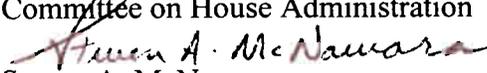


Office of Inspector General  
U.S. House of Representatives  
Washington, DC 20515-9990

MEMORANDUM

TO: The Honorable Bill Thomas, Chairman  
Committee on House Administration

The Honorable Steny H. Hoyer, Ranking Minority Member  
Committee on House Administration

FROM:   
Steven A. McNamara  
Inspector General

DATE: May 1, 2000

SUBJECT: Advisory Report On The Fire Protection Systems In The House Complex  
(Report No. 00-HOC-02)

**INTRODUCTION AND BACKGROUND**

In our report, *Fire Protection Systems Do Not Adequately Protect the House* (Report No. 98-HOC-20) issued on December 18, 1998, we concluded that the fire protection systems within the House Complex were deficient. We recommended that the Committee on House Administration (Committee) designate a House entity to closely monitor the Architect of the Capitol's (AOC) development and implementation of a comprehensive fire protection program for the House Complex. On December 23, 1998, the Committee appointed the Office of Inspector General (OIG) as the entity to monitor the AOC's development and implementation of a comprehensive fire protection program.

As the designee, we were subsequently requested by the Committee, on January 28, 1999, to evaluate the AOC's plan, submitted to the Committee in January 1999, in response to the OIG's recommendation to develop a comprehensive plan to correct identified deficiencies. At that time, we found the AOC's plan to be helpful in identifying projects currently in progress, but ultimately found that the plan provided little, if any, insight into the AOC's specific objectives, strategies, standards, and procedures for addressing the fire protection deficiencies within the House. As a part of our requirement to monitor the AOC's development and implementation of a viable comprehensive fire protection plan, we attended bi-weekly meetings, established by the House Superintendent in August 1999, to address the current status of House fire protection projects.

## **OBJECTIVES AND SCOPE**

We initiated a follow-up review of the significant deficiencies and issues identified in our prior report to determine the status and progress the Architect of the Capitol (AOC) had made to improve the fire protection systems in the House Complex during the past year: specifically the implementation of a comprehensive fire protection plan, fire protection systems maintenance, and emergency egress. Our work was conducted during the period January 28, 1999 through March 31, 2000, and consisted of following up on prior findings and recommendations through meetings with AOC officials, reviewing pertinent AOC contractor studies and reports, and observing AOC equipment installations, tests, and commissionings.

## **RESULTS OF REVIEW**

During this follow-up review, we found that the AOC has improved the level of fire protection within the House Complex through the installation of additional fire protection system hardware, such as smoke detectors, sprinklers, and tamper and waterflow switches. Despite these physical improvements, we are still concerned about the AOC's progress in implementing the report recommendations we made regarding overall fire protection systems management, especially development of a comprehensive fire protection plan and systems maintenance; and key aspects of emergency egress within the House Complex.

### **Fire Protection Improvements Accomplished**

The most noticeable improvements can be seen in the Rayburn House Office Building (HOB). During the past year, the AOC commissioned and activated the newly installed manual pull stations, strobes, and speakers which, when activated, warn occupants of a fire emergency. Prior to this improvement, the only protection in the Rayburn HOB was an antiquated fire alarm system that required manual intervention for its operation. Smoke detectors and firefighter phones were also installed in the Rayburn HOB--although the AOC is still working to fully activate these components. The AOC completed the design and expects to award the Rayburn HOB sprinkler system installation contract in May 2000.

Other fire protection improvements include the connection of tamper and waterflow switches and manual pull stations to the Cannon HOB fire alarm systems; the installation of tamper and waterflow switches currently being wired to the Longworth HOB's fire alarm system; the installation of sprinklers in the Police Uniform Room; a variety of improvements made to the O'Neill HOB, including the installation of sprinklers in rooms occupied by the Page program; and the replacement of many older fire extinguishers located throughout the House buildings.

Also, throughout the year, we observed that basement hallways--formerly laden with recycled trash bins--have been free of trash. In addition, the Chief Administrative Officer has taken appropriate actions to ensure upper floor hallways have been free of excess furniture. Continuing to keep the hallways free from obstacles is crucial to the timely evacuation of the buildings during an emergency.

## **Fire Protection Improvements Still Needed**

Although the AOC made improvements to House fire protection systems, they continue to take a haphazard approach to planning, implementing, installing, and completing fire protection systems throughout the House complex. Specifically, additional improvements are needed in fire protection systems management, defective sprinkler replacement, and emergency escape routes and planning. As a result, some tasks were completed before the requirements had been developed--resulting in improper scheduling, wasted resources, and the omission of critical system components.

