

GAO

Report to the Honorable Sherwood
Boehlert, Chairman, Committee on
Science, House of Representatives

August 2001

FIRE SAFETY

Comprehensive Information on Fire Incidences in Federal Facilities Is Lacking

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Abbreviations

ANSI	American National Standards Institute
CFOI	Census of Fatal Occupational Injuries
GSA	General Services Administration
NFPA	National Fire Protection Association
NFIRS	National Fire Incident Reporting System
OMB	Office of Management and Budget
OSHA	Occupational Safety and Health Administration



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United States General Accounting Office
Washington, DC 20548

August 20, 2001

The Honorable Sherwood Boehlert
Chairman, Committee on Science
House of Representatives

Dear Mr. Chairman:

Developing standards that protect against fire and testing products against those standards are critical in promoting fire safety. According to the National Fire Protection Association (NFPA), business office properties, including federal offices and other federal civilian facilities, annually experience thousands of fires, over \$100 million in property losses, and dozens of casualties each year. The government and the public rely on product standards, testing, and certification for protection from fires. For example, organizations such as Underwriters Laboratories, the American Society for Testing and Materials, and NFPA are "standards-development organizations" that are part of the private sector process for developing standards on a voluntary, consensus, and largely self-regulated basis. Generally, the technical committees of these organizations include manufacturers, government officials, consumer representatives, and others who discuss and propose standards and testing procedures.

The nation's system for developing standards and testing products to certify their compliance with those standards is complex.¹ The system consists of a decentralized, largely self-regulated network of private independent standards-development organizations, testing laboratories, and government agencies. For example, there are about 50,000 private sector voluntary standards, developed by more than 620 organizations. This number does not include over 44,000 regulatory and procurement standards developed by some 80 federal regulatory and procurement authorities, or other codes, rules, and regulations containing standards that have been adopted by state and local governments.

The American National Standards Institute (ANSI) is a private nonprofit organization of codes and standards developers and other organizations.

¹A standard is a prescribed set of rules, conditions, or requirements concerning definitions of terms; classification of components; specification of materials, performance, or operations; delineation of procedures; or measurement of quantity or quality in describing materials, products, services, or practices.

ANSI establishes rules for developing standards in an open, inclusive, and transparent way, on the basis of the consensus of the parties represented in the technical committees. Federal agencies, like the Consumer Product Safety Commission, the Department of Labor's Occupational Safety and Health Administration (OSHA), and the General Services Administration (GSA), use standards established through this consensus method and the results of testing that determines product compliance with these standards to help ensure the quality and safety of the goods and services that they and the public purchase. Without standards that are developed through the consensus process to accomplish this purpose, federal agencies would have to independently develop their own standards to evaluate the safety of millions of products.

Federal agencies, along with state and local government, have long maintained responsibilities for identifying and responding to the national fire threat. Most significantly, the U.S. Fire Administration—an agency within the Federal Emergency Management Agency—has been statutorily designated as the lead federal agency for coordinating fire data collection and analysis. It also maintains a national fire incident database and provides training and technical assistance to local fire departments and other local enforcement agencies. Also, the Department of Commerce's National Institute of Standards and Technology performs research on fire-related issues.

In a letter to us and in subsequent meetings, you expressed interest in the adequacy of standards that promote fire safety and associated procedures for testing products in protecting federal employees and the public. You were concerned that some products, which had been tested and certified as meeting these standards, had nonetheless failed in the market but were still being used in federal facilities. For example, in the early 1990s, millions of a specific type of sprinkler head commonly installed in federal facilities failed to activate in fires. In October 1998 the Consumer Product Safety Commission recalled them.

In response to your concerns and discussions with your office, this report

- provides information on the federal government's reliance on private sector voluntary fire standards and testing products against those standards and
- discusses whether data that are available about fire incidents and their causes in civilian federal facilities are sufficient to allow federal agencies to determine if they need to take action to protect federal workers from the threat of fire.

To provide this information, we identified and reviewed existing standards-development procedures, testing protocols, and certification programs. We also interviewed representatives of major standards-development organizations, testing laboratories, and certification organizations. We also interviewed fire experts from federal agencies and from major fire safety-related associations and fire departments. We also obtained data from the available federal and NFPA fire-incident databases and reporting systems. Finally, as requested, we provide information on the failure of Omega sprinkler heads to activate and on concerns about the flammability of information technology equipment. Appendix I provides a detailed discussion of our scope and methodology. Appendix II provides a list of the groups we contacted for this review.

Results in Brief

When erecting facilities; renovating offices; and purchasing equipment, materials, and supplies, federal agencies rely on the fire safety standards promulgated by standards-development organizations and testing to those standards by private, independent laboratories and product certification organizations. For example, GSA—the federal agency responsible for listing goods and services that are approved for procurement by federal agencies—uses product certifications as a way of ensuring the quality and safety of these goods and services. In addition, federal agencies often incorporate those standards into regulations, such as the Consumer Product Safety Commission's consumer product safety regulations. Such reliance is widely accepted nationwide and internationally, and the federal government has long encouraged its agencies to rely on private sector, consensus-based standards. In 1983, an Office of Management and Budget (OMB) circular encouraged agencies to use these standards to the maximum extent practicable; and in March 1996, the Congress enacted the National Technology Transfer and Advancement Act of 1995 (Public Law 104-113), requiring agencies to use these standards, except when it is inconsistent with applicable law or otherwise impractical. The circular and the act also direct federal agencies to consult with and participate, when appropriate, in standards-development organizations and report to OMB when they do not use private sector, voluntary standards in their procurement or regulatory activities.

