

**Before the Committee on Government Reform  
United States House of Representatives**

---

For Release on Delivery  
Expected at  
2:00 p.m. EST  
Friday  
April 22, 2005  
CC-2005-027

# **Impact of Water Leaks on the Central Artery/Tunnel Project and Remaining Risks**

**Statement of  
The Honorable Kenneth M. Mead  
Inspector General  
U.S. Department of Transportation**



Mr. Chairman and Members of the Committee:

Thank you for the opportunity to testify today on Federal oversight of Boston's Central Artery Tunnel Project (Project), the most expensive public highway project in U.S. history, and one that is important to Massachusetts and the entire Northeast. Our office has reviewed the use of Federal funds on this Project since 1991, and in 2000, Congress directed the Secretary of Transportation to withhold obligations of Federal funds and all Project approvals until we determine that the annual Finance Plan updates for the Central Artery reflects that there will be sufficient financial resources to complete the Project. We are currently reviewing the Project's 2004 Finance Plan.

The Project's troubled history of delays and cost increases is well known. The Central Artery was originally scheduled to be substantially completed by December 1998—almost 7 years earlier than the current estimate of September 2005. Costs have also steadily escalated from \$2.6 billion to \$14.625 billion, causing Congress to cap the Federal investment in the Project at \$8.549 billion. As of September 2004, all but \$81 million of Federal monies have been released and obligated.

The event that most galvanized the public's attention to the Central Artery problems occurred in February 2000, when the Artery had to finally admit that costs would be at least \$12.2 billion rather than \$10.8 billion shown in the Project's 1998 Finance Plan. We then reported in February 2000 that Project managers had made deliberate misrepresentations by not disclosing \$1.4 billion of cost increases in the 1998 and 1999 finance plans. The Securities and Exchange Commission found the Massachusetts Turnpike Authority (Authority) and its former Chairman violated the Securities Act of 1933 on three municipal bond offerings. After making management changes in response to this unconscionable violation of the public's trust, the authority has been much more transparent in its disclosures and responsive to our recommendations on opportunities to improve disclosures in the finance plan.

Four months ago, we delivered testimony to a Massachusetts state legislative committee about the Central Artery and two types of leaks in the I-93 tunnels. Leaks in the concrete slurry wall panels became a public concern on September 15, 2004, when one panel was breached, spilling 300 gallons of water a minute onto the tunnel roadway. Public attention soon focused as well on a second type of leak, at the roof-wall joints of the tunnels, although the Authority and the Federal Highway Administration (FHWA) had been addressing them for years.

In our December 2004 testimony, we said that while there was much we did not know about the leaks, the taxpayers should not foot the bill for them. We also said

that the cost recovery effort had not accomplished enough, and we urged the Commonwealth to act expeditiously to repair the leaks, protect the taxpayers' interests, and restore the public's confidence.

The imperatives at that time were to identify the nature and extent of the leak problems, determine how and why they occurred, implement an appropriate and lasting solution, and ensure that the responsible parties (not the taxpayers) bear the burden. We also stated that taxpayers and people who use the Artery must have confidence that the Authority has taken these actions with all due diligence.

These remain the imperatives today. Seven months after the September breach, there is much about this problem that we still do not know, including how many leaks there are and their severity; how much it will cost to fix the leaks; and how you can be assured that the responsible parties, not the taxpayers, are made to bear the repair costs. For example, we do not yet know the extent to which errors or omissions in the design, construction, quality assurance, or oversight may have contributed to the leaks.

Determining this responsibility has implications for the liabilities of the multiple parties involved. These parties include the Authority itself, project oversight contractor Bechtel/Parsons Brinckerhoff (Bechtel/Parsons), and the design construction contractors, each of whom have vested interests that will be affected by determining responsibility and, accordingly, their financial liability.

In our testimony today we will update the Committee on the status of the leaks, risks to the taxpayers, current cost recovery efforts, and the impacts of the leaks on the Project's Finance Plan. We will also discuss two important lessons learned from this troubled project. The key points in our testimony are:

- There are two types of leaks in the I-93 tunnels: those in the slurry wall panels and those at the roof-wall joints. Regarding slurry wall panel leaks, the most recent tally shows there are 102 defective or leaking slurry wall panels, including two that need major repair, 33 that need moderate repair, and 67 that need only patching. To date ten panels with minor defects have been patched but not yet accepted by the Authority. The Authority is considering three methods to repair the two severely defective panels and must make its decision in a manner that assures the public that it has selected the best method, not the most expedient or just because it costs the least. More defective panels may be discovered because almost 400 of the 1,937 wall panels have yet to be inspected for defects.

