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United States Government Accountability Office
Washington, DC 20548

November 16, 2006

The Honorable Wayne Allard
Chairman
The Honorable Richard Durbin
Ranking Minority Member
Subcommittee on the Legislative Branch
Committee on Appropriations
United States Senate

The Honorable Jerry Lewis
Chairman
The Honorable David Obey
Ranking Minority Member
Committee on Appropriations
House of Representatives

Subject: *Capitol Power Plant Utility Tunnels*

The Architect of the Capitol (AOC), through the Capitol Power Plant (CPP), operates five walkable utility tunnels¹ containing steam and chilled water pipes associated with serving the heating and cooling requirements of the U.S. Capitol and 23 surrounding facilities. The tunnels also carry other utilities, such as fiber optic and telephone lines. The Office of Compliance (OOC), which is responsible for advancing safety, health, and workplace rights in the legislative branch, and the tunnel workers have raised concerns about health and safety issues in the tunnels. Specifically, in March 2006, the utility tunnel workers sent a letter to Congress complaining of unsafe working conditions in the tunnels, including falling concrete, asbestos, and extreme heat.² In February 2006, OOC filed a complaint against AOC concerning hazards in the tunnels, including falling concrete, an inadequate communication system for these confined spaces, and inadequate escape exits. According to OOC officials, these conditions had been previously brought to the attention of AOC by OOC inspectors as early as 1999. Following a reinspection in mid-2005, OOC determined that AOC had not made sufficient progress in addressing them and that conditions in the tunnels had deteriorated further. In addition, in January 2006, OOC issued citations for and asked AOC to address a potential asbestos hazard and heat stress

¹The tunnels are not identified by name in this report for security reasons.

²On October 18, 2006, the utility tunnel workers filed a whistleblower complaint against AOC alleging that they were retaliated against after they informed Members of Congress about the conditions in the tunnels.

conditions. In light of these concerns, you asked us to review the condition of the tunnels. Accordingly, we examined (1) the current condition of the tunnels, (2) AOC's plan for making repairs and improvements to the tunnels, and (3) the responsiveness of AOC's plan to the issues raised by OOC and the tunnel workers.

To report on the condition of the tunnels, we reviewed various reports on the condition of the tunnels from 2000 to the present, viewed videotapes of the tunnels, hired a mechanical engineer to tour the tunnels, and interviewed tunnel workers and other AOC staff. To assess AOC's plans for making repairs and improvements, we reviewed the August 31, 2006, Utility Tunnel Improvement Plan that AOC submitted to Congress and various projects that AOC initiated to implement this plan; interviewed AOC officials; and attended weekly AOC meetings at CPP on the repair efforts in the tunnels. Generally, it is our policy not to address issues in litigation. Thus, given the ongoing complaint and negotiations between OOC and AOC regarding the concerns identified in the tunnels, we did not address whether issues identified in the complaint or the actions taken by AOC complied with legal standards. To understand the concerns that had been raised and the status of the concerns, we interviewed the tunnel workers and officials from both AOC and OOC. We also compared the plan with the concerns that had been raised. Furthermore, in accordance with our policy, we did not address concerns the tunnel workers have raised in its recent whistleblower complaint.

This report is based on information gathered through October 2006, and AOC is continuing to work on solving the problems in the utility tunnels. We did not conduct an audit: We performed our work to assist Congress in considering the future needs of the Capitol Power Plant Utility Tunnel System. We requested comments on the draft of this letter from AOC and OOC.

Results in Brief

AOC has started to address problems in the tunnels, but their condition remains substantially unchanged—that is, the conditions OOC cited as hazardous remain. For example, AOC has installed supports in some areas of one tunnel to minimize the potential for falling concrete and has required individuals entering the tunnels to wear protective equipment and clothing to shield them from potential asbestos exposure. In addition, AOC is working toward removing the delaminated concrete and cleaning the tunnels, so that the exhaust fans can be turned on to reduce the temperature in the tunnels.³ An AOC contractor has completed assessments of three of the tunnels and determined that they are not in danger of collapse. The contractor is still assessing the two remaining tunnels and expects to complete these assessments by December 31, 2006. Most other AOC efforts are in the study, planning, or procurement stage. As a result, the potential for falling concrete, asbestos exposure, excessive heat, poor communications, and inadequate escape procedures continue to pose problems.⁴ Progress in resolving the problems in the

³Delaminating concrete is concrete that is separated from the steel reinforcing and is in danger of falling from the wall or ceiling.