### **Fire Protection Systems Management**

Our December 1998 report concluded the House Complex fire protection was deficient due to incomplete, inadequate, or absent water-based and chemical extinguishing systems; fire alarm and detection systems; fire extinguishers; and fire doors. As a result, the complex was not in compliance with Occupational Safety and Health Act (OSHA) or National Fire Protection Association (NFPA) Standards. The OIG recommended the AOC develop a comprehensive plan to correct deficiencies in water-based and chemical extinguishing systems, fire alarms, smoke and heat detectors, fire extinguishers, and fire doors. We also recommended the AOC connect building fire alarm systems to a central station service that conforms to NFPA 72; develop and implement a comprehensive testing plan for each of the fire protection systems in accordance with NFPA standards; and review the comprehensive recommendations from the fire protection survey reports and incorporate them into a viable comprehensive plan. The following paragraphs discuss the results of our follow-up review regarding each recommendation.

### **Comprehensive Fire Protection Plan**

A comprehensive fire protection plan should include the current status of fire protection within the HOBs; near-, mid-, and long-term objectives to correct identified deficiencies; timelines (including intermediate milestones) to correct deficiencies and implement fire protection systems; and resource requirements (including funding) for full fire system implementation. In addition, the plan should follow NFPA standard maintenance schedules for each system; determine how maintenance will be accomplished; develop timelines (including intermediate milestones) for initiating maintenance schedules; and develop resource requirements (including funding) for maintaining all fire protection systems. As part of the evaluation of current status of fire protection, the AOC should also consider the adequacy of emergency egress exits throughout the House Complex.

Our analysis of the AOC's January 1999 plan revealed that it did not address the deficiencies in the fire protection systems contained in our report or the comprehensive recommendations from our fire engineer's fire protection survey reports. Since that analysis, the AOC has not provided any further information or updates to the plan originally submitted to the Committee. However, since September 1998, the AOC issued 17 task orders which they consider their plan to upgrade fire protection systems in the HOBs. These include task orders to complete a complex-wide survey of Omega sprinklers, determine the status of the fire protection systems in the HOBs, and

complete design drawings to replace the existing fire pumps in the Longworth and Cannon HOBs. Also, these task orders include designs to upgrade the electrical feeders for the Ford HOB fire pump and studies to upgrade emergency signs and lighting, and determine the egress directions and routes based on occupancy loads for the HOBs. In our opinion, these task orders do not identify overall goals or objectives for fire protection in the HOBs, and, alone, do not comprise a viable comprehensive plan.

In a mid-December 1999 meeting with AOC management, we were informed that the AOC was still determining the current state of fire protection for the House. However, since that meeting, the AOC's contractor provided reports on all the HOBs, with the exception of the Capitol and the House tunnels. Since the AOC recently received the reports, they should now have a clear picture of the overall status of fire protection within each building, and should be able to develop a meaningful comprehensive plan. AOC officials also attributed some problems with devising a fire protection plan to their difficulties in determining when funding will be appropriated for the different projects. However, we believe that the development of a complete and sound comprehensive plan is the first step in requesting and receiving these funds. Even though the AOC may not know when all projects will be funded, they still need to determine what projects must be completed and their associated priority. Without these determinations, it is unlikely that fire protection projects will be completed in an effective manner, much less receive the necessary funds.

It is also our judgment that proceeding with fire protection projects in the absence of a viable comprehensive plan greatly increases the risk of improper scheduling, wasted resources, and the omission of critical system components. For example, the AOC proceeded with the installation of exit signage within the Cannon HOB before the egress studies and the door replacement program for the House buildings were completed, resulting in misplaced exit signs. We identified this situation during this follow-up review and, upon notification, the AOC covered the misplaced exit signs.

### Connection of Fire Alarm Systems

According to NFPA 72, the fire alarm systems in a complex should be connected to a central station. This station will centrally monitor all the systems and provide up to date information dissemination to emergency responders, fire departments, and occupants (i.e. Capitol Police and Superintendents).

Even though the buildings contain multiple fire alarm system components, several individual components are not connected to the buildings' main fire alarm system. Until individual components are completed and connected, a central station cannot monitor overall systems. To accomplish central station monitoring, the AOC issued a two-part task order in September 1998 to first study and prepare a general and comprehensive written description of the fire protection features in each facility and then design the interconnectivity and operability of various fire detection, alarm, and suppression systems within the Complex. Since the second part of the task order, design interconnectivity, was not scheduled until the general and comprehensive description was completed, the initial meeting on design interconnectivity did not occur until February 2000. Without a comprehensive plan, we could not determine if the project was on

schedule. Also, we were unable to determine when the AOC plans to link the individual buildings to a central station.

### Comprehensive Testing Plan

A comprehensive testing plan should list each fire protection system and provide a detailed schedule of maintenance requirements. In addition, this testing plan should identify the specific detailed maintenance required for each system or piece of equipment and incorporate NFPA testing standards.

During the follow-up review, we determined that the AOC has not developed or implemented a comprehensive inspection, testing, and maintenance plan to overcome deficiencies in the existing fire protection systems. For example, the fire extinguishers that were purchased and installed during October 1998 did not receive the required annual maintenance inspection in November 1999. Fire extinguishers should be checked monthly to ensure the pressure is within the acceptable range and that there is no physical damage to the extinguisher. Annually, the extinguishers should undergo a more in-depth inspection. We observed that although the extinguishers did receive the monthly check, they still did not have the appropriate inspection tags and did not undergo the required annual inspection. Until we discussed the annual inspection requirement with AOC officials during the follow-up review, they were not aware that the extinguishers required annual maintenance inspections. In addition, monthly emergency lighting and exit sign testing required by NFPA had not been accomplished.

