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NEW ORLEANS HURRICANE AND FLOOD PROTECTION AND COASTAL LOUISIANA RESTORATION: STATUS AND PROGRESS

HEARING

BEFORE THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE

ONE HUNDRED ELEVENTH CONGRESS

FIRST SESSION

JUNE 16, 2009

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ONE HUNDRED ELEVENTH CONGRESS
FIRST SESSION

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C O N T E N T S

NEW ORLEANS HURRICANE AND FLOOD PROTECTION AND COASTAL LOUISIANA RESTORATION: STATUS AND PROGRESS

TUESDAY, JUNE 16, 2009

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
Washington, DC.

The full Committee met, pursuant to notice, at 2:30 p.m. in room 406, Dirksen Senate Office Building, Hon. Barbara Boxer (chairman of the full Committee) presiding.

Present: Senators Boxer, Vitter, and Udall.

Also present: Senator Landrieu.

OPENING STATEMENT OF HON. BARBARA BOXER, U.S. SENATOR FROM THE STATE OF CALIFORNIA

Senator BOXER. Thank you. Welcome everybody. We are going to get started with my opening statement. Then, as soon as Senator Landrieu and Senator Vitter arrive, I assume—Senator Vitter is here. Great. So, next we will turn to them and their opening statements and then we will turn to the Corps.

Good afternoon. We are meeting today to examine progress made on hurricane protection and coastal restoration since the devastating hurricanes that struck Louisiana in 2005.

After becoming Chair of this Committee, the very first field hearing that I held was in New Orleans to address post-hurricane clean up, hurricane protection and restoration of the wetlands. These issues remain top priorities of this Committee, and I want to thank Senators Landrieu and Vitter for making sure that we keep our eye on the ball here because nothing is going to be done unless we keep our eye on the ball.

Hurricanes Katrina and Rita were a wake-up call about the life and death role played by our flood control systems and the dire consequences of not properly designing this critical infrastructure, and also the consequences of not executing well in the aftermath of a hurricane or any natural disaster.

In my State, obviously we do not deal with hurricanes. We deal with earthquakes, flood, fire, and anything else that you can imagine. So, I think the wake-up call to America, regardless of political party, was A, are we doing enough to prevent, in this case, the flooding, and B, if we have an emergency and we need to evacuate folks and we need to do the job right, we better make sure we are prepared.

To me, these storms showed why we must invest in restoring Louisiana's natural hurricane protection system, the wetlands. For centuries, the protective wetlands of the Louisiana coast blunted the force of countless storms, absorbing their energy and softening their impact. But those wetlands have been rapidly disappearing and they require our constant attention.

We have learned a great deal over the past few years about why the New Orleans Hurricane Protection System failed. Groups of experts have identified important lessons from the disaster so that we are better prepared for the next hurricane, the next storm, the next flood. So, I think we are making progress in improving protections.

In 2007, we took a major step forward.

Senator Landrieu, please sit right there and then we will invite you to join us on the dais. Senator, sit right there. You are our first witness once I am finished and Senator Vitter is finished. They we turn to you.

I was just saying that my very first field hearing, Madam Senator, was in New Orleans and it was just a few months after I took the gavel, so it must have been about March.

Senator LANDRIEU. It was February.

Senator BOXER. It was February, actually, after I took the gavel. And I was telling everybody that your constant pressure, your constant concern, along with Senator Vitter's, certainly has ensured everyone in this Country that I am not going to take my eye off of this. And I stated that we are making some progress. But we have a long, long, long way to go. You know, when the cameras are all there, it is one thing. When the cameras leave, we have got to do the rest of the hard work.

In 2007, we took a major step forward in this Committee. We passed out of the Committee the Water Resources Development Act, for the first time in 7 years. This landmark legislation authorized critical water resources projects around the Country, including a comprehensive program to restore Louisiana wetlands and other important hurricane protection projects.

Congress has invested nearly $14.5 billion for hurricane protection projects in Louisiana over the past 3 years. Because of this investment, there has been great progress to upgrade the New Orleans Hurricane Protection System. Nearly 4 years after Hurricane Katrina, we can take some comfort in that. But I think the three of us know, and lots of others know and they will be here coming forward, the experts who have come here from your home State, Senators, we know there is a lot more to do.

Now, I understand that the Corps has stated that some hurricane protection projects preferred by local citizens are too costly and they have not been adequately studied. We are here to examine those decisions and to make sure the right choice is made that puts the safety of the citizenry first.

And let me point this out. We know what the American people saw when they saw the mishandling in the aftermath of Katrina. It is in our minds until the day that we die. We see those images. And we know how we felt. Would it not be tragic if, at this moment, we chose the wrong fix? And I think it is very important, and I commend both Senators, for working together on this. It is essen-

tial that we do the right thing at this stage. Frankly, I am not into wasting hundreds of millions of dollars. I would rather spend more and get a project that I know meets the need.

So, I look forward to hearing from our witnesses about the progress that has been made and the steps that we must take to be prepared in the future.

My time is expired, so I will call on Senator Vitter and then Senator Landrieu.

Senator Vitter.

OPENING STATEMENT OF HON. DAVID VITTER, U.S. SENATOR FROM THE STATE OF LOUISIANA

Senator VITTER. Thank you very much, Madam Chair.

Several months ago, I asked for this update hearing and you were very kind and generous to immediately agree. Thank you for that. Thank you for this hearing. You agreed to a similar request for that field hearing in early 2007 in the New Orleans area, and thank you very much for that, and for all of your continuing interest.

Katrina certainly was, as we all know, a historic event. But I think it is important that we refocus about why it was.

First of all, it is the only instance in our history that involved the complete and total evacuation of a major metropolitan area and the complete cessation, for some significant period of time, of all life and economic activity there.

Second, we talk about it as a natural disaster. Of course, a hurricane is. But it was also a manmade disaster because most of the flooding we are talking about in the New Orleans area was directly due to design failures in the levee system, most notably the walls of the outflow canals, which we are going to talk a lot about today.

So that is why it is so important that we get the fix right, as you said, so that we never have to repeat that sort of history.

Now, I do want to say at the beginning that there is a lot that is good and there is a lot that is right that is going on in terms of the Corps' work and our overall recovery. Since Katrina, and then Rita, and more recently Gustav and Ike, we have had a truly unprecedented level of taxpayer support and that has come through this Committee and through this Congress, and everyone in Louisiana wants to say thank you. It has been absolutely unprecedented. It matched an unprecedented event. They have been unbelievably generous and unprecedented. And that is leading to important work that is moving forward, most notably building true what we call 100-year protection in the greater New Orleans area in time for the 2011 hurricane season. So that is good and that is very important.

But I do want to underscore two big concerns I have as that very important work moves forward. First, Congress asked the Corps, mandated that the Corps look at and issue clear reports about what the next step might look like after we finish the 100-year level of protection and asked them to be very focused and quite specific in coming up with project ideas for something called the Louisiana Coastal Area Study.

My first big concern, and disappointment, is that in responding to that mandate, the Corps has been exceedingly general and ex-

ceedingly vague with their analysis rather than giving us the much more specific, project specific list of ideas that we asked for. That, obviously, is a big impediment to moving forward in terms of active consideration for the next step and that impacts all of coastal Louisiana.

My second big, big concern is the one I think we are going to focus on in discussions with the witnesses today. That is that we are in the process of perhaps moving forward, I hope not, but perhaps moving forward with the wrong fix for the outfall canals.

Madam Chair, you have been there. You know that what we are talking about is three what we call outfall canals, 17th Street Canal, Orleans Avenue Canal and London Avenue Canal. Most of the flooding of New Orleans after Katrina was a result of breaches in these canals. All of the flooding in New Orleans west of the Industrial Canal was essentially the result of that.

These breaches were manmade in the sense that we now have the engineering analysis that says there were design flaws. These walls breached from below. They gave in from below. They were not over-topped, except in some limited instances. They gave way because they were not deep enough and they were not strong enough.

The Corps right now is moving forward with Option 1 in terms of addressing that situation, rather than Option 2 or 2a. Option 1 is to close off the canals at the lake so that storm surge does not come into the canals and lead to a breach as it did with Katrina. But then, to artificially keep at a low level the water level in the canals rather than rebuilding the walls so that they are strong enough to accommodate a normal water level, which you can get in events.

In contrast, Option 2, and 2a, is to actually fix the problem, which is the poorly designed walls, and rebuild those correctly. And so my second big concern, which will be the subject of at least most of my questions, I think of lot of our overall discussion, is that we are choosing the wrong fix for the biggest thing that went wrong, that caused catastrophic flooding in New Orleans.

I do not want to repeat the mistakes of history. After Hurricane Betsy, all of us, the Country, made a big mistake and chose the wrong path forward in terms of our protection system in greater New Orleans. And that led to the devastation of Katrina. The Country chose that, basically, because it was the cheaper alternative.

Right now, the Corps wants to move forward with Option 1 and I think there is a push in that direction basically because it is a cheaper alternative. I do not want to repeat that grave mistake in history and save pennies on the front end and pay hundreds of billions of dollars on the back end with another catastrophic event.

So, thank you for your leadership on this and I also thank my colleague, Senator Landrieu, for all of her leadership on these issues.

Senator BOXER. Thank you, Senator. Senator Landrieu.

OPENING STATEMENT OF HON. MARY L. LANDRIEU, U.S. SENATOR FROM THE STATE OF LOUISIANA

Senator LANDRIEU. Thank you, Madam Chair.

I have a long and very detailed report for the Committee. I would like to submit it to the record.

Senator BOXER. Without objection.

[The referenced material was not received at time of print.]

Senator LANDRIEU. Thank you. I will summarize my remarks in the 5 minutes provided.

I want to thank you, Madam Chair, for your continued focus on this very critical issue, not just for Louisiana and South Louisiana, but for the whole Gulf Coast and in many coastal areas in America. The fact that you, at the request of Senator Vitter and me, have continued this focus and others, is truly commendable. Thank you for your visits, thank you for flying over the wetlands, thank you for walking the levees, and that hands-on approach, I think, will be very valuable as we move forward.

I want to speak, just for a moment, about the bigger picture, as Senator Vitter has outlined some of the specifics about the project before us. I want to say that discussing the status of hurricane protection and critical coastal restoration underway in South Louisiana is of extreme importance.

This area, Madam Chair, is one of the most unique and fragile delta landscapes in the world, a landscape that drains over 40 percent of the North American continent. Positioned at the mouth of one of the largest and most powerful rivers in the world, Coastal Louisiana and the delta hold a tremendous bounty of natural and human resources. Our coast is a working coast that contributes 90 percent of America's off-shore energy production, 30 percent of overall oil and gas supply, and 30 percent of its seafood in the lower 48 States. And that is not counting the navigation that comes into this as well.

But the coast is in a state of crisis, losing 25 to 35 square miles of wetlands per year and, as we pointed out a number of times on the maps, Madam Chair, putting dozens of cities, not just New Orleans, but dozens of cities, suburban areas, mid-size cities, and villages and agricultural communities at risk.

This Committee bears an immense responsibility to the Nation as it relates to flood control and the ecosystem. I thank this Committee for its work, primarily through the WRDA bills, and we look forward to working with you on WRDA bills in the future.

But as you said, Madam Chair, we have a long way to go. We are not nearly where we need to be. We have got to change our direction. We have a long way to go to ensure that the entire coast of Louisiana can thrive with safer cities, vibrant communities and more sustainable landscapes.

Of particular concern today, as Senator Vitter pointed out, is the decision by the Corps of Engineers to proceed with a plan for storm surge protection that will neglect a critical piece of the puzzle, in my opinion.

The Greater New Orleans Area averages one of the rainiest cities in the United States. The heaviest and most intense rainfalls occur during hurricane season. If Hurricane Katrina taught us anything, we must coordinate and manage our outer hurricane protection with the interior drainage and flood control of the city. If we fail to properly design the system, we will fail the people of New Orleans and the region again and likely repeat the same mistake that

killed over 1,400 people in Louisiana and brought a major American city to the brink of collapse.

I urge this Committee to take swift action to address the concerns of our State, the city of New Orleans, Jefferson Parish and the New Orleans Sewage and Water Board. You will hear from them later. But let me go on.

While the subject today is focused on this project, I want to say that we need a new direction. The piecemeal approach that we have used for over the last really 40 or 50 years is what I now call a patch and pray model. Madam Chair, this model has failed our Nation. It failed the people of New Orleans and our region, it has failed South Louisiana. Our coastal communities can no longer afford the backlogs, the delays, the inefficient process of overlapping and confusing Federal authorization, and delayed appropriations.

We must build a better model. We must move in a new direction. We must find a new way to focus our efforts at the Federal, State and local levels so we can construct the best water infrastructure and a more natural landscape that keeps communities safe and strong.

I went in search of a new model, Madam Chair, and I believe that I found one, not in its identical form, but in The Netherlands, with EPA Administrator Lisa Jackson and members of your own staff. What we learned from the Dutch model, I believe we can learn a great deal.

I will not go into the details. They suffered a catastrophic flood, but through reorganization, professional water management districts, by securing a permanent funding source and the gathering of political will and planning, Madam Chair, not just for 6 months or a year, but for decades. They are now planning almost for centuries. How refreshing. This is what our Government needs to aspire to.

I know that my time is at end, but let me just——

Senator BOXER. I will give you another minute to close.

Senator LANDRIEU. Thank you.

Let me just conclude with this. What I learned in The Netherlands is that people can live, safely and securely, below sea level and near the water. What a novel idea. Because many people in America, Madam Chair, including maybe some members of this Committee, do not believe that people can live safely below sea level and near the water. Well, we have a problem since we have 20 million or more people living below sea level in America, maybe more, it is a rough estimate, including in the Sacramento Valley, as well as 50 percent of the American people living within 50 miles of the coast. We need a new model.

So that is what my testimony is about today. I am going to supply some more materials from the ongoing dialogs with the Dutch. The Dutch Deltaurus Institute, I believe, is the finest in the world. And I believe this Committee, under your leadership, Madam Chair, can provide the extraordinary leadership necessary to change direction, to seek a new model, a safe model, not just for Louisiana and the Gulf Coast, but for coastal communities throughout this Nation. I pledge to work with you and your Committee every step of the way in a bipartisan manner to accomplish this.

Again, I thank you very, very much and look forward to the testimony and I will be staying to hear the specifics on the proposal Pump to the River today.

Senator BOXER. Please join us right up here.

At this time, we call to the table Brigadier General Michael Walsh, Commander, Division Engineer, Mississippi Valley Division, U.S. Army Corps. Welcome, Commander. I should say General. Welcome, General, and please read your statement or place it in the record and summarize it and then we will ask questions.

STATEMENT OF BRIGADIER GENERAL MICHAEL WALSH, COMMANDER, DIVISION ENGINEER, MISSISSIPPI VALLEY DIVISION, U.S. ARMY CORPS OF ENGINEERS

General WALSH. Thank you, Madam Chair and members of the Committee.

I am Brigadier General Mike Walsh, Commander of the Mississippi Valley Division, U.S. Army Corps of Engineers, and also the President-Designee of the Mississippi River Commission.

Thank you for this opportunity to discuss the Corps' ongoing reconstruction, restoration and improvement efforts on the Hurricane and Storm Damage Risk Reduction System for the Greater New Orleans area.

Just a quick pause. We are engaged in multiple fronts, from supporting engineering work for our armed forces here in the United States as well as overseas, to water resource engineering from Canada to the Gulf Coast. We have recently been reminded by our sacrifice of some of our teammates when we lost three civilians during Memorial Day to an IED that hit one of our convoys in Fallujah. Our civilians and soldiers are engaged in harm's way today.

The Federal projects for Greater New Orleans were extensively damaged, as you mentioned, by Hurricane Katrina in 2005. With quick action from Congress to provide authority and appropriations, the Corps repaired and restored 220 miles of the system to the pre-Katrina level of protection.

Our immediate operational goal is to provide risk reduction from hurricanes and storm surge that have a 1 percent chance of occurring in any given year by June 1, 2011. We are using the overall resources of the entire Mississippi Valley Division and other Corps expertise across the Nation to deliver, including the Engineer Research and Development Center, also known as ERDC. It is an award winning research facility recognized worldwide. We are also using folks from the Northwest Division, Walla Walla District, Kansas City District, Portland, North Atlantic Division, the Baltimore and Philadelphia Districts, the Great Lakes and Ohio River Division, the Chicago District, and many others.

But even beyond this internal effort, we are also leveraging the knowledge and capabilities of our partners in industry, architectural firms, members of academia, and international counterparts to develop and apply state-of-the-art engineering solutions.

Our overarching goal is to provide a reliable Storm Surge Risk Reduction System that will deliver in compliance to authorities and appropriations to meet the needs of Southeast Louisiana. I plan to highlight a few to date and provide an overview of the ongoing efforts to restore the coastal ecosystem of Louisiana.

More details are provided in my written testimony, Madam Chair, and I will be happy to answer questions afterwards.

With regard to the Hurricane Storm Damage Risk Reduction System status, the risk reduction systems in the New Orleans area include about 350 miles of levees and floodwalls, navigable floodgates, canal closure structures, pump stations and other structures. The threat of a 100-year storm surge is being addressed through improvements to the perimeter system composed of the Lake Pontchartrain and Vicinity and the West Bank and Vicinity projects that protect major areas of Jefferson, Orleans, Plaquemines, St. Bernard and St. Charles parishes.

There are also interior drainage systems that provide for the removal of rainfall that is being addressed through improvements on the Southeast Louisiana Urban Flood Damage Reduction Project, also known as SELA.

Major features of the work include erecting surge protection barriers, building levees and floodwalls, replacing I-walls with stronger T-walls, adding scour protection, making repairs to existing pump stations, storm proofing pump stations, improving interior drainage, and restoring, completing and improving components of the existing perimeter protection system.

The authorized and funded work also includes incorporating the Plaquemines Parish non-Federal levee system into the existing New Orleans to Venice hurricane risk reduction project and improving levees in Terrebonne Parish and work in Grand Isle as well.

Today, we are more than one-third through with the construction of improvements. The system is stronger and more resilient than prior to Katrina or at any other time in history. Extensive modeling, lessons learned and risk informed processes have enhanced our design criteria for on-the-ground construction and the progress continues.

The contracting effort to accomplish this massive construction project in a short timeframe is immense. We are maintaining our aggressive obligation schedule originally laid out in 2007, and we have awarded over 190 contracts and obligated $4.2 billion for the program.

The majority of the funds are planned for obligation by the end of year 2009. Current obligations include over $1.2 billion directly to small and disadvantaged businesses. About 37 percent of the obligations are going directly to small and disadvantaged businesses.

With the assistance of the Office of the Federal Coordinator for the Gulf Coast Rebuilding and in close partnership with Governor Jindal, we have signed all three major partnership agreements with the State of Louisiana necessary to proceed with construction.

We have also signed all deferred payment agreements with the State of Louisiana that extend the State's payments for cost-shared portions of the work over a 30-year period, supporting the policy announced by the Federal Government in the State of Louisiana in August 2008.

We have implemented a robust independent external peer review of the Hurricane Storm Damage Risk Reduction System. This includes the overall design criteria and their application during design and construction, the armoring manual and the quality man-

agement plan. The most complex projects will receive additional peer review during construction and the design process.

Recognizing the need and the fundamental responsibility to reach out to stakeholders and to inform our decisionmaking with the public's input, the Corps has hosted more than 110 public meetings in Jefferson, Orleans, Plaquemines, St. Bernard and St. Charles parishes to listen and to consider public comment and include critical information into the development of the system.

Last year during Hurricanes Gustav and Ike, we coordinated with the Sewerage and Water Board of New Orleans to close the gates of the Interim Closure Structure at the outfall canals of Lake Pontchartrain, and then pumped the storm water out of the canals. The 12-foot surge from Hurricane Gustav tested the system and the Nation watched as waves overlapped the flood walls on the Inner Harbor Navigation Canal. The system performed as designed. No damages to the floodwalls occurred due to the new T-wall designs and the armoring and splash pads installed at the existing I-walls.

In regard to other efforts in addition to the previously described ecosystem restoration, higher levels of storm risk reduction measures are also being studied in coastal Louisiana as part of the authorized Louisiana Coastal Area Program and the ongoing Louisiana Coastal Protection and Restoration Study.

The ecosystem restoration activities are conducted under multiple authorities with funding from various sources and several different cost-sharing formulas. They include the Coastal Wetlands Planning, Protection and Restoration Act, also known as CWPPRA, the Louisiana Coastal Area ecosystem restoration program, a related effort to restore wetlands affected by the Mississippi River Gulf Outlet, and the science that is needed to support all of these related restoration efforts.

The Louisiana Coastal Protection and Restoration Final Technical Report is currently undergoing agency and public review and is scheduled to be provided to the Assistant Secretary of the Army in August 2009. This report contains an analysis of Category 5 risk reduction and identifies an array of viable comprehensive plans that include structural, non-structural and coastal restoration measures. The report also establishes the opportunity to move forward on report components for our State partner, the Coastal Protection and Restoration Authority.

In addition, regarding the Mississippi River Gulf Outlet, the comprehensive plan for deauthorizing the deep draft navigation was completed in 2008. The MRGO channel was officially closed to all navigation on April 22, 2009 and construction crews are in the final stages of placing over 300,000 tons of rock to complete the MRGO closure structure by July of this year.

We are in the process of constructing an 18,500-foot long rock dike along the bank of the eastern lobe of Lake Borgne to help maintain the lake as a separate ecosystem. A study to identify the best way to restore wetlands affected by the MRGO is also ongoing. Feasibility scoping meetings for this study were held in April and May of this year, and we plan to release the draft to public comment and external review by May 2010.

Madam Chair, this concludes my testimony and I thank you for allowing me to present the ongoing efforts of the U.S. Army Corps of Engineers in the New Orleans area. It is my pleasure to serve the Army and the Nation. I am prepared to take your questions.

[The prepared statement of General Walsh follows:]

DEPARTMENT OF THE ARMY

U.S. ARMY CORPS OF ENGINEERS

COMPLETE STATEMENT

OF

BRIGADIER GENERAL MICHAEL WALSH
COMMANDER, MISSISSIPPI VALLEY DIVISION

BEFORE THE

ENVIRONMENT AND PUBLIC WORKS COMMITTEE

UNITED STATES SENATE

ON

NEW ORLEANS HURRICANE AND FLOOD PROTECTION AND COASTAL LOUISIANA RESTORATION: STATUS AND PROGRESS

June 16, 2009

Introduction

Madam Chair and Members of the Committee, I am Brigadier General Michael Walsh, Commander of the Mississippi Valley Division, U.S. Army Corps of Engineers. Thank you for the opportunity to be here today to discuss the Corps of Engineers' ongoing reconstruction, restoration and improvement efforts on the Hurricane and Storm Damage Risk Reduction System (HSDRRS) for the Greater New Orleans area. The Federal Hurricane and Storm Damage Risk Reduction System projects for Greater New Orleans were extensively damaged by Hurricane Katrina in 2005. With quick action from Congress to provide authority and appropriations, the Corps repaired and restored 220 miles of the system to the pre-Katrina level of protection and is now working to provide risk reduction from hurricanes and storm surges that have a 1% chance of occurring in any given year (known as 100-year risk reduction).

We are using the overall resources of the entire Mississippi Valley Division and other Corps expertise across the Nation to keep the program on schedule and deliver on our commitment to provide 100-year risk reduction in 2011. Construction will continue after that date to complete other features in 2013. But even beyond this internal effort, we are leveraging the knowledge and capability of our partners in industry, architect-engineer firms, members of academia and international counterparts to develop and apply state-of-the-practice engineering solutions to the Greater New Orleans Hurricane and Storm Damage Risk Reduction System and across coastal Louisiana.

My testimony today will focus on the Greater New Orleans Hurricane and Storm Damage Risk Reduction System progress to date and provide an overview of the ongoing efforts to restore the coastal ecosystem of Louisiana.

Hurricane and Storm Damage Risk Reduction System Status

The risk reduction systems in the New Orleans area include about 350 miles of levees and floodwalls, navigable floodgates, canal closure structures, seventy-three pump stations and numerous other structures. The threat of 100-year storm surge is being addressed through improvements to the perimeter system composed of the existing Lake Pontchartrain and Vicinity (LPV) and West Bank and Vicinity (WBV) projects that protect major areas of Jefferson, Orleans, Plaquemines, St. Bernard, and St. Charles parishes. There is also an interior drainage system which provides for the removal of rainfall that is being addressed through improvements to the Southeast Louisiana Urban Flood Damage Reduction Project (SELA) project. SELA is designed for a 10-year rainfall event.

Major features of the work we are doing in Louisiana include erecting surge protection barriers to reduce storm surges entering the Inner Harbor Navigation Canal (IHNC), adding scour protection, replacing deficient I-walls with stronger T-walls, making repairs to existing pumping stations, storm proofing pump stations, improving interior drainage and restoring and completing components of the Lake Pontchartrain and Vicinity (LPV) and West Bank and Vicinity (WBV) projects. The authorized and funded work also includes incorporating the Plaquemines Parish non-federal levees into the existing New Orleans to Venice hurricane risk reduction project, and improving levees in Terrebonne Parish. In addition, ecosystem restoration and higher levels of storm risk reduction measures are also being studied for coastal Louisiana as part of the

authorized Louisiana Coastal Area program and the ongoing Louisiana Coastal Protection and Restoration study.

Today we are more than one third through construction of the improved Hurricane Storm Damage and Risk Reduction System. The system is already stronger and more resilient than prior to Katrina and at any time in history. Extensive modeling, lessons learned, and risk informed processes have enhanced our design criteria and on-the-ground construction. The progress continues to occur.

The contracting effort to accomplish this massive construction project in a short time frame is immense. We are proud of our accomplishment in maintaining our aggressive obligation schedule, originally laid out in 2007. We have already awarded over 190 contracts and obligated over $4.2 billion for the program. The majority of funds are planned for obligation by the end of 2009. Current obligations include over $1.2 billion to Small and Disadvantaged Businesses, 37% of all contract obligations. We are cognizant of the opportunities to contribute to small and disadvantaged businesses' development.

With the assistance of the Office of the Federal Coordinator for Gulf Coast Rebuilding and in close partnership with Governor Jindal, we have signed all three major Project Partnership Agreements with the State of Louisiana necessary to proceed with construction, namely those agreements associated with the WBV, LPV, and SELA Projects. We have also signed all deferred payment agreements with the State of Louisiana that extend the State's payments for the cost-shared portion of the work over a 30-year period, supporting the policy announcement between the Federal government and the State of Louisiana in August 2008. The state's estimated cost share is $1.83 billion, of which $.33 billion is the real estate acquisitions and $1.5 billion is the state's required cash contribution. Because of the deferred payment agreement, $1.5 billion of the $14.3 billion in Federal funds appropriated for this program is funding the non-Federal cash requirement until the non-Federal funds are received.

We have implemented a robust independent external peer review of the Hurricane Storm Damage Risk Reduction System. This includes the overall design criteria and their application during design and construction, the armoring manual, and the quality management plan. The most complex projects will receive additional peer review during design and construction.

To allow for safe continued operation of the interior drainage system during hurricanes and storm events, we constructed five new safe rooms for pump station operators and added storm proofing in Jefferson Parish for more than $28 million; completed 47 pump station repairs in Jefferson, Orleans and St. Bernard Parishes for a total of more than $56 million; and awarded contracts for 16 pump station repairs in Plaquemines Parish for more than $19 million --- all to be completed in 2009. The safe rooms and pump station repairs were all 100% federally funded. We are very close to finalizing an overarching agreement that would address the remaining portion of the $340M in storm proofing work in Jefferson and Orleans parishes.

We have awarded all Harvey Canal floodwall contracts (five), totaling about $340 million. No federal protection previously existed along the east side of Harvey Canal, making this area the most vulnerable on the West Bank. About 3.5 miles of floodwalls and one mile of levee will be constructed along the east side of the Harvey Canal, and we expect to complete this work in the fall of 2010. However, the 100-year level of risk reduction will not be achieved until the Gulf

Intracoastal Waterway - West Closure Complex is constructed, currently scheduled to finish by June 2011.

We completed rebuilding three pump stations in St. Bernard Parish for the Lake Borgne Basin Levee District. The Corps spent more than $20 million to rebuild the pumps, which were severely damaged during Hurricane Katrina.

Recognizing the need and fundamental responsibility to reach out to stakeholders and to inform our decision making with public input, the Corps has also hosted more than 110 public meetings in Jefferson, Orleans, Plaquemines, St. Bernard, and St. Charles parishes to obtain public comment into the development of the system.

Last year during Hurricanes Gustav and Ike, we coordinated with the Sewerage and Water Board of New Orleans to close gates at the Interim Closure Structures at the outfall canals at Lake Pontchartrain and then pumped storm water out of the canals. The 12-foot surge from Hurricane Gustav tested the system and the Nation watched as waves lapped over the floodwalls along the Inner Harbor Navigation Canal (IHNC). The system performed as designed. No damages to the floodwalls occurred, due to the new T-walls, the armoring, and the splash pads installed for existing I-walls.

Inner Harbor Navigation Canal (IHNC) Surge Barrier

In 2008 we awarded the largest-ever Corps Design-Build contract for the IHNC surge barrier at Lake Borgne. Project features consist of three navigable gated structures and a concrete pile-supported barrier wall stretching across the Gulf Intracoastal Waterway and the Mississippi River Gulf Outlet (MRGO). Once constructed, the surge barrier will be the largest in the world and will provide risk reduction from flooding to the Ninth Ward, Gentilly, New Orleans East, Orleans Metro, and St. Bernard Parishes. Construction is underway on the concrete pile-supported barrier wall and overall project completion to provide 100-year risk reduction is scheduled for June 2011. Extensive efforts in engineering analyses, hydraulic modeling, and simulation exercises with pilots have enhanced navigational safety. With input from the navigation industry and the United States Coast Guard, enhanced features include lengthened and tapered guide walls, dolphins, increased impact resistance and more. We continue to work with industry and stakeholders on the operational scenarios of the project.

We have recently updated our project cost estimate for the IHNC surge barrier. In addition to the added features for enhanced navigational safety, other cost drivers include a more robust barrier wall to meet design criteria and the nourishment of 705 acres of marsh performed to meet Louisiana Coastal Zone Management standards. The additional IHNC funding requirement was met within the overall HSDRRS program through a reallocation of funds.

Also included as part of the IHNC surge risk reduction is the Lake Pontchartrain (Seabrook) Floodgate, a navigable surge barrier. This project is now going through the preliminary planning needed to meet the National Environmental Policy Act (NEPA) requirements. We plan to construct this project by the 2011 goal.

Permanent Protection for Outfall Canals

Interim Closure Structures at the three outfall canals (17th Street, Orleans Ave. and London Ave.) currently provide the 100-year level of risk reduction. These Interim Closure Structures are temporary facilities until a permanent solution is implemented. The sites under consideration for the Permanent Protection System for the Outfall Canals are currently being evaluated to comply with NEPA.

The Corps submitted a Report to Congress on 26 February 2009 providing a cost analysis of pump station Options 1, 2 and 2a. The Corps is authorized and funded to construct Option 1, which consists of the construction of permanent gated pumping stations at or near the mouths of 17th Street, Orleans and London Avenue Canals. This is the plan that we have been implementing since the Hurricanes in 2005. The operational effectiveness of Option 1 was demonstrated during Hurricanes Gustav and Ike in 2008 when the temporary control structures and pump stations at the outfall canals were successfully operated in concert with the city's pumps at the interior ends of the canals. We anticipate that the New Orleans District commander could sign the Record of Decision for the Individual Environmental Report (IER) document for the permanent pumping stations by the end of June 2009 and we expect to execute an agreement for initiation of this work with the State of Louisiana in early August 2009.

Local stakeholders have sought support for Options 2 and 2a which would expand the scope of work to include significant modifications to the three main outfall canals of the City's interior drainage system in addition to the pumping stations that are being built under Option 1. Since Options 2 and 2a address interior rainwater drainage issues and not storm surge protection, both exceed our current authority and would require additional authorization and funding for construction.

However, the Corps will include reasonable and prudent measures in the design of the permanent pumping stations, such as deepened sills, within the bounds of our current authority and funding, to ensure that no large work element would have to be removed or replaced if Options 2 or 2a are eventually constructed.

In addition, we have initiated a rigorous re-analysis of the floodwalls that line the canals to validate the safe water elevations in each canal. In that reanalysis we will also be looking for ways to improve the floodwalls and increase the safe water elevations. The London Avenue and Orleans Avenue canal assessments will be available by the end of June, and 17th Street Canal assessment will be available by the end of September. In conjunction with this effort, the Corps is reviewing the operating protocol between the Corps and the New Orleans Sewerage and Water Board and will propose modifications and adjust it as necessary to address any risk of exceeding the safe water elevations. The Southeast Louisiana Flood Protection Authority will assist in the establishment of the external peer review process for these studies.

We have also estimated the effort required to study the feasibility of Options 2 or 2a and provide an engineering analysis of any additional flood risk reduction that could be achieved in improving the system that conveys rainfall runoff to the permanent pump stations. The study would identify and evaluate alternatives for providing rainfall runoff evacuation to include assessments of relative flood risk, environmental impacts, technical feasibility and cost. As I mentioned previously, we are currently authorized to perform this study; however, additional

funding is required. We estimate approximately $15.6 million with a completion schedule of 36 months for this effort.

We remain committed to providing permanent risk reduction at the outfall canals in 2013. As with the entire HSDRRS program, cooperation among the federal, state and local sponsors along with local communities is paramount to achieving this goal.

Gulf Intracoastal Waterway--West Closure Complex (GIWW – WCC)

In May 2009, another major feature of the 100-year system, the Gulf Intracoastal Waterway--West Closure Complex, part of the West Bank and Vicinity project which reduces risk for Jefferson, Orleans, and Plaquemines parishes, was awarded as an Early Contractor Involvement contract. The Corps has worked very closely with EPA, navigation interests, local government and non-government organizations to develop a plan to reduce risk of storm surge inundation on the West Bank. We've developed a plan to minimize impacts to a 3,200-acre wetland area, Bayou aux Carpes, through collaboration with the EPA and other resource agencies. In 1985, EPA, under the authority granted in Section 404(c) of the Clean Water Act (CWA), restricted the discharge of dredged or fill material in Bayou aux Carpes. EPA's Final Determination restricting the discharge of dredged or fill material was based on findings that discharges would have unacceptable adverse effects on shellfish beds and fishery areas, wildlife, and recreational areas. The Corps recently received approval for a modification of the 1985 EPA Final Determination for the actions proposed as a part of the Gulf Intracoastal Waterway West Closure Complex project. We recognize the importance of Bayou aux Carpes and will use special construction techniques to minimize impacts to the wetlands site. Early Contractor Involvement allows the construction contractors to become familiar with the project during the design phases and before construction starts. This allows them an opportunity to order long-lead-time items in advance. Implementation of the West Closure Complex will significantly reduce the risk to a large area of the West Bank by removing over 25 miles of levees, floodwalls, gates and pumping stations along the Harvey and Algiers Canals from exposure to storm surge. Risk reduction to the 100-year level will be completed by the 2011 hurricane season with interim pumping capacity. All project construction is scheduled to be completed in 2013.

