AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

S. HRG. 109–1108

COMMUNICATIONS IN A DISASTER

HEARING

BEFORE THE

COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION UNITED STATES SENATE

ONE HUNDRED NINTH CONGRESS

FIRST SESSION

SEPTEMBER 22, 2005

Printed for the use of the Committee on Commerce, Science, and Transportation

U.S. GOVERNMENT PRINTING OFFICE

64–137 PDF WASHINGTON : 2011

For sale by the Superintendent of Documents, U.S. Government Printing Office
Internet: bookstore.gpo.gov Phone: toll free (866) 512–1800; DC area (202) 512–1800
Fax: (202) 512–2104 Mail: Stop IDCC, Washington, DC 20402–0001

SENATE COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION

ONE HUNDRED NINTH CONGRESS

FIRST SESSION

TED STEVENS, Alaska, *Chairman*

JOHN McCAIN, Arizona
CONRAD BURNS, Montana
TRENT LOTT, Mississippi
KAY BAILEY HUTCHISON, Texas
OLYMPIA J. SNOWE, Maine
GORDON H. SMITH, Oregon
JOHN ENSIGN, Nevada
GEORGE ALLEN, Virginia
JOHN E. SUNUNU, New Hampshire
JIM DeMINT, South Carolina
DAVID VITTER, Louisiana

DANIEL K. INOUYE, Hawaii, *Co-Chairman*
JOHN D. ROCKEFELLER IV, West Virginia
JOHN F. KERRY, Massachusetts
BYRON L. DORGAN, North Dakota
BARBARA BOXER, California
BILL NELSON, Florida
MARIA CANTWELL, Washington
FRANK R. LAUTENBERG, New Jersey
E. BENJAMIN NELSON, Nebraska
MARK PRYOR, Arkansas

LISA J. SUTHERLAND, *Republican Staff Director*
CHRISTINE DRAGER KURTH, *Republican Deputy Staff Director*
DAVID RUSSELL, *Republican Chief Counsel*
MARGARET L. CUMMISKY, *Democratic Staff Director and Chief Counsel*
SAMUEL E. WHITEHORN, *Democratic Deputy Staff Director and General Counsel*
LILA HARPER HELMS, *Democratic Policy Director*

CONTENTS

	Page
Hearing held on September 22, 2005	1
Statement of Senator Burns	3
Statement of Senator Inouye	2
Prepared statement	2
Statement of Senator McCain	4
Statement of Senator E. Benjamin Nelson	9
Statement of Senator Bill Nelson	3
Statement of Senator Stevens	1
Statement of Senator Sununu	4
Article, dated September 9, 2005, from *The Wall Street Journal,* entitled "Cut Off: At Center of Crisis, City Officials Faced Struggle to Keep in Touch; Mayor's Inner-Circle Spent Two Days in the Dark; Web Phone Became Lifeline; Police Chief Rips a Server Free" by Christopher Rhoads	5
Statement of Senator Vitter	34
Prepared statement	35

WITNESSES

Citron, Jeffrey A., Chairman/CEO, Vonage Holdings Corporation	50
Prepared statement	52
Eslambolchi, Hossein, President, AT&T Global Networking Technology Services and AT&T Labs; AT&T Chief Technology Officer and Chief Information Officer	53
Prepared statement	55
Martin, Hon. Kevin J., Chairman, Federal Communications Commission	9
Prepared statement	13
Roth, Paul, Executive Vice President, External Affairs and Public Relations, Cingular Wireless	45
Prepared statement	47
Smith, William L., Chief Technology Officer, BellSouth	38
Prepared statement	39

APPENDIX

Smith, Hon. Gordon H., U.S. Senator from Oregon, prepared statement	69

COMMUNICATIONS IN A DISASTER

THURSDAY, SEPTEMBER 22, 2005

U.S. SENATE,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, DC.

The Committee met, pursuant to notice, at 10 a.m. in room SD–562, Dirksen Senate Office Building, Hon. Ted Stevens, Chairman of the Committee, presiding.

OPENING STATEMENT OF HON. TED STEVENS, U.S. SENATOR FROM ALASKA

The CHAIRMAN. Good morning. According to the FCC, Hurricane Katrina disrupted service to approximately three million phonelines. The storm surge was reported in excess of 20 feet, and tens of feet of flood water resulted in a rarely seen area of devastation. Thousands have worked around the clock to restore phone service, and we appreciate their extraordinary efforts. Today we have asked to hear from the FCC, and some of the companies involved, about what Hurricane Katrina did to the communications networks, and about their efforts to restore service. In particular, we hope to hear about three common problems.

Credentialing. First, repair crews were ready to begin restoring service, but couldn't get permission from officials who were controlling the area to enter the area. There needs to be a plan in place for important people who are associated with restoring the critical infrastructure and communications.

As far as security, once the repair crews enter the affected area there's no reason they should have to fear for their lives. Part of any disaster recovery plan must include providing for safety of essential communications personnel.

And also the issue of power, of energy. Over-reliance on the power grid is not acceptable. Companies need to ensure that they have sufficient backup generators with sufficient fuel in place. Maybe natural gas pipelines could provide a backup fuel source for critical infrastructure. We have no solution to offer, we want to hear what solutions are being explored and how they could be implemented. But above all we intend to commend all of you for your efforts during the disaster. Apparently we have another one in the wings, a very difficult time for all communications people, and we look forward to hearing your testimony. I do hope Members will keep their opening statements to not more than two minutes, so that we can proceed with the second bank of these hearings and finish by noon. Senator Inouye.

STATEMENT OF HON. DANIEL K. INOUYE, U.S. SENATOR FROM HAWAII

Senator INOUYE. Thank you. Mr. Chairman, I'd like to join you in commending Chairman Martin for his superb leadership during this critical time, and also commend the leaders of the industry who did the impossible. Yes, we have work to do but considering what we had in place, thank God you were there. Now, I ask that my full statement be made part of the record.

[The prepared statement of Senator Inouye follows:]

PREPARED STATEMENT OF HON. DANIEL K. INOUYE, U.S. SENATOR FROM HAWAII

We have spent this week examining many of Hurricane Katrina's painful lessons, and the possible solutions that this Committee can advance to mitigate future disasters.

We have examined Federal entities that did their job well, like the National Oceanic and Atmospheric Administration's forecasting and warning systems, and we have considered Federal entities that need to do better, like the Federal Trade Commission and its work to protect consumers from price gouging.

Today's hearing is on entities that attempted to do their best in dangerous and difficult situations, where, in many cases, the hard infrastructure limited their best efforts.

Chairman Martin demonstrated strong leadership by swiftly marshalling the Federal Communication Commission's (FCC) resources and working with the affected communications industries. The FCC's timely attention to the crisis, waiving rules and granting necessary authorities, helped to bring critical networks back online.

Additionally, the proposals announced last week to dedicate the FCC resources to emergency preparedness functions are right on target. I have long supported Commissioner Copps' call for the creation of a Bureau that focuses specifically on emergency preparedness and elevates this work among the FCC's priorities. These actions will do just that.

The communications industry also must be thanked for its tireless efforts, not only to restore service to its customers, but to provide life saving connectivity to local and Federal first responders in the Gulf Coast region. Employees of these companies forged ahead under the most trying circumstances for the common good.

Despite the dedication of those before us, there are still significant emergency communications problems that must be solved immediately.

I cannot help but think that we are repeating history. We expected so much more 4 years after the September 11 tragedy. Yet, here we today, asking many of the same questions that we asked then:

- Why is it that our first responders cannot communicate with each other?
- How dependent are our communications networks on the availability of electrical power?
- Is security for critical infrastructure a necessary component for emergency preparedness?
- If systems fail, what backups are in place, and how quickly is the response in getting primary systems back online?
- Are there baseline critical preparedness standards that should be followed by communications network providers?
- What will it take to ensure that the equipment and facilities are hardened to withstand a natural disaster?
- Are we spending money on the wrong equipment?
- With such focus on interoperability, have we neglected redundancy?

In my view, the time for talk is over. The inability to effectively communicate during the major disasters costs lives. We simply cannot repeat these failures.

I look forward to the testimony of the witnesses.

STATEMENT OF HON. BILL NELSON,
U.S. SENATOR FROM FLORIDA

Senator BILL NELSON. Thank you, Mr. Chairman. One of the questions that I want to ask in this hearing and I thank you, Mr. Chairman, you're spot on that we examine this, is how can we as a Nation move to an all digital-based communication system with an integrated and resilient 9-1-1 emergency system? It was with this thought in mind that Senator Burns and I introduced a bill a couple of months ago that would ensure that the people who use VoIP phone service would be able to have full E–911 capabilities. Hurricane Katrina shows that it's time for the Committee to consider this bill. We had a personal situation several months ago, in Florida, where someone with VoIP had an emergency, their child was desperately ill and, of course, they found out, unfortunately, that they did not have 9-1-1 service, and therefore the tragedy ensued.

Now, with regard to Hurricane Katrina we saw the crippling of the 9-1-1 system. Key centers were either knocked out by the water or they were overloaded with calls and that left citizens with no way to call for help. But backup technology exists today to fix this problem. So I think it's urgent that Congress act to make sure that 9-1-1 calls go through in the case of future emergencies, and that's what Senator Burns' and my legislation addresses. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you. Senator Burns.

STATEMENT OF HON. CONRAD BURNS,
U.S. SENATOR FROM MONTANA

Senator BURNS. Thank you, Mr. Chairman, for having this hearing. I think Senator Nelson makes a valid point. I think as we move—now calls for a time of a little bit of wisdom and less emotion, and also with some policy that has been sort of hanging up and looking for a way to move forward. The transition to DTV and to free up some 700 block spectrum is necessary at this time, and I think as we move with that there comes into the question of Voice over IP, 9-1-1, enhanced 9-1-1. I would hope the President would see fit to go ahead and fund these communication centers so that we can make those systems interoperable, and also 9-1-1 would be the—not only a locator service but also the emergency number across the country. And you're right, the technology is there. The policy has not been changed so that we can move that, and it all hinges, I think, on how we transition to DTV and start dealing with that 700 block spectrum. We need to move on that and come to some sort of a decision and policy to allow—when we talk about people offering video services, or voice services, or data, we don't talk about that any more, we talk about bandwidth. Digital is ones and zeros, and it has taken all kinds of identification away from anything that should move on our wires or wirelessly. And now we've got to understand that. More of us fall in the same rule book now than ever before, and I think with that transition we will talk about that policy and probably come to some sort of a, I would hope, wise decision, set the policies, that knowing all of the stakeholders and what's at stake, to be honest with you. So thank you for this hearing.

The CHAIRMAN. Senator McCain.

STATEMENT OF HON. JOHN MCCAIN,
U.S. SENATOR FROM ARIZONA

Senator MCCAIN. Thank you, Mr. Chairman. I thank you for holding this hearing, and as we discuss how Katrina impacted Louisiana, Alabama, and Mississippi it's important we apply the lessons we learned to the reconstruction effort in New Orleans, and to improve the telecommunication infrastructure of other cities. One lesson that we're learning, and I hope our witnesses today will discuss at greater length, is a need for diversity and redundancy in our telecommunications technologies. One sliver of good that may result from this tragedy is that cities like New Orleans may become proving grounds for new and diverse communications technologies. Another lesson that we first learned four years ago that was highlighted by the 9/11 Commission is that we must provide first responders with the spectrum they need to respond to catastrophic events. Recently, Chairman Keane on CNN said that, "what's frustrating is it's the same thing over again. I mean, how many people have to lose their lives? It's lack of communication, our first responders not being able to talk to each other . . . Basically, it's many of the things that . . . if some of our recommendations had been passed by the United States Congress . . . could have been avoided." That's a very tough indictment from the Co-Chairmen of the 9/11 Commission.

In the last Congress, I introduced legislation to implement this recommendation, it was voted out of the Commerce Committee, and it saw no further action. I then added provisions and amendments to the intelligence reform bill last fall to provide this spectrum to first responders. Unfortunately, this language was taken out in conference and replaced with a, quote, sense of the Congress that such legislation should be voted out during the first session of the 109th Congress. This session I reintroduced the legislation to provide spectrum to first responders, still Congress has yet to act this year despite its stated intention to do so before the current session ends. We're 10 months into this first session, and it has almost been a month since Hurricane Katrina, but the Senate has yet to take up any legislating providing first responders their spectrum. I urge us to take up the Save Lives Act as soon as possible so we can begin the process of giving our first responders the essential tools to respond to national catastrophes. I thank you, Mr. Chairman, for holding this hearing—it's very important—and I thank our witnesses including Chairman Martin. I thank you, Mr. Chairman.

The CHAIRMAN. Senator Sununu.

STATEMENT OF HON. JOHN E. SUNUNU,
U.S. SENATOR FROM NEW HAMPSHIRE

Senator SUNUNU. Thank you, Mr. Chairman. While this hearing is going to cover I think a broad swath of emergency-related communication issues like spectrum, I'm particularly interested in the current issues around IP voice. Voice over IP has a great story to tell. I think coming out of New Orleans we see that the story is even stronger when it's the only reliable source of connection avail-

able to the President of the United States, people ought to sit up and take notice. I think it's particularly timely because we have a FCC ruling that obviously puts down a hard requirement on IP voice, and their compliance with emergency calling obligations. My concern is that, given all the talk about flexibility and innovation, if we start imposing hard requirements in a heavy-handed way we risk either discouraging innovation and investment in this particular area, or ending up without the diversity that everyone says they're so interested in. There's no question that IP systems generally are very robust, have unique features that allow them to respond to certain kinds of disruptions in networks and in service, and that's one of the reasons that communication was able to take place in New Orleans through an IP voice system. There was a reasonably well-written article in *The Wall Street Journal* about this very point and, Mr. Chairman, I would like unanimous consent that we include that in the record.

[The information referred to follows:]

The Wall Street Journal, September 9, 2005

CUT OFF: AT CENTER OF CRISIS, CITY OFFICIALS FACED STRUGGLE TO KEEP IN TOUCH; MAYOR'S INNER-CIRCLE SPENT TWO DAYS IN THE DARK; WEB PHONE BECAME LIFELINE; POLICE CHIEF RIPS A SERVER FREE

by Christopher Rhoads

NEW ORLEANS—For days after Hurricane Katrina's devastating rampage through this city, a small corps of city leaders holed up at the Hyatt Hotel. They had virtually no way to communicate with the outside world.

A command center set up before the storm stopped working when the backup generator ran out of diesel fuel. Cellphone towers had been knocked out by high winds. Many land lines in the area were unusable.

When emergency power finally returned to the Hyatt, Scott Domke, a member of the city's technology team, remembered that he had recently set up an Internet phone account with Vonage Holdings Corp. He was able to find a working socket in a conference room and linked his laptop to an Internet connection.

At 12:27 a.m. on Wednesday, Aug. 31, the mayor's inner circle made its first outside call in two days. Eventually, the team was able to get eight lines running from the single Vonage account. That evening, the phone rang and it was President Bush calling from Air Force One.

During the first days of Katrina, the besieged mayor's office struggled to stay connected. It was forced to rely on ingenuity and extreme methods, including breaking in to an Office Depot—as the chief of police stood watch and chased away unofficial looters—to obtain necessary equipment. The Hyatt group would eventually be forced to move to a higher floor as a gang intent on breaking into its stockpile of food assaulted the hotel.

The tragedy has revealed many ways that the city was unprepared for the storm, flood and chaos that followed, and its communications system was no exception. Greg Meffert, the city's chief technology officer, says that the New Orleans emergency communication plan relied heavily on basic phone service remaining intact. Cellphone backups also failed, and the few older model satellite phones lost battery power and couldn't be recharged. But under duress, Mr. Meffert and his three-member team also found creative ways to cope with the disaster.

Hurricane conditions first hit the city on Saturday, Aug. 27. Mr. Meffert—whose hats include deputy mayor, the mayor's right-hand man and CTO—and several of his team and their families had decided the Hyatt, which is a couple of blocks from City Hall, was the best place to hunker down and establish communications for the storm. The hotel was better served with power and food than the city command post. With the mayor and some other officials, including the chief of police, they moved into some conference rooms on the fourth floor and figured they'd be in the hotel for a couple of nights at the most.

Over the next two days, what remained of the city government that had not evacuated before the storm—a core group of about 15 people—steadily descended into information darkness.

By the time the eye of Katrina made landfall that Monday morning, the group had already suffered more than 24 hours of hurricane-force winds, including a tornado that ripped off part of one side of the hotel.

"When the tornado rolled over us, you could hear a weird rumbling sound," recalled the 40-year-old Mr. Meffert this week, sitting unshaven behind his desk in City Hall in khaki shorts, a black T-shirt and white tennis sneakers. Army Rangers and other troops ran through the still submerged streets below his window. "You could hear the windows popping out like gunshots," he said.

Mr. Meffert says phone service went out at the Hyatt because of power failures and water damage to the hotel's main switch. After that, the Hyatt team's only available means of communication were police radios. But those were operating at a fraction of capacity because the generator serving the main transmission site broke down. Sometimes dozens of officers were trying to use one channel.

For the most part, city officials relied on "human chains of communication," he says. "It was like: 'Go tell so-and-so if you see them.'"

The team slept on floors and tables in the sweaty conference rooms. Then they figured the worst was over and that communications—and normality—would soon return.

Instead, the opposite happened.

On Tuesday, the levee at the 17th Street Canal broke, and water poured into the city, raising the water level by a foot or more every 20 minutes, Mr. Meffert estimates. Within hours, nearby streets were submerged in more than 12 feet of water. Water quickly engulfed the Hyatt and surrounding government buildings. Mr. Meffert and his team spent most of this day helping with rescue efforts, mostly from boats. "We were just pulling [people] from the water," he says.

Mr. Meffert evacuated his wife and two young boys to his parents' home in San Antonio. The evacuation party included the pregnant wife of the chief of police.

That evening Mr. Meffert realized things would get worse unless communications were restored, immediately.

That's when Mr. Domke had his brainstorm. For the next five days, virtually all communications out of New Orleans by the city's top officials depended on Mr. Domke's laptop and this single Internet phone account.

Mr. Meffert, a software entrepreneur before he joined the mayor's office in 2002, realized he needed more lines and more phones to cope with a rapidly deteriorating situation. Before dawn on Wednesday, Messrs. Meffert and Domke and some other aides drove a military Humvee into the darkness and devastation. They were accompanied by the chief of police, Eddie Compass.

Their destination was Office Depot, where they loaded up on phones, routers, printers and fax machines—anything that was needed to support a government under siege by weather and crime. The store had already been looted of some supplies. While Mr. Meffert was looking for printer cartridges, several looters returned. Mr. Compass, the police chief, roared at the looters and chased them off, says Mr. Meffert.

Mr. Meffert told the chief he needed a large computer server for e-mail. They found the one used by Office Depot in its backroom.

"Do you really need this?" Mr. Meffert says the police chief asked him.

"Yes, we do," Mr. Meffert says he replied.

The server was screwed into an equipment rack in the backroom. Without the use of tools, the chief bent parts of the metal rack and ripped the server out of its housing with his hands, Mr. Meffert says, adding: "I have never seen that before."

The team was sleeping and working out of a single conference room, called Burgundy D. There were enough cots for five people. Another half-dozen slept on the floor. In one corner, phones, routers, cables and other gear lay in a pile. Dirty blankets and clothes were scattered about.

On Wednesday evening, when Mr. Meffert was manning the phones, one rang. On the other end was President Bush in Air Force One. Mr. Meffert, now wearing the hat of secretary, scribbled down the number and sent someone to find Mayor Ray Nagin.

The mayor later recounted his conversation with the president in an interview with WWL–AM on Thursday. "I told him we had an incredible crisis here and that his flying over in Air Force One does not do it justice," the mayor said.

Later in the interview, conducted over the single Hyatt link, the mayor blasted the response to date. "I need reinforcements, I need troops, man. I need 500 buses, man," he said.

On Thursday morning, Mr. Meffert's team got word that 200 gang members were moving on the Hyatt, apparently aware that it still had food, drink and power. To signify that they were in the gang, members had made a distinguishing rip in their

shirts, says Mr. Meffert. An elevated walkway from the Superdome connects to a shopping arcade, which in turn connects to the Hyatt.

Around 10 o'clock that morning, the team evacuated its fourth-floor command post for the 27th floor. The only equipment it brought along was a handful of cordless phones, which had a range of 300 feet. On the 27th floor, where the mayor was staying, the phones worked only if the user hung over the balcony toward the atrium inside the building.

"This was when the last parts of the government were about to come undone," says Mr. Meffert. "It felt like the Alamo—we were surrounded and had only short bursts of communication."

With Police Chief Compass and other officers blocking the entrance, looters were not able to enter the Hyatt, Mr. Meffert says.

At the same time, water continued to rise around the building. Mr. Domke and Jimmy Goodson, an aide in charge of security for the team, realized that the electronics for the hotel—upon which the single communication link depended—were on the ground floor, perilously close to the rising water. They dispatched members of their group to throw sandbags around the electronics room. The water reached within three inches of the room but never damaged the electronics, Mr. Meffert says.

New Orleans had an emergency communications plan, but it had serious flaws. The back-up communications of the city's Office of Emergency Preparedness consisted of a few older-model satellite phones, but their batteries went dead and couldn't be recharged, Mr. Meffert says.

In the early stages of the storm, the city's emergency command office, on the ninth floor of city hall, got power from an emergency diesel generator. But by the time the hurricane passed, it had burned up about one third of its fuel. Fuel soon ran out completely and couldn't be replenished.

Meantime, the commercial phone systems that the city relied on blinked out during the storm and its immediate aftermath, according to Mr. Meffert. Land lines went dead in part because of switch and power failures, and city-issued cellphones stopped working after towers were blown down, he says. BellSouth Corp. says that its nearby telecom hub was operative throughout the crisis.

Mr. Meffert says the satellite phones were used in the early stages, but their batteries soon were drained. He tried to recharge one phone, but it wouldn't keep the charge, he says. "It kept flashing 'low bat,'" he recalls.

Mr. Meffert says that the city was unable to spend more on emergency communications because of a budget crisis and cuts in federal aid. But he doubts that additional money would have helped much. "Virtually no city could have ever prepared for something of this magnitude," he says.

When Mr. Meffert arrived at the mayor's office in 2002, budgets were calculated on cheap calculators, he says. Out of 70 major cities in the U.S., the New Orleans municipal website was ranked dead last that year in a quality survey.

This past year, Mr. Meffert's team constructed an innovative surveillance bubble over the city consisting of cameras, wireless Internet and software in an attempt to lower the city's record murder rate. Though controversial with civil-rights groups, the system has nearly halved crime in the 20 percent of the city where it operates, says Mr. Meffert. He distributed BlackBerrys among senior ranks in the government, devices that proved invaluable in this crisis once e-mail resumed working late last week.

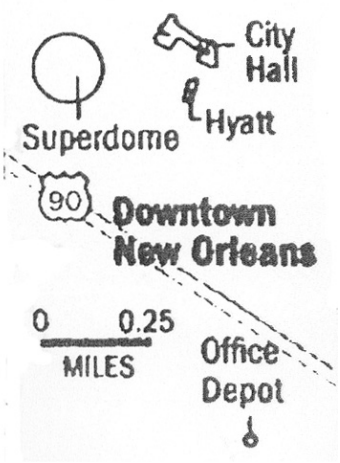
In the middle of the chaos several days ago, Mr. Meffert was notified that the city's website now ranks No. 1 of those 70 major U.S. cities. The site stayed up throughout the storm because Mr. Domke was able to shift it to a Dallas server.

