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HURRICANE KATRINA: WHO'S IN CHARGE OF THE NEW ORLEANS LEVEES?

HEARING

BEFORE THE

COMMITTEE ON HOMELAND SECURITY AND GOVERNMENTAL AFFAIRS UNITED STATES SENATE

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HURRICANE KATRINA: WHO'S IN CHARGE OF THE NEW ORLEANS LEVEES?

THURSDAY, DECEMBER 15, 2005

U.S. SENATE,
COMMITTEE ON HOMELAND SECURITY
AND GOVERNMENTAL AFFAIRS
Washington, DC.

The Committee met, pursuant to notice, at 10:02 a.m., in room SD–342, Dirksen Senate Office Building, Hon. Susan M. Collins, Chairman of the Committee, presiding.

Present: Senators Collins, Voinovich, Coleman, Levin, and Carper.

OPENING STATEMENT OF CHAIRMAN COLLINS

Chairman COLLINS. The Committee will come to order.

Today the Committee continues its investigation into the preparation for and response to Hurricane Katrina. The focus of our ninth Katrina hearing is on the key government agencies at the local, State and Federal levels responsible for operating and maintaining the levees that were supposed to protect New Orleans.

While the levees were absolutely critical to the survival of the city, our November 2 hearing demonstrated that this last line of defense was fatally flawed in design, construction, or maintenance. The witnesses testified that these flaws resulted in the levees not merely being overtopped, but actually crumbling before the onslaught of the storm.

The people of New Orleans and the surrounding parishes depended on the levees to protect them. It now appears their faith had little foundation. Even though the hurricane caused extensive damage, it was the flooding from the levee breaches that actually destroyed the city of New Orleans.

Our purpose today is to follow up on that hearing by examining which agencies were responsible for operating, maintaining, and inspecting the levees; for preparing for emergencies; and for responding to problems ranging from gradual erosion to sudden collapses.

The Army Corps of Engineers, the Orleans Levee District, and the Louisiana Department of Transportation and Development are the key players. But they each played their parts in a system fragmented by overlapping obligations and inexplicable past practices. On the screen at the side of the room,[1] the principal legal obligations of each is set out.

[1] The PowerPoint presentation appears in the Appendix on pages 49–62.

Once the levees have been constructed, the Army Corps of Engineers is expected to: Turn over completed sections to the Orleans Levee District; perform an annual inspection with the district; and review the semi-annual reports filed by the district.

The Orleans Levee District is charged by law with: Operating and maintaining the levees; conducting a quarterly inspection of the levees at least once every 90 days; and filing a semi-annual report with the Army Corps.

The Louisiana Department of Transportation is obligated by State law to: Approve the soundness of the engineering practice and the feasibility of the plans and specifications submitted by the Orleans Levee District; conduct training of the district's commissioners; and review the district's emergency plans.

All had responsibility for preparing for and responding to emergencies. In addition to the Corps' responsibilities under the Flood Control Act, the National Response Plan designates the Corps as the primary agency responsible for public works. Likewise, the Louisiana Department of Transportation is tasked with the public works emergency functions under Louisiana's Emergency Operations Plan.

In addition to owning the levees, the Orleans Levee District is given a supporting role for public works by Louisiana's Emergency Operations Plan.

Today the Committee will hear from witnesses from all three agencies as we examine how those various responsibilities were actually carried out. The laws called for one thing. Today we will hear about the reality, about the confusion on issues as fundamental as control, the misunderstandings, and what appear to be abdications of responsibility.

To begin, there was confusion about the basic question of who is in charge of the levees. Key officials at the Army Corps and the Orleans Levee District have demonstrated this confusion by telling the Committee staff one thing in transcribed interviews, and then changing their positions later.

But that confusion is difficult to understand. There are at least 18 letters from the Army Corps of Engineers turning over various sections of the Lake Pontchartrain and Vicinity Hurricane Protection Project to the Orleans Levee District. In one such letter, dated June 15, 2000, the Army Corps informed the Orleans Levee District that the final inspection had been completed on a section of the levees and the Orleans Levee District was now responsible for the operation and maintenance of the completed section. The letter goes on to explain that maintenance means keeping all completed works in first-class condition.

Responsibility for emergency management was also unclear. For example, when asked about the Louisiana Department of Transportation's levee and flood control repair responsibilities articulated explicitly in the State's Emergency Operations Plan, the Assistant Secretary for the Department stated, "I'm not sure what that means, because we don't have any State flood control works. [The] State doesn't own any flood control works."

The uncertainty about control, combined with overlapping responsibility for emergency management, affected the repair efforts at one of the breach sites after Hurricane Katrina. In a staff inter-

view, the Commander of the New Orleans District of the Army Corps of Engineers described the confusion: "Who is in charge? Where's the parish president? Where is the mayor? And then the State? Who is in charge?"

In addition to this confusion about control and emergency management, there are also cases in which the letter of the law may have been observed, but its spirit was mocked. For example, Louisiana State law requires educational training for levee board commissioners.

However, the former President of the Board candidly described the training sessions as follows, "Once in four years, you know what that is? That's going up to a workshop for the weekend and having a crawfish boil up here and hear a couple people talk about some things, and they get a little piece of paper, and they honored the law."

He also described the annual inspections of the levees conducted by the Army Corps, the Louisiana Department of Transportation, and the Orleans Levee District as largely ceremonial events. . . . "They . . . normally meet and get some beignets and coffee in the morning and get to the buses, and the colonel and the brass is all dressed up. You have commissioners. They have some news cameras following you around. . . . And you have your little beignets, and then . . . you have a nice lunch somewhere or whatever. They have this stop-off thing or whatever. And that's what the inspections are about."

Finally, although the title of the Orleans Levee District implies that the district's primary function is to operate, maintain, and inspect the levees, the Committee found that the minutes of the meetings of the District's Board of Commissioners showed that the majority of the Board's meetings were actually devoted to other activities. For example, the district owns commercial property that it leases to various restaurants, karate clubs, and beautician schools. It also owns two marinas, an airport, and it licenses a floating casino. Collectively, based on our review of the minutes, these enterprises consumed the majority of the Board's deliberating time in recent years.

The tragedy that unfolded last August to one of America's most vibrant cities was rooted in the failure of the levees. That failure, in turn, did not happen by chance, but as a result of fundamental flaws in design, construction, or maintenance. Those flowed from basic problems with governance.

Superb engineers and competent contractors can solve some of these issues, but until we face up honestly to the issue of governance, we will have failed the citizens of New Orleans and taxpayers across America. Confused, overlapping, and imprecise roles, shortcomings in training and qualifications, the focus on unrelated business activities, and complacency as to the vulnerability of the system were the human flaws that Katrina exposed.

The future of the city of New Orleans is inextricably linked to its levee system. The Mayor, business leaders, and the Federal Reconstruction Coordinator have all emphasized to me that the private sector will not make significant investments in the city without assurances that the levees will be rebuilt stronger and better.

But that commitment to strengthening the levees must be accompanied by significant reforms. The confusion and chaos that characterized the current regulatory regime can no longer be tolerated. Not only must we strengthen the levees themselves, but also we must strengthen the oversight of the entire levee system if we are truly to protect New Orleans from another catastrophic failure.

I am very pleased today to recognize Senator Carper, who is going to be acting as the Ranking Member today. Senator Lieberman, who has been extremely involved in this investigation and has a special interest in the integrity of the levee system and its oversight, unfortunately is ill today and is unable to join us. He has asked Senator Carper to very ably step in to act as the Ranking Member, and I am pleased to call upon him for his opening statement.

OPENING STATEMENT OF SENATOR CARPER

Senator CARPER. Thank you, Madam Chairman. I am honored to sit at your right hand and to pinch hit for Senator Lieberman.

That was quite an opening statement, by the way. I do not know that I can add a whole lot to it. I will try to reemphasize a couple of points that you have made and maybe add one or two others as well.

To our witnesses today, thank you for joining us, and we look forward to hearing from you. You will get a chance to speak, and thank you for your patience in the interim.

More than a million people in the New Orleans area—that is more than the whole State of Delaware, by the way—counted on the levees to protect their lives, to protect their homes, and to protect their businesses. We must know why they failed, not the people, not the businesses, not the homes—the levees. It is the key, as the Chairman has said, to any rebuilding plan for New Orleans.

Preliminary evidence from the teams examining the levees suggest at least to us that design flaws contributed significantly to the collapse of the levees. Media reports also indicate that there may have been failures in the levee maintenance and inspection regime. It also appears that there was no plan in place to respond to a major breach of these levees that are so critical to the life of this city and to the lives of its citizens.

This morning our Committee will hear from representatives of the key agencies at each level of government, Federal, State, and local, who have the responsibilities over the levee system. Each of you will explain how you viewed your responsibilities for the design, for the construction, for the maintenance of the levees, and who responds if they do fail.

In brief, the U.S. Army Corps of Engineers is responsible for the design and construction of the levees, as we have seen and heard. The State Department of Transportation and Development provides technical support to the levee district, sometimes serving as a local sponsor itself. Local sponsors, the levee districts, share the cost of constructing the levees and are then responsible for operation and maintenance once the levees are completed. Both the State and the Corps also have ongoing oversight responsibilities of operation and maintenance activities.

That all sounds simple enough, but a closer examination reveals a more confused and disturbing picture. The Army Corps says that they finished the levees and floodwalls and turned at least most of them over to the Orleans Levee Board. At the same time, the Corps admits that the levees continue to settle into the earth and has continued to ask Congress and the Administration for funding to build those levees back up and to maintain them as a Federal responsibility. And also, although Army Corps regulations require levee districts to immediately repair damaged or below-grade sections, it often takes months or even years before repairs are made.

To make matters worse, there is still confusion about what level of protection the levees were capable of providing. The Army Corps has stated for years that the system was capable of withstanding a "fast-moving Category 3" storm, but this system of rating the strength of hurricanes, known as the Saffir-Simpson Scale, was not invented when these levees and floodwalls were designed. And the hypothetical hurricane that the Corps used as a basis for the design of the New Orleans levees, known as the Standard Project Hurricane, does not really fit the current definition of Category 3 hurricane.

In the case of wind speed, the Standard Project Hurricane would be classified, I believe, as a Category 2 storm. In the case of central pressure, it would be a Category 4. When Committee staff asked for documentation to show how the Army Corps of Engineers arrived at the conclusion that the levee system would protect against a Category 3 hurricane, our staff was told that there really was not any.

And finally, we know a lot more about hurricanes in the Gulf of Mexico, and we are well aware of changes occurring in the physical environment that impact the effectiveness of levees in New Orleans, such as the settling and sinking of the entire region, the loss of coastal wetlands, and the widening of the Mississippi River Gulf Outlet.

And despite this, there was no systematic effort at any level of government to determine exactly what effect these changes had on the level of protection provided by the levees. As a result, there has been no chance in the design of the Lake Pontchartrain and Vicinity Project since the project was authorized, I believe, in 1965. An effort begun in 1999 to examine how to improve the levee protection to guard against a Category 4 or Category 5 storm never got past the preliminary study phase.

Finally, the response to the breaches is problematic. Although the Army Corps of Engineers and the levee district struggled under catastrophic conditions to close off the floodwall breaches in the aftermath of Katrina, it is clear that no one had a plan in place to deal with this kind of disaster.

So, Madam Chairman, and to my colleagues, I conclude these remarks really where I started. Over a million people depended on these levees for their protection. Billions of dollars worth of property and economic activity lay behind these barriers. And yet, despite their enormous importance, the patchwork of government agencies simply failed to ensure that the level of protection the levees were intended to provide was in fact being provided. Federal, State, and local leaders are now trying to determine how to rebuild

New Orleans and the surrounding parishes flooded by Hurricane Katrina. A critical element of those plans is going to be what level of hurricane protection is needed?

As we will discuss this morning, it is not just a question of building hurricane protection barriers that are high enough to stand up to these storms, it is also imperative that we reexamine the roles and responsibilities of the government agencies at all levels that are responsible for the financing, design, building, and maintenance of the levee system, as well as for responding to emergencies. As we have seen in Katrina, the levee system is only as strong as its weakest link, and that a critical part of that system is the government agencies that create and maintain it.

Thanks very much.

Chairman COLLINS. Thank you. I want to thank our two other members for coming today.

I am now going to welcome our witnesses to the hearing. We have representatives from the Federal, State, and local government agencies that have a role in the design, construction, operation, maintenance, and inspection of the levees in New Orleans and in preparation for and in response to emergencies involving those levees.

Colonel Richard Wagenaar is the District Engineer and Commander for the New Orleans District of the Army Corps of Engineers. The Colonel is a 26-year veteran of the U.S. Army with significant command experience both in the United States and abroad.

Alfred Naomi is the Senior Project Manager for the New Orleans District of the Army Corps. Mr. Naomi has over 23 years of experience as either a Project Manager or Senior Project Manager with the Army Corps.

Gerard Colletti is the Operations Manager for Completed Works for the Army Corps' New Orleans District. Mr. Colletti started working for the Army Corps in 1977 as a student while attending college. He began work for the Corps full time in 1982 and has rotated through several departments at the Corps, including flood control, hurricane protection and emergency management, and inspections of completed works.

Edmond Preau is the Assistant Secretary for Public Works and Intermodal Transportation of the Louisiana Department of Transportation and Development. He is a registered professional engineer and has worked for the Department or its predecessor since 1968.

Also, Mr. Preau, I understand that you had to defer some family obligations in order to be with us today. I want to thank you very much for doing so. I understand that created some hardship for you and your family, and I very much appreciate your rearranging your schedule. I think your testimony is very important to us, and our consideration would have been incomplete without your participation, but I do very much appreciate your being here.

James Huey served as the President of the Board of Commissioners of the Orleans Levee District from June 1996 to October of 2005. Prior to becoming the Board's President, Mr. Huey served as a Commissioner and Chairman of the Board's Engineering Committee. In total, Mr. Huey has served the Board for approximately 13 years.

And finally, Max Hearn is the Executive Director for the Orleans Levee District. After serving in the U.S. Air Force for 30 years, Mr. Hearn started working for the Orleans Levee District in 1989 as the Director of Operations and Maintenance. He became the Executive Director in 1997 and has served in that capacity ever since.

I would ask that you all rise so that I can swear you in. Do you swear that the testimony that you're about to give the Committee will be the truth, the whole truth, and nothing but the truth, so help you, God?

Colonel Wagenaar. I do.

Mr. NAOMI. I do.

Mr. COLLETTI. I do.

Mr. PREAU. I do.

Mr. HUEY. I do.

Mr. HEARN. I do.

Chairman COLLINS. Thank you. It is my understanding that Colonel Wagenaar, Mr. Huey, and Mr. Hearn have formal statements and that the other witnesses today will be available to respond to questions. So, Colonel, we will start with you.

TESTIMONY OF RICHARD P. WAGENAAR,[1] COLONEL, COMMANDER AND DISTRICT ENGINEER, NEW ORLEANS DISTRICT, U.S. ARMY CORPS OF ENGINEERS, ACCOMPANIED BY ALFRED C. NAOMI, SENIOR PROJECT MANAGER, NEW ORLEANS DISTRICT, U.S. ARMY CORPS OF ENGINEERS, AND GERARD A. COLLETTI, OPERATIONS MANAGERS FOR COMPLETED WORKS, NEW ORLEANS DISTRICT, U.S. ARMY CORPS OF ENGINEERS

Colonel WAGENAAR. Madam Chairman and distinguished Members of the Committee, I am Colonel Richard Wagenaar. I am the Commander and District Engineer of the U.S. Army Corps of Engineers, New Orleans District, one of 45 operating around the world. While the district is small in geographic area, it has the most civil works staff of any district in the Corps today.

The primary missions of the district include operating and maintaining navigation on the Mississippi River and other navigable waters in South Louisiana, constructing flood and storm damage reduction projects, and working with other Federal agencies and the State to restore the aquatic ecosystem of Coastal Louisiana.

I am honored to be testifying before your Committee today on the roles and responsibilities of the Corps of Engineers related to storm damage reduction in the metropolitan New Orleans area and our response prior to, during, and following Hurricane Katrina.

My statement covers the following topics: The storm damage reduction system for the metropolitan New Orleans area; responsibility for operations, maintenance, and inspection of the system; and the role of the Corps of Engineers New Orleans District in responding to Hurricane Katrina.

In the metropolitan New Orleans area, the Corps has constructed two large storm damage reduction projects, the West Bank Louisiana and Vicinity Hurricane Protection Project and the Lake Pontchartrain and Vicinity Louisiana Hurricane Protection Project.

[1] The prepared statement of Colonel Wagenaar appears in the Appendix on page 63.

The Corps designed the West Bank project to reduce the risk of storm damage on the West Bank of the Mississippi River from storm surges coming from Lakes Cataouatche and Salvador and waterways leading to the Gulf of Mexico. It covers parts of Orleans, Jefferson, and Plaquemines Parishes and includes the Westwego to Harvey Canal, and the Lake Cataouatche and East of Harvey Canal areas. The Corps designed the Lake Pontchartrain and Vicinity Hurricane Protection Project to reduce the risk of storm damage between Lake Pontchartrain and the Mississippi River Levee from storm surges coming from Lake Pontchartrain. It covers parts of St. Bernard, Orleans, Jefferson, and St. Charles Parishes.

In accordance with Title 33, Part 208.10 of the Code of Federal Regulations, operations and maintenance of these two projects is a non-Federal responsibility. For the West Bank and Vicinity Project, the Louisiana Department of Transportation and Development is the non-Federal sponsor for construction, and the West Jefferson Levee District is the non-Federal sponsor for operations and maintenance.

For the Lake Pontchartrain and Vicinity Project, the Lake Borgne Basin and Levee District, St. Bernard Parish, the Orleans Levee District, the East Jefferson Levee District, and the Pontchartrain Levee District are sponsors for the work in St. Bernard, Orleans, Jefferson, and St. Charles Parishes respectively.

The levees in the New Orleans area are inspected visually on a regular basis by both the Corps and the local levee district, together and independently. Specifically, the Corps has an annual inspection program, with the New Orleans District Engineer and with the appropriate design engineers. The local levee districts patrol the system periodically between the annual joint inspections. The Corps also completed a joint inspection of the Orleans area with both the levee district and the State in June 2005.

The Corps of Engineers responds in three ways to natural disasters. In all cases, our priorities are to support efforts to save lives and find people, to sustain lives through the provision of water and shelter, and to set the conditions for recovery, such as cleanup and restoring infrastructure and navigation.

First we respond in support of the Federal Emergency Management Agency. We also provide engineering assistance, as needed, in support of the Department of Defense military forces, who are responding to the disaster. Finally, we act under our own civil works mission responsibilities, which in the area impacted by Katrina involved principally our storm and flood damage reduction and commercial navigation missions.

For example, we conduct surveys of all of the structures in the area, both navigation and flood and storm damage reduction, and then begin to make repairs. We are also working under our Public Law 84–99 authority with the local parishes to repair the levee systems that were damaged during the event. Under this authority, we repair structures built by the Corps, as well as non-federally built structures that qualify for the Corps Rehabilitation and Inspection Program.

I took command of the New Orleans District on July 12, 2005. Prior to my arrival, the district had participated in an annual hur-

ricane preparedness exercise conducted by our regional headquarters, the Mississippi Valley Division. The district also hosted a day long hurricane preparedness conference on July 25, in which representatives of local, State, and Federal emergency offices attended. Also, prior to Hurricane Katrina, district emergency teams reviewed their crisis information and made preliminary plans for activation, including prepositioning equipment and supplies.

About a week prior to landfall in Louisiana, I began monitoring the storm as it moved east of Florida. On August 24, we monitored Hurricane Katrina's projections, and I directed that a block of hotel rooms be secured in Vicksburg, Mississippi. As provided in our crisis plan, I coordinated the activation and deployment of the Crisis Management Team. On August 26, I advised my commander, Mississippi Valley Division Commander Brigadier General Robert Crear, that forecasts did not bode well for New Orleans and key decisions would be made from my Emergency Operations Center (EOC) the following day.

After an emergency meeting on August 27, I issued an evacuation order for the New Orleans District staff under the Department of Defense Alternate Safe Haven Plan, with teams deployed to alternate operations sites. I also ordered the main district building closed for Monday, August 29. The Crisis Management Team established a temporary district headquarters in Vicksburg, Mississippi. The District Reconstitution Team deployed to Baton Rouge, and other emergency teams deployed to various locations with orders to be operational no later than 4 p.m. on August 28.

Soon after my arrival into my district EOC on August 28, the division conducted a conference call to discuss and assess preparations. Immediately following the call, my Chief of Emergency Management and I visited the Orleans and Jefferson Parish EOCs and had short meetings with emergency officials. At 8 p.m., I ordered my team to the bunker. Eight district employees and I remained at the district to coordinate operations in a bunker designed to withstand a Category 5 hurricane. Our goal was to monitor how the levee system was faring, talking by phone with local parish and city officials, and to provide immediate post-storm assessment to the chain of command.

The biggest challenge both during the storm and its aftermath was communications. The Corps and all of its partners have redundancies built in to provide backup. However, each time one system failed, it seemed as though everyone moved to the next redundancy and then overloaded it. Throughout the night we received numerous reports of overtopped, failing, or breached levees. After a few hours of sleep, I was woken up early August 29, Monday, and was told that water was overtopping a levee or that there was a levee failure. Many of these reports came from a local radio station. Around that time, we also received a call from a district employee who reported overtopping of the walls along the Inner Harbor Navigation Canal. There was little that could be done to investigate at that time since the worst of the storm was upon us. By about 11 a.m., the winds had decreased some and the weather was beginning to clear. By 2 p.m., we had moved from the bunker and reestablished the Emergency Operations Center in the main

district office building. Around this time is when I believe we first received a call regarding the breach at the 17th Street Canal.

We departed the main district building at about 3 p.m. It was apparent as soon as we left the district that New Orleans had suffered catastrophic damage. Due to debris, water, and live electrical wires, it took us an hour-and-a-half to get to the Causeway and I–10 intersection, about three miles from the main district office building. Blocked here, we attempted to travel east to get to the canal and were stopped at the I–10/610 split where the water levels left only treetops exposed. I didn't know the city all that well, but I knew rainwater didn't cause flooding like this. Based on the water height at that location, it was obvious that significant flooding was occurring.

We also attempted to drive to the canal from another route, but the high water, debris, and strong winds kept us from getting through to inspect damage to the levee. We made our way back to the main district office building in the early evening. It was around this time that we heard media reports about how the city had "dodged a bullet," but it was clear to us that conditions were very bad. Soon after this, I submitted a situation report to my division commander.

Due to the extreme conditions outside, we put together a security and escape plan. We continued our attempts to communicate with district teams and local officials. We had difficulty calling out, but people could call us intermittently. Sometime that evening, Rudy St. Germaine, engineer of the New Orleans Sewerage and Water Board, joined us. We managed to request a helicopter, and last we heard it was supposed to arrive the next day at 7:30 a.m. We hunkered down for the night.

Immediately the following morning, August 30, I dispatched two people to the 17th Street Canal, who commandeered a boat to inspect the canal. The helicopter arrived at 9:15 a.m., and Mr. St. Germaine and I were able to view the city from above shortly afterwards. I saw the breach at the 17th Street Canal, and then we flew over toward the east side of the city. The bridge spans on Interstate 10 were knocked off their foundations or gone completely. Devastation was widespread, but it was in the Six Flags area in New Orleans East that I first saw hundreds, if not thousands, of people on their roofs waiting to be rescued.

When we flew over the Inner Harbor Navigation Canal we found three breaches. It was at this time that we determined that water was actually draining out of the Lower 9th Ward area and not into the neighborhood area.

After completing an overflight of the rest of the city, I returned to my main district office building at approximately 2:30 p.m. and attempted to call the CMT in Vicksburg to initiate coordination. At that time I also found two district construction representatives in my EOC that reported in voluntarily. We immediately put together a plan to initiate operations on the 17th Street Canal in conjunction with the West Jefferson Levee District.

Throughout the rest of the day and evening, with intermittent communications, we worked a plan to repair the breach on the canal. The Crisis Management Team in Vicksburg immediately began orchestrating the necessary resources and materials to stem

the flow of water. With verbal authorization, Corps contractors responded.

Normal transportation routes were impassable, complicating even small tasks. The security, transportation, communications, and living conditions at this point were marginal at best. We were working 24 hours a day at this point.

By August 31, the Corps had begun marshaling resources. Contractors, material, and equipment were arriving at the 17th Street Canal site. By that afternoon, 10 large sandbags were dropped into the breach in our first attempt to close the breach. The activities at the site were chaotic, as three to four different operations were being executed with multiple agencies involved.

By September 1, contractors had begun delivering sand, gravel, and large rock to areas on the 17th Street Canal, where an access road was being built to reach the breach. Deliveries were also being made to the sandbag staging area in the vicinity of the Coast Guard station, where thousands of 2- to 5-ton sandbags were being prepared.

The next step at the 17th Street Canal and later the London Avenue Canal was to cut off flow from Lake Pontchartrain. Contractors drove 150 feet of steel piling across the canal to seal it. Meanwhile, Army Chinook and Black Hawk helicopter crews began placing 7,000-pound sandbags, an average of 600 bags each day, into the breaches. One breach took over 2,000 sandbags before engineers could see the bags under the water surface.

Sandbagging operations ran 24 hours a day for 10 days, with riggers averaging one to three hookups every 2 minutes during daylight hours. We stockpiled 1,500 bags and even more rock to address future repairs. Crane barges were also used to place sandbags, stone, and gravel, especially along breaches on the Inner Harbor Navigation Canal, where ground access was nonexistent. Expedient repairs were made to two breaches there.