St. Bernard Levees and Floodwalls

Following Hurricane Katrina, about 80% of the levees in St. Bernard Parish were either repaired or constructed to achieve the pre-Katrina authorized elevation. In order to meet the design criteria to provide 100-year level of protection, St. Bernard Parish levees would have to be raised between 10 and 15 feet above the current elevations.

After evaluating several alternatives, the Corps found that T-walls on top of existing levees provided the most timely, cost-effective solution. Construction of more traditional earthen levees would have broadened the cross-section significantly, thus requiring a 900 foot wide footprint and more real estate than is currently available, and would require impacting many acres of wetlands. By building floodwalls instead of levees, the Corps is reducing the amount of borrow material needed by approximately 25 million cubic yards. As part of the National Environmental Policy Act (NEPA), the Corps considered opinions and comments of local residents and stakeholders as part of the decision process. On May 26, 2009, the New Orleans

District commander signed the Decision of Record for Individual Environmental Report (IER) 10 which advances the plan to construct 22.3 miles of floodwalls in St. Bernard Parish.

Eastern Tie In

We are currently working with the Plaquemines Parish government on the Eastern Tie In project which will tie the HSDRRS into the Mississippi River levee just south of the town of Oakville on the eastern side of the system on the west bank. Plaquemines Parish government officials have expressed concerns that the proposed alignment would induce flooding to areas south of the town of Oakville. We've extended the public review period for the Individual Environmental Report 13 to address the pros and cons of potential alternatives that we discussed during a June 1, 2009 meeting with CPRA, Plaquemines Parish government officials and Southeast Louisiana Flood Protection Authority – West (SLFPA-W). We've committed to meet again to review in more detail the Corps' hydrologic analysis and compare to the Parish's own hydrologic analysis of flood risk.

Southeast Louisiana Urban Flood Damage Reduction Project (SELA)

We are continuing construction on eight Southeast Louisiana Urban Flood Damage Reduction Project (SELA) interior drainage projects worth about $174 million, with seven of those being accelerated to completion under Public Law 109–148, Department Of Defense, Emergency Supplemental Appropriations to Address Hurricanes in the Gulf Of Mexico, and Pandemic Influenza Act, 2006 (3rd Supplemental). Three of these projects are essentially complete (generating benefits).

Of the work authorized, approved and funded under the SELA program, 51 of 74 contracts have been awarded. Scheduled work in Jefferson and Orleans Parishes is approximately 60 percent complete, and the remaining work is scheduled to be completed in 2016. While completion of the SELA projects is not a requirement to provide 100-year protection to the Greater New Orleans area, completion of SELA projects will continue to improve the system's ability to handle interior drainage.

The Project Partnership Agreement signed on January 16, 2009 with the State of Louisiana paved the way for construction of $1.3 billion of SELA features in Orleans and Jefferson Parishes.

Other Efforts

We are also engaged on several other fronts, primarily under the Louisiana Coastal Protection and Restoration (LACPR) authority and the several authorities that support the ongoing effort to restore the coastal ecosystem. The ecosystem restoration activities are conducted under multiple authorities, with funding from varying sources and an array of different cost-sharing formulas. They include: (1) the Coastal Wetlands Planning, Protection and Restoration Act; (2) a Louisiana Coastal Area (LCA) ecosystem restoration program; (3) a related effort to restore wetlands affected by the Mississippi River Gulf Outlet; and (4) the science needed to support all of these related ecosystem restoration efforts.

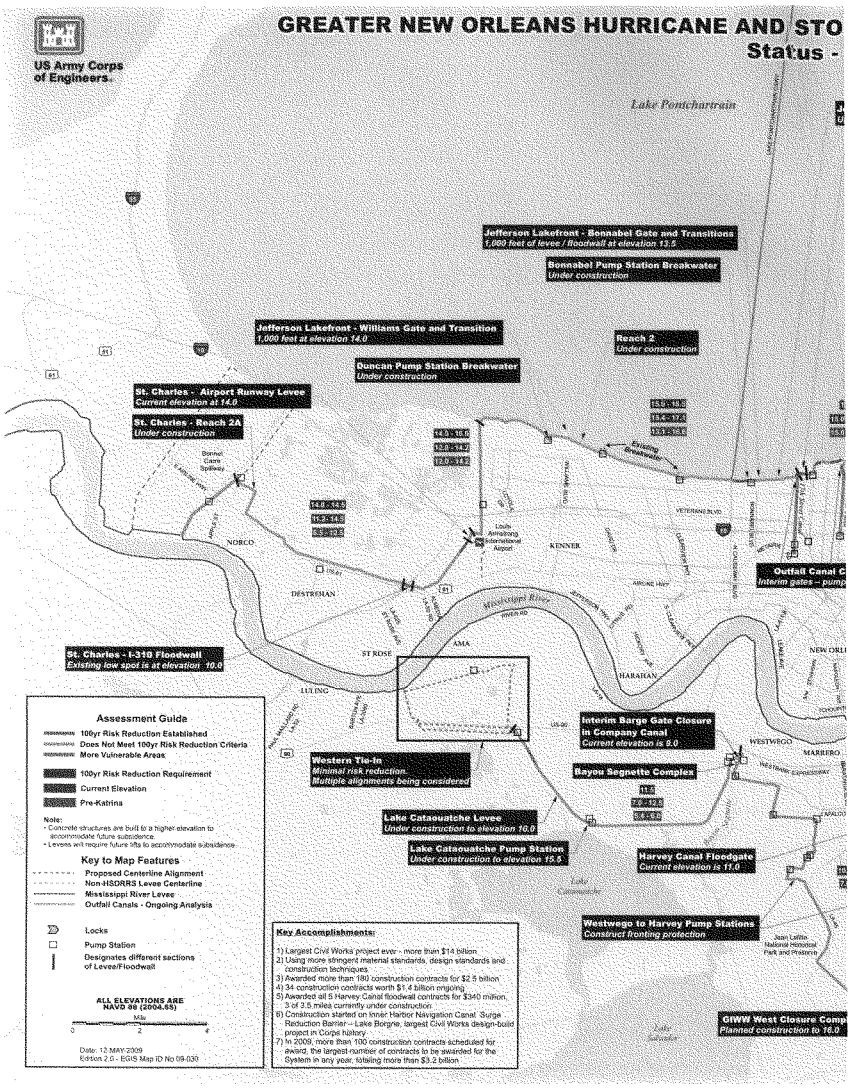
The Louisiana Coastal Protection and Restoration (LACPR) Final Technical Report is currently undergoing agency and public review and is scheduled to be provided to the Assistant Secretary of the Army for Civil Works in August 2009. The report contains an analysis of Category 5 risk reduction as required by the Department of Defense Appropriations Act of 2006 (Public Law 109-148) signed on December 30, 2005. The report identifies an array of viable comprehensive plans that include structural, non-structural and coastal restoration measures for risk reduction in coastal Louisiana. It also establishes the opportunity to move forward on report components with our state partner, the Coastal Protection and Restoration Authority (CPRA).
. The report also establishes the opportunity to move forward on report components with our state partner, the Coastal Protection and Restoration Authority (CPRA).

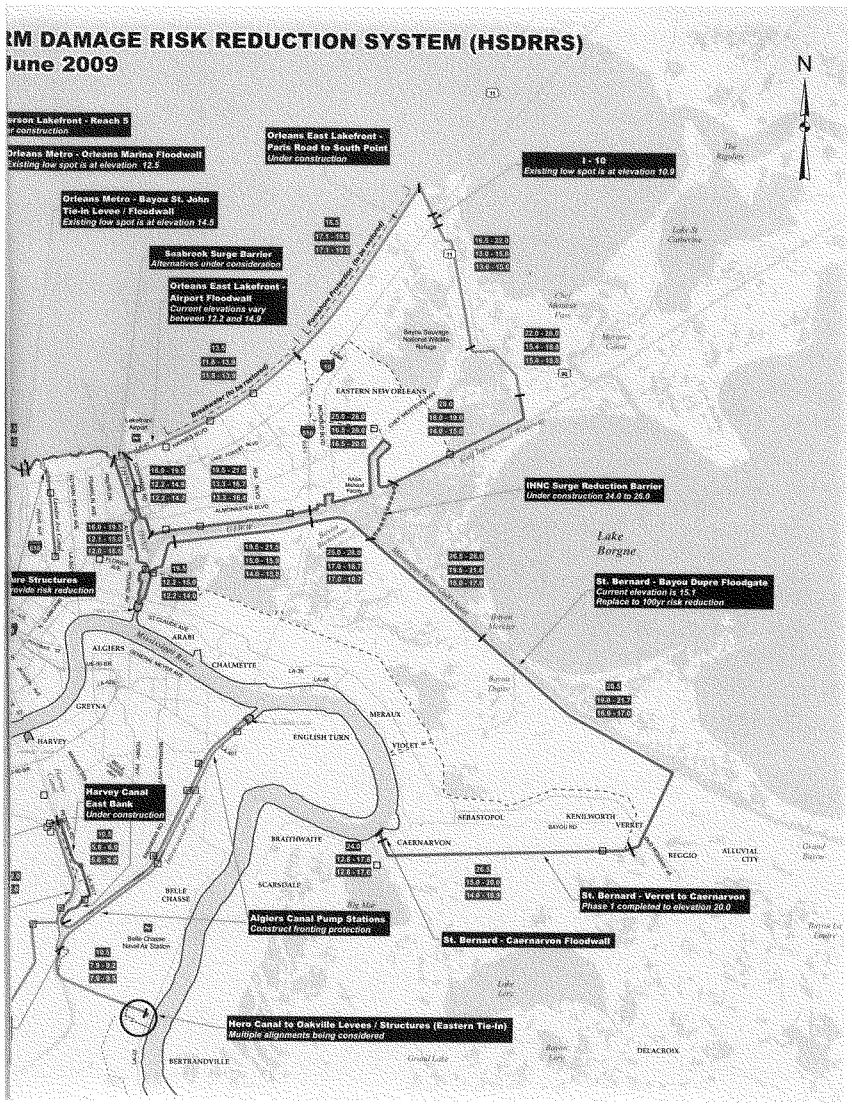
The Coastal Wetlands Planning Protection and Restoration Act (CWPPRA) also referred to as the Breaux Act, was authorized by Public Law 101-646, Title III, Nov 29, 1990. The Act established the authority to produce a list of priority projects and to construct these projects in Louisiana to provide for the long-term conservation of Louisiana's coastal wetlands. Currently, there are 146 active projects of which 76 have been constructed and 18 under construction. Funding is appropriated through the Sport Fish Restoration and Boating Safety Trust Fund (Trust Fund). The program is administered by the Louisiana Coastal Wetlands Conservation and Restoration Task Force, consisting of the Secretary of the Army, Administrator of the Environmental Protection Agency, Secretary of the Interior, Secretary of Agriculture, the Secretary of Commerce and the Governor of Louisiana. The Act designated the Secretary of the Army (Secretary) as the chairman. The Secretary delegated the Task Force chair responsibility to the Army Corps of Engineers, New Orleans District Commander, and similar delegation by the other federal agencies have been made

WRDA 2007 authorized the LCA program. Under the LCA program, the Corps in partnership with the CPRA has initiated feasibility level analysis for 12 of the 15 features. We anticipate initiating the remaining 3 features by FY2010. All 15 features are part of the LCA near term plan. We expect to complete final reports in FY 2010 on 6 of these features in Dec of 2010. In addition we will submit the Barataria Basin Barrier Shoreline Restoration report and the Beneficial Use of Dredge Material Report by the 2nd quarter of FY2010. These reports will then be provided to the Assistant Secretary of the Army (Civil Works) for approval or transmittal in accordance with Section 7006 of WRDA 2007. In addition, there are four other components of the program to further restoration and reduce uncertainties and increase effectiveness of restoration measures.

Since Hurricane Katrina, the Corps of Engineers has been involved in leading a number of simultaneous efforts located on or near the MRGO. The comprehensive plan for deauthorization of deep draft navigation was completed in 2008. The MRGO channel was officially closed to all navigation on 22 April 2009. Construction crews are now in the final stages of placing over 300,000 tons of rock to complete the MRGO closure structure in July 2009. We are also in the process of constructing an 18,500-foot long rock dike along part of the bank of the eastern lobe of Lake Borgne to help maintain the lake as a separate ecosystem. A study to identify the best ways to restore wetlands affected by the MRGO is also ongoing. Feasibility scoping meetings for this study were held in April and May 2009 and we plan to release the draft report for public comment and external review in May 2010.

This concludes my testimony. Again, thank you for allowing me to testify on the ongoing efforts of the Corps of Engineers in the New Orleans area. I will be happy to answer any questions you or the other Members may have.


US Army Corps of Engineers
GREATER NEW ORLEANS HURRICANE AND STO
Status -
Lake Pontchartrain
Jefferson Lakefront - Bonnabel Gate and Transitions
1,000 feet of levee / floodwall at elevation 13.5
Bonnabel Pump Station Breakwater
Under construction
Jefferson Lakefront - Williams Gate and Transition
1,000 feet at elevation 14.0
Reach 2
Under construction
Duncan Pump Station Breakwater
Under construction
St. Charles - Airport Runway Levee
Current elevation at 14.0
St. Charles - Reach 2A
Under construction
Bonnet Carre Spillway
NOBCO
DESTREHAN
Louis Armstrong International Airport
KENNER
VETERANS BLVD
Outfall Canal C
Interim gates – pump
Mississippi River
AMA
ST ROSE
LULING
HABAHAN
NEW ORLI
St. Charles - I-310 Floodwall
Existing low spot is at elevation 10.0
Interim Barge Gate Closure in Company Canal
Current elevation is 9.0
Western Tie-In
Minimal risk reduction.
Multiple alignments being considered
Bayou Segnette Complex
WESTWEGO
MARRERO
Lake Catsouatche Levee
Under construction to elevation 10.0
Lake Catsouatche Pump Station
Under construction to elevation 15.5
Harvey Canal Floodgate
Current elevation is 11.0
Lake Cataouatche
Westwego to Harvey Pump Stations
Construct fronting protection
Jean Lafitte National Historical Park and Preserve
GIWW West Closure Comp
Planned construction to 16.0
Lake Salvador
Assessment Guide
100yr Risk Reduction Established
Does Not Meet 100yr Risk Reduction Criteria
More Vulnerable Areas
100yr Risk Reduction Requirement
Current Elevation
Pre-Katrina
Note:
- Concrete structures are built to a higher elevation to accommodate future subsidence.
- Levees will require future lifts to accommodate subsidence.
Key to Map Features
Proposed Centerline Alignment
Non-HSDRRS Levee Centerline
Mississippi River Levee
Outfall Canals - Ongoing Analysis
Locks
Pump Station
Designates different sections of Levee/Floodwall
ALL ELEVATIONS ARE NAVD 88 (2004.65)
Mile
0
2
4
Date: 12 MAY 2009
Edition 2.0 - EGIS Map ID No 09-030
Key Accomplishments:
1) Largest Civil Works project ever - more than $14 billion
2) Using more stringent material standards, design standards and construction techniques
3) Awarded more than 180 construction contracts for $2.5 billion
4) 34 construction contracts worth $1.4 billion ongoing
5) Awarded all 5 Harvey Canal floodwall contracts for $340 million, 3 of 3.5 miles currently under construction
6) Construction started on Inner Harbor Navigation Canal Surge Reduction Barrier – Lake Borgne, largest Civil Works design-build project in Corps history
7) In 2009, more than 100 construction contracts scheduled for award, the largest number of contracts to be awarded for the System in any year, totaling more than $3.2 billion


RM DAMAGE RISK REDUCTION SYSTEM (HSDRRS)
June 2009
N
rson Lakefront - Reach 5
r construction
Orleans Metro - Orleans Marina Floodwall
Existing low spot is at elevation 12.5
Orleans East Lakefront - Paris Road to South Point
Under construction
I - 10
Existing low spot is at elevation 10.9
Orleans Metro - Bayou St. John Tie-in Levee / Floodwall
Existing low spot is at elevation 14.5
Seabrook Surge Barrier
Alternatives under consideration
Orleans East Lakefront - Airport Floodwall
Current elevations vary between 12.2 and 14.9
Breakwater (to be restored)
EASTERN NEW ORLEANS
INNC Surge Reduction Barrier
Under construction 24.0 to 26.0
Lake Borgne
re Structures
ovide risk reduction
St. Bernard - Bayou Dupre Floodgate
Current elevation is 15.1
Replace to 100yr risk reduction
ALGIERS
ARABI
CHALMETTE
GRETNA
HARVEY
MERAUX
ENGLISH TURN
VIOLET
Harvey Canal East Bank
Under construction
BRAITHWAITE
CAERNARVON
SEBASTOPOL
KENILWORTH
VERRET
BEGGIO
ALLUVIAL CITY
SCARSDALE
BELLE CHASSE
St. Bernard - Verret to Caernarvon
Phase 1 completed to elevation 20.0
Algiers Canal Pump Stations
Construct fronting protection
St. Bernard - Caernarvon Floodwall
Belle Chasse Naval Air Station
Hero Canal to Oakville Levees / Structures (Eastern Tie-In)
Multiple alignments being considered
BERTRANDVILLE
DELACROIX
Lake Lery
Grand Lake

Environment and Public Works Committee Hearing
June 16, 2009
Follow-Up Questions for Written Submission

Questions for General Walsh

Questions from:

Senator Barbara Boxer

1. On June 12, 2009, the Office of Special Counsel (OSC) concluded an investigation into claims made by Maria Garzino, a Corps employee deployed to New Orleans following hurricane Katrina and involved with the installation of pumping systems for the New Orleans outfall canals. The investigation reinforced Ms. Garzino's claims. In particular, OSC found that the existing hydraulic pumps that were installed in the three outfall canals following the hurricane are not fully reliable. However, the Corps has stated publicly and your own testimony at the hearing on June 16 stated that the pumping system performed as designed during Hurricanes Gustav and Ike. In the light of the OSC investigation, will the Corps revise its previous statements, communicate the results of the OSC investigation publicly, and inform the citizens of New Orleans that the pumping system as currently built do not adequately provide 100-year flood protection?

The interim control structures and pump stations reliably provide 100-yr level risk of reduction from storm surges for greater New Orleans. The Interim Closure Structures (ICS) and pump stations performed as designed during Hurricanes Gustav & Ike – the gates were closed and the pumps were operated in coordination with the Sewage & Water Board of New Orleans' system. The ICS provide 100-year storm surge risk reduction, when the gates are closed, by providing a 16 foot high surge barrier across the mouths of the outfall canals as will the permanent pump stations. The pumps, which allow for the drainage of rainwater to continue during storm events when the gates are closed, do not provide protection from storm surge. The pumping capacities of the temporary pumps, which pump water out of the canals, are sized to accommodate the Sewerage and Water Board's ability to pump water into the canals, which is approximately the amount of rainfall expected in a 10-year rainfall event. These temporary pumps are expected to have only a limited life. Consequently, the Department of Defense Inspector General report dated February 27, 2009 found: *"as long as the permanent facilities proceed according to schedule and a thorough inspection and maintenance program is followed for the temporary facilities, there are no immediate vulnerabilities to catastrophic failures with the hydraulic pumping systems or their supporting systems"*.

2. The OSC investigation also substantiated claims that contracting protocols were violated and these violations resulted in procurement of untested and ultimately, unreliable pumps at a cost of hundreds of millions of dollars. The investigation also noted that the installation of new direct-drive pumps is necessary to replace the deficient, existing hydraulic pumps that were installed in 2007 and that replacement costs will be

greater than $430 million. Why did the Corps install hydraulic pumps at a cost of hundreds of millions of dollars that could now have to be replaced for hundreds of millions of additional dollars just 3-5 years later? Does the Corps intend to implement any reforms to prevent similar contracting and procurement practices from taking place in the future that result in the procurement of defective equipment at significant cost to the taxpayer?

Following Hurricane Katrina in August 2005, the immediate priority for the Corps of Engineers was to provide storm surge protection at the outfall canals prior to the upcoming 2006 hurricane season. In this limited timeframe, it was not technically feasible to acquire permanent pump stations capable of providing the long term service required for the Greater New Orleans Hurricane and Storm Damage Risk Reduction System (HSDRRS). The closure structures and pumps were always intended to be temporary until permanent pump stations could be constructed as part of the HSDRRS. The temporary pumps were needed to remove rainwater from the city's three outfall canals in the event the gates were closed to keep storm surge from entering the canals. The procurement cost of the initial 40 hydraulic pumps was approximately $40 million. Upon completion of the initial pumps and gate structures, the Corps added capacity with the installation of 19 direct drive pumps at a procurement cost of $52 million. At this time the pumps are fully reliable, but have an estimated service life of 5-7 years, beyond which the reliability of the pumps will progressively diminish.

The Government Accounting Office and Department of Defense Inspector General both investigated the contracting protocol allegations and found that there were no substantive violations. Their investigations yielded the following two recommendations and steps have been taken to implement both:

1. Take steps, through additional guidance or otherwise, to reinforce the importance of adherence to sound acquisition practices, even during expedited procurements, including ensuring that important contract provisions, such as any required testing, are clear so that the contractor and the government understand what conditions or criteria must be met for successful completion of the contract; and,
2. Develop procedures to ensure that any required contract-related documentation, including that related to contract pricing, is completed and filed within a reasonable period of time.

3. Would installation of direct drive pumps to provide 100-year storm surge protection at the 17th Street, Orleans, and London Avenue drainage canals, as outlined under Option 1 in the Report to Congress dated August 30, 2007 (Report to Congress) be necessary if only direct drive pumps were installed initially, instead of the hydraulic pumps referenced in the OSC investigation?

The pumps do not provide storm surge protection, but rather address interior drainage of rainwater. Regardless of the types of pumps used, the Corps always

intended to replace the interim closure structures (ICS) and pumps with the permanent pump stations, the construction of which was authorized and funded by Congress along with the rest of the Greater New Orleans Hurricane & Storm Damage Risk Reduction System. The ICS and temporary pumps were installed to provide immediate risk reduction to the people of New Orleans, beginning with the 2006 hurricane season until the permanent pump stations could be constructed. Whether hydraulic or direct-drive, the pumps installed in 2006 and 2007 were designed for a project life of 5 – 7 years.

4. In addition to replacement of hydraulic pumps and installation of permanent closure structures, the Report to Congress outlined additional options for providing storm surge and flood protection. At the hearing on June 16, you testified that the Corps did not have sufficient authorization to carry out anything other than Option 1 to provide 100-year storm surge protection. Please provide a detailed description of the authorizations that the Corps believes would be needed to construct options 2 or 2a?

The Congress would have to enact legislation that specifically authorizes the Secretary of the Army to carry out either Option 2 or 2a, as identified in the Corps Pump Report presented to Congress, because these options include features that go beyond those necessary to provide the storm surge protection intended by the existing authorization.

5. Title VII of the Water Resources Development Act of 2007 (WRDA) required the Corps to meet certain milestones regarding the restoration of coastal wetlands. The law required the Corps provide to Congress within one year of enactment a comprehensive plan for protecting, preserving, and restoring the coastal Louisiana ecosystem. The deadline for providing this plan to Congress was November of last year. Has work on this plan begun, and if so, when will the plan be completed and sent to Congress? Why has the delivery of this plan been delayed?

Section 7002 of WRDA 2007 directs development of a comprehensive plan and further provides that in developing the comprehensive plan, the Secretary shall integrate the Louisiana Coastal Area (LCA) Ecosystem Restoration Plan into the analysis and design of the Louisiana Coastal Protection and Restoration study (LACPR) and ensure that the comprehensive plan is not inconsistent with the State's Master Plan. There have been extensive ongoing efforts to implement the LCA ecosystem restoration plan authorized in WRDA 2007 and the LACPR effort which builds upon the State's Master Plan. Until funds are appropriated to initiate the development of the comprehensive plan, the Corps will continue to focus its efforts on the immediate ongoing initiatives given the importance of these initiatives and their importance to the overall plan.

6. WRDA 2007 also required the establishment of a task force, known as the Coastal Louisiana Ecosystem Protection and Restoration Task Force, to advise the Secretary on efforts to restore and protect the coastal Louisiana ecosystem. At the hearing on June 16, you testified that a recommendation on how to implement the task force has been

submitted to the Secretary. When will the Secretary and the Corps establish and convene this task force? The task force is also required to submit a biennial report to Congress on the progress of restoration efforts. Will the task force be established in enough time to meet this requirement?

Section 7004 of the Water Resources Development Act (WRDA) of 2007 establishes the Coastal Louisiana Ecosystem Protection and Restoration Task Force (Task Force), but to date, funds have not been appropriated to implement Section 7004. In the interim, the Corps New Orleans District and Mississippi Valley Division have successfully engaged Federal and State agency representatives at the regional level throughout the study process for the Louisiana Coastal Protection and Restoration study and the Louisiana Coastal Area Program. Similarly, Corps Headquarters has engaged Washington-level Federal Principals throughout the study process for these efforts. These meetings have been an efficient and effective way to communicate and solicit input from the agencies. Until funds are appropriated for the Task Force, the Corps will continue to engage the Federal and State agencies through both the regional working group and Federal Principals Group. Likewise, the biennial report cannot be prepared until funds are appropriated to implement section 7004.

7. Section 7006 (e) of WRDA 2007 authorized a number of specific restoration projects and set timelines for the completion of feasibility reports for these projects. Please describe the status and expected date of completion for each of these feasibility reports.

Section 7006(e) (1) of Water Resources Development Act (WRDA) 2007 authorizes the Secretary to carry out the Land Bridge between Caillou Lake and the Gulf of Mexico project at a total cost of $56,300,000; the Gulf Shoreline at Point Au Fer Island project at a total cost of $43,400,000; the Modification of Caernarvon Diversion project at a total cost of $20,700,000; and the Modification of Davis Pond Diversion project at a total cost of $64,200,000; if the Secretary determines that such projects are feasible.

In accordance with section 105 of WRDA 1986, an executed feasibility cost sharing agreement (FCSA) is required prior to initiation of the feasibility study to support implementation of these four projects. The Corps executed a FCSA for these projects with the State of Louisiana in June 2009. The Corps will work with the Assistant Secretary of the Army for Civil Works to submit notification to the Committee on Transportation and Infrastructure of the House of Representatives and the Committee on Environment and Public Works of the Senate regarding the status of this study in December 2009, and is making a concerted effort to expeditiously deliver the report no later than November 2011.

Section 7006(e)(3)(A) of WRDA of 2007 authorizes the Secretary to carry out Multipurpose Operation of Houma Navigation Lock project at a total cost of $18,100,000; the Terrebonne Basin Barrier Shoreline Restoration project at a total cost of $124,600,000; the Small Diversion at Convent/Blind River project at a total

cost of $88,000,000; the Amite River Diversion Canal Modification project at a total cost of $5,600,000; the Medium Diversion at White's Ditch at a total cost of $86,100,000; and the Convey Atchafalaya River Water to Northern Terrebonne Marshes project at a total cost of $221,200,000, in accordance with the plans and subject to the conditions, recommended in a final report of the Chief of Engineers if a favorable report of the Chief is completed by not later than December 31, 2010. This section also directs submittal of feasibility reports for these projects by December 31, 2008.

In accordance with section 105 of WRDA 1986, an executed FCSA is required prior to initiation of the required feasibility study to support implementation of these six projects. Execution of the FCSA with the State of Louisiana to begin work on the required feasibility report for these six projects did not occur until November 2008; therefore, submittal of the feasibility report to Congress by December 2008 was not possible. However, consistent with section 7006(e) (3) (B) the Corps is on schedule to meet the critical date of December 31, 2010 for completion of the Chief's Report.

Senator Amy Klobuchar

1. General Walsh, maintaining adequate water levels in the upper Mississippi River is extremely important to barge and tugboat traffic and in turn to the regional and national economy. When extreme weather events occur, how does the Army Corps plan to balance the need to maintain flood control efforts with the need to protect transport vessels which, to keep services running and people employed, must maintain the ability to transport agricultural and other commodities on our waterways?

The Corps of Engineers continuously works to balance flood control and navigation needs for the upper Mississippi River to the extent possible. The navigation locks and dams on the upper Mississippi River do not provide flood control benefits and are not regulated as such. During major floods, dam gates are normally wide open to allow flood flows to pass, and navigation is closed for safety due to inundation of the structures. During drought conditions, the navigation dams are operated to maintain the authorized 9-foot draft navigation as conditions allow. Normally, reservoirs upstream of St. Paul, MN and on tributaries to the upper Mississippi River are not operated nor have the capability to significantly reduce drought impacts to navigation.

Senator James M. Inhofe

1. What was the amount of the Inner Harbor Navigation Canal surge barrier cost estimate increase mentioned in your written testimony? Does the reallocation of funds mentioned mean that now or at some point in the future you will need additional funds for some other feature of the program?

The recent cost increase for the Inner Harbor Navigation Canal (IHNC) surge barriers at Lake Borgne and Lake Pontchartrain (Seabrook) was $540M. The

funds were reallocated from the Armoring Critical Elements feature of the New Orleans hurricane and storm damage reduction system. Several factors contributed to this recent increase in the project cost estimate, including the added features for enhanced navigational safety, design criteria refinements that led to a more robust structural design, material cost increases in 2008 and provisions for the nourishment of 705 acres of marsh necessary to meet Louisiana Coastal Zone Management standards to achieve environmental compliance.

We remain confident in our ability to deliver the entire program within current appropriations. The programmatic cost estimate that established the basis for the budget requests and appropriations included allowances for contingencies and escalation based on rigorous assessments of market risks and uncertainties. The contingencies and escalation were applied across the entire program in the formulation of the cost estimate. The engineering solution for the IHNC corridor, which includes both the Lake Borgne and Lake Pontchartrain (Seabrook) surge barrier system, was both the most complex project feature in the HSDRRS and the most conceptual at the time the original project cost estimate was developed. This resulted in an inherently higher risk of contingencies. Other projects were better defined and are less subject to cost increases. Accordingly, we expect to achieve savings on projects that come in under budget that can be applied to complete the armoring feature, which will be among the last of the system elements to be constructed.

2. With respect to the outfall canals issue, the Corps has said in reports to Congress that Option 2 is generally more technically advantageous than Option 1 because it would have greater reliability and "further reduces risk of flooding." Could you please clarify what is meant by the phrase "further reduces the risk of flooding"? Does it mean that Option 2 provides greater than 100-year level of protection? Does it mean there are (more) interior drainage benefits to Option 2? Or does that statement mean something else entirely?

Both Option 1 and Option 2 provide the same 100-year level of storm surge risk reduction, by relocating the primary line of protection for the area to the lakefront. Both options prevent storm surge from entering the drainage canals. Option 2 "further reduces the risk of flooding" by eliminating the above grade canals and replacing them with below grade canals and by taking the older interior pumping equipment out of service and replacing them with new, more operationally effective equipment at or near the lakefront.

3. Your testimony cited Hurricanes Gustav and Ike as examples to demonstrate the operational effectiveness of Option 1. Could you please describe the relative size and severity of Gustav, Ike and Katrina as experienced in New Orleans, as well as the storm currently being used to represent the 100-year level of protection?

While in the Gulf of Mexico, Hurricane Gustav was a strong hurricane; the minimum central pressure was 941 millibars and maximum sustained winds reaching 130 knots. At landfall on the Louisiana coast on September 1, 2008,

Gustav had weakened to a central pressure of 954 millibars and maximum sustained winds of 90 knots. Peak surges in the New Orleans area reached as high as 11 feet at the IHNC Lock, the second highest recorded surge, second only to Katrina.

Although Hurricane Ike did not make landfall in Louisiana, it was a very large, powerful storm, affecting most of coastal Louisiana in addition to Texas. In many locations along the Louisiana coast, the storm surge was greater than Gustav, and along Southwest Louisiana, the storm surge was greater than Hurricanes Audrey and Rita. While in the Gulf of Mexico, Ike's minimum central pressure reached 935 millibars, with maximum sustained winds of 125 knots.

The peak surge in Lake Pontchartrain for Hurricane Gustav was 4.8 feet and for Hurricane Ike, the peak surge was 5.4 feet, as measured near the London Ave Outfall Canal Interim Closure Structure. Comparable surge measurements near this location are 10 to 11 feet from Hurricane Katrina, and 5.0 – 5.5 feet from Hurricane Betsy. As a result of the interim closure structure, after initial drawdown, the stages in London Ave Outfall Canal were maintained from 2 to 3.5 feet throughout both hurricanes.

The Permanent Closure Structure will be designed for a storm that has a 1 percent annual probability of occurrence that produces a peak surge elevation of 10.1 feet, along with its associated waves. The structure will be designed to ensure 100-year protection into the future; climate changes such as subsidence and sea level rise will be incorporated in the design.

4. What entity currently operates the temporary closure gates and pumps at the lakefront of the three outfall canals? What entity will operate the permanent features?

Since the project is still in the construction phase, the Corps of Engineers operates the temporary closure gates and pumps at the three outfall canals. The authorizing legislation for the permanent closure structures and pump stations requires that the non-Federal sponsor be responsible for 100 percent of the costs of operation, maintenance, repair, replacement, and rehabilitation (OMRR&R) of the permanent features. The non-Federal sponsor (the State of Louisiana) has the latitude to enter into sub-agreements with other agencies to carry out those OMRR&R responsibilities. However, the Corps would continue to look to the State to ensure that these responsibilities are met.

5. Some of the concern about proceeding with Option 1 seems to be concern about the likelihood of flooding during non-hurricane events. While the lakefront closure gates and pumps are being designed for use during hurricanes, are there any reasons (technical, engineering, environmental, cost, etc.) these features couldn't be used during significant, but non-hurricane, weather events?

For non-tropical events, the water levels in Lake Pontchartrain are normally low and the canals drain well by gravity with water levels remaining below the established safe water elevations (SWE). Under these conditions there is no apparent advantage to operating the Interim Control Structures or permanent Option 1 facilities.