Toward the end of last week, the "cavalry" began arriving, says Mr. Meffert, in the form of several thousand walkie-talkie phones provided by Sprint Nextel Corp. The phones operate directly between users within short distances, so they do not require cell towers to transmit.

At the same time, a team from computer supplier Unisys Corp. arrived, led by an ex-Army Ranger named Ed Minyard. In addition to providing equipment to begin constructing a wireless network in the Hyatt and City Hall, Mr. Minyard brought some other supplies: bottles of Wild Turkey whiskey.

"We had the necessary provisions," says Mr. Minyard. "These boys needed it."

Peter Grant in New York contributed to this article.



Call Waiting

- Sat., Aug. 27: City officials move into the Hyatt Hotel.
- Aug. 28: Cell towers go down, power goes out. Many land-lines weren't usable. At 10 p.m., the Hyatt group loses all communications.
- Aug. 29: Katrina makes landfall.
- Aug. 30: After a levee breaks, water engulfs the Hyatt and some government buildings.
- Aug. 31: City officials make first outside call in more than two days at 12:27 a.m. Top government communications depend on an Internet phone account.

Source: Interviews with New Orleans city officials.

Senator SUNUNU. As things sit right now we have an FCC order that on September 28, IP voice customers are going to be cut off from their providers if they don't fully acknowledge a notification from their providers, and while the intent of this is naturally to make sure that customers have access to emergency service, I think most people exercising common sense would agree there are also safety risks and personal risks associated with someone being cut off from their voice or any other communications provider. We all understand the way the world works and consumers work, they may not be aware of the issues associated with this ruling, and their safety may be in much greater jeopardy having suddenly lost their service than their safety would ever be improved by having access to emergency service. We all want people to have access to emergency calling service, but one of the great values of IP technology and wireless technology, more broadly, is that it can communicate with people when they are on the move, on the go, and that has a inherent value to their safety and security, regardless of whether or not their provider knows their location 24 hours a day. The fact that you can call from remote locations, in and of itself, provides a great enhancement to safety. These are the issues that we need to balance in making any new rulings about E–911. I know the Chairman is fully aware of these concerns and I'm sure Chairman Martin is fully able to address his thinking on the ruling, but I want to emphasize that we need to be very cautious. I think we need to consider allowing a good deal more flexibility in

implementing emergency services, so that in the long run we have the kind of flexibility, diversity, and innovation the industry deserves. Thank you, Mr. Chairman.

The CHAIRMAN. Ben Nelson.

STATEMENT OF HON. E. BENJAMIN NELSON, U.S. SENATOR FROM NEBRASKA

Senator BEN NELSON. Thank you, Mr. Chairman. And I want to thank all the witnesses from the panels who are going to be here today. I'm going to be brief. Clearly the devastation of Hurricane Katrina has given us a very clear picture of those things that perhaps went right, and those things that didn't go right, and those lessons that we can learn are going to be critical not so much to deal with the past hurricanes, or even the current hurricane, because of the time factor, but for the future and for the future of any other kind of disaster, manmade or natural, we need to know the lessons that we're learning and how to put them in place.

I hope this hearing, for example, will shed some light on what measures of what were taken to mitigate the damage from the disaster that worked, as well as what we should be focusing on in preparation for future disasters. No one should believe that everything went wrong, and no one should believe that there aren't changes that could be made, but what we must hear from the witnesses today and others, is what we need to do to facilitate without frustrating technology, capability as well as the willingness of the industry to be able to take care of its own needs so that communication can occur before, during, and after any kind of natural disaster.

So I thank you very much, Mr. Chairman, and look forward to the testimony today. Thank you.

The CHAIRMAN. Thank you very much. For the Committee's information our DTV bill will provide spectrum to first responders as soon as the broadcasters move. It's intended that they will get 24 MHz. We'll mark that up in October in compliance with the reconciliation instructions the Committee has received from the Budget Committee, and the budget committee will mark it up on October 25. It is our intention that all communications will provide E–911, including VoIP, and we will provide the authority that the FCC needs to carry out, I believe, that desire.

Chairman Martin, for myself I'll tell you we're very proud of what you're doing. I think you've demonstrated tremendous leadership during this disaster period with your emergency orders which we—I don't think any of us have any criticism at all of what you've done. We urge you to let us know if there's any further authority you need. We'd be pleased to provide you whatever you think you need, but we thank you also for coming this morning. We're pleased to hear your statement now.

STATEMENT OF HON. KEVIN J. MARTIN, CHAIRMAN, FEDERAL COMMUNICATIONS COMMISSION

Mr. MARTIN. Well, thank you, Chairman Stevens, for that personal note of support for the Commission's efforts. I appreciate that.

Good morning, Chairman Stevens, Co-Chairman Inouye, and members of the Committee. I appreciate the opportunity to be with you today. As we all know Hurricane Katrina devastated the Gulf Coast. People lost their homes, their businesses, and even their lives. Our hearts go out to all the survivors who are now struggling to put their lives back together.

My statement focuses on the effects of the hurricane on the Nation's communications infrastructure. First, I will briefly discuss the immediate impact on communications services in the area and provide a status report. Second, I will describe the steps the Federal Communications Commission has taken to facilitate the restoration of service and to provide support for evacuees. And, finally, I will offer some initial lessons learned from this terrible tragedy.

The destruction of the facilities of the communications companies in the region and, therefore, the services upon which citizens rely, was extraordinary. Almost three million customer telephone lines were knocked down in the Louisiana, Mississippi, and Alabama areas.

As you can see on this first chart the most significant damage was in the region colored red. The next most hard-hit area, colored yellow, reached out more than a 100 miles from where this storm first landed. And even the area in green above that sustained moderate damage. As you can see from this, just the size of the area demonstrates how far-reaching Katrina's impact was. In addition 38 9-1-1 call centers also went down.

As you can see in this chart the area in blue reflects the extensive areas and locations where Hurricane Katrina knocked out 9-1-1 call centers, and the area in red indicates where the call centers remain out today, almost all of those in the New Orleans area. In addition to the wireline issues, facilities with damaged local wireless networks also sustained considerable damage, with more than 1,000 cell sites out of service.

As you can see in this next chart, over 20 million telephone calls did not go through the day after the hurricane. The number of failed calls peaked that day, and then slowly decreased daily as service began to be restored. We also estimate that approximately 100 broadcast stations were knocked off-the-air.

This chart follows the outages and the restoration of radio stations. You can see that the percent of radio stations on-the-air in the Gulf Coast region fell to just over 20 percent on the day after the hurricane, and since then stations have been coming back on-the-air each day. And, finally, hundreds of thousands of cable customers also lost service. Now, as a result of these service outages it was extremely difficult for hundreds of thousands of people to receive news and emergency information and communicate with their loved ones. Emergency workers and public officials had difficulty coordinating, and it is at times like these that we are reminded of the importance of being able to communicate.

Fortunately, the work to restore communication service began almost immediately, and while considerable work remains to be done, the companies in the region have made meaningful progress. They have overcome significant obstacles, including flooding, lack of power, and dwindling fuel resources for generators.

Now, to the best of our knowledge, here is the current status. This chart demonstrates the spike in the number of customers who were out of service which, again, fell precipitously about a week after the hurricane. Approximately 2.5 million customer lines have been restored leaving a little over 300 thousand customers still out of service.

The 35 9-1-1 centers have also been restored, but again three in Louisiana remain out of service. And as you can see in this chart the sustained damage kept many call centers out of operation for almost nine days. All wireless switching centers in the affected area are now operational, and over 1000 cell sites have been restored.

And as you can see in this chart where out of service sites are marked in red, approximately 600 sites still out of service are concentrated within the surrounding New Orleans area. The size of the graph indicates the size of each individual market, and the purple color slices indicate where cell sites were knocked out of service but have come back into operation. You can also see that cell sites were actually knocked out as far North as Hattiesburg.

And, finally, as this next chart shows, almost 70 percent of the TV stations in the affected area were knocked off-the-air the day after the hurricane. Since then, TV stations have been coming back on-the-air slowly and today only four remain off-the-air.

Now, fortunately, satellite service providers did not experience damage to their infrastructure. They have helped bridge some of the gaps left by these other outages. They have provided satellite phones and video links to law enforcement officials, medical personnel, emergency relief personnel, and news outlets.

The Commission has devoted significant time and resources to enable first responders to communicate, and to help facilitate companies' ability to quickly restore services in the region. We have granted over 70 special temporary authority requests and more than a 100 temporary frequency authorizations. For example, we allowed law enforcement authorities to use an ultra-wideband imaging system to locate hurricane victims underneath the rubble. The Commission waived numerous rules to enable telephone companies to reroute traffic, disconnect and reconnect lines, and switch long-distance providers so the consumer's phone calls could still get through. And from the beginning the Commission has reached out to impacted industries, often numerous times a day, to identify their needs to pass information along to the Federal Emergency Management Agency and the National Communication System.

And, finally, we have facilitated disaster relief efforts and fundraising efforts, for example, by temporarily reassigning the toll free 800 number, 1–800–RED–CROSS, to the American Red Cross. And last week I also announced my intention for the Commission to take three additional actions, in an effort to continue to provide immediate relief to consumers and businesses and to enhance the Commission's planning and response efforts.

First, I proposed to provide $211 million in Universal Service funding to the disaster area. For all people eligible for FEMA disaster assistance, we'll provide support for wireless handsets in a package of 300 free minutes. We will also allow public and nonprofit healthcare providers, including the American Red Cross shel-

ters, to apply for support of their telecommunications needs. We will use the E-Rate Program to help reconnect schools and libraries throughout the region, and we will allow carriers to use the High Cost Program to prioritize rebuilding facilities damaged by the hurricane.

Second, I am also establishing an independent expert panel composed of public safety and communications industry representatives that will be charged with reviewing the impact of Hurricane Katrina on the communications infrastructure in the affected area.

And, third, I announced my intention to create a new Public Safety/Homeland Security Bureau that will develop policies and rules to promote effective and reliable communications for public safety, national security, and disaster management.

While there is still much work for the Commission to do to facilitate the restoration of services in the Gulf Coast, I think it is important that we take the time to learn from this tragedy. We need to assess what worked, what did not, and what the Commission should do now to make our communications networks more robust.

And I have three initial suggestions. First, we should ensure that the public has the tools necessary to know when an emergency is coming and to contact first responders. This should involve three steps. We should have a comprehensive alert system that allows officials at the national, State, and local levels to reach affected citizens in the most effective and efficient manner possible. It should incorporate the Internet, which was designed by the military for its robust network redundancy functionalities and other advances in technology, so that officials can reach large numbers of people simultaneously through different communications media.

We also need to ensure that providers comply with our 9-1-1 rules. The 9-1-1 system is critical to our Nation's ability to respond to a host of crises. The obligation to provide access to emergency operators should not be optional for any service provider regardless of whether that provider is wireless, wireline, cable, or VoIP.

We also should ensure that Public Safety Answering Points are redundant. Hurricane Katrina severed communication links to multiple PSAPs, the key facilities that handle those local emergency and first responder calls. Going forward, we need to establish redundant routing that will help create a more resilient network to aid public safety.

Second, I suggest we enable first responders to communicate seamlessly. First responders need an interoperable mobile wireless communication system that can be rapidly deployed anywhere in the country. Such a system must have two essential features.

First, the system must be interoperable. It must allow different organizations from different jurisdictions to communicate with each other immediately through both voice and data transmissions. This requires that there be sufficient spectrum devoted to these purposes. It also requires that first responders have equipment capable of operating on multiple frequencies in multiple formats so that different systems can connect with each other. Properly implemented, a system with adequate spectrum and smart radios would help to ensure that both data and voice are transmitted between agencies instantly, replacing multiple lengthy phone calls to multiple agencies.

Second, the system must be capable of rapid deployment and restoration. This requires the use of multiple flexible technologies and a truly mobile infrastructure. If we learned anything from Hurricane Katrina it is that we cannot rely solely on terrestrial communications. When radio towers are knocked down, satellite communications may be the most effective means of communicating. Additionally, mobile antennas should be used to establish communications quickly. Smart radios can enable first responders to find available towers or infrastructure on multiple frequencies. WiFi or spread spectrum technologies and other frequency hopping techniques can enable them to use limited spectrum quickly and efficiently. A system taking advantage of such measures would be capable of truly rapid deployment.

My third suggestion is to enhance network resiliency. We should ensure that all communication providers develop and adhere to the best practices to ensure reliability in the event of a disaster and quick restoration of services and facilities in the event of a service disruption. We also should take full advantage of IP-based technologies to enhance the resiliency of traditional communications networks. IP technology provides the dynamic capability to change and reroute telecommunications traffic within the network. In the event of a systems failure within the traditional network, greater use of these technologies will enable service providers to restore service more quickly and to provide the flexibility to initiate service and new locations chosen by the customer.

In conclusion, I look forward to working cooperatively with Members of this Committee, other Senators, the House of Representatives, and my colleagues at the Commission to achieve the goals outlined above. We would appreciate any guidance you may have on these issues. Thank you for the opportunity to testify, and I would be happy to answer any questions you may have.

[The prepared statement of Chairman Martin follows:]

PREPARED STATEMENT OF HON. KEVIN J. MARTIN, CHAIRMAN, FEDERAL COMMUNICATIONS COMMISSION

Introduction

Good morning, Chairman Stevens, Chairman Inouye, and members of the Committee. I appreciate the opportunity to be with you today. As we all know, Hurricane Katrina devastated the Gulf Coast. People lost their homes, their businesses, and even their lives. Our hearts go out to all of the survivors who are now struggling with putting their lives back together.

My statement focuses on the effects of the hurricane on the nation's communications infrastructure. First, I will briefly discuss the immediate impact on communications services in the area and provide a status report on the extent to which services have been restored. Second, I will describe the steps the Federal Communications Commission has taken both to facilitate the restoration of service and to provide support for evacuees. Finally, I will offer some initial lessons learned from this terrible tragedy.

Impact on Communications Infrastructure

The destruction to the facilities of the communications companies in the region, and therefore the services upon which citizens rely, was extraordinary. More than three million customer telephone lines were knocked down in the Louisiana, Mississippi, and Alabama areas. Significant damage was inflicted both on the wireline switching centers that route calls and on the lines used to connect buildings and customers to the network. Thirty-eight 9-1-1 call centers went down. Local wireless networks also sustained considerable damage, with more than one thousand cell sites out of service. Over 20 million telephone calls did not go through the day after the hurricane. While we were not able to contact every station in the immediate

aftermath, we estimate that approximately 100 broadcast stations were knocked off-the-air. Hundreds of thousands of cable customers lost service. As a result, it was extremely difficult for hundreds of thousands of people to receive news and emergency information and to communicate with their loved ones. Emergency workers and public safety officials had difficulty coordinating.

It was at times like these that we were reminded of the importance of being able to communicate. While no communications network could be expected to remain fully operational in the face of a direct hit from a Category 4 or 5 hurricane, that fact was little consolation to the people on the ground.

Fortunately, the work to restore communications services began almost immediately. While considerable problems remain, the companies in the region have made meaningful progress. They have overcome significant obstacles—including flooding, lack of power, dwindling fuel resources for generators, and security—to rebuild, reconnect, and broadcast. Three radio stations in New Orleans continued to operate throughout the storm, and a fourth resumed operations within several hours of losing power. Wireline carriers were able to begin restoring service within 5 days, with significant improvement accomplished within a week. Wireless carriers began to restore service within 2 days and achieved substantial improvement by the first weekend. These extraordinary efforts are being performed by the employees of these companies, many of whom have suffered their own personal losses, yet still continue to work to restore services to all.

To the best of our knowledge, the current status is as follows:

Wireline. Approximately 2,500,000 customer lines have been restored, leaving 301,000 customer lines still out of service (268,000 in Louisiana and 33,000 in Mississippi). Thirty-five 9-1-1 call centers have been restored; three in Louisiana remain out of service.

Wireless. All wireless switching centers in the affected areas are operational. Over one thousand cell sites have been restored. Approximately 600 cell sites continue to be out of service, the majority within New Orleans and other areas of Louisiana. BellSouth has committed its facilities in New Orleans to wireless providers to make restoration of wireless service a priority.

Broadcast. Three television stations have come back on-the-air; four remain off-the-air. Although we cannot determine exactly how many radio stations have been restored, we do know that only 36 stations remain off-the-air.

Cable. We cannot estimate how many customers have had their cable service restored since the hurricane. We do know that approximately 143,000 customers have had their service restored in the last 2 weeks, and that approximately 280,000 remain without service.

Satellite. Fortunately, satellite service providers did not experience damage to their infrastructure. They have helped to bridge some of the gaps left by the outages by providing satellite phones and video links to law enforcement officials, medical personnel, emergency relief personnel, and news outlets. Additionally, direct broadcast satellite providers provided equipment to over 100 shelters so that evacuees can receive critical information—as well as entertainment—from television.

Commission Actions to Support Restoration

The Commission has devoted significant time and resources to enable first responders to communicate and to facilitate companies' ability to quickly restore services in the region. On August 30, the Commission established an internal Task Force to coordinate hurricane response efforts. The Task Force's activities centered around three major goals: (1) Regulatory Relief for Industries; (2) Industry Outreach and Coordination with Other Federal Agencies; and (3) Assistance to consumers and evacuees. Hundreds of FCC employees have been directly involved in these efforts. The Commission stayed open late every day, 7 days a week, for 3 weeks following the hurricane in order to assist consumers, the industries, and other Federal agencies. I am extremely proud of the efforts and dedication of the FCC staff that have helped us in this endeavor.

Summary of Commission Actions

The Commission has taken a number of steps to cut bureaucratic "red tape." Although a thorough discussion of the Commission's actions can be found in the appendix, I will discuss a few here. Almost immediately after the hurricane subsided, the Commission notified all communications providers of expedited treatment for requests of special temporary authority (STA). We have granted over 70 STA requests and more than 100 temporary frequency authorizations for emergency workers, organizations, and companies to provide wireless and broadcast service in the affected areas and shelters around the country. In most cases these requests were granted within 4 hours, with all requests approved within 24 hours. The Commission re-

leased several public notices and quickly adopted orders to provide temporary relief, and we waived numerous rules to enable telephone companies to re-route traffic, disconnect and reconnect lines, and switch long-distance providers so that consumers' phone calls can get through. We have extended filing deadlines, construction requirements, and discontinuance of service rules for wireless licensees in the affected areas.

From the beginning, the Commission has reached out to the impacted industries—often numerous times a day—to identify their needs to pass along to the Federal Emergency Management Agency (FEMA) and the National Communications System (NCS). The Commission provides the critical information about the necessary resources to FEMA and NCS, who are responsible for ensuring that priority needs are met, and we update FEMA and NCS daily on these evolving needs.

In addition, critical information on operational status of communications companies is transmitted on a daily basis to the National Coordinating Center (NCC) for its Situation Reports. The Commission also has been coordinating with the Interagency Coordinating Council on Individuals with Disabilities, organized by the Department of Homeland Security, to ensure that the needs of the disability community are addressed in the coordinated Federal relief efforts.

Finally, the Commission has worked closely with the communications industry to help identify resources for use by disaster response personnel. The Agency both transmits this information to NCC and facilitates industry's communication with other Federal officials. For example, we granted an STA to Time Domain for an ultra-wideband through-the-wall imaging system to help law enforcement authorities locate hurricane victims, and special temporary authority was granted to Intel to set up WiMax broadband communications systems to provide Internet service at Red Cross relief centers.

Consumers in the Gulf Coast, and evacuees to other areas, also need information and assistance, and the Commission has worked to provide that support. We have manned our toll-free consumer line 7 days a week to help individuals get access to critical information about telecommunications and broadcast services in the affected area. Consumers, industry, and other agencies also can access the Commission's special webpage that provides information on all of the Commission's actions, and provide other valuable information. Finally, we have facilitated disaster relief efforts and fundraising efforts by temporarily reassigning the toll free 800–number "1–800–RED–CROSS" to the National Chapter of the American Red Cross, as well as providing temporary waivers to non-commercial radio and TV stations that wish to air Hurricane Katrina fundraising programming.

Proposal for Next Steps

Last week, I announced my intention for the Commission to take three major actions in an effort to continue to provide immediate relief to consumers and businesses, and to enhance the Commission's planning and response efforts.

(1) Provide Over $200 Million of Immediate Relief to the Affected Areas

First, I proposed to provide $211 million in universal service funding to the disaster area. We will work through four existing programs to provide this support. We will use the Low Income Program to help those who have been cutoff to reestablish their lines of communication. For all people eligible for FEMA disaster assistance, we will provide support for wireless handsets and a package of 300 free minutes for evacuees and people still in the affected area without telephone service. For all people eligible for FEMA disaster assistance, we also will provide support to pay the costs of reconnecting consumers to the network as the disaster-struck area is rebuilt.

Through the Rural Health Care Program, we will support those individuals providing emergency healthcare services in the region. We will allow public and nonprofit healthcare providers, including American Red Cross shelters, to apply for support of their telecommunications needs. We will increase discounts from 25 percent to 50 percent for qualified providers in the area. To speed the delivery of support, we will modify the filing window for this Funding Year to allow healthcare providers to submit new or revised applications.

We will use the E-Rate Program to help reconnect schools and libraries throughout the region. We will open a new Funding Year 2005 filing window for schools and libraries affected by the hurricane. We will treat schools and libraries struck by the hurricane at the highest level of priority (90 percent) for Funding Years 2005 and 2006. The Commission can authorize $96 million in E-rate funds for the approximately 600 schools and libraries in Louisiana, Mississippi, and Alabama hit by the hurricane. We will also allow schools and libraries serving evacuees to amend

their Funding Year 2005 applications to account for the unexpected increase in population.

Finally, we will allow carriers to use the High Cost Program to prioritize rebuilding facilities damaged by the hurricane. We will allow telephone companies greater flexibility to use USF support to prioritizing rebuilding wire-centers affected by the hurricane.

(2) Examine Ways To Improve Network Reliability and Public Safety Communications in Times of Crisis

Second, I am establishing an independent expert panel composed of public safety and communications industry representatives that will be charged with reviewing the impact of Hurricane Katrina on the communications infrastructure in the affected area. The panel will make recommendations to the Commission regarding ways to improve disaster preparedness, network reliability, and communication among first responders such as police, fire fighters, and emergency medical personnel.

(3) Create a New FCC Bureau To Better Coordinate Our Planning and Response Efforts When Disaster Strikes

Third, I announced my intention to create a new Public Safety/Homeland Security Bureau. The Bureau will coordinate public safety, national security, and disaster management activities within the FCC. The Bureau will develop policies and rules to promote effective and reliable communications for public safety, national security, and disaster management. It will have responsibility for issues including:

- Public Safety Communications, including 911 centers and first responders
- Priority Emergency Communications
- Alert and Warning of U.S. Citizens
- Continuity of Government Operations
- Disaster Management Coordination (*i.e.,* infrastructure reporting and analysis in times of disaster)
- Disaster Management Outreach
- Communications Infrastructure Protection
- Network Reliability and Interoperability
- Network Security

Lessons Learned

While there is still much work for the Commission to do to facilitate the restoration of services in the Gulf Coast, I think it is important that we take the time to learn from this tragedy in order to improve our ability to serve the public in the event of another disaster. We need to assess what worked, what did not, and what the Commission should do now to make our communications networks more robust in the future. The planned expert panel will be tasked with answering some of these questions, but for now, I have three suggestions.