A week to the day after Katrina, the 17th Street Canal breach was closed. For the next week, which included a rescue of one of our employees, I was involved in the formation of Task Force Unwatering under the command of Colonel Duane Gapinski and accompanied the President during his visit.

By September 8, I had turned my attention to the reconstitution of the New Orleans District. Many of our employees in the New Orleans District lost their homes and belongings, the same as their friends and neighbors, but returned to the main district office building to work and to help ensure that their fellow citizens were able to begin the recovery and rebuilding process. I am immensely proud of them for their sense of duty and their selfless service.

This concludes my statement. Again, I appreciate the opportunity to testify today. I would be pleased to answer any questions you may have.

Chairman COLLINS. Thank you. Mr. Huey.

TESTIMONY OF JAMES P. HUEY,[1] FORMER PRESIDENT OF THE BOARD OF COMMISSIONERS OF THE ORLEANS LEVEE DISTRICT

Mr. HUEY. My name is James P. Huey, and I am the former President of the Board of Commissioners of the Orleans Levee District, having served as the Board's President from June 1996 until October 2005.

I appreciate the opportunity this Committee has afforded me to testify here today. I want to take this opportunity to thank your staff and the delegation investigating this very important segment of the flood control system. They have conducted themselves in a very professional and courteous manner and have been sensitive and courteous in gathering the information and facts that will be crucial to this Committee in identifying any weakness and/or problem that may have contributed to the disaster that Hurricane Katrina created for the city of New Orleans and the surrounding parishes.

I completely understand the importance of providing the information in a truthful and factual manner, so that this Committee will have the best information possible. This is the only way to assure that our community will be provided with the appropriate flood control system to protect their property and lives.

In order for our community to rebuild and recover from this catastrophic event, our people must have the confidence that the proper solutions will be formulated and that the errors identified are corrected. This can only be accomplished if we all tell the truth and provide the facts regardless of our personal and/or self-interest. It is with this spirit and understanding that I testify today.

I appear before this Committee with a sense of the deepest sadness in the wake of the greatest natural catastrophe in American history, Hurricane Katrina. Hurricane Katrina virtually destroyed the great city of New Orleans, where I was raised, grew up, and have made my home since boyhood. This hurricane affected me personally. I have been displaced from my home and witnessed catastrophic destruction to the city that is my home. This hurricane also resulted in my resignation as President of the Board in late October under criticism primarily for actions taken by me immediately after the storm. I am not here to defend those actions or take up this Committee's valuable time debating those issues because they do not concern the important issue and enormous challenge being addressed by this Committee: Understanding how the recent catastrophe caused by the flooding of the city of New Orleans can be avoided in the future.

I also do not appear here as an advocate for any particular cause or viewpoint; the issues are of such gravity and stretch beyond the realm of personal or partisan interest. I hope, therefore, that you will receive what I say solely as the expression of a concerned citizen with one purpose in mind, to assist you in your awesome responsibility of formulating policies for the flood protection of one of the greatest cities in our country. And it is at this level of the Congress of the United States that these issues need to be debated and policy decisions made because flood control protection for the city

[1] The prepared statement of Mr. Huey appears in the Appendix on page 69.

of New Orleans and the Lake Pontchartrain vicinity has been the product of national legislation since enactment of the Flood Control Act of 1965.

In your letter to me, dated December 7, 2005, you stated that the focus of this hearing would be on the roles and responsibilities of the Federal, State, and local government entities for the design, construction, operation and maintenance, and inspection of the levees, and the preparation for, and response to, levee emergencies in metropolitan New Orleans. You also stated in this letter that I would be asked to testify concerning my experiences as President of the Orleans Levee Board, particularly with respect to the Orleans Levee District's operation and maintenance procedures and policies, inspection of the levees, and also the financial resources available and used to meet the levee district's primary mission of protecting the lives and property of the citizens of Orleans Parish by constructing, operating, and maintaining the levees within the district's jurisdiction. I will do so to my very best to share with you my understanding of these matters and my experience as a Commissioner and as President of the Orleans Levee Board on how these matters were addressed and dealt with by the Orleans Levee Board and District.

The floodwalls and levees that failed during the impact of Hurricane Katrina on the city of New Orleans were constructed by the U.S. Corps of Engineers as part of the Lake Pontchartrain and Vicinity High Level Plan. When I was appointed to the levee board as a commissioner in 1992, the Board was actively pursuing the commencement of the construction of parallel protection for the London Avenue, Orleans Avenue, and 17th Street Canals. The role and responsibilities of the Orleans Levee District for this project was to act as local sponsor and, as such, provide certain assurances for this project to the Corps and its consideration of the Corps constructing the project. These assurances by the Board, as local sponsor, were set forth in a number of agreements between the Board and the United States of America, by and through the Corps of Engineers, dating back to July 1966. The responsibilities and obligations of the Board, as the authorized local governmental body to enter into these agreements under Louisiana law, were set forth in detail in these agreements.

These obligations of the Board as local sponsor, referred to as "assurances" in these agreements, consisted of the following:

> To provide all lands, easements, and right-of-ways, including borrow and spoil disposal areas necessary for construction, operation, and maintenance of the project;
>
> To accomplish all necessary alterations and relocations to roads, railroads, pipelines, cables, wharves, drainage structures, and other facilities required for the construction of the project;
>
> To hold and save the United States free from damages due to the construction works;
>
> To provide 30 percent of the cost for the project through cash contributions in lump sum, or in installments paid at least annually, in proportion to the Federal appropriation for the project, in accordance with the construction schedules as required by the Chief Engineer of the United

States Corps of Engineers; or as substitute for any part of the cash contribution, to accomplish, in accordance with approved construction schedules, items of work of equivalent value as determined by the Chief Engineer;

To provide all interior drainage and pumping plants required for reclamation and development of the protected areas;

To maintain and operate after completion of a project all features of the project in accordance with regulations prescribed by the Corps;

To acquire adequate easements or other interest in land to prevent encroachment on existing ponding areas, unless substitute storage capacity or equivalent pumping capacity if provided promptly; and

To comply with all applicable provisions of the Federal law relating to the project, including the Flood Control Act, Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, and the Civil Rights Act of 1964.

In connection with the local cost share for these projects, including the floodwalls for parallel protection on the London Avenue and 17th Street Canals, the levee district was authorized to identify and select engineering consultant firms to participate in the work on the parallel protection plan and provide services in accordance with the requirements of the Corps. The payments made by the levee district to these consultants were an in-kind contribution and credited on the 30 percent local sponsor contribution. The levee district did secure the services of engineering firms for the design phases of these projects, and their work was subject to the review and approval of the Corps. After the Corps approved the engineering work for the project, the Corps then entered into contracts for the construction of the project with local contractors.

These were the responsibilities and duties of the Orleans Levee District in connection with the design and construction of floodwalls on the outfall canals that failed as a result of the impact of Hurricane Katrina. As set forth in the assurances, after these projects were completed, the Orleans Levee District's personnel maintained and inspected these projects consisting of 27.8 miles of inner levees and floodwalls in the city of New Orleans. In addition, the district maintained and inspected some 73.4 miles of front-line levees on Lake Pontchartrain and 27.5 miles of Mississippi River levees and floodwalls protecting the citizens of the city of New Orleans. In total, the district maintains and inspects a total of some 128 miles of levees, including 203 floodgates and 102 valves. As required under the assurances, the operation and maintenance of these levees is in accordance with the regulations prescribed by the U.S. Corps of Engineers.

During my tenure as Commissioner on the Orleans Levee Board, I can tell you that we worked closely with the Corps' district office in New Orleans and had an open and solid working relationship with the Corps. Prior to my election as President of the Board, I served as Chairman of the Board's Engineering Committee, and as such, I was personally familiar with the parallel protection plan authorized and constructed by the Corps. This committee met monthly, and a Corps representative updated the district on the

status of the work at each monthly committee meeting. Also, after my election as President, the Corps representatives each month attended committee meetings of the Board and briefed the Committees on the status of projects as well as future projects necessary to complete the Lake Pontchartrain and Vicinity Hurricane Protection Plan.

I can also inform you that, to my knowledge, there were no complaints by the Corps about the inspection and maintenance of the flood protection system by the Orleans Levee District. In addition, the recent reports that the system was only inspected biannually and only in a cursory manner by levee district and Corps representatives are inaccurate and unfounded. As will be discussed by the Executive Director of the District, inspection of the flood control system was a daily function of the operations and maintenance departments of the levee district. The Executive Director of the Levee District, Max Hearn, well knows the procedures followed since he served as the Director of Operations and Maintenance until his promotion to Executive Director in 1997.

The maintenance and inspection of the levee system was also conducted under the supervision of the Orleans Levee District Engineering Department. The district has a Chief Engineer, an Assistant Chief Engineer, and a staff that report to the Board each month at Committee and Board meetings. Furthermore, while I was President over the past 9 years, I was available on a daily basis to discuss any needs or concerns of the levee district staff, especially any related to flood control.

In sum, after serving 13 years on the Orleans Levee Board, I can earnestly tell you that it was my understanding that the primary responsibility for design and construction of the flood protection system of the city of New Orleans rested with the U.S. Corps of Engineers. The Orleans Levee District did not unilaterally initiate flood control projects, which were subject to the direction and control of the U.S. Corps of Engineers. I do not say this in any way to cast blame for the recent catastrophe on the Corps. I say this because this is how things were, and are. This was the reality when I was appointed and throughout my tenure on the Board. There are good reasons why this was the case. The scope and cost of these projects are far beyond the financial capability of local governmental agencies. Simply put, flood protection is a national obligation beyond the capacity of State and local governments.

The local government entities have obligations, as reflected in the assurances, to be provided for the projects, and the Orleans Levee District provided these assurances for completion of these projects by the Corps. After completion of these projects by the Corps, the Orleans Levee District operated, maintained, and inspected these flood protection projects in accordance with the regulations of the Corps.

During the time I served on the Board, the levee district also had a legal department that attended to all of the legal questions confronted by the district, including the Board's obligations under Federal and State laws relating to flood control. While a member of the Board, I cannot recall one instance when we were advised either by our in-house counsel or through outside complaints brought to our attention that the Board was not fulfilling its legal obligation

regarding any aspect of the operation, maintenance, or inspection of the flood control system that protected the lives and properties of our citizens of the city of New Orleans.

I appreciate the opportunity to make this statement and will do my best to answer your questions. Thank you.

Chairman COLLINS. Thank you, Mr. Huey. Mr. Hearn.

TESTIMONY OF MAX L. HEARN,[1] EXECUTIVE DIRECTOR, ORLEANS LEVEE DISTRICT

Mr. HEARN. Senator Collins, Committee Members, thank you for inviting me to participate in these hearings.

I'm Max Hearn, Executive Director of the Orleans Levee District, and I'm a resident of Jefferson Parish, just outside the city of New Orleans, and live there with my family. My home is within the area protected by the flood control structures, and we were impacted, along with our neighbors, by Hurricane Katrina and the aftermath. Consequently, both in my capacity as the Director of the levee district, as a husband and homeowner, I welcome this Senate investigation.

We citizens of Louisiana and residents of New Orleans share your concerns regarding the integrity of the flood control structures that protect our city, our homes, and our families. We also share your goal to determine what went wrong and to take preventative measures to ensure that the loss of life and devastation to property never occurs in New Orleans or any other community protected by the Lake Pontchartrain and Vicinity Hurricane Protection system.

As stated earlier, I served in the U.S. Air Force from 1959 until my retirement from active duty in 1989, after attaining the rank of colonel. Beginning in 1989, I was employed as the Director of Operations and Maintenance for the Orleans Levee District. I became the Executive Director of the levee district in 1997 and serve in that capacity today. In these capacities, I am very familiar with the relationships among the various governmental entities involved with the flood control systems and the operation and maintenance of these systems.

As you know, a large portion of New Orleans lies below sea level. The city is surrounded by water, wetlands, and marsh, and is threatened by the Mississippi River, Lake Pontchartrain, and the Gulf of Mexico. Consequently, flood protection is essential to this city.

As I appreciate the Flood Control Act of 1928, the Federal Government, through the U.S. Army Corps of Engineers, assumed primary responsibility for the national flood control system. As such, the Corps determined where the levees and flood control structures were needed, established the criteria for the design and construction of the levees, then assigned the operation and maintenance responsibilities for the levees over to local governmental bodies, like the levee district.

The levee district was created by the Louisiana legislature as the State governmental entity charged to coordinate and cooperate with the Federal Government with respect to flood control structures built under the National Flood Control Act. The district's ju-

[1] The prepared statement of Mr. Hearn appears in the Appendix on page 79.

risdiction, as Mr. Huey said, includes 73 miles of front-line levees, 28 miles of inner levees and floodwalls, 28 miles of Mississippi River levees, 203 floodgates, 102 valves, and two flood control structures.

Following Hurricane Betsy in 1965, which caused extensive flooding in New Orleans, the Corps of Engineers worked with the levee districts in the region to design and build upgrades to the flood control system. The floodwalls for the New Orleans outfall canals, which are the focus of this Committee's attention, are part of the Corps of Engineers' Lake Pontchartrain and Vicinity Hurricane Protection Plan. The designs for these flood walls were approved by the Corps and construction was commenced in the late 1980s. As sections of the project were completed, the floodwalls and levees were turned over to the levee district for operation and maintenance.

The levee district's operation and maintenance procedures are conducted in accordance with Federal regulations and under the oversight of the Corps. In fact, the levee district was required to enter into contracts with the Federal Government assuring that the operation and maintenance of the levees constructed under the Federal Flood Control Act would comply with the Federal regulations and the Corps of Engineers guidelines. These regulations and guidelines set forth specific inspection and operation procedures.

The levee district maintenance supervisors conduct major inspections prior to the beginning of the hurricane flood season and during high-water events. Additionally, at regular intervals of at least a monthly basis, district work crews and supervisors, in conjunction with regularly scheduled maintenance, observe the levee system and the flood control structures within the district's jurisdiction.

During any inspection of the levees and floodwalls, the district employees check for levee problems including unusual subsidence, encroachment by trees, shrubs, or private structures, animal burrows, seepage, sand boils, leaks, caving, erosion, slides, sloughs, and for floodwall problems including accumulation of trash or debris, things growing on the floodwall, cracked, unstable, or misaligned floodwalls. Levee district employees are trained to report any problems observed during their routine maintenance activities to their supervisor for corrective action.

The Corps conducts annual inspections of the flood control structures within the Orleans Levee District's jurisdiction and grades the levee district on compliance. During my tenure as the Executive Director of the Orleans Levee District, the Corps has always evaluated the district's compliance level as "Outstanding."

The district operates the gates, valves, and other flood control structures as appropriate for various high water and storm events.

In preparation for the approach of Hurricane Katrina, the levee district instituted its emergency operations plan, which included the activation of the Emergency Operations Center, located at the Lakefront Airport Administration Building, and the mustering of the Emergency Maintenance Crews. Additionally, the district assured that sufficient food, water, fuel, sandbags, trucks, and equipment were on hand for the emergency response.

Prior to Katrina's impact, levee district employees closed all of the hurricane flood protection gates and valves, along with 13 floodgates on the Mississippi River. As the hurricane approached and as water levels began to rise, district employees monitored the water levels and patrolled the flood control system. As weather conditions deteriorated and became unsafe, the district's employees were pulled into sheltered areas to ride out the storm.

During the storm, 60 levee district employees were staged at the Franklin Avenue facility, 19 at the Emergency Operations Center, and additionally, 43 district police officers were stationed at various locations. At the height of the storm one of the walls of the administration building blew out and the lower floor eventually flooded to a depth of about 4 feet. Additionally, one of the buildings used as a staging facility for the Emergency Maintenance Crews was damaged during the storm.

On the morning of August 30, conditions had abated such that field inspections were possible. District employees immediately inspected flood control structures that were accessible and coordinated with the Corps of Engineers, the Louisiana Department of Transportation and Development, and the East and West Jefferson Levee Districts, to respond to the 17th Street Canal breach.

The 17th Street Canal breach was inaccessible to our land-based equipment due to flooding. Beginning August 30, and using sandbags and equipment staged by the Orleans Levee District, U.S. Army personnel began airlifting sandbags to close the breach. On August 31, the Department of Transportation and Development began construction of a road to the breach so that land-based repair could be conducted.

The levee district was requested by the Corps to close the London Avenue Canal mouth, and this closure was completed on September 2, 2005. The Corps suggested that we build a ramp across the Norfolk Southern Railroad tracks to Jordan Road to allow heavy equipment access to Lakeshore Drive. This ramp was completed on September 5.

The National Guard commandeered the Franklin facility on September 6 to provide additional security and assistance for the area, and at that time we relocated to Baton Rouge, Louisiana, in accordance with our Business Continuity Plan.

This concludes my formal statement, and I'll entertain any questions you may have for me.

Chairman COLLINS. Thank you very much, Mr. Hearn.

Colonel, when you assessed the scene at the 17th Street Canal levee breach, who did you think was in charge of making the repairs?

Colonel WAGENAAR. Senator, my original thought was that it was the Orleans Levee District.

Chairman COLLINS. In your statement this morning you describe the situation at that breach as being chaotic. In the staff interview you referred to a turf war that you found. Could you describe for the Committee the confrontation that you encountered at the 17th Street Canal breach?

Colonel WAGENAAR. Yes, Senator. The situation—I mean understanding that there was no communications, the canal was literally surrounded by water on all sides, our initial coordination—because

we had no communications with the Orleans Levee District, my two construction reps typically work on the West Bank of New Orleans. They were in contact with the West Jefferson Levee District. That canal typically is the border between Orleans Levee District and East Jefferson Levee District. West Jefferson Levee District had the assets to immediately move into the area sandbags and some equipment to move to the site to do some work initially. So we had three levee districts involved in a repair operation, and the Corps really wasn't initially engaged because it was up to the levee district to attempt a repair.

About 2 days into the repair, the Corps had started bringing resources from around the Southeast of the United States, contractors, many major contractors moving into the area. But—and we wanted to engage all of those resources into the repair, however, personalities, the situation, hours without sleep, they would not let the Corps of Engineers operate in that area to attempt multiple different courses of action to try and stop the water from flowing into the city. There were personalities out there that prevented the Corps from establishing overall control of the site—and this was about day two or three after the hurricane—until Secretary Bradbury from the State DOTD and the Director of Civil Works from the U.S. Army Corps of Engineers arrived and directed all State entities to work for the Corps of Engineers. There was no direct oversight by the Corps until that time.

Chairman COLLINS. When the Corps tried to bring in special equipment, did anyone try to block that?

Colonel WAGENAAR. Senator, there was a turf war on the site because one project was being done by one entity and the Corps tried to bring in all their contractors at one time. We didn't care who was working on what. We just wanted the hole filled. But there was an individual from the West Jefferson Levee District that wanted exclusive use or construction of the road behind the levee wall, and when the Corps tried to get involved in supporting that effort, he literally blocked our equipment from operating on the bridge.

Chairman COLLINS. Mr. Preau, who do you think was responsible for that repair?

TESTIMONY OF EDMOND J. PREAU, JR., ASSISTANT SECRETARY, PUBLIC WORKS AND INTERMODAL TRANSPORTATION, LOUISIANA DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT

Mr. PREAU. Originally, the levee districts are supposed to be first responders on situations like this. If it is beyond their control, beyond their resources, then it would move up to the State level to take over. I think it was beyond the State's resources at that point. We looked towards the Federal Government, who had a lot more resources than we did, and who we've relied upon in the past to do major repairs.

If you read the project agreements, most major repairs are to be undertaken by the Corps of Engineers on Federal projects.

Chairman COLLINS. Mr. Huey, what is your view on this? Who do you see as being in charge?

Mr. HUEY. Well, first of all, I'd like to clarify the fact that this is the first I heard of that situation, and I think it's an excellent situation. First of all, you have a levee district who's from another parish, who's telling a colonel from the Corps of Engineers—I've never heard of anything of that nature.

But, first of all, it is unequivocally, I would say, the Corps of Engineers. And again, history and time will prove, and through every—I always look at it—and previous colonels that I have met may look at it in fact that the levee district is a client, a partner with the Corps of Engineers in flood protection. That's often stated from time to time. We are a resource for the Corps of Engineers. I look at it from the standpoint, from my level, is that they're the head, they're the brains. They have the engineering, the design, the overall knowledge of how the flood protection system should be constructed, and so forth.

The levee district provides substantial resources, and as I mentioned in my statement, the various assurances and so forth. We've provided resources, sandbags, whatever equipment we have available to the Corps. In previous storms, George as being a tropical storm, we identified the effects of the coastal erosion from high levels, and we pump our water. We're one of the few places in the entire world, next to the Netherlands, that I understand, we have no gravitational drainage, we're in a bowl. So those levees are the critical part.

And our pumping stations are designed to pump the water into the river, the lake, or these canals. So the water levels rose to the levels of the—where the pumping station basically had no place to pump, and we provided and worked with the Corps with providing sandbags and things of that nature or whatever. But that is my understanding, the Corps of Engineers.

Chairman COLLINS. Thank you. I am going to pursue this issue in the second round of questions. My time has expired. But I think your answers, as well as what happened at that site, demonstrates the need for far more clarity in establishing who is in charge and when does maintenance, routine maintenance become a major repair. Does that change who becomes responsible?

Senator CARPER. Thanks, Madam Chairman.

I have some specific questions, I just want to go back and ask our three witnesses who have spoken, just to put in your own words, in layman's terms, the respective responsibilities of each of the three entities that we have heard from. I am going to ask each of you to describe what you believe to be the Army Corps' responsibilities, what you believe to be the New Orleans District's responsibilities, and so forth.

And then I am going to ask each of you to say whether you agree with the other assessments or not, and just words that anybody could listen in and sort of understand this.

Colonel WAGENAAR. Senator Carper, as the District Engineer for the New Orleans District, I am responsible for hurricane protection, flood control, navigation, ecosystem restoration, and water resources development projects in southern Louisiana and the metropolitan area of New Orleans. I am responsible for that program of the U.S. Army Corps of Engineers.

The Hurricane Protection Project, as a comprehensive project, the Lake Pontchartrain and Vicinity Project, is a Corps of Engineer project, comprehensive. It has multiple different components. When viewed comprehensively, the Corps of Engineers is responsible for the project as a whole. As components are completed, such as the 17th Street Canal, the operations and maintenance is turned over to the local authorities, the local levee districts or levee boards; that is why I believe when the canal—as a separate entity—that's why I believed at the time that the levee board was responsible for the immediate action on that canal, pending any request through the process of State, Federal, back down to the Corps for support.

Senator CARPER. Talk to us about the responsibility of the State. The Department of Transportation and Development, how do they figure into this?

Colonel WAGENAAR. I can't give you the specifics. Mr. Preau may be able to do that.

Senator CARPER. Just your understanding.

Colonel WAGENAAR. Senator, my view is, is that they somewhat have an overarching command and control structure of the levee districts in facilitating mutual support, and we look to the State to provide guidance to the levee boards. But that's about the extent of my knowledge in regards to their ability to have oversight over those levee boards and districts.

Senator CARPER. Good, thanks.

Mr. Huey, the same question, if you will, just in your own terms, to where you agree with the Colonel's interpretation, and just add to or take away from that. Your understanding of the relative responsibilities in a situation like this of both the Army Corps, the State, and the levee district?

Mr. HUEY. First of all, you said in my own words. I was sitting here reading Orleans Levee District responsibilities basically prepared for me, what-have-you, but from just the day-to-day experience, from the outlook of a commissioner. Understanding the fact that our staff works hand-in-glove with the Corps day to day. That's one of the primary, our engineering staff, our people on a daily basis, we have a tremendous relationship.

On the other hand, they attend—Mr. Naomi, who is here, attends virtually every meeting of the Orleans Levee District, both committee meetings and board meetings, and that's who us, as commissioners, and the people look to as our experts and people who are constructing and building the flood protection system, and we're working hand-in-glove as their support team and assuring that it is maintained and serviced properly.

I think one of the biggest weaknesses here appears to be in an emergency situation, who steps up to the plate. First of all, I would like to clarify one of the things, that the Orleans Levee District was—the only dry area in the city was along Lakeshore Drive. Our folks, Mr. Hearn and about 60 of our people, were trapped in this facility for 10 days. During that period of time, they were the ones bringing the 5,000 pound sandbags from our facility back and forth along this particular area.

As the Colonel said, one of the most frustrating problems was communications. We virtually had none. I could only get Max on the phone or the radio for a matter of a minute or two, and he was

trying to tell me what was going on there, and vice versa, and I had headed to Baton Rouge for the recovery effort. So—but our people did join in. We support them. If in fact the situation would have been they were out, which Max will tell you, exploring these areas, and a lot of the information we were getting was from scattered news media reports, rumors, things of that nature also, but again, I disagree from the standpoint of the fact that we look to the Corps.

Now, our people may be responsible for the first ones out there, and if we spot a breach or a problem, contact the Corps, get them in here because we're not prepared, we don't have the helicopters or certain things, or the—really, I would have to say the expertise of the type of engineers they have to say, "You have this breach coming in here. What do we do?"

Senator CARPER. Thank you. Mr. Hearn, your response to the same question, if you would, please. What I am trying to get is just a lay person's understanding of the relative responsibilities of the three major entities here, Federal, State, and local.

Mr. HEARN. I think the responsibility for a breach like this is above the Orleans Levee District, but we would go to DOTD and the Corps to get their support because they can do the contracting or get whatever is necessary. I think the confusion—if there is a way to explain that—is that it was on the Orleans Levee District side. We couldn't get to it because the depth of the water. East Jeff was trying to help out. West Jeff had the riprap.