On infrequent occasions, non-hurricane weather events cause above normal water elevations in Lake Pontchartrain, which if combined with heavy pumping from the interior pump stations could raise water levels in the canals to near the SWEs. If these conditions occur, there are no technical, engineering, environmental or cost impediments to operating the Interim Control Structures or Option 1 facilities to regulate water levels in the canals, although in the 3 years that the ICS have been in place, the Corps has not lowered gates or run pumps for a non-tropical event. We remain vigilant, monitor lake and weather predictions and prepare staff for possible deployment.

The non-Federal sponsor is responsible for operation, maintenance, repair, replacement, and rehabilitation of the permanent canal closures and pump stations once construction is complete. The non-Federal sponsor will have the discretion to operate the lakefront facilities to regulate water levels in the canals during routine rainwater pumping events.

6. Is the "Pump to the River" component of Option 2a a feature for hurricane protection or for interior drainage?

Pump to the River is an interior drainage component.

7. Has the Corps previously studied the "Pump to the River" component of Option 2a? If yes, what were the conclusions?

Pump to the River was considered as a diversion component of Option 2a in the report to Congress, prepared in response to Section 4303 of Public Law 110-28. The report was far less than a feasibility-level investigation.

The Pump to the River component of Option 2a was not previously studied by the Corps of Engineers. While the Corps has initiated a Section 533(d)study for the Hoey's Basin under the Southeast Louisiana (SELA) program, Pump to the River was not an alternative evaluated in that study. Also, due to lack of funding the study was put on hold. A Project Management Plan (PMP) is now being prepared for the SELA Hoey's Basin section 533(d) study, and in response to Jefferson Parish's request, a pump to the river plan is part of the PMP. Initiation of the study is dependent upon completion and approval of the PMP and appropriation of funds.

8. Do the State and local interests support the Corps' decision to build T-walls on top of existing levees rather than raising the existing levees in St. Bernard Parish?

Since June 2006, the Corps has held numerous public meetings in St. Bernard Parish to ensure the public is informed of activities on the Hurricane and Storm Damage Risk Reduction System (HSDRRS), for providing the 100-yr risk reduction system for St. Bernard Parish. The method for providing the HSDRRS has been described as the construction of a T-wall on top of the existing levees. The State and local interests have been provided a copy of the Project Description Document (PDD) for review. The PDD describes the 100-year risk reduction system (T-walls on top of existing levees). Individual Environmental Documents (IERs) have been produced to comply with the National Environmental Policy Act. These IERs describe the method for providing the 100-year risk reduction system as T-walls on top of existing levees. These documents have been through the required public review period and have been approved by the New Orleans District Commander. To date, no opposition to constructing T-walls on top of the existing levees has been received from the State, local government, Levee Authority, or local levee district. Additionally, for the most part, it is the Corps' understanding that the general public is pleased with the decision to construct T-walls.

9. Could you please talk a little bit about the effect on the Corps of the shift from having numerous non-federal sponsors to having the State be the non-federal sponsor for all of these various components? Has it simplified or clarified things for the Corps? Or has it simply added one more entity to the group of viewpoints you need to take into consideration?

Pursuant to the enactment of legislation in September 2006, two Flood Control Authorities were established; one overseeing flood control on the east bank of the Mississippi River and one on the west bank. The intent was to centralize operations responsibility for flood control projects; facilitate better coordination with Federal partners; and enhance levee district management. The State of Louisiana established the Coastal Protection Restoration Authority to act as the integrator and the single state entity sponsor for the Hurricane and Storm Damage Reduction and Flood Damage Reduction System. My assessment is that this centralization of responsibility supports the "systems" approach for planning, design, construction and operation and maintenance, repair, replacement and rehabilitation of the system. The Corps continues to work with all stakeholders, but establishment of CPRA as the single state entity sponsor has simplified things for the Corps by consolidating responsibilities which has positively affected the desired outcomes and led to a common perspective of the Hurricane and Storm Damage Risk Reduction System as a system.

10. Besides the intended Gulf Intracoastal Waterway - West Closure Complex, the Inner Harbor Navigation Canal surge barrier, and the Seabrook Floodgate, are you aware of any hurricane or flood protection structures located or planned to be located in federal navigable waterways in the United States? If yes, please list them and indicate what entity is responsible for operations and maintenance.

Within the New Orleans District there are nine navigation locks and/or navigable floodgates, which are features of Federal navigation projects operated and maintained by the Corps of Engineers, integrated into the Mississippi River or Atchafalaya River flood protection levee systems. These include: Old River Lock, Port Allen Lock, Harvey Lock, Algiers Lock, IHNC Lock, Bayou Sorrel Lock, Bayou Boeuf Lock, East & West Calumet Floodgates and the Charenton Floodgate.

The Harvey Canal navigable floodgate is a feature of the West Bank and Vicinity Hurricane Protection Project. It is currently being operated by the Corps. The completion of the floodgate was accelerated as part of the 3rd Emergency Supplemental authority (Public Law 109-148) and is only being operated by the Corps until which time that the adjacent Cousins Pump Station expansion project is completed. Upon completion of the Cousins Pump Station expansion, also a feature of the West Bank project, the operations, maintenance, repair, rehabilitation and replacement of the Harvey floodgate will be turned over to the Non Federal sponsor. That turnover is expected to be November 2009.

The proposed sector gate at Bayou Segnette will be constructed in a Federal navigation channel, integrated into the hurricane and storm damage risk reduction system and operation and maintenance of the structure will be the responsibility of the non-Federal sponsor upon completion of construction.

The Golden Meadow Floodgate, now officially known as the Leon Theriot Floodgate, is located in a Federal navigation channel (Bayou Lafourche) and is being incorporated into the Leon Theriot Lock, currently under construction by the South Lafourche Levee District who also operates and maintains the structures.

The sector gate at Bayou Dupre is located in a Federal navigation channel, integrated into the hurricane and storm damage risk reduction system and is operated and maintained by the Lake Borgne Basin Levee District.

As required by the Emergency Supplemental Appropriations Act for Defense, the Global War on Terror, and Hurricane Recovery, 2006, Public Law 109-234, upon construction completion, the operation, maintenance, repair, replacement, and rehabilitation of the surgegates at the West Closure Complex and the IHNC Lake Borgne and Lake Pontchartrain (Seabrook) surge barriers is the responsibility of the non-Federal sponsor.

11. WRDA 2007 directly authorized 9 LCA features and provided contingent authorization for another 6 features, if those features had favorable Chiefs Reports by December 31, 2010. Is the Corps pursuing these 15 features in any particular order? If yes, what is the order and how was it established? Please include information as to what entity advocated for or determined the priority order and whether the priority order was established based on ecological benefits, cost, cost-effectiveness, authorization constraints, a need to sequence multiple features in a particular order, or other factors.

The authorization for the Louisiana Coastal Area as identified in the Chief's Report dated 31 January 2005 required additional investigations prior to the initiation of construction. Overall, 12 project investigations are underway with 10 of those investigations starting after the enactment of WRDA 2007. The investigations for the features authorized in Section 7006 (e)(3) of WRDA 2007 are on track for completion of a Chief's Report by 31 December 2010 (in accordance with the requirements of that section). The investigations for the features authorized by Section 7006(e)(1) are scheduled to be completed by November 2011. The investigation for the Barataria Basin Barrier Shoreline feature authorized by Section 7006(c) is scheduled to be completed by July 2010. The investigation for the Beneficial Use of Dredged Material Program authorized in Section 7006(d) is scheduled to be completed by July 2010. The project management plans for the investigations for the other features that require submittal of a construction report as outlined in Section 7006(c) are being coordinated with the State of Louisiana.

The order of the study starts was based on WRDA 2007 deadlines and the priorities of our state cost share partner.

Senator BOXER. Thank you, General.

General, I am going to ask you a big favor. If you could, after we have asked you our questions, is it possible for you to stay and hear the panel? Senator Landrieu had suggested that would be a good idea. Is that possible?

General WALSH. Yes, Madam Chair.

Senator BOXER. Thank you so much. Because I think it is important.

General, how long have you been on this particular beat?

General WALSH. I took over about 14 months ago. Previous to that, I was General Petraeus' engineer in Iraq.

Senator BOXER. Oh, boy. So you took over 14 months ago. And how long will this assignment run, if it runs its normal course?

General WALSH. I work at the pleasure of the Chief, Ma'am.

Senator BOXER. So, you never know.

General WALSH. Yes, Ma'am.

Senator BOXER. The reason I ask this is, I found in my own State, when I work on major flood control projects, one of the problems is we have great people and then you look over your shoulder, they have the whole history and they are gone. So, I mean I am hoping for some stability here because it makes it really difficult. That is not in your control, but let the record reflect that it is a concern that I have in any of these big projects. I think we really need to have consistency.

General, while the Corps has made significant progress in rebuilding the hurricane protection system of New Orleans, important issues need to be resolved. As we have heard today, local interests, we are going to hear that, object, and so do my two colleagues here, object to the Corps' current plans for the replacement of pumps in the New Orleans outfall canal known as Option 1. The Corps claims other options will need additional study and authorization.

Could you describe to us why the Corps is proceeding with Option 1 and what actions the Corps will take to determine if other options are feasible and to determine which option provides the greatest protection for New Orleans?

General WALSH. Ma'am, we have put together a technical report that we submitted to Congress in 2007 and we had put together a team of both locals and people from academia that laid out a number of different options on how to address the closure structure. They came up with a number of options for us to look at. We have looked at them and there are three options that currently——

Senator BOXER. I am just asking you, why did you pick Option 1 and, in the face of all the disagreement, it seems to me from the two Senators here and, I do not know about the congressional delegation, but it looks unanimous. Plus, the community. Do not give the whole history. Explain to me why you picked Option 1. Is it because it was the cheapest?

General WALSH. No, Ma'am——

Senator BOXER. So what reason?

General WALSH. We are looking at Option 1 as it meets the intent of the authorization and looking at reducing the risk due to storm surges.

Senator BOXER. OK. Well, I am going to let my two colleagues go forward on this in a minute. Not yet, David. David's ready to go.

[Laughter.]

Senator BOXER. Just wait. I want to ask a couple of other questions. And I am going to give my colleagues more time than I have taken because they are the true experts here.

General Walsh, following the hurricanes of 2005, there was a recognition that coastal wetlands work in tandem with levees and other infrastructure to provide hurricane protection. There was a need to do that. Congress directed the Corps to complete a study of how to provide Category 5 hurricane protection that includes but structural elements and wetlands restoration. This study has not been submitted to Congress, as required. Is this the study that is coming to us in August 2009 that you referred to?

General WALSH. Ma'am, we will be submitting it to the Assistant Secretary of the Army for Civil Works in August 2009.

Senator BOXER. When it is going to come here?

General WALSH. I do not know if I can answer that, Ma'am.

Senator BOXER. Well, we need an answer because this is a very, very critical report dealing with the coastal wetlands. So, who is going to make the decision as to when we get to see that report?

General WALSH. The report is being reviewed now by the public and by the National Academy of Sciences. We will be addressing those comments and sending it back through my office and the Chief of Engineers' Office to make sure of its technical completeness and then we will be sending it over to the Assistant Secretary.

Senator BOXER. OK. Now, is that the report that you referred to when you said we will see a report in 2009, or that someone will get a report. Was that the report that you were referring to?

General WALSH. Yes, Ma'am.

Senator BOXER. OK. Well, why has it been delayed?

General WALSH. Ma'am, The LACPR——

Senator BOXER. Do me a favor. Could you say Senator instead of Ma'am?

General WALSH. Yes, Senator.

Senator BOXER. It is just a thing. I worked so hard to get that title, so I would appreciate it. Thank you.

General WALSH. Yes, Senator. The LACPR is an unprecedented and complex study in looking at that much of a coastal area. What we looked at was breaking down the 26 coastal parishes into five planning units, and we spent a large amount of time working with the public and academia on coming up with solutions in those five areas. We have gone through one National Academy of Science review of that draft report and we continue to submit and work with the public and make some changes to that report. We have completed that report and left about four or five options in each one of the five planning units on the way to move forward.

Senator BOXER. Well, I can just say, these deadlines that are asked of you are not just pulled out of the air. There are reasons for it. Do you know how long it takes us to make a case to our colleagues that we need to take action? We need these reports or we are just going to lose time, time, time.

General Walsh, my last question. I am sure you are happy to know. While the Corps has made great progress, I give you that for sure, on rebuilding much of the hurricane protection system in New Orleans, progress has been significantly slower in coastal Louisiana restoration projects that were authorized in WRDA, the Water Resources Development Act of 2007. We had important milestones required in WRDA, such as establishment of a task force to guide restoration and completion of a comprehensive restoration plan. That has not begun. Why are those projects not moving forward more rapidly and what needs to be done to expedite these projects?

General WALSH. Senator, I think we are talking about LCA and we just signed the final four partnership agreement letters with the State. We are proceeding forward and should have those, at least six of those LCA reports completed by December 2010.

Senator BOXER. And you will have that task force appointed to guide the restoration? That was a milestone that we laid out. We said an establishment of a task force to guide restoration and completion of a comprehensive restoration plan. Our understanding is that you have not done that, and it is 2009. We passed this is 2007.

General WALSH. The recommendation for what to do with that task force has been submitted through the Chief's Office and is at the Assistant Secretary's Office——

Senator BOXER. Well, it looks like we are going to have to go up a little higher——

General WALSH. In the timeframe, we have put together a science and technology board and we have hired a science and technology director to help look at some of the science needed to inform those projects as they come due.

Senator BOXER. Well, we are going to stay on it because when we pass a law here we expect the law to be followed. This is not a blame thing. It is just that we need to move forward. We cannot wait until another disaster strikes. You know, if anything I have learned from these two Senators here, and I know from my own State of California and Sacramento, you know, we do not control Mother Nature. We are trying to, but we had better do a better job because no one in this Country wants to see so many thousands and hundreds and millions of people be dislocated.

So, here is the thing. I am going to give Senator Vitter 12 minutes. I am going to give Senator Landrieu 12 minutes. So, they can go unimpeded for that long.

General WALSH. Thank you, Madam Chair.

Senator VITTER. Thanks, Madam Chair, and thank you again General for your leadership.

As I said in my opening statement, I want to focus a lot on the outfall canal issues and Pump to the River, which is critically important to getting this fixed right.

Now, I just want to point out. This is greater New Orleans. These are the three outfall canals we are talking about. These three stars are the breaches in the outfall canals that caused most of the catastrophic flooding east of the Industrial Canal.

Now, General, those walls of the outfall canals were part of a Federal Corps-led project, correct?

General WALSH. Some of those walls were designed and constructed by the Corps of Engineers and some were done by the local Levee Board.

Senator VITTER. They were all, either originally or made part of, a Federal Corps project, right?

General WALSH. Yes, Senator.

Senator VITTER. OK. With about a 70 Federal, 30 local cost split. Correct?

General WALSH. Yes, Senator.

Senator VITTER. Now, where those breaches occurred, the walls have obviously been repaired, correct?

General WALSH. Yes, sir.

Senator VITTER. And a completely new, better design was used. Is that right?

General WALSH. That is right.

Senator VITTER. Where there were not breaches, the walls have not been redesigned or rebuilt. Correct?

General WALSH. That is correct.

Senator VITTER. So, wherever there is not a breach, which is 99 percent of the walls we are talking about, there is the same old faulty design that led to the breaches. Is that fair to say?

General WALSH. Design of those walls was based upon a standard hurricane coming through. Hurricane Katrina was much larger than what the walls were designed for and so what you see was the original designs are showing at about 12 to 14 feet on what those walls were originally designed for on a standard hurricane. We are now looking at something larger than a standard hurricane and, therefore, you hear the discussion of a water elevation that we have agreed to with the Sewerage and Water Board as to where we should allow the water to rise.

Senator VITTER. OK. So, those walls where it did not breach are not being redesigned or not being rebuilt under Option 1. Is that correct?

General WALSH. Right now, Senator, we have an engineer study going on and looking at the walls in all three canals and——

Senator VITTER. But under Option 1, which you want to move forward with, they would not be redesigned, they would not be rebuilt?

General WALSH. That is right. Yes, sir.

Senator VITTER. They would be under Option 2?

General WALSH. They would be redesigned, sir.

Senator VITTER. And I assume rebuilt? We would not just redesign them? We would build them that way?

General WALSH. Yes, sir.

Senator VITTER. OK. So, under Option 1, the solution is to lower the water level allowed in the canal to a lower "safe water level." Is that right?

General WALSH. Right now, as we have worked with the Sewerage and Water Board, certainly with Gustav, they are evacuating the rainwater out of the city, they will put it into the canal, and it will run freely into Lake Pontchartrain. And so, those few times when the water level of the lake gets high enough, we will be working with the Sewerage and Water Board, we will close the gates

and, as they continue to put water into the outlets, we will pump that into Lake Pontchartrain.

Senator VITTER. And you will monitor the water so that it is below this new "safe water level." Correct?

General WALSH. That is correct. And we worked very closely with the Sewerage and Water Board. We had our canal captains work very closely with the very professional staff that they have at the Sewerage and Water Board during Gustav and——

Senator VITTER. In the case of the 17th Street Canal, that "safe water level" is seven or eight feet below the top of the wall. Is that correct?

General WALSH. It is seven or eight feet below the top of the wall. Yes, sir.

Senator VITTER. Now, General, just a real sort of common sense question. Let us say you hired a carpenter to build a bookcase for your home, a tall bookcase, and he builds it and moves it into your home. It looked beautiful and you started putting books on it. Once you put books above, say, the fourth shelf from the floor, it started careening over on you and you could not do that. So you called the carpenter up and explained the problem and he came into your home and took measurements and looked at the design and called in experts. Then a week later he said we figured out what is wrong and we figured out the solution, and the solution is do not put any books above the fourth shelf from the floor. Would that be a satisfying answer to you?

General WALSH. Sir, I would be looking at what the design was. Certainly, the 12-foot wall was built and designed off of a standard hurricane scenario. What happened was a much larger scenario than what we looked at. So during the process, with IPET and others, we looked at multiple, thousands of hurricanes, that could come into that particular area, which would require us to look at that design and reestablish what the safe water levels——

Senator VITTER. Let me just underscore. The safe level is seven or eight feet below the top of the wall. Clearly, that is diminished capacity from the original design. Clearly, you all did not build a wall eight feet higher than you needed to for no good reason, right?

General WALSH. Yes, sir, it was built toward the standard hurricane design and not to what we learned after Katrina. And certainly we would want to use what we learned from Katrina. Again, to use an analogy, it would be taking a bag that could hold 12 pounds of apples and then putting 15 in it. What we are looking for is not putting 12 into that bag. We are looking at putting eight into that bag because we now know that bag can only hold eight pounds of apples.

Senator VITTER. Your August 30, 2007 report to Congress asked you to look at these different options and report on them. It concluded "Option 2 is generally more technically advantageous and may be more effective operationally over Option 1 because it would have greater reliability and further reduces risk of flooding."

And more recently, just on May 20, 2009, Chris Accardo, your Chief of Operations in New Orleans, at a public meeting said very forthrightly at the public meeting, "So when you compare Option 1 to Option 2, this is a no brainer, folks. I heard one politician after

another come up and say they want Option 2 over Option 1. Well, that is obvious. We all want Option 2 over Option 1."

So the Corps, in two different instances, clearly has said Option 2 and 2a is better than Option 1. What do we tell the residents in the area why you want to move forward with Option 1?

General WALSH. Senator, in the same report it shows that Option 1 could be more advantageous considering the engineering challenge and the construction complexities of Option 2.

Senator VITTER. OK, to me that means it is cheaper. What am I missing?

General WALSH. What I think it means to me is that it meets the criteria in regards to providing perimeter protection to what we learned from Katrina.

Senator VITTER. Do Options 2 and 2a not meet that criteria, provide that protection?

General WALSH. Neither 2 nor 2a provide any additional protection from surge.

Senator VITTER. But they provide a heck of a lot more protection from flooding.

General WALSH. From interior drainage, you may be able to get some more benefits out of 2 or 2a. What we are looking at from the authorizations and the funding that is set aside for it is for storm surge.

Senator VITTER. Well, I just point out that the initial program included the canal walls and that was a Federal program under Corps leadership and that was about both. So you cannot just ignore one whole side of the equation now.

General WALSH. And that is why, sir, we established safe water elevations in working with our partners so that as they evacuate the water out of the city from normal rain events, it will pump directly into Lake Pontchartrain.

Senator VITTER. Now, General, as you know, one of the things you all are arguing is that Option 2 and 2a are not authorized. I never understood this. I continue not to understand this. This is authorization language, the language and the only language that Congress passed. And it says the relevant part is used to modify the 17th Street, Orleans Avenue and London Avenue drainage canals and install pumps and closure structures at or near the lakefront. Why does that not describe 2 as well as it describes 1?

General WALSH. Sir, I believe we have the authority to do the study to see if that is a feasible option, but we are not funded to do the study.

Senator VITTER. This is the authorization language to do it. This is the authorization language to actually do the permanent fix. My question is: Does this language not cover Option 2 just as surely as it covers Option 1?

General WALSH. We believe that it covers a study but the study is not funded.

Senator VITTER. OK, can you point to the language that says that? Because I am missing it. I have read this about 100 times and I do not know what you are talking about in terms of study does not cover Option 2. I mean, the language is pretty simple and I do not understand why it does not cover Option 2.

General WALSH. Yes, sir, I would have to answer that for the record. I am certainly not trained as a lawyer to give you that background.

Senator VITTER. OK. Well, I just point out that, in fact, I believe this language covers Option 2 more clearly than it covers Option 1 because it says you can modify the drainage canal. Right? Option 1 does not modify the drainage canals. You just said that a few minutes ago. How does Option 1 modify the drainage canals?

General WALSH. Option 1 is looking at perimeter protection, sir.

Senator VITTER. So, is it not correct that Option 1 does not modify the drainage canals?

General WALSH. Option 1, at this point, does not modify the canal, but as I——

Senator VITTER. Option 2 does modify the drainage canals. Correct?

General WALSH. Option 2 does modify the drainage canal.

Senator VITTER. The authorization language says modify the canals. Now to me, this fits Option 2 better than it fits Option 1 because of that word. What am I missing?

General WALSH. Sir, I would have to have the legal counsel give you that discussion.

Senator VITTER. Well they have and I still do not understand it. I went to 3 years of law school and maybe I need to go back. But it is useful to focus on the plain language and, again, modify is not even a part of Option 1.

Senator BOXER. Senator Landrieu.

Senator LANDRIEU. Thank you. I would like to follow up on that excellent line of questioning by Senator Vitter because it is not just puzzling, but it is aggravating, frustrating and frightening, actually, General, to the people that we represent that whether you are a lawyer or not, this is written in pretty plain vanilla English. And we are having a hard time understanding, as you can just see, why the language that we have read and re-read continues to be blocked by the Corps of Engineers when clearly the language says that Option 2 is legal.

Now, I think Senator Vitter, in his line of questioning, proved that point or as authorized. But let me ask you this question. What amount of study funding do you think is standing between you and doing Option 2? What is the general amount of study funding?

General WALSH. To study Option 2 or 2a would be about $15.8 million.

Senator LANDRIEU. $15 million to do a study?

General WALSH. That is correct.

Senator LANDRIEU. OK. Now, we are spending $14 billion on a project. So, relatively speaking, $15 million would not be that much money. But I think that people would argue greatly with you that it would cost that much money. But, even if it did, even if it did cost $15 million, in light of the billions of dollars that we are spending, it might be wise to conduct such a study, particularly because we think we have already authorized a different approach. Would you agree to that?

General WALSH. No, Ma'am. I believe that the funding that was set aside by Congress was to look at surge——

Senator LANDRIEU. I did not ask you that. I said, would you oppose additional funding? Let us not get focused on whether it is $5 million, or $10 million or $15 million to do the study. Would you or the Corps oppose an additional study if it was required to try to reach a better option?

General WALSH. Senator, if it was funded by Congress, we would proceed with the study.

Senator LANDRIEU. OK. I want to say that I believe the language is very clear. And I believe that we have already authorized you to choose Option 2. I believe that is very clear. But if it is not, Madam Chair, one way forward if it is determined ultimately that it is not, one way forward is to reauthorize a study, fund it and move past this issue.

Let me get to the heart of the matter. Senator Vitter used the bookcase analogy. I would like to use a brake analogy on an automobile. If my family and friends were in a fatal automobile accident and it was brought in for review, the automobile, and it was told to me that the reason is that the brake system did not work, there was something wrong with it, and then the company proceeded to install the same brake system in the automobile, do you think that I would let one member of my family step in that automobile again? I do not think so.

But that is what you are asking the people of Louisiana and South Louisiana. You are just fixing the same system that broke in the first place, General. And you are only fixing the parts of the canal that broke. There are other parts of the canal that were basically at the same level. And that is what has us angry and more than befuddled.

Let me ask you to clarify this. This Committee, as you know, that you are testifying before, is responsible for climate change issues and regardless of the debate about what is causing it, we all know storms are going to intensify and levels of sea level are rising. When you said that the people of New Orleans were now building a system for the region and Jefferson, St. Bernard, Plaquemines and Southeast Louisiana, under the system that you plan to build with the money that we have given you, there is a 1 percent chance per year. What does that mean for someone's lifetime? Can you translate that to lifetime, assuming someone lives 80 years? Is that an 80 percent probability that they are going to be, in their lifetime, catastrophically—what is the 1 percent a year? Explain that in a lifetime for me.

General WALSH. Yes, Ma'am, if I could just go back to the brake analogy and then I will get to that. Certainly, what we have put together in the past was parallel protection for the city. What we are looking at now is perimeter protection for the city. So, we are putting in a different type of brake system to follow the same analogy.

Senator LANDRIEU. Well, I do not necessarily agree with that, a different kind of brake system. You are putting in the same canals. You are basically building, because you testified that you are not modifying. You have testified that you are basically constructing the same system and you are just hoping that the coordination that you might put into place with the Sewer and Water Board, or in the process of putting into place, works. But if you backed up from

it, talk about this 1 percent chance in a year. What comfort does that give the people of our region, that there will be no catastrophic flooding in someone's lifetime?

General WALSH. Yes, Ma'am, we are putting closures out in front of the canals which were not in place prior to—I do not know what an 80-year plan is, but I do know roughly what it is on a 30-year mortgage and you have a 25 percent chance of flooding in a 30-year mortgage. It is 1 percent chance of flooding in any given year.

Senator LANDRIEU. It is a 25 percent chance on a 30-year mortgage. Now, you know that people in St. Bernard Parish have lost their homes, in some instances three times in the last 40 years. So, I am not sure that standard is necessarily accurate or something that we would agree with that you have outlined. But the point is that we want to build a better, stronger system with integrated flood control, not just on our canals, but the interior drainage of this low-lying area. And the coastal restoration that is necessary to protect people from catastrophic flooding.

So, you have testified that the language for the option that we choose is language that will modify according to what our language says in this document here, and you have testified that you would not oppose the funding of a study if it came to that issue. Is that correct?

General WALSH. That is correct, Ma'am.

Senator LANDRIEU. Thank you.

General WALSH. And as we proceed with Option 1, we are looking at putting in adaptable features, a heavier foundation, a lower sill, so that if there is an opportunity for Congress to do something in the future, it will not frustrate those changes in the future.

Senator LANDRIEU. Let me just, as I have a few minutes left, I just want to go over this particular point again because this has been what has frustrated our delegation. Your staff has indicated that the Corps lacks the authorization to implement Options 2 and 2a. Would you specify the exact legislative language that is missing?

General WALSH. Ma'am, I will have to add that for the record and have our folks who work on legislative language submit that.

Senator LANDRIEU. OK. Thank you, Madam Chair.

Senator BOXER. Thank you. Before I take it back to Senator Vitter, I have given him another 5 minutes and you, Senator Landrieu if you want additional time. Senator Udall, would you like to make a comment or two?

Senator UDALL. Thank you, Madam Chair, very much. I just wanted to come by and support my colleague, Senator Landrieu, on her efforts here. I know that she is very interested in seeing that restoration is done in such a way that it is environmentally sensitive and takes into consideration all of the industries in the area.

I toured this area when I was in the House with Representative Toussaint, who is very familiar with the problems down there. We spent several days, flew over the area in a helicopter and got to see things on the ground also. So I know that we have some real, real serious issues.

I have had several visits with my good friend, Mary Landrieu, and I know she takes this very seriously. General Walsh, I hope that I can be here for all of your testimony but I have got a couple

of other things to do. I hope that I will be able to get back. But I wanted to say I think this is an important hearing and it is something that I know that she has worked hard at. And I think part of this has to do, Senator Landrieu, does it not, with your trip that you just took to The Netherlands with the Staff Director, trying to collect information and see what the best way is to tackle this problem, looking for solutions that are out there.

So with that, thank you, Madam Chair.

Senator LANDRIEU. Well, I appreciate that. And I want to say, not to take up too much more time, but the attention that members of this Committee, Madam Chair, have given, both Democrats and Republicans as well, has been so encouraging to the people of our State because we do not think that this is just about Louisiana. We think this is about looking for a new engineering model that will work for the whole Country, of which we happen to be basically the canaries in the mine at this particular point.

It is only going to be a matter of time until a major storm hits Florida or some catastrophic flooding occurs in California and I am waiting for the Corps of Engineers to get to the point where they admit that the model that we have, Senator, is not sufficient in any way to protect people from catastrophic flooding in this Nation. Thank you for being here.

Senator BOXER. OK, so we are going to close this panel by asking Senator Vitter to ask his remaining questions. Then we will move on and hear from the people of New Orleans.

Senator VITTER. Thanks, Madam Chair.

General, you said in your statement that all of your important work in South Louisiana has gone through extensive peer review and similar review. Has the analysis of Option 1 versus Option 2 and 2a gone through any sort of outside peer review?

General WALSH. Yes, sir. As we were putting together the report that we submitted to Congress in 2007, it goes through the evaluation process and the methods that we are looking at and getting multiple comments from many different people. Then we put together a senior review panel that looked at the documents in 2007. That senior peer review had members not only from the Corps of Engineers, but we had members from academia and six members from private architect-engineer firms. Many folks provided input to this report.

Senator VITTER. So, presumably, they validated the comparative analysis I referenced a few minutes ago?

General WALSH. As I understand your question, yes. Yes, sir.

Senator VITTER. OK. Go back to this frustrating authorization, General. You all are now modifying Option 1 to lower the sills, to do other things that would be required if Option 2 is built in the future. Correct?

General WALSH. We are reviewing that, yes, sir.

Senator VITTER. The Corps has told me that is the new Option 1, that Option 1 is modified for that. My question is simple. If you do not have the authority to do all of Option 2, how do you have authority to do part of Option 2 which is modifying the sills and doing what you are talking about doing to be consistent with Option 2? Because that is not necessary for Option 1.

General WALSH. Sir, what we are looking at is for Option 1 to protect the city from perimeter protection and surge.

Senator VITTER. Right, but the modifications I am talking about would only be required for Option 2. So how do you not have authority for Option 2, but have authority to do that, which is part of Option 2?

General WALSH. Sir, the Chief has some minor discretionary authority to make those changes.

Senator VITTER. OK. To me, that means because you all can do what you want. In terms of the dollars, you have also said you have only been given the dollars to do Option 1. Did Congress not give you the dollars, the Corps and the then Bush administration, asked for?

General WALSH. Yes, sir.

Senator VITTER. And the Corps did not say, Congress you have a choice. Option 1 costs this much. Option 2 costs this much. The Corps said, we want these dollars.

General WALSH. What we were looking for is to provide perimeter protection again surge. Yes, sir.

Senator VITTER. I am just pointing out that when you say you only have the money to do Option 1, it is because you only asked for the money to do Option 1. There was no discussion with this Committee or Congress about those choices. Certainly, serving on this Committee, if I had understood at the time that your position 2 years later would be this authorization, this money, excludes Option 2, I would have thrown a fit. But there was no discussion about that. I just put that for the record.

Finally, Pump to the River is a very important component of all of this. That is the a of 2a. It would send a lot of important drainage that goes into the 17th Street Canal in a whole other direction so we do not impact and further stress the 17th Street Canal. Is that a fair statement? A fair description?

General WALSH. As I understand it, yes, Senator.

Senator VITTER. Well, this is a statement, not a question. I think that is very reasonable, given that we are artificially lowering the capacity of the outfall canals with this safe water level. We are saying that the water cannot be allowed to get above seven feet lower than the top of the wall, which is way lower than what it was built for. So, would it not be reasonable, in light of that, to build a supplementary project like Pump to the River that sends some volume of water in another direction to compensate for that lowering of capacity?

General WALSH. Right now, Senator, the Sewerage and Water Board pumps the water out of the city for rain events and tropical events. We do not need to close the gates and provide perimeter protection unless Lake Pontchartrain gets within one foot of the safe water elevation. That did happen in Gustav and Ike, and we sent our canal captains to work with them and we were able to provide just the right amount, or more than the right amount, of coordination to make that happen.

Senator VITTER. General, let me just end with a statement. Again, my big overarching concern is that we could be repeating a grave mistake of history.

After Hurricane Betsy, all of us moved forward and built a protection system that was the cheapest but not the best. And we disregarded the Wrigley's—[phonetically]-protection system that would have prevented water from coming into the lake and we built this system instead. I do not want to repeat that mistake of building something because it is cheaper, but not better.

And again, in this regard, Chris Accardo of the Corps agrees with me. He said at that May 20, 2009 public hearing, referring to that previous episode in the 1950s and 1960s, "That is why you do not have it place today. And if you would have had it in place for Katrina, you would not have had the mess that we have." So, that is what I want to avoid for the future.

Thank you, Madam Chair.

Senator BOXER. OK. Well, Senator Vitter's questioning has brought some other questions to our Senator Landrieu. So, why do you not take 5 minutes?

Senator LANDRIEU. Thank you. It will really only be 2 minutes.

Are you aware that in expert testimony before the Courts, General, on the issue of damage related to the storm, that it has been identified that there was $40 billion worth of damage caused by the failure of this system?

General WALSH. I am not familiar with that.

Senator LANDRIEU. Well, the record will reflect that, and perhaps it may be in the testimony, but $40 billion of additional damage was created by the failure of this levee system. So, when Senator Vitter and I keep pressing for the best project, this is why. We cannot afford another $40 billion or $50 billion or $80 billion mistake. Pinching pennies to be penny wise but pound foolish is the point here.

I just want to ask the final question. You say you talked with the Sewage and Water Board. We are at a point, middle of the storm, storm surge, perimeter protection, the gates come down. What amount of flooding do you think is acceptable in the city?