Regarding roof-wall joint leaks, the number of leaks is constantly changing because as leaks are sealed with grout injections, new ones emerge and sometimes old ones re-emerge. In the summer of 2004, the Authority had

counted 724 roof-wall joint leaks. Since then, a majority of those have been sealed with injections of grout, but new and re-emerging leaks have been found, leaving a balance of 662 leaks as of March 22, 2005. Roof-wall leaks are also likely to be a continuing problem because less than half of the 9,125 roof-wall joints have been inspected under the current inspection program. Unless a way is found to permanently seal these leaks, they could remain a long-term problem that leads to higher maintenance costs.

- While the Authority has said its contractors, and not the taxpayers, will pay to fix all the leaks, we are not entirely confident of this. The Authority does retain a portion of contractor payments until the work is accepted and it can use those funds to offset leak costs. However, it is not clear that the withheld amount will be adequate to cover all leak costs. In addition, the taxpayers have already paid some leak related costs. Last fall, the Authority estimated that it had spent \$7 million to repair the leaks, and identified total cost exposure of \$17 million. We are very concerned that they may have to pay even more. A consultant is now analyzing how much has been paid for leak expenses and expects to issue its report next month.
- The taxpayers will not recover the costs already paid for the leaks unless the Authority's newest cost recovery program is more successful than prior cost recovery efforts, which were anemic. Last year, we recommended that the cost recovery effort be removed from the control of the Authority because we believe the Authority lacks the independence needed to pursue cost recovery efforts vigorously against Bechtel/Parsons, its partner. In February 2005, the Massachusetts Attorney General's Office took over the Project's cost recovery program. We feel this is a positive step, but it is too soon to tell whether this effort will be more successful than its predecessors. The challenge will be to sift through all the conflicting facts and determine the cause of cost increases, the responsible party, and, unlike in years past, aggressively pursue the responsible party to recover costs.

The Attorney General is now seeking many millions more through the cost recovery program for design errors and omissions made by Project design contractors that resulted in added construction expenses. To put some perspective on the potential amounts involved, contract modifications, which include payments to contractors for work they claim to be outside the scope of their original contract, have been a significant cause of costs overruns. As of January 31, 2005, the Authority had paid over \$2.13 billion in approved construction contract modifications. An outstanding question is to what extent these modifications were due to errors or omissions on the part of design contractors. As of February 28,

2005, there were also 3,640 open, unresolved contractors' claims for additional payments, with a total contractor proposal value of \$442 million. The Authority has budgeted \$226 million to pay these unresolved claims.

- We are also reviewing the Project's 2004 Finance Plan. The \$81 million in remaining unobligated Federal funds for the Project cannot be released until we report to the Department of Transportation that the Authority's annual Finance Plan contains reasonable Project cost and schedule estimates, as well as adequate funding sources. In February 2005, we advised FHWA that until unknowns about the leaks are substantially resolved, we will not have the information needed to conclude that the Finance Plan contains reasonable cost and schedule estimates and adequate funding sources. The Authority retained a consultant to perform an audit of leak-related costs and payments. The audit is expected to be completed by May 2005, and should provide information needed to assess the impact of leaks on the Project. We will perform a quality assurance review of the work and will then complete the remainder of our evaluation.

Regarding lessons learned, I would like to highlight two important lessons—one applies to the states and the other to FHWA.

- The Central Artery Project had a problematic history and presents many lessons learned. The Authority hired Bechtel/Parsons to provide preliminary designs, manage design consultants and construction contractors, track the Project's cost and schedule, advise the Authority on Project decisions and in some instances act as the Authority's representative. In 1998, the Authority combined some of its employees with Bechtel/Parsons employees in an Integrated Project Organization. This was intended to make management more efficient, but it hindered the Authority's ability to oversee Bechtel/Parsons, because the Authority and Bechtel/Parsons had effectively become partners in the Project. The Authority has already approved or paid more than \$1.9 billion in invoices from Bechtel/Parsons for its work on the Project. Although the company has recently admitted some liability in failing to correct construction defects that it knew existed at the site of the panel that was breached on September 15, generally it has not been held liable for any design errors or omissions under the cost recovery program. The Authority's inability to recover any of these costs may be due at least in part to its partnering relationship with Bechtel/Parsons.
- FHWA has traditionally provided little oversight of the billions of dollars it provides to states and municipalities each year, and the lack of oversight contributed significantly to the Central Artery problems. The extensive

problems encountered in the Central Artery Project have had a huge impact on FHWA's understanding of its oversight role. These painful oversight lessons are now a central component of the Administration's highway reauthorization proposal, which aims to strengthen FHWA's oversight and stewardship provisions.