And that turf war that occurred, according to the Colonel, over on the Hammond Highway Bridge, I think it was just assumed that that's the Orleans Levee District's responsibility, and we couldn't come anywhere close to it. So, to me, it's a matter of if the Orleans Levee District could handle it, then we would. We would go to DOTD and the Corps at the same time, and it's a partnership between the three of us to handle whatever breach we may have.

Senator CARPER. My time has expired, and I look forward to a second round. Thank you.

Chairman COLLINS. Senator Voinovich.

OPENING STATEMENT OF SENATOR VOINOVICH

Senator VOINOVICH. Thank you, Madam Chairman. I thank you for these hearings. I think you and Senator Lieberman are doing an outstanding job. This is the ninth Katrina hearing, and I think that once the investigation is complete you will come back with a comprehensive report that delineates the problems and proposes good solutions.

It is obvious to me from the testimony here and from reading some of the interviews that there is a real lack of understanding about who is responsible for what. It is clear that opinions about who should have assumed responsibility vary widely. Madam Chairman, as a former mayor and governor, I think that if I were sitting at today's witness table, I would have thought that the Chairman had taken me out to the shed for a good tongue-lashing. And if you listened carefully to what was said, Madam Chairman, today's witnesses did not do the job they were supposed to be doing. I am concerned about that, and I am sure that you are too. I think that some of you were not as candid in your testimony here

as you were when you were with the staff. It appears that there are some differences in terms of information from the testimony and information the staff picked up from their interviews.

The point I am making is that we have not done the job, Madam Chairman, that we should have been doing over the years in terms of funding the Army Corps of Engineers and dealing with some of the problems that we have in this country. We have been penny wise and pound foolish in terms of our human capital and our physical capital needs of this agency and, quite frankly, a bunch of other agencies.

The thing that really frustrates me is, is that this Lake Pontchartrain and Vicinity Hurricane Protection Project was first authorized in 1965. This is the 41st year. As of early 2005, the project was not expected to be completed until 2015, nearly 50 years after it was authorized. Prior to Katrina, the project was estimated to be from 60 to 90 percent complete in different areas. It said Federal allocations reached $458 million, 87 percent of the Federal responsibility on the project. It was supposed to be $738 million.

The Corps Project Fact Sheet stated that the project's fiscal year 2005 appropriation and the President's budget request for 2005 and 2006 were insufficient to fund new construction contracts. The Corps had the capability to use $20 million. The Corps noted that several levees had settled and needed to be raised to provide the designed level of protection.

Madam Chairman, we can criticize these folks, but we do bear some of the responsibility, and it is about time that we faced up, this Administration, and I am talking about this one and the ones before them, and this Congress and Congresses before, that we face up to our responsibilities in terms of dealing with the infrastructure problems that are confronting this country.

I would like to know, Colonel, why have you not been more candid with this Committee in terms of what you need? Have you given this information to the person that runs the Army Corps of Engineers, and have they made this information available to the Office of Management and Budget? Have you come before this Committee? I dealt with the Corps back when I was Chairman of the Transportation and Infrastructure Subcommittee as a freshman here. I had it for 2 years. I kept asking the question, "Do you need more money?" It seemed like everybody shut up. I am asking you, what have you done to try and make sure that we or the Office of Management and Budget know the fact that you did not have the money to get the job done?

Colonel WAGENAAR. Senator, I believe that the process we use at my level—to notify my headquarters to request monies for those projects and explain to them our capabilities on construction for all of my projects, that information would make it to this Committee or to the Congress of the United States.

But there's also an understanding at my level that there are national priorities and the Congress does its best to distribute those appropriations as possible. I mean every district in the Corps of Engineers, I believe, would like increased funding for its projects, but we also have a common-sense approach to understanding that the Congress is distributing those appropriations based on its priorities, and that's how we look at it and——

Senator VOINOVICH. Let me interrupt you because I am almost running out of time. The fact of the matter is, we cannot do that unless we have the information that is necessary to make good decisions.

I want to ask you one other thing. Did you ever tell the Department of Transportation and Development or the Orleans Levee Commission that the maintenance on this was not what it should be?

Colonel WAGENAAR. Sir, I cannot answer that. One of my experts may be able to answer that, sir.

Senator VOINOVICH. Mr. Colletti.

Mr. COLLETTI. Yes, sir. We've dealt with the levee district for many years, and their operation and maintenance has been outstanding. So, from the aspect of cutting the grass, making sure that the levees are in the condition for what they were designed from a visual standpoint, and all the inspections that are done throughout the year, we have felt that they've done an outstanding job.

Senator VOINOVICH. So you did not see any problems there?

Mr. COLLETTI. No, sir.

Senator VOINOVICH. OK. Thank you, Madam Chairman.

Chairman COLLINS. Thank you. Senator Coleman.

OPENING STATEMENT OF SENATOR COLEMAN

Senator COLEMAN. Thank you. I also want to thank you for your leadership on this issue and at these hearings. It is critically important, and you and the Ranking Member have done an outstanding job.

I have three areas that I want to delve into. One is the construction design, the other is maintenance, and third is reaction. And I am like you, Madam Chairman. I also want to say there is a need for clarity, whatever comes out of these hearings, and I hope we get that. My mom did not raise dumb kids, and I am a little confused as to who has ultimate responsibility here—actually, not responsibility, but when responsibility needs to be transferred. Mr. Huey would say that the Corps has the responsibility. The Corps would say—and I think the State would agree—that the folks at the local level have the first response, and then it is shifted through. Who makes that decision? When is it made? And is it clear who makes it? Because in times of crisis, if that is not clear, you have got big problems. And I think we had problems here.

I also want to say in regard to the money, I represent a State that borders the Mississippi River. We do a lot of work with the Corps. We have a lot of needs. And, Colonel, I appreciate your candor in terms of priorities. I think that is the reality that we deal with here. It is simply not a matter of money. There are a lot of us who would say that a lot of things need to be done. The question is how the money is used, and then when it is used, is it used in a way in which it is going to maximize what is needed?

Let me ask you a question about design because there have been some questions about floodgates—floodgates at mouths of canals. Jefferson Parish has floodgates, and those gates did not fail. My folks have raised this question about floodgates, and at least some of the feedback I got was that the Orleans Sewerage and Water Board opposed floodgates here at the entrance to the Orleans and

London Avenue Canals. I am not sure who is to respond. Would it be perhaps Mr. Huey? Can someone provide some insight into the opposition to floodgates and whether floodgates would have made a difference here?

Mr. NAOMI. Yes, sir. The way the project was designed, or at least after the reevaluation in 1984, the Corps started addressing the outfall canals. The outfall canals are the canals that lead far into the city, 2 or 3 miles into the city where the pump stations are, and those canals connect directly to Lake Pontchartrain. The Corps' preferred plan was to put structures at the mouths of those canals where it entered Lake Pontchartrain to keep the storm surge from entering those canals.

The construction of those gated structures was opposed by local officials, including the Sewerage and Water Board, the city officials, and such, because they felt that if those gates were constructed, they would not be able to operate the pumping stations during a hurricane event. And so those concerns were great in their minds, and so they succeeded in obtaining legislation to require the Corps to put parallel protection or put floodwalls along those canals in lieu of the floodgates.

Senator COLEMAN. And in retrospect, the decision to go parallel protections versus floodgates, would you conclude that floodgates would have been a better course of action?

Mr. NAOMI. Well, I think that they both would have been designed to the same level of protection, of course, for the Standard Project Hurricane. But it is problematic as to what would have happened had we had floodgates versus those floodwalls. Certainly the floodgates could have had a problem, too, so it is hard to say definitively what would have happened. But it certainly would have—there wouldn't have been any floodwalls along those canals to fail had we put the floodgates in.

Senator COLEMAN. Let me ask you about the issue of maintenance. At an earlier hearing, I believe we were told by a number of experts that the issue with the failure of the levee system was not necessarily the overflow, but it was an erosion underneath. I am trying to understand maintenance. Somebody has got to be looking at things and seeing erosion. My question is: Are there no visible signs of that erosion before this catastrophe? If there should have been some way to see that beforehand, who had the responsibility to identify that and deal with it?

Mr. COLLETTI. Well, from our standpoint, our inspections are visual. They are not subsurface types of inspections. Subsurface investigations are all done at the initial design and construction phases. So, the levee district or the Corps is not doing any type of subsurface investigations at any of the levees or floodwalls at this point.

Senator COLEMAN. I want to make it clear. Am I hearing that we do not have the capacity to determine whether the kind of structural damage that was occurring over a period of time could have been identified and then prevented? Colonel.

Colonel WAGENAAR. Senator, I believe that—I mean, from a visual—we typically do visual inspections. I don't know of any physical inspections that the levee district or the Corps does post-construction. So they look for visible signs of potential problems. At

that point, based on the problem, is when actions are taken on all of the different types of flood control structures in the city.

Senator COLEMAN. But we heard a lot of testimony that, again, erosion occurred. I want to make it clear. Do we not have the capacity to figure out that there is a systemic structural problem until a catastrophe occurs?

Colonel WAGENAAR. Senator, I do not believe at this point that the failure or what caused the failure has been determined. There is a significant amount of information being gathered, to include removing the sheet pile, which we just did in the last 2 days, and we determined that the sheet pile was to the design specifications of the Corps of Engineers and it was not shorter than some people had hypothesized.

But I believe that we are gathering all of that information for each of those breaches because each one could have had a different cause of failure. I will tell you there were over 50 breaches in the metropolitan area. Two-thirds of the flooded area would still have occurred regardless of whether these walls would have failed. The New Orleans East area and the St. Bernard area, those levees were severely compromised by the magnitude of Katrina. Their flooding had nothing to do with the floodwalls on the 17th Street Canal.

Senator COLEMAN. Thank you, Madam Chairman.

Chairman COLLINS. Thank you, Senator.

I am going to follow up on the issue that Senator Coleman just raised. Mr. Hearn, the Committee received a letter from a retired professor of ocean engineering at MIT, Ernst Frankel. It is at Tab 18 in the exhibit book.[1] He has considerable expertise in coastal structures, and he wrote to us that it is insufficient to rely solely on visual inspections of levees because voids or pockets of water or air may develop within the body of the levee. He recommends that acoustic and mechanical inspection techniques are normally employed in order to determine whether there are any voids or other weaknesses within the levee.

Did your personnel employ mechanical inspection techniques that involved, for example, drilling holes to obtain soil samples from within the levee?

Mr. HEARN. No, Senator, we did not. The task that we have, as I gave in my opening statement, is basically looking for sand boils, which would indicate some water getting underneath the sheet piling or coming up on the other side.

The other thing we do is what we call a levee profile, with our survey department of each of the levees to find out exactly how much subsidence they have in a period of time. We did the 17th Street Canal—we do them all, and it takes us about 3 years to do all of the levees because of the length. We did the 17th Street Canal last year, and the profile was less than half an inch deviation from what it was from the year before, which did not indicate any subsidence at all or any problems at all with that particular levee. But we do not have the seismic gear. Maybe that is coming in the future of a way to test it, but we have not done that in the past.

[1] Exhibit 18 appears in the Appendix on page 114.

Chairman COLLINS. Professor Frankel also wrote that it is critical to inspect the integrity of the surface layer on the water side of the levees, particularly that part which is underwater, which is the point that Senator Coleman just raised. Did any of your personnel inspect areas of the levee walls that are underwater, either visually or using acoustic equipment?

Mr. HEARN. No, we did not.

Chairman COLLINS. Mr. Colletti, as the Army Corps' operations manager, are you aware of any structural or geotechnical review of the levees done during the years before Hurricane Katrina and specifically of the levees along the 17th Street and London Avenue Canals?

Mr. COLLETTI. As far as I know, the structural analysis that was done along those particular canals was done during the design and construction phases. You just asked about scour surveys or investigations. We do those near the structures, but not against floodwalls.

Chairman COLLINS. You stated to the Committee staff that a structural re-evaluation is not part of the inspection program. Is that correct?

Mr. COLLETTI. That is standard unless we know of a known problem or it has been brought to our attention or there is a suspicion of some type of problem. Then we will go and actually do some type of additional evaluation.

I want to make it clear. The reason we do that is we are responsible for over 1,300 miles of levees and floodwalls. So to just go out and actually do random inspections, it may not turn up anything. We may miss the spot where there actually was a failure about to occur.

Chairman COLLINS. Mr. Huey, is it accurate that the first time that you became aware of the Federal regulation requiring inspections of the levees at least once every 90 days was when our Committee staff read that regulation to you?

Mr. HUEY. Yes, ma'am.

Chairman COLLINS. Colonel Wagenaar, the Army Corps regulation requires you as the district engineer to keep informed of the levee district's compliance with the operation and maintenance regulations through "careful analysis of the semiannual reports submitted by the levee district." Did the Orleans District submit to the Corps or submit to you semiannual reports?

Colonel WAGENAAR. Ma'am, I cannot answer that. Mr. Colletti may be able to answer that.

Chairman COLLINS. Mr. Colletti.

Mr. COLLETTI. We do receive operation and maintenance reports, semiannual reports on the structures, and on certain features of the projects. In the past we did not enforce the semiannual requirement on certain types of projects, particularly those that meet and have routine project maintenance along them, on river levees and hurricane protection Federal project levees. They are routinely maintained, so the levee districts are out there overseeing that work.

Also, we meet semiannually with the Levee Board Association and its members, of which the Orleans Levee District and most of the other levee districts, as well as DOTD, are all involved. We

meet with them in May of each year at a workshop, and we meet again in December.

In addition to that, we have a very proactive flood control permits program where we evaluate, not just with this levee district but with other levee districts, anywhere from 300 to 500 permits throughout the year.

So there is involvement out there that is in addition to just basic routine visual inspections, not only by the levee district, DOTD, the Corps, landowners, facility owners, stakeholders that have some business in those levees that are next to them.

Chairman COLLINS. Mr. Hearn, in our review of the district's financial statements, we found that the district's Special Levee Improvement Fund had a balance of approximately $13 million at the end of June 2005, the end of your fiscal year, that was "available for spending for major maintenance and capital improvements of the levee system."

Was any consideration given to spending that money on more sophisticated levee inspection equipment so that you could do more than just a visual inspection and instead have the acoustical and mechanical equipment that is recommended by the MIT professor?

Mr. HEARN. No, ma'am. Until this breach, there was no indication, and I had complete faith in this levee system. You can believe that or I would not be in the position I am in today. Before this breach, I had heard no mention of seismic or anything else. And as we are going to find out as this investigation is completed, the seismic indication on the 17th Street Canal said the piling was at a certain depth. We pulled them, and they are actually at a different depth. So I don't think we have refined it to the point and did not have the knowledge of the fact that this system could fail and it needed inspection from the water side or from seismic. I think that will be considered in the future.

But, yes, we do have the $13 million to do projects with, and, for example, on the Marabou Canal Bridge, we gave $1 million to the Corps because they did not have enough funding to finish the bridge. So I am sure that as this develops, whatever our requirements are for the inspections, then we can use that money to buy the equipment that we need.

Chairman COLLINS. Mr. Huey, I was really surprised to learn that the levee district has commercial enterprises. I would have thought that the levee district would be concentrating solely on the operation and maintenance of the levees pursuant to its agreement with the Army Corps. And, in fact, when we reviewed the minutes of the board's meetings, we found that a majority of the meeting time was actually spent discussing these commercial enterprises, whether it was the licensing of the casino or the operations of the airport or the marinas or the commercial leases with the karate business and the beauty shop and the restaurants.

Do you think it is appropriate for the board to be involved in these commercial activities? Do those business activities detract time and attention from what is truly the mission of the board, which is to ensure the safety, the maintenance, and the operation of the levees?

Mr. HUEY. Yes and no. First of all, the "no" part is the fact that, no, I don't think it detracts the levee district, and there are numerous instances in which it has been a tremendous help.

The levee district, I was the first president in the history of the levee district—and it was formed in 1890, so over a hundred years. In 1996, when I became president, the levee district had a $6 million deficit, the first time in history. So taking the district over, looking at the city, very poor city—we are struggling—our chances of getting any tax increase or things of that nature was nil to none. As a matter of fact, our legislature in their wisdom said, well, go out—because they took half the millage away from the Orleans Levee District and gave it to the Sewerage and Water Board and School Board down the line, so the Orleans Levee District receives half the millage of the other levee districts in the State because we do have commercial properties.

I have spent a substantial amount of my time educating our legislators in the State of Louisiana about the entity that they created under the Constitution, the Orleans Levee District. With that, the Orleans Levee District under the Constitution was so substantially different than any other levee district in the State of Louisiana, it is a very confusing factor that has complicated a lot of issues in this matter, and I was asked whether things should be changed or this, that, and the other, or what have you, by the investigating committee. And my answer to that is a yes and a no—yes because it is confusing, we have got to clarify it to the public because they have got the same questions you have asked on their mind. How can we focus on flood protection when we are running all of these other entities and so forth from that aspect of it?

But Mr. Hearn and his staff, when I came on board, we started running things in more of a businesslike manner, reducing overhead costs. I think the flood-proof bridges that were being built alleviated a big burden off of folks because we used to have to sandbag these, and these were evacuation routes and things of that nature.

But to get to the bottom line, we utilize a lot of the same resources we have and the folks that operate the equipment and tractors and so forth to close floodgates and things of that nature or what have you. Our commercial properties were 50-percent self-funded, and our bond rating from a $6 million deficit to a $21 million surplus, which has been identified in the financial statement, was developed with prudent management and with the understanding in the board—that is why a lot of our focus was maximizing our abilities for the assets under our control to generate revenue because we knew it was essential to continue to provide the level of services that our community has come to expect and deserves from the Orleans Levee District.

Does that need to be changed? I think they are taking a look at it in the State at this particular point in time. My only fear and concern here is that decisions will be made without the appropriate facts and people jumping the gun.

The previous question, I would like to address that because all of a sudden some professor who is supposed to really be good at what he does says that the Corps of Engineers only had the sheet piles driven down 9, 10 feet and that is what caused this thing, and

it caused commotion in the news media and lawsuits popping out all over the darn place because people think this. When they did their core sample—and they took it the other day—it was built to specifications. I think these folks need to have the opportunity and the time to find out what really happened there.

The second point, could things have been identified without this situation? It was brought to my attention by your delegation of the Sewerage and Water Board being called by a lady who was on Bel Air who found—and was told that it wasn't their water, it was water from the lake. Well, doggone it, if the Orleans Levee Board would have known that it was water from the lake in this lady's backyard on the 17th Street Canal, we would have certainly—we may not have known where it was at, but we would have known there was a problem. Those are the type of issues that we need to find out. How was that missed? You know, who didn't call us or somebody, you know?

Those are things I would like to see focused on, but, yes, we do have a lot of additional responsibilities, and the board has focused on that, but I think these folks have been working in conjunction with the Corps. Our flood protection system, as Mr. Hearn said, we have complete confidence in unless we hear otherwise from the experts that we look to in the Corps of Engineers.

So I think there are going to be some changes made, but I think that the type of research and investigation that is being done by this Committee to get down to the true facts so that your decisions can be based on reality and that the proper things would be done is the best way to approach it, not jumping the gun.

Chairman COLLINS. Thank you. Senator Carper.

Senator CARPER. Thank you, Madam Chairman.

A quick question of Mr. Huey, just a real brief answer, if you would. How are the commissioners chosen?

How is the president chosen to serve on these levee districts?

Mr. HUEY. The commissioners are made up—there are eight appointees to the board: Two are appointed by the city of New Orleans. That is normally or has been the tradition, basically, that the mayor appoints the chief administrative officer and also a council person from that particular district that covers the majority of the lakefront levee district or council person. The governor selects six. Out of those eight members, they elect a president and the officers of the board.

Senator CARPER. And are there specific requirements that are spelled out in legislation or statute that say what kind of background the members need to have?

Mr. HUEY. No, I do not believe there is.

Senator CARPER. And folks serve a specific number of years? Is there a term to their tenure and then they have to be reappointed? Or are they term-limited?

Mr. HUEY. No, no terms limits. We serve at the pleasure of the governor.

Senator CARPER. Fair enough. OK.

I want to go back to a point that Senator Voinovich made a little bit earlier, and we were talking about—in fact, you asked a question. I don't know that our witnesses had an opportunity to answer it. I think what you were saying is if they are sort of in our shoes,

how would they ask questions about whether the Administration and the Congress has met its responsibilities.

In my State—and my guess is it is probably true in Ohio and in Maine as well—we meet regularly with the Army Corps of Engineers. Our delegation sort of meets collectively. It is easy in a little State like Delaware where you only have three people on your delegation. But we meet regularly with the Army Corps. We talk about priorities, theirs and ours, and we develop almost a game plan to come to the Administration and to the Congress and lobbying the relevant committees, Appropriations and otherwise, to make sure that the priorities that we have identified—that we get them funded, and if we don't get them funded the first year, we go back the second year or the third year or the fourth year.

For anyone who ever visits our beaches in Delaware, you find that we try to protect our beaches, our dunes, and the areas behind them, and we work very closely with the Army Corps in developing those priorities and those projects and trying to get them funded.

So when we think of the responsibilities here, there is obviously the responsibility that the Federal, State, and local agencies have. We have responsibilities, too, but also I would add that the delegation, the Federal delegations, House and Senate within a respective State, have an opportunity and I think a responsibility to identify what their needs are and then just to lobby like heck to get them addressed over time. It has been about—what did you say, 41 years? That is a long lobbying effort, at least in my experience.

I want to go back to Mr. Naomi, and I don't want you to leave here and feel like you haven't had a chance to answer a bunch of questions, so I will ask you a couple, if I could. The Army Corps of Engineers has publicly said that the hurricane protection system was designed to protect against a fast-moving or a moderate Category 3 hurricane. The Saffir-Simpson rating scale, as far as I know, did not exist when these projects were designed, and they were, in fact, designed to a completely different standard. I think it is one called the Standard Project Hurricane. And here is my question: Mr. Naomi, how did the Corps establish that the projects were designed to protect against a fast-moving Category 3 or a moderate Category 3? That is the first question. And the second question is: What, in fact, was the level of protection this system provided during Hurricane Katrina?

Mr. NAOMI. Well, you are correct, the authorization by Congress provides for the Standard Project Hurricane, and that authorization and that level of protection was established long before Saffir-Simpson. The problem that we encountered is that when folks, the general public, want to know what level of protection we have, what kind of category we are protected against, it is very difficult to say based on this hybrid type storm. And when you try and explain this to the general public or you have a wind speed of a high strength Category 2 and a central pressure of a Category 4 and the surge characteristics of a Category 3, it is very hard to explain why that is.

Well, there are some very good scientific reasons why that is, and it certainly made sense to the meteorologists and to the folks at the Weather Service who gave us that design. But it does not really make much sense to the media or the general public.

So when we set out the criteria of what the SPH, the Standard Project Hurricane, were and applied them to the Saffir-Simpson Scale, you try and draw some general conclusions so that it will help people understand the type of protection they have. And so when we look at the 11.5-foot storm surge in Lake Pontchartrain which the Standard Project Hurricane was designed to protect against, that came in in the area of a Category 3 storm, a fast-moving, relatively low strength Category 3 storm.

And so that is what we generally would say, just to help the public understand the type of protection that they have. So an 11.5-foot storm surge in the lake is what we have designed to protect against. Generally, the lakefront levees are around 17 feet, which accounts for a certain amount of wave action and wave run-up. And so when we explain to the public what level of protection they have, we generally will say a fast-moving Category 3 storm so that people can understand better what that relationship is. They seem to understand the Saffir-Simpson Scale. They have a harder time understanding the Standard Project Hurricane.

Senator CARPER. All right. Thanks.

Mr. Preau, I would welcome your comments in response to what Mr. Naomi has said on this point. Anything, Mr. Preau?

Mr. PREAU. The Saffir-Simpson Scale is kind of misleading when you are talking about hurricane protection projects. We are building projects to protect against wave action, not wind. Hurricane Katrina was listed as a Category 5 when it was out in the Gulf. There have been people now saying it is a Category 4. Wind speed dropped when it hit land, so now it is a Category 4. That storm was the biggest storm ever to enter the Gulf of Mexico. Hurricane Camille on the Mississippi coast pushed up about 20 to 25 foot of surge. Hurricane Katrina put over 30 foot of surge up there. Camille was listed as a Category 5 and went down in the history books as a Category 5. I think it would be a real disservice to everybody if Katrina goes down in the history books as a Category 4 because the wind speed dropped at the last minute.

Winds can drop immediately. Water has, as it has been explained by some, a memory to it. When you have a surge up, it does not drop as quickly as the wind does. So you have that storm surge stays up well after the wind dies. I think if we are telling people what type of protection we are providing, it ought to all be based on we are providing protection against a storm surge of so many feet.

Senator CARPER. All right. Thank you, sir.

My next question would be for the Army Corps, and I don't care if—maybe several of you may want to take a shot at this, Colonel and Mr. Naomi and Mr. Colletti. There have been a number of changes in our understanding of hurricanes in the Gulf since the Lake Pontchartrain Project was authorized some 40 years ago, and there has been regional subsidence in the entire southern Louisiana area, a significant loss of coastal wetlands, and the Mississippi River Gulf outlet, which I understand acted as sort of a channel for Katrina's surge, has been widened. There has also been subsidence of individual levee segments.

A couple of questions. First, how have these changes affected the protection needed for New Orleans? And, second, how has this been

factored into the design of the levee system since it was originally conceived some 40 years ago?