⁴The hot working conditions in the tunnels throughout the year are a result of the heat given off by the steam pipes in an enclosed area. The heat is not related to seasonal changes in temperature.

tunnels has been hindered because the tunnel conditions that AOC and its contractors are trying to address make it difficult to work in the tunnels.

AOC issued its Utility Tunnel Improvement Plan on August 31, 2006, as directed by the House Committee on Appropriations, but the plan is incomplete, in part because AOC has not completed its assessment of the tunnels. In a June 1, 2006, House report,⁵ the House Committee on Appropriations directed AOC to provide to the committee “a plan and budget that strategically addresses long term repairs to the steam tunnels.” Combining the information it currently has on the condition of the tunnels, AOC categorized the tunnel projects into immediate and short-term repairs that it estimates will cost about \$119 million over the next 6 years. AOC identified another \$14.4 million in longer-range initiatives to mitigate the known problems in the tunnels. Such initiatives include conducting quarterly structural inspections and making necessary annual repairs. The plan does not contain an analysis or discussion of options for addressing the immediate and short-term needs of the tunnels, as called for in the House report. AOC does indicate in the plan that it will conduct an alternatives study to evaluate the long-term use of the existing tunnels and options for meeting the Capitol Hill Complex’s future utility distribution needs. AOC recognizes that the current plan does not fully respond to the questions raised in the committee’s report. According to AOC officials, AOC could not complete the work necessary to respond to all of the requested information in the time allotted. But without information on options and recommendations for addressing tunnel problems and future utility distribution needs, Congress does not get a full picture of the potential solutions to the tunnel problems and their costs.

AOC and OOC are working cooperatively to resolve the health and safety concerns in the utility tunnels, but the slow progress of the work has left the tunnel workers frustrated. To settle OOC’s January 2006 citations and February 2006 complaint, AOC and OOC are exchanging proposals and discussing ongoing technical issues. OOC has been reviewing AOC’s utility improvement plan. While AOC’s plan covers the issues raised by the OOC and the tunnel workers, limited work has been completed to date and the workers have no clear picture of when the work will be done. To improve communication, AOC began holding weekly meetings with the tunnel shop workers in April 2006 to discuss tunnel issues and the actions being taken.

Background

CPP, which is managed by AOC, is located in Washington, D.C., at New Jersey and E Streets, Southeast. It is the central heating and cooling plant that provides steam, chilled water, or both, year-round for about 16 million square feet of space in 24 facilities.⁶ Steam is used for comfort heating, heating domestic hot water, cooking, and humidification. Chilled water is used for comfort and equipment cooling.

CPP consists of four main facilities: the steam plant, the East Refrigeration Plant, the West Refrigeration Plant, and administration buildings. The plant also includes a coal

⁵H.R. Rep. No. 109-485, at 21-22 (2006).

⁶CPP provides chilled water to 19 of the 24 facilities and steam to 24 facilities. Five of the buildings are not part of the Capitol Hill Complex; however, they are served by CPP and are billed for services provided.

yard south of the power plant. CPP's distribution infrastructure consists of approximately 2-1/2 miles of walkable utility tunnels containing steam pipes, chilled water pipes, and other utility services, such as fiber optic and telephone lines for CPP customers. Access to the utility tunnels is provided through various manholes and tunnel entrances in buildings. In addition, some steam and chilled water pipes are buried in more than a half mile of covered trenches. Access to the buried utilities is through manholes. The walkable tunnels were built at various times—one in 1908, two in the 1930s, and two in the 1950s.