(1) Ensure That the Public Has the Tools Necessary To Know When an Emergency Is Coming and To Contact First Responders

We should take three steps to help ensure that the public has these critical and life-saving tools. First, we should have a comprehensive alert system that allows officials at the national, State and local levels to reach affected citizens in the most effective and efficient manner possible. It should incorporate the Internet, which was designed by the military for its robust network redundancy functionalities, and other advances in technology so that officials can reach large numbers of people simultaneously through different communications media.

Second, we need to ensure that all providers comply with our 9-1-1 rules. The 911 system is quite literally one of life or death. It is critical to our nation's ability to respond to a host of crises. The Commission has been working hard to minimize the likelihood of situations where users are unable to access it. The obligation to provide access to emergency operators should be not optional for any telephone service provider—regardless of whether that provider is wireless, wireline, cable, or VoIP.

Third, we should ensure that Public Safety Answering Points (PSAPs) are redundant. Hurricane Katrina severed communications links to multiple Public Safety Answering Points (PSAPs), the key facilities that handle local emergency and first responder calls. Going forward, we need to establish a process to work with states and municipalities to improve the redundancy of critical communications links that serve PSAPs. As part of this effort, the Federal Government should take a lead role to facilitate and encourage cooperation among local jurisdictions to address mutual

restoration and redundant routing that will help create a more resilient network to aid public safety first responders.

(2) Enable First Responders To Communicate Seamlessly

First responders need an interoperable, mobile wireless communications system that can be rapidly deployed anywhere in the country. Such a system must have two essential features. First, the system must be interoperable—it must allow different organizations from different jurisdictions to communicate with each other immediately, through both voice and data transmissions. This requires that there be sufficient spectrum devoted to these purposes. And, equally importantly, it requires that first responders have equipment capable of operating on multiple frequencies in multiple formats, so that different systems can connect with each other. So-called "smart radios" are ideally suited to this purpose, as they can intelligently jump to different frequencies and formats as needed to establish communications. Properly implemented, a system with adequate spectrum and smart radios would help to ensure that both data and voice are transmitted between agencies instantly, replacing multiple, lengthy phone calls to multiple agencies.

Second, the system must be capable of rapid deployment and/or restoration. This requires the use of multiple, flexible technologies and truly mobile infrastructure. If we learned anything from Hurricane Katrina, it is that we cannot rely solely on terrestrial communications. When radio towers are knocked down, satellite communications are, in some instances, the most effective means of communicating. At the same time, we should use new technologies so that first responders can take advantage of whatever terrestrial network is available. Smart radios would enable first responders to find any available towers or infrastructure on multiple frequencies, and WiFi, spread spectrum and other frequency hopping techniques would enable them to use limited spectrum quickly and efficiently. Additionally, mobile antennas—for both satellite and terrestrial technology—should be used to establish communications as quickly as possible. This could include inflatable antennas, antennas-on-wheels, or other mobile facilities. A system taking advantage of such measures would be capable of truly rapid deployment.

(3) Enhance Network Resiliency

We should ensure that all communications providers develop and adhere to best practices to ensure reliability in the event of a disaster and quick restoration of service and facilities in the event service is disrupted. These best practices should address, among other things, maintaining service during extended commercial power outages through the use of back-up generators and equipment.

We also should take full advantage of IP-based technologies to enhance the resiliency of traditional communications networks. IP technology provides the dynamic capability to change and reroute telecommunications traffic within the network. In the event of systems failure within the traditional network, greater use of these technologies will enable service providers to restore service more quickly and to provide the flexibility to initiate service at new locations chosen by consumers.

Conclusion

I look forward to working cooperatively with Members of this Committee, other Senators, the House of Representatives, and my colleagues at the Commission to achieve the goals outlined above. We would appreciate any guidance you may have on these issues. Thank you for the opportunity to testify, and I would be happy to answer any questions you may have.

APPENDIX A—FCC HURRICANE KATRINA RELIEF EFFORTS (AS OF SEPTEMBER 21, 2005)

The Commission continues its work to assist consumers, industries and other Federal agencies with Hurricane Katrina relief efforts. Below is a list of FCC actions taken since the start of the disaster. The list is arranged by service with state-specific actions noted separately. Public Notices and other decisions can be viewed on the FCC-established Hurricane Katrina webpage (*http://www.fcc.gov/cgb/katrina/*). The webpage was created on August 31, 2005, in order to centralize and disseminate hurricane related information.

Wireline

General FCC Actions

FCC granted a temporary waiver of a variety of procedural rules relating to the Universal Service Fund to carriers, state commissions, and other program beneficiaries, such as schools and libraries. Accordingly, affected entities in the hurri-

cane-affected areas may postpone filing numerous USF forms, payments, and data, allowing affected parties adequate time to file appropriately (9/21/05).

FCC granted a temporary waiver of Commission rules that require BellSouth and other incumbent LECs to provide advance notice and waiting periods before certain network changes may be implemented to help speed restoration of network services (9/21/05).

FCC granted an STA giving BellSouth temporary authority to provide interLATA (long-distance) services using its internal corporate network in order to relieve its over-burdened separate affiliate, BellSouth Long Distance (9/13/05).

FCC granted a temporary waiver for certain carrier change requirements to allow customers whose long-distance service has been disrupted by Hurricane Katrina to be connected to an operational long-distance provider (9/5/05).

FCC granted a temporary waiver of the FCC's rule for aging residential numbers for customers in the affected areas. Waiver of this rule will allow carriers, upon request, to disconnect temporarily customers' telephone service to avoid billing issues, and reinstate the same number when the service is reconnected for customers in the affected areas (9/4/05).

FCC assisted LaFourche Telephone Company's restoration of long-distance service (9/4–9/5/05).

FCC provided BellSouth with information necessary to port the Mississippi Department of Wildlife's 800 number from Sprint to BellSouth because Sprint's facilities used to provide that number are down (9/4/05).

FCC granted an STA for Verizon to use 4 microwave POPs in Baton Rouge to restore damage due to the hurricane (9/3/05).

FCC granted the emergency request of the American Red Cross for reassignment of the toll free number 1–800–RED–CROSS to help in the disaster relief and coordination effort for the multi-state area affected by the hurricane (9/2/05).

FCC provided authority to NeuStar (the North American Telephone Number Administrator) and other service providers to use local number portability technology to reroute telephone traffic to switches unaffected by the hurricane (9/1/05).

FCC granted a 60-day extension to carriers operating in Louisiana, Mississippi, or Alabama for the filing of Form 477 local competition and broadband data. This extension also applied to carriers that rely on personnel, facilities, or records located in these states (9/1/05).

FCC reached out to VoIP service providers in Alabama, Louisiana, and Mississippi to determine whether adjustments were needed in the filing deadline for VoIP E–911 status report due September 2, 2005 (8/31/05).

Wireless

General FCC Actions

FCC granted an STA to Chevron USA, Inc. to use frequency in the Gov/Non-Gov M941–M944 shared band for the purpose of restoring communications capabilities damaged by Hurricane Katrina (9/15/05).

FCC modified the STA previously granted on 9/2/05 to Verizon for Rivada to allow leasing of spectrum to Ericsson on behalf of Northcom (9/9/05).

FCC granted an STA to the North Carolina Forestry Commission to operate VHF mobile units in the disaster area (9/8/05).

FCC released a Public Notice to list the names and contact information of the FCC-certified frequency coordinators for land mobile radio operations and coordinating bodies for microwave radio operations (9/7/05).

FCC released a Public Notice to ensure that wireless service providers do not improperly disconnect consumers displaced by the hurricane because they are unable to pay their bills (9/7/05).

FCC granted an STA to Florida Power and Light to use 900 MHz frequencies in Louisiana, Mississippi, and Alabama for electric power maintenance and restoration (9/7/05).

FCC granted an STA to Detroit Edison to use VHF and UHF frequencies in hurricane-affected areas (9/7/05).

FCC informed amateur radio operators that they have the authority to make transmissions necessary to meet essential communication needs and facilitate relief actions, and that prior FCC approval is not required (9/1/05).

FCC issued a Public Notice that provides information to wireless licensees in the affected areas about STAs, FCC points of contact for various radio services, rule sections addressing "emergency communications," and the temporary waiver of application filing deadlines (e.g., renewals, construction notifications, discontinuance notices, etc.), construction requirements, and discontinuance of service requirements (9/1/05).

FCC granted STA to BellSouth to use GMRS radios (commercially available walkie talkie-type radios that require licenses) in support of restoration of communications facilities in Florida, Alabama, Louisiana, and Mississippi (8/31/05).

FCC granted an STA to Detroit Edison Company to operate on eleven VHF mobile frequencies in Florida in support of restoration of electrical service to areas affected by Hurricane Katrina (8/31/05).

FCC granted an STA to Ameren, a utility services company licensed in the Industrial Radio Service, to operate outside its licensed area of operation due to hurricane relief (8/31/05).

Louisiana-Specific Actions

FCC granted an STA to Verizon to use 6 microwave paths (18 and 10 GHz) in the New Orleans, LA area to restore communications due to damage from Hurricane Katrina (9/16/05).

FCC granted an STA to Chevron USA, Inc. to use frequency pair 451/456.3125 MHz in Plaquemines County, LA, to replace communications lost in Chevron's Venice offshore loading facilities when Nextel's facilities sustained damage (9/16/05).

FCC granted an STA to the State of Louisiana to use twenty 700 MHz frequency pairs in New Orleans, LA, to replace all first responder's public safety communications (9/16/05). These channels are in addition to those 700 MHz channels authorized under their state license.

FCC modified the STA previously granted on 9/3/05 to Verizon to use 4 microwave POPs in Baton Rouge to restore damage due to the hurricane (9/15/05).

FCC granted an STA to Cingular Wireless LLC to operate on PCS spectrum at two sites located in Columbia and Monroe, LA, to provide critically needed communications services in support of the relief effort from Hurricane Katrina (9/14/05).

FCC granted an STA to BellSouth to operate two microwave paths on 18 GHz microwave and fixed satellite service frequencies as part of emergency radio systems that helped restore BellSouth's telecommunications to the New Orleans area (9/14/05).

FCC granted an STA to Chevron USA, Inc. to use a single base frequency 451.1125 MHz and five mobile frequencies in Plaquemines County, LA, to replace communications lost in Chevron's storage facility when Nextel's facilities sustained damage (9/14/05).

FCC granted an STA to Amoco Production Company to use frequency 153.335 MHz within 40 KM of the Mandelville, LA, area for restoration of petroleum facilities (9/12/05).

FCC granted an STA to the State of New Jersey to operate a repeater and 200 mobiles on 806/851.3375 MHz in New Orleans for law enforcement assistance (9/12/05).

FCC granted an STA to Texas Utilities to operate station WPFM603 in Louisiana (currently operation is limited to Texas only) for restoration of utilities (9/12/05).

FCC granted an STA to Chevron to operate 900 MHz microwave links from the coast at Leeville, LA, and Coden, AL, to offshore platforms in the Gulf of Mexico (9/9/05).

FCC granted an STA to Motorola to use channels licensed to Saint John the Baptist Parish and Jefferson Parish in New Orleans for public safety; the Parishes' systems are not operational due to storm damage, and the Parishes have consented to Motorola's request (9/9/05).

FCC granted an STA to Chemtura Corp. for one base frequency and ten mobile frequencies in the 460–470 MHz band in the Saint Charles County, LA area (9/9/05).

FCC granted an STA to the California Highway Patrol to operate portable and mobile radios in support of other law enforcement and relief agencies in Louisiana (9/6/05).

FCC granted an STA to Duke Energy to operate an 800 MHz system near Tangipahoa Parish in Louisiana (9/6/05).

FCC granted an STA to LifeCom/Air Methods to set up a control center with mobile radio communications in the 460 MHz band in the New Orleans area for disaster relief (9/6/05).

FCC granted an STA to Alltel to operate a 17-watt short range cellular system in direct support of the FEMA Director. The system will operate initially from Baton Rouge and will later be moved to the New Orleans Superdome (9/3/05).

FCC granted an STA to Cingular wireless to operate on microwave frequencies on 6 GHZ microwave frequencies at 21 sites in Louisiana (9/2/05).

As part of a Public Notice in the 800 MHz proceeding initiating "Wave 2" negotiations in the 800 MHz rebanding process, FCC granted a request from the 800 MHz Transition Administrator to move Louisiana from Wave 2, which begins in October

2005, to Wave 3, which begins in January 2006. This will enable public safety entities in Louisiana to focus on immediate public safety needs (9/2/05).

FCC granted Alcatel an equipment authorization for a new digital microwave radio system that will be deployed by Verizon Wireless in Baton Rouge and the southern Louisiana area for transport facilities to replace equipment lost in the hurricane (9/1/05).

Mississippi-Specific Actions

FCC granted an STA to Clearwire to allow operation in BTA 042 (Biloxi-Gulfport-Pascagoula, MS) to permit service in and around Biloxi, MS, and to the Hancock Medical Center in Bay Saint Louis, MS, to provide Internet services and computers for access by victims (9/16/05).

FCC granted an STA to Sea Tow International to use Marine VHF channel 7 in Harrison County, MS, and Marine channel 8 in Hancock County, MS, to provide marine rescue and recovery services (9/14/05).

FCC granted an STA to an amateur radio operator providing communications services to the American Red Cross in Ocean Springs, Mississippi, to operate on High Frequency bands that he could not otherwise use (9/11/05).

FCC granted an STA to the California Highway Patrol to operate portable and mobile radios in support of other law enforcement and relief agencies in Mississippi (9/6/05).

Alabama-Specific Actions

FCC granted an STA to the Marengo County Commission in Demopolis, Alabama, to operate on two VHF public safety frequencies (156.12 and 159.12) for mobiles and base stations within the county (9/8/05).

Tennessee-Specific Actions:

FCC granted an STA to a Red Cross office to use GMRS frequencies to provide security and support in Knoxville, TN (9/7/05).

Broadcast and Cable

FCC Actions

FCC granted an STA for silent authority to WLVV–AM, WLVV, Inc., Mobile, AL (9/15/05).

FCC released a Public Notice to extend retransmission consent/must carry elections in areas affected by Hurricane Katrina (extension from October 1, 2005 to November 15, 2005) (9/14/05).

FCC granted an STA for silent authority to two LPTV stations: W30ID, New Orleans, and W36CU, Gulfport (9/12/05).

FCC granted an emergency authorization to the Houston Independent Media Center for use of a low power FM system on 95.3 MHz, to broadcast emergency information to evacuees housed in the vicinity of the Astrodome, from an area adjacent to the Astrodome (9/11/05).

FCC granted an application from Austin Airwaves to operate stations on 94.9, 95.3, and 99.5 MHz to broadcast emergency information to evacuees inside the Astrodome (9/5/05). As of 9/8/05, Harris County officials have suspended use of these stations within the Astrodome.

FCC released a Public Notice to remind video program distributors of the need to make emergency information regarding Hurricane Katrina evacuation and relief effort accessible to persons with hearing and vision disabilities (9/9/05).

FCC granted an extension for the FCC Cable Horizontal and Vertical Ownership Limits Proceeding Reply Period (9/8/05).

FCC released a Public Notice to extend the Auction No. 84 settlement period for certain mutually exclusive AM auction applications and for the submission of Section 307(b) showings; extension given from September 16, 2005 to October 31, 2005 (9/7/05).

FCC created database to capture information about AM/FM/TV broadcasters impacted by the hurricane (9/4/05).

FCC released a Public Notice waiving certain non-commercial educational (NCE) rules to permit NCE television and radio stations in the New Orleans area to simulcast and rebroadcast commercial station programming (9/2/05).

FCC compiled information regarding the radio and television broadcast operations in Louisiana, Mississippi, and Alabama through direct calls and e-mails to over 150 AM/FM/TV broadcasters in the area; continually updating information and referring needs to other Federal agencies (9/1/05–Present).

FCC granted waivers to the following non-commercial FM and TV stations to permit them to air fundraising programming to aid disaster relief efforts (9/1–present):

- Association of Public Television Stations, for all its member public television stations to permit interruptions in regular programming for fundraising.
- National Public Radio, on behalf of its affiliates, to permit interruptions in regular programming for fundraising for victims and for NPR affiliates directed affected by the hurricane.
- National Federation of Community Broadcasters, on behalf of its 183 member stations, to permit interruptions in regular programming for fundraising.
- KXPW–LP, Georgetown, TX—two week fundraising effort.
- WITF–FM, Harrisburg, PA, for one-minute fundraising spots, from 9/9/05 to 9/30/05.
- WBGO, Newark, NJ, for four-hour benefit concert from Lincoln Center, on 9/17/05.
- Arkansas Educational Television Commission on behalf of its five-station network.
- Greater Cincinnati Television Educational Foundation to permit fundraising by WCET–TV.
- KRFC(FM), Fort Collins, CO to permit the broadcast of an 8-hour benefit concert on 9/3/05.
- Grand Valley State University, Michigan Association of Public Broadcasters, and Michigan Public Radio Network, on behalf of Michigan NCE radio and television stations to permit interruptions in regular programming for fundraising.
- KATB(FM), Anchorage, Alaska, to permit interruptions in regular programming to air pre-produced 30- and 60-second segments supporting the North American Mission Board's Disaster Relief efforts, running from 9/2–9/9/05.
- WACC–LP, Enfield, Connecticut, to promote and air coverage of a fundraising car wash to be held on 9/10; proceeds to be donated to the American Red Cross.
- WRNK–LP, Lanett, Alabama, to make announcements requesting that listeners drop off certain items (bottled water, personal hygiene items, etc., but not cash or other money) from 9/6–9/8/05; donated items will be taken to the New Life Family Church in Biloxi, Mississippi.
- WHCF–FM, Bangor, Maine, to conduct an on-air fundraiser soliciting pledges for Operation Blessing International, a relief agency based in Virginia Beach, Virginia.
- KTIS–FM, Minneapolis, Minnesota, to participate in a fundraising campaign with at least 24 other stations in the market on 9/9/05; funds raised will be given to the Red Cross.
- KULA–LP, Ili'ili, American Samoa, to permit KULA–LP to broadcast a fundraising program to benefit disaster relief efforts on 9/8/05.
- WVUA–FM, Tuscaloosa, Alabama, to permit the station to promote a fundraising concert to be held on 9/9/05; this is a periodic fundraiser for the station—in this instance, 25 percent of the proceeds will be donated to the Red Cross.
- KBCS–FM, Bellevue, Washington, to permit the station to air fundraising requests to help rebuild NCE station WWOZ, New Orleans.
- WETD, Alfred, New York, to permit the station to air a live broadcast of a "Coins for Katrina Benefit Concert" on 9/11/05.

FCC released a Public Notice to help radio and television stations resume and maintain broadcast operations to residents of the affected areas by outlining streamlined instructions to apply for STAs and by waiving requirements that stations notify the FCC within 24 hours of using emergency antennas (8/31/05).

FCC released a Public Notice to assist cable television and other multi-channel video programming distributors in the affected areas by outlining streamlined instructions to apply for STAs to install temporary facilities or modify existing facilities and by waiving certain technical requirements (8/31/05).

Louisiana-Specific Actions

FCC granted an STA for silent authority to WBOK–AM, Christian Broadcasting Corporation, New Orleans, LA (9/15/05).

FCC granted an STA for silent authority to WDSU–TV and WDSU–DT, Hearst-Argyle Television, New Orleans, LA (9/15/05).

FCC granted an STA for silent authority to KMRL–FM, White Dove Fellowship, Buras, LA (9/14/05).

FCC granted an STA for silent authority to WTUL–FM, Tulane Educational Fund, New Orleans, LA (9/14/05).

FCC granted tolling pursuant to Section 73.3598(b)(1) via letter to American Family Association, extending the period to construct KSUL–FM, Port Sulphur, LA, by at least 6 months (9/14/05).

FCC granted 90 additional construction days via letter to Star Over Orlovista, permittee of WEUS(AM), Orlovista, FL (9/14/05).

FCC granted an STA for silent authority to WHNO–TV, CH 20, New Orleans, LA (9/13/05).

FCC sent a letter to Equity Offices, in Louisiana, to expedite entrance by station staff to WUPL–TV facility located in Jefferson Parish, LA (9/13/05).

FCC granted an emergency authorization pursuant to the Salvation Army to operate an emergency FM station on 107.9 MHz to broadcast to residents and recovery workers in New Orleans, LA (9/12/05).

FCC granted an STA for WWOZ(FM), Friends of WWOZ, Inc., New Orleans, LA, to remain silent; station has been silent since August 27, 2005 (9/9/05).

FCC granted an STA for WVUE and WVUE–DT, LA, licensed to Emmis Television, to remain silent (9/8/05).

FCC granted an STA for WWL–DT (WWL's digital station), New Orleans, LA, licensed to Belo Corporation, to remain silent (9/8/05).

FCC granted an STA for WTIX–AM, WTIX, Inc., New Orleans, LA, that ceased operations on August 29, 2005, to remain silent (9/7/05).

FCC granted an STA for WTNO–LP, New Orleans, LA, licensed to Tiger Eye Finance, Inc., to remain silent (9/7/05).

FCC granted an STA for WWNO(FM), New Orleans, LA, to operate from its licensed site with an emergency antenna and reduced power (9/7/05).

FCC granted an STA for stations licensed to American Family Association in Louisiana that ceased operations on August 28, 2005, to remain silent (9/6/05).

FCC granted an STA to WUPL(TV) of Slidell, LA, to remain silent for 60 days (9/1/05).

Mississippi-Specific Actions

FCC expedited grant of program test authority and covering license for major facilities upgrade to WBBN, Taylorsville, MS, providing greatly increased coverage area (9/13/05).

FCC granted an STA to permit Mississippi Public Broadcasting, licensee of NCE station WMAH–TV, Biloxi, MS, to rebroadcast September 11 NFL games of the New Orleans Saints and Green Bay Packers (9/8/05).

FCC granted an STA to Hancock County Emergency Management to operate an emergency FM station on 103.5 MHz to broadcast to the Bay City-Wavelend-Shoreline Park, Mississippi area; we understand this to be the only station operating in the area (9/8/05).

FCC granted an STA for stations licensed to American Family Association in Mississippi that ceased operations on August 28, 2005, to remain silent (9/6/05).

FCC granted an STA for WFMM(FM), Telesouth Communications, Inc., Sumrall, Mississippi, to remain silent after it went silent on 8/29/05 (9/6/05).

Satellite

General FCC Actions

FCC granted Harris the authority to operate twelve temporary-fixed earth stations to transmit voice and data communications between points in the Gulf Coast Region and various agencies in Florida in their disaster relief efforts (9/21/05).

FCC granted an STA to BBC News to use 1.2 Meter temporary-fixed Ku-Band antenna to provide news coverage of the Hurricane Katrina aftermath (9/19/05).

FCC granted an STA to PetroCom for use of a C-Band antenna to restore its digital backhaul operations from the Gulf of Mexico (9/13/05).

FCC granted an STA for Maritime Telecommunications Network to use 5 conventional Ku-Band Earth stations for communications in the area affected by the hurricane (9/10/05).

FCC granted an STA to Viasat to operate conventional Ku-Band VSAT to provide Internet access service to FEMA (9/7/05).

FCC granted an STA to BJ Services to operate conventional Ku-Band VSAT remotes to reinitiate Internet access services lost by Katrina (9/7/05).

FCC granted an STA to ARD German Television to use a suitcase antenna on a German satellite news-gathering truck to provide news coverage (9/5/05).

FCC granted an STA to Maritime Telecommunications Network to operate 5 satellite dishes providing transportable Internet access (9/4/05).

FCC granted an STA to MTN to offer satellite Internet access on 3 government-run cruise ships (9/4/05).