The federal government has no comprehensive, centralized database regarding the incidence of fires in federal facilities or the causes of such fires. As reported by NFPA, from 1993 through 1997, fires in office facilities, including federal civilian facilities, annually caused about 90 injuries and about \$130 million in property damage. To address this fire risk, certain parts of the private sector—for example, a major hotel chain

and some insurance organizations—track the number of fires in different types of facilities and their causes. Although responsible for serving as the lead federal agency for coordinating fire data collection and analysis by maintaining a national fire incident database, the U.S. Fire Administration does not collect data on the number of fires in federal office facilities, the causes of those fires, or the specific types of products involved in fires. According to its comments on a draft of our report, the Fire Administration does not have the resources or authority to implement a nationwide study of fires in federal workspace. GSA does not systematically collect information on fires that have occurred in the facilities for which it is responsible—about 330 million square feet in over 8,300 buildings. In addition, the nonfederal NFPA does not gather specific information about whether a fire occurred on private or government property or whether the fire involved specific products. As a result of a lack of centralized data collection and reporting systems, relatively little assurance exists that the government has sufficient knowledge of the number and causes of fires in federal facilities to take appropriate action to protect federal employees from the threat of fire. For example, the Omega fire sprinkler system that failed in numerous locations and in laboratory tests as early as 1990 was not recalled until 1998 and has only recently been replaced at some major government facilities, such as the Smithsonian and the Library of Congress. This report contains a recommendation aimed at determining whether a systematic collection of data on fires in federal workspace would provide information useful to the federal government in its efforts to reduce the risk of fires.

We provided a draft of our report to the U.S. Fire Administration, GSA, the Department of Labor, and the Consumer Product Safety Commission. The Director of the Fire Administration's National Fire Data Center agreed, in principle, with our recommendation. GSA senior program officials suggested the deletion of a statement that it could not provide us with complete information on fires that caused over \$100,000 damage in federal facilities, but we declined to make this change because the statement was germane to our discussion. GSA also provided additional information, which we incorporated into our report. The Department of Labor and the Consumer Product Safety Commission provided technical and editorial comments, which we incorporated where appropriate. Because of its role in testing Omega sprinklers, we sent a copy of the draft to Underwriters Laboratories, which had no comments.

Background

In the United States, product safety, including fire safety, is largely promoted through a process of consensus-based standards and voluntary

certification programs. ANSI establishes requirements to ensure that standards are formulated through a consensus-based process that is open and transparent and that adequately considers and resolves comments received from manufacturers, the fire safety community, consumers, government agencies, and other stakeholders. Standards are generally developed in the technical committees of organizations that include independent laboratories, such as Underwriters Laboratories; and trade and professional associations, such as the American Society for Testing and Materials. These entities form a decentralized, largely self-regulated network of private, independent, standards-development organizations. For those organizations that choose to follow ANSI procedures, ANSI performs audits and investigations to ensure that standards-development organizations follow approved consensus-based procedures for establishing standards. Standards promulgated by such organizations can become part of a system of American National Standards currently listed by ANSI. Overall, according to NFPA, the U.S. standards community maintains over 94,000 active standards, both American National Standards and others. These 94,000 active standards include private sector voluntary standards as well as regulatory and procurement standards.

The process of developing consensus-based standards is designed to balance the needs of consumers, federal and nonfederal regulators, and manufacturers. According to ANSI officials, new standards are commonly adopted or existing ones are frequently revised because manufacturers express a need for such actions on the basis of the development of new products. Representatives of other parties—such as regulators or consumers—may raise concerns about product safety and performance.

For marketing and consumer safety purposes, product manufacturers may have their products tested at independent testing laboratories to certify that the products meet applicable product standards. This testing and certification process is called “product conformity testing and certification.” Some local, state and federal agencies require such testing and certification. For example, manufacturers of electrical home appliances have their products tested and certified by Underwriters Laboratories to enable them to attest that the products meet safety standards regarding fire, electrical shock, and casualty hazards. Alternatively, where acceptable, manufacturers can certify on their own that their products were tested and met applicable standards.

Standards are also voluntarily accepted and widely used by manufacturers and regulatory agencies to provide guidance and specifications to manufacturers, contractors, and procurement officials. Each year millions

of products are sold in the United States and throughout the world that bear the mark of testing organizations. Consumers, manufacturers, and federal agencies follow the very widespread, internationally recognized practice of relying on consensus standards and testing at laboratories to promote public safety. In the case of facilities and residences, the most extensive use of the standards is their adoption into model building codes by reference. Model building codes contain standards published by many organizations, including professional engineering societies, building materials trade associations, federal agencies, and testing laboratories.