There has been a major shift in direction under Secretary Mineta and Federal Highway Administrator Peters, and FHWA has begun developing new policies, procedures, and practices to improve its oversight. FHWA has also begun to provide better oversight to major projects, including the Woodrow Wilson Bridge connecting Maryland and Virginia and the Springfield interchange in Virginia. For example, FHWA recently initiated its Financial Integrity Review and Evaluation (FIRE) Program, which requires extensive oversight of state management practices. Effectively implementing these improvements, however, will require significant changes to FHWA's culture.

### **The Authority is Still Assessing the Number and Significance of the I-93 Leaks**

The Authority has made progress identifying the nature and extent of both the slurry wall panel leaks and the roof-wall joint leaks, but the effort is not complete. What it has found is surprising in that the problems are much more extensive than originally indicated. To date, the Authority has identified 102 wall panel leaks, including two with severe defects, and 662 remaining roof-wall joint leaks.

Notwithstanding that the project is in its final stage and is scheduled to be substantially complete in September 2005, it is imperative that the Authority promptly complete a thorough assessment and identify and implement corrective actions. Although engineers have not questioned the structural integrity of the tunnels, the leaks also present public perceptions and concerns about safety.

The Authority now faces a significant challenge—implementing solutions for the most defective wall panel and other defects and leaks that restore the public's confidence in tunnel safety and ensuring that the taxpayers will not bear the burden of the added costs. But, there is a major hurdle to overcome. Specifically the public must perceive that the fixes for these leaks are the right ones. Given the troubled history of the Project, restoring public confidence will be a significant challenge to the Authority.

**Slurry Wall Panel Leaks.** The history of the September 15 breach provides insight into this challenge. On that date, a leak breached the east wall of the I-93 northbound tunnel just south of Congress Street and about 70 feet below the surface of Atlantic Avenue. According to U.S. Department of Transportation

leakage criteria, a severe leak has an active flow of 30 or more drips per minute. The September leak had a water flow of roughly 300 gallons per minute.

The breached wall is made of concrete panels that were built using the slurry wall trench excavation technique. As the trench was excavated, it was filled with a special clay mix, called slurry, to support the earth around the trench. Deep structural steel piles were placed vertically in the trench, 4 to 6 feet apart. Once the excavation was complete, concrete was pumped into the trench from the bottom up with flexible pipes called “tremies” and the slurry was gradually displaced.

The Authority hired two experts—Mueser Rutledge Consulting Engineers (Mueser Rutledge) and Lemley & Associates—to review the slurry wall panel leaks. In a November 3, 2004 report, Mueser Rutledge concluded that the breach was caused by a series of construction deficiencies that were documented during the fabrication of the panel that leaked.

Specifically, Bechtel/Parsons reported that a leak in the same wall panel had occurred on July 20, 2001. Construction progress records from that period revealed that Modern Continental made a string of errors during the construction of the concrete panel where the leak occurred. The Mueser Rutledge review of Bechtel/Parsons’ construction records found that:

- Before excavation, the contractor failed to remove the temporary steel endplate placed at the adjoining concrete panel built by another contractor, as well as the residual concrete around the endplate.
- The trench was not properly cleaned of debris at the completion of the excavation for the panel, or debris fell into the panel just before or during placement of the concrete. The inclusion of debris diminished the structural integrity of the panel.
- Because of an obstruction, the contractor could not install a steel reinforcing cage that according to specifications had to span the length of the panel within the concrete. The contractor reduced the size of the cage rather than remove the obstruction.
- The obstruction prevented the contractor from using two tremie pipes to lay the concrete as required by the contract. Using only one pipe caused an uneven distribution of the concrete in the trench.
- The bottom of the cage shifted out of position during concrete placement.

- Finally, during the tunnel excavation, a leak and debris inclusion were discovered in the slurry wall, but workers patched the defect, rather than remove the inclusion and permanently repair it.