Have you talked with the Sewage and Water Board about the rain event? How much rain can be absorbed when your gates are closed for your perimeter? Do you know that? Can you testify on that to the record? Is it two feet in Broadmoor or is it five feet in Broadmoor? Or is it three feet in Mid-City? How much rain can we absorb with your gates closed if the storm sits over the city as it has not done in either Katrina or Gustav but it has done in other lifetime in other storms?

General WALSH. Senator, the pumps are built so they can handle the water as the city pumps it out.

Senator LANDRIEU. Currently. At any level of rainfall?

General WALSH. Yes, Ma'am.

Senator LANDRIEU. OK. I am looking forward to the testimony, Madam Chair, of the next panel because that is the issue here. With the canals closed under this plan and a storm sitting over the city dropping heavy rainfall, Orleans and Jefferson, which is about 1 million people roughly, close to 1 million people, are at risk of catastrophic flooding not from the perimeter, but from the rain internal flooding, which is what we are trying to point out here in this testimony.

I thank the Chair. She has been very gracious. And thank you, General, for agreeing to stay because I think it is important for you to hear this next panel.

Senator BOXER. General, I want to thank you. I know this has not been very pleasant but, again, I have to say the Corps works so hard. But I get frustrated sometimes because you have a turnover and one individual finally learns everything, like today you learned about the $40 billion in damages. That is an important piece of information because that should drive what we spend to fix this.

It does not make any sense, it seems to me, to choose an option that is like $1 billion instead of $2 billion, I am just throwing a number out, when you could spend $1 billion and have $40 billion worth of damages and spend $2 billion and not have any damage. I am just pointing this out.

And I think my colleagues have used very important examples, the carpenter example and the brakes example. You know, fool me once, OK, but do not fool us twice here. I do not mean you personally. I mean the Corps as an institution has got to work with us. And I just would beg you to, at some point, think about this. We need to know if you are picking, and I believe you are picking, an option because it is less money. I do believe that. I really do believe that.

We are all in a terrible bind here because we have so much of a problem with our budget, with our debt. But we have to be honest. Look, if you told us that and we decided that is all we can do, then it is on us. But it is so hard for me to accept the fact that this option, in light of what I have been told by my colleagues who have nothing to gain by having to push us for more money, this is their worst nightmare in the world. They have had to push so hard. They do not want to.

But if they, and the next panel, and again you are very gracious to stay, if they are really clear on it, all I can say is do not rush to fund an inadequate project. I am concerned. Senator Vitter has said you may be in the process of signing some agreements to move forward with this. That is a terrible idea.

I would think that you would think enough of this Committee, these colleagues here, and the community, as well as the congressionals, to at least take a pause here and take another look. If I have a message for you, even before hearing the panel, it is that. Do not rush to undertake the expenditure of a lot of funds that might not be adequate for the task.

So, I know it has not been a very pleasant experience for you but I am appreciative of your time and appreciative that you will stay.

With that, we will call up our panel. Jeff Jacobs, Scholar, National Research Council, Committee on New Orleans Regional Hurricane Protection. Steven Peyronnin, I know I did not say that right. Did say that badly? How do I pronounce it? Executive Director, Coalition to Restore Coastal Louisiana. Dr. Robert Twilley, Vice Chancellor of Research and Economic Development, Professor, Department of Oceanography and Coastal Sciences, Louisiana State University. Joseph Rault, President, Rault Resources Group of New Orleans, Executive Committee Board Member, Pump to the River. Thomas L. Jackson, Commissioner and Past President,

Southeast Louisiana Flood Protection Authority—East, retired civil engineer and Past National President of the American Society of Civil Engineers.

Let me just say, this is quite an amazing panel. Because we went so long with our first panel, but I think, I am sure you appreciate the fact that we did in order to get to the bottom of all of these issues, my own schedule means that I need to leave. I will try to stay for as many as I can hear. I am going to hand the gavel, when I leave, over to Senator Vitter and he can run this and include Senator Landrieu. I think with the two of you Senators here, we should be able to get a lot of clarity.

So, why do we not start with Jeff and we will go right through this way. OK?

Go ahead, Jeff Jacobs.

STATEMENT OF JEFFREY JACOBS, SCHOLAR, NATIONAL RESEARCH COUNCIL AND STUDY DIRECTOR, COMMITTEE ON NEW ORLEANS REGIONAL HURRICANE PROTECTION PROJECTS

Mr. JACOBS. Good afternoon, Madam Chair, members of the Committee, and others.

My name is Jeffrey Jacobs. I am a Scholar with the National Research Council and I served as the Study Director for the National Academy of Engineering and National Research Council's Committee on New Orleans Regional Hurricane Protection Projects. The Council is the operating arm of the National Academy, which operates under an 1863 congressional charter to provide independent advice to the Federal Government on scientific and technical matters.

Our committee was convened in December 2005 at the request of Mr. J.P. Woodley, then-Assistant Secretary of the Army for Civil Works, to review reports from the Interagency Performance Evaluation Task Force, or IPET. The IPET was established by the Corps of Engineers to evaluate the performance of the New Orleans hurricane protection system during Hurricane Katrina.

Our committee's fifth and final report was issued in April 2009 and it reviewed the IPET draft final report and also commented on lessons learned during Hurricane Katrina. My comments this afternoon summarize those lessons as identified in our report.

One lesson regards the limits of protective structures. Hurricane Katrina illustrated undue optimism about the ability of structures such as levees and floodwalls to provide absolute flood protection. Post-Katrina strengthening of the system has reduced some vulnerabilities but the risks of inundation and flooding in New Orleans never can be fully eliminated by protective structures.

Another lesson regards the future footprint of the hurricane protection system. Many reconstruction activities apparently are taking place largely according to the system's pre-Katrina footprint, without consideration of whether this configuration is optimal. We recommend that there should at least be some discussions of the pros and cons of different configurations of protective structures.

Another lesson regards relocations. Regardless of future levee construction, it likely will not be possible to provide equal levels of flood protection across the city. Plans for system upgrades should

discourage settlement in areas most vulnerable to hurricane storm surge, and voluntary relocation of people and neighborhoods out of particularly vulnerable areas should be considered as a public policy option.

Another lesson regards flood proofing. Where it is not feasible to relocate people and buildings out of vulnerable areas, significant improvements in flood proofing will be essential. To provide adequate protection against flooding in vulnerable areas, we recommend that the first floor of houses be elevated to at least the height associated with the 100-year storm event.

Another lesson regards the 100-year level of flood protection. The 100-year flood defines areas with a 1 percent chance of flooding. Each year, it is a crucial national flood insurance standard. For areas where levee failure is not a major safety concern, the 100-year standard may be appropriate for developing regulations and setting insurance rates.

However, for heavily populated urban areas where failure of protective structures would be catastrophic, such as New Orleans, the 100-year standard is inadequate. By comparison, the Association of State Floodplain Managers recommends that the 500-year flood be used as a minimum safety standard for urban areas.

Another lesson regards evacuation. Although the disaster response plan for New Orleans successfully evacuated much of the city before Katrina, it was inadequate. Future plans should consider options such as improved local and regional shelters to make evacuations less imposing and locating facilities for the ill and elderly away from more vulnerable areas subject to frequent evacuations.

Another lesson regards risk communication. Before Katrina, there unfortunately was a limited appreciation of the risk associated with living behind levees. Risks posed by hurricanes and storm surge to New Orleans should be more consistently and effectively communicated to residents and decisionmakers.

And a final lesson from our report regards periodic assessment and independent review. The level of protection provided by the New Orleans hurricane protection system has changed over the years because of factors such as geologic subsidence. It thus is important to conduct regular assessments that evaluate environmental and other factors that affect system performance. It also is important to provide an independent, second opinion of major engineering and design plans to help ensure that calculations are reliable and methods employed are appropriate.

The post-Katrina setting poses many challenges and open questions. There is no model for post-hurricane recovery for New Orleans. Building a protection system to higher standards and making wise choices about future development should help create a safer city. But there is no clear agreement about the path forward.

What does seem clear, however, is that information regarding the risk of hurricane storm surge and damages to New Orleans should be more widely acknowledged and appreciated than in the past and accorded a higher priority in future development plans and decisions.

Madam Chair and members of the Committee, that concludes my remarks. I thank you for inviting me to speak with you today. I

would be happy to discuss questions you may have about our committee's report.

[The prepared statement of Mr. Jacobs follows:]

THE NEW ORLEANS HURRICANE PROTECTION SYSTEM:

LESSONS LEARNED FROM HURRICANE KATRINA

Statement of

Jeffrey Jacobs, Ph.D.

Scholar

National Research Council

and

Study Director

Committee on New Orleans Regional Hurricane Protection Projects

National Academy of Engineering and National Research Council

The National Academies

before the

Committee on Environment and Public Works

U.S. Senate

June 16, 2009

Good afternoon Madam Chair, members of the Committee, and others. My name is Jeffrey Jacobs. I am a Scholar with the Water Science and Technology Board of the National Research Council and I served as the study director for the National Academy of Engineering and National Research Council's Committee on New Orleans Regional Hurricane Protection Projects. The Council is the operating arm of the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine of The National Academies. The Academies operate under an 1863 charter from Congress to provide independent advice to the federal government on scientific and technical matters.

Our committee was convened in December 2005 at the request of then-Assistant Secretary of the Army for Civil Works, Mr. J.P. Woodley, to provide an independent review of the work of the Interagency Performance Evaluation Task Force, or IPET. The IPET group was assembled by the U.S. Army Corps of Engineers to evaluate the performance of the New Orleans hurricane protection system during Hurricane Katrina and to provide advice in repairing the system. During its 3.5-year tenure our committee issued five reports, all of which reviewed draft reports issued by the IPET. Our committee's fifth and final report was issued in April 2009 and it reviewed the IPET draft final report and commented on important "lessons learned" during Hurricane Katrina and its aftermath. My comments this afternoon summarize those lessons as identified and discussed in our final report.

The Limits of Protective Structures

The greater New Orleans metropolitan region is naturally vulnerable to flooding, especially in areas below sea level. Post-Katrina repairs to and strengthening of the hurricane protection structures have reduced some vulnerabilities, but the risks of inundation and

flooding never can be fully eliminated by protective structures, no matter how large or sturdy those structures may be.

Future Footprint of the Hurricane Protection System

Hurricane Katrina illustrated an undue optimism about the ability of the hurricane protection infrastructure in the greater New Orleans area to provide absolute flood protection. Despite weaknesses in the system that were exposed during Hurricane Katrina, reconstruction activities apparently are taking place largely according to the system's pre-Katrina footprint and without consideration of whether this configuration is optimal. For example, the creation of a protection system with a smaller overall footprint might offer advantages in terms of cost and inspection and maintenance requirements. At the very least, there should be discussions that consider the pros and cons of different configurations of protective structures and different levels of protection across the region.

Relocations to Improve Public Safety

Regardless of future levee construction activities, it likely will not be possible to provide equal degrees of flood protection across the city. Higher elevation parts of the region—such as areas on the natural Mississippi River levees—inherently are safer than lower-lying areas—such as extensive areas below sea level in St. Bernard's parish and in New Orleans East. Rebuilding the New Orleans area and its protective system to its pre-Katrina state would leave the city and its inhabitants vulnerable to additional Katrina-like disasters. Planning and design for upgrading the system should discourage settlement in areas most vulnerable to hurricane storm surge flooding. Because protective structures never can provide absolute protection, voluntary relocation of people and neighborhoods out of

particularly vulnerable areas—with adequate resources to improve their living conditions in less vulnerable areas—should be considered as a viable public policy option.

Floodproofing Measures

Where it is not feasible to relocate people and buildings out of vulnerable areas, significant improvements in floodproofing will be essential. To adequately protect the safety of homes and residents in vulnerable areas, the first floor of houses should be elevated to at least a height associated with the 100-year storm event. Raising first floors even higher to meet a more conservative level of flood protection is preferable. In addition to elevating homes and other buildings, critical infrastructure such as electric power, water, gas, telecommunications, and pumping facilities should be strengthened to ensure that interdependent infrastructure systems can function reliably in an extreme flooding event.

The 100-year Level of Flood Protection

The 100-year level of flood protection—which defines areas with a one percent chance of flooding each year—is a crucial flood insurance standard. It has been applied widely across the nation and is being used in some circumstances for reconstruction and planning activities in New Orleans. For areas where levee failure is not a safety concern, the 100-year standard may be appropriate for developing regulations, setting insurance rates, and informing decisions in city planning and disaster preparedness. For heavily-populated urban areas, however, where the failure of protective structures would be catastrophic—such as New Orleans—the 100-year standard is inadequate. By way of comparison, the Association of State Floodplain Managers recommends that a 500-year flood is an appropriate minimum standard for urban areas.

Evacuation Plans

The disaster response plan for New Orleans, although successfully evacuating a large portion of the metropolitan area population, was inadequate for the Katrina event. There is a need for more extensive and systematic evacuation studies, plans, and communication of those plans. A comprehensive evacuation program should include not only well designed and tested plans and criteria for evacuation warnings, but also alternatives such as improved local and regional shelters that could make evacuations less imposing. It also should consider longer-term strategies to enhance the efficiency of evacuations, such as locating facilities for the ill and elderly away from vulnerable areas that may be subject to frequent evacuations.

Risk Communication

Communicating risks posed by hurricanes and storm surge is essential to preparing a vulnerable population for the potential occurrence of a hurricane. Unfortunately, before Katrina, there was a limited understanding and appreciation of the risks of living behind levees. The risks of flooding across New Orleans area should be refined, simplified, and communicated consistently. To achieve more effective communication, the IPET should hire a firm to create a professional summary of the entire IPET draft report in "layman's" terminology so as to make its findings more accessible to citizens, business owners, and decision makers.

Periodic Assessment and Independent Review

Changing environmental conditions, such as geologic subsidence, may affect the level of protection provided by hurricane and flood protection projects. Furthermore, advances in scientific and engineering theories and methods may render assumptions on which these

projects were based partly or fully obsolete. For the New Orleans hurricane protection system, regular assessments that evaluate underlying environmental, scientific, and engineering factors that affect system performance should be conducted. An independent "second opinion" can help ensure that calculations are reliable, methods employed are credible and appropriate, designs are adequate and safe, potential blind spots are minimized, and other issues are raised as appropriate.

Better hurricane protection and preparedness for New Orleans will require a combination of structural and nonstructural measures and cooperation among federal, state, parish, and other entities, as well as the citizens of New Orleans. The post-Katrina setting poses challenges and open questions, as there is no model for post-hurricane recovery in New Orleans. Building a hurricane protection system to better standards and making wise choices about future development should help create a safer city but there is no clear agreement about the path forward for the New Orleans metro region. What does seem clear, however, is that information regarding the risk of hurricane-induced damages to New Orleans should be more widely acknowledged and appreciated than in the past and accorded a higher priority in future development plans and decisions.

Madam Chair and members of the committee, that concludes my remarks. Thank you for inviting me to speak with you today. I would be pleased to discuss questions that you and your colleagues may have about our committee's report.

Environment and Public Works Committee Hearing
June 16, 2009
Follow-Up Questions for Written Submission

Questions for Jacobs
Senator James M. Inhofe

1. Dr. Jacobs, your testimony advises using a variety of measures to improve hurricane protection and preparedness. Some of these measures seem to me to be State or local responsibilities, while others might include a federal role. Did your committee discuss either the current or a recommended future distribution of authorities and responsibilities among federal, State and local entities? If yes, please provide a brief summary of that discussion. If no, would your committee be an appropriate entity for Congress to consider asking to look at that question?

Response:

I appreciate these important and relevant questions from Senator Imhofe, as improved hurricane preparedness for New Orleans will rely upon the efforts of many federal and non-federal entities.

Regarding the first question, our committee did not discuss how the responsibilities for implementing its recommendations might be best distributed among federal and non-federal bodies.

Regarding the second question, our committee has completed its project and has been disbanded. However, as this question primarily relates to public administration and policy—not sciences and engineering—the National Academy of Sciences does not seem to be an appropriate body to discuss the topic and to offer advice.

Senator BOXER. Thank you very much. I am going to amend what I said before, just because I am very interested in this Pump to the River issue. Mr. Rault, would you mind going next? And then we will go to Steve.

STATEMENT OF JOSEPH M. RAULT, EXECUTIVE COMMITTEE BOARD MEMBER, PUMP TO THE RIVER

Mr. RAULT. Thank you very much, Madam Chair and distinguished Members of the Committee. It is really a pleasure to be here on behalf of the citizens of New Orleans and Jefferson, particularly with the widespread catastrophic problems caused by the breaches of the 17th Street Canal.

My name is Joseph Rault. I am a native of New Orleans. I am representing a non-profit citizens group of 100,00 people who live in the Hoey's Basin as pointed out by Senator Vitter on the chart up front, 85,000 of which are in Orleans Parish or County, and 15,000 of which are in adjoining Jefferson Parish or County.

We have 24 neighborhood groups who are listed on the map in the back of my testimony and, Madam Chair, I would like to ask that my written testimony be introduced in the record.

Senator BOXER. Without objection. So ordered.

Mr. RAULT. Thank you so much.

These 100,000 people are from all walks of life and all of them suffered tremendous problems.

I am a graduate of MIT, for my background. I attended Georgetown Law here in Washington. I graduated from Tulane Law in New Orleans. I served in the United States Navy from 1943 until 1946 and ended up as the commander of the USS LCI 549 at the Bikini atomic bomb test. I am a private businessman. I own my own business in medium high-rise development of office buildings, two of which are in Jefferson Parish.

I have met over the last 3 years with the Corps at all of their partnering meetings, as described by the General. At every one of them where there were stakeholders involved, Pump to the River, Option 2 and Option 1 were all discussed and at each one, the consensus was that Option 2 was the way to go and Option 2a, known as Pump to the River, was an acceptable option and should be explored.

My wife and I lived in Jefferson Parish for the last 30 years. We raised our children and our grandchildren in a very happy environment. We lost our home, as did thousands of others. We want to restore that area. And speaking for that 100,000 people, really representing the million people in the combined area, we would like to move forward.

What did those people do? They immediately got on their horse and looked at all options and whether they could find a solution so we could go forward. And that was in the Corps' own record, where shortly after the storm the Corps engaged a study by DMJM Harris Company. And what did it say? This was just months after the storm. It said Pump to the River was a feasible option and should be explored.

From that point on, we, the citizens in Jefferson Parish and Orleans, agreed to engage private engineers who came, verified, studied and saw that this was a real option.

What is Pump to the River? As Senator Vitter said, it is very simple. You build a pipeline to the close-by Mississippi River, add a pump, and take the water from the source of where it is collecting in the lowest part of the basin. What does it do? It would take 25 percent of the water out of the 17th Street Canal system and would cost very competitively by the Corps' own statements, $205 million.

They have linked a to 2, but it is an independent, self-standing project that could be done with or without any other support. But I want to make it clear, we do support Option 2 for the safety of the people. The advantage of this is that $205 million is only 6 percent of what the Corps is going to spend on the pumps at the mouth. The $205 million is only 20 percent of what Option 2 would be. By reducing the water volume in the 17th Street Canal, this would be a significant, a significant, saving in any alterations and expenditures to the canal under Option 2.

Similarly, this would reduce the costs of the pumps at the mouth of the canal at the Lake Pontchartrain side because there would be less water to handle at that end. And the most important part, as Senator Vitter pointed out and Senator Landrieu concurred, it is safer. It would simply take the water out of the system and avoid the huge risk of the collapse of the walls again. Again, this is independent system. It is not dependent on any other system.

With due respect to the General's comments about storm surge, while it is nice to say that we are going to do the sill deep enough to accommodate either 1 or 2, this is not just about storm surge, it is about hurricane protection, whether it is from storms, storm surge, heavy rain, lightning, whatever might cause flooding to the citizens of that area.

Now, who is for this? Everyone in the State unanimously is with this. The State of Louisiana, the city of New Orleans, the City Council of New Orleans, represented here by Joe Sherman, Jefferson Parish, represented here by Councilman John Young who has handed me resolutions that I would like put in the record from Jefferson Parish, and from the Regional Planning Commission of seven Parishes, that is seven counties, supporting Pump to the River and supporting 2 or 2a.

May I have permission——

Senator BOXER. Yes. Absolutely. Put it in the record. And if you could finish in the next minute or so.

Mr. RAULT. Thank you very much. I appreciate, Madam Chair——

Senator BOXER. No, you are doing great. You are doing just fine.

Mr. RAULT. Who is against this? Nobody. The Corps has admitted, as Senator Vitter pointed out twice, once in writing in the 2007 report and again 3 weeks ago when Mr. Accardo voluntarily said it to a group of 400 people who were there to protest what the Corps was doing. I was one of them and my ears almost fell off when I heard it. And here today are other members of our committee who similarly were there: Lisa Ludwig, our project manager, John Baus, Joe Sharman and Dr. Shirley Laska of UNO, who prepared one of these.

So, in conclusion, I can only say, Madam Chair and members of the Committee, thank you for seeing us. Pump to the River is the

answer. In addition to Option 2, the safety is obvious. It is a stand-alone project. It can be done for a very competitive price of $205 million and it does not have to be bundled into any of the other options. It can stand alone and start immediately.

We need help now, today, and not over an 8- or 10-year period as was suggested by the Corps as it might take for 2, which I seriously question. I also seriously question their estimate of the cost.

Finally, the flood insurance claims paid by the U.S. Government in this area alone were $4.2 billion. Pump to the River is only 20 percent of that. It would pay for itself over and over again, not to mention the redundancy of all of the problems from the private insurance companies and so forth.

Last, the biggest hospital in the area, Ochsner, is in this area and would be accommodated in its security and safety during a storm.

Thank you so much for this opportunity on behalf of the 100,000 people.

[The prepared statement of Mr. Rault follows:]

ORAL TESTIMONY
BY
JOSEPH M. RAULT
PRESENTED TO THE

SENATE ENVIRONMENT & PUBLIC WORKS COMMITTEE
JUNE 16, 2009

GOOD AFTERNOON: Madam, Chair, Distinguished Senators and Members of the Senate Environment & Public Works Committee. We deeply appreciate the attention you and Congress have given the 17th Street Outfall Canal and further are delighted to be a part of this Hearing. It is well known that the breach in the 17th Street Canal wall during Katrina caused catastrophic flooding in New Orleans and Jefferson Parish causing the loss of many lives and hundreds of millions of dollars in damage to thousands of residences.

My name is Joseph M. Rault. I am a native of New Orleans and I am honored to be here representing Pump to the River Jefferson/Orleans, a community non-profit organization comprising 26 neighborhoods and over 100,000 citizens of Orleans (85,000) and Jefferson (15,000) Parishes. We are from all walks of life and live in what's called the Hoey's Basin in the heart of New Orleans and we are drained by the 17th Street Canal system.

I am a graduate of MIT and received a degree in Marine Transportation from its school of Naval Architecture and Marine

Engineering (1948). I attended Georgetown Law and graduated from Tulane School of Law LLB (1950) and am a member of the Louisiana State and Federal Bar Association. I have served in the U.S. Navy (1943 - 1946) where I became commander of the USS LCI 549 - at the atomic bomb test in Bikini. Currently I own and operate my own business, Rault Resources, Inc., in commercial office building development.

Over the past 3 years, I have attended and participated in many Corps meetings with stakeholder groups discussing various options for the 17th Street Canal. Most of these resulted in favoring Options 2 & 2a. I have also participated in the research of the Congressional legislation resulting in 2 acts requiring reports and cost estimates from the Corps.

My wife and I have lived in Jefferson Parish for some 30 years where we raised children and grandchildren in a happy environment. Those days are now gone. The flooding of our area was so rapid that many people were trapped in their homes and had to be rescued. The water was filthy and toxic from all of the garbage and dead animals that had drowned. We had 4 feet of water in our home that stayed 3 weeks. We lost our home as did thousands of others.

Today, homeowners are still fearful of another breach and flooding. They don't want to risk more money to rebuild, not to mention risk their own lives. This is exactly why the residents, the political powers and the congressional delegation are strongly

opposed to Option 1 which was so well covered by the previous witness, Mr. Tom Jackson. I agree with his entire testimony.

Homeowners decided to do something about it and search for a solution. The idea was initially found in the very record of the Corps of Engineers in an early engineering report entitled DMJM Harris dated August 18, 2006, just some months after Katrina, in which Pump to the River was recommended as a feasible option. This led to an intense research by the private consulting engineers authorized by the Parish of Jefferson to confirm that finding. The results were a positive approval reflected in six engineering reports.

The engineering reports substantiate that Pump to the River could take as much as 25% of the water out of the 17th Street Canal by pumping it in a new pipeline direct to the nearby Mississippi River, at a cost of only $205M! A cost effective solution.

The advantages of Pump to the River are as follows:

1) $205M - only 6% of the Corps' estimate of Option 2.

2) $205M - only 23% of the cost of all 3 Option 1 outfall pumping stations.

3) By reducing the water volume in the 17th Street Canal by 25%, this would significantly reduce the cost of sizing the canal which could be a major savings.

4) Similarly, this would reduce the cost of the Lake Pontchartrain pumping station due to the reduced volume and simplify construction of this station.

5) Of most importance is added SAFETY - the reduction of water flow in the canal would dramatically increase the margin of safety and security of the wall system - without which these could be a CATASTROPHIC CALAMTY if an excessive water flow pressured and breached the walls! It takes those last straws off the camels back.

6) And Pump to the River is an independent system not relying on either Option 1 or Option 2 and can be built and working in about 18 - 24 months! It simply adds value to the entire project.

****

Thus it now seems that everyone is in favor of Option 2 and Pump to the River.

WHO IS FOR PUMP TO THE RIVER?

State of Louisiana
City of N.O.
City Council of N.O.
N.O. S&WB
New Orleans Metropolitan Association of Realtors
Jefferson Parish
Jefferson Parish Council
President of Jefferson Parish
Regional Planning Commission
26 neighborhood groups from Orleans & Jefferson parishes
(representing 100,000 residents)
Jefferson Business Council
Jefferson Chamber

WHO IS AGAINST PUMP TO THE RIVER?

NOBODY!

N.B. Please note that even the Corps of Engineers acknowledges that Pump to the River is the best technical option! They simply say they do not have authority at this time for its funding.

The Corps in its last report to Congress acknowledged that Option 2 was far superior and safer:

> "Option 2 is generally more technically advantageous .... over Option 1 because it would give greater reliability and further reduces the risk of flooding." Report to Congress in response to Section 4303 of Public Law 110-28;

> Just 3 weeks ago, the Corps of Engineers again openly acknowledged at its public environmental hearing on the 17th Street Canal before 400 attendees that both Option 2 and Option 2a as well as the Pump to the River component were far superior to Option 1. In the words of the Corps' chief operating officer, Mr. Chris Accardo, which rang in my ears and I now paraphrase:

> > *Yes, **both PTR and Option 2 are technically far superior than Option 1 and we would like to use them, but they are not as yet authorized for funding by Congress.*** (paraphrased and verified by the Times Picayune article dated May 20 by Mark Schleifstein.)

CONCLUSION

In conclusion, Pump to the River, agreed to by all stakeholders including the Corps, would add a safety element to the 17th Street Canal of immeasurable proportions, would give residents better hurricane protection, better drainage and less reliance on the walls of the canals. At $205M, it is a bargain and would save lives

and save money by virtually eliminating the $4.3B flood insurance claims for Katrina alone and other remedial cost that ran into the billions. It would also provide safety to our huge Ochsner Hospital Medical Complex that is surrounded by this area, including emergency vehicle transportation.

Pump to the River is the right thing to do. Moreover, the peace of mind it provides would be priceless.

Thank you,

Joseph M. Rault
Pump to the River Orleans/Jefferson
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Metairie, LA 70005
(504)581-1314
jrault3356@aol.com

PUMP TO THE RIVER – JEFFERSON AND ORLEANS PARISHES
PROPOSAL AFFECTING 17TH STREET /MONTICELLO CANAL DRAINAGE AREA

Pump to the River
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Metairie, LA 70005

Telephone: (504) 581-1314
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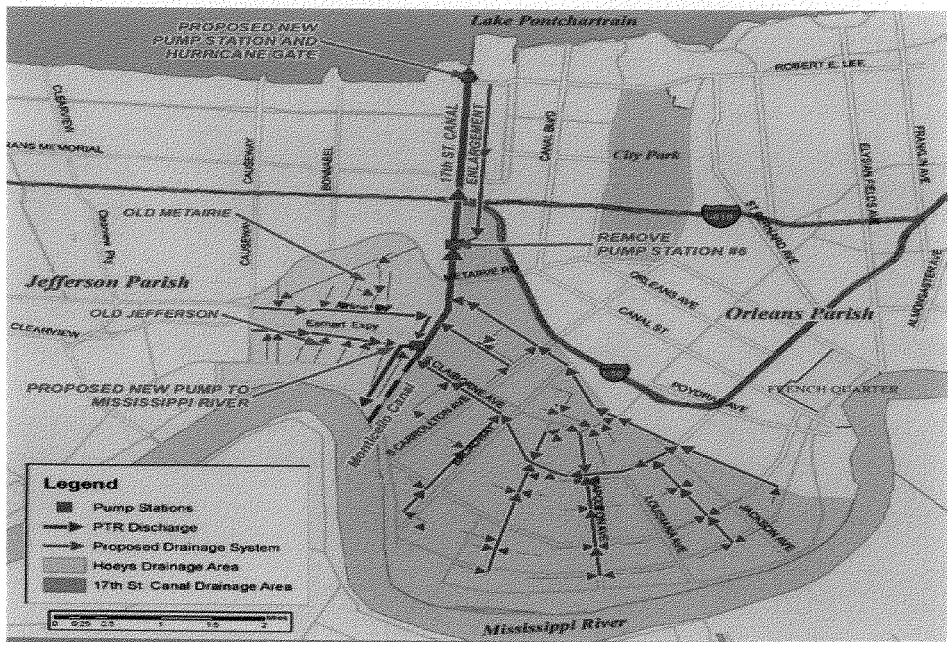
Email: vets2400@aol.com
www.pumptotheriver.org



JEFFERSON PARISH/COUNTY

On joint motion of all Councilmembers present the following resolution was offered as amended:

RESOLUTION NO. 111976

A resolution requesting the Assistant Secretary of the Army for Civil Works suspend all procurement actions leading to the award of a contract for the design and construction of the permanent pump stations to be constructed at or near the lakefront on the 17th Street Canal. (Parishwide)

WHEREAS, The Emergency Supplemental Appropriations Act for Defense, The Global War or Terror, and Hurricane Recovery, 2006 (P.L. 109-234, June 15, 2006) authorized and directed the Secretary of the Army, acting through the Chief of Engineers to modify the 17th Street, Orleans Avenue, and London Avenue drainage canals and install pumps and closure structures at or near the lakefront.; and

WHEREAS, In response to the concerns of the local residences and businesses in Jefferson Parish, and others, with the solution selected by the Administration for implementation of construction of the permanent pump stations for the 17th Street Canal, the U.S. Troop Readiness, Veterans Care, Katrina Recovery, and Iraq Accountability Appropriations Act, 2007 (Section 4303, PL 110-28, dated May 25, 2007) directed the Chief of Engineers to investigate the overall technical advantages, disadvantages and operational effectiveness of operating the new pumping stations at the mouths of the 17th Street, Orleans Avenue and London Avenue Canals, directed for construction in PL 109-234, concurrently or in series with the existing pump station or in combination with directly to the Mississippi River in Jefferson Parish; and the technical advantages, disadvantages and operational effectiveness of replacing or improving the flood wall adjacent to the canals.; and

WHEREAS, report of the Corps of Engineers, August 2007, in response to Section 4303 of PL 110-28, found that: Option 1, new pump stations operating concurrently or in series with the existing pump stations, was the least complex and presented the fewest engineering challenges.; Option 2, removing the existing pump stations and configuring the new pump stations and associated canals to handle all needed discharges to the lakefront, was found to be more effective operationally, have greater reliability and further reduce the risk of flooding, and Option 2a, in conjunction with Option 2 the construction of a new pumping station to convey storm water in Hoey's Basin directly to the Mississippi River, was found to reduce the size of the new pump station at the lake front on the 17th Street Canal and reduce the size of canal modifications under Option 2.; and

WHEREAS, The Act Making Appropriations for military Construction, The Department of Veterans Affairs, and Related Agencies for the Fiscal Tear ending September, 30 2008, and for Other Purposes(PL 110-252), directed the Chief of Engineers to proceed with the NEPA documentation with Options 1, 2 and 2a and to provide cost estimates for Options 1, 2 and 2a as described in the August 2007 report to Congress.; and

WHEREAS, The Jefferson Parish Council by resolution 111178, dated 29 October 2008, requested that the Corps of Engineers coordinate and consult with Jefferson Parish on the Permanent Pump Station Report to Congress and that the Corps of Engineers provide a copy of said report prior to its submission to the Congress, to Jefferson Parish and other local and State governmental entities who will be expected to cost share in certain portions of the design, construction and will be required to operate and maintain the permanent pump stations and supporting storm water protection infrastructure.

WHEREAS, The Corps of Engineers completed the report on the cost estimates for the three options as directed by PL 110-252 and the Assistant Secretary of the Army for Civil Works provided the report to the Chairmen of the Senate and House Appropriations Subcommittees on Energy and Water Development on February 26, 2009 and to Jefferson Parish; and

WHEREAS, The Cost estimates contained in the report for Options 1, 2 and 2a are $797,026,000, $3,404,061,000 and $3,515,546,000, respectively, and

WHEREAS, Jefferson Parish and other stake holders were allowed only limited technical input into the design criteria used to develop the cost estimates and construction

schedules, and

WHEREAS, This report did not contain an Independent Risk and Reliability Analysis, and

WHEREAS, The cost estimate for Option 1 does not address the removal of the Katrina damaged and weakened floodwalls and the existing pump stations are left to pump to the new permanent pump stations at high discharge levels that can exceed the safe water elevations in the canals, and

WHEREAS, The citizens of Jefferson Parish remain at risk to catastrophic flooding should these weakened and damaged flood walls fail. and

WHEREAS, The Corps is proceeding with the procurement of a design and construction contract for Option 1 without seeking further input from Jefferson Parish or other stakeholders; and

WHEREAS, On March 10, 2009 the Honorable C. Ray Nagin, Mayor of the City of New Orleans, met with Major General Merdith Temple, Deputy Commanding General for Civil and Emergency Operation, and stated that Sewerage and Water Board and the City of New Orleans considers Option 1 to be technically flawed and fraught with long term risk to the safety of the citizens and businesses of Orleans Parish and other stakeholders and therefore was an unacceptable solution for the construction of the three permanent pump stations; and

WHEREAS, General Temple committed to Mayor Nagin that the Corps would conduct an Independent Peer Review of the Options 1, 2 & 2a; and

WHEREAS, On March 12, 2009, Mayor Nagin met with Secretary John Paul Woodley, Jr., Assistant Secretary of the Army for Civil Works and restated the Board and City's position with regard to proceeding with Option 1; and

WHEREAS, Secretary Woodley stated that the Corps had constructed the temporary interim pump stations at the lakefront on the 17th Street, Orleans Avenue and London Avenue canals to have a sufficient life span so as not to bring undue pressure on the stakeholders while a solution for the permanent pump stations was being sought and that an Independent Peer Review involving the stakeholders, as pledged by General Temple.