Federal Government Relies Heavily on Consensus-Based Standards and Testing

When erecting facilities; renovating offices; and purchasing equipment, materials, and supplies, federal agencies rely on the fire safety standards developed by private standards-development organizations. Furthermore, the federal government has historically encouraged its agencies to use standards developed by these organizations. For example, in its 1983 Circular A-119, OMB encouraged agencies to use these standards. Moreover, the National Technology Transfer and Advancement Act of 1995 requires agencies to use standards developed or adopted by voluntary consensus bodies, except when it is inconsistent with applicable law or otherwise impractical. Essentially, OMB Circular A-119 and the act direct federal agencies to use voluntary consensus standards whenever possible. They also direct federal agencies to consult with and participate, when appropriate, in standards-setting organizations and provide explanations when they do not use voluntary consensus standards in their procurement or regulatory activities. As of June 2001, according to NFPA, about 15 percent of the estimated 94,000 standards effective in the United States had been developed by civilian federal agencies. Furthermore, the Public Buildings Amendments of 1988 require GSA to construct or alter buildings in compliance with the national building codes and other nationally recognized codes to the maximum extent feasible.

Federal agencies also engage in a variety of activities related to certifying that products conform to standards. For example, the National Institute of Standards and Technology publishes directories listing more than 200 federal government procurement and regulatory programs in which agencies are actively involved in procuring or requiring others to procure products meeting certification, accreditation, listing, or registration requirements. Furthermore, many federal agencies participate in the development of fire standards and product-testing procedures. For example, GSA participates on technical committees, such as those of NFPA and Underwriters Laboratories. As a result, GSA specifies numerous products and building code regulations that meet standards and testing

requirements from standards-development organizations and testing laboratories. In addition, voluntary standards and the testing of products to those standards are widely accepted by other civilian federal agencies, such as the departments of Agriculture, Housing and Urban Development, the Interior, Labor, Transportation, and the Treasury as well as the Environmental Protection Agency.

Comprehensive Data on Fire Incidences in Federal Facilities Are Lacking

The federal government has no comprehensive, centralized database regarding the incidence of fires in federal facilities or the causes of such fires. According to NFPA, fires in office facilities, including federal civilian facilities, annually cause about 90 injuries and about \$130 million in property damages. Although responsible for maintaining a national fire incident database and for serving as the lead agency in coordinating fire data collection and analysis, the U.S. Fire Administration does not collect data on the number of fires in federal office facilities and the causes of those fires, nor about specific types of products involved in the fires. For its part, GSA collects a minimal amount of information in the facilities for which it is responsible—about 330 million square feet in over 8,300 buildings—to determine the number and causes of fires that have occurred in the facilities. In addition, like the U.S. Fire Administration, NFPA does not gather specific information about whether a fire occurred on private or government property or whether the fire involved specific products. Thus, these databases do not contain sufficiently detailed data to allow the identification of fire incidents in federal facilities or fires associated with specific product defects. Also, the government does not have a mechanism for providing fire incident data to standards-development organizations when they consider the revision of product standards and testing procedures. As a result of a lack of detailed data collection and reporting systems, the government cannot assess the number and causes of fires in federal facilities and therefore cannot determine if any action is needed to ease the threat of fire.

Data Regarding Fires in Federal Facilities Do Not Provide Sufficient Information for Determining if Additional Actions Are Needed to Protect Federal Employees

Certain private sector firms take steps to identify the nature of the fire threat in their facilities. For example, to help insurance companies, communities, and others evaluate fire risks, the Insurance Services Office, an affiliate of the insurance industry of the United States, maintains detailed records and performs investigations about individual properties and communities around the country, including such factors as the physical features of buildings, detailed engineering analyses of building construction, occupancy hazards, and internal and external fire protection. In addition, the Marriott Corporation, a worldwide hotel chain, maintains

data on fires throughout its facilities. According to a Marriott official, Marriott uses this information to assess the risk of fire in its facilities and to take corrective actions.

At the same time, the number and causes of fires in federal workspace are not known. The federal government—an employer of over two million civilian employees—does not have a system for centrally and comprehensively reporting fire incidents in its facilities and the causes of those incidents. For example, according to GSA officials, the agency—which manages over 300 million square feet of office space—collects information on fires that cause over \$100,000 in damage. However, when we requested this information, GSA could not provide it and provided examples of only two fires. According to a GSA official, GSA cancelled a requirement for its regional offices to report smaller fires to a central repository. GSA explained that it found the task of reporting smaller fires to be very labor intensive and time consuming. GSA also found that analysis of the reported information could not determine specific fire trends.

Databases that are available and maintained by federal agencies—such as databases of the Department of Labor, Consumer Product Safety Commission, and U.S. Fire Administration—do not provide sufficient detail for determining the number and causes of fires in federal facilities, including the products involved in the fires. For example, according to the Department of Labor (Labor), 7 civilian federal employees died (excluding the 21 who died in forest or brush fires), and 1,818 civilian federal employees were injured while at work as a result of fires or explosions between 1992 and 1999.² Although Labor gathers information about federal employees' injuries and fatalities caused by fires, this information does not identify details, such as the cause of the fire. Furthermore, because of a lack of reporting detail, the data do not lend themselves to an analysis of what specific products may have been involved in the fire and whether the product had been certified as meeting appropriate product standards.