The Mueser Rutledge report also faulted the Authority's Project management contractor, Bechtel/Parsons, for failing to ensure that the wall panel was repaired when the defect was first discovered in 1999. Bechtel/Parsons has admitted some liability in failing to correct construction defects that it knew existed at the site of the panel that was breached on September 15.

After the September 15 wall breach, the Authority began inspecting the 1,937 slurry wall panels in the tunnels for similar defects. As of April 13, 2005, about 80 percent of the panels had been inspected. Among them, inspectors found two panels that need major repair, including the panel that was breached on September 15, 33 that need moderate repair, and 67 that require minor patching. A majority of the defective panels, including the two with the most serious defects, were constructed by Modern Continental. To date, 10 panels requiring patching have been repaired but not yet accepted by the Authority.

When we testified in December, it was an open question whether the September breach was a one-of-a-kind event or a harbinger of systemic problems in the tunnel walls. However, based on the results of the Authority's inspections to date, it is clear, in our opinion, that the wall panel leaks are systemic and are not centered in just one contractor's section, as was originally suggested.

**Questions remain about how to fix the wall panel with the most severe defects.** The only formal proposals for repair of that wall panel are two proposed by Modern Continental, the company that constructed the wall panel. Both of Modern Continental's repair plans involve bolting a steel plate to the slurry wall, and one adds an encasement of reinforced concrete.

The slurry wall expert engineer that the Authority hired to assess the leaks and propose concepts for fixing them has identified another option. However, the Authority has not pursued this option further, which is the crux of the perception issue confronting the Authority.

Mueser Rutledge has suggested a more extensive repair method that brings the wall back as close as possible to the original design specifications. This method includes draining the groundwater from around the defective wall panel. The Authority has suggested that the "dewatering" necessary to carry out Mueser Rutledge's method poses unnecessary risk to the stability of the ground under the nearby Federal Reserve Bank garage. However, the Authority has not set specific criteria for what would be acceptable both in design and risks. Although the FHWA has reviewed each proposal, including the concept by Mueser Rutledge, it



too did not review all the information necessary to fully evaluate the Mueser Rutledge concept and its risks.

The challenge for the Authority is to analyze all of the possible repair methods in a manner that the public will perceive as reasoned, conscientious, and unbiased. The Authority must give the public confidence that it is selecting the best method of repair, and not the most expedient or the one that costs the least.

**Roof-Wall Joint Leaks.** The Authority is also assessing the second category of leaks, those at the roof-wall joints, and determining how they will affect the Project's schedule. As early as 2000, the Authority, Bechtel/Parsons, and the FHWA noted that roof leaks in the I-93 tunnels were occurring more frequently and at a higher rate than expected. In the summer of 2004, the Authority had counted 724 roof-wall joint leaks. Since then, a majority of those have been sealed with injections of grout, but new and re-emerging leaks have been found, leaving a balance of 662 leaks as of March 22, 2005.

In the Authority's current inspection program, less than half of the tunnel's 9,125 roof-wall girder bays have been checked for leaks, so it is likely that many more will be found. The cause of the roof-wall joint leaks has not been identified, but the suspects are poor construction, including use of improper equipment and inadequate surface preparation for applying a waterproofing membrane. The resolution of this issue may determine whether the construction contractor, the section design consultant, or the Authority pays for this cost. The Authority has said that some of the roof leaks are a normal occurrence in such tunnels, but if not corrected in a timely manner could corrode steel beams and electrical wiring.

We found evidence to suggest that the roof leaks may also be associated with the selection and installation of waterproofing systems. Construction documents indicated that the Project was experiencing waterproofing problems in the latter part of the 1990s. The Project established a Waterproofing Task Force in March 1997 to address problems being experienced with several of the Project construction contracts.

In its July 31, 1997, report, the task force attributed 95 percent of the Project's waterproofing problems to unsatisfactory quality control practices of the construction contractors. The report did not, however, address the adequacy of quality assurance, which is the responsibility of Bechtel/Parsons. The task force also found that waterproofing systems had not been adequately prepared and installed, and reported that the Project would continue to have problems unless contractors changed their surface preparation and installation practices. Finally, the task force recommended eliminating future use of two waterproofing

systems,<sup>1</sup> which had already been installed on segments of the I-93 tunnels, but were not working.