In 2000, an AOC contractor reported that its study of the walkable utility tunnels indicated deterioration of the tunnel structure due to, among other things, aging and failure of the waterproofing system. According to the contractor, the deterioration was rapidly advancing in some sections and required immediate attention, and the tunnels posed a danger to worker safety, especially from delaminating concrete in the tunnel roofs that could fall without warning. On December 7, 2000, OOC's General Counsel issued a citation for unabated hazards in the tunnels—falling concrete, an inadequate communication system, and inadequate escape exits from these confined spaces. In 2005, OOC inspected the tunnels and determined that AOC had not made sufficient progress in addressing the previously identified hazards; OOC also identified additional concerns. As a result, in January 2006, OOC's General Counsel issued two more citations—one for an asbestos hazard and one for a heat stress hazard—and asked AOC to address them. In addition, on February 28, 2006, OOC's General Counsel issued a complaint stating that AOC had not taken sufficient action to address the problems identified in the December 2000 citation.

Since OOC's initial citation in December 2000, AOC has reported taking some actions to address some of the problems in the tunnels, including the following:

- In 2001, AOC contracted with the Federal Occupational Health (FOH) to assess the condition of asbestos in the entire CPP, including the tunnels.⁷ FOH found that the asbestos in the tunnels was generally in good condition—that is it was not damaged or exposed.⁸
- In 2004, AOC replaced 600 feet of the roof in one tunnel in response to the 2000 contractor's report on tunnel conditions.
- In 2004, AOC began another project to upgrade 15 tunnel entry and exit points.
- In 2005, AOC removed asbestos from one of the tunnels.⁹

In addition, since 1999, AOC's Construction Management Division has been working to identify and remove developing spalls¹⁰ and has recently increased its efforts to identify and remove any spalling concrete.

⁷FOH is a component of the United States Public Health Service within the Department of Health and Human Services.

⁸According to OOC officials, FOH's finding is inconsistent with OOC's observations in the tunnels.

⁹According to an AOC official, AOC has determined that there is still some asbestos in the far end of this tunnel.

¹⁰A spall indicates an area of concrete delamination that may expose the existing reinforcing steel in the tunnel structure.

Condition of the Utility Tunnels Remains Substantially Unchanged

AOC has taken some steps to mitigate problems in the tunnels and has initiated some actions to resolve them, but little change has taken place thus far. To mitigate problems, AOC has installed supports to parts of the ceiling of one tunnel to minimize the potential of falling concrete; required individuals entering the tunnels to wear protective equipment and clothing; contracted with FOH for air sampling and asbestos condition assessments; purchased a portable air-conditioning system; begun upgrades to the tunnels' communication system; and improved several tunnel emergency escape exits. In addition, an AOC contractor has completed structural assessments of three of the five tunnels and determined that they are not in danger of collapse. AOC has received a draft assessment report on the fourth tunnel, and the assessment of the fifth tunnel is still in progress. AOC is scheduled to receive the final reports for these two tunnels by December 31, 2006. Most of the actions AOC has initiated to resolve the tunnel problems are still in the study, planning, or procurement stage. (For specific information about the tunnel projects, see enc. I.)

While AOC has taken a number of actions to begin addressing the problems identified in the tunnels, few of the problems have been resolved thus far and the condition of the tunnels remains substantially unchanged. Problems persist, including the potential for falling concrete, loose asbestos, and high heat; communication systems that do not provide consistent coverage throughout the tunnels; a lack of adequate emergency egress; inadequate lighting; and a lack of emergency lighting. Progress in addressing the tunnel problems has been hindered because the conditions that AOC and its contractors are trying to address make it difficult for them to work, according to AOC officials.

In a preliminary report in July 2006, FOH identified asbestos in the material used to insulate pipe and pipe fittings in three of the four walkable tunnels.¹¹ According to FOH, in two of the tunnels inspected, the condition of the insulation on both steam pipes and condensate lines was good overall. FOH has not completed its inspection of the third tunnel because the tunnel had been closed.¹² FOH does not believe that dust in the tunnels contains asbestos except where the asbestos insulation has been damaged. According to OOC officials, OOC does not concur with this assessment because it found asbestos in dust samples taken off pipe coverings in areas where damage to the insulation material was not apparent. FOH recommends the complete abatement of all asbestos in the tunnels. However, if complete abatement is not practicable, then FOH recommends that damaged insulation be removed or repaired. Specifically, according to FOH, insulation on either side of the stanchions that hold utility pipes has been damaged by pipe movement and should be removed; other damaged insulation should be repaired; and periodic inspections should be done. FOH has provided limited data analysis indicating that for some activities in the tunnels, protective equipment may not be necessary. However, AOC has stated that it will continue to require protective equipment until further analysis is completed.