²These fatalities do not include federal employee deaths due to bombings, such as the Oklahoma City bombing or incidents overseas, such as the August 1998 bombing of the US Embassy in Dar Es Salaam, Tanzania. However, the number of civilian injuries among federal employees does include bombing victims. For example, according to the Department of Labor, the number of injuries among civilian federal employees includes many injuries that resulted from the 1995 bombing of the Murrah Federal Building in Oklahoma City. The Department of Labor could not provide additional detail regarding injuries due to bombings.

Within Labor, OSHA's Office of Federal Agency Programs, the Bureau of Labor Statistics, and the Office of Workers' Compensation Programs routinely gather information about federal employee injuries and fatalities. OSHA's Office of Federal Agency Programs, whose mission is to provide guidance to each federal agency on occupational and health issues, also collects annual injury statistics from each federal agency. These statistics are in aggregated form, however, and do not provide detail about the nature or source of the injury.

The Department of Labor's Bureau of Labor Statistics has been collecting information on federal employee fatalities since 1992 through its Census of Fatal Occupational Injuries (CFOI). This census contains information regarding work-related fatality data that the federal government and the states have gathered from workers' compensation reports, death certificates, the news media, and other sources. According to the CFOI, between 1992 and 1999, 7 civilian federal employees were fatally injured due to fire-related incidents while working (excluding the 21 who died in brush or forest fires). Although the fatal injuries census does identify federal employee fatalities due to fires, it does not contain details about the fire, such as the cause of the fire or the types of products or materials that may have been involved in the fire.

Also within the Department of Labor, the Office of Workers' Compensation Programs maintains information about federal employees or families of federal employees who have filed claims due to work-related traumas. The office was able to provide from its database information about the claims of federal employees or their families resulting from fire-related incidents. According to the Office of Workers' Compensation, between 1992 and 1999 1,818 civilian federal employees were injured in federal workspace as a result of fire-related incidents while working. However, this information includes data only for those federal employees who actually filed claims. Similar to CFOI data, this database does not contain additional details about the fire, such as the cause of the fire or the types of products or materials that may have been involved in the fire.

The Consumer Product Safety Commission maintains a variety of data on product recalls and incidents related to consumer products. However, none of the four databases that it maintains can identify information about federal facilities or federal employees.

The U.S. Fire Administration is chartered as the nation's lead federal agency for coordinating fire data collection and analysis. However, the national fire incident databases maintained by the U.S. Fire Administration

do not gather specific information about whether a fire occurred on private or government property or whether the fire involved specific products. The Fire Administration maintains the National Fire Incident Reporting System (NFIRS)—a national database through which local fire departments report annually on the numbers and types of fires that occur within their jurisdictions, including the causes of those fires. Reporting, however, is voluntary; according to the U.S. Fire Administration, this results in about one-half of all fires that occur each year being reported. In addition, the U.S. Fire Administration does not collect data on the number of fires in federal office facilities and the causes of those fires, nor about specific types of products involved in a fire. According to its comments on a draft of our report, the Fire Administration does not have the resources or authority to implement a nationwide study of fires in federal workspace.

In addition to the federal databases, NFPA also maintains a national fire incident database. According to NFPA, between 1993 and 1997, an average of 6,100 fires occurred per year in federal and nonfederal office space, resulting in an average of 1 death, 91 injuries, and \$131.5 million in property damage per year. NFPA's estimates are based on information that fire departments report to the Fire Administration's NFIRS system and on information from NFPA's annual survey. NFPA annually samples the nation's fire departments about their fire experiences during the year; using this data, NFPA projects overall information about fires and their causes to the nation as a whole. However, neither the U.S. Fire Administration nor NFPA gathers specific information about whether a fire occurred on private or government property or whether the fire involved specific products.

In the past, the federal government has collected data regarding fires occurring on federal property. The Federal Fire Council was originally established by Executive Order within GSA in 1936 to act as an advisory agency to protect federal employees from fire. The council was specifically authorized to collect data concerning fire losses on government property. However, the council moved to the Department of Commerce in 1972 and was abolished in 1982.

The Federal Government Does Not Have Standard Procedures for Collecting Data on Fires in its Facilities or for Sharing This Information With Standards-Development Organizations

Along with manufacturers, consumer representatives, fire safety officials, and others, the federal government is one of several important stakeholders involved in the standards-development process. However, as previously discussed, the government does not consistently and comprehensively collect information on fire incidents in federal facilities, and hence it cannot systematically provide these data to standards-development organizations for consideration during revisions of standards. Furthermore, some federal agencies may be slow to respond to information about failures of certain products, including those products intended to suppress fires. In at least one case, a fire sprinkler product that failed in both the work place and the testing laboratory, as early as 1990, continued to be used in federal facilities, and it has only recently been replaced at some facilities. This case is discussed below.