In 2000, the Project established a Leak Task Force composed of representatives from Bechtel/Parsons, FHWA, and the Authority to develop a response plan for the leaks in the I-93 tunnels. The task force identified leaks in seven segments of the tunnels. It found that the leaks seemed to be directly proportional to rainfall, suggesting that it was not the ground water that was penetrating the tunnels, but water originating in the area above the tunnel roof. Because construction of I-93 was not finished, the tunnels remained partially open to the weather, taking in water through uncovered ramps, unfinished roofs, openings around beams that held up the elevated highway, and unsealed utility conduits.

However, in a December 2001 draft report<sup>2</sup> on Project cost overruns, a consultant concluded that the original design of the waterproofing above the roof girders in one section of the I-93 tunnels provided insufficient protection against leaks. To address this issue, the original design specifications were later amended to require the application of waterproofing spray over an area greater than originally specified and the installation of a protective board.

In March 2005, Project engineers estimated that the roof-wall joint leaks will be reduced to a small number by October 2005 and will continue to be a maintenance task after 2007, when the Authority takes over tunnel maintenance. Nonetheless, who pays for keeping the leaks at bay and who bears responsibility has yet to be determined. Unless a way is found to permanently seal these leaks, they could remain a long-term problem that leads to higher maintenance costs.

**Deficiencies in quality control processes.** We also have concerns about the failures in the construction quality control process that the leaks have revealed. Investigation of the September 15 leak showed that both Modern Continental and Bechtel/Parsons representatives knew that the wall panel was defective when it was built, and that they had documented this in field reports, but no records have been found that show they followed up on the problem.

The fact that another 101 defective slurry wall panels have been found, including a second one with severe defects, so many years after they were constructed certainly shows that the Project's construction quality assurance process was not working as intended. This now raises question as to where else the quality assurance process may not have worked. The Authority and FHWA should be

---

1 The Bentonite and Cold-Applied Polyurethane waterproofing systems—two of five waterproofing systems used on the Project.

2 Central Artery/Tunnel Project Review and Assessment of C15A2 Global Contract Modification, Deloitte & Touche, December 2001.

taking steps to ensure that there are no other construction quality lapses. They should consider implementing a Project-wide construction quality review. One step may be to conduct a review of a random sample of engineers' field reports for indications of other construction problems that were not properly corrected.

## **Taxpayers Must Not be Saddled With the Cost of the Leaks**

The Authority has said it will require construction contractors to repair all identified leaks, of both types, before it will issue final acceptance of the tunnel sections. The Authority has also said that under the contract warranty provisions, the contractors will be required to fix additional leaks for at least 1 year after final acceptance, and some contracts contain a longer warranty period.

While the Authority has said its contractors, and not the taxpayers, will pay to fix all the leaks, we are not so confident. The primary risk to the taxpayers involves establishing the responsible party. Determining who is responsible is complex because the problems could be caused by poor construction, design errors, poor oversight, or a combination of those factors. In fact, some contractors have already been paid for leak-related expenses, and unless the Project's cost recovery team can recover those funds from the contractors, the taxpayers will have paid the tab for errors made by contractors.

It also remains to be seen to what extent construction contractors will file claims with the Authority for additional payments for leak-related work by alleging that poor design or site conditions, not poor construction, caused the leaks. Project management has a history of paying about 50 percent of all such claims from a construction contractor. The Authority could, in turn, recover some of the extra costs from those claims from other contractors responsible for design errors or omissions, but the Project has a dismal record in cost recovery.

Bechtel/Parsons officials, in testimony to a Massachusetts state legislative committee, said that it will pay its "fair share" of the cost to repair the wall panel that was breached. However, final costs will depend on how many leaks there are, their severity, the cost to repair, and whether leak-related costs—such as damage to electrical components—exist beyond the repair work. The key to protecting the taxpayers will be resolving the uncertainty about who is ultimately responsible for the leaks.

At this time, work is still ongoing and the ultimate cost is not known. With our assistance, the Authority has retained a consultant to identify past and current costs associated with both types of leaks and to assign them to specific contracts. The consultant will also gather information on contract liability clauses, liability limits, and whether the Project's budget, contingencies, and reserves are sufficient to cover leak-related expenses. The consultant's report will be issued next month.

According to the Authority, it has spent approximately \$7 million over the last 3 years for leak repairs, all of which was paid to McCourt/Obiyashi, the tunnel finishing contractor. In November 2004, the Authority stated it had identified costs related to leak repairs of almost \$17 million. However, it stated it had yet to back charge the responsible construction or oversight contractors for these costs. We are concerned that the total costs will be significantly larger.