Mr. NAOMI. Sir, the levee was designed back in 1965 when it was authorized, and that is a long time ago. I was in high school at the time.

Senator CARPER. So was I. [Laughter.]

No, that is not true. I was in college at Ohio State.

Mr. NAOMI. The system was re-evaluated in 1984, and the high-level plan was instituted back in 1984. So the design back in 1965 really was changed in 1984 to go to what is called the high-level plan. So the plan that we are constructing right now is really from 1984. And those levees are designed based on certain criteria, and certainly the issues of subsidence and coastal land loss are important and changes have occurred.

It was our intention and in what we had underway at the time was, as we completed some rather sophisticated models that have been developed in the last 3 to 5 years, we were going to remodel the Standard Project Hurricane to see exactly what level of protection was afforded by these existing levees. Unfortunately, we got overtaken by events with Hurricane Katrina, and we were not able to complete that program. That is even underway now.

But that is an important factor that we do have to go back and re-evaluate, and re-evaluation of projects this size takes quite a while and takes quite a bit of money and resources to undertake. We do not undertake those things lackadaisically. We take those things very seriously. We have to involve our local sponsors and the State as well as various other Federal agencies in the environmental consequences of these projects. So certainly re-evaluation is called for to look at all these ecological and geographic changes that have occurred over the last 40 years and the last 20 years or so since the project was re-evaluated the last time.

Unfortunately, it takes so long to construct these projects, they are so massive, that you could re-evaluate one of these projects several times before it is totally completed.

Senator CARPER. My time has expired. If I could, Madam Chairman, let me just ask if either of the witnesses from the Army Corps want to add to that or take away, just briefly.

Colonel WAGENAAR. The only thing I would add, Senator, is that regarding the Mississippi River Gulf Outlet, it is a federally authorized navigation canal, a channel. There is a lot of passion and feelings behind what happened with the River Gulf Outlet in regards to the hurricane. I believe, though, that modeling and science has to show what actually happened with Katrina and how the storm surge overtook the hurricane protection levees along the Mississippi River Gulf Outlet.

I believe it is too simple to state that the Mississippi River Gulf Outlet was the cause of all of this destruction. I believe the models and the science has to prove that out.

Senator CARPER. All right. Gentlemen, thanks very much.

Madam Chairman, I am supposed to be in Senator Frist's office right now for a meeting. I am going to slip out, so thanks for letting me sit in here with you today, and see you both later on the floor.

Chairman COLLINS. Thank you.

Senator CARPER. Again, to our witnesses, thank you very much for joining us today.

Chairman COLLINS. Senator Voinovich.

Senator VOINOVICH. According to the information that I mentioned earlier, the Corps noted that several levees had settled and needed to be raised to provide the design level of protection. Mr. Colletti, are you familiar with the levees that settled and needed to be raised to provide the design level of protection?

Mr. COLLETTI. Well, the levee protection and construction and reconstruction is generally handled through Mr. Naomi's project management group. So throughout the years, there are pieces of levees that do settle.

Senator VOINOVICH. The question I have for whoever wants to answer it is: Given that several levees had settled and needed to be raised to provide the design level of protection, had the appropriate repairs been made, would that have made a difference in terms of whether or not the city would have flooded?

Mr. NAOMI. Senator, I think it would be highly unlikely that raising the levees to the degree that we were going to raise them would have prevented the significant flooding that was experienced due to Katrina. We had no plans to do anything with the floodwalls on the outfall canals. There were some levees in Eastern New Orleans and in St. Bernard Parish that needed to be raised, but the surge that was encountered at those locations——

Senator VOINOVICH. So what you are saying is it would not have made a difference.

Mr. NAOMI. No, sir, it would not have.

Senator VOINOVICH. Madam Chairman, one of the things that I am still puzzled about is whether Katrina was a Category 5 or a Category 3 storm. I understand that the National Science Foundation and the American Society of Civil Engineers both concluded that this was actually a Category 3 and that had the levees been maintained properly this might not have happened.

Chairman COLLINS. That is correct.

Senator VOINOVICH. So I think that there is a significant difference of opinion regarding the strength of the storm. You all think this was a Category 4 or 5, and others think it is was a Category 3. Is that right?

Colonel WAGENAAR. Senator, as an example, what we base it on, there were many areas of the Mississippi River Gulf Outlet levee that were 17.5 feet, at the authorized elevation. That levee system was completely destroyed by this storm. Completely overtopped, completely removed. And it was at its authorized height.

Senator VOINOVICH. OK. So you believe it was more than a Category 3.

Colonel WAGENAAR. Yes, sir.

Senator VOINOVICH. OK. Madam Chairman, do we know yet what the plan for rebuilding is? Has that decision been made as to whether the levees will be built to withstand a Category 3 or a Category 5 storm?

Chairman COLLINS. It is my understanding that the decision has not been made. I would defer to the colonel.

Colonel WAGENAAR. Senator, we are using emergency monies right now to re-establish the pre-Katrina levee system to its au-

thorized height, which is Category 3 in most areas, and no decision has been made on future heights of that levee system.

Senator VOINOVICH. I will ask you the same question I have asked other members of the Corps of Engineers. In preparation for upcoming storms, would you do anything differently? With the work that you are doing right now to fix what has deteriorated or been destroyed, would you make changes to your efforts based on whether you were preparing for a Category 3 or a Category 5 storm?

Colonel WAGENAAR. Senator, I guess the easy answer would be that if we want to offer a level of protection greater than what was there before, then we need to look at this system comprehensively. It is not as simple as building a levee 50 or 60 or 70 feet high. It also includes water evacuation from the city. It includes coastal restoration. We have to look at the system comprehensively. I am not sure that has been done in the past. But to offer a level of protection greater than what was there before really is going to take a comprehensive approach.

Senator VOINOVICH. Well, I think somebody ought to get on with the question. The decision as to what you do there will impact how the town is going to be developed. Major decisions are going to have to be made on the basis of that.

Supplementing Mr. Huey's description of the annual levee inspection, Mr. Hearn said that, "The inspection starts at 9 a.m. and ends at 12:30 p.m. and covers close to 100 miles of levees. Mr. Hearn also said that even though professional engineers work for the OLD, they perform nothing more than a visual inspection of the levees." Is that true? Is that a visual inspection?

Mr. HEARN. That is correct.

Senator VOINOVICH. OK. I would like to hear from the colonel or from the Army Corps of Engineers. Do you think that the current way that these are being inspected is adequate? And does the Orleans Levee District need to become a lot more sophisticated in what they are doing?

Mr. COLLETTI. Well, all of our inspections have been visual, with the exception of when we have a known problem. When you have in that case over 100 miles of levees, we have a program along the Mississippi River called levee monitoring, and you occasionally go through reaches and you do some subsurface testing along the bank lines and such. It is quite expensive to do that.

After the fact here in this case, but we have considered possibly instituting some type of hurricane protection monitoring program which would maybe randomly take samples at certain areas.

Senator VOINOVICH. OK, here is the deal: You had the hurricane. We have operation and maintenance. And according to what I read, Madam Chairman, once something is turned over to the Orleans Levee District—I have got some previous testimony that says that they were not sure whether or not it had been turned over to them or not. But the fact is—let's get back to the original question. Now that we have been through this, would you suggest as a professional that in terms of the maintenance and monitoring better equipment should be used in order to get the job done at this stage of the game?

Mr. COLLETTI. There are better techniques that possibly could be utilized, and I think it is going to be possibly a combination of OLD as well as the Corps of Engineers. But initially——

Senator VOINOVICH. Having survived this disaster, who do you think should be responsible for making sure that the levees are being sufficiently maintained?

Mr. COLLETTI. Operation and maintenance, as it has been, is the responsibility of the Orleans Levee District. To go beyond where we are at and do structural re-evaluation I believe is going to take more than the capabilities of the Orleans Levee District. I cannot say for sure what would that be, but it is much more extensive when you do structural re-evaluations.

Senator VOINOVICH. You indicated to me that, as far as you were concerned, they were doing a good job in terms of operation and maintenance. Is that what you said?

Mr. COLLETTI. That is correct.

Senator VOINOVICH. According to, again, staff, "Mr. Hearn indicated that at least on one example they failed in its operation and maintenance. Last year a train damaged a railroad floodgate in the East Orleans area. Mr. Hearn agreed that the OLD's duty to repair the floodgate"—and this may not have anything to do with the problem, but were you aware of that?

Mr. COLLETTI. Yes. As I said, there are over 100 miles of levees and floodwalls and such, and you are going to have pieces of that——

Senator VOINOVICH. Would you say that they could have done a better job? And did you let them know that?

Mr. COLLETTI. In their defense, in that particular instance, they did provide sandbagging of that area. They did take an action, and they did show that responsibility. It just so happened that it was overtopped at that location.

Senator VOINOVICH. Mr. Preau, what are your responsibilities here? I understand that you were responsible for looking at the emergency plans. According to Mr. Hearn's testimony, "DOTD has been slack in performing its duties. Although DOTD is supposed to review the levee district's emergency operation plan, Mr. Hearn has never received comments or any indication of approval or disapproval." What do you say to that?

Mr. PREAU. We do review the emergency operations plans of all of the levee districts. If there are no comments to send back, we don't send any comments back.

Senator VOINOVICH. Do you ever tell them the plans are approved? Or, if they don't hear from you, the plans are OK?

Mr. PREAU. There is nothing in there that says we have to approve it, to my knowledge. It says we review them. All of these operations plans, emergency operations plans, were set up on a template, set up by, I believe, Homeland Security for each levee district. They are put on a template. In my time here, they were put together originally back—what was it, Max? About 1985, I think?

Mr. HEARN. Yes.

Mr. PREAU. Somewhere around 1985. I have not been involved in reviewing them that long. So all I look at is the updates. Every 2 years they are supposed to update them. We look to see that they have the correct names and phone numbers in it. There is nothing

to change on the plan. If there was, it would have been given to us by Homeland Security.

Senator VOINOVICH. I have run out of time, but, Madam Chairman, if I could just ask one for the record.

Chairman COLLINS. Sure.

Senator VOINOVICH. This is to you, Colonel. Do you have a record of the turnover of completed projects to the local project sponsors and the New Orleans District? Is there paperwork on that?

Colonel WAGENAAR. Senator, I would have to ask Mr. Colletti to respond.

Mr. COLLETTI. We have provided various pieces of paperwork on pieces of the system. I don't know how many. I think Senator Collins had mentioned 22 or something to that effect. There were various pieces that we have turned over to them.

Senator VOINOVICH. Do you have documentation to accompany each of those turnovers? In other words, do they know that it was turned over to them?

Mr. COLLETTI. The letters pretty much explain that. Basically they state that the project is—the contracts are completed and it is now their responsibility for operation and maintenance.

Senator VOINOVICH. I would like to see the paperwork during the last several years. Because according to what Mr. Hearn said to the staff people, "This is partly explained by Mr. Hearn understanding that no part of the LP&V HPP has been officially turned over to the levee district even though the levee district assumes maintenance responsibilities once the contractor finished the work on the section." I would like to know whether or not they know it has been turned over to them and they have responsibilities.

Mr. COLLETTI. Yes, when we send those letters—some of those are actually sent by certified letter. So there is a documentation there with those.

Senator VOINOVICH. Thank you.

Chairman COLLINS. Thank you, Senator. Senator Levin.

OPENING STATEMENT OF SENATOR LEVIN

Senator LEVIN. Madam Chairman, thank you. And I apologize for coming so late. I am going to try to ask questions which I believe have not either been addressed or have not been addressed clearly as far as we can tell.

The first is, who had the responsibility. Let's look backwards first as to who had the responsibility for operation, maintenance, repair, replacement, and rehab for the 17th Street Canal floodwall. OK, we will start with you, Colonel. Who had the responsibility for the operation, maintenance, repair, replacement, and rehab of the 17th Street Canal floodwall?

Colonel WAGENAAR. Senator, in regards to the operations and maintenance, it is my understanding that the Orleans Levee District was responsible. In regards to repair, rehab, or future construction, it would be a partnership between ourselves, the State DOTD as the cost-share sponsor, and the levee district as the local sponsor to do that work.

Senator LEVIN. And that would depend on the size or scope of the repair necessary? What would it depend on?

Colonel WAGENAAR. It would depend on the activity, Senator.

Senator LEVIN. And is that clearly divided as to who would have what responsibility for repair, who would have what responsibility for replacement, and who would have what responsibility for rehab? Is that a clear division line between State, Federal, and local?

Colonel WAGENAAR. I believe it is pretty clear. Mr. Colletti may be able to add light to it, but I believe it is clear, Senator.

Senator LEVIN. And was it clear at the time?

Colonel WAGENAAR. Yes, sir.

Senator LEVIN. OK.

Mr. COLLETTI. On the Federal projects, if the project is damaged by a flood or coastal storm or hurricane, it is repaired under Public Law 99 through the Corps of Engineers. If it is damaged by—such as the railroad gate, if it is damaged by a train accident, then it is the responsibility of the levee district.

Senator LEVIN. And where does the State come in? I think the colonel said the State also has a role.

Colonel WAGENAAR. They have oversight, yes, Senator.

Senator LEVIN. Oversight, but in terms of responsibility to carry out and to fund the repair, replacement, and rehab, is there any State funding in that?

Mr. PREAU. No, sir, there is not. The State, unless it is the non-Federal sponsor, would not have any authority in that.

Senator LEVIN. Now, in terms of operation and maintenance, the colonel said that is up to the district?

Colonel WAGENAAR. The levee district, yes, sir.

Senator LEVIN. The levee district. Do you all agree that the levee district at the time of these events was responsible for the operation and maintenance of the 17th Street Canal floodwall? Do you all agree with that?

Mr. NAOMI. Yes, I agree with that.

Mr. PREAU. Yes.

Mr. HUEY. Yes.

Senator LEVIN. OK. Now, in terms of the question of whether or not a project is completed or not, was this project considered at the time a completed project?

Mr. NAOMI. The project itself, overall project, was not completed. Individual parts of it were, but construction—it was still in the construction general program of the Corps of Engineers and, as such, was a project that was deemed under construction.

Senator LEVIN. And did that have any impact as to who was responsible for operation, maintenance, and repair, the fact that it was not in the view of the Corps of Engineers a completed project?

Mr. NAOMI. Well, the pieces of the projects that were turned over were in operation and maintenance, and the only time we get involved actually from the construction standpoint is when we have to go out and build something. Generally, when the project pieces are finished, we turn them over to the sponsor for maintenance.

Senator LEVIN. All right. But the fact that the overall project was not completed did not then have any effect as to who was responsible for the operation and maintenance of that part of the project.

Mr. NAOMI. I don't think so, sir.

Senator LEVIN. OK.

Mr. HUEY. Could I step in because it also clarifies a question asked by Senator Voinovich earlier with the turning over of projects. Mr. Hearn and I, in discussions, in talking with Chief Engineer Steve Spencer, I want to clarify the fact that when Mr. Hearn made the statement that he has never seen anything—or he hasn't seen anything to turn over a project, that is one of the reasons. We have received, according to Chief Engineer Steve Spencer, from the Corps of Engineers letters turning over the various floodproof bridges, for example, as they are completed and so forth. The levee systems and other things have been dealt with prior to his time, so they had already been turned over. Projects such as the 17th Street Canal, which is an ongoing project, which was a floodproof bridge in the process of being completed, and things of that nature, they will say, hey, look, you need to cut the grass, maintain it, take a look at it, because the project is substantially completed, but they don't officially turn it over because it doesn't fit into the project criteria.

Senator LEVIN. Well, was the 17th Street Canal part of this overall project? Had it been turned over to the district?

Mr. HUEY. Not officially, but it was clearly understood that we maintain and cut the grass and look out for the—all of our normal day-to-day activities and looking for things and so forth. And unless I am wrong, Mr. Hearn, we had been taking care of that particular section from the bridge on down that was completed while the bridge was being completed.

Senator LEVIN. So that the operation and maintenance of that section was your responsibility regardless of the fact that it had not been officially turned over to you?

Mr. HUEY. Correct. I mean, that is the kind of working relationship we work with the Corps on a day-to-day basis. I think our people communicate on a day-to-day basis on things of this nature, and the reason I stepped in there, to make sure it is clarified with the fact that Al Naomi attends virtually every meeting. We talk about this. The commissioners are aware of what is going on, and the staff works on a day-to-day basis. And I know from pretty well the time I have been on the board that the levee district had taken over maintaining it because the Corps doesn't do some of the maintenance services we do. They don't go out with tractors and cut grass.

Senator LEVIN. My major question, though, is the fact that it had not been formally turned over did not affect the question of whose responsibility it was for the operation and maintenance of that portion.

Mr. HUEY. Not in my mind.

Senator LEVIN. Not, apparently, in anybody's mind.

Mr. HUEY. If the Corps asks us to do something, we do it. That is the way I look at it.

Senator LEVIN. Do you all agree with that, that the fact that this portion of the overall project had not been formally turned over by the Corps did not affect the responsibility question for operation and maintenance? Would you all agree with that?

Colonel WAGENAAR. Senator, I am not sure that we did not formally turn it over. I would have to look at the documentation.

Senator LEVIN. But if you had not formally turned it over, officially turned it over, would that have had any effect on who was responsible for operation and maintenance of that part of the project?

Colonel WAGENAAR. No, sir, and the actions of the levee district clearly indicate that they had responsibility for those canals.

Senator LEVIN. OK. And now the interim turnover question, where does that fit?

Mr. COLLETTI. That essentially is basically a notification that the contract is complete. When we go to do a construction contract, we get a right of entry for certain limits of the project, and the interim turnover per se is to notify them that we are finished in that area and that they will go ahead and maintain it. We do not ask them to maintain while we are doing construction within the area.

Senator LEVIN. Does that have any effect as to whether or not interim control status had been achieved or adopted or stated? Does that have any effect on who is responsible to do the operation and maintenance?

Mr. COLLETTI. No, sir, other than, like I said, in that construction limits, when it is finished, we look at the levee district to do that.

Senator LEVIN. And then once it is finished, in terms of reconstruction, rehabilitation, repair, that depends on very clear and set ground rules which you all agree are clear and well defined? Is that fair? No, Mr. Preau? Am I pronouncing your name correctly?

Mr. PREAU. Yes, sir.

Senator LEVIN. You are shaking your head no.

Mr. PREAU. I am shaking my head no about the whole issue of turning over piecemeal pieces of these projects. When a project takes 40 years to develop and they start turning loose pieces a little bit at a time, you do not have a completed project. It is supposed to be useful elements. I do not think we even have useful elements. It looks like it is just turned over as the construction contract ends. It is handed to the levee district, and they are told to go maintain it.

Senator LEVIN. What is the relevance?

Mr. PREAU. The relevance comes down to who is responsible for the repair.

Senator LEVIN. For the repair issue, OK. So there is a question here because it was a piece turned over, and not a finished piece turned over, as to who is responsible for the repair and rehab of that—or of any project? Is that what you are saying?

Mr. PREAU. That is what I am saying, and it is not just for that project. That is for all of these Corps projects. They are long-term, multi-year projects, and they are done in pieces.

Senator LEVIN. And that the rule for who is responsible for repair of those projects is not clear when these are turned over, in effect, in pieces rather than as larger pieces. Is that what you are saying?

Mr. PREAU. That is what I am saying, and I think that needs clarification. It needs it on all of the Corps agreements. It says "a useful element."

Senator LEVIN. Thank you. Thank you, Madam Chairman.

Chairman COLLINS. Thank you, Senator Levin.

The issue you raised is one that we have spent a great deal of time on today, and I really think it is the key issue. Who is in charge? Who is responsible when there is a problem? Who responds when there is a breach? And having listened to the testimony today, having read the staff interviews, I believe it is still unclear, and it is imperative that we clearly define the lines of responsibility and authority.

I would like to pose two brief hypotheticals to try to get at this issue a little further. The first is that water is found to be seeping up from the ground near the Mississippi River levee, so for that hypothetical, who is responsible for responding? Colonel?

Colonel WAGENAAR. Depending on who that initial seepage was reported to, near the Mississippi River levee, it could multiple different factors. But, for example, if the Sewer and Water Board went to investigate it for a potential water main leak or something to that effect, they would report that to the levee district and to the Corps. That is the process that should occur. If it is in the vicinity of the Federal levees on the Mississippi River, ultimately that is a Corps responsibility to analyze and look at that issue and potentially effect repair.

Chairman COLLINS. Mr. Preau, what is your answer to that question?

Mr. PREAU. I think I would have to agree with that one.

Chairman COLLINS. Mr. Hearn.

Mr. HEARN. I agree with that. Normally it would be reported to either the Sewer and Water Board or to us. When we go out, we find out whether or not it is river water or whether or not it is a leaking water pipe. We would call Sewer and Water Board if it was a leaky water pipe. We would call the Corps of Engineers and start working on the sand boil if it was Mississippi River water.

Chairman COLLINS. There, again, it depends on who got the report, how big is the problem, what is the cause of the problem. The answer varies.

Second example: Let's say that an earthquake hits New Orleans, and as a result, a portion of the levee system experiences considerable subsidence. In that hypothetical, Mr. Hearn, who is responsible for responding?

Mr. HEARN. I think if it is an earthquake that caused that subsidence, we would have to come to the Corps of Engineers—it would depend upon the amount of subsidence you are talking about. If it was small subsidence, then we could take care of it in-house coordinating with the Corps. Then we would fund it, have it repaired. If it is larger than that, we would go to the Corps and ask for assistance on the repair.

Chairman COLLINS. Mr. Preau.

Mr. PREAU. I would say that if it was an act of God type of occurrence, then it would be the Corps that would be responsible under P.L. 84–99.

Chairman COLLINS. Colonel.

Colonel WAGENAAR. I believe that if it is an immediate action, then the levee district has to respond to it. And then if it exceeds their capacity, they request through the State to the Corps for assistance or directly. They can come directly to us. But if it exceeds their capability, then the Corps comes in.

Chairman COLLINS. Again, the answers are a little different, and once again, really what you are telling me is it depends, and I think that is a problem. I think we need to have a clear delineation of who does what, and I don't know whether that requires legislation or regulation or revisions of State law or Federal law. But that seems to me to be a problem that we saw in real life, not in a hypothetical, when Colonel Wagenaar discussed the turf war that broke out on the 17th Street Canal breach. And that is what we have to straighten out.

Mr. Huey, first of all, I want to thank you for being very candid in your staff interview. I really appreciated that because it is important that we understand exactly what happened. You made a comment about the qualifications of the people who serve on the levee board, and you talked about people coming from special interest groups. "I have got commissioners, like I said before, who are only concerned about DBE"—is that disadvantaged business enterprises?

Mr. HUEY. Correct.

Chairman COLLINS. ". . . who get the contracts in developing New Orleans East. I've got them who are only concerned about particular issues, and the least on their mind appears to be flood control because they think that is all done by the Corps. As we have said here, they are there for whatever political agendas or personal agendas that they have, number one."

So I want to ask you two questions. First, I want to go back to the issue of whether the board should be involved in business enterprises or whether it would be clearer to those who are appointed to the Board what their duty is and what their obligation is if the Board only dealt with the levees. So let me ask you that question first.

Mr. HUEY. Yes, I think it would be clearer, and if I could just comment quickly on that, the previous board—which I will just make a statement here and so forth. It was one of the finest and most talented boards in my tenure that I could ever know. It was made up with—it was the first time I have been on a board ever that we had a retired Corps of Engineers individual, Vic Landry, who was vice president, who was able to assure and work with all the levee district systems and work with the Corps, and that we were focused in the right direction on flood protection. We had a Congressional Medal of Honor-winning general, General Livingston, who lent a lot to the board. We had some substantial folks who identified some of these complexities, and that is why some of the maneuvers had looked to say how can we divest ourselves from some of the commercial activities, and we went into the privatization of the lakefront airport, for example. We were looking into the formulation of—the board functioned similar to what they do at the rate commission in New Orleans where you have a private-public type partnership, where you can work or have an entity that focuses on your private-public—commercial development of the area and generating of revenues, and the board primarily focused on the flood protection and get the benefits of all.

Where we can continue to utilize the resources we have in people who maintain and do the things with the—for the levee system, our police department, for example, and things of that nature where we

could utilize them more efficiently. They are like the Marine Corps, I used to say. You have them. You need them if a storm comes. You want to make sure that your property is secure and things of that nature. You hope you never need them in the event of that, but they are there. And if they are there, get some use out of them. Those type of things.

So I think the board was moving in a direction to try to clarify that issue because it was somewhat complicated, and so to answer your question, yes, I do think that some seriousness needs to be looked into it, but it needs to be done in the right way, understanding that I had mentioned to you before that the levee district's funding, 50 percent is self-generating. So I hope in the wisdom of what they do in our local community is addressed with the fact that where will that money go.

Chairman COLLINS. Should there be qualifications to serve on the board? For example, should there be a requirement that someone has engineering experience or business management experience? As I understand it, the only qualification right now is you have to be a resident of the State. Should there be——

Mr. HUEY. No. Of the district, from what I understand, the governor just appointed an appointee and suspended the rules of the State because you have to live in the—vote in the parish you reside in for 1 year, and I do not believe that individual qualifies at this particular point in time. But if not, that ought to be the governor's choice. But to answer qualification, the past board, when they moved on, just said that they hoped in the governor's wisdom, a new governor moving in and so forth, that she would select more of the type of business people, the type of people in which you are going to look to—because as we saw it and looked at the board, our staff and the way they have worked and so forth for so many years understands the flood protection system. They work so closely with the Corps of Engineers, and we saw our responsibility to assure that we are providing the funding necessary and the resources necessary to our folks to continue to grow because as you develop this flood protection system we are talking about, you are developing a liability—more property to maintain, more grass to cut, more responsibilities and floodgates to open and close, and so forth. And we were concerned about our ability to generate it through a tax base. So that is why the board focused a lot on the business activities.