The Case of Omega Sprinklers

Omega sprinklers were installed in hundreds of thousands of nonfederal facilities and in about 100 GSA-managed buildings.³ In 1990, a fire occurred at a hospital in Miami, FL, resulting in four injuries. During this fire, Omega sprinklers failed to activate. Through 1998, at least 16 additional fires occurred, during which Omega sprinklers failed to work, including a May 16, 1995, fire at a Department of Veterans Affairs hospital in Canandaigua, NY. During the New York fire, an Omega sprinkler head located directly over the fire failed to activate. Losses resulting from these and other fires were estimated at over \$4.3 million (see table 1).

³Between 1982 and 1998, Central Sprinkler Company (CSC), one of the largest suppliers of fire sprinklers, manufactured between 9 to 10 million sprinklers under the brand name Omega.

Table 1: Known Fires in Which Omega Fire Sprinklers Failed to Activate

Year	Location	Facility	Injuries	Estimated loss (\$)
July 1990	Miami, FL	Hospital	Yes, 4	\$600
May 1993	Simi Valley, CA	Private home	No	*
Nov 1994	Three Rivers, TX	Federal correctional facility	*	*
Jan 1995	Romulus, MI	Hotel	Yes	\$5,000
May 1995	Canandaigua, NY	Veterans Affairs Medical Center	No ^a	\$1,000
Jan 1997	West Hollywood, CA	Apartment	No	\$15,000
April 1997	Fort Wayne, IN	Juvenile holding facility	No	\$80,000
Sept 1997	Gulf Breezes, FL	Marina	No	\$3,500,000
Oct 1997	Kent Island, MD	Bed and breakfast	No	\$50,000
Nov 1997	Horsham, PA	Hotel	No	*
Feb 1998	Marrietta, GA	Lodge	No	\$3,000
Feb 1998	Milford, MA	Rooming house	No	\$250,000
March 1998	Beverly, MA	Dormitory	No	\$5,000
March 1998	Riverside, CA	Private residence	*	*
May 1998	Escondido, CA	Retirement center	No	*
May 1998	Scottsdale, AZ	Apartment	Yes	\$400,000
*	Dallas, TX	Private residence	*	*
Total				\$4,309,600

*Data were not available.

^aOne injury was sustained by a staff member during the use of a fire hydrant while helping to extinguish the fire.

Source: GAO analysis based on files reviewed at the Fairfax County, VA, Fire Department and interviews with County officials, as well as interviews with officials from, and/or documents maintained by, the Marriott Corporation; the Consumer Product Safety Commission; GSA; the National Institute of Standards and Technology; the Department of Veterans Affairs; and Underwriters Laboratories.

Although none of the fires reported in table 1 occurred in Fairfax County, VA, the County fire department became concerned that many of the sprinklers were installed in public and private facilities in the county. Throughout the mid-1990s, by publicizing its concerns about the sprinklers, the County fire department contributed to the widespread dissemination of information about the sprinklers in the media. In addition, tests performed in 1996 at independent testing laboratories—Underwriters Laboratories and Factory Mutual Research Corporation—revealed failure rates of 30 percent to 40 percent.

On March 3, 1998, the Consumer Product Safety Commission announced that it had filed an administrative complaint against the manufacturer, resulting in the October 1998 nationwide recall of more than 8 million

Omega sprinklers. The agency began investigating Central Sprinkler Company's Omega sprinklers in 1996 when an agency fire engineer learned about a fire at a Marriott hotel in Romulus, MI, where an Omega sprinkler failed to activate. After identifying that there was a hazard that warranted recalling the product, the Commission staff sought a voluntary recall from Central. Unable to reach such an agreement with Central, the agency's staff were authorized to file an administrative complaint against the company. Moreover, the Commission attempted to coordinate with other federal agencies, such as the Department of Veterans Affairs and GSA. The Department of Veterans Affairs participated in the recall in accordance with the terms of the Commission's settlement agreement with the manufacturer.

GSA officials stated that they became aware of the problems associated with Omega sprinklers in 1996 after hearing about them from the news media and Fairfax County Fire Department officials. GSA began a survey to identify the 100 GSA-managed buildings that contained the sprinklers. It also pursued an agreement with the manufacturer, resulting in a 1997 negotiated settlement for the replacement of some 27,000 devices in GSA-controlled buildings.

Officials from OSHA stated that they were unsure about when they became aware of the problems associated with Omega sprinklers. An agency official explained that OSHA generally does not monitor information regarding problems with specific products, except for Consumer Product Safety Commission recalls. According to OSHA, it checks such recalls only informally and within the limited context of one of its programs, but not as a part of its primary compliance efforts. In addition, according to OSHA officials, when OSHA did find out about the Omega sprinklers problems, it took no action because such problems are outside the agency's jurisdiction unless the problems involve noncompliance with applicable OSHA requirements. According to an OSHA official, OSHA does issue "Hazard Information Bulletins" that could potentially contain information about failures of specific products. However, these bulletins do not generally duplicate Consumer Product Safety Commission recall information and do not generally concern consumer products.