FCC granted an STA to Canada TV to use a transportable satellite news gathering truck (9/3/05).

FCC granted an STA to Iridium to use spectrum owned by Globalstar to increase Iridium's capacity (9/2/05). Iridium has turned on its equipment on this frequency and no interference problems have been reported.

FCC granted an STA to Loral Skynet for authority to use a satellite dish transportable on a Humvee to provide free VoIP and Internet access at the site of the relief efforts (9/2/05).

FCC released a Public Notice to help satellite and submarine cable providers maintain operations to emergency communications services in the affected areas by outlining streamlined instructions to apply for STAs (9/1/05).

FCC granted an STA to Independent Television News to use satellite spectrum to serve a transportable news gathering truck from London in support of hurricane relief (9/1/05).

Louisiana-Specific Actions

FCC granted an STA to VSL Networks to use a Ku-Band antenna to provide service to Motorola in support of the Louisiana state police (9/7/05).

Mississippi-Specific Actions

FCC granted an STA to Telenor Satellite Services to operate one 1.8 meter temporary fixed C-Band antenna to communicate with NSS–7 @ 2.2 W.L. at Camp Barron Point, MS (9/16/05).

FCC granted an STA to permit Telenor Satellite Services to operate a 2.4 meter temporary fixed C-Band antenna on a hospital ship at Bay St. Louis, MS (9/9/05).

Coordination With NTIA

FCC assisted with NTIA's grant of STAs for the U.S. military to use 75 frequencies.

FCC granted an STA to Intel Corporation for operation in the frequency band 3650–3700 MHz to provide wireless services for relief center located at Kelly Air Force Base, Texas (9/8/05).

In coordination with NTIA, FCC granted an STA to Intel Corporation for operation in the frequency band 3485.5–3585.5 MHz to provide wireless services for relief center located at Kelly Air Force Base, Texas (9/8/05).

In coordination with NTIA, FCC granted an STA for Intel to set up a WiMax system in the area from Biloxi and New Orleans to provide Internet connectivity to 225 Red Cross Disaster Centers (9/3/05).

In coordination with NTIA, FCC granted an STA request from Time Dominion for authorization to use high-power ultra-wide band equipment for through-the-wall imaging system operations (9/2/05).

In coordination with NTIA, FCC granted an STA to France Telecom to provide Inmarsat services and to operate Inmarsat terminals in support of hurricane relief (9/1/05). FCC extended STA on 9/8/05.

Appendix B will be retained in Committee files.

The CHAIRMAN. Thank you very much and I would propose we have a five minute limitation. We still have four witnesses on another panel.

Mr. Chairman, would it make any sense for us to authorize you to issue the credentials that repair crews need in advance so they can move immediately in the event of a disaster of this type?

Mr. MARTIN. Well, Mr. Chairman, we certainly try to coordinate with FEMA in getting them to issue those credentials, and I think the Commission being able to play an increased role in that is important, but in the end I think that the FEMA and the emergency personnel that are on the ground are probably going to be the ones that need to issue the credentials. Sir, the Commission could be more involved in that process and try to play a more responsive role, but I do think that emergency management personnel on the ground ultimately have to be the ones that can actually issue those credentials.

The CHAIRMAN. Almost every one of these areas has a disaster plan. Some of them use them, some don't. But the disaster plan itself could provide that you could authorize persons in advance to have such credentials so they can move before FEMA. FEMA will be very busy. I'm not sure we can rely upon them taking the time to issue the credentials to communications crews so we would urge you to talk to FEMA and see if it can't be worked out in advance.

Mr. MARTIN. We certainly may end up considering that. Maybe there's a way to authorize a certain number of personnel in advance to do that.

The CHAIRMAN. I certainly applaud and I think the Committee would applaud your action using the universal service funds in the way you've just outlined. We want to make certain, of course, that those networks are set up as quickly as possible. What is the timeframe? Did you put a limit on the amount of time they can use these monies for universal service for the things you outlined?

Mr. MARTIN. Well, we, for example, allowed some of the schools and libraries to apply for money from the schools and libraries program. They could do that for 2005 and 2006 funding cycles, so we have established some limits but we have recognized it's going to take some time for them to be able utilize those resources.

The CHAIRMAN. Is that Fund robust enough to withstand this disaster and the next one coming?

Mr. MARTIN. We certainly hope so and will do everything we can. I think that the Universal Service Fund has certainly been critical to making sure that everyone in the country is connected. I think that it's traditionally done a very good job of making sure that we can utilize those resources so that everyone can stay connected. I think it will be able to take care of this as well, I hope.

The CHAIRMAN. We've scheduled a hearing on interoperability in disaster areas for next Thursday morning. I wonder, you mentioned a blue ribbon panel commission to examine into the disaster that has taken place already, would you intend to ask that panel to look into the question of legislation in those items that you believe you should have authority for that you don't have now.

Mr. MARTIN. Yes, sir, we'll make sure that will be one of the things they would look into.

The CHAIRMAN. What's the time frame for that report?

Mr. MARTIN. Well, we actually have a report that is due on the interoperability issue and some of the other spectrum needs of public safety that is actually due in December, but I would imagine that we will have this other report which will be due sometime in the early part of next year.

The CHAIRMAN. Well, is our hearing next Thursday premature as far as you're concerned? This legislation is forthcoming now about interoperability.

Mr. MARTIN. I wouldn't comment on whether the Senate would want to do hearings or not, whether that would be premature, but I'm sure that you all would continue to gather the information you need to make the judgments about legislation.

The CHAIRMAN. Thank you very much. Again, I congratulate you for the way you and your colleagues at the Commission have acted during this disaster. We hope you have similar preparation for the one that is coming. Senator Inouye.

Senator INOUYE. Thank you very much. Chairman Stevens brought up this blue ribbon panel that you intend to have appointed. Will this panel differ from the present two panels you have, the Network Reliability Interoperability Council and Media Security and Reliability Council?

Mr. MARTIN. Well, I think it will in that those were looking at more longer-term issues as they relate to making sure the network was more resilient. I think I would want this particular group to look at expressly what happened with Hurricane Katrina. What were some of the deficiencies that occurred, for example, with emergency responders being able to communicate? What are the immediate recommendations as opposed to just longer-term network resiliencies? I'd want them to be examining the flaws that may have occurred down in the Gulf area, and focus particularly on that. I also think it might be important to make sure that public safety were even more involved than they have been in the Network Reliability and Interoperability Council.

Senator INOUYE. Now these two councils adopted so-called voluntary best practices?

Mr. MARTIN. Yes, sir.

Senator INOUYE. Were they effective?

Mr. MARTIN. Well, some of the voluntary best practices about having, for example, backup power from the wireline networks, I think, were effective, but certainly the hurricane demonstrated that, even if you have backup power you still need to have access to fuel and adequate security to be able to get in and establish and service that backup power. And in some instances, for example, in New Orleans they needed to have adequate water to be able to continue to cool the generators that were working. While we did establish best practices for what the backup power requirements might be, I think those are the kind of issues that we need to thoroughly explore. So I think they were effective in setting up some of the parameters, but I think it needs to go further and we need to explore it in more depth.

Senator INOUYE. So this new panel will also be looking at best practices.

Mr. MARTIN. Yes, sir.

Senator INOUYE. Now, will you make them voluntary or would you put some muscle in back of it?

Mr. MARTIN. Well, I think we can see what recommendations come out of the panel for the best practices and whether they would recommend that they become more specific requirements or whether they continue to be voluntary.

Senator INOUYE. Were these best practices implemented during Katrina?

Mr. MARTIN. Well, I think that they were. As I said, I think that, for example, on the wireline network I think that they, many of BellSouth's facilities I think did comply with the their best practices, but I don't think that those best practices had always anticipated some of the problems with security, getting access to fuel, that actually occurred in this instance.

Senator INOUYE. Well, both of us here commend you for your extraordinary leadership during Katrina. Do you believe that the

Commission should have a more prominent role, maybe as a facilitator?

Mr. MARTIN. I certainly think we did everything we could during Hurricane Katrina to act as a facilitator, and I think that the Commission does have both an expertise in the communication infrastructure and extensive contacts with the various companies, and I think that the government should be trying to take full advantage of that. So certainly if we are given the opportunity to have even more of a prominent role as a facilitator we would certainly be able to do that.

Senator INOUYE. Thank you very much.

The CHAIRMAN. Senator Burns.

Senator BURNS. I guess I'm just kind of interested in that report that'll come out in December. I congratulate you on setting up and taking some action and changing some policies with regard to a disaster area. I have no questions other than that. I'm pretty interested in that report though and when it comes out and what your recommendations might be. As we move forward on this—you said that there were 23 call centers that were knocked completely out down there, and how many are back in operation now?

Mr. MARTIN. There were 38 call centers that were actually knocked down and all but three are back in service now.

Senator BURNS. Now, in those call centers did they have mobile units? Did they have a unit that they could move out of their present location to be moved to a place where there's shelter, or was there shelter to be moved to that would be an alternative to usual operating areas?

Mr. MARTIN. I don't think they had anything that was mobile. I don't think there—in some instances there might not have been anything in the immediate area that would have been able to withstand the storm either. But I think that when I talk about redundancy for the 9-1-1 call centers, what we need to do is make sure that the emergency call centers and the Public Safety Answering Points have redundant capabilities so that when the call center goes down they automatically identify what's the closest local 9-1-1 call center so they can automatically reroute that traffic of any that comes in to the call center to whatever local community or the next nearest town that has a call center. And, unfortunately, we didn't have that as a standard protocol for the Public Safety Answering Points, so when the call center went out the calls didn't go anywhere they just dropped right there. Rather than focus on the mobility of the infrastructure, we should make sure that the calls automatically get routed to a different call center going forward.

Senator BURNS. Well, that is probably what concerns most county executives. If you've got an integrated system where that's the call center for fire, police, and first responders the ability for that thing to survive or to be mobile or redirected is very important and we must take that under consideration whenever we pass this bill. Thank you.

Mr. MARTIN. Thank you.

The CHAIRMAN. Senator Bill Nelson.

Senator BILL NELSON. Thank you, Mr. Chairman. Chairman Martin, you've certainly gotten into this issue and I appreciate your

involvement very much. The FCC has stated a few months ago that the Agency lacks the authority to grant 9-1-1 liability protections to the answering centers and the VoIP providers in the same way that you do with regard to wireless and wireline providers. You suggested that Congress would need to take that step, and I certainly agree, and that's why a number of members on this committee have co-sponsored this bill, S. 1063. In addition, I mentioned Senator Burns, it's also Senator Snowe, Senator Kerry, and others not on this Committee. Would that help the situation from your perspective as the FCC Chairman?

Mr. MARTIN. Well, the Commission certainly has done everything it can within its authority today to require that all technologies including Voice over IP comply with the 9-1-1 rule. We did at the time, though, state that the issues related to liability, Congress would need to end up addressing. As I understand it, the bill that both you and Senator Burns have introduced also does address the IP technologies access as a mandated access to some of the underlying telecommunications infrastructure which the Commission doesn't have the authority to do today. So I think that great progress is being made in trying to make sure that Voice over IP technologies are going to be meeting that kind of a 9-1-1 deadline, but I think that everyone should do all we can to make sure of that, so I think any additional help to facilitate that is obviously welcome.

Senator BILL NELSON. One of the things we're hearing from the industry is that they're having trouble without the liability protection of getting insurance, various contracts, and getting capital investment that they need. Now, Congress gave this protection to the wireless and the wireline providers and so we'll see if that is the pleasure of this committee and I certainly hope it will be. Again, I say that, unfortunately, we had a personal experience of this in Deltona, which is north of Orlando, with a family and they got caught because they didn't have E–911 service.

Let me ask you, the FCC has acted in requiring the VoIP E–911 capability, but you directed the VoIP companies to shut off phone service to any customers who haven't acknowledged limitations in their VoIP 9-1-1 service. Well, there have been a bunch of us who have written you about this asking you not to cut off people's VoIP service. This, of course, could affect an awful lot of people nationwide. Can't your agency rethink this requirement especially in light of Hurricane Katrina?

Mr. MARTIN. Well, Senator, we actually have tried to provide some additional flexibility on that in that we've continued to extend that deadline as we've seen the carriers make progress in trying to make sure that all of their customers are notified. And the family that you mentioned from Florida actually was one of the families that came before the Commission and petitioned us and asked us to put in both the requirement that the voice-over IP key providers provide access to 9-1-1 capability and that they inform all their customers about any of the limitations until they meet that requirement. And I think that in some companies we've seen extraordinary progress in making those customer notifications so that we've got some companies that have 100 percent compliance and numerous companies that have gotten over 90 percent compliance,

but there are some that are still straggling in. We actually have a report that's due to the Commission today from all the voice-over IP key providers to give us a status update about where they are on obtaining those requisite notifications from their customers. So we're going to be anxious to take a look and see just how much progress has been made. Like I said, several have made extraordinary progress and I think some are still straggling in.

Senator BILL NELSON. Well, to make my point, has the FCC ever ordered on a wide scale that residential phone service be cut off?

Mr. MARTIN. Not that I'm aware of but I don't think that there has ever been someone marketing to residential customers service as a replacement service for wireline landline service that didn't provide 9-1-1 either, so while we haven't ever ordered the cutting off of retail customer service in the mass market, there also hasn't been an instance in which someone was marketing a replacement service for traditional telephone that was also not capable of providing that 9-1-1 service.

Senator BILL NELSON. Well, obviously, the problems have been brought to the fore, and we'll do our part in trying to solve it. Thank you, Mr. Chairman.

The CHAIRMAN. Senator McCain.

Senator MCCAIN. Thank you, Mr. Chairman. And, again, congratulations, Chairman Martin, on the fine job that you have done. Do you support providing additional spectrum to first responders as recommended by the 9/11 Commission?

Mr. MARTIN. Yes, sir. I think that it's critical that first responders have all the access to the spectrum that they're going to need, and they're going to need some additional spectrum to have the interoperability capability they need.

Senator MCCAIN. And don't you think that the entire spectrum should be turned over rather penalize some broadcasters who happen to be on that spectrum, as opposed to others who are not?

Mr. MARTIN. I think that it's, I think that it is important for the government to figure out a way to get to the end of the digital transition, and I think it'll be easier on consumers in many ways if more of the broadcasters are involved all at the same time, but my focus has been on what's going to be the——

Senator MCCAIN. If you can turn over some why shouldn't you be able to turn over all? I mean, why penalize one group of broadcasters who happen to reside on that first responder spectrum as opposed to others? It seems to me that there's a date certain, although that was emasculated by a provision in the Balanced Budget Act, but all spectrum should be turned over rather than having some turned over and some not. That it would be patently unfair to me.

Mr. MARTIN. Maybe I misspoke. I was saying I think that it would also be more cumbersome or more burdensome on consumers if you didn't have all of the broadcasters trying to make the transition at the same time, so I wasn't in disagreement with you.

Senator MCCAIN. OK. You mentioned that satellite communications and I read satellite communications didn't break down, is that correct?

Mr. MARTIN. That's correct. Satellite communications——

Senator MCCAIN. What's the lesson there? And I only have a few minutes. What's the lesson?

Mr. MARTIN. Well, the lesson is that the satellite capabilities, while they can be more expensive and difficult to establish, they certainly have some additional resiliency because they're not relying on a terrestrial network, so we need to integrate satellite capability into emergency responders.

Senator MCCAIN. So we should certainly consider inclusion of satellite communications as part of the overall solution to our ability to respond to disasters, is that right?

Mr. MARTIN. That's correct.

Senator MCCAIN. Tell us about smart radios, Chairman Martin. You've mentioned in your written statement that smart radios enabled people to jump from one spectrum to another, or one frequency to another. Talk to us a little bit about that.

Mr. MARTIN. Well, smart radios have the ability to re-tune or to tune just like you do a regular radio from different frequencies, so what that would allow is during a time of emergency is, if the fire or the police from other surrounding areas, or even from places far away, might have radios that in their hometown communicate on a certain frequency could come into New Orleans and use any available frequency to continue to communicate. And so if everyone has radios that are smart enough to re-tune themselves then you could say, well, in New Orleans, here's all the spectrum that would be available even if that was a different area of spectrum or different frequencies than what might be available in New York where they——

Senator MCCAIN. So we should definitely encourage that kind of equipment?

Mr. MARTIN. Yes, I think so. And it will allow for both more efficient and more resilient communications for first responders.

Senator MCCAIN. Mr. Citron is going to testify here in a minute that if he could offer this committee any advice on rebuilding communication infrastructure in the Gulf Coast it would be not to favor one facility or provider over another, instead he suggests that we create a climate that fosters deployment of all those technologies. Do you agree with that statement?

Mr. MARTIN. Yes, I do.

Senator MCCAIN. How do we do it?

Mr. MARTIN. Well, I think that the Commission has been attempting to move forward in not favoring any particular technology or any particular service provider, but I think that the—I think that we should continue on with the policy that we've adopted that does that, but I don't think there's any particular——

Senator MCCAIN. How are you progressing so far?

Mr. MARTIN. Well, I think that we are making progress in making sure that other technologies can provide voice communications, not only wireline and traditional telephones but wireless and, for example, the cable companies are being able to take advantage of their infrastructure to provide voice-over IP for voice communications. So I think that we're seeing new technologies all the time that are able to take advantage of that, and I think that's what Mr. Citron is probably meaning although I haven't seen his testimony.

Senator MCCAIN. I think he may also mean that one entity or another should not dominate. In other words, there should be a number of corporations allowed to compete for these facilities. I think he means that as well, or these capabilities.

Mr. MARTIN. Sure. And I think that that's—I think that is important as well.

Senator MCCAIN. If you had one major lesson that we should learn from this disaster as far as communications are concerned, what would that be, Mr. Martin?

Mr. MARTIN. Well, I think that the—I think certainly the public safety interoperability and the importance of being able to re-establish that emergency responder network is the first. I would also say a more comprehensive emergency alert system is the second. And I think you've got to make sure that——

Senator MCCAIN. And whose job is that?

Mr. MARTIN. What's that?

Senator MCCAIN. And whose job is that?

Mr. MARTIN. The emergency alert system?

Senator MCCAIN. Yes.

Mr. MARTIN. The emergency alert system currently, we've got one that applies to broadcast. We also are extending that to other digital mass media, but I think it needs to be more integrated into other new technologies as well. The Commission is asking whether we have the authority to but that's not clear. Other government agencies are looking at it as well, NOAA, for example, and I think that several bills in Congress are asking who should be responsible for that.

Senator MCCAIN. Well, it seems to me, Mr. Chairman, that they should at least—the FCC should at least play a role in developing that capability, and I hope we could perhaps address that to give them that authority if they don't have it. I thank you, Mr. Chairman. I thank you for holding this very important hearing.

The CHAIRMAN. That is our intent. We'll have that hearing next Thursday. Senator Sununu.

Senator SUNUNU. Thank you, Mr. Chairman. I certainly agree with Senator McCain about the value and robustness, the resilience created and offered by satellite phone systems. I think resilient was the word that you used, Chairman Martin. Has the FCC issued an order to require satellite phone providers to comply with 9-1-1 service?

Mr. MARTIN. Well, we have issued an order that requires satellite phone providers to provide a 9-1-1 service. They do it in a slightly different way, trying to recognize they have a different technology and different technical benefits and limitations, but yes we have.

Senator SUNUNU. Why not issue an order similarly recognizing the technological difference then with IP voice providers?

Mr. MARTIN. I think we did, and I think in our order that we did recognize some of those similar limitations with IP technologies and tried to give them some additional advantages. For example, on the wireless side we require that the technology automatically provide location information and we haven't put on those requirements on voice-over IP providers, so I think that our orders thus far have recognized the limitations of those different technologies.

Senator SUNUNU. Do you feel that you've worked effectively with providers and the emergency response community in structuring these orders to take into consideration the concerns of the providers with regard to technology in formulating the rule?

Mr. MARTIN. I do. And I think we've worked very closely with both the providers that are utilizing this technology but also the public safety community, and both of them have come in and obviously not always agreed, but we've worked with both of them.

Senator SUNUNU. You suggest that this kind of a requirement is typical, I guess, that no new system has been rolled out without this requirement, although to the best of my knowledge cell phone wireless providers when their service was first rolled out, were not subjected to this kind of a requirement.

Mr. MARTIN. I think there are two different issues. I mean, I think that one is the difference between basic 9-1-1 connections and enhanced or so-called enhanced 9-1-1 connections. The basic 9-1-1 is just the ability to deliver the call to a public safety official, the Public Safety Answering Point. And the cellular technologies have been required to provide that basic 9-1-1 service since 1996, and all of them have been in compliance since then.

Senator SUNUNU. Since 1996? I appreciate that, although I think the pace with which they've been able to comply with the enhanced services has been slower than many people would like, slower than the providers themselves would like, but even so, 1996, that wasn't when cell phone service, wireless service, was introduced.

Mr. MARTIN. No, it wasn't. It was introduced earlier, and actually it created a problem for the Commission at the time in 1996 that the technology had become so widespread and many of the carriers complained that it made it more difficult to then implement a 9-1-1 service. And the fact that we delayed that requirement made it more difficult to implement later. And in addition to that, at the time, cellular service was not being marketed as a replacement for landline or wireline service, unlike what's occurring with voice-over IP today, where they're telling people to turn off their other phones. At the time cellular technology until the mid-1990s was only being used as a complementary service, and I think that's an important distinction between what's going on with voice-over IP today.

Senator SUNUNU. Technology changes, times change, and I think that's the broad point here. You've got different services, each with different strengths and weaknesses, different qualities of resilience, cell phone service, satellite service, IP service, and I think the lesson is in each case, certainly in previous cases, the Commission has worked to identify or recognize technological capabilities, technological limitations, and to make sure that the orders it puts out do not inhibit, distort, the pace of innovation. We have liability issues that could dissuade a lot of people from making investments in emergency services if they're not addressed, and I just want to underscore the importance of the Commission recognizing that. If we put out too many arbitrary dates, or if we try to force everyone into the exact same position or the exact same approach to emergency services, customers and security and safety is ultimately going to suffer. You said there were 38 9-1-1 centers that went down. Why did those 38 centers go down?

Mr. MARTIN. Many of them were actually destroyed along the Gulf Coast. Even in the Mississippi and Alabama area I saw several—I saw one Public Safety Answering Point that was actually physically destroyed, so they went down because they were physically destroyed.

Senator SUNUNU. I imagine, of course, the ones near the coast but 38, it's a very long geographical pattern, you showed the charts there. I don't imagine that any more than half of those were physically destroyed——

Mr. MARTIN. Oh, no, no, no. There was a wide variety of reasons why.

Chairman SUNUNU.—inoperable. Were they able to switch and transfer calls to senders that were online in order to meet the emergency needs?

Mr. MARTIN. They have the technology available to do that. They didn't have a protocol in place on who to switch it to, and that was what I was talking about in my testimony, when I said that we need to make sure that the PSAPs put in place when their call centers go down where the traffic is supposed to go. Many of the local Public Safety Answering Points hadn't actually told anyone where that traffic would go so it just got dropped. So it's not that the technology wasn't capable, it was actually that they hadn't told it where to be redirected.

Senator SUNUNU. Well, and we can argue about what's technology-related and what isn't. There were obviously inadequacies in the existing system, things we'd like to change and improve in the existing system, which brings us back to the point of different technologies, different approaches. We want to make sure we're encouraging innovation and new ideas to make that overall system more robust and more resilient rather than just say everyone participate in the system as it is and subject everyone's system to the same shortcomings. So there's a value to redundancy, there's a value to different systems, whether it's the satellite systems spoken about by Senator McCain, the IP voice systems, the wireless systems, and the work that the wireless carriers did in being able to put mobile facilities on the site, and we want to make sure that we don't burden everyone with the same weaknesses because if we do so, we're going to create a lot less incentive for innovation. Thank you very much, Mr. Chairman.