I am sure that some wiser than me can come up with a way that maybe all of this could be brought together for an overall good of the community.

Chairman COLLINS. Thank you.

Mr. Hearn, my final question is for you. We have been carefully reviewing the minutes of the district board meetings as well as the minutes of the various committee meetings of the board, and what we have found is, in the months before Hurricane Katrina devastated New Orleans, a number of unfunded projects were identified, and that included fixing the subsidence of a major levee in New Orleans East, repairing two pumping stations, floodproofing the Hammond Highway Bridge, and repairing bulkheads at the airport and at one of the marinas.

Now, I understand that some of these projects are the responsibility of the Corps, or you could argue that they are the responsibility of the Corps. But some are not, and the fact is that the levee board was aware of these needed repairs and had some $21 million in the bank, $13 million of which was specifically allocated to levee-related projects.

So my question is: Why didn't the board use some of its millions of dollars that it had in the bank to make New Orleans safer through these repairs which had been identified?

Mr. HEARN. The pumping station project, for example, there are two of them, and they are over $10 to $12 million each, if you had put that in frontal protection of the pumping station on London Avenue Canal, I don't think that would have made any difference in this particular case. But it is a lack of funding. If you look at that, the $13 million, and you see the debt service associated with the bonds that we had applied for to get the money to build all these other projects, we did not feel that there was enough money in that pot to construct these other projects. The New Orleans East, all we did was go to all of our Senators—or our delegation, the Louisiana delegation, requesting assistance on the funding from the President's budget. There just was not enough money there to do that.

Chairman COLLINS. Mr. Huey.

Mr. HUEY. If I can answer that, and I thank you, Max, for trying to not throw the finger anywhere. The board is responsible for where the money is spent. What Max's responsibility should have been is to come to the board and say, Hey, board, we have these particular projects, and I would like to utilize some funding for this.

The board makes those decisions, and in my entire tenure, in order to expend money for flood protection projects, we have always dealt with the fact that the Corps of Engineers in that are going to put up a certain specific funding, and we have always come up with our matching funds. OK? But I want to at least say that these folks, the Corps of Engineers, and Al Naomi in particular—and I heard it was mentioned here, and I don't know what the higher-ups in the Corps of Engineers or who presents things to the Senate and so forth, but this man should have presented the case to us, and he should have said how bad money was needed, and we let loose on that $1 million because we had never heard of the Federal Government shutting a project down during the construction and hurricane season coming up. And if you check the minutes, you will see how we have done that. I have packets of letters we wrote our Senators and so forth. But from our budget from the levee district, you have a very good question from that end of it.

Let's take, for example, we have been criticized for the Mardi Gras Fountain, and here I have got before 1983, when he talked about the high-level protection plan changing, is the tax referendum where the people—we went to the people. We got authorized for taxing, and what projects along Lakeshore Drive and things like that that can be utilized as far as flood protection? And we spent $2.5 million in redoing the Mardi Gras Fountain, which is a historical entity within the city of New Orleans. The maintenance was becoming phenomenal. It was very old and what have you. But in this project, one thing it taught us that I think is going

to save us billions of dollars, the seawall—and I think the Corps of Engineers and everybody here will certainly attest to this. The seawall certainly showed us where the breakwater—when the waves hit, they didn't even come close to topping some of those waves on a consistent basis and how important that seawall is. But we have had a serious problem with erosion just on normal storm days that are coming back and digging holes behind it, and the concern that it is going to collapse into the lake.

So with it being so costly and our chances of knowing that we may not get funded to replace it because it would be in the billions, we have come up with some methods, and one of those things in conjunction with the Mardi Gras Fountain was to utilize that, build that fountain, sheet pile was driven between the seawall and the earth, and we built a promenade. So now you have something that—and it held up tremendously during Katrina. The board had passed a resolution to continue if, in fact, this proved to be an economical fix, to do so much of that each year until we can cover the lakefront.

So those are the kind of things that I think the board looked and how it can maximize utilization of its funds in both recreational—because, again, we are mandated by the legislature to maintain 35 percent green space. We have swing sets up there we have been sued for, and we have had problems over there, and we are not a recreational department, but they asked us—we want to do something for the people. There are levees on top. Even the Federal Government has authorized the fact they want to see the levees for walking and bike paths. And we work through those programs, too.

So, yes, we do have other responsibilities. I am sure the intent is very good and want the people to enjoy, especially when we are landlocked and have as much recreational area, and they are trying to use the levee systems and the flood protection system as part of that.

Chairman COLLINS. The point that I want to make is there is no doubt that the Army Corps has been underfunded, and underfunded for years, as Senator Voinovich pointed out. But when the local levee board has more than $20 million on hand, you would expect that some of that money is being spent to improve the inspection process and to improve the maintenance. So that is hard to understand. It is hard to understand that kind of balance not being used for some of these safety-related repairs or to improve your ability to detect problems.

Mr. HUEY. Yes. Well, first of all, that is a wonderful question. I am glad you gave me a follow-up on that because I do want to make a point.

Recall the fact that I was the first president in the history of the levee district to take over a $6 million deficit. I have been the president for 9 years. We were digging out of a hole, and a surplus had started to just develop, and it is somewhat of the $21 million, it is lower than that due to the fact that the way our taxes and our ad valorem taxes are—it drops. So you have to have the cushion money. It will drop during a collection period. You never really know how much you are going to collect, for example. So at that particular point in time, when the financials were done at $21 million, I am certainly proud to say that, hey, I was able to make a

$27 million difference in the financial condition of the levee district.

Now, that is why I wanted to explain the Mardi Gras Fountain, and there are numerous other cases in which that is done and that the levee district has worked on that, but how do you expend money on something that the Corps of Engineers, who we look at as the experts in this area and that we work with and we pride ourselves on working with them, they are expert—you look, you see boils, you see breaches, you do this, the various things. They go to workshops, they work together and try and identify what is an inspection method. I think the question that arises in my mind: Is there any other better way to inspect them? Everybody I have talked to so far said no. You mentioned an individual, and it sounds like, hey, maybe that is something we need to look into. But I am a little discouraged because the last specialist that told the city of New Orleans that these folks did not build this thing to specification, found out it is built to specifications, he was supposed to be an expert, too.

So I think we need to investigate why his equipment said that it was only 9 feet deep, and they had to go dig down there and pull it up and find out it was built to—so we are hearing all of these things, and it is important to us to get to what are the real issues here. And if that is a real issue in flood protection, I will assure you, the city of New Orleans, the State of Louisiana, we understand flood problems, and we will allocate, and they have never failed to come up with our matching funds. If we could better utilize the budget—it is a levee district. It was asked to me by your investigative staff how can we use—they are some pretty good people. They know how to get stuff out of you. If we can have a general fund, can we use it for whatever? Yes, we can. The general fund is flexible. And had we known these problems and that our funds could better be utilized, I think the board would have moved to do that.

Chairman COLLINS. Thank you.

I want to thank all of our witnesses for testifying today. You really have added to our understanding. I am convinced that we need to sort out the lines of authority much more clearly as we proceed to rebuild the levees stronger and better than ever. Before I adjourn the hearing, I would like to take a moment to read a few excerpts from an Army Corps of Engineers document.

"The hurricane inundated over 5,000 square miles in Louisiana, including highly populated urban areas in Orleans and St. Bernard Parishes. Fortunately, advance warning by the U.S. Weather Bureau enabled hundreds of thousands of residents to flee their homes before the storm struck. Many others, however, were not so fortunate. Rapidly rising water trapped them in their homes, on roofs, on tops of cars, in trees, and anything else that stood above the water. Extensive flooding was caused by overtopping and breaching of existing protection levees. In her trip through Louisiana, the hurricane left 81 dead, over 17,600 injured, and caused the evacuation of 250,000 persons to storm shelters."

Well, perhaps from the statistics on the number of people who lost their lives, it became evident to you that I am not reading from a document related to Hurricane Katrina. It is instead taken from

the Army Corps' after-action report for Hurricane Betsy, and it was drafted in September of 1965.

This is troubling to me, and when you read this report and you look at the pictures, one immediately notices that many of the same neighborhoods that were devastated by Katrina were also damaged and flooded by Hurricane Betsy. The similarities are striking.

Furthermore, Hurricane Betsy led to the initiation of new flood control projects, some of which failed the city of New Orleans during Hurricane Katrina. And I mention this because, as I said earlier, the future of New Orleans is tied to its levee system. If people and businesses cannot be assured that the levees are strong, that there is effective and efficient oversight of the levees, then we cannot assure them that we are protecting New Orleans from a future catastrophic failure. And I feel we simply all have an obligation in this regard. The stakes are just too high. And that is why it is important that we do identify what went wrong and make it right.

We owe that to the people who have lost their lives, their properties, their jobs. We owe it to the city of New Orleans. We owe it to the State of Louisiana. And I appreciate your help this morning in giving us a better understanding of what went wrong and how we can do better in the future.

Thank you for your cooperation. This hearing record will remain open for 15 days for additional questions and materials.

This hearing is now adjourned. Thank you.

[Whereupon, at 12:43 p.m., the Committee was adjourned.]

APPENDIX

Hurricane Katrina: Who's In Charge of the New Orleans Levees?

Army Corps of Engineers

- Turn over completed sections to the Orleans Levee District
  [Engineering Regulation 1150-2-301]

- Perform an annual inspection with the Orleans Levee District
  [Division Regulation 1110-1-310]

- Review the semi-annual reports filed by the Orleans Levee District
  [Engineering Regulation 1150-2-301]

Orleans Levee District

- Operating and maintaining the levees
  [District - Army Corps assurance agreements]

- Conducting a quarterly inspection of the levees at least once every 90 days
  [33 CFR 208.10(b)(1),(c)(1)]

- Filing a semi-annual report
  [33 CFR 208.10(a)(6)]

Louisiana Department of Transportation and Development

- Approve of the soundness of the engineering practice and the feasibility of the plans and specifications submitted by the Orleans Levee District
  [La. R.S. 38:307 (A)(1)]

- Conduct training of the Orleans Levee District's commissioners
  [La. R.S. 38:301 (B)]

- Review the Orleans Levee District's emergency plans
  [La. R.S. 38:319]

Emergency Management

- Army Corps of Engineers:
  Flood Control Act responsibilities, and primary agency for public works under National Response Plan

- La. Dept. of Transportation and Development:
  Primary agency for public works under La. State Emergency Operations Plan

- Orleans Levee District:
  Supporting agency for public works under La. State Emergency Operations Plan

June 15, 2000

Operations Division
Technical Support Branch

Stevan Spencer, Chief Engineer
Board of Commissioners
Orleans Levee District
202 Administration Building
New Orleans Lakefront Airport
New Orleans, Louisiana 70126

Dear Mr. Spencer:

You are hereby informed that our contract (#98-C-0050) for Lake Pontchartrain, Louisiana and Vicinity, Hurricane Protection Project, High Level Plan, Orleans Parish Lakefront Levee, Orleans Marina Phase V - Sluice Gates, in Orleans Parish, Louisiana, has been completed by the United States under Public Law 298, 89th Congress, approved October 27, 1965.

A final inspection was conducted on May 18, 2000, and all contract work was found to be satisfactorily completed. In accordance with the acts of assurance furnished prior to commencement of work, Orleans Levee District becomes responsible for the operation and maintenance of completed features of the Lake Pontchartrain and Vicinity Hurricane Protection Project in Orleans Parish. In this connection, maintenance has been construed as keeping all completed works in first-class condition to serve the purpose for which they were designed.

CERTIFIED MAIL NO._____
RETURN RECEIPT REQUESTED

"I'm not sure what that means, because we don't have any state flood control works… [The] State doesn't own any flood control works."

Staff Interview with Edmond Preau, Assistant Secretary, La. Dept. of Transportation and Development, 11/17/2005, p. 92

"Who is in charge? Where's the Parish President? Where is the Mayor? And then the State?... Who is in charge? That was my view. I still have that view."

Staff Interview with Colonel Richard Wagenaar, District Engineer of the New Orleans District, Army Corps of Engineers, 11/15/2005, pp. 122-3

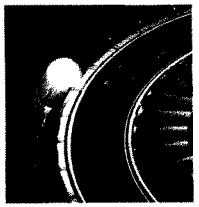
"Once in four years, you know what that is? That's going up to a workshop for a weekend and have a crawfish boil up here and hear a couple people talk about some things and they get a little piece of paper and they honored the law...."

Staff Interview with James Huey, Former President, Orleans Levee District, 11/29/2005, pp. 104-5

"They...normally meet and get some beignets and coffee in the morning and get…to the buses, and the colonel and the brass is all dressed up. You have commissioners. They have some news cameras following you around and all of this stuff. And you have your little beignets, and then you...go do the tourist and...you have a nice lunch somewhere or whatever. They have this stop-off thing or whatever. And that's what the inspections are about."

Staff Interview with James Huey, Former President, Orleans Levee District, 11/29/2005, pp.108-9

Orleans Levee District's Diverse Business Activities

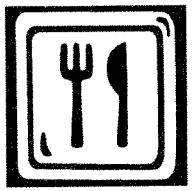


Casino

Marinas

Airport

Commercial Leases to…



Restaurants

Karate Club

Beautician School

Pharmacy

"Mr. Hearn advised that the Corps builds the levees, then turns them over to the OLD, which performs all the maintenance such as cutting grass, patching holes, repairing gates, etc."

Minutes of the Orleans Levee District Board of Commissioners Meeting, 12/19/01, p. 4

"The entire project has never been completed; therefore, it is not officially, then, turned over to the Orleans Levee District from the Corps of Engineers, to my understanding, until the entire project is complete."

Staff Interview with Max Hearn, Executive Director, Orleans Levee District, 11/14/2005, p. 16

"As sections of the project were completed, the floodwalls and levees were then turned over to the Orleans Levee District for operation and maintenance."

Max Hearn,
Hearing Statement,
12/15/2005, p. 2

COMPLETE STATEMENT OF

Richard P. Wagenaar, Colonel
Commander and District Engineer
NEW ORLEANS DISTRICT
U.S. ARMY CORPS OF ENGINEERS

DEPARTMENT OF THE ARMY

BEFORE THE

Committee on Homeland Security and Governmental Affairs

UNITED STATES SENATE

December 15, 2005

Introduction

Madam Chair and distinguished members of the Committee, I am Colonel Richard Wagenaar. I am the commander and district engineer of the U.S. Army Corps of Engineers' New Orleans District, one of 45 operating around the world. While the district is small in geographic area, it has the most civil works staff of any district in the Corps today. The primary missions of the district include operating and maintaining navigation on the Mississippi River and other navigable waterways in south Louisiana, constructing flood and storm damage reduction projects, and working with other Federal agencies and the State to restore the aquatic ecosystem of coastal Louisiana. I am honored to be testifying before your Committee today on the roles and responsibilities of the Corps of Engineers related to storm damage reduction in the metropolitan New Orleans area, and our response prior to, during, and following Hurricane Katrina.

My statement covers the following topics:

- The storm damage reduction system for the metropolitan New Orleans area;
- Responsibility for operation, maintenance, and inspection of this system; and,
- The role of the Corps of Engineers New Orleans District in responding to Hurricane Katrina.

Storm Damage Reduction Projects in Metropolitan New Orleans

In the metropolitan New Orleans area, the Corps has constructed two large storm damage reduction projects - the West Bank, Louisiana and Vicinity Hurricane Protection Project and the Lake Pontchartrain and Vicinity, Louisiana Hurricane Protection Project.

The Corps designed the West Bank project to reduce the risk of storm damage on the West Bank of the Mississippi River from storm surges coming from Lakes Cataouatche and Salvador and waterways leading to the Gulf of Mexico. It covers parts of Orleans,

Jefferson and Plaquemines Parishes and includes the Westwego to Harvey Canal (authorized by the Water Resources Development Act (WRDA) of 1986) and the Lake Cataouatche and East of Harvey Canal areas (both authorized by WRDA 1996). These components were combined in WRDA 1999 into a single project under the title West Bank, Louisiana and Vicinity. The Westwego to Harvey canal area includes 22 miles of earthen levee and 2 miles of floodwalls extending from the Harvey Canal down to the V-levee near the Jean Lafitte National Historical Park and back up to the town of Westwego. The Lake Cataouatche area eliminated the west side closure in Westwego, and added about 10 miles of levee and 2 miles of floodwalls to the project. The East of Harvey Canal area includes a sector floodgate in the Harvey Canal just below Lapalco Boulevard and about 25 miles of levee and 5 miles of floodwalls, including enlargement of the Federal levees along the Algiers Canal.

The Corps designed the Lake Pontchartrain and Vicinity Hurricane Protection Project to reduce the risk of storm damage between Lake Pontchartrain and the Mississippi River levee from storm surges coming from Lake Pontchartrain. It covers parts of St. Bernard, Orleans, Jefferson, and St. Charles Parishes. The current project consists of a levee north of Airline Highway (U.S. 61) from the Bonnet Carré Spillway East Guide Levee to the Jefferson-St. Charles Parish boundary; a floodwall along the Jefferson-St. Charles Parish line; a levee along the Jefferson Parish lakefront; a levee along the Orleans Parish lakefront; parallel protection (levees, floodwalls, and flood proofed bridges) along three outfall canals (17th Street, Orleans Avenue, and London Avenue); levees from the New Orleans lakefront to the Gulf Intracoastal Waterway (GIWW); levees along the GIWW and Mississippi River-Gulf Outlet (MR-GO); a levee around the Chalmette Area; and a mitigation dike on the west shore of Lake Pontchartrain.

Responsibility for Operation, Maintenance, and Inspection

In accordance with Title 33, Part 208.10 of the Code of Federal Regulations, operation and maintenance of these two projects is a non-Federal responsibility. For the West Bank and Vicinity project, the Louisiana Department of Transportation and Development is the non-Federal sponsor for construction and the West Jefferson Levee District is the non-Federal sponsor for operations and maintenance. West Jefferson acts as executive agent on behalf of the Transportation Department. For the Lake Pontchartrain and Vicinity project, the Lake Borgne Basin and Levee District, St. Bernard Parish, the Orleans Levee District, the East Jefferson Levee District, and the Pontchartrain Levee District are sponsors for the work in St. Bernard, Orleans, Jefferson, and St. Charles Parishes, respectively.

The levees in the New Orleans area are inspected visually on a regular basis by both the Corps and the local levee district, together and independently. Specifically, the Corps has an annual inspection with the New Orleans District Engineer and with the appropriate design engineers. The local levee districts patrol the system periodically between the annual joint inspections. The Corps also completed a joint inspection of the Orleans area with both the levee district and the State in June 2005.

The Role of the Corps of Engineers in Response to a Hurricane

The Corps of Engineers responds in three ways to natural disasters. First, we respond in support of the Federal Emergency Management Agency. We also provide engineering assistance as needed in support of the Department of Defense military forces who are responding to the disaster. Finally, we act under our own civil works mission responsibilities, which, in the area impacted by Katrina, involve principally our storm and flood damage reduction and commercial navigation missions. In all cases, our priorities are to support efforts to save lives and find people, to sustain lives through provision of water and shelter, and to set conditions for recovery, such as cleanup, and restoring infrastructure and navigation.

Support of FEMA

In support of FEMA, we are responsible for Emergency Support Function 3, one of 15 Emergency Support Functions that come together prior to and during an event that falls within the definition of an Incident of National Significance under the National Response Plan. One type of event is a "major disaster" as defined in the Robert T. Stafford Disaster Relief and Recovery Act. The President determined that Hurricane Katrina was a major disaster. Under Emergency Support Function 3, we have missions to provide ice, water, and temporary power. For these pre-scripted missions, we have standing contracts and move these capabilities forward to major mobilization sites prior to landfall. From there, we have operational support areas that are located throughout the disaster area, where commodities flow when they are needed. We also provide temporary roofing and debris removal. On an as-needed basis, we also provide technical assistance at the request of FEMA such as structural surveys or bringing water and sewage treatment plants back into operation.

Each of these missions is performed by groups of Corps of Engineers employees from around the globe who are trained and ready prior to the advent of a disaster and know that when a disaster occurs, they will be called in to respond. We have them standing in various stages of readiness.

Corps of Engineers' Inherent Mission Responsibilities

In addition to our support of the broader response that FEMA coordinates, the Corps of Engineers has its own responsibilities in flood and storm damage reduction and commercial navigation. For example, we conduct surveys of all the structures in the area, both navigation and flood and storm damage reduction, and then begin to make repairs. We are also working under our P.L. 84-99 authority with the local parishes to repair the levee systems that were damaged during the event. Under this authority, we repair structures built by the Corps, as well as non-Federally built structures that qualify for the Corps Rehabilitation and Inspection program. Following a major disaster, the Corps typically is only authorized to repair and rehabilitate those non-Federally built structures that have qualified under this program. Most of the storm damage reduction system for the metropolitan New Orleans area, including some of the features breached by Hurricane Katrina, is not Corps-owned, though much of the system originally was built by the Corps.

Actions by the District Prior to Hurricane Katrina

I took command of the New Orleans District on July 12, 2005. Prior to my arrival, the District had participated in an annual hurricane preparedness exercise conducted by our regional headquarters, the Mississippi Valley Division. The District also hosted a daylong Hurricane Preparedness Conference on July 25th in which representatives of local, state and federal emergency offices attended. Also prior to Hurricane Katrina, District emergency teams reviewed their crisis information and made preliminary plans for activation, including pre-positioning equipment and supplies.

About a week prior to landfall in Louisiana, I began monitoring the storm as it moved east of Florida. On August 24th, we monitored Hurricane Katrina's projections and I directed that a block of hotel rooms be secured in Vicksburg, Mississippi. As provided in our crisis plan, I coordinated the activation and deployment of the Crisis Management Team. On August 26th I advised my commander, Mississippi Valley Division Commander Brigadier General Robert Crear, that forecasts did not bode well for New Orleans and key decisions would be made from my Emergency Operations Center (EOC) the following day.

After an emergency meeting on August 27th, I issued an evacuation order for the New Orleans District staff under the Department of Defense Alternate Safe Haven plan, with teams deployed to alternate operations sites. I also ordered the main district office building closed for Monday, August 29th. The Crisis Management Team (CMT) established a temporary district headquarters in Vicksburg, Mississippi, the District Reconstitution Team deployed to Baton Rouge, and other emergency teams deployed to various locations with orders to be operational no later than 4 p.m. on the 28th of August.

Soon after my arrival into my district EOC on August 28th, the Division conducted a conference call to discuss and assess preparations. Immediately following the call, my Chief of Emergency Management and I visited the Orleans and Jefferson Parish EOCs and had short meetings with emergency officials. At 8 p.m., I ordered my team to the bunker. Eight district employees and I remained at the district to conduct operations in a bunker designed to withstand a Category 5 hurricane. Our goal was to monitor how the levee system was faring, talking by phone with local parish and city officials, and to provide immediate post-storm assessment to the chain of command.

Actions by the District During Hurricane Katrina

The biggest challenge both during the storm and its aftermath was communications. The Corps and all its partners have redundancies built in to provide backup. However, each time one system failed, it seemed as though everyone moved to the next redundancy and then overloaded it. Throughout the night we received numerous reports of overtopped, failing or breached levees. After a few hours sleep, I was woken up early August 29th (Monday) and was told that water was overtopping a levee or that

there was a levee failure. Many of these reports came from a local radio station. Around that time, we also received a call from a district employee who reported overtopping of the walls along the Inner Harbor Navigation Canal (IHNC). There was little that could be done to investigate at that time, since the worst of the storm was upon us. By about 11 a.m. the winds had decreased some and the weather was beginning to clear. By 2 p.m., we had moved from the bunker and re-established the Emergency Operations Center in the main district office building. Around this time is when I believe we first received a call regarding the breach at the 17th Street Canal.

Actions by the District Following Hurricane Katrina

We departed the main district office building at about 3 p.m. It was apparent as soon as we left the district that New Orleans had suffered catastrophic damage. Due to debris, water, and live electrical wires, it took us an hour-and-a-half to get to the Causeway and I-10 intersection – about three miles from the main district office building. Blocked here, we attempted to travel east to get to the canal and were stopped at the I-10/610 split where the water levels left only tree tops exposed. I didn't know the city all that well, but I knew rainwater didn't cause flooding like this. Based on the water height at that location, it was obvious that significant flooding was occurring.

We also attempted to drive to the canal from another route, but the high water, debris and strong winds kept us from getting through to inspect damage to the levee. We made our way back to the main district office building in the early evening. It was around this time that we heard media reports about how the city had "dodged a bullet," but it was clear to us that conditions were very bad. Soon after this, I submitted a situation report to my Division commander. Due to the extreme conditions outside, we put together a security and escape plan. We continued our attempts to communicate with district teams and local officials. We had difficulty calling out, but people could call us intermittently. Sometime that evening, Rudy St. Germaine, engineer for the New Orleans Sewage and Water Board, joined us. We managed to request a helicopter and last we heard, it was supposed to arrive the next day at 7:30 a.m. We hunkered down for the night.