In addition to the cost of fixing the leaks, other related costs should not be passed on to the taxpayers. These include the cost of the consultants employed to assess the leak damage; replacement of damaged wall panels, electrical components, and insulation; reapplication of waterproofing systems; and constant monitoring and patching of the leak sites.

### **It is Too Soon to Tell Whether the Current Cost Recovery Effort Will Bear Fruit**

In general, “cost recovery” involves the Authority filing a claim against design consultants for any additional costs incurred during construction that can be attributed to errors, omissions, or other deficient or unsatisfactory performance in designing the project. While it is encouraging that the Authority’s cost recovery program has been reassigned to the Attorney General’s Office, historically the Central Artery’s cost recovery program has not been effective.

In 2003, in response to a request by members of the House Transportation and Infrastructure Committee, we reviewed Project cost recovery and found that 8 years of effort had yielded only \$30,000 in recoveries from a single consultant. We reported that the cost recovery effort had been hampered by conflicts of interest, failure to identify some change orders that might be due to design errors or omissions, and failure to review change orders and refer them for cost recovery in a timely manner.

The Project transferred the task of cost recovery to a team of Project and outside attorneys directed by a retired Probate Court judge. Over the next 2 years, the new team recovered \$3.5 million and filed lawsuits seeking another \$164 million. While the new cost recovery effort was an improvement over its predecessor, it recovered only a small percentage of funds.

In our December 2004 testimony we suggested that the Massachusetts legislature create an independent commission to investigate the leaks, determine the responsible parties, and ensure that they, and not the taxpayers, bear the costs of the leaks. We recommended that the Massachusetts Attorney General’s Office participate in the commission, which would gather information that could be used to assist the cost recovery effort. The commission was not created, but in February 2005, the Authority and the Attorney General agreed that the Attorney

General's Office would take over the Project's cost recovery efforts until December 2006.

We see this as an improvement because the Attorney General's Office can pursue both civil and criminal court actions to recover funds paid to Project contractors. The Attorney General's Office has filed a motion to stay a \$150 million lawsuit against the Bechtel/Parsons joint venture alleging financial malfeasance. The purpose of the stay is to provide an opportunity for the Attorney General to evaluate the lawsuit and attempt to settle it as he sees appropriate. Ten other lawsuits that the previous team filed against design consultants are in the discovery stage and future court dates have been scheduled.

The Attorney General's Office is in the process of hiring engineering consultants and has held a series of meetings with Bechtel/Parsons. While the transfer of cost recovery to the Attorney General appears to be a step in the right direction, we do not yet know whether it will return more funds than previous efforts did. Fundamental to achieving success in cost recovery will be establishing the responsible party, which has presented a formidable challenge to prior efforts.

### **The Cost of the Leaks Must be Addressed in the Central Artery Finance Plan**

We are now reviewing the Project's 2004 Finance Plan. The \$81 million in remaining unobligated Federal funds for the Project cannot be released until we report to the Department of Transportation that the Authority's annual finance plan contains reasonable Project cost and schedule estimates, as well as adequate funding sources.

Likewise, FHWA should not accept the Project's 2004 Finance Plan until the leaks are adequately identified and the appropriate solutions are under way. FHWA should also withhold its final acceptance of the Project and ensure that funds held in retainage by the Project are not released until cost and repair issues are resolved.

In February 2005, we advised FHWA that until unknowns about the leaks are substantially resolved, we do not have a credible basis on which to conclude that the Finance Plan contains a cost estimate that is based on all known and reasonably expected costs, identifies appropriate and available funding sources sufficient to meet the total estimated costs, or provides a project construction schedule that is based on all known and reasonably anticipated delays.

To determine the impacts the tunnel leaks will have on the Project, the Authority in January 2005 retained Deloitte & Touche to perform an audit of related costs and payments. We reviewed the statement of work for this audit to ensure it

would generate the information needed to complete our assessment of the project's Finance Plan. The audit is expected to be completed by May 2005, and will provide the following information.

- Past and current costs associated with the leaks by contract.
- Contract requirements regarding contractual liability and limits on that liability for all relevant parties.
- Payments made for leak-related costs and amounts recovered to date.
- Whether the project's \$14.625 billion budget, including contingencies and reserves, is sufficient to cover current leak-related expenses.
- Future maintenance costs that can reasonably be expected as a result of the roof leaks.