NOW, THEREFORE, BE IT RESOLVED, by the Jefferson Parish Council of Jefferson Parish, Louisiana, the governing authority of said Parish:

SECTION 1. That the Council does hereby request that the Assistant Secretary of the Army for Civil Works, acting through the Chief of Engineers, immediately suspend all procurement actions which would otherwise lead to the design and construction of the three permanent pump stations under Option 1 until: (a) the Jefferson Parish Council has the opportunity to provide additional technical input and to understand the engineering basis underlying each of the options considered; (b) the Corps has undertaken and completed an Independent Peer review of all relevant reports and engineering data and analyses related to the three project options conducted generally in accordance with Section 2034 of Public Law 110-114; and (c) the risk and reliability analyses for all three options has been completed in cooperation with local stakeholders

SECTION 2. That the Council does hereby request the Governor of the State of Louisiana, the Honorable Bobby Jindal, to officially withhold the State's support for implementation of Option 1 under the terms of the Project Partnering Agreement existing between the State and the Department of the Army for the Lake Pontchartrain and Vicinity Hurricane Protection Project until the action specified in SECTION 1 have been satisfactorily completed, and that the Governor immediately notify the Assistant Secretary of the Army for Civil Works of this decision.

SECTION 3. That the Council does hereby request the Southeast Louisiana Flood Control Authority – East to withhold its support for the implementation of Option 1 pending satisfactory completion of actions specified in SECTION 1.

SECTION 4. That this resolution be sent to: President Barrak Obama; the Honorable John Paul Woodley, Jr., Governor Bobby Jindal, Senators Landrieu and Vitter,

Representatives Scalise, Melancon, and Cao, Colonel Alvin B. Lee (District Engineer, New Orleans District); Brigadier General Michael J. Walsh (Commander, Mississippi Valley Division erm Vicksburg, MS); Lt. General Robert L. Van Antwerp, (Commander and Chief of Engineers, HQ USACE, Washington, DC), Mr. Garret Graves (Governor's Executive Assistant for Coastal Activities and Chairman, Louisiana Coastal Protection and Restoration Authority) and the Southeast Louisiana Flood Control Authority - East.

The foregoing resolution having been submitted to a vote, the vote thereon was as follows:

YEAS: 6 NAYS: None ABSENT: (1) Lee

The resolution was declared to be adopted on this the 18th day of March, 2009.

THE FOREGOING IS CERTIFIED
TO BE A TRUE & CORRECT COPY

Eula A. Lopez

EULA A. LOPEZ
PARISH CLERK
JEFFERSON PARISH COUNCIL

REGIONAL PLANNING C

NUMBER **09-1004**

RA RISING COUNTIES

RESOLUTION

REGIONAL PLANNING COMMISSION
JEFFERSON, ORLEANS, PLAQUEMINES, ST. BERNARD AND ST. TAMMANY PARISHES

A Resolution requesting the Assistant Secretary of the Army for Civil Works suspend all procurement actions leading to the award of a contract for the design and construction of the permanent pump stations to be constructed at or near the lakefront on the 17th Street, Orleans Avenue and London Avenue Canals.

Introduced by John Young, seconded by C Ray Nagin, on the 14th day of April, 2009.

WHEREAS, The Emergency Supplemental Appropriations Act for Defense, The Global War or Terror, and Hurricane Recovery, 2006 (P.L. 109-234, June 15, 2006) authorized and directed the Secretary of the Army, acting through the Chief of Engineers to modify the 17th Street, Orleans Avenue, and London Avenue drainage canals and install pumps and closure structures at or near the lakefront.; and

WHEREAS, In response to the concerns of the local residences and businesses in Jefferson Parish, and others, with the solution selected by the Administration for implementation of construction of the permanent pump stations for the 17th Street Canal, the U.S. Troop Readiness, Veterans Care, Katrina Recovery, and Iraq Accountability Appropriations Act, 2007 (Section 4303, PL 110-28, dated May 25, 2007) directed the Chief of Engineers to investigate the overall technical advantages, disadvantages and operational effectiveness of operating the new pumping stations at the mouths of the 17th Street, Orleans Avenue and London Avenue Canals, directed for construction in PL 109-234, concurrently or in series with the existing pump station or in combination with directly to the Mississippi River in Jefferson Parish; and the technical advantages, disadvantages and operational effectiveness of replacing or improving the flood wall adjacent to the canals.; and

WHEREAS, report of the Corps of Engineers, August 2007, in response to Section 4303 of PL 110-28, found that: Option 1, new pump stations operating concurrently or in series with the existing pump stations, was the least complex and presented the fewest engineering challenges.; Option 2, removing the existing pump stations and configuring the new pump stations and associated canals to handle all needed discharges to the lakefront, was found to be more effective operationally, have greater reliability and further reduce the risk of flooding, and Option 2a, in conjunction with Option 2 the construction of a new pumping station to convey storm water in Hoey's Basin directly to the Mississippi River, was found to reduce the size of the new pump station at the lake front on the 17th Street Canal and reduce the size of canal modifications under Option 2.; and

WHEREAS, The Act Making Appropriations for Military Construction, The Department of Veterans Affairs, and Related Agencies for the Fiscal Tear ending September, 30 2008, and for Other Purposes (PL 110-252), directed the Chief of Engineers to proceed with the NEPA documentation with Options 1, 2 and 2a and to provide cost estimates for Options 1, 2 and 2a as described in the August 2007 report to Congress.; and

WHEREAS, The Jefferson Parish Council by resolution 111178, dated 29 October 2008, requested that the Corps of Engineers coordinate and consult with Jefferson Parish on the Permanent Pump Station Report to Congress and that the Corps of Engineers provide a copy of said report prior to its submission to the Congress, to Jefferson Parish and other local and State governmental entities who will be expected to cost share in certain portions of the design, construction and will be required to operate and maintain the permanent pump stations and supporting storm water protection infrastructure.

WHEREAS, The Corps of Engineers completed the report on the cost estimates for the three options as directed by PL 110-252 and the Assistant Secretary of the Army for Civil Works provided the report to the Chairmen of the Senate and House Appropriations Subcommittees on Energy and Water Development on February 26, 2009 and to Jefferson Parish; and

WHEREAS, The Cost estimates contained in the report for Options 1, 2 and 2a are $797,026,000, $3,404,061,000 and $3,515,546,000, respectively, and

RPC Resolution No. 09_1004
April 14, 2009

WHEREAS, Jefferson Parish and other stake holders were allowed only limited technical input into the design criteria used to develop the cost estimates and construction schedules, and

WHEREAS, This report did not contain an Independent Risk and Reliability Analysis which quantifies and compares the risk and reliability of the Options 1, 2 and 2a, and

WHEREAS, The cost estimate for Option 1 does not address the removal of the Katrina damaged and weakened floodwalls and the existing pump stations are left to pump to the new permanent pump stations at high discharge levels that can exceed the safe water elevations in the canals, and

WHEREAS, The citizens of Jefferson and Orleans Parishes remain at risk to catastrophic flooding should these weakened and damaged flood walls fail. and

WHEREAS, The Corps is proceeding with the procurement of a design and construction contract for Option 1 without seeking further input from Jefferson and Orleans parishes; and

WHEREAS, On March 10, 2009 other stakeholders; and the Honorable C. Ray Nagin, Mayor of the City of New Orleans, met with Major General Merdith Temple, Deputy Commanding General for Civil and Emergency Operation, and stated that Sewerage and Water Board and the City of New Orleans considers Option 1 to be technically flawed and fraught with long term risk to the safety of the citizens and businesses of Orleans Parish and other stakeholders and therefore was an unacceptable solution for the construction of the three permanent pump stations; and

WHEREAS, General Temple committed to Mayor Nagin that the Corps would conduct an Independent Peer Review of the Options 1, 2 & 2a; and

WHEREAS, On March 12, 2009, representative of the Sewerage and Water Board met with Secretary John Paul Woodley, Jr., Assistant Secretary of the Army for Civil Works and restated the Board and City's position with regard to proceeding with Option 1; and

WHEREAS, Secretary Woodley stated that the Corps had constructed the temporary interim pump stations at the lakefront on the 17th Street, Orleans Avenue and London Avenue canals to have a sufficient life span so as not to bring undue pressure on the stakeholders while a solution for the permanent pump stations was being sought and that an Independent Peer Review involving the stakeholders, as pledged by General Temple would be incorporated into the schedule.

NOW, THEREFORE, BE IT RESOLVED:

By the Regional Planning Commission for Jefferson, Orleans, Plaquemines, St. Bernard and St. Tammany Parishes functioning in its capacity as the metropolitan planning organization for Southeast Louisiana:

SECTION 1. That the Regional Planning Commission does hereby request that the Assistant Secretary of the Army for Civil Works, acting through the Chief of Engineers, immediately suspend all procurement actions which would otherwise lead to the design and construction of the three permanent pump stations under Option 1 until: (a) the Jefferson Parish Council and the Sewerage and Water Board of New Orleans has the opportunity to provide additional technical input and to understand the engineering basis underlying each of the options considered; (b) the Corps has undertaken and completed an Independent Peer review of all relevant reports and engineering data and analyses related to the three project options conducted generally in accordance with Section 2034 of Public Law 110-114; and (c) the risk and reliability analyses for all three options has been completed in cooperation with local stakeholders

SECTION 2. That the Regional Planning Commission does hereby request the Governor of the State of Louisiana, the Honorable Bobby Jindal, to officially withhold the State's support for implementation of Option 1 under the terms of the Project Partnering Agreement existing between the State and the Department of the Army for the Lake Pontchartrain and Vicinity Hurricane Protection Project until the action specified in SECTION 1 have been satisfactorily completed, and that the Governor immediately notify the Assistant Secretary of the Army for Civil Works of this decision.

SECTION 3. That the Regional Planning Commission does hereby request the Southeast Louisiana Flood Control Authority – East to withhold its support for the implementation of Option 1 pending satisfactory completion of actions specified in SECTION 1.

SECTION 4. That this resolution be sent to: President Barrak Obama; the Honorable John Paul Woodley, Jr., Governor Bobby Jindal, Senators Landrieu and Vitter, Representatives Scalise, Melancon, and Cao, Colonel Alvin B. Lee (District Engineer, New Orleans District); Brigadier General Michael J. Walsh (Commander, Mississippi Valley Division, Vicksburg, MS); Lt. General Robert L.

RPC Resolution No. 09_1004
April 14, 2009

Van Antwerp, (Commander and Chief of Engineers, HQ USACE, Washington, DC), Mr. Garret Graves (Governor's Executive Assistant for Coastal Activities and Chairman, Louisiana Coastal Protection and Restoration Authority) and the Southeast Louisiana Flood Control Authority - East.

Whereupon, after discussion, the question was called and resulted in the following:

AYES: 19 NAYS: 0 ABSTENTIONS: 0

and the Chairman declared the Resolution duly carried.

C. RAY NAGIN
CHAIRMAN

CRAIG P. TAFFARO, JR.
SECRETARY

Joseph Rault
108 Homestead Avenue
Metairie, LA 70005
(504)581-1314

August 7, 2009

Senator Barbara Boxer, Chairman
Senator James M. Inhofe, Ranking Member
Senate Committee on Environment and Public Works
410 Dirksen
Senate Office Building
Washington, DC 20510

Subject: Environment and Public Works Committee Hearing
June 16, 2009
Follow-Up Questions for Written Submission

Dear Chairman Boxer and Ranking Member Inhofe,

In reply to your letter of July 27, 2009 and in response to the four questions submitted to me by Senator Inhofe of Oklahoma, I am attaching hereto my answers to the four questions for filing as an addition to my original testimony. I would be happy to answer any further questions that Senator Inhofe may have or expand on these answers either in writing or in person as the Senator may wish.

Respectfully submitted,

Joseph Rault
Executive Committee Board Member
Pump to the River

JR:mc

Environment and Public Works Committee Hearing
June 16, 2009
Follow-Up Questions for Written Submission

1) Mr. Rault, you said that the "Pump to the River" option does not rely on either Option 1 or Option 2. Does that mean you believe Pump to the River could be added as a feature of Option 1?

YES.
Pump to the River is an independent stand alone project that would install a new pipeline from the lowest part of the Hoey's Basin near the end of the 17th Street Canal in Jefferson Parish and run it directly to the nearby Mississippi River and add a pumping station to divert the water that otherwise would have gone into the canal. Further, Pump to the River could reduce the cost of Option 1 because it would remove approximately 25% of the water from the canal thus lessening and downsizing the pumping requirements and station since it would have less water to handle and thus be an added safety factor to the canal by reducing the pressure on the walls. However, 98% of the walls remain in a weakened condition through faulty design and construction and pose a significant threat to the safety of the neighborhoods, particularly if there is any lack of coordination between the operation of the two pumping stations required in Option 1. So, we are against Option 1 for safety reasons.

2) Is your cost estimate of $205 million the same regardless of whether it is built in connection with Option 1 or Option 2?

YES.
The Corps of Engineers placed the cost of Pump to the River at $205M in their Environmental Hearing on May 20, 2009. The consulting engineers for the Parish of Jefferson in their study dated

July 9, 2007 which is an exhibit in the hearing has estimated the cost at approximately $170M. The project can be started immediately and can be completed in approximately 30 months using an existing abandoned railroad right of way directly to the River for the pipeline. In addition to the safety feature that Pump to the River brings to the 17th Street Canal, its installation would significantly reduce the cost of Option 2 because the Canal could be downsized due to the reduction in approximately 25% of the water flow, so its $205M cost would be offset by the savings of Option 2 and in the meantime would provide major hurricane relief.

3) Would you consider the "Pump to the River" component of Option 2a a feature for hurricane protection or for interior drainage?

It is a feature for hurricane protection primarily for several reasons. 1) the weakness of the walls in the 17th Street Canal only allow a 6 ft. water level usage of the 12 ft. wall that is 50% less; so the streets of N.O. and Jefferson must provide the other 50% so in the event of a hurricane and its accompanying heavy rainfall Pump to the River is essential to protect the neighborhoods from flooding due to this excess ground surface-storage requirement. Further, in the event of a slow moving storm with heavy rain events over a prolonged period it is critical to get this water out of the system before it raises the canal level to a breaking point of the walls. The two are invariably tied together. The added pumping capacity offered by "Pump to the River" clearly constitutes hurricane protection, because it provides margins of safety critical to both Option 1 and Option 2.

4) Do you know if the Corps has previously studied the "Pump to the River" component of Option 2a? If yes, what were the conclusions?

YES.

The Corps has studied this on a number of occasions including shortly after Katrina and as recently as its 4303 report to Congress and in each case have concluded that this is the best technical solution. The post Katrina report was DMJM Harris dated August 4, 2006 and its 2nd report is the 4303 report dated August 30, 2007; both of which are exhibits at the Hearing.

Senator BOXER. Thank you, Mr. Rault.

I just want to take a personal privilege here as the Chair to say how much I appreciate our witnesses today, particularly Mr. Rault. Because I have to leave, I wanted to say that I have been having cross conversations with my two colleagues here. Having lived through so many floods in my area, a lot of folks say hey, why is Senator Boxer so interested? Because I understand what is at stake here.

One of the first things I did when I was a member of the House, a long time ago, is to work on getting an appropriate flood control project for, believe it or not, a creek that would overflow to such a degree that it would absolutely flood many, many, many houses. Sometimes we actually had to have people evacuate to their rooftops. That is true. I remember that once. That was when I was on the County Board of Supervisors. So I get what water can do, what water can do.

I am so persuaded that this Pump to the River project makes sense that I have asked my colleagues to work with me. We may not be able to wait for the next Water Resources Development Act. We may just have to go to our colleagues on the Committee and say, this is an urgent need. I think between Senator Vitter and myself, and Senator Landrieu, we can cover the Committee and see what they think about this. I am very worried that we are going to miss an opportunity here to authorize something that seems to make a lot of sense.

I would just ask you, Mr. Rault, if you, working with my colleagues and the members of the community, would you see that the Committee gets copies of any studies that have been done that you are aware on Pump to the River? Studies either by the cities, the counties, and the flood control districts, all of the various agencies, the citizens. Do you have some of those?

Senator VITTER. Madam Chair, actually Joe gave me a list of seven of exactly what you are talking about to submit to the record.

Senator BOXER. Good. We have those in the record, so we will read those. But it seems to me if we can move forward with seven studies behind us with an authorization, and then have some hearings on it to just flesh it out further, and get our colleagues to go with us, I think we can persuade them. And then, of course, Senator Landrieu goes to her magic committee, the Appropriations Committee, and tries to get the thing moving.

It just seems to me to make so much sense that if you are pumping everything into this lake, it is just common sense that if there is another place to put it that is deeper and wider and broader, then let us do that. We have got to get rid of the water and get rid of it fast.

Look, obviously I respect the Corps. But I would like to say to the good General, without asking him to take the microphone again because the poor guy has done enough of that, if you would please respond to me in writing as to the Corps' view on the Pump to the River Project. If you could write to us about what you think the consensus is on that project.

Here is the thing. I think Mr. Rault makes the case. It is a stand alone. So, this other fight over 1 and 2 goes on. But this, to me,

it seems to me that we could do this and it does not do damage to our other discussion on Options 1 or 2 or 2a, or b or c or d.

Mr. RAULT. Thank you, Madam Chair, and I offered the seven engineering reports and other studies for the record and the engineers are ready to roll.

Senator BOXER. Well, that is good. And at this point, I am going to hand the gavel over to my colleague. You know, there is a lot of trust in this, Senator Vitter, because Lord knows what you could do with me out of the room on other issues.

[Laughter.]

Senator BOXER. So, this is just for the purpose of this hearing. It is not for the purpose of writing global warming legislation, or Clean Air Act amendments. I have your word.

I have really, frankly, learned so much from the people of your State and I have such respect for them and admiration for them and friendship with them. So, I hope you will consider me part of your team as we move forward.

I know that things are going to get better. The reason is that you have people who are hearing you, are listening to you and you also have within your community the intelligence and the drive to save what James Carville says is a very special culture. And we in America cannot afford to lose that culture, that tradition, that history. And as long as I am Chairman of this Committee, you are not going to lose it. We are going to work very hard to get this done.

I thank you and I will run on to my other meetings because California calls. I will turn the gavel over to my friend, Senator Vitter.

Senator VITTER [presiding]. Thank you, Madam Chair, and you certainly have my commitment about the gavel today. We look forward to working with you, in the very near future, along the lines you have outlined. I would just suggest that we include in that clarification because I honestly do not think that this is anything new, that 2 is covered just as surely as 1, and then leave it up to the appropriators and others to study both.

Thank you very much. Thank you for all your leadership.

And now we will go back to the order and Mr. Steven Peyronnin.

STATEMENT OF STEVEN PEYRONNIN, EXECUTIVE DIRECTOR OF THE COALITION TO RESTORE COASTAL LOUISIANA

Mr. PEYRONNIN. On behalf of the members and partners of the Coalition to Restore Coastal Louisiana, I thank you very much for the opportunity to be here today.

I am sure it will come as no surprise to the members of this Committee that in the past 75 years, coastal Louisiana has lost more than 2,300 miles of coastal wetlands and that, without immediate and decisive action, Louisiana could potentially lose an additional 800 square miles by the year 2050.

Decades of science and planning have made it clear that we possess the scientific, technical and engineering expertise to restore sustainability to this landscape, and at the same time enhance reliable hurricane protection. What is lacking is a clear sense of urgency to pursue the projects, the plans and the tools authorized by Congress in the LCA.

The LCA authorized the construction of five initial projects recommended in the Chief of Engineers report because of their ad-

vanced investigations and the ability to implement them expeditiously. Despite the clear path articulated in the authorization, only one project is scheduled to begin construction prior to 2012.

Under the LCA, Congress also authorized the development and delivery of a comprehensive restoration plan by January 2008. This plan has not been initiated.

Among the most critical elements of the restoration plan were the requirements for specific, measurable success criteria and a prioritized list of projects. Many scientists agree that it is not possible to restore the landscape of coastal Louisiana to historic conditions. This leads to the critical question of exactly how much of Louisiana's coast can be restored and which areas are the most essential?

Without the most basic understanding of what a successful program should achieve, and what elements or projects are the most important, it is nearly impossible to prioritize limited resources to implement an effective and efficient program.

Without a restoration plan, there is no framework for integrating restoration projects with storm protection projects. Despite technical modeling that indicates that the existing coastal landscape reduces storm surge, the Corps of Engineers has not analyzed how expanded restoration efforts would enhance hurricane protection.

Without a restoration plan, there also is no framework for integrating restoration projects with navigation activities. Under the current management priorities for the Mississippi River, levees harness the river to prevent flooding and then funnel the trapped sediment beyond the continental shelf to maintain navigation. The result is the elimination of desperately needed sediment and fresh water from the surrounding ecosystem, exposing river levees to the full brunt of storms and hurricanes.

This narrow management focus has created a system that is not sustainable. Recognizing restoration as an equal priority is not simply a matter of economic incentive or public safety. It is a matter of maintaining the sustainability of the entire lower river system.

Comprehensive restorations will have implications that expand across the missions and capacities of multiple Federal agencies. The LCA authorization addressed this in two ways. First, by requiring the comprehensive plan to describe the role of other Federal and State agencies in a long-term restoration program, and second by establishing a task force of Federal and State entities to make recommendations and contribute financial support.

With neither a comprehensive plan nor a task force in place, the Federal resources concentrated in coastal Louisiana are often disconnected and isolated. The result has been a segmented process that lacks critical input and resources from multiple agencies, negating the full leverage of a coordinated Federal effort.

The LCA authorization created a number of tools, as I have described, for pushing forward with a programmatic restoration plan. The Corps has not used these tools, and has instead relied on a traditional project development process that is ill-suited to urgently respond to this crisis.

The hurricanes of 2005 demonstrated that we cannot wait until after a disaster to insist on accountability. Scientists estimate that

restoration efforts in coastal Louisiana have less than a decade before our chances of success are significantly reduced.

Accountability simply must be a perpetual element of any effective program. But accountability must be balanced with the capacity to succeed. Given the shear scope and complexity of comprehensive restoration in coastal Louisiana, we must recognize that a true commitment will constitute the largest ecosystem restoration ever in the world.

The issue before this Committee today has been described as the most preventable environmental crisis in America. Without a strong sense of urgency and commitment, we face the almost certain collapse of the largest delta on this continent, taking with it the very heart and soul of Louisiana.

I thank you for your time to be here today and I welcome any questions.

[The prepared statement of Mr. Peyronnin follows:]

TESTIMONY OF STEVEN PEYRONNIN, EXECUTIVE DIRECTOR
OF THE COALITION TO RESTORE COASTAL LOUISIANA

TO

U.S. SENATE COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS

June 16, 2009

My name is Steven Peyronnin and I am the executive director of the Coalition to Restore Coastal Louisiana. On behalf of the Coalition, I would like to express our appreciation to the Committee and the Chairman for the invitation to testify about the progress of restoration efforts under the Louisiana Coastal Area (LCA) authorization, Title VII WRDA 2007.

The Coalition to Restore Coastal Louisiana is a non-profit, advocacy organization comprised of businesses, local governments, industries, scientific communities, environmental and conservation organizations, civic and faith-based groups and a broad spectrum of concerned citizens who share our mission of restoring and protecting a sustainable coastal Louisiana.

The views that I express here are supported by broader environmental and conservation interests as well, namely the Environmental Defense Fund, the National Audubon Society and the National Wildlife Federation, that have partnered with our organization to focus national attention and action on the current land loss crisis in coastal Louisiana.

In the past 75 years, Louisiana has lost more than 2300 square miles of coastal wetlands. Roughly translated, this is an area equivalent to the entire state of Delaware that has simply disappeared. While a fraction of wetland loss in Louisiana is attributable to the natural deltaic process typified by alternating cycles of deposition and subsidence, substantial human alteration of this landscape is responsible for the majority of Louisiana's coastal land loss.

Mississippi River levees built to facilitate and maintain navigation and flood protection have choked off Mississippi River sediment that once built and sustained this vast deltaic complex. Additionally, thousands of miles of oil and gas pipelines and canals that provide essential energy to the nation now slice through Louisiana's wetlands, introducing damaging levels of saltwater and hastening the erosion of this sediment starved landscape. Further compounding the demise

of this subsiding ecosystem is the inevitable challenge posed by intense and frequent hurricanes and the implications of climate change and relative sea level rise.

Amidst the challenge of restoring this magnificent landscape is the recognition that the Louisiana delta is a working delta, supporting unique cultures and communities as well as critical energy extraction and processing infrastructure. It provides both a nursery for the Gulf of Mexico's vast fisheries and a home for fishing fleets. It is the largest navigation gateway for food, fiber, and fuels produced by, and imported into, the United States. As four hurricanes in less than five years have shown, this system-wide collapse poses a serious threat to urban and coastal populations, domestic energy production, critical navigation infrastructure, abundant fisheries, and world-renown Louisiana cultures and communities.

Efforts to implement the LCA program must have a sense of urgency

Without immediate and decisive action, Louisiana will continue to lose land at an alarming rate, potentially losing another 500 square miles of land by the year 2050. The implications are severe but despite these obstacles, it is still possible to restore Louisiana's coastal landscape to a sustainable and productive state.

Decades of science and planning have made it clear that we possess the scientific, technical and engineering expertise to restore sustainability to this landscape and at the same time provide sustainable protection to vulnerable coastal communities and urban population centers. What is lacking is a clear sense of urgency to embrace the restoration program authorized by Congress.

While coastal restoration has been recognized as a priority for decades, the inherent link between a healthy coast and sustainable hurricane protection became clear following the storms of 2005. Since that time the Corps of Engineers has demonstrated a clear sense of urgency in implementing hurricane levee improvements in the New Orleans area and working to complete all modifications and enhancements by 2011. Their efforts to rebuild and enhance levees in New Orleans demonstrates what is possible with a clear sense of urgency, priority and commitment, but it is clearly evident that restoration efforts have not met with the same sense of urgency and commitment.

Scientific analysis has demonstrated that there is a clear benefit to the effectiveness of levees when they are buffered by wetlands. Considering the tremendous federal investment in hurricane levees, it is imperative that we protect and enhance that investment by devoting the same sense of urgency to ecosystem restoration efforts that substantially reduce the risk of flooding, amplify protection levels and reduce the impact of storms and surge on the present levee system.

Over four years ago the Chief of Engineers submitted a final report clearly recognizing the severe wetland loss occurring along coastal Louisiana. The report recommended 5 critical near term ecosystem restoration features based on their relatively advanced investigations and their ability to be implemented expeditiously. Congress acknowledged that sense of urgency by authorizing those 5 initial projects for construction under the LCA. Despite the clear path articulated in the authorization, only one project is scheduled to begin construction before 2012.

Not only is the lack of progress a troubling obstacle to restoring a sustainable coast, but it has also negated the ability to leverage Federal opportunities that could provide desperately needed funding streams and a strong sense of urgency. Without a single project ready for construction, LCA projects were not considered in the American Recovery and Reinvestment Act of 2009 because they fell far short of the shovel ready requirement intended to urgently move projects forward.

A comprehensive plan is essential to success

The authorization of the LCA was viewed by many as the first deliberate step toward a programmatic restoration plan for coastal Louisiana. Within the LCA, Congress authorized not only 5 near term projects for construction, but also directed the Secretary of the Army to formulate a long-term comprehensive plan. Among the most critical elements of the authorized LCA plan were the requirements for specific, measurable success criteria and a prioritized list of projects. Many scientists agree that it is not possible to restore the landscape of coastal Louisiana to historic conditions. This conclusion leads to the critical question of exactly how much of Louisiana's coast can be restored and sustained and which areas are the most essential. Without the most basic understanding of what a successful restoration program should achieve

and what elements or projects are the most important, it is nearly impossible to implement a program that effectively and efficiently prioritizes limited resources in an expedited manner.

Integrating restoration with protection

In the absence of a long term, integrated restoration plan, there is currently no framework for how restoration efforts work with protection activities. The Corps of Engineers has instead relied on the Louisiana Coastal Protection and Restoration Technical Report (LaCPR), or "Category 5" report, to evaluate coastal restoration based solely on the existing landscape's capacity to reduce storm surge. Despite technical modeling that indicates a reduction in storm surge by the existing landscape, the Corps of Engineers has not initiated any additional technical analyses that would quantify the additional surge reduction capacities associated with expanded restoration efforts. As a result, the LaCPR report proposes simply maintaining the current landscape as the only ecosystem alternative for storm, hurricane and flood protection.

Mississippi River management must prioritize restoration

In the absence of a long term, integrated restoration plan, there is currently no framework for how restoration efforts work with navigation activities. For nearly a century the Corps of Engineers has managed the Mississippi River to control flooding and to maximize and maintain navigation. This management model constructed levees to harness the river for safety and protection, constricting the deposition of sediment that once built and sustained the coast of Louisiana. That same sediment, now confined and concentrated in a narrow river, was quickly categorized as an impediment to navigation. Levees and jetties were intentionally designed to funnel sediments beyond the continental shelf, eliminating them from the deltaic wetland system. The unintended consequence of this narrow management practice has devastated an entire ecosystem, jeopardizing irreplaceable habitat and fisheries and exposing coastal communities and vital national infrastructure to storms and hurricanes. Ironically it is this exact practice of management that is now the greatest threat to disrupt navigation and flood protection on the Lower Mississippi River.

Stated very simply, managing the lower Mississippi River system strictly for navigation and flood control purposes has created a system that is geologically unstable and systematically

unsustainable. Dredging costs are escalating as sea level rise forces sediment deposition further up the River. Wetland loss exposes navigation levees to the full brunt of storm surge that could eventually compromise their integrity and elevate surge levels far upstream. This collapse not only threatens the ecosystem but ultimately threatens the sustainability of the entire River system. In concept, the sustainability of the navigation system and the deltaic ecosystem are intertwined. They share the common objective of removing sediment from the lower River that in turn can restore the ecosystem that ultimately protects the integrity of the entire system.

This suggests a comprehensive solution to Louisiana's coastal collapse that entails real integration of navigation and flood protection goals into a coastal restoration framework. Elevating restoration within Mississippi River management as an equal priority is no longer a matter of preference, economic justification or public safety; it is a matter of maintaining the comprehensive sustainability of the entire lower Mississippi River system.

Leveraging the full Federal commitment

As evidenced by the broad range of impacts of coastal land loss, comprehensive restoration efforts will have implications that span across the missions and capacities of multiple Federal agencies. The LCA authorization addressed this by requiring the comprehensive plan to describe the role of other Federal and State agencies in carrying out a long-term restoration program and by also establishing a Task Force of Federal and State entities to make recommendations and leverage financial support.

The Federal government has invested significant resources in hurricane recovery and protection, not solely through the Corps of Engineers but through multiple Federal agencies as well. Without a framework for additional engagement these resources are often disconnected and disjointed, reducing the ability to fully leverage a comprehensive Federal commitment. Without a Task Force, a programmatic approach to comprehensive restoration lacks critical input from various Federal agencies with specific expertise and resources and an absence of diverse input into critical decisions.

Accountability and capacity

The hurricanes of 2005 demonstrated that we cannot wait until after a natural disaster to insist on accountability. Scientists estimate that restoration efforts in coastal Louisiana have less than a decade before our chances of success are significantly reduced. Accountability simply must be a perpetual element of any effective program. But accountability must be balanced with the capacity to succeed.

At the heart of a meaningful and urgent commitment to restoration is a corresponding commitment to the capacity required to meet established deadlines and objectives. If urgency is a priority, the capacity of those charged with restoration must reflect that priority.

Given the shear scope and complexity of comprehensive protection and restoration in coastal Louisiana, we must recognize that a true commitment will likely constitute the largest ecosystem restoration program in the history of the world. Consequently we must ensure that Federal entities charged with the execution of a comprehensive restoration program have the capacity to meet that challenge. Where a single agency or entity lacks resources or authority, Congress has authorized the inclusion of multiple Federal entities to enhance capacity.

Recommendations

The progress toward comprehensive coastal restoration in Louisiana has clearly stalled within the confines of the traditional Corps of Engineers process. The delay of LCA projects and the failure to comply with Congressional direction clearly demonstrate that the traditional model for project development and implementation is ill-suited to respond to this crisis. Under this traditional model, major policy and project decisions are often dictated by obstacles or governed by constraints rather than driven by objectives or fueled by a sense of urgency. As a result, inaction often becomes the most likely alternative to difficult decisions despite the fact that inaction is the most costly alternative. If this pattern of delay continues, it will eliminate any chance of success.

In short Congress authorized a comprehensive set of tools not just to execute 5 projects, but to initiate a broader comprehensive program. To embrace the authority bestowed by Congress we recommend:

- Immediate steps should be taken to convene the Coastal Louisiana Ecosystem Protection and Restoration Task Force (Task Force) to leverage the full Federal commitment and capacities of Federal entities. The Council on Environmental Quality is uniquely positioned to lead this effort with statutory responsibility under NEPA for environmental oversight of all Federal agencies and interagency decision-making on environmental matters.

- The Task Force should review the project development path for the 5 construction projects authorized under Sec 7006(c)(1) and recommend opportunities to streamline and expedite the implementation of these near-term priorities.

- The Secretary of the Army, in conjunction with the Task Force, should immediately commence development of the comprehensive plan authorized under LCA to ensure that measurable success criteria and a prioritized project list are integrated with navigation and hurricane protection efforts.

I offer this testimony today with a mixed sense of disappointment over the lack of progress of restoration efforts in coastal Louisiana, and a sense of optimism that there is still an opportunity to redirect and recommit to meaningful and urgent action.

Respectfully submitted,

Steven Peyronnin
Executive Director
Coalition to Restore Coastal Louisiana

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August 10, 2009

Senate Committee on Environment and Public Works
Attn: Heather Majors
410 Dirksen
Senate Office Building
Washington D.C. 20510

Dear Madam Chair and Committee Members:

Thank you for the opportunity to testify before the Senate Committee on Environment and Public Works regarding restoration features authorized under the Louisiana Coastal Area (LCA). Please accept my response to the following questions posed by Senator Inhofe regarding my testimony.