Immediately the following morning, August 30th, I dispatched two people to the 17th Street Canal who commandeered a boat to inspect the canal. The helicopter arrived at 9:15 a.m. and Mr. St. Germaine and I were able to view the city from above shortly afterwards. I saw the breach at the 17th Street Canal, and then we flew over toward the east side of the city. The bridge spans on Interstate 10 were knocked off their foundations or gone completely. Devastation was widespread, but it was in the Six Flags area in New Orleans East that I first saw hundreds, if not thousands of people on their roofs, waiting to be rescued. When we flew over the Inner Harbor Navigation Canal, we found three breaches. It was at this time that we determined that water was actually draining out of the Lower 9th Ward area, and not into the neighborhood area. After completing an over-flight of the rest of the city, I returned to the main district office building at approximately 2:30 p.m. and attempted to call the CMT in Vicksburg to initiate coordination. At that time I also found two district construction representatives in

my EOC that reported in voluntarily. We immediately put together a plan to initiate operations on the 17th Street Canal in conjunction with the West Jefferson Levee District. Throughout the rest of the day and evening, with intermittent communications, we worked a plan to repair the breach on the canal. The Crisis Management Team in Vicksburg immediately began orchestrating the necessary resources and materials to stem the flow of water. With verbal authorization, Corps contractors responded. Normal transportation routes were impassible, complicating even small tasks. The security, transportation, communication and living conditions at this point were marginal at best. We were working 24 hours a day at this point.

By August 31st, the Corps had begun marshalling resources – contractors, materials, and equipment were arriving at the 17th Street Canal site. By that afternoon, ten large sandbags were dropped into the breach in our first attempt to close the breach. The activities at the site were chaotic as three to four different operations were being executed with multiple agencies involved.

By September 1st, contractors had begun delivering sand, gravel and large rock to areas on the 17th Street Canal, where an access road was being built to reach the breach. Deliveries were also being made to the sandbag staging area in the vicinity of the Coast Guard station where thousands of two- to five-ton sandbags were being prepared.

The next step at the 17th Street Canal, and later the London Avenue Canal, was to cut off flow from Lake Pontchartrain. Contractors drove 150 feet of steel piling across the canal to seal it. Meanwhile, Army Chinook and Black Hawk helicopter crews began placing 7,000-pound sandbags – an average of 600 bags each day – into the breaches. One breach took over 2,000 sandbags before engineers could see the bags under the water surface.

Sandbagging operations ran 24 hours for 10 days, with riggers averaging one to three hookups every two minutes during daylight hours. We stockpiled 1500 bags and even more rock to address future repairs. Crane barges were also used to place sandbags, stone and gravel, especially along breaches on the IHNC, where ground access was non-existent. Expedient repairs were made to two breaches there.

A week to the day after Katrina, the 17th Street Canal breach was closed. For the next week, which included a rescue of one of our employees, I was involved in the formation of Task Force Unwatering under the command of Colonel Duane Gapinski and accompanied the President during his visit. By September 8th, I had turned my attention to the reconstitution of the New Orleans District. Many of our employees in the New Orleans District lost their homes and belongings, the same as their friends and neighbors, but returned to the main district office building to work and to help ensure that their fellow citizens were able to begin the recovery and rebuilding process. I am immensely proud of them for their sense of duty and their selfless service.

This concludes my statement. Again, I appreciate the opportunity to testify today. I would be pleased to answer any questions you may have.

STATEMENT BY JAMES P. HUEY
Former President of the Board of Commissioners
of the Orleans Levee District

UNITED STATES SENATE
Committee on
Homeland Security and Governmental Affairs

Committee Hearing December 15, 2005
"Hurricane Katrina: Who's In Charge of the New Orleans Levees?"

****

My name is James P. Huey and I am the former President of the Board of Commissioners of the Orleans Levee District, having served as the Board's President from June of 1996 until October, 2005.

I appreciate the opportunity this committee has afforded me to testify here today. I want to take this opportunity to thank your staff and the delegation investigating this very important segment of the flood control system. They have conducted themselves in a very professional manner and have been sensitive and courteous in gathering the information and facts that will be crucial to this committee in identifying any weakness and/or problems that may have contributed to the disaster that Hurricane Katrina created for the City of New Orleans and the surrounding Parishes.

I completely understand the importance of providing this information in a

truthful and factual manner, so that this committee will have the best information possible. This is the only way to assure that our community will be provided with the appropriate flood control system to protect their property and lives.

In order for our community to rebuild and recover from this catastrophic event our people must have the confidence that the proper solutions will be formulated and that the errors identified are corrected. This can only be accomplished if we all tell the truth and provide the facts regardless of our personal and/or self interest. It is with this spirit and understanding that I will testify today.

I appear before this Committee with a sense of the deepest sadness in the wake of the greatest natural catastrophe in American history - Hurricane Katrina. Hurricane Katrina virtually destroyed the great City of New Orleans, where I was raised, grew up and have made my home since boyhood. This Hurricane affected me personally - I have been displaced from my home and witnessed catastrophic destruction to the city that is my home. This Hurricane also resulted in my resignation as President of the Board in late October under criticism primarily for actions taken by me immediately after the storm. I am not hear to defend those actions or take up this Committee's valuable time

debating those issues, because they do not concern the important issue and enormous challenge being addressed by this Committee - understanding how the recent catastrophe caused by the flooding of the City of New Orleans can be avoided in the future.

I also do not appear here as an advocate for any particular cause or view point; the issues are of such gravity and stretch beyond the realm of personal or partisan interest. I hope, therefore, that you will receive what I say as solely the expression of a concerned citizen with one purpose in mind - to assist you in your awesome responsibility of formulating policies for the flood protection of one of the greatest cities in our country. And it is at the level of the Congress of the United States that these issues need to be debated and policy decisions made, because flood protection for the City of New Orleans and the Lake Pontchartrain vicinity has been the product of national legislation since enactment of the Flood Contract Act of 1965.

In your letter to me dated on December 7, 2005, you stated that the focus of this hearing would be on the roles and responsibilities of the federal, state and local government entities for the design, construction, operation and maintenance, and inspection of the levees, and the preparation for, and response to, levee emergencies in metropolitan New Orleans. You also stated

in this letter that I would be asked to testify concerning my experiences as President of the Orleans Levee Board, particularly with respect to the Orleans Levee District's operation and maintenance procedures and policies, inspection of the levees, and also the financial resources available and used to meet the Levee District's primary mission of protecting the lives and property of the citizens of Orleans Parish by constructing, operating and maintaining the levees within the District's jurisdiction. I will do my very best to share with you my understanding of these matters and my experience as a Commissioner and as President of the Orleans Levee Board on how these matters were addressed and dealt with by the Orleans Levee Board and District.

The flood walls and levees that failed during the impact of Hurricane Katrina on the City of New Orleans were constructed by the USCAE as part of the Lake Pontchartrain and Vicinity High Level Plan. When I was appointed to the Levee Board as a Commissioner in 1992, the Board was actively pursuing the commencement of the construction of parallel protection for the London Avenue, Orleans Avenue and 17th Street canals. The role and responsibilities of the Orleans Levee District for this project was to act as local sponsor and as such provide certain assurances for this project to the Corps in consideration of the Corps constructing the project. These assurances by the Board, as

local sponsor, were set forth in a number of agreements between the Board and the United States of America, by and through the Corps of Engineers, dating back to July of 1966. The responsibilities and obligations of the Board, as the authorized local governmental body to enter into these agreements under Louisiana law, were set forth in detail in these agreements. These obligations of the Board as local sponsor, referred to as "assurances" in these agreements, consisted of the following:

- To provide all lands, easements, and rights-of-ways, including borrow and spoil disposal areas necessary for construction, operation and maintenance of the project;
- To accomplish all necessary alterations and relocations to roads, railroads, pipelines, cables, wharves, drainage structures, and other facilities required for the construction of the project;
- To hold and save the United States free from damages due to the construction works;
- To provide 30 percent of the cost for the project through cash contributions in a lump sum, or in installments paid at least annually, in proportion to the federal appropriation for the project, in accordance with the construction schedules as required by the

Chief of Engineers of the USACE; or, as a substitute for any part of the cash contribution, to accomplish, in accordance with approved construction schedules, items of work of equivalent value as determined by the Chief of Engineers;

- To provide all interior drainage and pumping plants required for reclamation and development of the protected areas;
- To maintain and operate after completion of a project all features of the project in accordance with regulations prescribed by the Corps;
- To acquire adequate easements or other interest in land to prevent encroachment on existing ponding areas, unless substitute storage capacity or equivalent pumping capacity if provided promptly; and,
- To comply with all applicable provisions of federal law relating to the project, including the Flood Control Act, Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 and the Civil Rights Act of 1964.

In connection with the local cost share for these project, including the flood walls for parallel protection on the London Avenue and 17th Street

canals, the Levee District was authorized to identify and select engineering consultant firms to participate in the work on the parallel protection plan and provide services in accordance with the requirements of the Corps. The payments made by the Levee District to these consultants were an "in kind" contribution and credit on the 30% local sponsor contribution. The Levee District did secure the services of engineering firms for the design phases of these projects and their work was subject to the review and approval of the Corps. After the Corps approved the engineering work for the projects, the Corps then entered into contracts for the construction of the projects with local contractors.

These were the responsibilities and duties of the Orleans Levee District in connection with the design and construction of the flood walls on the outfall canals that failed as a result of the impact of Hurricane Katrina. As set forth in the assurances, after these projects were completed, the Orleans Levee District's personnel maintained and inspected these projects consisting of 27.8 miles of Inner levees and flood walls in the city of New Orleans. In addition, the District maintained and inspected some 73.4 miles of Frontline levees on Lake Pontchartrain, and 27.5 miles of Mississippi River levees and flood walls protecting the citizens of the City of New Orleans. In total, the District

maintains and inspects a total of some 128 miles of levees, including 203 floodgates and 102 valves. As required under the assurances, the operation and maintenance of these levees is in accordance with the regulations prescribed by the USACE.

During my tenure as a Commissioner on the Orleans Levee Board, I can tell you that we worked closely with the Corps' district office in New Orleans and had an open and solid working relationship with the Corps. Prior to my election as President of the Board, I served as the Chairman of the Board's Engineering Committee, and as such I was personally familiar with the parallel protection plan authorized and constructed by the Corps. This Committee met monthly and a Corps representative updated the District on the status of the work at each monthly committee meeting. Also, after my election as President, Corps representatives each month attended committee meetings of the Board and briefed the committees on the status of projects as well as future projects necessary to complete the Lake Pontchartrain and Vicinity Hurricane Protection Plan. I can also inform you that to my knowledge there were no complaints by the Corps about the inspection and maintenance of the flood protection system by the Orleans Levee District. In addition, the recent reports that the system was only inspected bi-annually and only in a cursory

manner by Levee District and Corps representatives are inaccurate and unfounded. As will be discussed by the Executive Director of the District, inspection of the flood control system was a daily function of the operations and maintenance departments of the Levee District. The Executive Director of the Levee District, Mr. Max L. Hearn, well knows the procedures followed since he served as the Director of Operations and Maintenance until his promotion to Executive Director in 1997. The maintenance and inspection of the levee system was also conducted under the supervision of the Orleans Levee District's Engineering Department. The District has a Chief Engineer, Assistant Chief Engineer and staff that report to the Board each month at committee and board meetings. Furthermore, while I was President over the past 9 years, I was available on a daily basis to discuss any needs or concerns of the Levee District's staff, especially any related to flood control.

In sum, after serving for 13 years on the Orleans Levee Board, I can earnestly tell you that it was my understanding that the primary responsibility for design and construction of the flood protection system for the City of New Orleans rested with the USACE. The Orleans Levee District did not unilaterally initiate flood control projects, which were subject to the direction and control of the USACE. I do not say this to in any way cast blame for the

recent catastrophe on the Corps. I say this because this is how things were, this was the reality when I was appointed and throughout my tenure on the Board. There are good reasons why this was the case. The scope and cost of these projects is far beyond the financial capability of local governmental agencies. Simply put, flood protection is a national obligation beyond the capacity of state and local governments. The local governmental entities have obligations as reflected in the assurances to be provided for the projects; and, the Orleans Levee District provided these assurances for completion of these projects by the Corps. After completion of these projects by the Corps, the Orleans Levee District operated, maintained and inspected these flood protection projects in accordance with the regulations of the Corps.

During the time I served on the Board, the Levee District also had a Legal Department that attended to all of the legal questions confronted by the District, including the Board's obligations under federal and state laws relating to flood control. While a member of the Board, I cannot recall one instance when we were advised either by our in-house counsel or through outside complaints brought to our attention that the Board was not fulfilling its legal obligations regarding any aspect of the operation, maintenance or inspection of the flood control system that protected the lives and property of the citizens of the City of New Orleans.

I appreciate the opportunity to make this statement and will do my best to answer any of your questions.

STATEMENT

Max L. Hearn, Executive Director, Orleans Levee District
New Orleans, Louisiana

December 13, 2005

I. Introduction

Senator Collins, Senator Lieberman, Committee Members, thank you for inviting me to participate in these hearings.

I am Max Hearn, the Executive Director for the Orleans Levee District. I am a resident of Jefferson Parish, just outside of the City of New Orleans, and live there with my family. My home is within the area protected by the flood control structures, and we were impacted, along with our neighbors, by Hurricane Katrina and the aftermath. Consequently, both in my capacity as the Director of the Levee District, and as a husband and home-owner, I welcome this Senate investigation. We citizens of Louisiana and residents of New Orleans share your concerns regarding the integrity of the flood control structures that protect our City, our homes and families. We also share your goal to determine what went wrong and to take preventative measures to ensure that the loss of life and devastation to property never recurs in New Orleans or in any other community protected by the Lake Pontchartrain and Vicinity Hurricane Protection system.

I served in the United States Air Force from 1959 until my retirement from active duty in 1989, after attaining the rank of Colonel. Beginning in 1989, I was employed as the Director of Operations and Maintenance for the Orleans Levee District. I became the Executive Director of the Levee District in 1997 and serve in that capacity today. In these capacities, I am very familiar with the relationships among the various governmental entities involved with the flood control systems and the operation and maintenance of these systems.

II. Responsibilities of Federal, State and Local Governmental Entities

New Orleans lies an average of six feet below sea level. The City is surrounded by water, wetlands and marsh, and is threatened by the Mississippi River, Lake Pontchartrain, and the Gulf of Mexico. Consequently, flood protection is essential for the City.

As I appreciate the Flood Control Act of 1928, the federal government, through the United States Army Corps of Engineers, assumed primary responsibility for national flood control systems. As such, the Corps determined where levees or other flood control structures were needed, established the criteria for the design and construction of the levees, then assigned the operation and maintenance responsibilities for the levees over to local governmental bodies, like the Levee District.

The Levee District was created by the Louisiana Legislature as the state governmental entity charged to coordinate and cooperate with the federal government with respect to flood control structures built under the National Flood Control Act. The District's jurisdiction includes 73 miles of front-line levees, 28 miles of inner levees and flood walls, 28 miles of Mississippi River levees, 203 floodgates, 102 valves and two flood control structures.

Following Hurricane Betsy in 1965 which caused extensive flooding in New Orleans, the Corps of Engineers has worked with the Levee Districts in the region to design and build upgrades to the flood protection system. The flood walls for the New Orleans outfall canals which are the focus of this Committee's attention, are part of the Corps of Engineer's Lake Pontchartrain and Vicinity Hurricane Protection Plan. The designs for these flood walls were approved by the Corps and construction was commenced in the late 1980's. As sections of the project were completed, the flood walls and levees were then turned over to the Orleans Levee District for operation and maintenance.

The Levee District's operation and maintenance procedures are conducted in accordance with federal regulations and under the oversight of the Corps. In fact, the Levee District was required to enter into contracts with the federal government assuring that the operation and maintenance of the levees constructed under the federal Flood Control Act would comply with federal regulations and Corps of Engineer guidelines. These regulations and guidelines set forth specific inspection, operation and maintenance procedures.

III. Orleans Levee District Inspection, Operation, and Maintenance

The Levee District maintenance supervisors conduct major inspections prior to the beginning of the hurricane flood season and during high water events. Additionally, at regular intervals of at least a monthly basis, District work crews and supervisors, in conjunction with regularly scheduled maintenance, observe the levee system and flood control structures within the District's jurisdiction.

During any inspection of the levees and flood walls, the District employees check for any levee problems including unusual subsidence, encroachments by trees, shrubs, or private structures, animal burrows, seepage, sand boils, leaks, caving, erosion, slides or sloughs, and for flood wall problems including accumulated trash or debris, and cracked, unstable, or mis-aligned flood walls. Levee District employees are trained to report any problems observed during their routine maintenance activities to their supervisors for corrective action.

The Corps conducts annual inspections of the flood control structures within the Orleans Levee District's jurisdiction and grades the Levee District on compliance. During my tenure as the Executive Director of the Levee District, the Corps has always evaluated the District's compliance level as "Outstanding."

The District operate the gates, valves and other flood control structures as appropriate for various high water and storm events.

IV. Pre-Hurricane Preparedness

In preparation for the approach of Hurricane Katrina, the Levee District instituted its emergency operations plan. This included activation of the Emergency Operations Center, located at the Lakefront Airport Administration Building, and mustering of the Emergency Maintenance Crews. Additionally, the District assured that sufficient food, water, fuel, sand bags, trucks and equipment were on hand for emergency response.

Prior to Katrina's impact, Levee District employees closed all of the hurricane protection floodgates and valves along with thirteen floodgates on the

Mississippi River. As the Hurricane approached, and as water levels began to rise, District employees monitored the water levels and patrolled the flood control system. As weather conditions deteriorated and became unsafe, the District's employees were pulled into sheltered areas to ride out the storm.

V. Post-Hurricane Response

During the storm, 60 Levee District employees were staged at the Franklin facility, and 19 were at the Emergency Operation Center. Additionally, 43 Levee District Police officers were stationed at various locations. At the height of the storm, one of the walls of the Airport Administration Building blew out and the lower floor eventually flooded to a depth of about four feet. Additionally, one of the buildings used as a staging facility for the Emergency Maintenance Crews was damaged during the storm.

On the morning of August 30th conditions had abated such that field inspections were possible. District employees immediately inspected the flood control structures that were accessible, and coordinated with the Corps of Engineers, the Louisiana Department of Transportation and Development, and the East and West Jefferson Levee Districts to respond to the 17th Street Canal breach.

The 17th Street Canal breach was inaccessible to our land-based equipment due to flooding. Beginning August 30th, and using sand bags and equipment staged by the Orleans Levee District, United States Army personnel began airlifting sandbags to close the breach. On August 31st, the Department of Transportation and Development began construction of a road to the breach so that land-based, repair operations could be conducted.

The Levee district was requested by the Corps to close the London Avenue Canal mouth. The closure was completed on September 2, 2005.

This concludes my formal statement, and I'll entertain questions at this time.

Max Hearn
December 13, 2005

American Society of Civil Engineers

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Hurricane Katrina: Who's In Charge of the New Orleans Levees?

Statement of

The American Society of Civil Engineers

Before the

Committee on Homeland Security and Governmental Affairs

U.S. Senate

December 15, 2005

Hurricane Katrina: Who's In Charge of the New Orleans Levees?

Statement of
The American Society of Civil Engineers
Before the
Committee on Homeland Security and Governmental Affairs
U.S. Senate
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Madame Chairman and Members of the Committee:

The American Society of Civil Engineers (ASCE) is pleased to offer this statement for the record of the hearing on *Hurricane Katrina: Who's In Charge of the New Orleans Levees?* ASCE commends the Committee for continuing its important work on the disaster that struck New Orleans in August 2005 and its consequences.

Background

The history surrounding Hurricane Katrina and the New Orleans levees is well known to this Committee. We will summarize the main issues briefly.

Hurricane Katrina was a catastrophic storm that made landfall in the Gulf Coast near the Louisiana and Mississippi border on the morning of August 29, 2005, with wind speeds near 150 miles per hour. But the damage in New Orleans due to the high winds and rain paled in comparison to the devastation resulting from the flooding.

The hurricane produced a storm surge that varied considerably depending on location, including the combined effects of orientation, geography, and topography with respect to the forces of the passing storm. Hydraulic modeling of the surge, verified by the most part by field observations of high water marks, show that essentially two significantly different levels of storm surge impacted the levee system.

ASCE's Levee Assessment Team found that, where the storm surge was most severe, causing massive overtopping, the levees experienced a range of damage from complete obliteration to intact with no signs of distress. Much of the difference in the degree of damage can be attributed to the types of levees and the materials used in their construction. The majority of the most heavily damaged or destroyed earthen levees that we inspected were constructed of sand or "shell fill," which was easily eroded.

At some of these locations the earthen embankments were simply gone. Those with embedded sheetpiles faired only marginally better and were often breached as well.

Further inland, in the western portion of the Mississippi River Gulf Outlet (MRGO) and along the Inner Harbor Navigation Canal, the degree of overtopping was less severe but again resulted in a number of breaches.

Many of these breaches occurred through I-wall structures that were severely scoured on the landside as a result of overtopping. These scour trenches undermined the support of the levee floodwalls and reduced the ability of the walls to withstand the forces of the water on their outer surfaces. Localized concentrations of overtopping water flow or possible localized weaker soils may have been responsible for why certain portions of the system were breached while others remained intact.

Another commonly observed problem was the frequent presence of "transitions" between different sections of the levees. There were a number of different types of these transitions that appeared to have caused problems, including inconsistent crest heights, change in levee type (I-wall vs. T-wall), change in material (concrete, steel sheetpile, earth), and transitions where certain rights-of-way resulted in penetrations of the flood control system.

Defense Secretary Donald H. Rumsfeld announced in October the creation of an independent panel of national experts under the direction of the National Academies of Science to evaluate the performance of hurricane protection systems in New Orleans and the surrounding areas.

Under the National Academies, the National Research Council will assemble a multi-disciplinary, independent panel of acknowledged national and international experts from the public and private sectors and academia. This panel will perform a high-level review and issue a final set of findings based primarily on the data gathered by another organization, the Interagency Performance Evaluation Task Force (IPET).

The IPET will include a broad interagency participation, private sector and academic expertise. The IPET is to obtain the facts by collecting, analyzing, testing, and modeling data and information on the performance of the New Orleans hurricane protection system during Hurricane Katrina.

Secretary Rumsfeld also authorized ASCE to convene an external review panel to conduct continuing expert peer review of the work performed by the IPET. The ASCE external review panel will also report findings directly to the National Research Council.

Who's in Charge of the New Orleans Levees?

Although the original levee system was built in the 19th century, the modern system was designed in the late 1950s by the U.S. Army Corps of Engineers. Today, the main stem levee system, comprised of levees, floodwalls, and various control structures, is 2,203 miles long. Approximately 1,607 miles lie along the Mississippi River itself and 596 miles lie along the south banks of the Arkansas and Red rivers and in the Atchafalaya Basin.

The levee system in and around New Orleans is composed of two separate arrangements: the Mississippi River Levees (MRL) and the Lake Pontchartrain and Vicinity Hurricane Protection Levees (LPV). Significantly, the MRL is designed to protect from river flooding and it is an entirely federal project under the control of the Mississippi River Commission. The LPV provides storm surge protection and is subject to a multitude of local levee boards. Also, the design criteria for the MRL are the Maximum Probable Flood, a very high standard, whereas the LPV is designed for the Standard Project Hurricane, which is roughly a Category 3 hurricane. Katrina came ashore as a Category 4 storm, and we are suffering the consequences.

The levees are constructed by the federal government and are maintained by local interests, except for government assistance as necessary during major floods. Periodic inspections of maintenance are made by the U.S. Army Corps of Engineers and local levee and drainage districts.

The Louisiana levee system has evolved over many generations, with projects being constructed by the Corps of Engineers under local sponsorship. Each parish (county) has a levee district, a political subdivision of the state "organized for the purpose [,] and charged with the duty [,] of constructing and maintaining levees, ..." LA. REV. STAT. ANN. § 281 (WEST 2005). Acting under state law, many local jurisdictions in Louisiana have constructed their own levees outside the federal framework.

The state's levee system itself is founded in the Louisiana Constitution. The Constitution created local levee and drainage districts (with taxing authority over property in the district's flood-prone areas) to build and maintain levees.

> For the purpose of constructing and maintaining levees, levee drainage, flood protection, hurricane flood protection, and for all other purposes incidental thereto, the governing authority of a levee district may levy annually a tax not to exceed five mills, except the Board of Levee Commissioners of the Orleans Levee District which may levy annually a tax not to exceed two and one-half mills, on the dollar of the assessed valuation of all taxable property situated within the alluvial portions of the district subject to overflow.

LA. CONST. ART. 6, § 39 (1974).

ASCE and the NSF found that, where levees were overtopped, the weaker material at the point of transition (i.e., earth to concrete, sheetpile to concrete, earth to sheetpile) would be more susceptible to failure. Many of the problems appeared to have been related to transition details and were often exacerbated by inconsistent crest heights, particularly where the weaker material had the lower height. Many of these transitions were found at sections where infrastructure elements designed and maintained by multiple authorities; where their multiple protection elements came together, the weakest (or lowest) segment or element controlled the overall performance. The American Society of Civil Engineers and the National Science Foundation, *Preliminary Report on the Performance of the New Orleans Levee Systems in Hurricane Katrina on August 29, 2005* (Nov. 2, 2005).

This finding was confirmed recently by the Corps' own investigators.

> A common problem observed throughout the flood protection system was the scour and washout found at the transition between structural features and earthen levees. In some cases, the structural features were at a higher elevation than the connecting earthen levee, resulting in scour and washout of the levee at the end of the structural feature. *At these sites, it appears the dissimilar geometry concentrated the flow of water at the intersection of the levee with the structural feature, causing turbulence that resulted in the erosion of the weaker levee soil.* A practical approach to integrating protection in these transitions would reduce vulnerability of failure in the future.