Federal facilities not controlled by GSA—including those of Capitol Hill (the House of Representatives, the Capitol, the Senate, and the Library of Congress) and the Smithsonian Institution—have either recently replaced or are just now replacing the defective Omega sprinklers. According to an official of the Architect of the Capitol, although the facility's management

was aware of the problems with the sprinklers, it continued using them because of cost considerations. At the time our review was completed, the Architect of the Capitol had removed and replaced the Omega sprinklers from all of the House of Representatives buildings and Capitol buildings, most of the Senate buildings, and one of the Library of Congress' buildings. The Architect of the Capitol was also in the process of replacing them in the remainder of the Senate and Library buildings. In addition, according to the Chief Fire Protection Engineer of the Smithsonian, agreement for a free-of-cost replacement of the Omega sprinklers has been reached, although the process of replacing them had not begun at the time we completed our work.

At your request, we also reviewed concerns about the extent to which information technology equipment—such as computer printers, monitors, and processing units—could be a source of fires in offices, homes, and other places, including federal workspace. A private testing laboratory in Sweden recently performed experiments that suggested that some types of information technology equipment could be subject to damage from flames that originate from external sources. In response to these concerns, the Information Technology Industry Council convened a panel of stakeholders—including the Consumer Product Safety Commission, Underwriters Laboratories, and others—to study the issue. The panel found that information technology equipment did not pose a widespread fire threat in the United States. According to the representatives of the American Chemistry Council, the threat of information technology equipment fires from external sources is mitigated by the presence of various types of flame retardants in the casings of this equipment. Moreover, representatives of the Information Technology Industry Council stated that the industry has a policy of making its equipment as safe as possible for consumers. They agreed, however, that the issue of the flammability of information technology equipment needed further study.

Conclusion

Fires, even relatively small ones, can have tragic and costly consequences. Knowing the numbers and types of fires in workspace, as well as the causes of fires and any products involved, is critical for understanding the extent of the risk of fire and can lead to identification and implementation of steps to reduce this risk. Some private sector organizations—for example, a major hotel chain and some insurance organizations—track the number of fires in different types of facilities and their causes. Such information is used to manage this risk and reduce property damage, injuries, and the loss of life. However, the federal government, which employs over two million people in space that GSA and other agencies

manage, collects very limited information on fires and lacks information on the risk of fires in its workspace. Without more complete information on fires, the federal government—a key player in the standards-development process—cannot provide timely information on the causes of fires in federal facilities to standards-development organizations for their use in developing and revising standards, testing procedures, and certification decisions. Collecting and analyzing data on the risk of fire in its workspace could enable the government to better protect its employees and enhance its ability to participate in producing standards that would better protect the public at large from fire.

Recommendation for Executive Action

We recommend that the Administrator, U.S. Fire Administration, in conjunction with the Consumer Product Safety Commission, GSA, OSHA, and other federal agencies that the Fire Administration identifies as being relevant, examine whether the systematic collection and analysis of data on fires in federal workspace is warranted. If they determine that data collection and analysis are warranted, data that should be considered for collection and analysis include: the number of fires in federal workspace; property damage, injuries, and deaths resulting from such fires; and the causes of these fires, including any products involved. In addition, the agencies should discuss, among other topics deemed relevant, the availability of resources for implementing any data collection system and any needed authority to facilitate federal agencies' cooperation in this effort.

Agency Comments and Our Evaluation

We provided copies of a draft of this report to the heads of the Federal Emergency Management Agency's Fire Administration and GSA, as well as the Consumer Product Safety Commission and the Department of Labor. Because of its role in testing Omega sprinklers, we also provided a copy of the report to Underwriters Laboratories. Although Underwriters Laboratories had no comments on the draft, the other recipients of the draft provided comments via E-mail. These comments, and our responses to them, are discussed below.

In commenting on our draft report, the Director of the Fire Administration's National Fire Data Center agreed in principle with our recommendation by stating that Fire Administration officials would gladly meet with GSA and others to examine whether specialized data collection is warranted. We welcome the Fire Administration's proposal. In addition, the Fire Administration listed several obstacles to the creation of a complete and accurate fire incident reporting system: (1) its lack of resources, (2) its lack of authority to require other federal agencies to

report fires, and (3) its lack of on-site management and control over an existing fire incident reporting system, the National Fire Incident Reporting System (NFIRS). Moreover, the Fire Administration does not specifically collect data on the number and causes of fires in federal office facilities, and no indication exists that the fire problem in federal facilities differs significantly from the overall national fire experience in similar workplace environments. We agree that data on federal fires are not currently collected, and we would cite this lack of information as a significant reason for exploring the need for a system to report the number and causes of fires in federal space. We further agree that a lack of resources, of authority to compel fire incident reporting, and of management over reporting may pose serious obstacles to improved fire incident reporting; therefore, we urge that the Fire Administration address these factors with other agencies when it meets with them to discuss the need for more specialized reporting on fires in federal work space.