Question:
As I'm sure you are aware, WRDA 2007 directly authorized 9 LCA features and provided contingent authorization for another 6 features, if those features had favorable Chief's Reports by December 31, 2010. In your opinion, what should be the priority order for proceeding on those 15 features?

Because a number of authorized LCA features are equally critical or synergistic, the priority order for LCA project features is itemized in tiers rather than a purely sequential listing of all 15 authorized features.

Tier 1: Most Critical
1. Medium Diversion at White's Ditch ($86,100,000)
2. Mississippi River Gulf Outlet environmental restoration ($105,300,000)*
3. Medium Diversion at Myrtle Grove with dedicated dredging ($278,300,000)
4. Small Diversion at Hope Canal ($68,600,000)

Tier 2: Critical
5. Convey Atchafalaya River Water to Northern Terrebonne Marshes ($221,200,000)
6. Multipurpose Operation of Houma Navigation Lock ($18,100,000)**
7. Terrebonne Basin Barrier Shoreline Restoration ($124,600,000)
8. Barataria Basin Barrier Shoreline Restoration ($242,600,000)
9. Amite River Diversion Canal Modification ($5,600,000)
10. Land Bridge at Caillou Lake ($56,300,000)

Tier 3: Less Critical
11. Modification of Caernarvon Diversion ($20,700,000)
12. Modification of Davis Pond Diversion ($64,200,000)
13. Small Diversion at Convent/Blind River ($88,000,000)
14. Gulf Shoreline at Point Au Fer Island ($43,400,000)
15. Small Bayou Lafourche Reintroduction ($133,500,000)

* Mississippi River Gulf Outlet environmental restoration prioritization is valued as a component of WRDA 7013 Mississippi River Gulf Outlet authorization.

** Multipurpose Operation of Houma Navigation Lock reflects only the value of studying the Houma Navigation Lock for environmental operation and does not reflect the separate authorization or cost to construct the lock.

Question:
Please describe the factors (e.g. ecological benefits, cost, cost-effectiveness, authorization constraints, a need to sequence multiple features in a particular order, etc.) and relative weights for those factors you use to develop this order.

Factors in Establishing Priority Order
Each of the 15 priority features were assigned a value based on their performance under the following criteria:

1. Storm Protection. A storm protection value was assigned based on the restoration feature's position on the landscape, storm surge reduction capabilities and proximity to coastal communities or urban populations.
2. Sustainability – A sustainability value was estimated as a function of providing long-term benefits with relatively low recurring costs.
3. Ecological Benefits – Ecological benefit was estimated based on the type of restoration feature and ecologic value of location impacted.
4. Scale of Benefits – The scale of the restoration feature's benefits was based on the size of the restoration feature and the region of impact.
5. Timing of Benefits – The timing of the restoration feature's impact reflects the duration before a restoration feature achieves its objective and the length of time the restoration feature continues to fulfill the objective.
6. Cost – The cost of the restoration feature was derived from the authorized cost of each project.
7. Cost Efficiency – The cost efficiency of the restoration feature was estimated as a function of the projects benefits (criteria 1-5) compared to its cost.
8. Synergies – The restoration feature's synergies were based on the restoration feature's coordinated enhancement or benefit when combined with another LCA restoration feature.

Weighting of Factors:
Each of the factors used to establish the priority order were assigned relative weighted averages. Storm protection, sustainability and cost efficiency received the highest

weighted value, while ecological benefits, scale of benefits, timing of benefits, and cost received lower weighted values.

Authorization Constraints
It should be noted that several LCA features have authorization constraints. Most importantly, both the State and the Corps are placing significant emphasis on meeting the LCA mandated timeframes for the 9 features authorized in 7006(e) under Additional Projects. Because there is no corresponding deadline for those projects authorized in 7006(c) under Initial Projects, the current LCA authorization has inadvertently incentivized pursuing feasibility reports on less critical projects rather than focusing valuable resources and federal appropriations on the construction of Initial projects authorized under 7006(c).

The USACE New Orleans District has incorporated the Sec. 7006(c)(1)(A) Mississippi River Gulf Outlet feature into the Sec. 7013 Mississippi River Gulf Outlet comprehensive restoration feature. The USACE New Orleans District has decided to delay action on the 7006 project pending completion of the 7013 feasibility study. Given the prolonged schedule for the 7013 feasibility study (anticipated for completion in 2011), the USACE could be directed to move forward with the 7006 authorization with post-Katrina modifications as an urgent priority feature.

Authorization to proceed on a feasibility report on environmental operation of the Houma Navigation Canal Lock is predicated on the authorization to construct the Houma Navigation Canal Lock as part of the Morganza to the Gulf Hurricane Protection System. Progress on this LCA restoration feature is unlikely to move forward unless the Houma Navigation Canal Lock is authorized to move forward as a restoration feature or authorized to proceed independently of the Morganza to the Gulf Hurricane Protection System currently under reevaluation by the USACE New Orleans District.

The LCA restoration features described in Sec. 7006(e)(1)(C) as Modification of Caernarvon Diversion and Sec. 7006(e)(1)(D) as Modification of Davis Pond Diversion are unlikely to produce significant restoration benefits unless their original authorizations are modified to remove constraints that govern the operation of these diversion structures based on achieving salinity targets rather than operating them for the purposes of sediment and freshwater delivery to the surrounding ecosystems. The original authorizations of these projects should be modified to remove that constraint.

Question:
Do you know if that is the priority order being used by the Corps and the State as the non-federal sponsor?

Corps and State Priority Order
Beyond the original priority system established by the Corps in the LCA report to determine the 15 priority LCA features, I am not aware of a priority order currently being used by the Corps to advance the 15 LCA priority features. Under the authorization constraints previously mentioned the Corps and State have focused on mandated

deadlines for feasibility reports rather than open-ended authorizations for the construction of critical projects.

The State has adopted a Master Plan (Comprehensive Master Plan for a Sustainable Coast) and executes the strategy outlined in the Master Plan through their Annual Plan. The State is currently developing a quantitative prioritization tool that will be implemented in the FY12 State Annual Plan. Based on funding levels and project construction schedules published in the FY10 State Annual Plan, my recommendations are largely consistent with the State's current planning priorities. The only significant deviation is the State's high prioritization of the Bayou Lafourche feature because of its dual function as both a restoration feature and water quality project.

Respectfully submitted,

Steven Peyronnin
Executive Director
Coalition to Restore Coastal Louisiana

Senator VITTER. Thank you very much, sir. Now we will here from Dr. Robert Twilley, who is a professor with the Department of Oceanography and Coastal Sciences at LSU.

Thank you, Doctor.

STATEMENT OF ROBERT R. TWILLEY, PROFESSOR, DEPARTMENT OF OCEANOGRAPHY AND COASTAL SCIENCES, VICE CHANCELLOR, RESEARCH AND ECONOMIC DEVELOPMENT, LOUISIANA STATE UNIVERSITY

Mr. TWILLEY. Thank you very much. I appreciate this opportunity of lending some comments to the Committee on the Environment and Public Works.

Let me start out just by saying that the sustainability of coastal Louisiana, as we have been hearing here today, is critical to the Nation. However, this is not just a Louisiana issue. The challenges facing the Gulf Coast reflect a national inability to come to grips with the need to deal with neglected infrastructure, both natural and built, and the realization that both of these natural and built environments provide security to coastal communities and to the Nation. It will not be possible to protect and restore coastal Louisiana without significant changes in the way the Federal and State governments deal with these issues.

It is alarming that, even though the Nation's largest port and energy complex, a metropolitan area of 1 million residents, and coastal wetlands of immense value are at risk, that funds to support the restoration and protection of coastal Louisiana have been slow in coming. And I want to offer three major points around that theme.

First, we have to, and it is urgent that, we devote our attention to finding solutions. There is much interest in solutions in the Gulf Coast that have been proposed by the Dutch in their efforts to protect The Netherlands. There are a couple of key points that the Dutch have learned that nearly three centuries of trying to live in a region largely below sea level that are relevant to our national priorities here in the United States.

First and foremost, civil engineering has been replaced by the principles of ecological engineering. Working with nature is a first principle of the new Dutch system. The Dutch have learned that shortening the coast using hardened structures, such as barriers which disrupt the natural hydrology, can have major adverse environmental impacts. This includes the realities of how a changing climate must be part of any new design features.

Second, water quality issues can limit the sustainable solutions to more comprehensive water management. Thus, strategies to reduce nutrients have to be in concert with water management solutions.

The Gulf Coast region has been attempting to deal with similar comprehensive approaches to watershed management, recognizing that the problems of Southern Louisiana are not solely those of our State.

First, sediment required to replenish the wetlands will come down the Mississippi River and much of the original sediment load of the Mississippi is trapped behind major dams in the Missouri River system. Thus, a more comprehensive approach to sediment buffers is required.

Second, a major dead zone, an area where marine life is stressed because of lack of oxygen, now exists in the Gulf of Mexico along Louisiana and parts of Texas as a result of excessive nutrients traveling the Mississippi from the farmland of the Midwest. Although sediments are critical to rebuilding the wetlands of the Mississippi River Delta, additional nutrients flowing through the river divergent structures could potentially impair inland waters of the State, shutting down our most critical strategy of restoring the Mississippi River Delta. Therefore, we must find practices and political will to reduce nutrients to the Gulf Coast hypoxic zone.

Third, the specter of climate change is adding to the coastal and water management challenges. Existing projects will have to be modified to accomplish the purposes for which they originally were designed and additional attention will be required to deal with the already significant strain on recovering ecosystems.

Only through rethinking how we manage the Mississippi River, not only to provide for navigation and flood control but also as a critical source of sediments to stabilize the degrading wetlands, will restoration be realized in a 100-year project cycle given the projected rates of sea level rise.

To do this, we have to urgently look for ways to fund these solutions. The largest source of funds for dealing with major water projects is found in the budget of the Corps. Unfortunately, priority setting is tied to a rudderless system for allocating Federal funds and assessing national needs.

Is it difficult to justify a national priority when objectives at the national level are not clear? Developing on a needs assessment is dependent upon national policies that are perfectly defined national goals for water use. Whom do we protect from flooding? What infrastructure is at risk? What losses and risks are most valuable to the economic, ecological and social well-being of this Nation? How important are our ports to the economy of this Country?

Recent National Research Council studies of the Corps' planning process and projects have indicated that the Corps is faced with conflicting laws and regulations that make prioritization and description needs difficult to manage.

I will end with what I find to be one of the most important parts of this issue which is that not only do we have to find solutions, not only do we have to fund solutions, we have to coordinate solutions. In the past, the United States successfully established processes that deal with challenges of developing priorities and funding to deal with water issues of national significance.

In 1879, Congress established the Mississippi River Commission with the mission of providing a navigable Mississippi and reducing the ravages of frequent floods. After the 1927 flood, Congress passed the Flood Control Act in 1928 which created the comprehensive Mississippi River and Tributaries project. This permitted the commission to deal with the lower valley as a whole: one mission, one entity and, therefore, a very successful cooperative project among interested parties to integrate resources to meet the challenge.

Although times are much different today, the need to deal with issues in the lower Mississippi River Valley in a comprehensive manner remains. The continuous funding on the work of the lower

Mississippi River Valley for nearly 80 years and the comprehensiveness of the effort show the utility of developing a separate Federal project, similar to the MR&T, for restoring and protecting coastal Louisiana.

Now, I will finish with this comment. Protection and restoration of coastal Louisiana should be a major priority for the United States. The Nation cannot live without its water resources and deltaic coast. It cannot continue to watch Louisiana disappear. Sooner or later, it will have to address the problem. The longer we wait, the more difficult the problem will become and the more money the eventual solution will cost.

Thank you.

[The prepared statement of Mr. Twilley follows:]

Restoring and Protecting Coastal Louisiana

The challenges facing the Gulf Coast reflect a national inability to come to grips with the need to deal with neglected infrastructure, both natural and built.

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Environment and Public Works
United States Senate

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Water is probably one of the most important resources that will define the economic, public health and environmental issues in the next century, certainly by 2050. Today, water resource quantity and quality across well-defined regional river basins represent highly engineered landscapes to support critical economic infrastructure that is being subjected to a changing global climate that will challenge our national priorities. Thus water resource planning through the development of public policy is arguably one of the most important features of our national security, our ability to sustain natural resources, provide for public health, and promote economic development. The following two sections are from previously published manuscripts that define some of the urgent challenges to establish national priorities in restoring and protecting the Gulf Coast region.

Infrastructure needs of Coastal Protection and Restoration:

The sustainability of coastal Louisiana is critical to the nation. It is the location of a large part of the nation's oil and gas industry and its largest port complex. It provides vital habitat for economically important fisheries and threatened and endangered species. Yet this region is under siege. The catastrophic effects of Hurricane Katrina in 2005 and recent storms in 2008 brought to the nation's attention the fragility of the region's hurricane defenses and the continuing loss of wetlands and ecosystems; a loss that has continued for more than a century with little or no abatement. Slowly, the flood protection system in New Orleans is being restored; even more slowly, attention is shifting to restoring the coastal deltaic system. But there is a lack of strong support for these two linked efforts, protection and restoration. There is a lack of funding but also the lack of a prioritization system at the federal level for allocating funds for critical water resources infrastructure. The challenges facing the Gulf Coast reflect a national inability to come to grips with the need to deal with neglected infrastructure, both natural and built, and the realization that both provide security to coastal communities. It will not be possible to protect and restore coastal Louisiana without significant changes in the way federal and state governments deal with these issues.

According to the American Society of Civil Engineers (ASCE), in its frequent report cards on the status of the nation's infrastructure, the United States is not maintaining and upgrading its infrastructure and is especially neglecting its natural and built water resources infrastructure. The ASCE indicates that the cost of all needed infrastructure work in the United States exceeds $1.5 trillion. Funding for water and wastewater treatment facilities is falling behind at a rate of more than $20 billion each year. Funding for flood-risk management, navigation, hydropower, and ecosystem restoration (wetland and aquatic), not including the short-term levee repair efforts in New Orleans, also continues to decline. With so many clear and pressing needs, it is vital that the United States devise more rational approaches to the funding and prioritization of infrastructure projects, including critical water resource projects such as those in coastal Louisiana.

The 2005 disaster in New Orleans awakened the nation to the serious vulnerabilities in flood protection that exist across the country and to the fact that the nation lacks a realistic assessment of the infrastructure, both built and natural, it takes to reduce these vulnerabilities. The failures of levees and other infrastructure that have occurred since Katrina, including those that occurred during the Midwest floods of 2008, have more clearly defined this issue as national in scope. At the same time, the need for national priorities in ecosystem restoration has lacked attention. The loss of coastal wetlands along the Gulf had been well known for decades, and environmental groups had been campaigning for action to restore this deltaic coast. Resources were going to projects in other parts of the country such as the $7.8 billion federal initiative to restore the Florida Ever-glades and the joint federal/state efforts to reduce pollution in the Chesapeake Bay. Other regions also deserve attention. The need for ecosystem restoration has been recognized in the Missouri River, the upper Mississippi River, the California Bay Delta, the Great Lakes, and numerous smaller areas across the country. There is an urgent need to assess investments in natural and built environments to reduce vulnerabilities to increased flooding risks.

Coastal Louisiana sits at the end of a natural funnel that drains 41% of the coterminous United States and parts of two provinces of Canada. This watershed, the Mississippi River basin, delivers water to the Gulf of Mexico through the mouths of the Mississippi and Atchafalaya Rivers. Extending more than 11,400 square miles, this coastal area was formed during the past 6,000 years by a variety of deltaic lobes formed by the Mississippi River switching east and west from Lafayette to Slidell, creating an extensive system of distributaries and diverse wetland landscapes as freshwater and silt mixed with coastal processes of the Gulf of Mexico. Periodic river flooding by breaches in natural levee ridges (crevasses) along the numerous distributaries across the deltaic landscape out to the barrier islands limited salt water intrusion and added sediments to coastal basins. These river and coastal processes built and sustained an extensive wetland ecosystem, the eighth largest delta in the world. In addition to providing nurseries for fish and other marine life and habitat for one of the largest bird migration routes in North America, these wetlands serve as green infrastructure, providing natural buffers that reduce flood risks to the vast energy production and port facilities of the Gulf area as well as human settlements inland from the coast. Early settlers in New Orleans were more concerned by flooding from the Mississippi than by the threat of Gulf storms, which would be buffered by extensive coastal forests that stood between the city and the Gulf of Mexico.

Long before Katrina, coastal wetlands were disappearing because of considerable human influence and disruption in the natural processes of a deltaic coast. Levees were built along the

banks of the Mississippi to keep the river from overflowing into floodplains and coastal environments to protect lands that had been converted to agriculture, industry, and human settlement. The sediment that once breached natural levees and nourished the wetlands was instead channeled out into the Gulf of Mexico, in essence starving the delta and causing it to recede rather than grow. The effect of levees was exacerbated by the construction of channels and pipeline corridors that crisscrossed the wetland landscape to provide access for extracting much needed domestic oil and gas resources by providing reliable navigation channels that could be connected to Mississippi River commerce. During the 1960s and 1970s, coastal land, mostly wetlands, disappeared at the rate of 39 square miles per year.

The potential conflict of human activities and processes necessary for a sustainable deltaic coast were identified after the 1927 flood. But pressure for protection and economic development ignored the call for more prudent management of river resources to integrate both protection and restoration policies. By the mid-1980s, coastal scientists had brought the public's attention to the loss of wetlands and the degradation of the Mississippi River delta. Very little was done to address the enormous problem because the environmental consequences were not deemed sufficient to justify the expense of restoration and mitigation. In 1992, the Mississippi River Commission, recognizing the problem of increased salinity that threatened deltaic habitats along the coast, opened a diversion structure through a Mississippi River levee at Caernarvon, south of New Orleans. This diversion structure simulates a levee breach by allowing Mississippi River water to flow by gravity (flood gates are opened during elevated river levels) into the wetlands behind the levees during certain periods of the year. This became the first significant step in what may become a series of such structures to the south of New Orleans.

New Orleans and the surrounding region have been protected in various ways from potential Mississippi River floods since the city was settled in 1717. After the disastrous 1927 flood, the Army Corps of Engineers instituted a massive river levee-rebuilding program that was accompanied by floodways and channel modification. This river-protection system has performed as expected since that time.

Coastal protection became the additional authority of the Corps in 1965, when Hurricane Betsy flooded parts of New Orleans. Until the arrival of Katrina, federal and local efforts had focused on providing protection against a storm defined by the National Oceanic and Atmospheric Administration (NOAA) as the standard project hurricane. Shortly after construction began in earnest, NOAA increased the estimated size of the standard project hurricane. In contrast to the river-protection system, funding for the coastal-protection system was through individual projects that came in dribs and drabs, thus limiting the ability of the Corps to change its design to accommodate the new, larger target hurricane. Instead, the Corps decided to move ahead to first complete all the work at the original level of protection. But as individual construction projects took place, ever-present subsidence was diminishing the level of protection provided by the newly constructed levees. When Katrina hit, the degree of completion of the major components of the protection system varied from 65 to 98% of the original design standards, not taking into account datum errors, subsidence, and sea level rise that had taken place since the original design. The failure during Katrina of several components of the protection system, together with the massive size of the hurricane itself and the loss of coastal habitat, resulted in a loss of more than 1,400 lives, the devastation of major housing districts within the city, and other damage throughout the region.

Finding solutions

Postmortems on the impact of the hurricane flooding recognized the longstanding relationship between extensive coastal wetlands and community protection, resulting in a great deal of debate about whom or what was to blame for failing to implement integrated protection and restoration. Now, however, it is more important that we devote our attention to finding solutions that will leave this important region with reduced risks from hurricanes, a navigation system that will support the substantial foreign trade through the Port of New Orleans, support for the area as a viable energy producer for the nation, and a rich and vibrant coastal wetland ecosystem.

Although there are now cooperative efforts to deal with the problems of coastal Louisiana, the picture is far from rosy. Two parallel efforts, one led by the state of Louisiana and the other by the Corps, have been under way since Katrina to determine the appropriate combination of structural activity (levees, flood walls, gates, and so forth), non-structural features (for example, building codes and evacuation planning), and wetland restoration needed to protect urban areas and distributed assets across the coastal landscape. The state plan has been approved by the Louisiana legislature, but the Corps plan has yet to be completed and submitted to Congress. Both plans call for restoration of the wetlands through diversions of the Mississippi River, and both would rely on adaptive management of the process to address the substantial design uncertainties in such a large dynamic deltaic system. A coastal ecosystem restoration program, much like that for the Everglades, was authorized by Congress in the Water Resources Development Act of 2007. Only a few preliminary projects were authorized, however, and funding has not yet been provided. This authorization establishes a structure to oversee this work but does not identify methods to be used to determine priorities among the various components of the overall program, nor does it provide an effective means for competent project authorization and funding. The state has recently announced plans to spend nearly $1.2 billion over the next three years on protection and restoration projects that are consistent with the state master plan. Although this is an impressive investment, it is an order of magnitude less than even some of the conservative estimates of system-level project costs for both coastal ecosystem restoration and storm risk reduction.

The specter of climate change is adding to the water and coastal management challenges. Climate change will bring about changes in weather patterns and the potential for increased flooding, drought, and sea-level rise. Existing projects will have to be modified to accomplish the purposes for which they were originally designed, and additional attention will be required to deal with the already significant strain on recovering ecosystems. The vulnerabilities of coastal landscapes to projected environmental changes are relative to the capacity of ecosystems to adapt. The present rate of wetland loss in this region suggests that these adaptive mechanisms are insufficient to deal with present rates of sea-level rise and subsidence.

Those working on coastal Louisiana restoration and protection have attempted to deal with the program on a comprehensive (watershed) basis, recognizing that the problems of southern Louisiana are not solely those of that state. The sediment required to replenish the wetlands will come from lands scattered throughout the basin and will be affected by the activities in the basin states. Much of the original sediment load of the Mississippi is trapped behind major dams on the Missouri River system. A major dead zone (an area where marine life is stressed because of lack

of oxygen) now exists in the Gulf of Mexico along Louisiana and parts of Texas as a result of excessive nutrients traveling down the Mississippi from the farmland of the Midwest. The flux of nitrate has increased threefold since the 1960s. Although sediments are critical to rebuilding the wetlands of the Mississippi River Delta, additional nutrients flowing through river diversion structures could potentially impair inland waters of the state. Two strategies have been suggested to limit the potential water quality issues along coastal Louisiana. An upstream strategy is a significant reduction in the application of chemicals to the farmland of the Midwest, along with restoring wetland buffer strips on the edge of fields that can reduce nutrient loading in river waters. Downstream in the coastal delta, wetland restoration is considered another mechanism of nutrient reduction to coastal waters. Both strategies have uncertainties in system capacity of nutrient reduction and political will in implementation. So a potential conflict in diverting river sediment for wetland restoration may be limited by coincident nutrient enhancement of hypoxia.

Funding limitations

Even though the nation's largest port and energy complex, a metropolitan area of nearly a million residents, and coastal wetlands of immense value are at risk, funds to support the restoration and protection of coastal Louisiana have been slow in coming. The Corps has been provided with about $8 billion to restore the levee system around New Orleans to the level of a 100-year flood. This level of protection is below that of a 400-year storm such as Katrina, but it will relieve New Orleans residents of the requirement to buy flood insurance against a potential hurricane. Congress has directed the Corps to study and report on the costs of providing New Orleans with protection against a category 5 hurricane. Early estimates indicate that the costs of such a project would exceed $10 billion. The cost of coastal restoration has been estimated at as much as $20 billion. Even in these days of mega-bailouts, those are big numbers.

The ability to move ahead with the protection and restoration of coastal Louisiana will require substantial funding. The Bush administration's budgets have kept funding for the water sector flat except for periods when disasters required immediate attention. In constant-dollar terms, the funds available for these projects are going down each year. In the tight funding environment of recent years, budget decisions have been driven largely by the historical record of funding, not an evaluation of the nation's risks and needs. The current fiscal crisis will only increase the pressure on the limited dollars that are available.

The largest source of funds for dealing with major water projects is found in the budget of the Corps. But the restoration and protection of coastal Louisiana is but one of many flood and hurricane protection, navigation, ecosystem restoration, and other projects that demand Corps and related federal water dollars. Major flood problems in the central valley of California, the reconstruction of levees in the Midwest, and the repair and upgrade of other structures identified in recent levee system inspections provide competition for New Orleans and coastal Louisiana. The aggregate projected costs of restoration projects in the Everglades (now $10.9 billion), upper Mississippi, Chesapeake Bay, Great Lakes, and California Bay Delta exceed $50 billion. Costs for other programs, such as the Missouri River basin, remain to be calculated.

Unfortunately, priority setting is tied to a rudderless system for allocating federal funds and assessing national needs. It is difficult to justify a national priority when objectives at the national level are not clear. Developing a needs assessment is dependent on having national policies that appropriately define national goals for water use. Whom do we protect from

flooding? What infrastructure is at risk? What losses and risks will have national consequences? What ecosystems need to be restored or are the most valuable to the economic, ecological, and social well-being of the nation? How important are ports to the economy of the country? Recent National Research Council studies of the Corps' planning processes and projects have indicated that the Corps is faced with conflicting laws and regulations that make prioritization and description of needs difficult to achieve.

Within the federal government, requests for funds are initiated by the departments and are based on guidance from the Office of Management and Budget, which establishes prioritization criteria for items to be included in the president's budget. But these priorities are only tangentially related to actual needs and are driven by economic cost/benefit criteria, not national needs. In making decisions on the budget, Congress, as was noted at a recent hearing on watershed planning, tends to deal with the authorizations and appropriations for specific projects with little consideration of the relationship of the projects to the greater needs of the nation or even the watershed in which the projects are to be built. With some exceptions, Congress supports projects on the basis of the political weight they carry.

Prioritizing funding on a watershed basis would not be new to the United States. In 1927, Congress directed the Corps to conduct studies of all U.S. river basins in order to plan for integrated development of the water resources of these basins. These "308 reports" (named for the section of the law that authorized the studies) became the basis for the development of the Tennessee Valley and Columbia River basins, among many others. In cases in which such basin/watershed planning has taken place in a collaborative manner, the results have been outstanding. The Delaware River Basin Commission brings together the states of New York, Pennsylvania, and New Jersey for cooperative management of that important river basin.

In recent years, members of the House and Senate have tried to establish a needs-based approach for allocating funds, but the efforts failed because too few members were interested in giving up the benefits of selecting projects on their political merit. During a 2007 debate on an amendment to a bill to create a bipartisan water resources commission to establish priorities for water project funding, Sen. John McCain (R-AZ) noted that, "We can best ensure safety of our nation's water resources system by establishing a process that helps us to dedicate funding to the most critical projects. The current system allows more of the same, where members demand projects that are in the members' interests, but not always in the public's." The amendment went nowhere.

Looking for other approaches

Is there a substitute for federal money to support water resource projects? Because of the massive costs of major restoration efforts, doing without Congress doesn't seem to be a reasonable approach. States are already participating in the funding of major projects. Louisiana has announced its intention to allocate substantial funding to coastal restoration and protection activities (more than $1 billion in the next three years). California recently passed a $5 billion bond issue to repair levees. With federal appropriations slow in coming, Florida has contributed more funding for restoring the Everglades and acquiring critical lands. But states are also in a funding squeeze and cannot provide all that is needed to support projects that are in the national interest.

Several alternative ways of financing infrastructure projects have been proposed and should be

seriously considered. Former senator Warren Rudman and New York investment banker Felix Rohatyn have proposed the establishment of a National Investment Corporation (NIC) with the authority to issue bonds with maturities of up to 50 years to finance infrastructure projects. The bonds would be guaranteed by the federal government and, as long-lived instruments, would align the financing of infrastructure investments with the benefits they create. Bond repayment would allow the NIC to be self-financing. In a similar approach begun after Katrina, a working group commissioned by the Corps proposed the creation of a congressionally chartered coastal investment corporation to support needed development projects. In 2007, Louisiana established the Coastal Protection and Restoration Financing Corporation that "will be responsible for selling bonds based on the expected revenue from future oil and gas royalty payments" and that will allow funding of projects over the next 10 years "instead of having to wait until a steady revenue stream arrives from the federal government in 2017." In the face of the current fiscal crisis and the need to develop a long-term approach, the development of the NIC offers the most realistic method of dealing with the need for the development of a sustainable funding stream.

Another challenge is coordinating federal funding and establishing regional priorities. In the past, the United States successfully established processes to deal with the challenge of developing priorities and funding to deal with water issues of national significance. In 1879, Congress established the Mississippi River Commission with the mission of providing a navigable Mississippi and reducing the ravages of frequent floods. After the 1927 flood, Congress passed the Flood Control Act of 1928, which created a comprehensive a Mississippi River and Tributaries (MR&T) project. This permitted the commission to deal with the lower valley as a whole: one mission, one entity, working cooperatively with all interested parties to integrate the resources needed to meet the challenge. Although the operations and size of government have changed since 1879 and 1928, the need to deal with work in the lower Mississippi Valley in a comprehensive manner remains. The continuous funding of work on the lower Mississippi River for nearly 80 years and the comprehensiveness of the effort show the utility of developing a separate federal project, similar to the MR&T, for restoring and protecting coastal Louisiana.

Protection and restoration of coastal Louisiana should be a major priority for the United States. The nation cannot live without its water resources and deltaic coast. It cannot continue to watch coastal Louisiana disappear. Sooner or later, it will have to address the problem. The longer we wait, the more difficult the problem will become, and the more money the eventual solution will cost.

Restoration vs Eutrophication

Delta restoration – system design toward a resilient, self-sustaining delta – is a generic environmental problem worldwide in which human and natural dynamics are strongly and inherently coupled. The urgent need for wetland restoration and rehabilitation at large spatial scales have been addressed through the diversion of riverine water from the Mississippi River. This management strategy aims to deliver sediment-laden water to declining wetlands areas and promote wetland productivity using human water control structures in major basin areas undergoing wetland loss (e.g., Barataria Bay, Breton Sound) (Day et al. 2005). The conflict to resolve ecosystem needs of river and coastal processes to sustain the delta with demand for structural features from levees and floodgates to protect people and infrastructure has always

historically favored investments in resiliency of the social system at the expense of the natural system. However, reductions in sediment loading to the deltaic region and restricted distribution of river flow across wetland landscapes combine to constrain the resources needed in large scale diversion projects that are needed to have any chance of stabilizing some wetland footprint in this area.

The challenge to develop bold new ideas of river management to reintroduce sediment to the coast are further complicated by how the chemistry of the river has changed over the last four decades. The Louisiana coastal region is at the receiving end of a large input of nitrate from upstream agricultural activities. Because of large nitrogen loading through the Mississippi River basin, there is increasing coastal eutrophication and the development of a large hypoxia zone (up to 21,000 km^2). As nitrogen is delivered to coastal waters, there is a risk of exacerbating eutrophic conditions through seasonal algae blooms (e.g., toxic), excess organic matter production, low oxygen concentrations in water and sediments, and long term nitrogen and phosphorous accumulation (Brown et al. 2006). As more freshwater diversion projects are planned along major waterways throughout the state of Louisiana, there is concern that this new constituent of nitrate will contribute to reduced water quality conditions of shallow bays and estuaries of the delta. Concerns about creating large human health risks as result of toxic algal blooms induced by increasing nitrogen inputs, underscore the difficulty of implementing large-scale restoration plans in coastal region.

Denitrification is the conversion of nitrate to nitrogen gas and is currently considered a critical ecological function for the removal of highly enriched N from anthropogenic sources. Since nitrate is generally the dominant form of excessive nitrogen entering coastal regions, it is potentially viable to ameliorate water quality problems through the reduction of nitrate via direct denitrification (Mitsch et al. 2001). As nitrate-enriched water masses flow through the landscape, the presence of riparian, headwater streams, and coastal wetlands can efficiently remove reactive nitrogen. Comparative studies of wetland and riparian ecosystems along the Mississippi River basin suggest that those habitats can retain up to 70% of nitrate inflow (Mitsch et al., 2005). However, large-scale managed input of nutrient-enriched Mississippi waters into wetlands and open waters has been controversial since its implementation in coastal Louisiana (Day et al. 2007). Presently there is no clear consensus on whether restoring wetlands with sediment from the river will also enhance the capacity of nitrate removal, thus reducing risks to eutrophication.

Delta restoration involves one or more carefully sited, partial river diversions (controlled avulsions, in a sense) that set in motion the natural processes that created the delta, but in a controlled manner that either builds new land area or nourishes existing wetlands preventing them from drowning. With increased nitrate concentrations over the last four decades, the reintroduction of river water into coastal areas may potentially contribute to harmful algal blooms and increased incidence of hypoxia. Social benefits will depend on how these increments of river input will alter existing physical, biological, and chemical characteristics to degrees of river flow. These natural science processes are coupled to human dynamics through tradeoffs such as displacing marine fisheries with freshwater species, or hard versus soft forms of coastal protection, or threats of hypoxia versus new wetland formation. In the end, these tradeoffs will determine the level of delta restoration (magnitude of river input) will take place under various incremental scenarios of river management.

In summary, the Mississippi River delta faces another round of human control through expanded public work projects following the catastrophic realities of hurricanes in 2005 and 2008. The challenge is even greater with complex interactions of land-use change throughout the catchment to the coast that must be resolved to accommodate bold new river management plans in concert with structural protection. First, expansion of engineered landscapes to reduce risks to hurricane flooding may further reduce the opportunities in systems-level approaches to river management using diversion structures to replenish sediment to the deltaic plain. Second, agricultural practices of land use and fertilization in the Mississippi River further complicate the opportunities to changing river management, since nitrogen enrichment contributes to expanding eutrophication problems of the region. Thus, urgent solutions to post-Katrina issues in the Mississippi River involve providing increased protection to communities while expanding river processes to restore wetland landscapes, which will also require changing approaches to agriculture land-use to reduce nitrogen load and risks of eutrophication. This juxtaposition of protection, wetland restoration, and eutrophication, all linked to bold new approaches to river basin management, has all been highlighted by the post-Katrina challenges for a sustainable coast. Managing all these competing tradeoffs to sustain the economic and natural resources of this region are representative of how we must consider new approaches to watershed – coastal catchments throughout the world. Water resource quantity and quality are largely determined by highly engineered landscapes of public work projects and agricultural land use interacting with a changing global hydrologic cycle. Thus water resource planning is arguably one of the most important features of national security, public health, economic development, and natural resource management in the next century. Ecosystem services derived from healthy natural resources will support our national wealth depending on how well we manage the finite water resources to satisfy our social needs.