Interagency Performance Evaluation Task Force, *Summary of Field Observations Relevant to Flood Protection in New Orleans, LA* 6-7 (Dec. 5, 2005) (emphasis added).[1]

The short answer to the question raised by this Committee is, everyone—and no one—is in charge of the New Orleans levee system. The duties and responsibilities of building and maintaining the city's levees are dispersed over a host of federal, state, and local authorities.

Policy Considerations for the Future

The results are clear: New Orleans has not been flooded from the river for almost 100 years. New Orleans sustained widespread flooding in 1965 (Betsy) and 2005 (Katrina) from hurricane storm surges. These project distinctions and the results of the hurricanes bolster the need to federalize the management of all levees and to raise the standard of protection.

Federal and state lawmakers must arrive at a consensus for the future that emphasizes the creation of an overarching state levee authority with the sole power to regulate, authorize, design, build, and maintain Louisiana's levee system. Because the federal government has invested heavily in the levee building program, the Corps of Engineers, accountable to the President and Congress, must have real and sweeping supervisory powers over the state levee program, including the power to veto a state or local project, to ensure that the levees are located, built, and maintained in the national interest.

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[1] These "transitions" between different sections of levees and "inconsistent crest heights" need further explanation. In some cases these transitions are appropriate. Every engineer working in South Louisiana has to carefully consider settlement. For large structures the long-term settlement due to consolidation of underlying soils can be significant. An earthen levee is soil-supported and can be easily "dressed" to regain design height after 10 or 20 years. But structures such as gates and pumping stations cannot be easily raised. Thus, structures are designed in year zero to have additional height so that they will settle to the design height in year 50 or more, depending on the design life of the project. Levees are constructed with additional height for short-term settlement only. Soil-supported earthen levees have a significant load and will settle much more than a pile-supported structure. Geotechnical and life-cycle cost analyses are used to determine the best initial height and a maintenance plan to "dress" the levees periodically during their design life. Thus, it is not uncommon to see structures and levees adjacent and in the same hurricane protection system with different crest heights. Obviously, the transitions need to be more carefully controlled, but they are not, as some think, errors in design.

In the short term, Congress must enact a "National Levee Safety Program." This program would be modeled on the highly successful National Dam Safety Program.

At a minimum, the levee safety legislation must include requirements for (1) regular safety inspections, possibly every five or 10 years, for all levee systems in the United States; (2) a national inventory of levees built, funded, or maintained by any federal government, state, or local agency or levee district; (3) a national levee safety review board, which will have the power to monitor the implementation of the levee safety program; and (4) an interagency committee on levee safety composed of federal executive branch heads to oversee levee safety programs.

We believe the levee safety program must be designed and carried out to ensure that new and existing levees are safe by encouraging the development of technologically and economically feasible programs and procedures for hazard reduction relating to levees; to support acceptable engineering policies and procedures to be used for levee site investigation, design, construction, operation and maintenance, and emergency preparedness; to promote the establishment and implementation of effective levee safety programs in every state based on state standards; to develop and support public education projects to increase public acceptance and support of state levee safety programs; to develop technical assistance materials for federal and state levee safety programs; to develop methods of providing technical assistance relating to levee safety to non-federal entities; and to develop technical assistance materials, seminars, and guidelines to improve the security of levees in the United States.

# # #

United States Government Accountability Office

GAO

Testimony
Before the Committee on Homeland Security and Governmental Affairs, U.S. Senate

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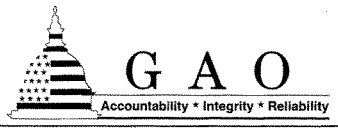
HURRICANE PROTECTION

Statutory and Regulatory Framework for Levee Maintenance and Emergency Response for the Lake Pontchartrain Project

Statement for the Record by Anu K. Mittal, Director
Natural Resources and Environment



GAO-06-322T

December 15, 2005

GAO
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Highlights

Highlights of GAO-06-322T, a statement for the record to the Committee on Homeland Security and Governmental Affairs, U.S. Senate

HURRICANE PROTECTION

Statutory and Regulatory Framework for Levee Maintenance and Emergency Response for the Lake Pontchartrain Project

Why GAO Did This Study

The greatest natural threat posed to the New Orleans area is from hurricane-induced storm surges, waves, and rainfalls. To protect the area from this threat, the U.S. Army Corps of Engineers (Corps) was authorized by Congress in 1965 to design and construct a system of levees as part of the Lake Pontchartrain and Vicinity, Louisiana Hurricane Protection Project. Although federally authorized, the project was a joint federal, state, and local effort. For the levees in the project, the Corps was responsible for design and construction, with the federal government paying 70 percent of the costs and state and local interests paying 30 percent.

As requested, GAO is providing information on the (1) level of protection authorized by Congress for the Lake Pontchartrain project; (2) authorities, roles, and responsibilities of the Corps and local sponsors with respect to the operation, maintenance, repair, replacement, and rehabilitation of the levees; (3) procedures in place to ensure that responsible parties maintain the levees in accordance with the authorized protection level; (4) authorities, roles, and responsibilities of the Corps and local parties when levees fail or are damaged; and (5) plans, capabilities, and activities that have been developed by the Corps to ensure an adequate emergency response when levees fail.

GAO is not making any recommendations at this time.

www.gao.gov/cgi-bin/getrpt?GAO-06-322T.

To view the full product, including the scope and methodology, click on the link above. For more information, contact Anu K. Mittal at (202) 512-3841 or mittala@gao.gov.

What GAO Found

Congress authorized the Lake Pontchartrain project to protect the New Orleans area from flooding caused by storm surge or rainfall associated with a hurricane that had the chance of occurring once in 200 years. This was termed as the "standard project hurricane" and represented the most severe combination of meteorological conditions considered reasonable for the region. As hurricanes are currently characterized, the Corps' standard project hurricane approximately equals a fast-moving category 3 hurricane, according to the Corps.

Agreements between the Corps and four New Orleans levee districts—the local sponsors for the Lake Pontchartrain project—specify that the local sponsors are responsible for operation, maintenance, repair, replacement, and rehabilitation of the levees after construction of the project, or a project unit, is complete. Pre-Katrina, according to the Corps, most of the levees included in the Lake Pontchartrain project had been completed and turned over to the local sponsors for operations and maintenance. The Corps has authority to repair or rehabilitate completed flood control projects if (1) deficiencies are related to the original construction or (2) damage is caused by a flood and the project is active in the Corps' Rehabilitation Inspection Program. According to internal Corps regulations, federal funds cannot be used for regular operations and maintenance activities.

Both local sponsors and the Corps are required to conduct regular inspections to ensure that levees are properly maintained. If the Corps finds that local sponsors are not properly maintaining the levees, internal Corps regulations outline a series of steps, such as notifying the governor or taking legal action, that the Corps can take to bring the local sponsor in to compliance. Corps inspection reports for 2001-2004 indicate that the completed portions of the Lake Pontchartrain project were maintained at an acceptable level.

When levees fail or are damaged, the Corps has authority to provide a variety of emergency response actions. Specifically, the Corps is authorized to undertake emergency operations and rehabilitation activities and, if tasked by the Federal Emergency Management Agency, to provide disaster response, recovery, and mitigation assistance to state and local governments, as needed. In addition, a Department of Defense manual assigns responsibilities, prescribes procedures, and provides guidance for responding to hazards. State and local roles and responsibilities when levees fail are similar to the Corps' responsibilities and are described in federal regulations.

The Corps is authorized to prepare for emergency response when levees fail by undertaking disaster preparedness, advance measures, and hazard mitigation activities. The Corps' New Orleans district has developed an all hazards emergency response plan for the New Orleans area.

Madam Chairman and Members of the Committee:

As you requested, this statement discusses the legislative and statutory framework governing levee maintenance and emergency response activities for the Lake Pontchartrain and Vicinity, Louisiana Hurricane Protection Project. This project, first authorized in 1965, is a joint federal, state, and local effort designed to protect the lowlands in the Lake Pontchartrain tidal basin within the greater New Orleans area from flooding by hurricane-induced sea surges and rainfall. As you know, the effects of Hurricane Katrina breached some of the approximately 125 miles of levees that are part of this project and flooded a large part of New Orleans. The breaches raised numerous questions about the design, construction, operation, and maintenance of the project levees and flood walls. In addition, the human suffering and loss of life resulting from Hurricane Katrina raised questions about the emergency response activities taken before, during, and after the flooding.

For this statement, we did not assess the extent to which the U.S. Army Corps of Engineers (Corps) and local sponsors have complied with the legislative and regulatory requirements. Some aspects of these assessments will be part of our larger ongoing review of the federal response to the Hurricane Katrina disaster, including the levees, which we plan to report on in 2006. Specifically, this statement discusses the (1) level of protection authorized by Congress for the Lake Pontchartrain project; (2) authorities, roles, and responsibilities of the Corps and local sponsors with respect to the operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) of the levees; (3) procedures required to ensure that responsible parties maintain the levees in accordance with the protection level authorized by Congress; (4) authorities, roles, and responsibilities of the Corps and local parties when levees fail or are damaged; and (5) plans, capabilities, and activities that have been developed by the Corps to ensure an adequate emergency response when levees fail. To conduct this work, we obtained and reviewed applicable laws, regulations, guidance, intergovernmental agreements, and other documents. We interviewed Corps personnel from headquarters, the Mississippi Valley Division, and the New Orleans District to obtain their perspectives on these issues. We performed the work reflected in this statement between October and December 2005 in accordance with generally accepted government auditing standards.

In summary:

- The Lake Pontchartrain project was authorized in 1965 to protect New Orleans and the surrounding area from flooding associated with a "standard project hurricane." A standard project hurricane was expected to occur once in 200 years and represented the most severe combination of meteorological conditions considered characteristic for the region. When Congress authorized the Lake Pontchartrain project, the current Saffir-Simpson Scale used by the National Weather Service to categorize hurricanes by intensity did not exist. According to the Corps, a standard project hurricane is roughly equivalent to a fast-moving category 3 hurricane on the Saffir-Simpson Scale.

- Agreements between the Corps and local sponsors of the Lake Pontchartrain project specify that, when a project unit is complete, it will be turned over to the local sponsors for operation, maintenance, repair, replacement, and rehabilitation. According to the Corps, prior to Katrina, all but three sections of the project that make up the Lake Pontchartrain project had been completed and turned over to the local sponsors for operation and maintenance.

- The Corps has the authority to repair or rehabilitate a flood control project if (1) deficiencies are identified that are the result of the original construction or (2) damage occurred from a flood and the project is active in the Corps' Rehabilitation Inspection Program. The Lake Pontchartrain project was active in the Rehabilitation Inspection Program prior to Hurricane Katrina.

- Corps district and division employees are to oversee the OMRR&R activities of the local sponsors through annual inspections. If, in the course of these oversight activities, the Corps finds that a local sponsor is not properly maintaining the levees, Corps regulations outline a series of steps that the Corps can take to bring the local sponsor back into compliance. These steps include notifying the local sponsor or state governor, or initiating legal action against the local sponsor if other steps do not result in compliance. Based on Corps inspection reports from 2001 through 2004, all completed project units of the Lake Pontchartrain project were inspected annually and considered in acceptable condition.

- In the event that levees fail or are damaged, the Corps has authority to provide a variety of emergency response actions. These actions include emergency operations, such as providing personnel and materials needed for flood fighting, and rehabilitation of damaged levees.

- The Corps is also authorized to take actions in advance of disasters to ensure an adequate emergency response if levees fail. These actions are (1) disaster preparedness, including developing emergency response plans and training personnel to respond to emergencies; (2) advance measures, including providing supplies, equipment, and contracting for the construction of temporary and permanent flood control projects; and (3) hazard mitigation activities, which are intended to help prevent or reduce the possibility of a disaster, or reduce its damaging effects by identifying lessons learned after the event. Although we have not evaluated the Corps' efforts, Corps officials told us that they employed these authorities in preparing for the potential flooding that was predicted from Hurricane Katrina. In addition, after the levees were breached, the Corps used its response and rehabilitation authorities to provide flood-fighting assistance and to begin the repair and restoration of the levees.

Background

Since its founding in 1718, the city of New Orleans and its surrounding areas have been subject to numerous floods from the Mississippi River and hurricanes. The greater New Orleans area, composed of Orleans, Jefferson, St. Charles, St. Bernard, and St. Tammany Parishes, sits in the tidal lowlands of Lake Pontchartrain and is bordered generally on its southern side by the Mississippi River. Lake Pontchartrain, a tidal basin of some 640 square miles, is connected with the Gulf of Mexico through Lake Borgne and the Mississippi Sound.

The greatest natural threat posed to the New Orleans area is from hurricane-induced storm surges, waves, and rainfalls. Because of this threat, a series of control structures, concrete flood walls, and levees was proposed for the area along Lake Pontchartrain in the 1960s. Congress first authorized the construction of the Lake Pontchartrain and Vicinity, Louisiana Hurricane Protection Project in the Flood Control Act of 1965[1] to provide hurricane protection to areas around the lake in Orleans, Jefferson, St. Bernard, and St. Charles Parishes. Although federally authorized, the project was a joint federal, state, and local effort. The Corps was responsible for project design and construction of the approximately 125 miles of levees, with the federal government paying 70 percent of the costs, and state and local interests paying 30 percent. Each of the four parishes protected by the project is associated with a local levee district that is generally composed of state-appointed officials and is

[1]Pub. L. No. 89-298, § 204, 79 Stat. 1073, 1077 (1965).

considered a state entity. Specifically, Orleans Parish is associated with the Orleans Levee District, Jefferson Parish is associated with the East Jefferson Levee District, St. Bernard Parish is associated with the Lake Borgne Levee District, and St. Charles Parish is associated with the Pontchartrain Levee District. These levee districts are the local sponsors of the project, and their responsibilities include ensuring the integrity of the levee system in their districts throughout the year.

Level of Protection Authorized by Congress

Congress authorized the Lake Pontchartrain project in 1965, substantially in accordance with a Chief of Engineers report, to protect the areas around the lake from flooding caused by storm surge or rainfall associated with a standard project hurricane. For the coastal region of Louisiana, a standard project hurricane was expected to have a frequency of occurrence of once in about 200 years, and represented the most severe combination of meteorological conditions considered reasonably characteristic for the region. According to the Chief of Engineers report, a standard project hurricane was selected as the design hurricane because of the urban nature of the area.[2]

When Congress authorized the Lake Pontchartrain project, the 1 through 5 scale—known as the Saffir-Simpson Scale—that is currently used by the National Weather Service to categorize hurricanes from lowest to highest intensity did not yet exist. According to the Corps, the standard project hurricane used for the Lake Pontchartrain project would roughly equal a fast-moving category 3 hurricane on the Saffir-Simpson Scale. In fact, the standard project hurricane for coastal Louisiana approximates the storm surge of a category 3 hurricane, the wind speed of a category 2 hurricane, and the barometric pressure at the center of a category 4 hurricane.[3] Table 1 compares the coastal Louisiana standard project hurricane parameters to which the Lake Pontchartrain project was designed with the parameters for category 2, 3, and 4 hurricanes on the Saffir-Simpson Scale.

[2]H.R. Doc. No. 231, 89th Cong., 1st Sess. (1965).

[3]Barometric pressure is a key indicator of a hurricane's intensity. The lower a hurricane's barometric pressure, the greater the wind speed and, therefore, the storm surge.

Table 1: Comparison of Standard Project Hurricane Parameters for Coastal Louisiana with Category 2, 3, and 4 Hurricane Parameters

	Standard project hurricane for coastal Louisiana	Saffir-Simpson category 2 hurricane	Saffir-Simpson category 3 hurricane	Saffir-Simpson category 4 hurricane
Central pressure[a]	27.6 Hg	28.50–28.91 Hg	27.91–8.47 Hg	27.17–27.88 Hg
Wind speed[b]	100 mph	96-110 mph	111-130 mph	131-155 mph
Radius of maximum winds[c]	30 miles	N/A	N/A	N/A
Average forward speed[c]	6 knots	N/A	N/A	N/A
Storm surge	11.2–13 feet[d]	6-8 feet	9-12 feet	13-18 feet

Source: GAO analysis of Corps and National Oceanic and Atmospheric Administration data.

Notes: The shaded areas indicate those parameters on the Saffir-Simpson Scale that are most closely aligned with those for the standard project hurricane.

[a]Central pressure is measured in inches of mercury (Hg) or millibars.

[b]Wind speed for the standard project hurricane was measured as the maximum 5-minute average wind speed. The Saffir-Simpson Scale uses the maximum 1-minute average wind speed, a lower threshold.

[c]The Corps estimated the radius of maximum winds and the average forward speed for a standard project hurricane, and the Saffir-Simpson Scale does not take either of these parameters into account.

[d]The standard project hurricane calculated maximum surge heights for different geographic areas within the Lake Pontchartrain area. The maximum surge height for the South Shore of Lake Pontchartrain—where the 17th Street, London, and Industrial Canals are located—was estimated at 11.2 feet.

At landfall, which was approximately 60 miles southeast of New Orleans, Hurricane Katrina had a central pressure of 27.17 Hg and a wind speed of 140 mph. Wind speeds in New Orleans, which was west of the eye of Hurricane Katrina, reached just over 100 mph. According to the National Oceanic and Atmospheric Administration's National Climatic Data Center, data on other Hurricane Katrina parameters are not readily available for several reasons, including the destruction of certain buildings and monitoring equipment and would have been used to measure storm surge.

Authorities, Roles, and Responsibilities for Operating and Maintaining the Levees

Consistent with federal law, agreements between the Corps and local sponsors of the Lake Pontchartrain project specify that local sponsors are responsible for operation, maintenance, repair, replacement, and rehabilitation of the levees when the construction of the project, or a project unit, is complete.[4] However, the Corps has authority to (1) repair the project if deficiencies are the result of the original construction[5] and (2) rehabilitate the project, if damage resulted from a flood and the project is active in the Corps' Rehabilitation Inspection Program.[6] Corps district and division employees are to oversee OMRR&R activities performed by the local sponsors on an annual basis.

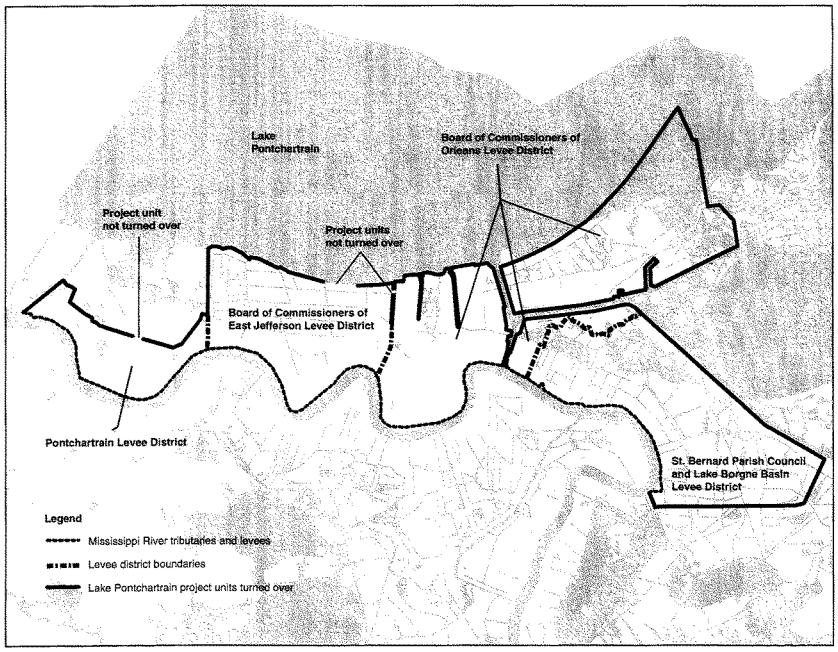
Once construction of Lake Pontchartrain project units were completed, the Corps was to transfer these project units to the local sponsors for OMRR&R. These sponsors include the Orleans, East Jefferson, Lake Borgne, and Pontchartrain levee districts. Although the Corps has not yet provided us with dates on when the project units for the Lake Pontchartrain project were completed, after Hurricane Katrina, the Corps' New Orleans District and the Department of Defense's Task Force Guardian determined, based on three criteria, that almost the entire Lake Pontchartrain hurricane project had been turned over to local sponsors for ongoing OMRR&R responsibilities. The criteria used to make this determination were (1) if the project unit was completed in accordance with the designed level of protection specified in the project decision document, (2) if the project unit was being operated and maintained by the local sponsor, and (3) if the project unit had passed the annual Inspection of Completed Works in accordance with Corps regulations. Based on this evaluation, the task force determined that only three project units—a bridge over the 17th Street canal, a project unit in Jefferson Parish, and a project unit in St. Charles Parish—had not yet been completed and turned over to the local sponsors. Figure 1 shows the three project units that have not been completed and turned over to the local sponsors.

[4]33 U.S.C. § 2213(j).

[5]Corps Regulation No. ER 1165-2-119.

[6]Corps Regulation No. ER 500-1-1.

Figure 1: Status of Completion and Turnover for Project Units in the Lake Pontchartrain and Vicinity Project



Sources: GAO; U.S. Army Corps of Engineers.

While the assurances signed by local sponsors do not define project completion, internal Corps regulations provide that completed projects or completed project units will normally be turned over when all construction, cleanup work, and testing of mechanical, electrical, and other equipment are complete and the project is in proper condition for

the assumption of operation and maintenance by the local sponsors.[7] Transfer is to be accomplished through a formal notice from the Corps to the local sponsor that includes a transfer date determined by the Corps' district engineers. According to Corps officials, the formal notice generally is in the form of a letter to the local sponsor.

According to internal Corps regulations, upon transfer of a completed project to the local sponsors, the Corps may no longer expend federal funds on construction or project improvements.[8] If the Corps determines that unsatisfactory conditions have developed as a result of the original levee construction, the Corps may undertake corrective action.[9] For example, a Corps district official responsible for operations and maintenance oversight told us that if settlement of a completed levee occurs, this is not considered a design or construction flaw. Instead, this is considered a condition that should be addressed by the local sponsors as part of their normal operations and maintenance responsibilities.

Local sponsors' responsibilities for OMRR&R of the completed portions of the Lake Pontchartrain project were established through local assurances signed by the levee districts and the Corps. For the Lake Pontchartrain hurricane project as constructed, these assurances were signed, and subsequently accepted by the federal government for the Orleans Levee District on June 21, 1985; the Pontchartrain Levee District on August 7, 1987; the East Jefferson Levee District on December 21, 1987; and the Lake Borgne Basin Levee District on December 7, 1977. The formal assurances commit the local sponsors to, among other things, operate and maintain all features of the project in accordance with Corps regulations. Also, in accordance with internal Corps regulations, the Corps is required to provide local sponsors with an operations and maintenance manual at the time of, or at the earliest practicable date after, the transfer of OMRR&R responsibilities from the Corps to local sponsors for a completed project or project unit. The manual is intended to assist the responsible local authorities in carrying out their operation and maintenance obligations. According to Corps officials, the OMRR&R responsibilities for levees are straightforward, and the manual that the Corps provides local sponsors is a one-page document that outlines the requirements as described by

[7]Corps Regulation No. ER 1150-2-301.

[8]Corps Regulation No. ER 1150-2-301.

[9]Corps Regulation No. ER 1165-2-119.

federal regulations.[10] Specifically, federal regulations require local sponsors to ensure that the structure is operating as intended and to continuously patrol the structure during flood periods to ensure that no conditions exist that might endanger the structure and to take immediate steps to control any condition that might endanger it. For maintenance, the regulations require local sponsors to ensure at all times that the structure is serviceable in times of flood. The regulations also require periodic inspections and maintenance measures, including the following:

- promoting the growth of sod, including routine mowing of the grass and weeds;
- exterminating burrowing animals;
- removing drift material or wild growth from the levee (such as brush and trees); and
- repairing any damage to the levee caused by erosion.

Repair, replacement, and rehabilitation are also considered part of the local sponsors' maintenance responsibilities, as outlined in internal Corps regulations. Repair refers to routine activities that maintain the project in well-kept condition; replacement refers to replacing worn-out elements; and rehabilitation refers to activities necessary to bring a deteriorated project back to its original condition. According to internal Corps' regulations, local sponsors' maintenance is considered to be deficient when these requirements have not fulfilled.[11]

Corps employees are to oversee local sponsors' OMRR&R activities to ensure compliance and project integrity. Corps employees are required to work directly with local sponsors to conduct annual compliance inspections; review local sponsors' semiannual compliance reports; and respond to engineering concerns, maintenance questions, and reports of problems. A Corps district official responsible for operations and maintenance oversight told us that generally the Lake Pontchartrain project's local sponsors have performed their operations and maintenance

[10]33 C.F.R. § 208.10. According to Corps officials, the Corps has provided local sponsors with specific operations and maintenance manuals for the Bienvenue and Dupre floodgate structures in the Lake Pontchartrain project.

[11]Corps Regulation No. ER 1130-2-530.

responsibilities as required and have been responsive to the Corps' concerns. Because the New Orleans district is part of the Mississippi Valley Division of the Corps, the division also has responsibility for managing and overseeing the periodic inspections conducted by district engineers; reviewing and approving district engineers' inspection reports; maintaining a database of information on inspections and remedial measures taken; and receiving annual OMRR&R summary reports from the districts under its command, aggregating these reports, and sending them to Corps headquarters.