¹¹According to the FOH study, in the fourth tunnel, asbestos was found in the insulation at one entrance area to the tunnel. FOH did not inspect the fifth tunnel because the asbestos was in the process of being abated.

¹²AOC closed access to one of the tunnels until supports could be installed to reduce the chance of concrete falling.

AOC's Utility Tunnel Improvement Plan Provides Some Required Information, but Does Not Address Options for Improvement

AOC issued its Utility Tunnel Improvement Plan on August 31, 2006, as directed by the House Committee on Appropriations, but the plan includes only some of the required information and discusses future efforts to provide all of the requested information. House Report 109-485, dated June 1, 2006, directed the Architect of the Capitol to “provide a plan and budget to the committee that strategically address long term repairs to the steam tunnels over the next 5 years.” According to the report, the plan should include, at a minimum, “an assessment of the tunnel problems that need to be corrected, the priorities from safety and operational standpoints, options for addressing the problems along with the costs and benefits and advantages and disadvantages of each option, the recommended options and schedule for implementation, and the identification of officials who will be accountable.”

As noted, because AOC's contractor has not finished assessing two of the five tunnels, AOC's plan does not fully identify the tunnel problems. The contractor expects to complete its assessment of the two tunnels in December 2006. Combining the information it currently has on the condition of the tunnels, AOC prioritized the tunnel projects into immediate, short-term, and longer-range initiatives and established accountability for these projects. AOC plans to initiate its immediate improvements—designed to mitigate health, life safety, structural, and heat stress concerns—by September 2007. AOC plans to initiate its short-term improvements—designed to correct mechanical, electrical, and structural defects—in fiscal years 2008 through 2012. AOC estimates the cost for the improvements in the plan to be \$119 million over the next 6 years. AOC also reported \$14.4 million in longer-range initiatives intended to mitigate the known problems in the tunnels through 2015. AOC's longer-range initiatives include conducting quarterly structural inspections, making necessary annual repairs, and modifying procedures to reflect changing tunnel conditions. According to AOC, its plans were based on information known at the time the report was being developed and are preliminary. As the condition assessments and alternatives study are completed, AOC expects to adjust its work plans, cost estimates, and schedules as appropriate.

Without information on the condition of the two tunnels that remain to be assessed, AOC's plan lacks a full picture of tunnel conditions, the work that needs to be done, and the cost and time it will take to complete the necessary work. In addition, the plan does not include a discussion of options for addressing the immediate and short-term needs of the tunnels. From the plan, it is not clear whether AOC considered various options for addressing the tunnel problems or explored the cost, benefits, advantages, and disadvantages of different options before determining what work to include in the plan. AOC does indicate in the plan that it will conduct an alternatives study to evaluate the long-term use of the existing tunnels and options for meeting the Capitol Hill Complex's future utility distribution needs. AOC officials said they wanted to address the total utility distribution system's needs in their alternative studies to ensure that Congress has a complete understanding of the system's requirements and associated costs. While the immediate improvements might need to be done before an alternatives study can be completed, AOC has reported needing more than \$100 million to address problems in the tunnels before it identifies and

considers the different options for resolving the problems.¹³ Thus, Congress does not have assurance that the proposed improvements and costs provide the best solutions for solving the problems in the tunnels. In addition, the plan focuses only on needs in the walkable tunnels and, as AOC points out, does not address the buried steam lines or utility vaults, where, according to AOC officials, other problems are known to exist.