(This last section is from : Twilley, R. R. and V. H. Rivera-Monroy. **2009**. Sediment and nutrient tradeoffs in restoring Mississippi River Delta: Restoration vs Eutrophication. Journal of Contemporary Water Research & Education 141:1-6.)

Recommended reading

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Gerald E. Galloway (gegallo@umd.edu) is the Glenn L. Martin Professor of Engineering at the University of Maryland, a former chief of the U.S. Army Corps of Engineers, and a former member of the Mississippi River Commission. He was recently appointed to the Louisiana Governor's Advisory Commission on Coastal Protection, Restoration and Conservation. Donald F. Boesch is professor of marine science and president of the University of Maryland Center for Environmental Science. He serves as chair of the Science Board for the Louisiana Coastal Area Ecosystem Restoration Program. Robert R. Twilley is professor of oceanography and coastal sciences, and associate vice chancellor of the Coastal Sustainability Agenda at Louisiana State University, Baton Rouge

Senator VITTER. Thank you, Dr. Twilley.

And now we will hear from Thomas L. Jackson. He is Commissioner and past President of the Southeast Louisiana Flood Protection Authority East and 2003 National President of the American Society of Civil Engineers.

Welcome.

STATEMENT OF THOMAS L. JACKSON, P.E., D.WRE, COMMISSIONER AND PAST PRESIDENT, SOUTHEAST LOUISIANA FLOOD PROTECTION AUTHORITY—EAST

Mr. JACKSON. Thank you, Senators.

I will skip my first part, which repeated what you just said. I will add that I am a registered professional civil engineer with specialty certification in water resources, was educated at Tulane University, and am also a lifelong resident of New Orleans and Jefferson Parish. So, I do have a vested interest.

My report to you today will focus on the selection of options for the pumping stations planned by the Corps of Engineers for the three outflow canals at the lakefront in Orleans Parish. The 17th Street, London and Orleans outfall canals drain the central part of the city of New Orleans and a portion of Jefferson Parish.

Following Hurricane Betsy flooding, the Corps raised the canal levees to 12.5 feet. While the Corps own engineers recommended T-walls to raise these canal levees, the Corps insisted that I-walls be used because they were cheap and within their budget for the project. Sound familiar? Unfortunately, during Hurricane Katrina, sections of these cheaper I-walls failed along the 17th Street and London Avenue Canals, flooding the city and a portion of Jefferson Parish.

Temporary pump stations and floodgates have been built at the lakefront to prevent hurricane tidal surges from entering these canals at this time. Levees and floodwalls along the 17th Street Canal have only been declared to be safe up to a level of 6 feet, not 12.5 feet as built by the Corps in the 1960s, and I think that was brought out earlier. Rainwater pumping at local stations will raise these canal levels at or near these maximum water levels every time we have a hard rainfall.

Permanent pumping stations and floodgates at the lakefront are planned by the Corps under Option 1. Local pumping stations would then pump directly into Lake Pontchartrain during non-hurricane events, only utilizing the new lakefront pumping stations when lake levels approach maximum safe water levels in the canals.

The Corps contends that only Option 1 is within the congressional authorization and budget, even though they have admitted that Option 2 is technically superior to Option 1.

Option 1 will leave the responsibility for the Corps' defective levees and floodwalls to local interests. The bottom line is that the Corps built poorly designed floodwalls and now they want to put the responsibility for their errors on local interests. They say protection can only be provided at the lakefront in accordance with their congressional authorization.

An extremely crucial consideration in this selection of options at issue is that safe water levels in these canals are not static. During

each rainfall, silt from urban runoff settles to the bottom of the canals every time the pumps are shut off, further restricting the canals. From time to time, the canals must be dug out to remove this silt. This cleaning will further deteriorate the levees and floodwalls and reduce the safe water levels to a point that local pumps cannot be operated at full capacity, resulting in flooding the city.

In addition, the stability of the levees and I-walls will continue to deteriorate because of poor soil conditions beneath these levees. It is incomprehensible that an agency of the Federal Government would be allowed by Congress to only partially correct such a serious error and dump the responsibility on local government as would happen under Option 1.

So what is the solution? Option 2, as shown by the Corps in its 90-day report to the Congress, would provide a full time pump station at the lakefront on each of these canals, removal of the interior local pump stations and conversion of the canals to low level, which would negate the need for the existing defective interior levees. The Corps has not adequately studied Option 2 and has rejected it outright saying they are not authorized to do any work that is not along the new hurricane protection alignment along the lakefront. The Corps has even publicly admitted that Option 2 is technically superior for overall needs.

What are the advantages of Option 2? First and foremost, the elimination of the intrusion of high water levels into the heart of the city. Second, the elimination altogether of the need for the defective levees and floodwalls. Third, improvements to local drainage. And fourth, drainage systems in Jefferson and Orleans could be interconnected for use during emergency situations.

In an attempt to reduce the volume of rainwater in the 17th Street Canal, Jefferson Parish suggested building a pumping station in Jefferson to pump rainwater directly into the Mississippi River. Option 2a would be helpful because it would decrease the load on the overburdened levees along the 17th Street Canal, as we discussed earlier.

What are we asking the Congress to do for us today? We ask that, as soon as possible, the Congress re-write the authorization, if necessary, to provide protection along the lakefront as well as any work necessary to eliminate the defective and inadequate protection along these outfall canals.

Second, we ask that the Congress authorize and require that the Corps conduct a thorough study of Option 2.

Third, we ask that Congress require that the Corps include the services of at least two external peer review experts for this evaluation.

Last, we ask that Congress create a panel of local interests and instruct the Corps and the peer review experts to provide monthly reports.

The interim pump stations and gates can provide protection while the best solution is studied and constructed. Additional studies are necessary because this is a situation where complete studies have not yet been conducted and the wrong solution is underway post haste by the Corps.

The people in this community deserve the best solution. Please do not allow the Corps to fail us again based on the Corps' short-

sighted and unnecessarily restrictive interpretation of congressional authorization for hurricane protection.

Thank you very much.

[The prepared statement of Mr. Jackson follows:]

Oral Testimony

Thomas L. Jackson, P.E., D.WRE

June 16, 2009

Senate Environment & Public Works Committee

Good Morning Madam Chairperson, and members of the Committee, my name is Thomas Jackson. Thank you for the opportunity to be here. I will submit a copy of my testimony along with supporting documents and ask that they be entered in to the record.

I appear before the committee today on behalf of the Southeast Louisiana Flood Protection Authority – East and as an engineering expert on planning and design of large drainage and pumping systems.

I am a Commissioner and past president of the Flood Authority. I am also the 2003 National President of the American Society of Civil Engineers (ASCE) and have served on the ASCE External Review Panel (ERP) providing external peer review of the Corps Interagency Performance Evaluation Taskforce (known as IPET) and their investigation of the New Orleans area hurricane protection system performance during Hurricane Katrina.

I am a registered Professional civil engineer in several Gulf States and a Diplomate with specialty certification in Water Resources engineering. I am retired from AECOM, Inc. as Senior Vice President and Chief Engineer of the firm.

Educated at Tulane University I am also a lifelong resident of New Orleans and Jefferson Parishes with experience in managing design of most of the large pumping stations built in the Orleans, Jefferson and St Bernard Parishes during the last 25 years. I am very familiar with this area and the problems in storm protection that we have had over the years.

My report to you today will focus on the selection of options for the pumping stations planned by the Corps of Engineers for the three outfall canals at the lakefront in Orleans Parish within the jurisdiction of the SLFPA–East.

First, some background:

The 17th Street, London and Orleans Outfall canals drain the central part of the City of New Orleans and a portion of the east bank of Jefferson Parish. These canals each are approximately two miles long from the New Orleans Sewerage and Water Board

(S&WB) outfall pumping stations to the lakefront. They are subject to tidal surges in Lake Pontchartrain which result in pressure on the levees of these canals.

Following Hurricane Betsy flooding, during the sixties and seventies, under the Corps' Lake Pontchartrain and Vicinity Hurricane Protection authorization, the Corps raised these existing canal levees to approximately twelve and one half feet above sea level. While the Corps' consulting firms recommended "T" walls to raise these canal levees, the Corps insisted that "I" walls be used because it was cheaper and within their budget for the project. Unfortunately, during Hurricane Katrina, sections of these cheaper "I" walls failed and were breached along 17th Street and London Ave. canals, catastrophically flooding the City and portions of Jefferson Parish.

Breach closures are now in place and temporary floodgates have been built at the lakefront to prevent hurricane tidal surges from entering these canals. The levee and floodwall along the 17th Street Canal from the temporary gates and pumps at the lakefront to Pumping Station number 6 has been declared to be safe by the Corps **only** up to a water level of 6.0 ft., not 12.5 ft. as designed and built under Lake Pontchartrain Hurricane & Vicinity Protection Authorization in the 1960' & 70's.

However, the temporary pumps and floodgates operations now required during storm surges, even during non-hurricane events, will raise these canal levels at or near the 6 ft. water levels against these floodwalls that is the maximum considered safe at this time by the Corps' evaluations. However, as will be explained later, the conditions in these canals that affect safe water levels are constantly changing.

OPTION 1

Permanent pumping stations at the lakefront are planned by the Corps under Option1 with flood gates so that local pumping stations can pump drainage water directly into Lake Pontchartrain during non hurricane events without secondary pumping of the lakefront stations and utilizing the secondary pumping at the lakefront only when lake levels approach maximum safe water levels in the canals.

The Corps contends that only Option 1 is within the Congressional Authorization and budget for lakefront flood protection, even though the Corps has on numerous occasions admitted that Option 2 is technically superior to Option 1.

The Corps is now proceeding quickly with plans to build "Option 1" which includes only a new pumping station and flood gate at the lakefront to keep storm surges out of these canals. This plan will allow normal lake tides in these canals during lake levels of 5 or 6 and closing off flood gates to surges only during hurricanes. Thus lake level tides would continue pressing against the defective canal levees and floodwalls, possibly as much as 98% of the time.

Option 1 will leave responsibility for the Corps' defective levees and floodwalls to local interests while pumping storm water every time it rains. During a hurricane event, the

Corps' Option 1 will require closure of the tidal gates at the lakefront and require closely orchestrated operation of the local pumps and the lakefront pumps so as not to raise water levels in the canals above the safe water levels designated by the Corps. The bottom line is that the Corps built poorly designed floodwalls, and now they want to put the responsibility for their errors on "local interests", saying they can now provide protection only at the lakefront in accordance with congressional authorization.

An extremely crucial consideration in the selection of the Options at issue is that the safe water levels in these canals are not static. Every time the S&WB pumps rain water, silt from urban runoff settles to the bottom further restricting the canals. From time to time the canals must be dug out to remove this silt. This cleaning will further deteriorate the levees and floodwalls and reduce the safe water level to a point that the S&WB pumps cannot be operated at full capacity resulting in flooding the City even in non-hurricane conditions. In addition, the stability of the levee and I-walls will continue to deteriorate because of very poor soil conditions beneath the levees.

New Orleans had addressed its rainfall drainage with canals. Now in order to correct the faulty floodwalls designed by the Corps along these canals, the Corps proposes Option 1 which would correct only the lake surge problem while creating a serious danger from rainfall flooding even in non-hurricane events. It is incomprehensible that an Agency of the Federal Government, that is, the Corps, would be allowed by Congress to only partially correct such a serious error and dump the responsibility for the consequences of that error on local government, as would happen under Option 1.

OPTION 2 IS THE SOLUTION

So what is the solution? Option 2 as shown by the Corps in the "90 day report to Congress" would provide a full time pump station at the lakefront on each of the canals, removal of local pump stations and conversion of the canals to low level drainage canals which would negate the need for the existing defective interior levees. The corps has not adequately studied Option 2 and has rejected it outright saying that they are "not authorized" to do any work that is not along the new hurricane protection alignment along the lakefront. The Corps has even publically admitted numerous times that Option 2 is a technically superior solution for overall needs.

During the deliberation of the options for protection of the outfall canals, the Corps conducted numerous meetings with local interests. I represented the Flood Protection Authority in those meetings. The Corps then convened a technical panel of fourteen experts to evaluate the options. I was invited by the Corps to serve as an expert on that group as well. The recommendation of the panel of experts was to construct Option 2 – not Option 1.

ADVANTAGES OF OPTION 2

1. First and foremost, elimination of the intrusion of high water levels into the heart of the City at each of the three outfall canals.

2. Elimination altogether the need for the defective levees and floodwalls.

3. Improvement to local drainage. Converting the outfall canals to low level drainage canals will allow drainage water from adjacent streets to be discharged directly into the canals, and not requiring routing the water up to two miles back to the pump stations raising the water to lake level as the Corps' Option 1 requires. This could vastly improve drainage in the lakefront area versus the additional danger to drainage that Option 1 would create.

4. Drainage systems in Jefferson and Orleans could be interconnected at Canal number 2 in Jefferson to the 17th Street Canal. This connection could be gated during normal operation and open only during extreme rainfall in either parish to prevent flooding in whichever area is threatened. The same interconnection could be provided through Hoey's cut if Option 2a is constructed.

OPTION 2a

In an attempt to reduce the volume of rainwater in the 17th Street Canal, Jefferson Parish officials suggested building a pumping station in Jefferson Parish pumping rainwater into the Mississippi River. That was designated as Option 2a because it is an addition to Option 2. As a member of the Southeast Flood Protection Authority- East, we have not previously commented publically on Option 2a because technically Option 2a addresses issues outside of the Authority's jurisdiction; However, Option 2a would be helpful because it would decrease the load on the over-burdened levees along the 17th Street Canal

WHAT ARE WE ASKING CONGRESS TO DO FOR US TODAY?

1. We ask that as soon as possible the Congress re-write the authorization for the protection of the three outfall canals to include the necessary improvements to provide protection along the lakefront as well as any work necessary to eliminate the defective and inadequate protection along the outfall canals;

2. We ask that Congress authorize and require that the Corps conduct a thorough study of all three Options for storm protection of the three outfall canals;

3. We ask that Congress require that the Corps include the services of at least two external peer review experts be employed during this evaluation; and

4. We ask Congress to create a panel of local interests and instruct the Corps and the peer review experts to provide monthly reports, to this local panel and to this Congressional Committee.

Until this is done and the best option is constructed, the protection for the New Orleans East Bank area is less than Congress authorized. The interim pumping stations and gates built with considerable tax dollars can provide protection as adequate as Option 1 while the best solution is studied and constructed. While normally local interests would be asking that the Corps quit studying and build improvements, this is a situation where adequate studies have not been conducted and the wrong solution is underway by the Corps. Whatever is constructed the people of the New Orleans area will be burdened or benefitted with the results for at least the next 100 years.

The people of this community deserve the best solution -- haven't they suffered enough at the hands of nature and Corps errors? Please do not allow the Corps to fail us again based on the Corps' short-sighted and unnecessarily restrictive interpretation of "Congressional Authorization" for hurricane protection.

Thank you for the opportunity to present this report. I will be happy to answer any questions.

On the motion of Mr. Jackson,
Seconded by Mr. Barry, the following resolution was offered:

RESOLUTION #08-21-08-07 – LAKEFRONT PUMPING STATIONS

"A resolution supporting Option 2 for the construction of the Lakefront Pumping Stations"

WHEREAS, the Lakefront Pumping Stations at the mouths of the 17th Street Canal, Orleans Outfall Canal and the London Ave. Canal are major components to hurricane protection for the City of New Orleans; and

WHEREAS, after more than a year and one half of study developing alternatives to closing these outfall canals to hurricane tidal surge; and

WHEREAS, after thorough consideration of each option including Option 1 which includes building new pumping stations at the lakefront while pumping in series with the existing interior Sewerage and Water Board pumping stations leaving the outfall canals between the two stations flowing at very high water levels against the very weak levees and floodwalls which breached during hurricane Katrina; and

WHEREAS, considering the fact that Option 1 would leave these weak levees and flood walls as an integral part of the system; and

WHEREAS, Option 1 is only part of the required improvements required to provide full 100 year hurricane protection while allowing drainage of the City to take place without jeopardizing flooding from a breach of the interior canal levees and floodwalls, and will require very large future expenditures by local agencies to complete the project; and

WHEREAS, Option 1 will require the lakefront and inland Sewerage and Water Board pumping stations to operate in series with each other during hurricane events; with any operator error, a very distinct potential exists of exceeding the maximum water level in each of the three outfall canals, thus failing the interior levees and spilling water into the City; and

WHEREAS, Option 2 will provide a complete project with permanent hurricane protection at the lakefront and allow drainage of the City without jeopardizing residents from flooding of the fragile levees and floodwalls between the new Lakefront pumping station and the NOS&WB interior pumping stations; and

WHEREAS, Option 2 will provide a lining of the three outfall canals between the new lakefront pumping stations and the existing interior pumping stations which will be removed providing a much more efficient and permanent protection system than proposed in Option 1.

NOW THEREFORE BE IT RESOLVED that the Southeast Louisiana Flood protection Authority – East does hereby fully support the selection of Option 2 as shown in the Environmental documents for the three lakefront pumping stations, and that a copy of this resolution be sent to the two Louisiana Senators and members of the House of Representatives, as well as the Governor, and members of the Coastal Protection and Restoration Authority (CPRA), New Orleans Mayor and City Council, U.S. Army Corps of Engineers, New Orleans Sewerage and Water Board, Jefferson Parish President and the members of the Jefferson Parish Council.

The foregoing was submitted to a vote, the vote thereon was as follows:

YEAS: Mr. Barry, Mr. Jackson, Mr. Losonsky, Mr. McKee, Mr. Pineda and Mr. Wittie
ABSTAINED: Mr. Goins
NAYS: None
ABSENT: Mr. Barnes

This resolution was declared adopted this 21st day of August, 2008.

I hereby certify that the above and foregoing is a true and correct copy of a resolution duly adopted by the Southeast Louisiana Flood Protection Authority-East at its meeting of August 21, 2008, at which a quorum was present.

John M. Barry
Secretary

This 21st day of August, 2008 at New Orleans, LA

On the motion of Mr. Jackson,
Seconded by Mr. Barry, the following resolution was offered:

RESOLUTION #03-19-09-14

A resolution restating Board Resolution #08-21-08-07 passed the 21st day of August, 2008, and urging the U.S. Congress to provide sufficient funds and clear authorization to the U.S. Army Corps of Engineers for Option 2 for the construction of the Lakefront Pumping Stations in Orleans Parish.

WHEREAS, the Sewerage and Water Board of New Orleans, the Jefferson Parish Council and the Coastal Protection and Restoration Authority (CPRA) have passed resolutions stating their opposition to the U.S. Army Corps of Engineers' (Corps) proceeding with the issuance of a Request for Proposals for the procurement of a design/build contract for the construction of the three pumping stations under Option 1, even though the Corps' Report to the Congress for P.L.110-252 dated September 26, 2008, revised December, 2008, states that Option1 was selected because of least cost, while the report further states that Option 2 is technically and operationally superior; and

WHEREAS, the Corps is proceeding with Option 1 based on their interpretation of the Congressional authorization and budget, without regard for the safety of the City of New Orleans and the east bank of Jefferson Parish.

NOW THEREFORE BE IT RESOLVED, that the Southeast Louisiana Flood Protection Authority-East supports the Resolution of the CPRA in withholding execution of a Project Partnership Agreement until all alternatives for the three canals are compared on a level playing field.

The foregoing was submitted to a vote, the vote thereon was as follows:

YEAS:	Mr. Barry, Mr. Estopinal, Mr. Goins, Mr. Jackson, Mr. Losonsky, Mr. Pineda and Mr. Wittie
NAYS:	None
ABSENT:	Mr. Barnes

This resolution was declared adopted this 19th day of March, 2009.

I hereby certify that the above and foregoing is a true and correct copy of a resolution duly adopted by the Southeast Louisiana Flood Protection Authority-East at its meeting of March 19, 2009, held in Chalmette, LA, at which a quorum was present.

John M. Barry
Secretary

On the motion of Mr. Jackson,
Seconded by Mr. Barry, the following resolution was offered:

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NAYS:	None
ABSENT:	Mr. Barnes

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WHEREAS, after more than a year and one half of study developing alternatives to closing these outfall canals to hurricane tidal surge; and

WHEREAS, after thorough consideration of each option including Option 1 which includes building new pumping stations at the lakefront while pumping in series with the existing interior Sewerage and Water Board pumping stations leaving the outfall canals between the two stations flowing at very high water levels against the very weak levees and floodwalls which breached during hurricane Katrina; and

WHEREAS, considering the fact that Option 1 would leave these weak levees and flood walls as an integral part of the system; and

WHEREAS, Option 1 is only part of the required improvements required to provide full 100 year hurricane protection while allowing drainage of the City to take place without jeopardizing flooding from a breach of the interior canal levees and floodwalls, and will require very large future expenditures by local agencies to complete the project; and

WHEREAS, Option 1 will require the lakefront and inland Sewerage and Water Board pumping stations to operate in series with each other during hurricane events; with any operator error, a very distinct potential exists of exceeding the maximum water level in each of the three outfall canals, thus failing the interior levees and spilling water into the City; and

WHEREAS, Option 2 will provide a complete project with permanent hurricane protection at the lakefront and allow drainage of the City without jeopardizing residents from flooding of the fragile levees and floodwalls between the new Lakefront pumping station and the NOS&WB interior pumping stations; and

WHEREAS, Option 2 will provide a lining of the three outfall canals between the new lakefront pumping stations and the existing interior pumping stations which will be removed providing a much more efficient and permanent protection system than proposed in Option 1.

NOW THEREFORE BE IT RESOLVED that the Southeast Louisiana Flood protection Authority – East does hereby fully support the selection of Option 2 as shown in the Environmental documents for the three lakefront pumping stations, and that a copy of this resolution be sent to the two Louisiana Senators and members of the House of Representatives, as well as the Governor, and members of the Coastal Protection and Restoration Authority (CPRA), New Orleans Mayor and City Council, U.S. Army Corps of Engineers, New Orleans Sewerage and Water Board, Jefferson Parish President and the members of the Jefferson Parish Council.

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ABSTAINED: Mr. Goins
NAYS: None
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John M. Barry
Secretary

This 21st day of August, 2008 at New Orleans, LA

THOMAS L. JACKSON, P.E., D.WRE
Commissioner, Southeast Louisiana Flood Protection Authority - East
3725 Fran St.
Metairie, LA 70001
(504) 330-7918

August 8, 2009

Senator Barbara Boxer, Chairman
Senator James M. Inhofe, Ranking Member
United States Senate
Committee on Environment and Public Works
410 Dirksen Senate Office Building
Washington, D.C. 20510

Attention: Heather Majors

Dear Senators Boxer and Inhofe:

In follow up to my testimony before the EPW Committee on June 16, 2009 and letter requesting responses to questions from Senator Inhofe, I submit the following responses:

Q-1. Mr. Jackson, I'd like to ask for some clarification on your evaluation of Options 1,2 and 2a.
a. Is it your opinion that Option 1 does or does not provide 100-year level of hurricane protection?

A-1a I believe that Option 1 does provide 100-year level of hurricane protection, however, Option 1 does not address the responsibility for the improper designs for the defective canal levees and I-walls between the lakefront pumping stations and the local Sewerage and Water Board pumping stations. The improper designs on these levees and I-walls failed on the 17th Street and London Ave. canals and were only repaired at the failure sites leaving miles of defective levees to local responsibility. Under Option 1, the same canals would be operated up to 15 feet above natural ground in adjacent neighborhoods only protected by defective designs.

Q-1b. Is it your opinion that Options 2 and 2a provide IOO-year level of protection or greater than IOO-year level of hurricane protection?

A-1b I believe that Options 2 and 2a would provide 100-year protection against hurricane tidal surges in Lake Pontchartrain. Option 2 would include the same or similar lakefront pumping station along the lakefront perimeter protection system as proposed under Option 1. What would not be addressed under Option1 would be the defective levees and I-walls along the canals inside the Option 1 pumping stations.

Option 2 would eliminate the high water level canal penetrating far into the center of New Orleans eliminating the need to rebuild the defective levee and I-walls, which would be the most expensive solutions according to the Corps of Engineers evaluations. Since the Corps designed and built these defective water control structures, they must be responsible for fixing the problem since Option 1 would require they continue in service.

Q-2. Two of your four specific requests relate to peer review. Are you familiar with the peer review provisions of WRDA 2007? If yes, do you view your requests as being consistent with, contradictory to, or simply additive to those provisions?

A-2 I am familiar with the peer review provisions of WRDA 2007. As ASCE National President 2003, we have been a leader in proposing external peer review. However, I believe that certain critical flood reduction projects post Katrina require input from local interests who understand the functions of New Orleans' unique topography and pumped drainage system.

This request would be consistent with and in addition to the WRDA 2007 provision.

Q-3. Could you please explain specifically what you are requesting in the first request listed in your written testimony? Are you asking that Congress today authorize or direct the construction of Option 2 or 2a? If yes, why should Congress authorize that construction prior to the study of all three Options included in your second request?

A-3 I am asking that congress first provide very clear authorization to the Corps for the selection of Option 2. This is necessary since the Corps is using the present authorization to reject Option 2 (testimony of General Walsh, EPW Cte. 6/16/09)

Second, require the Corps to immediately begin a study and comparison of all three Options and defining any changes to the proposed lakefront pumping station needed for Option 2 such as intake sill elevation as well as pump lift capacity to lower the intake canals to accommodate Option 2.

Third, as soon as the changes to the Option 1 lakefront pumping stations are defined, proceed immediately with the construction of the pumping stations that will accommodate either Option 1 or 2.

Fourth, complete the study of Option 2 and 2a, and proceed with an option that will provide perimeter protection as well as protection to New Orleans and Jefferson Parish from the defective levees and I-walls.

Q-4. You raised the issue of the effectiveness of the levees and floodwalls along the outfall canals. Why not recommend strengthening or replacing these levees and floodwalls rather than recommending Option 2 or 2a?

A-4 In initial studies of all options, two options were dismissed because of costs. The first was to retrofit the temporary stations built by the Corps following Katrina. The second was to replace the canal parallel protection deemed defective because of design errors. This option was dismissed because of high costs. I want to add that the I-wall design problem that resulted in the failures was studied by the Corps in the 1980's and published in the E-99 report which identified the failure mechanism that was responsible for all three canal failures. The E-99 investigation did not make it into the Corps design manuals and was not used in the designs of these canal I-walls.

Q-5. Some of the concern about proceeding with Option 1 seems to be concern about the likelihood of flooding during non-hurricane events. While the lakefront closure gates and pumps are being designed to be used during hurricanes, do you know if there are any reasons (technical, engineering, environmental, cost, etc.) these features couldn't be used during significant, but non-hurricane weather events?

A-5 My concern relates to the long term expected silting of the canals which would restrict the canal cross section required for the canal to flow under the "maximum water surface" determined by the Corps to prevent catastrophic failure of the defective levees. These levees are so fragile that cleaning the canals may even cause failure of the levees. When the canals silt up, the only solution for pumping without endangering the I-walls is to reduce pumping. This action will cause flooding in hard rainfall events as well as hurricanes.

Q-6. Would you consider the "Pump to the River" component of Option 2a a feature for hurricane protection or for interior drainage?

A-6 The New Orleans Sewerage and Water Board has identified during studies that an additional capacity of 2,000 cubic feet per second (cfs) is necessary to protect the city and portions of Jefferson parish for the 10 year design storm. This additional capacity could be best accomplished by the pump to the river component compared to adding 2,000 cfs to the hydraulic capacity of the 17th street canal, Pumping Station #6 and the proposed new lakefront station. While the pump to the river is a feature for interior drainage, it will have a significant impact on costs and design of the hurricane protection features constructed along the 17th street canal.

Q-7. Do you know if the Corps has previously studied the "Pump to the River" component of Option 2a? If yes, what were the conclusions?

A-7 I do not believe that the Corps has done any significant studies on the Pump to the River component of Option 2a. A Corps study to determine all potential alternatives to remove rainwater from the City conducted by DMJM Harris AECOM recommended the pump to the river as a possible alternative to remove some of the rainwater from the 17th street canal. Jefferson Parish had previously concluded a study that pump to the river was recommended for preventing flooding from future levee breaches along the 17th street canal. All that I have heard

from the Corps is that Pump to the River was determined to be outside of their authorizations and should be addressed under Southeast Louisiana Urban Flood Control Project (SELA).

I hope that my responses will enhance the understanding of my testimony before the Committee. Should there be any additional information required, do not hesitate to contact me. Thank you very much for consideration of our requests.

Sincerely,

Thomas L. Jackson, P.E., D.WRE
Commissioner
Southeast Louisiana Flood Protection Authority - East

Senator VITTER. Thank you very much, Mr. Jackson. Thanks to all of you.

As we begin questions, let me just submit for the record the seven items, reports, petitions, engineering studies supporting Pump to the River, a statement of Congressman Steve Scalise on all of these topics, and a list of further questions for the Corps of Engineers which, General, I will get to you in writing and you can have any reasonable amount of time to submit answers in writing.

[The referenced documents follow:]

Senator Vitter would like to submit to the Senate Environment and Public Works Committee a list the following documents for the record of behalf of Joe Rault, the Pump to the River Organization, and the residents of Jefferson and Orleans parishes. These documents are available for review in Senator Vitter's Hart 516 Office.

- Copies of Hoey's Basin PTR petitions provided to Senator Vitter from 1,000 citizens of Jefferson Parish.
- The Southeast Louisiana Urban Flood Control Project Jefferson Parish, Louisiana Feasibility Report, "Harahan Pump to the River Plan" for the Department of Public Works Jefferson Parish, Louisiana, Dated May 2000
- Final report of Alternatives Analysis of the Interim Drainage Maintenance Opportunities for Orleans East Bank Project New Orleans District. Prepared for US Army Corps of Engineers New Orleans District
- Report on Alternative Drainage outlet to the Mississippi River for the Hoey's Basin Jefferson Parish, Louisiana for Jefferson Parish, Louisiana
- A Review of Repetitive Flood Loss Data for Hoey's Basin, Jefferson Parish, Louisiana, submitted by the Center for Hazards Assessment, Response and Technology (CHART), The University of New Orleans, dated August 2007
- Master Drainage Plan for Hoey's Basin prepared for Jefferson Parish Department of Public Works
- Southeast Louisiana Project Post Authorization Change Hoey's Basin Jefferson Parish, Louisiana Engineering Investigations Appendix. Appendix C section 1 Hydrology and Hydraulics. Section 4 Design. Prepared by Linfield, Hunter & Junius, Inc.

Statement of Congressman Steve Scalise
Senate Committee on Environment and Public Works
A Hearing on New Orleans Hurricane and Flood Protection and Coastal Louisiana Restoration: Status and Progress
June 16, 2009

Thank you Chairman Boxer and Ranking Member Inhofe for holding this important hearing on New Orleans hurricane and flood protection and Louisiana coastal restoration, and I appreciate the opportunity to submit a statement for the record. I also want to thank today's panelists for attending the hearing and for the work they do to strengthen the hurricane and flood protection system in Louisiana, including efforts to rebuild our coast.

Despite Congressional intent and direction to modify the 17th Street, Orleans Avenue, and London Avenue canals, the Corps continues to proceed with Option 1, which does not provide the best option for hurricane protection. While the Corps continues to cite the effectiveness of the outfall canal levees during Hurricanes Gustav and Ike as evidence that Option 1 is sufficient for hurricane protection, the Corps has noted in its own report to Congress that Options 2 and 2a (which includes Pump to the River) are more reliable options for hurricane and flood protection.[1] While there has been much debate between the Corps and local and state officials, as well as the Louisiana Congressional delegation, over the extent of authorization for Option 1 versus Options 2 and 2a, there is consensus between local, state and federal officials that Options 2 and 2a provide more protection to the residents and businesses in the New Orleans region. If the protection of life and property are the underlying goals driving our decisions regarding hurricane and flood protection projects, then Options 2 and 2a should be the alternatives selected by the Corps.

Specifically, Option 2a, which includes Pump to the River, would provide superior protection for residents of Jefferson and Orleans Parishes and would reduce the amount of storm water required to be pumped into Lake Pontchartrain by approximately 20 percent and enable storm water to be removed from Hoey's Basin and many Uptown New Orleans communities more quickly.

I remain concerned that the Corps is proceeding with Option 1 over Options 2 and 2a simply because this Option is the cheapest. Having noted that Option 1 is inferior to Options 2 and 2a, the Corps is risking the safety of families in the New Orleans region. I urge my colleagues in the House and Senate to support the Louisiana Congressional delegation as we work to ensure optimal hurricane protection for the New Orleans region by supporting Options 2 and 2a.

In addition to providing a permanent fix for the three outfall canals, the Corps was also instructed through P.L. 109-103, Section 5009, to conduct the Louisiana Coastal Protection and Restoration (LACPR) report, which was intended to provide recommendations for projects that

[1] U.S. Army Corps of Engineers. Hurricane Protection System, New Orleans, Louisiana. Report to Congress for P.L. 11-252. Revised: December 2008.

provide protection for a storm surge equivalent to a Category 5 hurricane. When the draft report was issued earlier this year, it did not include a defined roadmap for comprehensive hurricane and flood protection. Instead, unfortunately, the report identified an array of alternatives. It is imperative that the Corps work with local, state and federal officials to present us a detailed list of specific project recommendations that Congress can authorize. Until then, we remain no closer to comprehensive hurricane protection than we are today.

A crucial component of comprehensive hurricane protection is rebuilding and restoring our coastline. Coastal erosion in Louisiana has reached catastrophic levels. Louisiana loses approximately 24 square miles of coastal wetlands each year, and the projected loss over the next 50 years, with current restoration efforts taken into account, is estimated to be approximately 500 square miles. More than 47% of Louisiana's population lives in Louisiana's coastal parishes. Not only are our wetlands important to Louisiana and the Gulf Coast; these wetlands also protect infrastructure of national significance. Five of the largest ports in the U.S. are located in South Louisiana, and our coastal wetlands provide storm protection for over 450 million tons of waterborne commerce carried through these ports, accounting for about 18% of all waterborne commerce in the U.S. About one-third of all U.S. oil and gas production comes across the coast of Louisiana, and we provide 26% (by weight) of the commercial fish landings in the lower 48 states.

Louisiana citizens understand the importance of investing in our coast. In 2006, Louisiana voters overwhelmingly approved a constitutional amendment to dedicate the state's share of offshore oil and gas revenues to hurricane protection and coastal restoration projects. Our state has made this commitment, but in order to protect these invaluable national resources, the federal government must join us in our efforts to make meaningful investments in coastal restoration.