The CHAIRMAN. Thank you very much. I do believe there's a capacity problem in some of these automatic adjustments as far as these systems are concerned. The weather bureau has a pilot's cell phone that you can get that's interoperable anywhere in the United States, so I would urge you to take a look at what the weather service has already done. I also want you to know I've just been informed there's a $2.5 billion dollar procurement going on at FEMA for emergency communications equipment, but for some reason or other satellite communications is ineligible for that. I would urge you to talk to FEMA and ask them why. Senator Vitter.

Senator VITTER. Thank you, Mr. Chairman, and I have an opening statement that I'd like to submit for the record.

The CHAIRMAN. Thank you, but I——

Senator VITTER. Sure.

The CHAIRMAN.—failed to recognize the Senator Ben Nelson sitting over there.

Senator BEN NELSON. Thank you, Mr. Chairman. I might be easily missed but I appreciate it very much.

The CHAIRMAN. I think you must not have been there for a while, Senator.

Senator BEN NELSON. I stepped out for a moment.

Chairman Martin, we're looking at another hurricane advancing toward the coast of Texas we believe. Perhaps the latest update will tell us closer in proximity where it's going to hit. Given what you know from the Katrina experience, do you have any knowledge or any ideas or any guesses about what might happen with 9-1-1 centers in that area with all kinds of wireless and landline center or capability or service? Any idea about what might happen with interoperability to give us some idea of what we're facing this weekend?

Mr. MARTIN. Well, many of the issues as it related to interoperability and the emergency personnel to be actually able to communicate when infrastructure has been damaged are hard to predict and I don't think there are any short-term fixes. I think the issues as they relate to making sure local PSAPs, the local 9-1-1 call centers, have identified who they want the traffic to go to if they're down. That's probably something that can be done even before the hurricane strikes.

Senator BEN NELSON. So they are in a position to be able to make decisions like that, and perhaps they've learned from the Katrina experience what steps they might take to protect against being down?

Mr. MARTIN. Yes, and so here at the Commission we'll make sure we try to reach out to those public safety communities along the coastline of the potential area. We've already started reaching out today to some of the communications infrastructure companies, the communication service providers, to try to help them with a contact point, identify what services they have in the area, and make sure that we're trying to get in touch with them before, whereas in Hurricane Katrina, we were actually trying to do that afterwards. So we were trying to reach out to radio stations, TV stations, afterwards. In this case we're trying to reach out to them before to establish lines of communication so it's easier to get an update.

Senator BEN NELSON. What might we expect in other communication service, whether it's wireless or otherwise?

Mr. MARTIN. Well, like I said, it's hard to end up predicting what will end up being the destruction to outside infrastructure. I certainly think that one of the things that was unique about New Orleans was the fact that when the—because of the way it was situated below sea level that even the flooding that occurred, in most instances when a hurricane comes through, while there could be extensive damage, the water retreats, and then you can get communications workers in more easily. During my discussions with both wireless and wireline companies, they talked extensively about the unique aspect of New Orleans in which the water surged in and then stayed, and that really complicated their efforts to restore communications in a way that I don't anticipate it would be exactly the same along the coast of Texas where Hurricane Rita is

supposed to strike. So I think that—I think some of the problems, as it related to Hurricane Katrina and exactly what happened in New Orleans, are somewhat unique. At least that's what I've been told by many of the companies that have been involved in numerous restorations, particularly in Florida last year, for example, where there were several hurricanes that hit, and Andrew previously in South Florida. So they said along the Gulf Coast, while there was significant destruction, that was a relatively normal operation to try to re-establish infrastructure, but New Orleans presented unbelievable problems because they couldn't even get their crews in because of the water and because of the security problems.

Senator BEN NELSON. Now, the CEO of AT&T has called on the FCC to require every communications provider to adopt crisis management plans. Apparently, AT&T has taken on a fairly significant and extensive plan involving emergency vehicles. What are your thoughts about your authority to require that, as well as whether you think that that's a good suggestion or not?

Mr. MARTIN. Well, I certainly think that the Commission would have the authority to require at this time that they have some kind of emergency response plans. I think that one of the things that the Commission should be evaluating is whether the best practices that were voluntary were sufficient in this case or whether we need to have some additional requirements or at least some minimum level of expectation of what the emergency response plan should be. So I think that's actually one of the things that the Commission should address first, is whether or not we need to be having some additional requirements.

Senator BEN NELSON. Well, as things stand at the moment, obviously there are some questions about reliability, redundancy, with respect to communication systems. Do you have any particular thoughts that you would like to share or that you might put together in the form of a rule, regulation, that might cure the questions that exist right now? Answer the questions and cure the concerns that exist right now about redundancy and resiliency, as well as reliability?

Mr. MARTIN. I don't have anything specific at this time, but we certainly are looking at it and I'll try to get back to you as quickly as we can with it.

Senator BEN NELSON. Thank you. Thank you, Mr. Chairman. Thank you.

The CHAIRMAN. Now, Senator Vitter.

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

Senator VITTER. Thank you, Mr. Chairman. I have an opening statement that I'd like to submit for the record.

The CHAIRMAN. Thank you. Yes, It will be.

Senator VITTER. I guess if I could underscore just a few points from it as a person who was on the ground, first, in Baton Rouge and then after the storm in the stricken area, just want to underscore how just complete and total the implosion of communication seemed to be. And when you're right there trying to communicate with people it's very dramatic and I really can't—there's no way I can overstate it because it was pretty stunning to everybody in-

volved how just completely dark the communication side was, not only initially but for some time after that. And I also want to underscore what complications that creates. Obviously, that's a problem coordinating relief and other activity, but it also gives folks in the stricken area an unbelievable sense of isolation, and the feeling that nobody in the outside world is doing anything, even when we're trying, and that is a very real negative impact. And the second thing it does is it puts the sort of normal process of rumors floating around, it puts it through the stratosphere, because all of a sudden there's no ability to get real and accurate information from the ground and so the rumors that begin go through the stratosphere and often make situations worse in terms of inflating concerns and not allowing folks to address the reality. So I just want to underscore that.

I also want to underscore from my opening comments how first responders on the ground just performed heroically in the face of all this, including folks having to physically travel to Baton Rouge and elsewhere to communicate and get pleas for supplies and other things. So I certainly want to salute all of the first responders and local leaders who did that.

[The prepared statement of Senator Vitter follows:]

PREPARED STATEMENT OF HON. DAVID VITTER, U.S. SENATOR FROM LOUISIANA

Mr. Chairman:

I want to thank you for this hearing. Also, I want to thank Chairman Martin and the rest of our witnesses for being here today.

One of the major problems experienced in almost every community after Hurricane Katrina was that they and their leaders were isolated. Communication in most communities was nonexistent because telephone, cellular phones, and other communication systems were so badly damaged.

This lack of communication caused isolation that led to a number of the problems we experienced after the storm, including lawlessness, a lack of basics such as food and water, a slower-paced rescue effort than would have otherwise been possible, and a slow-paced evacuation of medical facilities.

Because of the lack of communication, officials *had to physically travel to Baton Rouge* just to make their needs known and request assistance.

Hurricane Katrina destroyed the communications infrastructure. More than 1,000 cell towers were knocked over. More than three million people on the Gulf Coast lost landline service. Bellsouth reported unprecedented losses of central offices from the storm, with many completely destroyed as never before in a storm. It's still hard to get calls through to Louisiana area codes.

This lack of communication made real recovery extremely difficult. But we had true leaders and heroes who managed to get the job done anyway.

I want to thank the first responders here today for going the extra mile. We saw numerous examples after the storm of police, firemen, and others performing admirably and heroically in terrible conditions.

Sheriff's deputies in St. Bernard were living on a small riverboat so they could continue their vital work. Eight days after the storm most still hadn't seen their homes or talked to their families, but they were committed to keeping St. Bernard safe and putting their duty above their families and property.

We need to learn from this experience and improve the communications infrastructure our first responders rely on.

Also, some broadcasters were great examples of how to work together in a crisis. WWL Radio and other radio stations in New Orleans, including stations that were previously competitors, all banded together to form "The United Broadcasters of New Orleans," pooling resources to stay on-the-air during the crisis. On the TV side, WWL TV moved in with Louisiana Public Broadcasting and continued to stay on-the-air, and WGNO moved in temporarily with WBRZ in Baton Rouge. These broadcasters on their own decided to work together and do what would provide the best information possible, especially important since so many other forms of communications were down.

I'm proposing several solutions to help us recover from this storm and overcome these challenges so we don't have the same problems in future storms. Senator Landrieu and I will be introducing a comprehensive package that includes many ideas to help spur our economy, including investment incentives to help our communications providers reinvest and restore their infrastructure.

I am proposing a Major Disaster Restoration Investment Tax Credit that would give 3 years of additional tax incentives for investment in the impacted areas. This proposal will provide a credit of 20 percent of investment for the first year, 15 percent for the second year, and 10 for the third year. This tax incentive would apply to all restoration investments in the area, but is it is especially important to telecommunications providers whose critical infrastructure was ravaged by Hurricane Katrina.

Also, our Louisiana Recovery Package includes a change in law that will make telecommunications providers eligible for Federal resources to help them in maintaining and restoring communications during a disaster. We all heard horror stories of the lawlessness and unsafe conditions in many areas after the storm. I also heard accounts from Bellsouth about the threatening conditions their repair works had to work in—so threatening that they almost had to pull out of the city in the midst of vital repairs. To help ensure these workers can repair critical infrastructure, this proposal would ensure they can have access to protection, fuel, and other resources that FEMA can provide to government agencies and other forms of critical infrastructure during an emergency.

To build on the plan I will introduce, I look forward to working with this Committee to address a few other concerns. First, we need to look at FCC rules, and find where we can streamline and cut red tape. I know Chairman Martin has been extremely helpful in what he's done so far, under the Commission's current authority, to waive many requirements, and I am thankful for his actions. But, because of the large scale of the rebuild in Southeast Louisiana and the Gulf Coast, we need to take a comprehensive look at where we can streamline to hasten the rebuild of our communications infrastructure. I expect we will need some expedited considerations for siting of cell towers, for example, and I sure we can find plenty of other regulations that need to be examined and modernized so we can facilitate a quick rebuild.

Again, I want to thank you, Mr. Chairman, for having this important hearing, and I want to thank our witnesses. I wish you all the best in the recovery, and I look forward to hearing your views on what we need to do to aid quick recovery and long-term prosperity.

Senator VITTER. A couple of very brief questions. You mentioned satellite communication as pretty reliable through all of this compared to cell and other things. My personal experience with satellite phones was that it was extremely spotty. Was that a function just of those systems not being very developed or robust in that geographic area do you think, or what do you think explains that?

Mr. MARTIN. Well, one of the challenges for satellite communications is that it's very difficult for individual communications devices to communicate all the way back up to a satellite which is one of the reasons why it's oftentimes more expensive and less efficient. One of the things that I think we need to try to end up doing is integrating in satellite capability with the regular terrestrial cellular network. In other words, being able to potentially roll in towers that could put out a wide area of service for regular cell phones to work, but then—as opposed to trying to connect back into the landline infrastructure, which is the way they do it today—use that as a kind of a back-haul through the satellite, just like, for example, many cellular companies do so that your cell phone may still work on a cruise ship, and take advantage of satellite capability integrated in with the cellular infrastructure. And I think that might be a more effective way of making sure that everyone can still have coverage and take care of some of that spotty problem. I think that's one of the things that the Commission and the industry are looking at, is how that could be done more, so that satellite capa-

bility could be integrated as opposed to just being a stand-alone alternative.

Senator VITTER. Right. Well, that's a good segue to my next question, which is just looking at the cell phone universe and capability, what sorts of things are you thinking of there to make that a lot more robust and get it back operating a lot more quickly?

Mr. MARTIN. Well, one of—I think that's probably the primary ones. I mean, one of the benefits of——

Senator VITTER. You mentioned mobile towers coming in.

Mr. MARTIN. Yes. Yes, having—and they did that. Many of the companies brought those in. Many times they were still connecting back into a landline infrastructure which still had lots of damage to it. And there were several of those mobile towers that were rolled in that actually had satellite capability, and so what we really need to do is make sure that some of the mobile equipment that can be rolled in after there has been destruction has the capability to communicate with satellite and other technology that will be more resilient, so that they're not just plugging back into an infrastructure that's already damaged. And I think that's one of the things that I know that several of the companies have talked to me about something they can really do. Cingular, for example, talked to me extensively about that, and they had one satellite antenna that they used in that way in the Gulf region. I think the importance of having more of that capability to be easily deployed is critical.

Senator VITTER. Okay. Thank you, Mr. Chairman.

The CHAIRMAN. Thank you, Senator. Thank you very much, Mr. Chairman. Again we commend you very highly for what you've done and we'll do our best to get you the additional authority you need in some of these areas we've discussed.

Mr. MARTIN. Thank you.

The CHAIRMAN. As a matter of fact, we sent one of the bills over to the leadership clearance right now. We'll do our best to get it to you.

Mr. MARTIN. All right. Thank you.

The CHAIRMAN. Now, if I may, I'd like to call the next panel, Mr. Bill Smith, the Chief Technology Officer for BellSouth from Atlanta, Georgia; Mr. Paul Roth, the Executive Vice-President for External Affairs and Public Relations for Cingular Wireless of Atlanta, Georgia; Jeffrey Citron, Chairman and Chief Executive Officer of Vonage of Edison, New Jersey; and Hossein Eslambolchi, President of AT&T Global Network Technology Services and AT&T Labs from Bedminster, New Jersey.

Gentlemen, we know you're very busy people. We're sorry to keep you waiting. We had some votes at the beginning of the day and had to start our hearing late, but we're very pleased that you have come to give us your points-of-view on the issues that we're considering today. I hate to put limitations on you, but I do hope we can make your statements as short as possible. We intend to put all of your statements in the record completely, but we are very interested in what you have to say so I don't want to cut you off in any way. Let me start with Mr. Smith, if I may, just in the way they appear on our program here today, witness list. Again, Mr. Smith,

you're the Chief Technology Officer for BellSouth in Atlanta, Georgia. We thank you for coming.

STATEMENT OF WILLIAM L. SMITH,
CHIEF TECHNOLOGY OFFICER, BELLSOUTH

Mr. SMITH. Well, thank you, Mr. Chairman. My name is Bill Smith, I'm Chief Technology Officer of BellSouth, and the purpose of my testimony today is to describe the impact of Hurricane Katrina on our employees, our network, and our customers.

First of all, I'm delighted to say that we've located all of our 6,500 employees in the impacted area. In the days and weeks following Katrina's landfall, we actually set up six tent cities where our employees and families could get food, shelter, medical care, and financial assistance, and we served over 8,000 meals daily in those facilities.

Now, I'd like to summarize the preparation and the impact on our network. Given the area that we serve, BellSouth has a great deal of experience with hurricanes and we're proud of the resiliency of our network. Based in large part on the experience that we've gained from past hurricanes, we had located most of our critical switching equipment on upper floors of buildings in the New Orleans area, and this planning helped us reduce our restoration time from months to weeks. As of this morning, we have approximately 200,000 of the original almost 2.5 million lines that remain impacted. Much of that original impact was due to loss of commercial power. Many of our 578 central offices in those areas were running on batteries supported by generators, and as Chairman Martin mentioned, the prolonged flooding and unprecedented security issues resulted in our generator power being lost at several central offices due to our inability to get fuel into them. We are in the process of restoring service to all of those offices at this time.

We've also been very focused on the wireless industry and its network restoration efforts. These carriers have actually provided input to us on priorities for restoration, and I think it's important to note that in this new and dynamic age of alternative technologies such as wireless and voice-over IP, those also use the traditional wireline network. So when you hear stories about the use of voice-over IP during this hurricane, keep in mind that there was some underlying network that that service was actually riding on.

The significant progress that we've made to date is oftentimes the result of tireless and heroic efforts of our employees who've been working around the clock to restore service. I wish I could share more and more details with you, but I think the building at 840 Poydras Street in New Orleans which houses our main central office and is a major telecommunications hub is a great example of what they faced. Our employees there had an ordeal that was more like what you would expect a combat soldier to face than that of a telecommunications professional. Nevertheless, with the assistance of the Louisiana State Police, U.S. Marshals, and the FBI, they made sure that this key facility remained operational throughout and is today. Furthermore, many of the people that are assisting in this restoration have lost everything, including their homes, and some of them and their families have been living in our tent

cities yet they continue to spend their days and their priorities on restoring service to their fellow-citizens.

So what has happened and what could we do? I think the cooperation and assistance from local and State authorities and Federal agencies has been great. The FCC has been extraordinarily helpful in what they've done. As we continue to restore service to the area, we think several things are critical.

First, is safe access to our facilities for our technicians.

Second, flexibility and patience as we assess these areas and work with local communities to rebuild.

And, finally, we believe the recognition that the cost for us to restore this infrastructure will be significant. We estimate it to be between $400 and $600 million, and we believe that legislative incentives such as tax credits would be very helpful.

Finally, I'd like to close with some lessons learned so far. First, we believe that both network providers and their customers are more and more dependent on commercial power. This ranges from fiberoptic systems and networks to phone systems in hotel rooms to cordless phones in consumer's homes.

Second, the communications industry and government bodies need to plan together to establish in advance, as Chairman Martin mentioned, alternate plans for routing E–911 traffic in the event of a catastrophe. We also believe that Katrina highlighted the critical need for E–911 support in all forms of communications. We believe that emergency personnel need radio equipment that accesses a common frequency.

Third, we believe that critical telecommunications infrastructure owners and operators should be designated as first responders in the event of a major disaster and should be included in preparations for such events.

Let me close by thanking you for your interest and thanking my colleagues at BellSouth. We've mobilized our company from top to bottom. We'll rebuild as we always do. Thank you.

[The prepared statement of Mr. Smith follows:]

PREPARED STATEMENT OF WILLIAM L. SMITH,
CHIEF TECHNOLOGY OFFICER, BELLSOUTH

I. Introduction

My name is Bill Smith, and I am the Chief Technology Officer for BellSouth. BellSouth is a full-service communications company providing service to customers in the nine southeastern states of Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, and Tennessee. I have worked for BellSouth for 26 years, and in my current position I am responsible for overseeing the planning of our overall network, integrating new technology into our network, and ensuring the interoperability between our networks and those of other carriers.

The purpose of my testimony today is to address the impact of Hurricane Katrina on BellSouth's network, the status of the network based on restoration completed to date, where we expect to go from here as we continue to restore communications to the hard hit Gulf Coast area, and what the Federal Government can do to assist in those efforts. What I will give you today is a snapshot—the situation is still changing rapidly, as power is restored, flood waters are pumped out, field surveys occur, and repairs are made. Furthermore, because we are still assessing the full impact of the storm on our network and our customers, damage estimates are preliminary. It will take some time for us to know with certainty the total magnitude of the destruction caused by Hurricane Katrina. Given the force of the hurricane, however, we are very pleased with the resiliency of our network, and with the significant progress that our employees, working with the larger communications industry, have made to restore service to date.

BellSouth's efforts in regard to hurricanes can be placed into three general categories: preparation, monitoring, and restoration. As is standard operating procedure for us during hurricane season, on August 23, 2005, BellSouth's network operations team began tracking Tropical Depression 12, then located over the southeastern Bahamas with thirty-five mile per hour winds and moving northwest at ten miles per hour. We continued monitoring the storm as the days progressed and began extensive preparations prior to Katrina making landfall in Florida. This is business as usual for us, but none could have imagined what was to follow. As Katrina worked its way across Florida toward the Gulf Coast, two integral pieces to this incredible story developed: the people, and the network. I plan to first walk you through the people side of this story, because without our people, we would have no company and no network. It is our employees who make BellSouth what it is.

II. Katrina's Impact on People

BellSouth has about 13,000 employees in the States of Alabama, Mississippi, and Louisiana, approximately 6,500 of whom were in the hardest hit areas affected by the storm. I am delighted to report that we have made contact with all our employees, and all are alive and safe. This is in no small part due to the preparations BellSouth instituted well in advance of Katrina making landfall. For example, BellSouth already had in place an 800-number for BellSouth employees to call to report their status in the event of an emergency and a separate telephone number employees could call to get emergency information. Immediately prior to Katrina making landfall, we also took steps to ensure adequate supplies and services were on hand, sending non-perishable food to strategic areas where employees could be stationed, setting up structural materials including tents, showers, toilets, tables and chairs, and engaging janitorial and guard services. Our experience with prior hurricanes taught us that our employees will be called upon to work round the clock, and they can best perform the extraordinary tasks expected of them if their basic needs for food, shelter, and the safety of their family are addressed.

As Katrina hit the Gulf Coast on August 29, we assessed potential locations for what we call BellSouth tent cities—stations where employees, and their immediate families, in affected areas could seek shelter, receive food, ice, water, showers, laundry services, air mattresses, linens and clothing, medical care, and financial loans. In addition, we had on hand access to our employee assistance program to provide counseling services as needed. The first tent city was set up in Gulfport, Mississippi on August 30, a second opened in Baton Rouge, Louisiana on September 1, and a third on September 2, in Covington, Louisiana. With the addition of tent cities in Hattiesburg and Jackson, Mississippi, and Marrero, Louisiana on September 10th, BellSouth was, at the height of its restoration efforts, operating six tent cities that provided assistance for our employees and their families, including medical care, and serving over eight thousand meals daily.

III. Impact on Network Operations

Given where our network is located, BellSouth has dealt with hurricanes for years, and is proud of the resiliency our network has consistently demonstrated. Based in large part on experiences gained from past hurricanes, as a part of our prior overall network planning and preparation in the low-lying areas of the New Orleans bowl, BellSouth had located most of its switches on the second floor (or above) in the buildings in that area. This planning helped to avoid any major damage to BellSouth's switches and reduced restoration time from months to weeks. In the coastal areas of Louisiana and Mississippi, BellSouth built certain flood-prone buildings on pilings in order to elevate those buildings approximately ten feet above ground level. Even these precautions, however, were not enough to withstand Katrina's sustained winds in excess of 145 miles per hour and storm surges of 25–40 feet.

Prior to Katrina making landfall in Florida, we activated our standard hurricane procedures. These include ensuring that our 1,000+ mobile generators are in working order and staged at the sites needed, fuel tanks are filled for our central office and key administrative office generators and vehicles, network supplies are relocated (including tents in the event tent cities need to be established for the safety and shelter of our employees), and support personnel are staged in nearby locations.

The tropical depression became Hurricane Katrina and first made landfall in South Florida as a Category 1 hurricane on Thursday evening, August 25th, causing considerable damage to the area. After passing over Florida and reaching the Gulf of Mexico, Katrina developed into a Category 5 hurricane and then dropped to a Category 4 just before making her second landfall in our operating area at about 2 p.m. on Monday, August 29th, east of New Orleans.

Operations in Florida, Alabama, Mississippi and Louisiana, all have been impacted by Katrina. Nevertheless, we have made significant strides toward restoration of communications capabilities. As I will describe in more detail below, we have three different types of restoration efforts underway. In places like Gulfport and Biloxi, Mississippi and New Orleans, Louisiana, the impact on our customers, our employees and our network have been catastrophic, and basic restoration is still encumbered by flooding, debris, and security issues. In other parts of Louisiana, Mississippi, and Alabama, we are well into our restoration efforts and progressing rapidly. In Florida, we are wrapping up our restoration efforts, and freeing up resources like generators and technicians to move to the other areas where they are needed.