We will perform a quality assurance review of Deloitte & Touche's work to ensure that it is adequate in scope and conducted in a manner that meets applicable auditing standards. We will then complete the remainder of our evaluation of the 2004 Finance Plan.

### **Lessons Learned: FHWA Must Refocus Its Efforts on Project and Financial Oversight**

You also asked us to talk about the lessons that this Project has taught us about oversight of major infrastructure construction projects. I would like to highlight two important lessons—one applies to the States and the other to FHWA:

#### ***States Should Maintain Their Oversight Role***

At the state level, the Central Artery Project's problematic history presents many lessons in how not to manage a public works megaproject. The Authority hired Bechtel/Parsons to provide preliminary designs, manage design consultants and construction contractors, track the Project's cost and schedule, advise the Authority on Project decisions and in some instances act as the Authority's representative. In 1998, the Authority combined some of its employees with Bechtel/Parsons employees in an Integrated Project Organization. This was intended to make management more efficient, but it hindered the Authority's ability to oversee Bechtel/Parsons, because the Authority and Bechtel/Parsons had effectively become partners in the Project.

The Authority has already approved or paid more than \$1.9 billion in invoices from Bechtel/Parsons for its work on the Project. Although the company has recently admitted some liability in failing to correct construction defects that it

knew existed at the site of the panel that was breached on September 15, it generally has not been held liable for any design errors or omissions under the cost recovery program. The Authority's inability to recover any of these costs may be due at least in part to its partnering relationship with Bechtel/Parsons.

### ***FHWA Needs to Provide Effective and Independent Oversight***

FHWA has traditionally provided little oversight of the billions of dollars it provides to states and municipalities each year, and the lack of oversight contributed significantly to the central Artery problems. The extensive problems encountered in the Central Artery Project have had a huge impact on FHWA's understanding of its oversight role.

We have reviewed a number of major projects that stand as examples of good project management—projects such as Utah's I-15 and the Alameda Corridor in California. In contrast, we have reviewed projects such as the Central Artery in Massachusetts and the Springfield Interchange in Virginia, in which management and oversight were ineffective, leading to significant cost increases, financing problems, schedule delays, or technical and construction difficulties.

We continue to find indications that other major projects also face similar problems. For example, in February 2005, we expressed our concern that cost estimates for the San Francisco-Oakland Bay Bridge (East Span) project in California have nearly doubled from \$2.6 billion to \$5.1 billion.

Although this project is in the early stages, the cost increase and a highly critical report from the state auditor raise significant concerns that the Bay Bridge is already a troubled project. For example, the state auditor found that the California Department of Transportation should have known as early as November 2003 that the program would experience large cost overruns. Yet we found that FHWA accepted the state's 2003 Finance Plan Update without evaluating the information provided to ensure the reasonableness of the state-reported cost projections.

**FHWA Actions to Strengthen Oversight.** FHWA has begun developing new policies, procedures, and practices to improve its oversight. In certain cases, FHWA is beginning to provide better oversight to major projects, including the Woodrow Wilson Bridge connecting Maryland and Virginia and the Springfield interchange in Virginia. For example, on February 28, 2005, FHWA initiated its Financial Integrity Review and Evaluation Program, which calls for Division Offices to perform extensive oversight of State management practices, including assessing management risks, reviewing financial management processes, and spot checking a sample of payments on highway projects to ensure that Federal funds are properly managed. This represents a significant shift in direction under Secretary Mineta and Administrator Peters to improve stewardship and oversight.

To fully exercise its oversight role, FHWA must ensure that state Departments of Transportation accomplish the following.