AOC recognizes that the current plan does not fully respond to the questions raised in the committee's report. According to AOC officials, they are continuing to develop the requested information and will provide it to the committee when available. They stated that the plan does not include all of the requested information because they could not complete the work in the time allotted. AOC officials said they wanted to be sure they addressed the total utility distribution system's needs in their alternatives study to ensure that Congress has a complete understanding of the systems requirements and associated costs.

Efforts to Address OOC and Workers' Concerns Are Moving Forward, but Progress on Worker Safety Issues Has Been Limited

AOC and OOC are moving toward resolving OOC's February 28, 2006, complaint on the deteriorating condition of the tunnels, the tunnel communication system, and emergency exits and the two January 2006 citations for asbestos and heat stress problems. Both AOC and OOC are discussing proposals to satisfy the applicable legal requirements and enable AOC to resolve the issues in the complaint and the two citations. However, according to OOC officials, some essential provisions that are critical to reaching any settlement, including what hazards will be covered under the agreement, have not to date been accepted by AOC. Furthermore, OOC officials said they have not been fully successful in obtaining necessary tunnel-related information from AOC on a timely basis. Part of this effort is to understand the extent to which OOC's Office of General Counsel will be involved in implementing activities to resolve the issues. AOC regularly keeps the General Counsel's office up to date on the status of tunnel operations and planned repair activities. OOC also says that it has been working amicably with AOC to resolve the complaint and citations. AOC and OOC are also continuing to meet to discuss and resolve new health and safety issues in the tunnels as they arise.

The tunnel workers have expressed concern about the safety of the tunnels due to the presence of asbestos, falling concrete, excessive heat, inadequate emergency exits, and a poor communication system. AOC's Utility Tunnel Improvement Plan covers these issues for the walkable tunnels, but, as noted, progress in resolving these issues has been limited. The tunnel workers told us they are discouraged and have no clear idea of when the problems will be solved. To improve communication, AOC began holding weekly meetings with the tunnel shop workers in April 2006 to discuss tunnel issues and the actions being taken. However, the tunnel workers have expressed frustration about the lack of progress in addressing their safety and health concerns.

¹³Since the plan was issued, an AOC contractor has estimated that it will cost between \$61.5 million and \$102.2 million to repair the structure of four of the five tunnels. These costs were not available when the Utility Tunnel Improvement Plan was issued.

AOC officials noted it has taken several actions to address the safety concerns cited by OOC and the tunnel workers. These actions include the establishment of safety and access control procedures for the tunnels, the requirement that protective equipment and clothing be worn, the upgrade of 15 tunnel entry and exit points, the shoring of delaminated concrete, and improvements to the reliability of the communication system in the tunnels. OOC officials noted that additional concerns in the tunnels, such as mold in one of the steam stations, continue to be identified.

Agency Comments

We provided a draft of this report to the Architect of the Capitol and the General Counsel of the Office of Compliance for their review and comment. The Architect of the Capitol provided us with written comments that are reproduced in enclosure II. AOC generally agreed with the information as presented in the report and provided technical comments that were incorporated, as appropriate. We received oral comments from the General Counsel at the Office of Compliance. He generally agreed with the information as presented in the report and provided technical comments that were incorporated, as appropriate.

We are sending copies of this report to the Architect of the Capitol, the General Counsel of the Office of Compliance, and others interested parties. We will also make copies available to others on request. In addition, the report will be available at no charge on GAO's Web site at <http://www.gao.gov>.

If you or your staff have any questions about this report, please contact me at (202) 512-6923 or dorn@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made major contributions to this report are Maria Edelstein and Tom Keightley.