IV. Network Status

In the Gulf region of Mississippi, Alabama, and Louisiana, BellSouth has 4.9 million access lines. A snapshot on August 30, after the second landfall, estimated that 2.475 million lines, a little more than half of those in the area, were actually affected by the storm. As of the morning of Tuesday, September 20, approximately 210,000 (8.5 percent) of the original 2.475 million lines remained impacted.

BellSouth has 1,591 central office buildings across its region. 578 of those central office buildings are located in Alabama, Louisiana, and Mississippi. Throughout the storm, 545 of the 578 central offices in Alabama, Louisiana, and Mississippi never lost service. As the loss of commercial power was widespread, many of these offices were running on batteries, supported by generators. Today, six central offices are still running on generators. Generators require fuel, and in the past, our network personnel have had access to the central offices where the generators are housed in order to ensure their proper fueling and operations. This was not true with Katrina.

Katrina was different from any hurricane BellSouth has faced previously. It had three distinct phases—the Florida hurricane, the Gulf Coast hurricane, and the New Orleans flooding. Severe damage was associated with the storm's landfall, but the flooding that followed when the levees broke created significant additional disruption. Generally, hurricanes have an initial surge, the water recedes, power restoration begins, and then we follow the power company with telecom restoration forces. When the levees broke in New Orleans, the water did not recede. Because of the continued flooding, and the unprecedented security issues, generator power was lost at several central offices due to our inability to refuel. The flooding also caused extensive damage to buildings and other structures in the flooded areas.

Since August 29th, BellSouth lost service at various times in a total of thirty-three of BellSouth's central offices in the impacted area. Today, there are fifteen central offices that have not been restored to service. Of the fifteen, ten are small offices along the coastal area with severe devastation. We have already begun restoring service in some of those areas using digital loop carrier systems. The remaining five offices are in the New Orleans flooded area. Four of these offices are currently being restored, and we started pumping the flood waters out of the fifth one on Tuesday, September 20.

We continue to work around the clock to restore service. As a part of our restoration efforts, we conduct damage surveys throughout the area. We have completed 27,666 surveys to date, and are finished with surveys in all but the hardest hit areas where accessibility is still an issue. We are between 30 percent and 70 percent complete with surveys in those hardest hit areas. Initially, we concentrate on restoration of highest priority circuits, specifically those which support public safety including hospitals, E–911 centers, and law enforcement. Then we focus on supporting other carriers, including the wireless industry. I have listed these sequentially, but they are often worked simultaneously.

Following the storm, in Florida and Alabama, there were no E–911 centers that incurred outages. For Mississippi, service was impacted to forty-three out of 138 E–911 centers, and service to all forty-three centers has been restored onsite or by re-routing the calls to other centers. Many E–911 centers required the re-routing of traffic, and in most instances the re-routing was accomplished within hours after contact with the E–911 center officials. All of these centers were back in service by September 4th.

In Louisiana, thirty-five of ninety-one E–911 centers were impacted, and thirty of these are partially or totally back in service, either onsite or through re-routing of calls to other centers. Of the five E–911 centers that remain out of service, all are in the New Orleans area. Three of the centers are located in Plaquemine and St. Bernard parishes, low-lying parishes along the Mississippi River. The remaining two are located in New Orleans. BellSouth is in contact with the E–911 officials in the five Louisiana E–911 centers that remain out of service, and we are working

with them to implement plans to re-route traffic to alternate sites and restore E–911 service to these areas.

BellSouth has also been extremely focused on the wireless industry in its network restoration efforts. Prior to the storm's landfall, we invited several key carriers to collocate at our emergency command center, recognizing the critical role that wireless plays in today's communications and also knowing the key role we play in enabling wireless service. Together with members of the wireless industry, we developed a joint wireless restoration plan, focused on inter-office rings, prioritizing cell site restoration, and the placement of microwave facilities. These carriers provided input for restoration priorities together with our team. We also conduct two daily calls—one with wireless carriers and one with wireline carriers. These collaborative efforts have been very important in the restoration effort. I am also proud of our efforts to re-route traffic from New Orleans to Texas, Florida, and/or to switches and locations requested by the carriers in order to create communications capacity and restore service for wireless and wireline customers. In this new and dynamic age of communications, alternative technologies, such as wireless and VoIP, utilize and interconnect with the traditional wireline network. Thus, as BellSouth restores and rebuilds our network, we are in fact enabling providers of such alternative technologies to re-institute their services as well.

BellSouth will continue to work collaboratively with the industry on the ongoing restoration efforts in the New Orleans and Gulf Coast areas. However, there are challenges. As the New Orleans and Gulf Coast areas are restored, there has been a substantial amount of construction activity by utilities and their contractors, as well as other businesses and homeowners. This activity has caused damage to BellSouth's network that must also be repaired. Indeed, several major routes have already been cut multiple times. For example, on Monday, September 12, a major fiber route from Hammond, Louisiana to Covington, Louisiana was cut by a tree trimming company. This had an impact on both wireline and wireless carriers. Even though we are deploying damage prevention crews, it will not be possible to prevent these types of occurrences for some time in the future, given the level of construction activity in the area.

Efforts are ongoing as we search collectively to overcome the unique problems caused by flood waters that blocked access to switches and cellular sites in need of restoration. Escorted teams traveled by boat to several of the sites to survey accessibility and status to determine what equipment was needed to restore service. Microwave antennas have already been placed in New Orleans to enable communications from two of these sites. The first one, at Florida Boulevard, serves T-Mobile, AllTel, and Sprint/Nextel; the second, at Franklin Road near Lake Airport, serves Verizon, Sprint/Nextel and Cingular. A third microwave antenna has now been placed in Biloxi, Mississippi.

The significant progress toward restoration is due to the tireless and often heroic efforts of our employees who are working around the clock with a single minded mission of restoring communications to these hard hit areas, and to the efforts of our wireless and wireline industry colleagues who have partnered with us with an unwavering commitment to enable communications.

Our experience in the New Orleans Main Central Office at 840 Poydras Street gives a sense of the situation on the ground. BellSouth employees began staffing an Emergency Operations Center (EOC) on the 12th Floor of the building on Sunday, August 28. The office lost power and engaged generators when the storm hit on Monday, but occupants breathed a sigh of relief that there was no flooding. Then, the levee broke and conditions rapidly deteriorated on Tuesday. Technicians and engineers in the office were trying to re-establish service and maintain power by keeping the generators fueled and running. As the situation in New Orleans deteriorated with violence and looting, the New Orleans Police and the Louisiana State Police told us to evacuate the building. There was gunfire in the area and we were told it was unsafe for our employees to remain. At 3 p.m. CST, the Louisiana State Police arrived and provided us with an armed escort so we could leave the building. We moved to Baton Rouge and, concerned for the security of the building, we arranged for FBI agents to take occupancy of the building at approximately 9 that evening. By Friday morning, the Louisiana State Police and the FBI occupied the building. At that time, we began armed and escorted caravans to the building to bring fuel for the generator, water for the chillers, BellSouth personnel, as well as personnel from other carriers (at BellSouth's open invitation). In spite of these harrowing facts, this key switch, which serves as a regional hub for multiple carriers, remained in operation. And, of course, some of the Poydras Street personnel, as well as personnel assisting in restoration efforts across the impacted area, are putting forth Herculean efforts in trying circumstances. Many of them have lost everything. Some of them are now residents, with their families, of the BellSouth tent

cities. Yet they continue to demonstrate commitment and resolve to rebuild the communications network expected by their fellow citizens.

Another heroic story rises out of the coastal town of Gulfport, Mississippi. On September 3, a brick wall protecting the main generator keeping the central office alive started to give way. Nine workers from that central office ran from the basement, where they had been working while riding out the storm, to the rooftop room and fortified the walls with whatever they could find—plastic tarps, plywood and even the cardboard from a science project of one worker's son. The main wall in the office collapsed, yet their efforts to protect the switch were successful.

V. Government Cooperation and Needs

The cooperation and assistance from local, State, and Federal agencies overall has been good. The FCC, along with its Staff members, has been extraordinarily helpful. The FCC reached out to offer assistance in many areas: waiving rules that will help customers who are without service; taking actions that have and will allow for the quick restoration of network facilities (including the emergency routing of traffic over whatever facilities are available for use); and helping with the publication of "find me" numbers to help locate BellSouth employees. Because of this, BellSouth has been able to make its interLATA corporate communications network available to companies like Sprint and Telapex, a Mississippi wireless carrier, for use in emergency routing of their traffic impacted by Katrina. BellSouth has also been in constant communication with other Federal agencies and has received strong support from the White House Executive Office of the President.

We will continue to need this type of help, particularly related to the efforts to restore communications in Louisiana and the Mississippi Gulf Coast areas. The magnitude of the damage will present unique issues that will need to be resolved quickly and efficiently in order to restore service. The Louisiana and Mississippi Public Service Commissions have also stepped up to provide assistance to the industry in efforts to assess damage, maintain the operation of the remaining network, and restore service to impacted areas.

As we continue to restore service to the area, several things are critical. First, we need safe access to our network facilities. This will require the abatement of the flooding in New Orleans, which is underway. Now, and when the flood waters have receded, we need adequate security measures to ensure the safety of our technicians trying to assess and conduct repairs.

Second, we will need flexibility and patience. It will take many months for BellSouth to permanently repair the damage caused by Katrina and restore service to residents in all areas. We will continue to work around the clock to restore service to our customers as they re-build and become ready to be served. BellSouth has experienced twenty-two hurricanes since 1992, storms such as Andrew, Hugo, and now Katrina. Congress and the private sector alike should be cautious about building unrealistic expectations about how long it takes to fully recover from a storm packing the furor of a Katrina. Also a key difference in this storm is the amount of social dislocation experienced by the fact that nearly one million people have been moved because of the storm. Many of the population patterns may never return as they were. Cities like Baton Rouge, Memphis, and LaFayette have experienced significant population growth with the attendant stress on all infrastructures, including the communications. Building capacity will take time.

Third, the government needs to recognize that the cost to BellSouth to restore the communications infrastructure will be significant. BellSouth has estimated that the cost to restore our network as a result of Hurricane Katrina will be between $400 and $600 million. By comparison, the cost to BellSouth of the damage caused by the four hurricanes that hit Florida last year was approximately $200 million. And, of course, we're still in the middle of the hurricane season, and the long-term impacts of the flooding in New Orleans are hard to estimate. Legislative incentives, such as tax credits, would be tremendously helpful as companies rebuild areas devastated by Katrina.

Restoration of our near-ubiquitous infrastructure will demand that we deploy capital, not as a cost-plus utility, but as a company re-building its network in a very competitive industry. We will be expected to rebuild without knowing what our ultimate demand will be. And, we will rebuild this network in an environment where many companies depend on our network for providing service to their customers, but where policy doesn't equally distribute the burden of restoration among all players. The FCC has been very helpful in waiving rules that hamper restoration. We will, however, need continued focus from the policy community on rules and regulations that hamper access to capital. Timely restoration requires that we spend this money now, well in advance of knowing what people and businesses will actually return to affected areas, and when, and that we add capacity in areas like Baton

Rouge, or even state parks where tent cities have emerged, without having any expectation of long-term continued service revenues out of that installed capacity.

VI. Path Forward and Lessons Learned

So what are the lessons learned thus far? Because we are still in the midst of restoration, it is difficult to create an exhaustive list of lessons learned as a result of the unique circumstance that has been presented by Hurricane Katrina and the consequent flooding in New Orleans, but the following are some of our more significant experiences to date.

First, both network providers, as well as customer/consumers, have become more and more dependent on commercial power. As networks deploy more advanced technology in the more remote parts of the network (remote terminals, DLC systems), these systems require power to operate, and thus introduce more potential points of failure in the event of an extended power outage. Consumers are using more cordless phones, which also require commercial power to operate. And the vast proliferation of cellular phones, which could potentially use automobile batteries for recharging, also becomes an issue when your automobile is six feet under water. As a result, many "communications" failures flow from the loss of power to customer premises equipment (CPE) and other power driven applications, not from a fundamental loss of connectivity in the telecommunications network.

Second, the communications industry and government bodies need to work more closely together to establish, well in advance, multiple alternate retreat points and paths for the routing of E–911 traffic in the case of a catastrophe. BellSouth has a proud history of service to E–911 centers and will continue its commitment to find new and better ways to ensure that emergency traffic can be successfully routed and handled during emergencies. BellSouth is concerned that some communications providers are using Katrina as a means to delay implementation of E–911 obligations. BellSouth believes that Katrina has highlighted the converse; which is a need for ubiquitous E–911 by all communications providers.

Third, emergency personnel need radio equipment that can access a common frequency. Many of the first responder issues in Katrina arise from the use of dedicated radio emergency communications equipment. As we saw in 9/11, oftentimes different departments (*i.e.,* police and fire), or different jurisdictions (*i.e.,* state and city or Louisiana and Arkansas), have equipment based on different frequencies and thus can not communicate with each other. This needs to be resolved, probably by the promulgation of national standards.

Fourth, carriers should be mindful of, and plan for, flooding when locating their switch equipment in flood-prone areas, locating them, where practical, above flood lines. As I previously mentioned, BellSouth has taken this step in the vast bulk of its offices, locating both switches and generators on upper floors of buildings. In addition, the location and availability of fuel needs to be addressed in a way that ensures that fuel can be available for emergency generators no matter the circumstance. This likely will have some environmental questions attendant to it that will require flexibility and engagement to resolve.

Fifth, critical telecommunications infrastructure owners and operators should be designated as first responders in the event of a major disaster and should be included in preparations or responses to such events. Unfortunately, that is not the case today, which has impeded response capabilities and undermined restoration efforts. The importance of restoring telecommunications networks during a disaster cannot be underestimated. When you hear stories about customers being able to use Vonage's service during the hurricane, keep in mind that they need an underlying network to ride in order for Vonage's service to work.

Finally, industry cooperation throughout the recovery from Katrina has been extraordinary. This should be used as a template to build industry-wide emergency response and restoration plans for future catastrophes of this kind.

I would like to close by thanking you for your interest and help and by thanking my colleagues at BellSouth. As FCC Commissioner Copps noted after seeing our response efforts, we have mobilized this company from top to bottom. In conjunction with that mobilization, our BellSouth family of employees and retirees has stepped forward with over $838,000 in contributions to aid the impacted families. Our company continues to match these contributions on a 2-to-1 basis. In addition, we have started an adopt-a-family program, which matches employees willing to help those needing help. And, we have announced a $5 million grant to the Departments of Education in Louisiana, and Mississippi, to facilitate e-learning, and to ensure that those high school students displaced by the storm can continue with their studies, through the use of technology, and graduate on time. We will restore and rebuild as we always do. That's what we expect of ourselves. That's what we do.

The CHAIRMAN. Thank you very much. Mr. Roth, who is the Executive Vice President of External Affairs and Public Relations with Cingular. Thank you. I must commend you. I had a Cingular system I took over to Kuwait, Iraq, Turkey, and Italy. It was an international chip and I never missed a lick anywhere along the line so, congratulations.

STATEMENT OF PAUL ROTH, EXECUTIVE VICE PRESIDENT, EXTERNAL AFFAIRS AND PUBLIC RELATIONS, CINGULAR WIRELESS

Mr. ROTH. Thank you, sir. Thank you. Thank you, Chairman Stevens and Members of the Committee. I appreciate the opportunity to testify today. I am Paul Roth the Executive Vice President of External Affairs and Public Relations for Cingular Wireless and I'm here today on behalf of Stan Sigman, our CEO, who is actively preparing for Hurricane Rita and still working on the restoration from Hurricane Katrina.

Katrina damaged our network like no storm or disaster had ever done. As the storm passed Cingular had lost approximately 85 percent of our coverage in the hardest hit areas of New Orleans and Biloxi. Of the lost towers, 20 percent were physically damaged and approximately 80 percent were lost when the infrastructure supporting them was damaged. We've all seen pictures of damage, and I'd like to call your attention to at least two examples of what the damage did to our wireless network.

The first one is of a concrete structure. This is what housed our electronics for one of our cell sites. The storm surge completely eradicated everything but the concrete foundation.

The second poster is of a crushed cell tower. Our towers are built on the coast for 200 mile an hour winds but they are not invincible to debris thrown at 150, 160 miles an hour. This is a tower that was knocked down, struck by debris.

But the real loss in the New Orleans area, was to one of our two switches. When the levees broke the switch was flooded knocking out the majority of the service in that area.

That's what happened and this is what we've done about it. We've learned from past disasters and we have a very comprehensive disaster plan. It's one that we practiced, rehearsed with the DHS just this spring in anticipation of the hurricane season. Our disaster response team set up staging areas, two of them, one in Mississippi, one outside of New Orleans. We had 800,000 gallons of fuel, we had 500 generators, 30 portable cell sites, and we had over 800 technicians staged ready to move in when the storm passed.

Because of our preparation Cingular was the first responder for many in the community. We loaned a generator to the Trent Lott Airport to assist in refueling efforts so that disaster flights could continue. We loaned generators to hotels and churches that had become temporary shelters for those escaping the storm. And we loaned 230 satellite and 3,500 wireless priority service-enabled phones to first responders.

We are also very proud of the fact that we treated customers as victims not as accounts. Examples of things we've done. We automatically waived up to 50 percent of the customer's monthly access

charge for those in the affected area. We charged no overage, long-distance, or roaming charges for customers in these areas as well, and no customers will be suspended in September, not even those who have not paid their bill.

As we move to restore service quickly and continue the restoration process, I'd like to give you an update. As of September 19, all of the areas were up to 100 percent of their original coverage. New Orleans was at 92 percent of its coverage. Biloxi was at 97 percent of its original coverage. With 68 cell sites physically damaged in those two areas, New Orleans' capacity is at 75 percent and improving daily. Capacity in Biloxi is up to the pre-storm level of a 100 percent.

As we look back we realize two things. One is no two disasters are the same, but we prepare and we learn from each one. And no amount of steel or redundancy can guarantee that communications will survive a disaster, either manmade or natural.

We have learned a couple of key lessons that I think the panel would be most interested in. The first is that wireless priority access which is a technology-prioritizing calls and capacity for first responders worked, and worked well in this area. This was a network solution that was built in to every Cingular wireless network following the lessons learned from 9/11.

The second, and this is something I think you'll find very interesting, is a project we call Pegasus. Pegasus is a solution for a worse-case scenario when the local infrastructure is completely destroyed.

Let me start by calling your attention to this poster of a COLT. A COLT is a cell site mounted on a light truck. What makes this one unique is the satellite dish that you might be able to see mounted on top that truck. The one pictured here is one of two built and used currently in the New Orleans area. It was in the works and was expedited for Katrina. The inspiration came from our cruise ship experience where we back-haul traffic off of a ship to a switch on the mainland. It can be driven into a disaster area or possibly engineered so it can be flown in instead of being on top of a building or on a beach following a disaster area. It can be operational in hours. It requires no commercial power or local telco facilities. It is a fully independent solution to local infrastructure. It uses the satellite dish you see on top to connect to an operational switch. The one in New Orleans, the one in this picture, is outside of Hammond, Louisiana, and is actually connected to our switch in Miami, Florida. So we're routing calls and probably as important as anything is the fact that it works with any existing Cingular cellular phone. So whether you're a victim in the affected area or a first responder, your current Cingular phone will work with this fully independent solution. One of these trucks is right now on its way to San Antonio in anticipation it will be needed following Hurricane Rita.

Pegasus, which is what we've named this project, should be developed and staged in key U.S. locations across the country that are vulnerable to such disasters. The Pegasus concept can be expanded, it can be engineered better, it can be deployed faster, and we are willing to work with government and the rest of the wire-

less industry to develop this project and evaluate other options and lessons learned.

Thank you for your time today and your interest.

[The prepared statement of Mr. Roth follows:]

PREPARED STATEMENT OF PAUL ROTH, EXECUTIVE VICE PRESIDENT, EXTERNAL AFFAIRS AND PUBLIC RELATIONS, CINGULAR WIRELESS

Mr. Chairman and members of the Committee:

Thank you for the opportunity to appear before you today to discuss the impact of Hurricane Katrina and its aftermath on the Cingular Wireless Network. I am Paul Roth, Cingular's Executive Vice President for External Affairs and Public Relations, and my testimony today will describe what happened after we put our hurricane crisis plan into effect, how we responded to the ensuing events, and what actions we are taking to improve our overall crisis response.

I. What Happened

I'd like to begin with an overview of the damage to our network and its causes with an emphasis on the hardest-hit areas in and around New Orleans and Biloxi. By the time Katrina and the related flooding that it caused reached its peak, we had lost about 85 percent of our network in the hardest hit areas. The primary network-affecting events were split between physical damage (20 percent) to our facilities and damage to the additional infrastructure that we depend on for power and connections (80 percent). Of course, simple percentages and familiar words don't always convey the magnitude of the destruction that our network infrastructure endured.

I'd like to call your attention to Attachments #1 and #2 below. The first shows an active cell site that turned into nothing but a concrete platform after Katrina. The second shows a crushed cell tower. Though we build our towers to withstand winds of 200 miles per hour, that does not make them invincible to the "debris-missiles" launched by 150 mile per hour winds. As bad as the damage from wind and debris was, the most significant single hit that our network took came when the levees broke and one of the two core switches in New Orleans became completely submerged.

II. How We Responded

Our first response to Katrina began long before the hurricane ever hit land. Both Cingular and AT&T Wireless had well-developed crisis plans before our merger. After our merger, one of the first actions we took was to meld these plans together. In the late spring we ran an exercise in crisis response and used one of the first storms of this season as a live, real-time test of our plan.

First Response. Our initial response was to set up staging areas to support our employees and to restore service. We engineered an initial deployment that included 500 portable generators, 800,000 gallons of fuel, 1,000 service personnel, and more than 30 portable cell sites called COWS and the first of a new breed of devices called satellite COLTS. In some instances we were among the first responders in heavily-damaged communities. In those cases we provided support to other first responders in the area. These joint efforts included: setting up a generator at Trent Lott Airport and restoring power so the airport could support emergency flight operations; providing fuel to police and other emergency personnel; and making 230 satellite phones and more than 3,500 other wireless phones with Wireless Priority Service to other first responders.

Employees. We moved immediately to take care of our employees so they could take care of our customers. We provided food, water, and basic supplies from trailers that we trucked into the affected areas. We also set up tent cities in Ocean Springs and Hammond that housed as many as 400 people. And, in less than 2 weeks, we were providing inoculations, banking services, and even daycare from licensed providers at our call center in Ocean Springs.

Services. We brought in trained personnel from throughout the country to restore service as expeditiously as possible. Within 3 weeks of Katrina's landfall in Louisiana, we had restored geographic coverage in New Orleans to 92 percent and in Biloxi to 97 percent. But coverage is not the same as capacity. Even though our restored network covers nearly all the geography it did before the storm, the overall capacity of our network is a bit further behind. The combination of physical damage to 68 cell sites and the disruption of the wired networks in New Orleans and Biloxi means that as of 9/19 our network is functioning at 75 percent of capacity in New Orleans and 100 percent of capacity in Biloxi. But in Biloxi, where wireless is the sole means of communication for many people, call volumes are at 140 percent of

capacity; and people are still experiencing some blocking as we add additional capacity.

III. What We Learned

Katrina has demonstrated that there is no thickness of steel or level of network redundancy that can guarantee any communications network will survive a worst-case natural or man-made disaster. However, with each crisis faced we improve our crisis plan and increase the speed and efficiency of our response.

