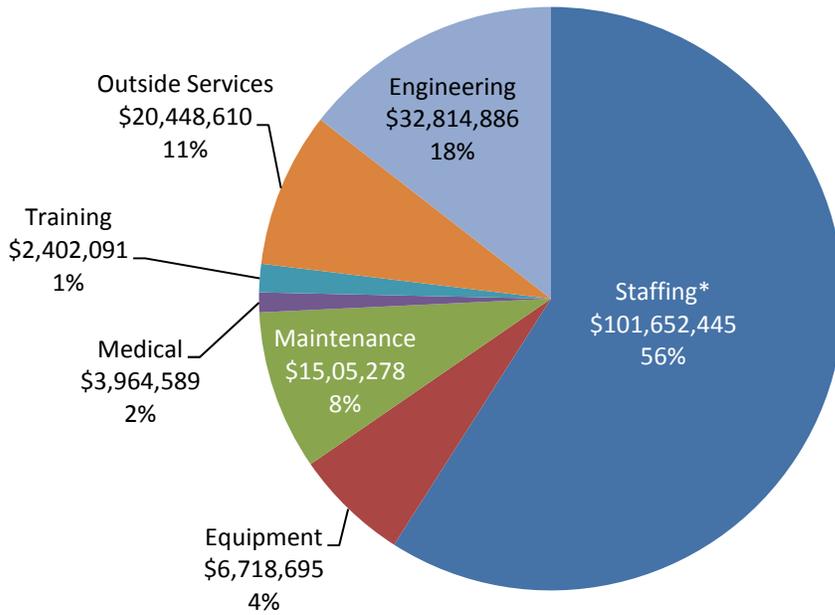
Loss Type	Location	Description	Dollar Loss
Leaks/Spills/Releases	LANL TA-54-491	Inadvertent discharge of the FM-200 automatic fire extinguishing system protecting the waste characterization modular structure occurred when an employee accidentally struck the manual discharge release station. There were no personnel injuries.	\$5,000
Leaks/Spills/Releases	ORNL Bldg 8330/8340	3 events, classified as non-fire events, occurred when capacitors inside of a modulator failed resulting in a release of energy. Typical responses to the failures included de-energizing the equipment and manually activating a CO ² system for cooling and equipment salvage. There was no fire and no fire was observed during the fire department's response. One hundred pounds of CO ² agent was locally released on the modulator upon receipt of an automatic alarm indicating capacitor failure occurring remotely at the control room. This was one of several recurring events involving different modulators. The costs related to each individual event were \$5,000. There were no personnel injuries.	\$15,000

Recurring Fire Protection Program Costs

Yearly or recurring fire protection costs for CY2011 reached \$183,051,594 for those sites reporting into the Fire Protection Program database. On a ratio of cost to replacement property value (recurring cost rate), the DOE spent approximately 23 cents per \$100 valuation for recurring fire protection activities at those sites.

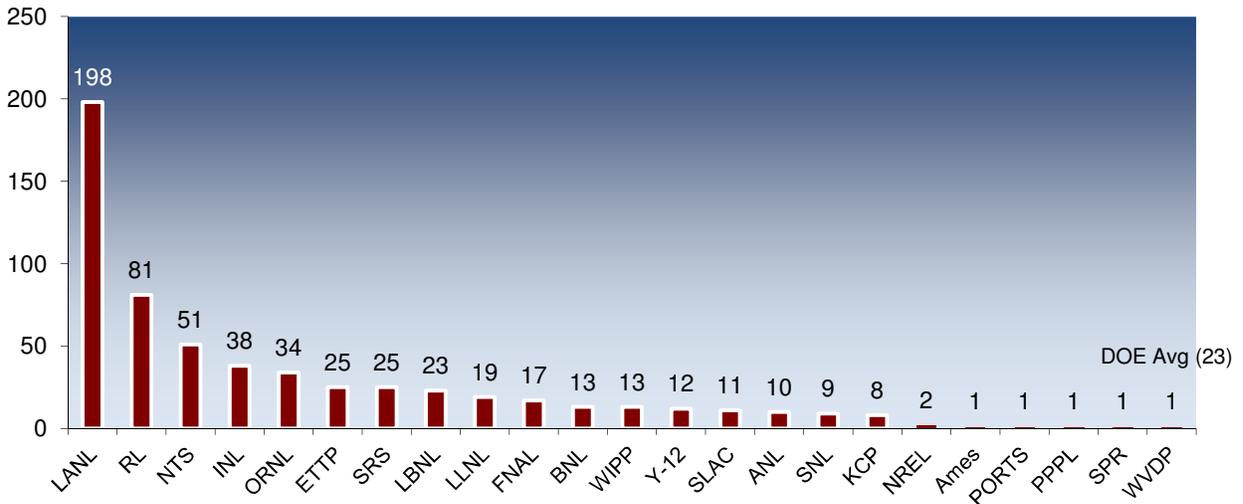
Figure 7 shows the CY2011 recurring cost distribution by activity. Figure 8 lists the recurring cost rate by DOE sites. It should be noted that not all recurring cost activities were consistently reported, such as outside contracts and maintenance activities.

Figure 7
Recurring Fire Protection Program Cost Distribution



* Fire Department Activities

Figure 8
Recurring Fire Protection Program Cost Rate by Site
(Rate in cents per \$100 of valuation)



Fire Department Activities

Number of Responses:

The following is a summary of fire department responses for CY2011.

1. Fire	482
2. Hazardous Materials	222
3. Other Emergency	1,770
4. Other Non-Emergency	1,891
5. Medical	1,741
Total	6,106

Comparing this 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.