One specific priority of mine that I would urge the Corps and my colleagues in the House and Senate to support is the beneficial use of dredged material to rebuild the wetlands in coastal Louisiana. Approximately 63 million tons of sediment are dredged from Louisiana's coastal areas, much of this to ensure safe passage of maritime vessels travelling to and from the Gulf of Mexico. While this sediment could and should be used entirely for coastal restoration projects, the Corps currently uses less than fifteen percent for this purpose. The Corps has an opportunity to use this material that is otherwise disposed of by working with our local coastal restoration partners in a strategic way to protect both the people of South Louisiana as well as the nation's natural resources that are at risk.

While we have made much progress since Hurricanes Katrina and Rita, much work remains. We have an unprecedented opportunity to evaluate our hurricane protection and coastal restoration efforts to ensure that we pursue common-sense policies that provide optimal protection to the residents of the Gulf Coast and ensure that the federal government is acting as a partner and not an impediment to our recovery.

I thank you again, Madam Chairman, for holding this important hearing.

DAVID VITTER
LOUISIANA

DEPUTY WHIP

Armed Services
Banking, Housing and Urban Affairs
Commerce, Science, and Transportation
Environment and Public Works
Small Business and Entrepreneurship

United States Senate

WASHINGTON, DC 20510

June 16, 2009

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VIA FACSIMILE AND ELECTRONIC MAIL /
IMMEDIATE ATTENTION REQUESTED.

Brigadier General Michael J. Walsh
Commander, Mississippi Valley Division
United States Army Corps of Engineers
P.O Box 80
Vicksburg, Mississippi 39181-0080

Dear General Walsh:

Thank you for participating in the hearing held by the Senate Environment and Public Works Committee on June 16, 2009, entitled, "New Orleans Hurricane Protection and Coastal Louisiana Restoration: Status and Progress." As discussed at the hearing, I have enclosed a list of questions that I would like the Corps to address in the coming weeks. Though I did not specify an exact date of response, I would encourage you to provide a highly-detailed response in a timely manner.

The Water Resources Development Act of 2007 is the product of years of work by Senate Environment and Public Works Committee. Thousands of hours of negotiations resulted in the conference report that became law in November of 2007. There are a number of unique and provisions in the bill that I fought to include in the final version of this law. I would like to go over a few of those with you to determine the status of their implementation:

a. **Morganza:** Section 1001 includes authorization for the Corps to construct the Morganza to the Gulf project. Has the Corps begun construction of this project? If not, why? When can I expect construction to begin?

b. **AGMAC channel:** Section 1001 directs the Corps to use spoil material from this navigation project to build improve flood protection in Vermilion Parish. Has the Corps approved the use of this material for these protection features? If the Corps' NEPA documents did not consider using this material, despite direction from Congress otherwise, when can I expect the Corps to adhere to the direction of Congress and use the dredged material for protection features?

c. **Credit:** Section 2003 and Section 7007 allows for the State of Louisiana to receive credit for work done prior to agreements being signed with the Corps. The provision also allows for any credit to be applied to any other project or study authorized in Title 7 of the bill. Is this currently

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being allowed? If not, even though the law says the State gets credit "prior to signing agreements," why are these credits not being applied?

d. **Use of CIAP funds:** Section 2007 and Section 7007 allow for the State of Louisiana to use Coastal Impact Assistance Program funds for cost share. How much of these funds have been put toward cost share? If no funds have been put toward cost share, why?

e. **Expedited Schedules:** Section 2009 directs the Corps to expedite any project that would provide hurricane protection to any area that flood during the preceding five years. How has the Corps compressed schedules for the Morganza to the Gulf project, Larose to Golden Meadow Project, Donaldsonville to the Gulf Project or SELA for St. Tammany Parish? Please provide pre-WRDA versus post-WRDA schedules to show how the Corps is complying with the law.

f. **Violet Diversion:** Section 3083 requires the Corps to design and construct the Violet Diversion project. The law requires the Corps to complete design on the project by November of this year (2009). Where are you on that design?

g. **Westbank O&M:** Section 3084 requires the Corps to maintain O&M related costs for the Algiers Canal. How has the Corps complied with this provision?

h. **IHNC lock replacement:** Section 5083 required the Corps to submit a supplemental EIS for the project by July 1, 2008. Did the Corps meet this deadline? If not, why?

i. **Larose to Golden Meadow:** Section 5157 authorizes the South Lafourche Levee District to build improvements to the Larose to Golden Meadow project and get reimbursed or credit for work. Do you plan to give the levee district credit for work performed that is designed to provide an updated 100-year level of protection?

j. **LACPR Study:** Section 7002 requires the Corps to develop a comprehensive plan for coastal Louisiana within one year of enactment or in November of 2008. Did you submit this? If not, why?

k. **Federal-State Task Force:** Section 7004 requires the Corps to establish a Federal-State Task Force to manage all work in coastal Louisiana. Can you tell me the status of that task force?

l. **Integration Team:** Section 7004 also establishes an Integration Team to identify ways to improve the inter-performance of projects. Could you please advise as to the status of this team?

m. **Authorized Restoration Projects:** Section 7006(c) authorizes five coastal restoration projects for construction based upon a January 2005 Chief's Report. How many of those have begun construction? Which ones and what is the Corps' status for each project?

n. **Beneficial Use of Dredged Material:** Section 7006(d) authorizes a beneficial use of dredge material program in Louisiana to build wetlands. The Chief's report specifically refers to a 25% cost share for the state on this program. What cost share is the Corps requiring?

o. **Addtional Coastal Restoration Projects, Group A:** Section 7006(e)(1) directs the Corps to submit four reports to Congress for restoration projects by December of this year (2009). How many of those reports will be submitted on time?

p. **Additional Coastal Restoration Projects, Group B:** Section 7006(e)(3) directs the Corps to submit six reports to Congress by December of last year (2008). How many of those reports were sent to Congress?

q. **Expedited LACPR Report:** Section 7010 requires the Corps to expedite completion of the LACPR report – or Cat 5 report for coastal Louisiana. This report was originally due in December of 2007. How have you expedited this report?

r. **MRGO Closure and Restoration:** Section 7012 and 7013 require closure and restoration of the MRGO at 100% federal cost. Have you required any funds from the State of Louisiana? If so, what are those costs?

s. **MRGO Restoration Plan:** Section 7013 requires a restoration plan for the MRGO by mid 2008. Was that restoration plan submitted? If not, why?

I have just listed 19 places where the Senate Environment and Public Works Committee, and this Congress, directed the Corps to do certain things in Federal law and the Corps has ignored clear direction. You are clearly operating outside of the law. Why has the Corps chosen this direction of operation?

Why is Congress even here if the Army Corps of Engineers is going to continue to ignore the law and our direction?

Lastly, I have a few more questions that need clarification:

1) **V-zone/D-Firm:** FEMA and the Corps have developed expanded floodplain standards and are prohibiting the use of federal funds to rebuild fire stations, police stations, schools, and other facilities in these V-zones. In addition, new D-FIRM maps have declared wide swaths of homes

and businesses within the 100-year floodplain and submit to exponential increase in flood insurance rates. In addition, you have also unilaterally increased the levee standards for virtually all coastal communities. Do you think that this is appropriate to do without any type of transition plan for these communities?

2) You note that the flood protection system in the Greater New Orleans area includes navigable floodgates. Under current law, the state will be responsible for operating and maintaining two massive navigation structures on the Gulf Intracoastal Waterway. As I understand, these will be the only two structures on the GIWW from Texas to Florida operated by a non-federal entity. Do you think that this is appropriate to have the State of Louisiana operate this navigation structure on the federal channel?

3) The Inner Harbor Surge Barrier on Lake Borgne and the Sea Brook gate were originally estimated to cost $350 million according to correspondence sent to Congress by OMB in 2006. The cost of these structures then escalated to $1.1 billion, now it is priced over $1.6 billion. The Lake Borgne structure was supposed to have interim protection in place for the 2009 hurricane season. In fact, the Congressional delegation and the State of Louisiana backed off of demands to increase the size of the navigation gate from 150 feet to 225 feet due to the Corps' statements that the larger gate would prevent interim protection in place for this hurricane season. The Corps recently announced that they will not meet their interim protection goals for the IHNC barrier.

   We are now faced with a situation whereby the Corps is constructing a navigation structure on the GIWW that will be 150 feet – equal to the narrowest on the entire waterway. In fact, this size is opposed by many in the navigation community and there are numerous efforts to replace or expand other 150 foot structures on the GIWW. The Western Closure Complex gate on the GIWW is 225 feet – just to the west of this gate. Do you think the cost escalation from $350 million to over $1.6 billion, the inability of the Corps to maintain its schedule, and misleading Congress on the 2009 hurricane season interim protection is appropriate?

4) The Corps recently requested a $540 million transfer of funds to address shortfalls on the IHNC surge barriers. You are proposing to reprogram funds Congress provided for armoring work to address your shortfalls on the IHNC barriers. Why did you not just ask for an additional $540 million in the stimulus or emergency supplemental? You are jeopardizing the entire protection system by placing this uncertainty on these dollars. Various expert reports made it clear that armoring is critical to the performance of these systems. What guarantees can the Corps make to ensure that those funds are replaced before 2011, outside of savings on projects that come under budget?

5) The original White House fact sheets on the Hurricane Protection System indicated a completion date of 2010. It then unceremoniously slipped to 2011. Your testimony references some

components stretching to 2013 and beyond. Could you please clarify these scheduling slips and exactly what features will be delayed beyond 2011?

6) The previous Administration forced the State of Louisiana to agree to be the non-federal sponsor for the Southeast Louisiana Urban Flood Control Project (SELA). This was forced upon the State despite objections from the previous sponsors – Jefferson Parish and the Orleans Sewerage and Water Board. There is no law that required this change in sponsorship and the Corps actually signed agreements with the Parish and Water Board after Katrina. Could you please help me understand this policy and if the Obama Administration will continue to select who they will partner with and who they won't?

7) The Morganza to the Gulf Project began in the late 1980s. Congress authorized the study in the 1992 WRDA bill, authorized the project in WRDA 2000, authorized a segment of the project (J-1) in 2002 and authorized the entire project again in WRDA 2007. This project will protect 225,000 people that have repeatedly flooded and been subject to hundreds of millions in FEMA disaster assistance. The Houma area, that this project protects, has one of the fastest growing economies in the nation according the National Conference of Mayors and recently had the lowest unemployment rate in the country according to the Department of Labor.

   Keeping in mind all of the Congressional authorizations I referenced, the 20-year history of the project, the importance of this area to the nation's economy, can you tell me how much construction work that the Corps of Engineers has performed on this project?

Thank you for your attention to this crucial matter. I look forward to receiving responses to these crucial questions.

Sincerely,

David Vitter
United States Senator

cc: Lieutenant General Robert L. Van Antwerp, Commander, United States Army Corps of Engineers
cc: Col. Al Lee, Commander, New Orleans District

Senator VITTER. The first one, I will just alert you, are 20 different significant items under the last WRDA bill which were mandated by the bill to track progress on those and, by our account, there has been little to no progress on those 20 items. But I will submit all of that for the record without objection. That is made part of the record.

Senator Landrieu, why do you not start with a 12-minute round and I will do that and, if we need to go further, we will do that.

Senator LANDRIEU. Thank you, Senator Vitter.

I think the testimony on Pump to the River has been substantial and quite clear. I just have a question, either to Mr. Rault or to Mr. Jackson. When you evaluated the Pump to the River model, Mr. Rault, what about the London Avenue Canal? Is that the same situation as the 17th Street Canal or is that different? Obviously, it is not the same geography exactly, but I guess it contributes to the draining of the city. I do not hear that mentioned at all. Is there a reason, Tom?

Mr. JACKSON. Senator Landrieu, under an agreement right after my retirement from AECOM, the company I worked for, I was under a consulting agreement with that firm and that firm was hired by the Corps to look at all potential discharge sites other than what was planned for the lakefront.

We looked and found very little, I must admit. We really kind of got out of the box in terms of looking at things that initially we would have normally dismissed. Of the two that appeared to have some possibility, the best possibility was Pump to the River at the southern end of the 17th Street Canal for the issues that Mr. Rault talked about.

The London Avenue Canal, there are a couple of options that we offered in that report, one of which was the New Orleans Sewage and Water Board station which pumps its "headwaters" of the London Avenue Canal and also has a feature built into it right now that can pump into the Florida Avenue Canal, which flows east and is pumped into the Industrial Canal. The recommendation there was, while that canal was being improved under a SELA project, to increase the capacity so as to relieve some of the flow in the London Avenue Canal.

Another alternative on the London Avenue Canal, there was a second pumping station, it sits on the east bank of the London Avenue Canal about halfway between its headwaters and the lake, and there is perhaps a potential, with further study, that that could also drain and then be pumped into the Industrial Canal. So, there are two possibilities on the Industrial Canal.

The Orleans Avenue Canal is a very light flow by comparison to the other two, and we found no reason, although we did look at a number of options, including using Bayou St. John which, I think all of us who live there know that would be suicide. But we even looked at that and we looked at pond storage of water in the wide median on the Pontchartrain Expressway, at the end of the Pontchartrain Expressway, Pontchartrain Boulevard.

So, we looked at a lot of different issues. But those three were the only three, one on 17 and two on London, which showed some potential.

Senator LANDRIEU. Well, I am glad that you mentioned that and I am going to submit in writing some questions to our levee boards because, while the focus today is really on the Pump to the River option and pressing the Corps of Engineers to admit that it is either in their authorization to proceed or to get them to support a new authorization to get that done, ultimately, and I think Senator Vitter and our whole delegation share this, we want a comprehensive system that keeps people in this area free from flooding to the greatest degree possible, regardless of whether it is from storm surge or rain. And it is from all of Orleans Parish, Jefferson, St. Bernard, Plaquemines, and, frankly, into the river parishes and ultimately to all of South Louisiana.

So, I am going to ask the levee boards to submit for the record of this hearing some additional options in that regard such as the retaining ponds. And do you know for the record, or does anyone want to testify to, the number of drainage canals in this metropolitan area either exposed or buried? Do we even have a comprehensive number that we talk about to the public? When you say the public should be made aware, this is part of the public becoming aware. Do we have a universal number that we agree to?

Mr. JACKSON. I am sure the Sewage and Water Board could give us a record, as well as Jefferson Parish and, of course, St. Bernard Parish. But it is in hundreds of miles——

Senator LANDRIEU. Well, I am going to ask for that to be submitted because it is important for our community but also for the Nation to realize that, while the focus has been on the 17th Street, the London and the Industrial, I do not want anyone to think there are just three canals in this region. That would be a huge mistake. I think we must get on the record the complexity and extent that we are talking about. So, Mr. Jackson, if you would try to do that in your time, I would appreciate it. And if the Corps can be of any help on that, even though you are not yet exactly focused on internal and we hope to get you more focused on.

[The information follows:]

Orleans—100 miles, Jefferson—60 miles, and St. Bernard—60 miles.

Senator LANDRIEU. Mr. Jacobs, a question I have wanted to ask you for a while. The report, and I understand that you all have been doing this for quite some time, the National Academy of Sciences. I think you said it was 1860, what was it?

Mr. JACOBS. The National Academy of Sciences was established in 1863.

Senator LANDRIEU. Eighteen sixty-three. All right. Either since 1963, or maybe to make it more relevant let us say in the last 25 years or 30 or so years, has the United States successfully moved any city or small community? And if so, how small or how large? What is the experience that you, or the engineers, have? Because that is basically what you all, part of your recommendation, was that people would just move. So, when did we do that in the last 25 years and to what extent?

Mr. JACOBS. Well, it is a very good question. And, of course, the situation in New Orleans is very unique, it is a very vexing challenge given the number of people there and the unique hydrology topography——

Senator LANDRIEU. But I want you to answer, if you can, when in the experience of either you, personally, or the organization that you are representing, has the United States relocated any significant amount of people for flooding?

Mr. JACOBS. The best example I can think of is the city of Valmeyer, Illinois. Are you aware of this one?

Senator LANDRIEU. How large was that city?

Mr. JACOBS. I think it was about 2,000 people.

Senator LANDRIEU. Two thousand people. And what year was it?

Mr. JACOBS. I do not know the year of the relocation but it was after the 1993 Mississippi River floods.

Senator LANDRIEU. OK and it was 2,000. Do you recall if all 2,000 of those people were relocated?

Mr. JACOBS. To my understanding, they have not all been relocated. The vast majority of them have.

Senator LANDRIEU. OK. Well let us, for the record, find out because this is one of the core issues that I am going to focus on. Let us just say 2,000 people and let us say 2 people per house. That is 1,000 houses. I would like to know how many of those houses were actually moved and if it was less, it might be 3 people per house, but let us say it was 1,000 homes. Do you know that we lost 250,000 homes in Louisiana?

Mr. JACOBS. Yes, I am aware of some of those statistics.

Senator LANDRIEU. So, do you all want to stand on your suggestion that we just move the 250,000 people?

Mr. JACOBS. Well, in our report we did not use that number. The point that we were making is that relocations, where viable, should just be considered.

Senator LANDRIEU. I realize that. The reason I am pointing that out is, with all due respect to your very prestigious organization, it is really what has the people of my community quite troubled and anxious. If you start from throwing out just an idea that one of the solutions is that people can just move, and you only have moved 1,000 homes at the most in the last 25 years, and we have 250,000 plus that need to be protected, it just leaves us really scratching our heads.

We are searching for another more realistic, cost effective, in the real world solution, such as building levees and internal flood control and restoration of wetlands and diversion projects, that will help the people of not just this delta, but all over the coast, live safely.

The other issue that you all point out in here is about reducing the footprint. To people that hear that, that means that they are going to build a levee on the wrong side of my house and I am outside the levee protection. So where is the levee going to be built? What neighborhoods are going to be in? What neighborhoods are going to be out?

Again, in the last 25 or 30 years, has a whole system been designed that actually reduced a footprint by, let us say, 15 percent or 20 percent or 25 percent? To your knowledge, has this ever been done?

Mr. JACOBS. No, Senator, I do not know of any other similar experience to New Orleans and Katrina.

Senator LANDRIEU. OK. Well, I would just hope that people who continue to refer to this study will call to this testimony that, in the last 25 years, this organization is only aware that one town was partially moved of 2,000 people or less, and they do not testify that at any time there was actually a smaller footprint actually adopted.

I want to say that my intention is to expand the footprint of this city and this region. My intention is that this region will have a flood control protection system that is safe and secure for future economic growth and development. I reject the notion that either Jefferson Parish or Orleans Parish or St. Bernard Parish or Plaquemines Parish will never have a greater footprint or a higher density or a greater population. I realize that expanding a footprint is different that expanding the population.

As the Senator from this State, I want to say that I am not going to lead the retreat. I will not lead the retreat. We are going to reclaim our land and reclaim our safety.

My time is almost at an end here. But I do want to say that one of the startling things, and I say startling, things that I learned in the delta in The Netherlands is that this country does not even have flood insurance. Think about that. They do not even carry flood insurance in Amsterdam or Rotterdam. It is unavailable and it is unnecessary. Well, I am not sure it is unavailable but it is not carried by a broad number of people because their system of protection is so strong and guaranteed to such levels of safety that it is quite unnecessary. Instead of the money they are using to pay premiums, for better or worse, they invest in a flood control system.

Now, I am not suggesting that we can move from where we are to that system entirely or that anyone should give up their insurance that they are probably happy to have. But I am suggesting that this retreat and pulling up is not the direction that we should move into.

I am happy for the testimony today and look forward to continued questioning at a later date.

Senator VITTER. Thank you, Senator.

I want to follow up on the outfall canal and the Pump to the River discussion.

As we were discussing with the General, Option 1 requires the artificial lowering of the water level in the 17th Street Canal, well below what we thought was normal and safe before Katrina. Is that fair to say, Mr. Rault and Mr. Jackson?

Mr. RAULT. That is correct. We have only got 6 feet permitted out of a 12.5 foot levee.

Senator VITTER. So, the wall was built 12.5 feet and now we are told that you cannot allow it to go higher than 6 feet. Is that right, Mr. Jackson?

Mr. JACKSON. Yes. Let me try to clarify a little bit. The Corps has closed off and plans to, with Option 1, close off tidal surge at the lakefront so that the canal levels in 17, Orleans and London would then be maintained at what would be considered approximately normal during a non-hurricane or a non-storm or a non-strong wind event. That may sound good if the levees on either side of the canals were substantial, dependable, and that we would not

have to worry about excavating the canals and removing silt and so forth in order to maintain that stability.

One of the things that I have said to people is that maybe a failure of the canal wall during a hurricane would not dump Lake Pontchartrain and the Gulf of Mexico into the city of New Orleans. But if you lived anywhere in the vicinity of that breach, there is still a lot of water in that canal up to elevation six and it would ruin a whole bunch of people's lives. It would not be as extensive a disaster as it would have been prior, and I give the Corps credit for that.

Senator VITTER. So, part of what you are saying, let me ask it this way: as an engineer, are you confident that maintaining that safe water level or lower will avoid any chance of a breach in those walls as we saw after Katrina?

Mr. JACKSON. I am absolutely not confident in the levees that are built, the floodwalls, the I-walls and sheet piles that were built. The section that failed may have been in a particularly bad soil. However, there has not been sufficient investigation to know if that was the only spot that there were terrible soils. For instance, the old Burried Beach Ridge, which was the primary failure point along London Avenue Canal, also passes across the 17th Street Canal south of Interstate 10. There is potential for the same kind of failures under the same kind of conditions there as there was on London.

Senator VITTER. So, just to underscore this, where the canal walls breached have been replaced with a whole new design. Correct?

Mr. JACKSON. T-walls.

Senator VITTER. But everywhere where they did not breach, which is 99 percent of the length of the walls, we have the same design and the same walls as we had before Katrina. Is that correct?

Mr. JACKSON. That is correct, Senator.

Senator VITTER. And under Option 1, that would not change?

Mr. JACKSON. That would not change. Under Option 2, there would be no need for either levees on the Orleans or the Jefferson side. I would recommend that we leave the levees on the Jefferson side of the canal to act as a polder separation, i.e., a safety valve.

Senator VITTER. So again, under Option 1, that would not change. Under Option 2, it would completely change for the better.

Mr. JACKSON. The system, I know you are all both familiar with Jefferson Parish, the system would look just like the Jefferson Parish outfall canals with a pump station at the lake.

Senator VITTER. Right. Right.

Mr. RAULT. Senator, if I might add to that?

Senator VITTER. Sure, Mr. Rault.

Mr. RAULT. Thank you. Our research and due diligence in developing our support of 2 and Pump to the River reflects that as recently as mid-March of this year, just a few months ago, the safe level was threatened in one of the outfall canals so much so that the Corps of Engineers asked the Sewage and Water Board to stop the pumps. Now, that was just in a rain event. It was not a hurricane, just a normal, New Orleans rain event.

So I think it underscores the problem that all of us have, including you and Senator Landrieu, as to how this choreography of keeping under that safe level, particularly in a hurricane event, could work out where you have two pump stations working together, supposedly.

Senator VITTER. Right. Right. Let me ask you both also if under Option 1 we have to keep the water level at six feet instead of 12.5, apart from the pumping capacity, that is a huge amount of water storage capacity, is it not, that is essentially lost? That is water that is going to have to be on the street instead of being put in the canal. Is that not correct?

Mr. JACKSON. Yes, Senator. However, we are under a pump system and, if we are open to the lake, we are pushing the water into the lake——

Senator VITTER. But my point is, if under Option 1 you cannot allow the water to get past 6 feet, you are giving up a lot of safe storage between 6 feet and 12.5 feet, which we thought we had, which the system was designed to include?

Mr. JACKSON. What we are giving up is a tremendous amount of hydrologic capacity, how much water can flow through that canal. That is what we are giving up by lowering the water surface.

Senator LANDRIEU. So that stays on the street?

Mr. JACKSON. Right. Absolutely. Or in someone's living room.

Senator VITTER. So, given that, is not the general concept of Pump to the River to move a significant volume of water in a whole other direction and avoid the 17th Street Canal, a reasonable compensation for that enormous loss from the capacity we thought we had before Katrina?

Mr. JACKSON. Yes. I would recommend strongly that both the Pump to the River, as well as the diversion of water off of London Avenue Canal, the two suggestions I made earlier, be investigated to reduce the flows in those outfall canals. Everything we can do to reduce those flows will help the whole situation and it will help the ultimate cost of Option 2 on each of those canals, or even Option 1 for that matter.

Senator VITTER. Mr. Rault.

Mr. RAULT. That is correct. I agree with Tom. We think that the lack of, the missing storage capacity, would end of on the streets and in the living rooms. It has happened before. The famous May 15th flood was strictly from the rainfall. There was no hurricane. How many times have we seen that? That is why I do not understand, we thought this was for hurricane protection, not just storm surge.

Senator VITTER. I guess one of the points I am trying to make is that the Corps will say, well, under Option 1 we are going to match at the lake the pumping capacity that the city has in the center of the city. We have some debate about whether that is true. But even if it is true, that ignores the storage issue, does it not? There is a whole lot of volume for storing water off the streets out of homes that we were supposed to have that is now being taken away from us. And that volume of water is represented by the length of the canal times the width of the canal times the difference between 6 feet and 12.5 feet. That is a lot of water.

Mr. RAULT. Yes, sir, it certainly is. As a homeowner would say, water is water. If my home is damaged by this kind of water or that kind of water, hurricane water, floodwater, whatever, it is still damaged. There is no question that the lack of using that capacity between 6 feet and 12.5 feet in the London Canal is going to be dumped on the streets in Louisiana, so much so that Jefferson Parish has already had to go and create ponding areas, like in playgrounds, in try to avoid that.

Senator VITTER. Right. Right.

Mr. RAULT. Pump to the River would definitely be the answer, as you have clearly pointed out, to eliminate that problem and at a very competitive price.

Senator VITTER. Well, again, I would make the point that not only is it an answer, all it would be doing is compensating us for what is being taken away in the safe water level, for the capacity we were told we had.

Mr. JACKSON. Which, in fact, we do not have in a safe way.

Mr. RAULT. It is a replacement, that is correct.

Mr. JACKSON. And that we paid for. We paid our local share and our Federal tax dollars paid for the Federal share.

Senator VITTER. Let me ask the other witnesses. In my opening statement, I expressed a frustration, also, with some of the ways the Corps is moving forward with the overall Louisiana coastal plan in being very general in terms of decision matrixes and other things versus far more specific with regard to possible future projects. That obviously impedes our ability to move some specific, concrete project forward beyond the 100-year plan. Do you all have any reaction to that critique or that concern?

Mr. PEYRONNIN. Senator, I think that it an accurate assessment. From a restoration perspective, our concern is that, similar to the levee criteria right now, there is no mechanism through which we can reflect the urgency of need under the traditional policy and guideline Corps process that has guided the Corps decisionmaking process for quite some time. That is currently up for revision at this point in time. I think a draft was submitted in 2008 and it is moving toward a final copy.

I think that an essential component of looking at how the Corps makes decisions is recognizing that all of the decisions we need to make about our environmental projects, our protection projects, are not equal. They certainly are all very important. But clearly, in coastal Louisiana, we are facing projects that have severe implications for the loss of life, the protection of significant property infrastructure, and there simply must be an expedited framework.

For example, I know that there has been an expedited framework for levee construction in greater New Orleans areas where the need for process has been reviewed. Clearly, there are opportunities within the Corps' process. If we can look at NEPA, and expedite NEPA processes, certainly there is an opportunity within the Corps' process that we could expedite absolutely critical and essential projects.

Senator VITTER. Dr. Twilley.

Mr. TWILLEY. I would just like to make one comment. I think it is critical that we focus. And the focus has to be on the river. This is a delta. This delta has to have its river. We have abandoned the

delta by managing the river, in the proper situation, for flood control and navigation.

Again, as I stated in my comments, we need a national agenda, a national priority, by which this delta not only includes, under the present Mississippi River Tributary Act, the responsibilities of navigation and flood control, but under a multipurpose scenario, you have to include ecosystem restoration and protection.

And that has to be at the national level with a commitment of what that region means to the Nation. Without managing the river and putting the river back in these flood plains, this system will not be able to sustain itself.

Senator VITTER. Thank you. Senator Landrieu.

Senator LANDRIEU. This is very final. I would just like to close by reading again into the record what the language clearly says about the $3 billion that we allocated in this Congress with a tough battle, a hard fought battle, $3 billion of which $530 million is focused on this project.

But, to the Corps of Engineers that is still here, I want to read the controlling language. It says to provide hurricane and storm damage reduction and flood damage reduction in the greater New Orleans and surrounding areas, $530 million shall be used to modify the system that we clearly saw in front of us was not functioning correctly, resulting in the damage, catastrophic damage, in the loss of 250,000 homes.

So, I think this hearing has been very good, Senator Vitter, and I thank you for your leadership. It is hard for me to believe we have to go through this hearing, though, based on the clear language that is in the law now. However, we are going to pursue whatever it takes to the Corps of Engineers to get this project done correctly.

And Pump to the River should be included and some additional options, Mr. Jackson, to the London Avenue Canal and perhaps some other canals. Dr. Twilley, thank you for your comments about the coast and the urgency of moving toward better management of the river itself to help with this project, and Mr. Peyronnin, for your focus on the comprehensive nature.

I will finally end with the requirements of a comprehensive plan. I would like to just ask you all, particularly Mr. Jacobs, Mr. Peyronnin and Dr. Twilley, are you all familiar with the Dutch model? While I know that are situation is somewhat different in many, many aspects, we are a much larger Country, they are much smaller, they have 16 million people, we have more, their whole country could fit inside of the bottom third of Louisiana. What similarities do you see and what are the one of two things that you think we could really appreciate from the Dutch model? I ask you to be very brief, 30 seconds or less.

Mr. Jacobs.

Mr. JACOBS. Thank you, Senator. I will be brief. I think the one point I would note is the higher level of flood protection for urban areas.

Senator LANDRIEU. It is one every what, 10,000 years?

Mr. JACOBS. Well, I think they have something like that in The Netherlands, do they not, a 10,000-year level of protection? Whereas in New Orleans and other parts of our Country, we are gen-

erally using the one in 100-year level of protection. Obviously, a great discrepancy and I mention the Association of State Floodplain Managers and their recommendation for a minimum 500-year standard for urban areas.

Senator LANDRIEU. Mr. Peyronnin.

Mr. PEYRONNIN. Yes, Senator. While I am not immediately familiar with the entire Dutch system, I will note that my experience is that they have taken on a perspective that they have to live with water. They understand the implications of trying to necessarily trying to control water and in fact I believe have launched a recent campaign about educating their citizens and looking at that from a water resource perspective.

The government structure is such that it understands that the commitment they have made to structural flood protection is extremely demanding from a financial perspective and has no guaranty of sustainability long into the future. They have started to look at other methodologies through which they can accomplish significant long-term sustainable flood protection that include better water resource management from a comprehensive perspective.

Senator LANDRIEU. Dr. Twilley.

Mr. TWILLEY. Simply, a national mandate. I mean, it is evident that they have a national priority of protecting the coast and with that, they marshal, as you saw at Deltaurus, some of the top engineering and science and coastal science related to these new principles which they call Give the River Room and in which they actually try to combine engineering design with ecological and coastal realities. And I think that comes from a national agenda, a national priority, and they put the fiscal resources into it to achieve it.

Senator LANDRIEU. Thank you. And thank you, Senator Vitter.

Senator VITTER. Thank you to all of our witnesses.

Just to summarize, my personal goal coming out of this hearing, which I think is shared by Senator Landrieu and Chair Boxer, is to first urge the Corps again to reconsider their position on authorization of 2 versus 1. I believe it very clear that they are both authorized.

But as we do that, to work with Chair Boxer and this Committee to pass authorization as quickly as possible for Pump to the River and the clarification on the 2 is included as well as 1 issue. So, we are going to be working in a very focused way on that in the next few weeks and we were literally talking to Chair Boxer about it during this hearing and have a clear path forward and we thank her for that.

Thank you all for your very valuable testimony and the hearing is adjourned.

[Whereupon, at 4:55 p.m. the full Committee was adjourned.]

[An additional statement submitted for the record follows:]

STATEMENT OF HON. JAMES M. INHOFE, U.S. SENATOR
FROM THE STATE OF OKLAHOMA

Thank you, Madam Chairman, for holding this hearing, and thank you to all the witnesses for agreeing to discuss these important issues with us today. I would also like to commend Senator Vitter for his tireless efforts on behalf of the people of Louisiana, particularly on issues related to the Corps of Engineers. EPW has not held a hearing dedicated to these Louisiana issues since a field hearing in February

2007. Both this hearing and that field hearing were prompted by Senator Vitter. He has worked very diligently to educate his colleagues here in the Senate on the importance of taking action, as well as on the details of what Congress needs to do to ensure proper protection for his State.

The issues surrounding how to provide hurricane and flood protection for New Orleans as well as appropriate coastal restoration activities are numerous and complex. The projects themselves are also very expensive. Oversight hearings like this one are an important step in ensuring that these things get done right. The people of Louisiana are counting on it for their very existence and way of life. The American taxpayers are counting on knowing that their tax dollars are being spent wisely, and not wasted on things that won't work technically or that won't provide all the benefits promised as justification for the costs.

This Committee previously has held several hearings establishing the reasoning for a Federal role in coastal restoration activities in southern Louisiana. Unlike the situation with the Florida Everglades in 2000, the fact that we had a Chief's Report for this project meant that I was able to support the authorization included in the Water Resources Development Act of 2007. Since a Federal role is no longer in question, I hope our witnesses will focus more on the details of this effort. As the committee of jurisdiction, we need to hear specifics about what is proceeding well and what the challenges and obstacles are. We need to hear if congressional action is needed to better focus or prioritize the Corps' activities in this area. My opinion is that the Everglades restoration effort is not going particularly well, and I hope we can avoid similar mistakes in coastal Louisiana restoration.

My understanding on the pump to the river issue is that we are basically discussing two options for reducing or preventing flooding in New Orleans. The first option, the one that is currently authorized and the Corps is constructing, combines the existing interior drainage system with the ability to pump water from the city's three outfall canals to Lake Pontchartrain. Previous reports from the Corps tell us that this component within the larger system being constructed will provide a 100-year level of protection for the city.

The second option would also contribute to providing a 100-year level of protection, but it involves redesigning the interior drainage system to eliminate the need for interior pumps on the outfall canals, instead relying on pumping water just at the lakefront or in combination with pumping to the Mississippi River. Preliminary estimates indicate that this option may be significantly more expensive and complex to construct. Operationally, however, it may be more reliable than the first option.

I look forward to the discussion with the witnesses of the pros, cons and tradeoffs of each option, and I again thank Senator Vitter for prompting this hearing.