The two most important lessons we learned from Katrina were the effectiveness of Wireless Priority Services (WPS) and the need to develop a wireless solution for worst-case scenarios where the local network infrastructure has been destroyed.

Wireless Priority Access. Because of the unprecedented volume of calls made on the wireless network following 9/11, we built (per Federal direction) the capability to prioritize wireless calls following a disaster so that the most important calls coming from first responders were the first calls completed. This functionality was put to its first real test after Hurricane Katrina and it worked well.

Solution for Worst Case Scenarios—Project Pegasus. Prior to Katrina, we had been working on a project we called Pegasus. Pegasus is our vision of a way to increase the scope and deployment of portable, satellite, cell sites (satellite COLTS) in an emergency.

These COLTS are portable cell sites with satellite connectivity mounted on light trucks. They can be driven or flown in to a disaster area. They work with any Cingular GSM phone enabling victims and first responders to use their existing phones during a crisis. These COLTS provide a satellite connection to any of our operational switches, become operational in a matter of hours, and require no commercial power or wired network infrastructure. The satellite COLT shown as Attachment #3 below is one of our two prototypes that was expedited for delivery to New Orleans and is working there today via its satellite connection to our switch in Miami.

Next Steps. We are moving as expeditiously as possible to expand our Pegasus Project so satellite COLTS can be built and made available in key locations around the U.S. for more-effective deployment. We know that Pegasus is only a start to a more fully-developed set of tools for worst-case scenarios.

We have resolved to open this project through the CTIA for cooperative rather than competitive development so that we can truly bring together the best-of-the-best to develop the full potential of wireless to help people stay connected in even the worst crises.

I thank you for your time and attention today and in the days ahead.

ATTACHMENT 1

Attachment 2

Attachment 3

The CHAIRMAN. Thank you very much, Mr. Roth. Next is Jeffrey Citron, the Chairman and Chief Executive Officer of Vonage. Good morning.

STATEMENT OF JEFFREY A. CITRON, CHAIRMAN/CEO, VONAGE HOLDINGS CORPORATION

Mr. CITRON. Well, good morning, Chairman Stevens, Chairman Inouye, and esteemed Members of the Committee. My name is Jeffrey Citron, and I am the Chairman and CEO of Vonage Holdings Corporation. Thank you for the opportunity to testify today on behalf of the entire Vonage family and our hundreds of thousands of customers. I want to extend my deep sympathy for those who lost family and friends and for all those who are now homeless as a result of the Gulf Coast disaster.

Our Nation is responding to this emergency with astonishing generosity and I am proud that Vonage employees are no exception. They dug deep into their pockets, but more importantly they have given their time and energy to keep people communicating throughout the disaster. They have worked 24 hours a day, seven days a week to donate several thousand working Internet phones to relief workers and families in the affected areas, keeping them in touch when other networks had failed.

The Wall Street Journal reported that when Katrina hit the Mayor and Chief of Police in New Orleans used several Vonage lines as their only connection to the outside world. President Bush while aboard Air Force One was able to call the Mayor on a makeshift Vonage phone bank, one of the first to establish with local officials in the affected areas. Much like September 11th, the phone networks failed. Wireless networks failed, satellite phones were unreliable, but the Internet was still alive in some places and so was Internet phone service. For example, as thousands of patients arrived at Baton Rouge General Hospital, Vonage was the only long-distance phone service doctors and emergency medical personnel could use to track down medical records and to reunite families. To support aid workers from shelters to FEMA, Vonage has been working with a nonprofit Part-15.org and other partners such as Cisco and Intel to build large wireless Internet hotspots with free Internet phone service in cities like Pass Christian and Biloxi, Mississippi.

Mr. Chairman, and members of the Committee, to be clear Vonage's service is successful in maintaining its operations during these critical moments because of the redundant and resilient nature of the Internet itself. Vonage services relies upon a high-speed Internet connection which we do not own nor do we provide. Our customers get broadband through many different means, cable modem service, DSL, wireless, broadband and, of course, even satellite. Vonage applauds the network operators that kept the Internet connections working for our users, and without their hard work and dedication our service would not be available to so many in need.

The flexibility that allows our service to work over any high-speed network, any connection anywhere, is the reason our subscribers were able to communicate in the midst of the Katrina disaster. Still while some of the thousands of Vonage customers in af-

fected areas were able to maintain communications, hundreds of our customers were not. Vonage not only relies upon broadband but electricity as well. Many of our users lacked the power, and to make matters worse, our partners servicing the New Orleans area was unable to send calls from the wireline telephone network to the Vonage Internet gateways and switches for an entire day.

If I can offer the Committee any counsel in rebuilding the Gulf region, it would be not to favor any one technology or provider over another. Instead, create a climate that fosters the development of many different networks. A robust communications infrastructure needs both wired networks, such as cable and DSL, as well as wireless networks, such as cell towers, WiFi, WiMax, and satellite.

As policymakers and as entrepreneurs we'll never know exactly which facilities will be available in a moment of a crisis. But a range of redundant infrastructure provides our chance of having something that will work. It is evident that cable and DSL and cellular are just not enough.

Mr. Chairman, not only did Katrina highlight the failure of the communications network, it should the underscore the urgent need to make our 9-1-1 network every bit as flexible and resilient as the Internet itself. Vonage is running hard and fast to build a nationwide E–911 network this year. As a result, Vonage has taken a serious look at our country's 9-1-1 systems and, frankly, what we found is sobering. When the phone network essentially fails, so does much of our 9-1-1 network as well. In far too many cases today's 9-1-1 system is characterized by local technology decisions and outdated infrastructure. Left to fend for themselves dedicated 9-1-1 professionals are unable to share resources or utilize today's technology. One of the main reason citizens in New Orleans cannot return to their homes is still a lack of functioning 9-1-1 as reported by Chairman Martin. A robust 9-1-1 system wouldn't be eliminated by the bounds of any single provider network but instead utilize the flexibility and resilience of the Internet itself. As we rebuild New Orleans and the affected regions, we would be foolish to ignore the technologies that are already on the table and available for use.

Additionally, Congress can play a role in accelerating the upgrade of our 9-1-1 systems by granting the same legal safeguards to all communication service providers that offer 9-1-1 emergency dialing.

In times of a crisis communications is critical. For a successful and speedy recovery the Internet is an incredible resilient and redundant network. This is exactly the kind of performance we need in a crisis and exactly what we need from communications and from 9-1-1 networks of tomorrow.

Our hearts go out to the families affected by this disaster. Mr. Chairman, we look forward to working with you and all the Committee Members to improve our nation's response and capabilities in the future.

Thank you very much for letting me speak here today.

[The prepared statement of Mr. Citron follows:]

PREPARED STATEMENT OF JEFFREY A. CITRON, CHAIRMAN/CEO, VONAGE HOLDINGS CORPORATION

Good morning, Chairman Stevens, Co-Chairman Inouye and esteemed members of the Committee. My name is Jeffrey Citron, Chairman and CEO of Vonage Holdings Corporation. Thank you for the opportunity to testify today. On behalf of the entire Vonage family and our one million users, I want to extend my deep sympathy for those who lost family and friends, and for all those who are now homeless as a result of the Gulf Coast disaster.

Our Nation is responding to this emergency with astonishing generosity and I'm proud that Vonage employees are no exception. They dug deep into their own pockets to give money to relief organizations—but perhaps more importantly they've given time and energy to keep people communicating throughout the disaster. Vonage teams have worked 24/7 to ready and ship several thousand donated Internet phones that have helped relief workers and affected families keep communicating when other networks failed.

The Wall Street Journal reported that immediately after Katrina hit, the Mayor and Chief of Police of New Orleans used several Vonage lines as their only connection to the outside world. President Bush, while aboard Air Force One, was able to call the Mayor's Vonage number, establishing some of the first communications with local officials.

Much like September 11, phone networks failed. Wireless networks failed. Satellite phones stopped working. But the Internet was still alive in some places, and so was Internet phone service.

As thousands of patients were coming into the Baton Rouge General Hospital, Vonage was the only long-distance voice system available to doctors and emergency medical personnel.

Vonage is also working with a not-for-profit (Part-15.org) and other partners such as Cisco and Intel to build large wireless Internet "hotspots" with free Internet phone service in many of the affected areas. In the cities of Pass Christian and Biloxi MS, police and other emergency responders are now using these wireless Internet connections for voice, video and data access. These networks are allowing local and Federal officials like FEMA to communicate and share information in areas where there is limited connectivity otherwise.

Mr. Chairman and members of the Committee, to be clear, Vonage's service is successful in maintaining operations during these critical moments because of the redundant and resilient nature of the Internet. Vonage's service relies upon a high-speed Internet connection. We don't own the last mile facilities that run to our users' homes. Our customers get broadband through many different means—cable modem service, DSL, wireless broadband, even satellite. Vonage applauds the network operators that kept Internet connections working for our users. The flexibility that allows our service to work over ANY high-speed Internet connection ANYWHERE is the reason our subscribers are able to communicate in the midst of the Katrina disaster.

Still, while many of the thousands of Vonage customers in the affected areas were able to maintain communications, some of our customers were not. Several hundred were without service. This is primarily because those users lacked power, and because our partner serving New Orleans was unable to send calls from the telephone network to Vonage's Internet gateways.

Despite these network failures and lack of power, our customers were able to use the Internet to forward their calls to cell phones and other locations.

If I can offer this Committee any counsel in rebuilding the communications infrastructure in the Gulf region, it would be NOT to favor one facility or provider over another. Instead, create a climate that fosters deployment of all these technologies. A robust communications infrastructure needs wired networks such as cable and DSL, as well as wireless networks such as cell towers, WiFi and WiMax.

As policymakers, and as entrepreneurs, we'll never know exactly which facilities will be available in a moment of crisis. But redundant infrastructure improves our chances of having SOMETHING that works.

Mr. Chairman, in addition to highlighting the failure of communications networks, Katrina also underscored the urgent need to make our 9-1-1 network every bit as flexible and resilient as the Internet.

Vonage is running hard and fast to build a nationwide E–911 network this year. As a result, Vonage has taken a serious look at our country's 9-1-1 system and frankly, what we've found is sobering.

In far too many cases, today's 9-1-1 system is characterized by local technology decisions and outdated infrastructure. Left to fend for themselves, dedicated 9-1-1 professionals are unable to share resources or utilize today's technology.

Did you know that many 9-1-1 centers are unable to transfer calls within a given state or region? Had this capability been in place before Katrina, when 9-1-1 centers in affected areas went down, calls could have been transferred to working 9-1-1 centers. At the very least state and national law enforcement could have had a better picture of where resources were most urgently needed.

Additionally, Congress can play a role in accelerating 9-1-1 deployment by granting the same legal safeguards to all communications services that offer 9-1-1 emergency dialing. Internet phone providers are given no legal protection for completing 9-1-1 calls, unlike wireless and wireline phone companies.

One of the main reasons citizens in New Orleans cannot return to their homes is the lack of a functioning 9-1-1 system. A robust 9-1-1 system wouldn't be limited by the bounds of a single provider's network, but would instead utilize all the flexibility and resilience of the Internet. As we rebuild New Orleans and the affected regions, we would be foolish to ignore technology already on the table.

In times of crisis, communications is critical for a successful and speedy recovery. The Internet is an incredibly resilient and redundant network. This is exactly the kind of performance we need in a crisis, and exactly what we need from the communications and 9-1-1 networks of tomorrow.

Our hearts go out to families affected by this disaster. Mr. Chairman, we look forward to working with you and the Committee to improve our response capability in the future.

Thank you.

The CHAIRMAN. Next, pronounce it for me, will you?

Mr. ESLAMBOLCHI. Eslambolchi.

The CHAIRMAN. Mr. Eslambolchi, AT&T Global Networking. Thank you very much. Appreciate your testimony.

STATEMENT OF HOSSEIN ESLAMBOLCHI, PRESIDENT, AT&T GLOBAL NETWORKING TECHNOLOGY SERVICES AND AT&T LABS; AT&T CHIEF TECHNOLOGY OFFICER AND CHIEF INFORMATION OFFICER

Mr. ESLAMBOLCHI. Thank you, Chairman Stevens, Senator Inouye, and Members of the Committee. My name is Hossein Eslambolchi. I'm the President of AT&T Global Networking Technology Services at AT&T Laboratories. I also serve as AT&T's Chief Technology Officer and AT&T Chief Information Officer. I also serve on AT&T's Governing Executive Committee. My duties include responsibility for AT&T's global network, including network disaster recovery.

Let me report to you first on AT&T's encounter with Katrina, then offer some policy recommendations. AT&T's network remained overwhelmingly intact following the hurricane and flooding. At all times we were able to carry at least 95 percent of the calls in the Gulf Coast area that came through our network. In addition, within just a few minutes our network automatically restored half of the capacity that was initially lost. Another quarter was restored within 24 hours through manually rerouting, and the final quarter was restored within 48 hours when AT&T workers physically installed two cables to re-route traffic on damaged regeneration equipment. We built our only major switching station in the New Orleans area on high ground. It did not flood and it remained operational. While this switch and more than 100 other offices lost commercial power at one time or another, we had sufficient backup generators, fuel, and batteries to meet that challenge.

Our greatest concern was security. Security concerns forced our employees to evacuate the switching facilities on August 31, as local law enforcement was unable to ensure the safety of the site. Fortunately, the building was subsequently secured, our employees

returned the following day with necessary supplies and food. During the period our employees were out of the building, the network infrastructure was put on automatic controls and monitored remotely by AT&T Global Network Operation Center.

On a nationwide basis following Katrina, we carried traffic at levels that exceeded the prior week's demand by about 10 percent. Nonetheless, we could not complete calls to other networks that suffered more severe disruptions. As a result, we were forced to block millions of calls a day into the affected area due to the outages in terminating local and cellular networks.

During the crisis the National Coordination Center, NCC, an industry forum with government participation and the National Communication System of the Department of Homeland Security played very positive roles in matching available resources to pending needs, the FCC stepped up in leadership and authority as a clearing house for telecommunication recovery needs.

AT&T worked with these entities and also put its resources to work to help others. We helped first responders, for example, by dispatching five emergency communication vehicles, ECVs with satellite capabilities to assist the Louisiana State Police, the Louisiana National Guard, Stennis International Airport, NASA Space Center, which became an evacuee center, and other civil emergency authorities in Mississippi and Louisiana. We also helped other carriers by providing generators and fuel and carrying a significant amount of traffic for other carriers that could not do so for themselves. We worked to help evacuees as well, working with other companies we helped establish voice and data communications services at the Houston Astrodome. We also issued 35,000 prepaid calling cards for survivors and evacuees, donated more than $1.5 million, including matching funds for our employees' donations, and gave 148 laptops to the Red Cross for relief efforts. In addition, we provided toll-free calling and 10 call centers to help with the national fundraiser, Shelter From The Storm.

For residential customers in southern Mississippi and the greater New Orleans area, we are waiving monthly fees and not billing for local and long-distance service from homes in the affected area until those customers once again originate service from home. We have temporarily stopped billing collection efforts in Louisiana, Mississippi, and Alabama.

For government and business customers, we are restoring services at damaged sites and augmenting the capabilities at other locations as needed. To do so, we operate a war room to meet and prioritize their needs. We are also waiving recurring and non-recurring charges that affect the sites until they can re-establish operations.

I've discussed in my written submission the importance of the preparation, execution, and ongoing improvement to provide vital communication infrastructure. Here though, I would like to offer a few specific policy recommendations based on our Katrina experience.

Make additional spectrum available for public safety purposes and ensure that all first responders can access it in a coordinated and interconnected fashion.

Furnish, standardize, and approve emergency credentials to infrastructure providers in advance, so that AT&T and others can get into affected areas to restore vital capability without delay or interference.

Pre-determine security needs for law enforcement deployment to protect critical infrastructure facilities immediately following a disaster.

Establish and routinely exercise mechanisms for public/private coordination across all essential disciplines.

Drill for emergencies under various scenarios frequently, and include the public and private sector. Do not be satisfied just with a written plan.

Consider incenting emergency preparations for infrastructure companies.

We can never anticipate every contingency, nor can we assure a foolproof communications network under all circumstances. Nonetheless, at AT&T we have done much to maintain reliability and restorability of networks, and together as an industry and as a nation we can do more.

I thank you for holding this hearing to advance this important discussion, Mr. Chairman.

[The prepared statement of Mr. Eslambolchi follows:]

PREPARED STATEMENT OF HOSSEIN ESLAMBOLCHI, PRESIDENT, AT&T GLOBAL NETWORKING TECHNOLOGY SERVICES AND AT&T LABS; AT&T CHIEF TECHNOLOGY OFFICER AND CHIEF INFORMATION OFFICER

Thank you, Chairman Stevens, Senator Inouye, and members of the Committee.

My name is Hossein Eslambolchi, and I am the President of AT&T's Global Networking Technology Services and AT&T Labs. I also serve as AT&T's Chief Technology Officer and Chief Information Officer. I advise AT&T's Chairman and senior leaders on technology issues, and serve on AT&T's Executive Committee, the company's governing panel.

In particular, I am responsible for AT&T's strategic technology direction, network operations, research and development, and information technology systems and processes. My network operations duties include responsibility for the design, development, engineering, operations, reliability, and restorability of AT&T's global network, and the development and creation of new services, tools, and capabilities for next-generation Internet Protocol (IP) networks. I joined AT&T's Bell Laboratories in 1986 and have more than 17 years of expertise in designing and developing packet networks. I also have spent significant time working on the reliability and restorability of telecommunications networks. In this regard, I headed the development team for AT&T's Fast Automated Restoration System (FASTAR), which AT&T successfully deployed in 1992, making it possible to quickly restore service when high-capacity fiber optic cables are damaged. As head of AT&T's global network, I am also responsible for AT&T's network disaster recovery capabilities and operations.

I want to thank you, Mr. Chairman, for calling this important hearing and for allowing me the opportunity to share with you what we have done and are doing generally to ensure the reliability and restorability of AT&T network services, and what we at AT&T have been doing specifically in response to Hurricane Katrina. After discussing our efforts generally to protect our network and our customers from disruption, there are four areas on which I would like to focus my remarks today: the impact of Katrina on AT&T's network; AT&T's assistance to first responders, other carriers, and those people directly affected by the storm; the lessons we have learned; and our policy recommendations. You also will see why we at AT&T speak of a spirit of service and a spirit of compassion in connection with our disaster-related activities.

I. Protecting Critical Communications Infrastructure

A. Preparation

As a preliminary matter, there are three overarching steps that AT&T has taken—and that are essential to protecting vital communications infrastructures. The first begins long before any disaster occurs. It entails *preparation* to ensure that the network and its components are as reliable as possible through proper design, hardening, redundancy, and performance at levels that far exceed routine needs. At AT&T, for example, we engineer our network to "five nines" of reliability—99.999 percent reliability—that requires a diversity of communications links and equipment. When links and associated systems fail, there must be instantaneous and seamless rollover to backup facilities. This capability must be periodically tested, and given the frequency of cable dig-ups throughout the country, let alone emergencies of unprecedented scale such as Katrina, this testing must occur frequently.

Proper preparation, however, also contemplates that even the best facilities could fail. Proper preparation therefore requires rigorous planning for service restoration, including advance placement and availability of service restoration equipment where it can quickly meet identified needs, and ongoing training to ensure the availability of the skilled work force needed to restore service. We make restoration our first priority and then move on to make repairs.

Such a commitment to preparation, excellent service in the face of disaster, and responsiveness to threats to our networks and customers, does not come cheaply. At AT&T, we have invested approximately $350 million since 1991 in our mobile network disaster recovery (NDR) infrastructure. We can quickly bring emergency communications vehicles (ECVs) wherever needed to provide communications services in an emergency, and we have more than 150 tractor trailers of various kinds stored in locations around the country and loaded with generators, fiber and other supplies, repair and restoration facilities, circuit and packet switching, HVAC capabilities, lights, batteries, chillers, pumps, food, first-aid, and whatever else may be necessary to make our response effective. We have extensively drilled our teams in various scenarios on a quarterly basis to ensure that readiness remains at peak levels.

Our NDR disaster planning and Continuity of Operations Plan (COOP) gives us the ability to duplicate necessary capabilities quickly to meet or exceed our customers' business needs and continuity requirements, including those of our government customers. This has many components, including unparalleled security capabilities, logical systems, and physical capabilities. Network security is of particular importance given the prevalence of attacks through worms and viruses and the possibility of related threats. AT&T works diligently to provide network security for our infrastructure and to our customers, and although that was not an issue in this disaster, it is a critical issue and threat almost every day. Network security requires great focus and attention, and will certainly remain a critical challenge that may someday be the subject of another "lessons learned" hearing.

AT&T also established a system-level certification and assurance governance process whereby we measure our estimated likelihood of recovery in the event of an incident. We then drill down to the component level and assess the consequences of a potential failure and the impact to our business. We work to mitigate the risk of failure by either eliminating the threat and the vulnerability, or by mitigating the exposure. This process informs our rigorous business case analysis and brings clarity to investment decisions. We regularly assess these components both for ourselves and on behalf of our customers.

B. Execution

The second vital step to protect communications infrastructure requires execution during and immediately following a disaster. In many respects, execution is a function of proper preparation, particularly having a robust infrastructure, a well-trained and frequently-drilled work force, and facilities and capabilities available for service restoration. Effective execution also requires a sophisticated command and control structure in emergencies to make every minute count, every deployment as effective and efficient as possible, and to enable our dedicated employees to work as safely and effectively as possible. We follow an "incident command structure," which is led at every moment by an experienced Executive Duty Officer. A similar system is frequently used by first responders.

In addition, execution requires close coordination with third parties, including Federal, State, and local government authorities and first responders, others in the telecommunications industry, and others in the private sector trying to restore essential services and facilities, such as power, water, roadways, and the like. This communication and coordination effort is often the most difficult part of execution during and immediately after a disaster. In the communications field, the tele-

communications industry response to disasters, other than that of a company responding to damage to its own facilities, is typically coordinated through the National Coordination Center (NCC). The Department of Homeland Security participates in the NCC through the National Communications System (NCS), as did the Federal Communications Commission (FCC) during the response to Hurricane Katrina. This important entity matches telecommunications companies to those governmental entities with unmet emergency telecommunications needs.

Finally, execution requires ingenuity and resourcefulness when the unforeseen happens. Each emergency situation presents its own unique set of challenges. Even the most thorough planning and training cannot take the place of highly skilled and resourceful emergency responders who can recognize and adapt to unplanned circumstances.

C. Evaluation and Improvement

Finally, the protection of the communications infrastructure requires a thorough and frank after-the-fact evaluation of performance, distillation of lessons learned, and implementation of *improvements.* In this regard, one outcome of Hurricane Katrina should be a critical reassessment of our performance as individual communications companies, as an industry, and as a nation, and implementation of the policy recommendations needed to improve performance in the future.

I hope to address each of these steps in my testimony today, both in general and in light of our recent experience with Hurricane Katrina. At the end of this testimony, I also offer some policy recommendations to advance this necessary national discussion.

II. Impact of Katrina on the Network and its Restoration

Overall, AT&T's network remained overwhelmingly intact following the hurricane and flooding. At all times, we were able to carry at least 95 percent of the calls in the Gulf Coast area that came to our network. Of the 5 percent of our capacity in the area that was initially lost, FASTAR, our software system that redirects and reroutes traffic, restored half of that capacity within a couple of hours. Within 24 hours of the storm making landfall, another quarter of that capacity was restored via manual rerouting, and the final quarter was restored within 48 hours of the storm making landfall when AT&T workers physically installed two cables in the ground and rerouted certain traffic. This latter effort successfully worked around the loss of certain regenerators that send digital bits long distances over fiber. On a nationwide basis, on the day of Katrina and over the next few days, we successfully carried intercity traffic at levels that exceeded demand the week prior to Katrina by approximately 10 percent.