Since the AOC does not have sufficient in-house experience to perform the required inspections, they plan to contract for the annual testing of the fire protection systems. While a contract for the required annual inspections would be a significant improvement for maintenance of the fire protection systems, NFPA standards require that some existing fire protection systems be tested on a weekly, monthly, semiannual, or annual basis. A comprehensive inspection, testing, and maintenance plan would provide the AOC with additional assurances that the existing systems will function properly when called upon during an emergency.

In summary, the problems identified above demonstrate the need for improved fire protection systems management. Specifically, a viable comprehensive plan that improves the fire protection systems, establishes a central station and tests existing systems within the House Complex. This plan should identify the specific objectives, strategies, procedures, and priorities to correct the identified deficiencies necessary to provide Members, staffs, and visitors appropriate fire protection throughout the House Complex.

### **Defective Sprinklers**

We reported that the House Complex contained Omega sprinklers that the Consumer Product Safety Commission identified as defective. We recommended that the House designee monitor the AOC's progress in coordinating the recall and replacement of all Omega sprinklers installed in the House Complex. After numerous contacts by the AOC, Central Sprinkler (Central), manufacturer of the Omega sprinkler, supplied 5,270 sprinkler heads to the AOC for installation in the House Complex. Initially, the AOC anticipated installing 30 heads each evening,

however, they found the replacement heads were not exact matches. Therefore, the AOC had to investigate alternative methods to install the replacement sprinkler heads that included testing for the presence of lead-based paint and asbestos in the proximity of the sprinkler heads and the availability of Central provided adapters. As a result of lead-based paint and asbestos testing, and insufficient adapters for the replacement sprinkler heads, the AOC has only installed approximately 1,300 sprinkler heads to date.

### **Emergency Escape Routes and Planning**

We reported that inadequate emergency escape routes and plans hinder the evacuation of the House Complex in the event of fire emergencies. We recommended that the AOC replace revolving doors with Americans with Disabilities Act and OSHA compliant doors and install emergency exit hardware on doors that are closed or locked for security purposes; continually ensure exit routes are clear of recycling bins and trash; review current signage and develop plans to improve the signage in each building; determine building occupancy loads for use in evacuation planning; and ensure the development of individual office evacuation plans.

During the follow-up, we found revolving doors still remained on key egress routes throughout the House Complex. AOC officials stated they have a plan to replace these doors but have not received sufficient funding to complete the installation. In the AOC's fiscal year 2000 budget, they requested \$900,000 for door replacement, but received only \$68,000 for design. During earlier appropriation hearings, the Subcommittee on Legislative Branch Appropriations stated the AOC must obtain final project designs before the Subcommittee will approve the funding. Therefore, until AOC completes the designs, construction funding will be withheld for the revolving door replacements.

According to the Capitol Police Physical Security Division, emergency exit hardware is installed on all 37 emergency doors within the HOBs, but only 10 of these doors are wired directly to the fire alarm systems. When the exit hardware is wired directly to the fire alarm systems, the doors open immediately when an alarm sounds. Otherwise, there is a 30 second delay for security purposes. Therefore, until the remaining doors are directly wired to the alarm systems, occupants will be forced to wait the 30 seconds to open the doors in an emergency. According to AOC officials, specific plans or schedules to wire the emergency exit hardware to the fire alarm systems are not available.

Results of the AOC directed egress studies identified deficiencies associated with revolving doors, door swing direction, common path of travel and travel distance, and clear direction of exit discharge. Furthermore, existing signage still needs to be addressed. Many of the existing exit signs are recessed in the walls, not visible from one end of the hall to the other, and difficult to see. Also, many of the signs do not adequately identify the proper route to exit the building during an emergency--directing personnel to stairwells but not out of the buildings. We found newly installed exit signs directing personnel to doors that are locked and temporary signs which redirect individuals back through the potential danger areas to exit the building. Since the egress studies are not complete and the existing signs are not adequate, the AOC should delay the exit sign installation until the studies are complete.

Further, the studies' results were based on occupancy rates calculated from formulas. These occupancy rates demonstrate that many of the buildings have the potential to be occupied by more people than the exits will accommodate during an evacuation. This, combined with the fact that the buildings still employ revolving doors and locked exits, places the occupants at risk if an evacuation is required during an emergency. Additionally, the coordination of occupancy levels, exit capacities, and evacuation plans is critical to ensure a safe and effective evacuation of each building during an emergency. Without adequate signage, proper exit doors, and comprehensive evacuation plans, Members, staff, and visitors alike, could be placed in jeopardy during an emergency.

### **Conclusion**

Overall, the AOC has taken positive steps to improve the fire protection systems within the House Complex. However, the AOC has significant work ahead before the Capitol complex has adequate fire protection. Therefore, the AOC must develop a viable comprehensive fire protection plan that identifies specific objectives, strategies, procedures, and priorities to correct the remaining deficiencies noted in our December 1998 report.