Terrell G. Dorn
Director, Physical Infrastructure Issues

Enclosures

Enclosure I: Tunnel Projects

Company	Award date	Work to be performed
Entech Engineering, Inc.	9/29/2005	Prepare scoping and inspection plan for the utility tunnel system
Lord & Co., Inc.	11/2/2005	Maintain radio
GRA, Inc.	1/9/2006	Provide management consulting services
The Safety Company, Inc.	1/13/2006	Develop heat stress programs and policies
The Safety Company, Inc.	3/3/2006	Provide tunnel evaluation for one tunnel
WACO, Inc.	4/14/2006	Perform minor insulation and minor abatement throughout one tunnel
B&W Fabricating	4/20/2006	Capitol Power Plant (CPP) emergency egress
Lord & Co., Inc.	5/4/2006	Provide radios for tunnels
US Public Health / FOH	5/5/2006	Provide exposure and hazard assessment, air sampling, asbestos condition inspection, and lead paint inspection
James Posey Assoc.	5/12/2006	Provide engineering services for tunnel design documents for one tunnel
Jacobs Engineering	6/12/2006	Provide construction manager services for CPP tunnel program
Entech Engineering, Inc.	7/21/2006	Perform facility conditions assessment of the utility tunnels
Topp Portable Air	7/21/2006	Rental of portable air units
URS Greiner Woodard Clyde	7/25/2006	Provide structural, environmental, safety, and health consulting services
Ameri-can Engineering	7/25/2006	Purchase decontamination trailer
US Public Health / FOH	7/28/2006	Tunnel entry procedures
IDS Blast Finishing	8/1/2006	Rental of Decontamination trailer
CESI	8/2/2006	Provide miscellaneous general housekeeping
The Safety Company, Inc.	8/15/2006	Develop emergency evacuation plan for CPP utility distribution system
A. Morton Thomas & Assoc.	8/16/2006	Provide surveying services for one tunnel, lot 12
Centennial Contractors	9/8/2006	Excavation and asbestos abatement for the egress point, lot 12
Topp Portable Air	9/30/2006	Purchase portable air units
Construction Management Division, AOC	11/2006 ^a	Begin removing delamination in one tunnel
To be determined	11/2006 ^a	Clean debris and dust from one tunnel
To be determined	12/2006 ^a	Clean mold and abate asbestos from one tunnel
To be determined	12/2006 ^a	Study alternative communication system
To be determined	12/2006 ^a	Design and initial construction of two new egress points for one tunnel

Source: AOC.

^aThese contracts have not yet been awarded. The date provided is when AOC expects to award the contract.

Enclosure II: Comments from the Architect of the Capitol



Washington, DC 20515

November 16, 2006

Mr. Terrell G. Dorn
Director, Physical Infrastructure Issues
Government Accountability Office

Dear Mr. Dorn:

We appreciate receiving the Government Accountability Office's draft correspondence on the Capitol Power Plant Utility Tunnels and the opportunity to provide comment. The Architect of the Capitol (AOC) agrees that implementation of the planning and execution of work as outlined in the AOC Tunnel Improvement Plan issued August 31, 2006, has not proceeded as originally anticipated. In executing this important work, AOC considers safety an integral part of every project, and continues to place priority on protecting employees prior to commencing work. Safety requirements put in place to mitigate heat stress and overhead hazards to tunnel employees and other workers have affected our efficiency, productivity and access.

Our estimate for immediate and short-term repairs totaling approximately \$119 million is driven by our goal to correct the Office of Compliance's Complaint and Citations within 5 years, in accordance with the time line being discussed with this office. The estimate also includes work necessary to keep the tunnels in continuous operation throughout the repair and improvement period. The Alternatives Study will provide recommendations for the Agency's future, long term utility distribution system. The corrections for structural, egress, temperature, asbestos, and communications issues cited by the Office of Compliance are complex and interrelated. They require thorough planning, study, and design, resulting in prolonged construction activity. However, AOC has taken substantial planning efforts to mitigate hazards to the tunnel employees in the short-term.

In summary, AOC recognizes that there are many challenges facing us in completing the physical tunnel upgrades. We are committed to our plan for immediate and short-term repairs and those actions for improving worker safety. When the Alternatives Study is completed, we will furnish the Government Accountability Office, Office of Compliance, Congress and our employees with a comprehensive plan to move forward with an improved utility distribution system.

Mr. Terrell G. Dorn
November 16, 2006
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We appreciate the opportunity to comment on the Government Accountability Office's draft report. We also have provided separate technical comments and clarifications. If you have further questions, please contact Anna Franz, Director of the Office of Planning and Project Management at 202-225-5900.

Sincerely,



Alan M. Hantman, FAIA
Architect of the Capitol

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