GSA senior program officials commented on a draft of our report. They requested that we delete a statement in our draft report that GSA could not provide us with complete information on fires that caused over \$100,000 damage in federal facilities it manages. GSA said that our statement was not germane. We declined to make this change because the statement is germane to our discussion about a lack of information on fires in the federal workplace. GSA's inability to provide the information we requested serves to illustrate this very point. In addition, we added information in our report regarding GSA's explanation that it had cancelled a previous requirement for its regional offices to report smaller fires to a central repository. GSA explained that such reporting was labor intensive and time consuming, and analyses of this information could not yield specific fire trends. We agree with GSA that some reporting requirements may be labor intensive, time consuming, and not helpful. Therefore, in our view, as stated above and as reflected in our recommendation, the Fire Administration should address these factors with GSA and other agencies when it meets with them to discuss the need for more specialized reporting on fires in federal work space. GSA did not comment on the recommendation in the draft of our report.

In addition, Department of Labor officials provided technical and clarifying comments, all of which we incorporated into our report. However, they did not comment on the recommendation. The Department of Labor's Bureau of Labor Statistics Assistant Commissioner, Office of Safety and Health, provided additional data regarding the number of federal employees who died as a result of fires or explosions from 1992 through 1999, clarifying that most of these fatalities occurred outside of

federal buildings. The Department's Occupational Safety and Health Administration's Acting Director for Policy provided additional information, which we incorporated into our report, about the extent of its involvement in the Omega sprinkler case and the rationale for the actions it took. The Consumer Product Safety Commission stated that its comments were editorial in nature, and we revised our report to incorporate these comments.

As arranged with your office, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days after the date of this letter. At that time, we will send copies of this report to the cognizant congressional committees; the Administrator, General Services Administration; the Chairman, Consumer Product Safety Commission; the Secretary of Labor; and the Administrator, Federal Emergency Management Agency. We will also make copies available to others on request.

If you have any questions about this report, please contact me at (202) 512-4907. Key contributors to this report were Geraldine Beard, Ernie Hazera, Bonnie Pignatiello Leer, Bert Japikse, and John Rose.

Sincerely yours,

A handwritten signature in black ink, appearing to read 'P. Guerrero', with a stylized flourish extending to the right.

Peter Guerrero
Director, Physical Infrastructure Issues

Appendix I: Objectives, Scope, and Methodology

Our report (1) provides information on the federal government's reliance on private voluntary fire standards and testing products against those standards and (2) discusses whether data that are available about fire incidents and their causes in civilian federal facilities are sufficient to protect federal workers from the threat of fire.

To examine the government's reliance on fire safety standards and testing, we reviewed policies and procedures regarding how standards-setting organizations and independent laboratories establish fire safety standards and test products, as well as the roles of federal agencies and other interested parties in these processes. We contacted standards-development organizations, including Factory Mutual Research, Underwriters Laboratories, Southwest Research Institute, the American National Standards Institute (ANSI), and the American Society for Testing and Materials. We also obtained information regarding how testing and standards-setting laboratories and organizations consider fire incident data and other information about fire hazards when revising fire safety standards and testing procedures. We obtained and analyzed regulatory and statutory criteria regarding the federal role in fire safety standards and testing. We interviewed federal officials from the General Services Administration (GSA), the National Institute of Standards and Technology, the U.S. Fire Administration, the Consumer Product Safety Commission, and the Department of Labor, as well as officials from standards-development organizations. We also interviewed fire protection officials, including officials from the International Association of Fire Fighters, the International Association of Fire Chiefs, and the Fairfax County, VA, Fire Department to obtain information on setting standards and testing products.

To examine whether data are available about incidents and causes of fires in civilian federal facilities, we contacted GSA, the manager of about 40 percent of all civilian, federal office space. However, GSA does not routinely collect information about all fires that occur in federal facilities. Therefore, we obtained and analyzed fire protection incident data from the Fire Administration and the National Fire Protection Association (NFPA). The U.S. Fire Administration maintains the National Fire Incident Reporting System, which is the world's largest national annual database of fire incident information. State participation is voluntary, with 42 states and the District of Columbia providing reports. The data in the National Fire Incident Reporting System comprise roughly one half of all reported fires that occur annually. NFPA annually surveys a sample (about one-third) of all U.S. fire departments to determine their fire experiences during the year. NFPA uses this annual survey together with the National

Fire Incident Reporting System to produce national estimates of the specific characteristics of fires nationwide. Through a review of the databases, we found that there was not sufficient detail to determine which of the fires reported occurred in federal facilities. In addition, the fire departments do not document the name brands of any product that might have been involved in a fire. However, NFPA was able to provide information about fires that have occurred in office space (federal and nonfederal) from 1993 through 1998. Finally, we did not conduct a reliability assessment of NFPA's database or the National Fire Incident Reporting System.