Federally authorized flood control projects, such as the Lake Pontchartrain project, are eligible for 100 percent federal rehabilitation if damaged by a flood as long as these projects are active in the Corps' Rehabilitation Inspection Program (rehabilitation program).[12] To maintain active status in this program, the Lake Pontchartrain project's levees are required to pass an annual OMRR&R inspection conducted jointly by the Corps, the local sponsor, the state Department of Transportation and Development, and other stakeholders, as appropriate.[13] According to the Corps' inspection reports from 2001 through 2004, all completed project units of the Lake Pontchartrain project were inspected each year and had received an acceptable rating.

Procedures to Ensure That Levees Are Properly Maintained

Both local sponsors and the Corps are required to conduct oversight activities to ensure that levees are properly maintained. If, in the course of these oversight activities, the Corps finds that the local sponsors are not properly maintaining the levees, internal Corps regulations outline a series of steps that the Corps can take until the local sponsor comes into compliance.

Local Sponsors' Oversight Activities

Federal regulations require that local levee districts are to appoint a permanent committee, headed by a superintendent, that will be responsible for all levee operation and maintenance activities and

[12]Locally authorized flood control projects can also participate in the rehabilitation program. If active, locally authorized projects are damaged in a flood emergency, the cost of rehabilitation is shared between the local authority and the federal government—20 percent and 80 percent, respectively. 33 C.F.R. § 203.82(f).

[13]For projects other than levees that have mechanical or electrical parts, such as locks, floodgates, drainage structures, and pumping stations, periodic engineering inspections are also performed.

inspections of federally constructed flood control projects.[14] The superintendent of the levee district is responsible for performing periodic inspections of the levee to ensure that routine maintenance responsibilities have been effectively completed and that no hazards to the levee exist. Typically, these inspections take place prior to the flood or hurricane season, immediately following a high-water period, and at other intermediate periods throughout the year. During an inspection, the superintendent is required to examine and be certain, among other things, that

- drainage systems are in good working condition and not becoming clogged;
- no unusual settlement or material loss of grade or levee cross section has taken place;
- cattle guards and gates are in good condition;
- the protective walls surrounding the levee have not been washed out or removed;
- the levee crown is shaped to drain readily;
- no unauthorized vehicular traffic or cattle grazing has occurred;
- no water seepage or saturated areas are occurring; and
- levee access roads are being properly maintained.

If, during these inspections, the superintendent discovers any levee portion to be in substandard condition, it is the levee district's responsibility to take immediate actions to correct the inadequacy. The superintendent is required to submit a report twice a year to the Corps District Engineer covering inspection, maintenance, and operation activities of the levee district. At this time, we have not examined the extent to which these steps were taken by the local sponsors, and the Corps has not provided us any documentation of such activities.

[14]33 C.F.R. § 208.10(a)(2).

The Corps' Oversight Activities

The Corps is responsible for overseeing the OMRR&R activities of the Lake Pontchartrain project's local sponsors through an annual compliance inspection program—known as the Inspection of Completed Works program—and reviewing the local sponsors' semiannual reports on OMRR&R activities submitted to the district office. According to internal Corps regulations, the primary purposes of the Inspection of Completed Works program are to prevent loss of life and catastrophic damages, preserve the value of the federal investment, and encourage local sponsors to bear responsibility for their own protection. According to Corps officials, for the Lake Pontchartrain project, the New Orleans District typically completes this annual compliance inspection prior to the hurricane season, in mid-May to early-June of each year. Our review of Corps inspection reports for 2001 through 2004 indicate that while inspections of the Lake Pontchartrain hurricane protection levees in the Orleans and St. Bernard Parishes were generally conducted in May of each year, the inspections of the levees in Jefferson and St. Charles Parishes were generally conducted in the September to November timeframe.[15] According to the Corps, these inspections are to cover the following items:

- level of protection,
- erosion control,
- slope stability,
- animal control,
- unwanted vegetative growth,
- concrete surfaces, and
- structural foundations.

Based on the results of these inspections, the district and division are to characterize the inspected units on a scale from 1 to 3, where 1 means that the project units have been maintained in accordance with the agreement between the Corps and the local sponsors and are expected to perform as

[15]According to Corps officials, the majority of the protection in the Jefferson and St. Charles Parishes is flood protection along the Mississippi River as opposed to hurricane protection. Therefore, inspections are done prior to the high-water period on the Mississippi River.

designed, and 3 means that the project units have maintenance deficiencies such that the project would probably fail during floods of project design or lesser magnitudes. Within 120 days of an inspection, the district is expected to prepare an inspection report and provide it to its commanding unit. For example, the New Orleans District should prepare an inspection report for the Lake Pontchartrain project and forward it to the Mississippi Valley Division for review and approval. Reports that indicate maintenance deficiencies are also to be submitted annually to headquarters. All of the completed units of the Lake Pontchartrain hurricane levees passed with an acceptable rating for the period 2001 through 2004.

If a project receives a rating of 3 as a result of an inspection, internal Corps regulations[16] outline a progression of steps that the Corps can take to ensure that local sponsors fulfill their OMRR&R responsibilities and bring the levees back up to the designed level of protection. The steps are as follows:

- Notify the sponsor orally of the deficiencies.
- Notify the sponsor in writing.
- Write a letter to the governor and the appropriate state agencies—which, in the case of the Lake Pontchartrain project, is the Department of Transportation and Development in Louisiana—to enlist state participation to resolve the problem.
- Notify the Federal Emergency Management Agency (FEMA) of the condition of the project.
- If acceptable actions are not taken by the nonfederal sponsor, take actions to remove the project from eligibility for federal emergency rehabilitation.
- Initiate legal action against the local sponsor to enforce OMRR&R obligations as outlined in local assurances.
- Transmit a report to the Congress recommending authorization of a new sponsor or reauthorization of the project along with measures to eliminate hazards.

[16]Corps Regulation No. ER 1130-2-530.

Although not documented in the annual inspection reports, according to Corps officials, almost all past Lake Pontchartrain project deficiencies have been resolved upon oral notification of the local levee district. The official responsible for the Inspection of Completed Works program in New Orleans only could recall one or two instances when the Corps wrote a letter to a local sponsor requesting that the sponsor commit resources to repair a deficiency, which resulted in full compliance by the local sponsor. Internal Corps regulations specifically prohibit the use of federal funds to correct problems caused by a lack of adequate local maintenance.

Authorities, Roles, and Responsibilities When Levees Fail

The Corps has authority to provide a variety of emergency response actions when levees fail or are damaged. Section 5 of the Flood Control Act of 1941, as amended, commonly referred to as Public Law 84-99, authorizes the Corps to conduct emergency operations and rehabilitation activities when levees fail or are damaged.[17] In addition, under the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act), as amended, the Corps and other federal agencies may be tasked by FEMA to provide disaster response, recovery, and mitigation assistance to state and local governments.[18] Furthermore, a Department of Defense Manual for Civil Emergencies assigns responsibilities, prescribes procedures, and provides guidance by which the Department of Defense responds to all hazards in accordance with the Stafford Act.[19] Although we have not evaluated the Corps' efforts, Corps officials told us that after the levees were breached the Corps used its response and rehabilitation authorities to provide flood-fighting assistance and to begin the repair and restoration of the levees. State and local roles and responsibilities when levees fail are similar to the Corps' responsibilities and are also described in federal regulations.[20]

Public Law 84-99

Public Law 84-99 authorizes the Corps to conduct emergency operations and rehabilitation activities when levees fail or are damaged during storms

[17] 33 U.S.C. § 701n. The Corps' administrative policies, guidance, and operating procedures for natural disaster preparedness, response, and recovery activities are set out in 33 C.F.R. part 203.

[18] 42 U.S.C. § 5121 *et seq.*

[19] DOD 3025.1-M (June 1994).

[20] 33 C.F.R. § 203.14.

or other events. Federal regulations specify that assistance is limited to providing emergency assistance to save lives and protect property, such as public facilities/services and residential, commercial, or industrial developments.[21] This emergency assistance may be provided during and following a flood or coastal storm. However, under federal regulations, nonfederal interests must fully utilize their own resources, including manpower, supplies, equipment, and funds before Corps assistance may be provided.[22] The National Guard, as part of the state's resources when it is under state control, must be fully utilized as part of the nonfederal response. According to federal regulations, the Corps is not to use funds to reimburse local authorities for the costs of these emergency activities.[23]

To implement flood response operation authorities under Public Law 84-99, internal Corps regulations specify that Corps district commanders must issue a Declaration of Emergency. The Declaration of Emergency may initially be verbal, but must be made in writing and reported in the district's situation report within 24 hours. Authority to issue a Declaration of Emergency has been delegated to deputy district engineers and includes all supervisors in the chain of command, from the district commander to the chief of emergency management.

Emergency operations include flood response and postflood response activities.

- *Flood response* includes activities such as flood fighting and rescue operations. These activities include providing technical assistance, such as review and recommendations in support of state and local efforts and help determining feasible solutions to uncommon situations, and direct assistance by
  - issuing supplies;
  - conducting rescue operations;
  - directing flood-fighting operations; and

[21]33 C.F.R. § 203.32. The regulations also specify that the Corps is not authorized to provide assistance to individual homeowners and businesses.

[22]33 C.F.R. § 203.14.

[23]33 C.F.R. § 203.32.

- contingency contracting for emergency operations.

Corps assistance during flood-fighting operations is to be temporary to meet the immediate threat and to supplement state and local efforts. This assistance is not intended to provide permanent solutions to flood problems and should be terminated when the emergency is over—for example, when flood waters have receded sufficiently.

- *Postflood response* includes emergency debris removal, temporary restoration of critical transportation routes and public services and utilities, and after action review and reporting.

Rehabilitation activities include the repair and restoration of eligible flood control projects and federally constructed hurricane or shore protection projects. Rehabilitation assistance is limited to federal and nonfederal flood control works that are in active status—those found to be properly maintained during inspections—in the Corps' Rehabilitation Inspection Program at the time of the hurricane, storm, or flood event.[24] Rehabilitation assistance is limited to repair or restoration of a flood control work to its predisaster condition and level of protection (e.g., the actual elevation of the levee, allowing for normal settlement).[25] Any damage to federally constructed levees are repaired with 100 percent of the cost borne by the federal government; and damage to nonfederally constructed levees are repaired with 80 percent of the cost borne by the federal government and 20 percent by the local sponsor.[26] Because the Lake Pontchartrain project is federally constructed and was active in the Corps' Rehabilitation Inspection Program, the Corps is authorized to rehabilitate any levees that failed or were damaged as a result of Hurricane Katrina, using this authority. Additionally, in the aftermath of Hurricane Katrina, the Assistant Secretary of the Army for Civil Works agreed to rehabilitate all of the damaged Lake Pontchartrain and other hurricane and flood control structures in the New Orleans area without any local

[24]33 C.F.R. § 203.41.

[25]Corps Regulation No. ER 500-1-1.

[26]Corps Regulation No. ER 500-1-1.

cost share, under emergency authority provided in statute.[27] Further, the federal government will fund the acquisition of lands, easements, rights-of-way, and disposal or borrow areas not owned or under control of the nonfederal sponsor, as well as the performance of relocations, that are needed for the rehabilitation and that are normally local responsibilities. The Corps estimates that funding these activities for the Lake Pontchartrain project will cost the federal government an additional $10 million and over $248 million in total for all damaged levee systems in the New Orleans area.

Stafford Act

The Stafford Act, as amended, authorizes federal agencies, including the Corps, to take emergency response actions when the President has issued a major disaster declaration. Under the act, a presidential declaration may be made after receiving a request from the governor of the affected state.[28] FEMA, within the Department of Homeland Security, is responsible for administering the major provisions of the Stafford Act. Actions taken under this authority include disaster response, recovery, and mitigation assistance to supplement state and local efforts.

To meet its obligations for emergency response, the Department of Homeland Security developed a National Response Plan, which describes the roles and responsibilities of various federal agencies.[29] Within the National Response Plan, the Department of Defense has responsibility for Emergency Support Function #3—Public Works and Engineering. The plan designates the Corps as the operating agent for this function, to include planning, preparedness, and response, with assistance to be provided by other branches of the Department of Defense, as needed.

The National Response Plan lists the following activities for the Corps:

[27]33 U.S.C. § 701n. According to the Corps, local sponsors requested that the Corps undertake this work at full federal expense due to the unprecedented damage and impacts to local governments and the inability of the local sponsors to finance their share of the costs. According to the Corps, the Assistant Secretary of the Army for Civil Works approved the request with the concurrence of the Office of Management and Budget and notified the House and Senate Appropriations Subcommittees on Energy and Water Development.

[28]42 U.S.C. § 5170.

[29]The Department of Homeland Security developed the National Response Plan in response to a presidential directive, HSPD-5.

- coordination and support of infrastructure risk and vulnerability assessments;
- participation in preincident activities, such as prepositioning assessment teams and contractors;
- participation in postincident assessments of public works and infrastructure to help determine critical needs and potential work loads;
- implementation of structural and nonstructural mitigation measures to minimize adverse effects or fully protect resources prior to an incident;
- execution of emergency contracting support for life-saving and life-sustaining services, to include providing potable water, ice, emergency power, and other emergency commodities and services;
- providing assistance in monitoring and stabilizing damaged structures, and demolishing structures designated as immediate hazards to public health and safety, and providing structural specialist expertise to support inspection of mass care facilities and urban search and rescue operations;
- providing emergency repair of damaged infrastructure and critical public facilities, and supporting the restoration of critical navigation, flood control, and other water infrastructure systems;
- managing, monitoring, and providing technical advice in the clearance, removal, and disposal of debris from public property and the re-establishment of ground and water routes into impacted areas; and
- implementing and managing FEMA's Public Assistance Program and other recovery programs involving federal, state, and tribal officials, including efforts to permanently repair, replace, or relocate damaged or destroyed public facilities and infrastructure.

Department of Defense Manual for Civil Emergencies

A Department of Defense Manual For Civil Emergencies assigns responsibilities, prescribes procedures, and provides guidance by which the Department of Defense responds to all hazards in accordance with the Stafford Act. The policy states that commanders may conduct disaster relief operations when a serious emergency or disaster is so imminent that waiting for instructions from higher authority would preclude effective response. According to the policy, commanders may do what is required and justified to save human life, prevent immediate human suffering, or lessen major property damage or destruction. Action taken in accordance

with the policy is limited to 10 days. A Corps commander providing assistance to civil authorities under this guidance is not required to obtain an agreement for reimbursement from the requesting agency before providing assistance.

Planned Emergency Response Activities

The Corps is authorized by Public Law 84-99 to prepare for emergency response when levees fail by undertaking disaster preparedness, advance measures, and hazard mitigation activities. Although we have not evaluated the Corps' efforts, Corps officials told us that they took action in advance of Hurricane Katrina to prepare for the potential flooding that was predicted. As part of this effort, according to Corps officials, the Corps' New Orleans district used a draft hurricane preparedness plan for the New Orleans area.

Disaster Preparedness

Corps division and district commanders are responsible for providing immediate and effective response and assistance prior to, during, and after emergencies and disasters. Although we have not reviewed the extent to which the Corps undertook these initiatives during the Katrina disaster, the Corps is responsible for the following:

1. *Creating an emergency management organization.* Division and district commanders are expected to provide adequate staffing for a readiness/emergency management organization to accomplish the preparedness mission. In addition, divisions and districts should have teams readily available to provide assistance under the Corps' authorities for flood emergencies and other natural disasters; execute responsibilities and missions under the Stafford Act and the National Response Plan; staff a Crisis Management Team, consisting of an Emergency Manager and senior representatives from technical and functional areas to provide guidance and direction during emergency situations; and staff a Crisis Action Team, consisting of the personnel necessary to operate an emergency operations center.

2. *Establishing and maintaining plans and procedures.* Corps headquarters, divisions, and districts are expected to prepare and maintain plans for emergencies and disasters, establishing an alternate emergency operations center, and reconstituting the district. These operation plans should cover emergency/disaster assistance procedures under all applicable authorities and potential mission assignments. Each division and district should have, at a minimum, an operation plan that provides procedures for generic disasters within the division and district. The plan should include general topics, such

as activating, staffing, and operating the emergency operations center; reporting requirements; notification and alert rosters; and organizing for response to disasters. The plan should also have one or more appendixes that specifically address the disasters most likely to impact the division and district. Operation plans are reviewed and updated annually to reflect administrative changes. The division/district's generic or principal disaster operation plan is supposed to be reviewed, revised, and republished biennially.

3. *Training personnel for response.* Divisions and districts are expected to ensure that personnel who are assigned emergency assistance responsibilities have been properly trained.

4. *Conducting exercises.* Exercises are to be conducted at least once every two years, consistent with available funding. This requirement may be waived if an actual emergency response was conducted during the two-year period that was of sufficient magnitude to have adequately trained emergency team members and other personnel.

5. *Establishing adequate command and control facilities.* Divisions, districts, and other Corps groups should provide a dedicated facility for an emergency operations center that will be able to provide command and control for emergency/disaster response and recovery activities.

6. *Maintaining supplies, tools, and equipment.* Divisions and districts are expected to maintain equipment and supplies that can be readily available for use by the emergency operations center, disaster field offices, disaster field teams, planning response teams, and similar entities. Equipment should be stockpiled for use during emergency operations and exercises.

7. *Managing inspections of flood control projects.* The Corps is responsible for ensuring that the levees are properly maintained to perform as designed during flood events.

Advance Measures

The Corps may take advance measures prior to a flooding event to protect against loss of life and significant damages to urban areas and public facilities.[30] In the case of imminent danger of levee failure or overtopping,

[30]Corps Regulation Nos. ER 500-1-1 and EP 500-1-1.

the Corps can also take corrective actions to ensure the stability, integrity, and safety of the levee.[31] Advance measures include the following:

1. *Technical assistance*: providing technical review, advice, and recommendations to state and local agencies before an anticipated flood event. For example, the Corps may provide personnel to inspect existing flood control works to identify potential problems and solutions, evaluate conditions to determine the requirements for additional flood control protection, and recommend the most expedient construction methods; provide hydraulic, hydrologic, and geotechnical analysis; and provide information readily available at Corps districts to local entities for use in the preparation of local evacuation and contingency flood plans.

2. *Direct assistance*: providing supplies, equipment, and contracting for the construction of temporary and permanent flood control projects. Examples of emergency contracting work include the construction of temporary levees; the repair, strengthening, or temporary raising of levees or other flood control works; shore protection projects; and removal of stream obstructions, including channel dredging of federal projects to restore the design flow.

Advance measures taken by the Corps are intended to supplement ongoing or planned state and local efforts, and are designed to deal with a specific threat. To implement advanced measures, the governor should make a written request to the Corps. The local sponsor for the advance measure assistance must agree to execute a cooperative agreement and, at no cost to the Corps, when the operation is over, remove all temporary work constructed by the Corps or agree to upgrade the work to standards acceptable to the Corps. In addition, the local sponsor is responsible for providing traditional items of local cooperation, such as lands, easements, rights-of-way, and disposal areas necessary for the work. Advance measures assistance is temporary and must be terminated no later than when the flood threat ends.

Hazard Mitigation

Hazard mitigation activities are intended to help prevent or reduce the possibility of a disaster or reduce its damaging effects. The Corps is required to participate on a FEMA-led hazard mitigation team to identify postdisaster mitigation opportunities and establish a framework for

[31]Corps Regulation Nos. ER 500-1-1 and EP 500-1-1.

recovery. According to the Corps' hazard mitigation policy, division commanders are to appoint primary and alternate representatives to serve on the hazard mitigation team; establish procedures for quick and effective response to the requirements of the team; ensure essential information and data necessary to assess mitigation opportunities are available or capable of being obtained quickly; ensure division hazard mitigation team representatives are trained in flood hazard mitigation concepts and techniques; and provide reports to FEMA and Corps headquarters. Recommendations of the hazard mitigation team are intended to reduce or avoid federal expenditures resulting from flood situations.[32]

New Orleans District's Hurricane Preparedness Plan

The Corps' New Orleans District has a draft hurricane preparedness plan that defines the district's role and responsibilities in the event of an emergency due to a hurricane.[33] The plan outlines the essential functions of the district before, during, and after a hurricane. These functions include pre-event planning, organization, response, and recovery in order to minimize the potential hazards to life and property. As part of this plan, the district defines emergency organizational staffing to support emergency operations. Selected personnel are assigned to specific teams or offices that, in the event of a disaster, are to provide the necessary liaison with federal, state, or local emergency management agencies; make decisions relative to Corps' capabilities and assignments; perform preliminary damage assessments; or accomplish specific missions. According to the plan, a New Orleans District Emergency Operations Center should be staffed to respond to an emergency, and the center is to become the focal point for collecting data, analyzing situations, allocating resources, furnishing reports to higher headquarters, and providing overall management and control of all district activities. With the activation of the emergency operations center, a crisis management team becomes responsible for coordinating and directing district activities in the crisis situation. A crisis action team is responsible for executing the activities as directed by the crisis management team. According to the plan, if a slow-moving category 3 or higher hurricane is approaching the area, the team should be activated and deployed at the direction of the commander. The

[32]Corps Regulation No. ER 500-1-1.

[33]The district's hurricane preparedness plan is in draft form. According Corps officials, however, the draft plan was used to prepare and respond to Hurricane Katrina. Corps District Regulation No. DR 500-1-3.

plan does not contain any specific guidance on how the district would respond to a levee failure.

In closing, Madam Chairman, the legislative and regulatory framework guiding the operations and maintenance of the levees divides this responsibility among a number of partners, depending upon specific circumstances. Similarly, the responsibilities for emergency preparedness and response are dependent on a variety of laws and regulations. As a result, the regulatory framework for these activities is complex and oftentimes unclear. Whether these responsibilities were appropriately fulfilled or played a role in the flooding of New Orleans in the wake of Hurricane Katrina in August 2005 is still to be determined.

GAO Contact and Staff Acknowledgments

For further information on this testimony, please contact Anu Mittal at (202) 512-3841 or mittala@gao.gov. Individuals making contributions to this testimony included Ed Zadjura, Assistant Director; Allison Bawden; Kevin Bray; Kisha Clark; John Delicath; Doreen Feldman; Jessica Marfurt; Barbara Patterson; and Barbara Timmerman.

Committee on Homeland Security and Governmental Affairs
EXHIBIT #18

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December 14, 2005

Senator Susan M. Collins
Chairman
Committee on Homeland Security
United States Senate
340 Dirksen Senate Office Building
Washington, DC 20510

FAX: 202 228 0460

Dear Senator Collins,

I am submitting this letter to you as a reference for your Committee's hearing on December 15, 2005 entitled "Who's in Charge of the New Orleans Levees?".

I am a retired Professor of Ocean Engineering at MIT who specialized in the planning, design, and construction of ports and coastal structures world wide. I served as a consultant and later executive in charge of port projects for the World Bank for about 10 years and as a consultant and advisor to 67 major ports around the world, including Singapore, Bombay, New Orleans, Colombo, Rotterdam, and more.

I continue to consult for and advise port authorities and serve on the board of the Panama Canal Authority and several major shipping companies. In the past, I also served on the Advisory Board of the Port of Singapore and others. I am the author of the authoritative text entitled "Port Planning and Development" and numerous professional papers.

Attached please find some comments regarding the management of construction, inspection, and maintenance of breakwaters, dikes, and levees designed to protect against or prevent damage by water (wave or current) flows to such protective structures. I should mention that while I am familiar with the Port of New Orleans and other Mississippi River bank facilities, I do not know nor have I visited levees elsewhere protecting New Orleans.

Respectfully yours,

Ernst G. Frankel
Professor (Emeritus)
Ph.D., DBA, M.Sc., MBA, B.Sc.

Comments of the Management of Construction, Maintenance, and Inspection of Levees and Other Protective Earthen Structures

Ernst G. Frankel

Construction: The construction of levees requires detailed surveys of supporting soil conditions by borings and soil sampling, and occasionally load bearing tests, to assure load bearing capability of the site. Sub-soil replacement and/or compacting may be required as well as dewatering to assure solidity of the levee base.

Levee construction requires effective management of material quality and placement to assure the rigidity and stability of the levee. Construction must prevent formation of any voids within the levee and effecting compacting of the material. Similarly, the water side levee face must be appropriately armored to prevent large-scale water intrusion and resulting levee body material erosion, with ultimate partial or total levee collapse.

Inspection: Inspection of levees requires physical as well as visual survey of levee condition. It is insufficient to rely solely on visual surveys, as eroding voids do not necessarily cause surface indentations or collapse, particularly when such erosion occurs well below the top of the levee. As a result, physical/mechanical, acoustic and other inspection methods are normally employed. **Mechanical** methods usually employ drill hole sampling (using core sample analysis). **Acoustic** inspection employs vertical and/or side scanning acoustic surveys, which permit identification of the density of material layers at different depths. Combinations of vertical and side scanning allow the determination of three-dimensional information of the volume of material and voids (air or water pockets) in the body of the levee. Such tests permit the effective determination of the condition of the levee and the planning of maintenance actions.

Protective Face Inspection: The most critical part of a levee is its face (water side) and inspection must determine the face layer (armor) integrity, particularly under water. This can usually be done either optically (visual monitors) or by acoustic sensing.

Levee Maintenance: Levees are subject to various types of destructive forces such as earthquakes, tremors, vibrations caused by nearby construction or traffic, waves and currents, subsidence of the supporting layers, and more. It is therefore imperative to monitor any and all such factors and assure proper levee inspection and corrective action to counter prospective levee damage. It is important, as a result, to maintain a program of preventative maintenance, which corrects impending damage by filling discovered voids, repairing levee face damage, etc., as it occurs and is discovered, and not wait until scheduled levee maintenance.