- **Preparing reliable project cost estimates.** We have repeatedly seen that unreliable costs estimates have led to significant cost increases. As with all of these items, the Central Artery stands out as the poster child for each problem, but the Artery is not alone. We found that the Virginia Department of Transportation understated the costs of the Springfield Interchange by \$236.5 million, or 35 percent, because it excluded known, planned, and identifiable costs that are standard elements of major highway construction projects. When initial cost estimates are unreliable, decision makers do not have the information they need to choose cost-effective transportation solutions. In addition, subsequent cost increases erode the public's trust in Federal and state project managers' abilities to act as good stewards of taxpayers' funds.
- **Preparing finance plans to identify project cost, schedule, and funding risks.** A finance plan is a management tool that provides project managers, oversight groups, and the public with important information about how much a project is expected to cost, when it will be completed, whether sufficient funds have been committed to the project, and whether there are risks to being able to complete the project on time and within budget. Despite their usefulness, finance plans are generally not required for projects costing less than \$1 billion. But even much smaller projects can burden a state's resources. We believe projects costing over \$100 million but less than \$1 billion should have finance plans.
- **Ensuring that statewide plans properly represent to the taxpayer how funds will be spent.** States are required to prepare financially constrained 3-year transportation plans and submit them concurrently to FHWA and Federal Transit Administration for joint approval. These plans are representations to the taxpayers of how states plan to use taxpayers funds to meet transportation needs and they identify which projects will be funded, their costs and funding sources. This is particularly important in states with large projects, because cost increases on one large project can adversely affect the states ability to complete many other important projects. We reviewed one state plan that was generally not realistic because the cost estimates cited for most projects were understated. As a result, only 30 percent of the projects were started on time, 57 percent were delayed, and 13 percent were eliminated. In Massachusetts, Congress intervened to ensure a balanced statewide transportation program by requiring the state plan to spend no less than \$400 million each year for construction and specific transportation projects.



- **Implementing more cost-effective engineering alternatives.** Our January 1993 report commended FHWA and Massachusetts Department of Public Works for value engineering activities that saved an estimated \$400 million in Central Artery Project costs. But we noted that an additional \$100 million in savings might have been achieved if the two agencies had thoroughly and objectively considered technically feasible but controversial value engineering recommendations. We also found that delays in finalizing value engineering reports and recommendations detracted from the overall success of the value engineering program. We are currently conducting an audit of value engineering to determine whether states are capitalizing on these cost-saving techniques and whether FHWA is ensuring that states are appropriately considering value engineering recommendations.

**Challenges FHWA Faces.** These initiatives in financial management are critical to strengthening FHWA's oversight and stewardship of major projects, but they present significant challenges.

First, they require a fundamental change in FHWA's culture, which has traditionally focused on being a supportive partner to the states rather than on providing independent oversight of state activities. FHWA itself has recognized that this relationship has sometimes blinded it to larger management issues. In its "Lessons Learned for Mega Projects," FHWA stated that the biggest lesson learned from the Central Artery project is that FHWA personnel need to remain independent from state officials and agencies to fulfill an oversight role. For example, when the Authority announced a \$1.4 billion cost increase in 2000, FHWA officials were caught unaware, even though they had just approved the Project's Finance Plan earlier the same day.<sup>3</sup>

Second, FHWA faces a major challenge in recruiting, managing, and retaining its workforce. FHWA expects about 60 percent of its staff, some in mission-critical assignments, to leave between Fiscal Year (FY) 2003 and FY 2007. The silver lining to this huge flux in personnel is that it will provide an opportunity for FHWA to develop a new mix of workforce skills to address the new missions, new technologies, and new project oversight requirements. For example, FHWA needs staff with financial management skills to provide guidance on innovative financing techniques and to evaluate key state processes for managing federal funds. Last year, engineers held almost 40 percent of FHWA's 2,858 permanent positions, while financial specialists held less than 4 percent. It needs to take aggressive and quick action to resolve this human capital skills gap.

---

<sup>3</sup> U.S. Department of Transportation, Office of Inspector General, Report Number TR-2000-050, "Current Costs and Funding of the Central Artery/Ted Williams Tunnel Project," February 10, 2000. OIG reports can be accessed on our website: [www.oig.dot.gov](http://www.oig.dot.gov).

## **Administration's Highway Reauthorization Proposal Strengthens Stewardship and Oversight**

The Central Artery Project has resulted in many lessons learned that are now central to the Administration's highway reauthorization proposals to strengthen oversight and stewardship of Federal highway funds. The Administration's proposed SAFETEA reauthorization includes key provisions requiring the following:

- An oversight program to monitor financial integrity and project delivery for projects funded under Title 23, including annual reviews of state financial management systems using risk assessment procedures;
- Project management plans for projects costing at least \$1 billion, or other projects as may be identified by the Secretary;
- Finance plans for projects costing \$100 million or more;
- Issuing minimum standards for the states to follow when estimating project costs; and
- Evaluating state practices for estimating project costs, awarding contracts, and reducing costs.

This concludes our testimony. We will be happy to answer any questions that you have.