We also attempted to determine the number of civilian federal employees who may have been injured or killed as a result of a fire-related incident while at work. In this regard, we obtained information from the Bureau of Labor Statistics' Census of Fatal Occupational Injuries (CFOI) regarding civilian federal employee fatalities from 1992 through 1999. The federal government and the states work together to collect work-related fatality data from workers' compensation reports, death certificates, news stories, and other sources for CFOI. All 50 states participate in CFOI. The Bureau of Labor Statistics was able to provide information from CFOI describing the number of civilian federal employees fatally injured due to fire-related incidents while at work. We also obtained information from the Office of Workers' Compensation Programs from 1992 through April 2001 regarding civilian federal employees or their families who have filed for workmen's compensation as a result of an injury or fatality due to a fire-related incident while at work. However, the data represent only those incidents for which a civilian federal employee or the family filed a claim. With the limited data available from the fatal injuries census and Office of Workers' Compensation Programs, we were unable to do an analysis of the number of claims filed due to bombings, such as the April 1995 Murrah Federal Building bombing in Oklahoma City, OK, and the August 1998 bombing of the U.S. Embassy in Dar Es Salaam, Tanzania. In addition, according to CFOI, the fatality data do not include fatalities due to bombings, such as the Oklahoma City bombing and the Dar Es Salaam bombing. When a fatality is reported, CFOI requires that Assaults and Violent Acts, Transportation Accidents, Fires, and Explosions reports take precedence in the reporting process. When two or more of these events occur, whoever inputs the information selects the first event listed. The Bureau of Labor Statistics classified the Oklahoma City bombing deaths as homicides under the Assaults and Violent Acts category. In addition, the Office of Workers' Compensation Programs was able to provide information on the number of injuries to civilian federal employees that its Dallas District Office reported for 1995 as resulting from explosions.

According to the Office of Workers' Compensation Programs, it is likely that many of these injuries resulted from the Oklahoma City bombing. Furthermore, the databases do not contain any details of fires. We used the fatality data from CFOI, because it is the more comprehensive source of federal employee fatality information. Finally, we did not conduct a reliability assessment of the Bureau of Labor Statistics' CFOI database or the database of the Office of Workers' Compensation Programs.

We also obtained information about fire incidents related to consumer products by contacting the Consumer Product Safety Commission. The Commission maintains several databases that allow it to conduct trend analyses of incidents involving various types of products, including the National Electronic Injury Surveillance System, a Death Certificate File, the Injury or Potential Injury Database, and the In-Depth Investigation File. In addition, the Commission maintains a library (paper files) of information on products that have been recalled. However, none of these sources contained information that would identify information about federal facilities, federal employees, or product brand names, with the exception of those that have been recalled. To examine the quality and limitations of these data, we reviewed relevant documents and interviewed officials from organizations that compile and report the data, including the National Fire Protection Association, Fire Administration, Consumer Product Safety Commission, Occupational Safety and Health Administration, Bureau of Labor Statistics, Office of Workers' Compensation Programs, and National Institute of Standards and Technology.

As requested, we examined details about reporting incidents and concerns involving Omega sprinkler heads and how standards-development organizations, federal agencies, and others responded to reports about the failures of these devices. We contacted officials from, and in some cases obtained documentation from, the Fairfax County (VA) Fire Department. We also contacted various federal regulatory agencies or agencies that used or were indirectly involved in using Omega sprinklers, including GSA, the Consumer Product Safety Commission, Occupational Safety and Health Administration, National Institute of Standards and Technology, Architect of the Capitol, Smithsonian Institution, and Department of Veterans Affairs. We also contacted officials from various laboratories that had tested Omega sprinklers, including Underwriters Laboratories, Factory Mutual, and the Southwest Research Institute. We also interviewed officials from the Marriott Corporation, which, along with Fairfax County, had publicized the problems associated with the sprinklers.

**Appendix I: Objectives, Scope, and
Methodology**

As requested, we also reviewed concerns about the possible flammability of information technology equipment. In this regard, we inquired and obtained information about such factors as the types of flame retardants currently used in the casings of information technology equipment and concerns about the environmental and health impacts of these substances, the standards used to mitigate the flammability of information technology equipment, and the tests used to determine the flammability of this equipment. Our sources of information were the American Chemistry Council; the Great Lakes Chemistry Council; the Information Technology Industry Council; the National Association of State Fire Marshals; SP (a private testing laboratory in Sweden); the National Fire Protection Association; Underwriters Laboratories; and federal agencies, including the U.S. Consumer Product Safety Commission and the U.S. Department of Commerce's National Institute of Standards and Technology.

We conducted our work from December 2000 through August 2001 in accordance with generally accepted government auditing standards.

Appendix II: Sources Contacted by GAO

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Federal Agencies

Architect of the Capitol

Consumer Product Safety Commission

Department of Labor:

Bureau of Labor Statistics

Occupational Safety and Health Administration

Office of Workers' Compensation Programs

Department of Veterans Affairs

Federal Emergency Management Administration:

United States Fire Administration

General Services Administration:

Federal Supply Service

Inspector General

Public Buildings Service

Library of Congress

National Institute of Standards and Technology

Smithsonian Institution

Standards- Development Organizations and Independent Laboratories

American National Standards Institute

American Society for Testing and Materials

Factory Mutual Research

National Fire Protection Association

Southwest Research Institute

Appendix II: Sources Contacted by GAO

Underwriters Laboratories, Inc.

SP Swedish National Testing and Research Institute

Industry Groups

American Chemistry Council

Great Lakes Chemistry Council

Information Technology Industry Council

Insurance Services Office

International Association of Fire Chiefs

International Association of Fire Fighters

National Association of State Fire Marshals

National Safety Council

Society of Fire Protection Engineers

Other Organizations

Fairfax County Fire Department, Fairfax County, VA

Marriott Corporation

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