Nonetheless, because we interconnect with other carriers, including local exchange carriers and wireless carriers, we could not complete calls to other networks that suffered more severe disruptions. As a result, following Hurricane Katrina's landfall on the Gulf Coast, we needed to block millions of calls a day into the affected area due to outages in other networks.

We built our only major switching station in the New Orleans area on high ground and, therefore, it was not flooded. One of our most immediate concerns in the aftermath of Katrina regarding that facility, however, was looting and security. Security concerns forced employees to evacuate our switching center late in the afternoon on August 31, as local law enforcement was unable to ensure the safety and security of the site. Fortunately, the building was secured late that night, and our employees returned to the building the following day, together with BellSouth employees who worked in the same building. At that time, our people delivered to the building fuel for the generators, water for the air conditioning chillers, food, and other supplies. Law enforcement authorities also set up operations in the lobby of the building in order to utilize the telephone connectivity available there. During the period that our employees were out of the building, the network infrastructure was put on automatic controls and monitored remotely by the AT&T Network Operations Center.

We had more than 100 offices lose commercial power, usually briefly, at one time or another. Fortunately, we had sufficient backup generators and enough fuel for them. We were able to restore power by putting many of these sites on generators, and by making use of batteries or fuel cells in connection with a few. We replenished fuel supplies as necessary to avoid disruption, but our preparations included staged supplies of thousands of gallons of gas in portable containers, thousands of gallons of diesel fuel in portable cells, and thousands of gallons of water in portable tankers for cooling towers. We continue to have fueling plans in place for each of our sites in the area, all of which have at least 2 to 3 days of fuel supply which

we are topping off regularly. Importantly, very good progress has been made now in the region to restore commercial power.

At this time, the AT&T network has been fully restored and repaired. We will remain engaged, however, during broader recovery efforts to ensure continued operation of our facilities, and to lend support to others where we can.

III. AT&T's Katrina Response and Outreach

AT&T began moving equipment and teams from around the country toward the Gulf States in the days before the storm made landfall. As the path of the storm became clearer, AT&T moved its assets closer to where they would be needed, but not so close as to be put in danger by Katrina. We followed our prescribed approach. The first team restored AT&T's service to its prior levels, the next maintained and monitored AT&T's facilities so as to prevent new issues from arising, and the third came in to help others. AT&T worked around the clock to respond to this crisis and safeguard its network, support efforts to respond to the disaster, and address the needs of evacuees.

Because we fully restored and secured all of our network capabilities within the first 48 hours of the crisis, in a spirit of service and compassion, AT&T was able to direct its efforts to benefit its customers, other telecommunications competitors and their customers, first responders, and evacuees as needed. In this instance, we were largely able to use our in-place capabilities to meet not only our own needs, but also those of others. We put a variety of our facilities to work for other carriers and their customers, and continue to carry significant amounts of additional traffic for other carriers that cannot currently do so themselves. AT&T is also helping to provide relief to those directly affected by the hurricane and flooding, and assistance to charitable relief activities.

Back at our offices, we continue to operate a war room, which is focused on helping our customers get back on their feet and on providing and prioritizing services to business customers with special needs. For example, a business that has relocated out-of-state due to the hurricane and flooding requires rapid and professional deployment of numerous phone lines and data capability. This effort is part of our command and control structure.

Of course, the same is particularly true of our work with government customers like FEMA. In addition to immediately increasing FEMA call capacity and toll-free number availability, over the weekend of September 10th, AT&T was able to install an additional 140 T1 circuits to boost call center capacity to support FEMA. AT&T worked directly with the IRS to execute in less than 24 hours an agreement to direct calls using IRS trunks which IRS provided to give FEMA necessary increased call capacity.

At the same time, we coordinated with the NCC regarding the considerable resources that we could make available. First, we focused on the broader telecommunications network and the critical needs of first responders and ongoing rescue operations. In coordination with the NCC, we dispatched five emergency communications vehicles (ECVs) with satellite capabilities, and other forms of assistance, to assist in the relief efforts. Never before had we deployed so many to a single area. During the first 13 days of the crisis, over 104,000 calls were made through AT&T ECVs. We assisted the Louisiana State Police, the Louisiana National Guard, Stennis International Airport, NASA and others, including civil emergency communications authorities in Mississippi and Louisiana.

- One ECV and other equipment were provided to NASA's Stennis Space Center in Mississippi, in a complex that hosts several Federal agencies, and which also became an evacuee center. By September 1, we were providing NASA with Internet connectivity and a phone bank, which has been used by shelter managers to make outgoing calls on behalf of area shelter residents.
- We provided diesel-powered generators to Louisiana State Police Troop L headquarters in Mandeville, LA on Saturday morning, September 3. They had lost their back-up power generator that morning. We offered an AT&T generator until its own could be repaired or commercial power restored.
- We deployed satellite communications capabilities through an ECV at a National Guard staging and billeting center at the Alario Sports Center in Westwego, LA, a few miles southwest of downtown New Orleans. We provided phone lines and Internet connectivity for the command staff, which it did not otherwise have available. Separately, we also enabled troops there to communicate with their families and others.
- We deployed communications facilities, including an ECV with satellite communications, near the Loyola Bus Station in downtown New Orleans—the station

had been converted into a holding location for prisoners. The service was provided for public and administrative use.

- On September 3rd, our restoration, repair, maintenance and clean-up efforts added an air wing as one of our helicopters and that of a vendor were put to use, partly to provide support and also to patrol seven of our own fiber routes in the area to ensure that the routes remained safely in place and unobstructed.
- Network operations provided several phones for use by a temporary air coordination tower at Stennis International Airport. This was crucial because this airport became a focal point of relief flights and related efforts.
- Network operations gave generators and fuel to BellSouth to enable some of their facilities to remain in operation. BellSouth continues to use some of our generators.

The second part of our response was to provide relief to individuals, telecommunications services in support of charitable work, and to make our own charitable contributions.

- Working with Avaya, Cisco, and SBC, we helped establish a communications network for evacuees at the Astrodome, including more than 1,000 phone lines as well as data infrastructure.
- We established a phone bank to assist displaced college students to find alternative educational opportunities.
- We provided toll-free calling and 10 call centers for a successful fundraiser: "Shelter from the Storm: A Concert for the Gulf Coast."
- We are not billing any local or long-distance residential customers in southern Mississippi and the greater New Orleans area unless the customer originated home long-distance usage after September 1. This includes waiver of fixed monthly fees. We have also stopped all outbound bill collection efforts in Louisiana, Mississippi and Alabama.
- We are also helping our business customers get back in business by restoring services at damaged sites and augmenting their capabilities at new locations. We are waiving recurring and non-recurring charges at affected sites until businesses can re-establish operations.
- The AT&T Foundation also pitched in to address the needs created by this disaster. It donated $1.5 million[1] and 148 laptops to the Red Cross for relief efforts. It issued 35,000 pre-paid calling cards for distribution to survivors and evacuees.

IV. Lessons Learned

Each emergency situation presents its own unique set of challenges, and even the most thorough planning cannot take the place of ingenuity and resourcefulness when the unforeseen happens. That said, much can be anticipated, and we must plan and drill to address a variety of events on any scale. I am sure I join all of you in saluting our first responders and relief workers in their tireless efforts on the ground. But the importance of resourcefulness does not in any way obviate the need for very carefully thought out emergency planning led by seasoned professionals. In this respect, we believe that Katrina has taught us several lessons which we all must incorporate into future planning:

- *Establish and Practice Disaster Recovery Processes in Anticipation of Emergencies: Communications, Command and Control.* Communications resources can be brought where needed very quickly, but it is essential that there be clear lines of command and control at all times in order to direct those resources effectively and to the area of greatest need. Moreover, if because of the scale or nature of the disaster, some aspect of the plan affecting the command structure is not workable, an alternative must also be part of the plan and ready for implementation. Finally, without practice and drilling, no team will be ready, and no plan will be ready to implement.
- *Internalize the 3P Paradigm: Preventative Action, Proactive Focus, Predictive Models.* It is crucial to invest in facilities and plan and drill regularly and thoroughly for a wide variety of contingencies. Investment cannot be deferred and possible scenarios ignored. We cannot wait for a disaster to occur before we are prepared to move aggressively.

[1] This figure includes $500,000 in matching funds for donations from AT&T employees.

- *Pre-Position Physical Resources at Optimal Locations for Fast Response—Sheltered and Above Sea Level.* This lesson certainly seems obvious now, but the fact remains that it was not always easy to do or done in New Orleans in a variety of different industries—telecommunications included. One strength of our response to Katrina was moving resources into the area quickly. Because we are a national corporation that created mobile resources to be deployed wherever needed, we are able to move our emergency resources far enough from at-risk areas to be out of harm's way, but close enough to be deployed quickly into affected areas.
- *Make Risk Analysis Routine: Harden Critical Infrastructure Where Indicated.* It is imperative to know what part of your infrastructure is critical to continued operation of the network in times of crisis and how to harden it as much as possible and to replace or restore it to the extent it may be damaged. Such analysis must be part of any risk assessment, and the assessment must be followed promptly by action.
- *Design Wireless Hubs for Worst-Case Scenario.* Wireless services in the Gulf Coast area suffered in Katrina's wake because of several perils. Some towers were simply blown over in the storm; others were knocked out due to flooding of the electronics at the base. Remaining towers were overloaded with rerouted traffic. Better planning for disastrous events is necessary and hardening and redundancy are crucial.
- *Establish Crisis Management Plan.* Every emergency situation is different, and even the best planning may not prevent things from going wrong. Thus, we need to prepare ourselves for that eventuality. Crisis management plans must recognize and allow for improvisation to adapt to the given circumstances.
- *Coordinate Restoration and Recovery Effort.* There should be no wasted effort in recovery operations. Everyone available should be participating, and there needs to be coordination so that efforts are not duplicated or in conflict with one another. The NCC and NCS played very positive roles in matching available resources to pending needs, and the FCC stepped in with leadership and authority as a clearinghouse for telecommunications recovery needs. It is essential that logistical information such as what roads are closed and what medical precautions need to be taken be readily available. Moreover, a recommendation we made after 9/11 still has not been implemented—companies who are crucial to the response to disasters such as AT&T should have special credentials designed for employees and accredited in advance in order to access disaster areas—AT&T employees only were able to respond and move mobile resources into the Gulf Coast area by virtue of their resourcefulness in talking their way into affected areas.
- *Design Five 9's of Reliability.* This storm again confirmed that telecommunications companies that design their networks to this standard—99.999 percent reliability—have excellent disaster recovery and response capabilities, as well as reasonably hardened networks. That is the only way to maintain this standard. In times of crisis, this capability becomes a vital national asset.
- *Interoperability and Spectrum Availability.* A crisis on the scale we saw in the Gulf Coast, and smaller challenges as well, demand a well coordinated information and communications delivery system. We must resolve the spectrum needs highlighted by the 9/11 Commission, among others, to provide first responders and others with a better and more effective means of communicating quickly and easily in an emergency.

IV. Policy Recommendations

These lessons learned lead to several specific policy recommendations. These include:

- Make additional spectrum available for public safety purposes, and ensure that all first responders can access it in a coordinated and interconnected fashion.
- Furnish standardized and approved emergency credentials to vital communications and other infrastructure providers in advance, so that AT&T and other specialized disaster staff can get into affected areas to restore vital capabilities without delay or interference. While our teams were given letters from state officials authorizing them to enter impacted areas, those were not necessarily recognized by security and other personnel in the field.
- Predetermine security needs for law enforcement deployment to protect critical infrastructure facilities immediately following a disaster.

- Establish and routinely exercise mechanisms for improved public/private coordination, communication, and leadership across all essential disciplines. In this emergency, many of the challenges were operational, not technical. For example, we needed testing of the air and water to assess the risks to our teams, advice on medical precautions that should be taken given the flooding and fires, crucial logistical information such as notice of road closings, flyover authority, and overnight accommodations for our technicians (who slept in trucks because military bases were closed to them). Better communication and coordination across the range of public and private responders would improve operations.
- Drill for emergencies under various different scenarios frequently, and include the public and private sector. Do not be satisfied with a written plan. Resolve all command and control issues.
- Consider subsidizing some emergency preparation by infrastructure companies since the government is likely to call such capabilities into use or would otherwise need to duplicate resources inefficiently.

We can never anticipate every contingency in an emergency, nor can we assure a foolproof communications network all the time under all circumstances. Nonetheless, at AT&T, we have done much to ensure reliability and restorability of communications networks and together—as an industry and as a nation—we can do more. I thank you for holding this hearing to advance this important discussion.

The CHAIRMAN. Thank you all very much. That's a marvelous series of statements. I've just gotten word this morning that 70 of the 400 TSA screeners at Houston's airport showed up. The problem really is of getting people to report for work as their families have to be evacuated. Did you experience that in general in terms of your operations during the disaster, the Katrina disaster? Mr. Smith.

Mr. SMITH. Mr. Chairman, we really had not experienced a significant amount of that. Our people I think come from a service ethic and, in fact, many even after losing their homes showed up at some of our facilities, our work centers, and said "I'm ready to go to work." And that's one of the things that we learned through the long history of hurricane experience we have, is that we've got to help our people be able to know their family's cared for, know they've got shelter, and that's why we started building these tent cities, so we have gained the experience to be able to come in, set it up, let our employees know that their families are well cared for so they can go to work and start helping us restore, so it's been a very limited problem for us.

The CHAIRMAN. And have you had any problems that way?

Mr. ESLAMBOLCHI. We did not have, Mr. Chairman, any problems in that construct at all. Most of the problem that we faced was more on the logistical side, how do you get the people to the right location with fuel, batteries, and generators. That was more of a logistical problem for us, and technically and operationally I think that was a little bit more challenging for us in this case than it was in the case for 9/11 incident. But we did not have that problem. We were able to get the right people with a spirit of service and compassion that AT&T has, we know our people are putting a lot of focus on restoring service and helping employees and other people.

The CHAIRMAN. Mr. Roth.

Mr. ROTH. No, Mr. Chairman, we did not have that problem, but I will tell you that one of the key learnings is that as we prepare for Hurricane Rita we have asked our employees to take care of their families. We have employee volunteers from unaffected parts

of the country who are coming in to do their jobs so the technicians that will be manning and staying at our switching centers during the storm are actually volunteers coming from other parts of the country so employees in that area are able to take care of their families.

The CHAIRMAN. Mr. Citron.

Mr. CITRON. No, none affected.

Mr. ESLAMBOLCHI. Mr. Chairman, if I may just add that we have such a dedicated set of employees that one of our technicians with a Gulfport, Mississippi, location, one of our central offices, with 75 and 80 mile-an-hour wind, the roof actually lifted off and came back on, and they had water actually into the building, and that employee was so dedicated almost for about 12 hours were mopping the floor to ensure that the electronic equipment stays out of the water. So it was very, a heroic event that happened in terms of to protect the service.

The CHAIRMAN. Let me ask you just a general question. This may sound sort of stupid, but have any of you been advised by your legal sections that you don't have authority to do things you would like to do during an emergency like this?

Mr. ROTH. No, sir.

The CHAIRMAN. Mr. Smith, has anybody told you you can't do that, you don't have authority to do it?

Mr. SMITH. No, sir, we haven't seen that. We've had challenges on getting things that we need like priority security escorts and so forth, so one of the things that we hope will come out of this as I mentioned in my testimony is that we be treated as a critical responder. So it hasn't been something from inside the company, but I think from the local, State, and Federal Government issues have come up around letting our people into those areas.

The CHAIRMAN. Well, we're going to examine that. We think the FCC should have that authority to issue, in advance, the credentials for the responders and for those people that you need. We haven't solved the problem of security yet, and that I think has to be part of a disaster plan. Mr. Roth.

Mr. ROTH. No, sir. I would agree with Mr. Smith's comments.

The CHAIRMAN. Mr. Citron.

Mr. CITRON. In addition to the comments raised here there is one issue that affects us directly. We do not have the statutory authority from the FCC to get direct interconnection to necessary critical facilities or to have the ability to manage our own numbering pools, and thus during natural disasters we did lose, or one of our partners lost, critical infrastructure. And because we did not have direct access to those facilities, we were unable to re-route those calls as my other partners here would have been able to do. We would recommend in any legislative activity that the VoIP providers be provided direct interconnection to network tandems and to be allowed the assignment of numbers directly to us so that we can better manage in a natural disaster.

The CHAIRMAN. All right. Mr. Eslambolchi.

Mr. ESLAMBOLCHI. We did not have any legal constraints in executing our strategy around the disaster recovery supporting those services.

The CHAIRMAN. Are there any constraints in the anti-trust laws that prevent you from working together in a disaster scenario?

Mr. SMITH. No, sir, Mr. Chairman. In fact, one thing I should have pointed out that helped a great deal is the quick action from the FCC. There were some things we did to start porting numbers that normally would not be allowed or to start using facilities that otherwise would not have been allowed. The FCC acted very quickly in that regard, so I commend them for their help. In terms of collaborative activity, in fact, Mr. Eslambolchi and I talked on the day of the hurricane. We had people in the same building. We coordinated armed caravans to get into the building and make sure we had material and supplies. We actually coordinated calls with wireless providers and other carriers, so I think in the time of a service emergency we do what needs to be done.

The CHAIRMAN. Well, as you go back to your offices if you find that you have any such advice from your people, we'd appreciate knowing it. We expect to handle a comprehensive disaster preparedness bill. We're seeing it now. The Texas plan is being exercised two days in advance and they are moving now and probably will have less real human loss because of the fact their plan is being initiated right away. Senator Inouye.

Senator INOUYE. It has become evident that network providers such as traditional telephones whether they be computers, modems, wireless phones, or cordless phones, are very dependant upon commercial electricity and commercial power; whether it's for recharging or even batteries, and as a result these network providers have become very vulnerable to disasters of this nature. And my question is, what steps can we take to minimize this vulnerability or this dependancy? Because you may have the best equipment, but if you don't have the electricity you're out of business. And this has happened in Katrina, it will happen in Rita, and steps have to be taken. Is there a role for the government? And the second question is, are you satisfied that we're ready for Rita?

The CHAIRMAN. Mr. Smith.

Mr. SMITH. The case of the first point on commercial power, you're absolutely right. We are more and more dependent, and as we move to fiberoptic-based systems and even cordless phones in homes we find many consumers don't realize that their cordless phone now requires commercial power. So we have people who report their phone out of service when the phone is actually working, it's just lost commercial power. It is an issue. We deal with that quite often. We had four hurricanes in six weeks last year in Florida. We have over a thousand generators that we move into areas to supply key power. The thing that was unique to us in Katrina was the flooding and security issues inside the core part of New Orleans. We've never had a situation before where we couldn't get fuel trucks into those locations either because of security or flooding. We've started looking at how we might change that. We had already provisioned our equipment on upper floors to get it out of the water risk, but if you go for several days in that situation and you can't get tanker trucks into a flooded area, or you have security issues, that's a problem. So we're working on the possibility of natural gas and other things as backup, but sometimes in the event of a natural disaster natural gas systems shut off for safety reasons

as well. So we haven't determined a foolproof system yet, although we are exploring other options.

The CHAIRMAN. Mr. Roth.

Mr. ROTH. Senator, in answer to your first question, the wireless network that Cingular uses has redundancy. We do depend on commercial power. We also have battery power as backup and we have generator as backup. What did make this storm unique from any other storm or disaster we've faced was the flooding, also flooded our generators, put them under water, and those that were not under water were inaccessible. We tried to float fuel into them, but it was not easy. That was the thing that was most difficult about it. I think that situation's quite unique. As your second question relates to Hurricane Rita, we have staging centers currently set up like the ones we had for Hurricane Katrina. We have staging centers in both San Antonio, Texas, and just outside of Dallas to move into the Houston/Galveston areas. We are prepared, I think, even better prepared for this one, because it's our anticipation of the water as it rises and surges will also retreat back to the ocean and will allow us quicker access back in whether it's for power or the restoration of the towers or anything else that is damaged in the storm, sir.

Mr. CITRON. While we also employ battery backup mechanisms as well as generators powered by diesel fuel, I think we miss the fact that the underscored importance of the electrical transmission system that exists in the United States. We have seen major blackouts in the Northeast not too long ago that crippled a lot of our telecommunications infrastructure. I think the underscoring message is while there's a lot that we can do with generators and power and fuel, there's a lot to be done with the electrical network itself that could add resiliency and redundancy to it in delivering that power down to critical communications infrastructure and even down to people's homes. As we now prepare for Rita as well, I think that we as a nation have learned a lot of lessons, and as a company I know that we are fully prepared for the impact of that storm.

Mr. ESLAMBOLCHI. We do have a significant amount of generator backup which uses normal fuel. We also have battery backup. Some of them go as much as days, some of them as much as 12, 14 days, couple of weeks of support, but clearly we need alternative sources of energy. I believe fuel cell technology is coming up very quickly to the research and the development. I think we need to think very hard about some investment in that area. I think it's going to really pay off big dividends. We could ask equipment providers to think about fuel cell technology as they develop new technologies that require power in that space. I also think we need to really fundamentally think about different ways to protect the reliability that is very close to what I call five nines of reliability. If you think about the public-switched network, it was designed for many, many decades. The mentality has always been around five nines of reliability, which means it's not just having a backup generator or backup power, you also have to protect yourself against flooding. So, you know, when you look at the New Orleans office, you know, we built the New Orleans office with BellSouth with 40 foot submarine walls. So we don't want to have the water get into the

building. So you have to think about something called the process 101 engineering you have to do in designing big telecommunication infrastructure, whether it is a public-switched network, whether it's PSAPs systems, or whether it is VoIP 9-1-1 or VoIP services, these are all fundamental structures that have to be in place, and everybody does it differently. There is no unique method, methodology that exists, and if you do the best practices and given the knowledge and experience that we have in this industry, if you apply that knowledge at the best in class to the other industries we could literally provide significantly more resiliency and reliability, not only for VoIP infrastructure but also for a cellular infrastructure which literally doesn't exist at a high level today across the country.

The CHAIRMAN. Thank you very much. Senator Burns.

Senator BURNS. As I go over your testimony here, most of it was loss of power. Most of you had redundant systems, systems that you could switch, but I agree with you that getting power—when the electricity goes off, everything goes off. I was interested, Mr. Smith, in your testimony on policy recommendations, you think your losses down there will be around $400 to $600 million. That's quite a bit. Do you carry any protection in your company for business disruption or anything like that, that you're reimbursed for if you hit a catastrophe like this?

Mr. SMITH. We have some coverage that primarily takes care of our building structure, but after Hurricane Andrew in South Florida, we were insured up until that point. After Hurricane Andrew we could no longer get insurance for outside plant facilities so the bulk of that damage of $400 to $600 million will not be insured.

Senator BURNS. In other words, you're recommending some sort of a tax situation so that you can recover that?

Mr. SMITH. We think that would be one mechanism, yes, sir, for helping us recover what will be at least two to three times larger than the largest storms we've ever faced. And as we pointed out earlier, many other people rely on our infrastructure as well, so we think one of the things that could help would be tax incentives.

Senator BURNS. I want to ask the panel, now, being as you were wiped out in certain areas, does this give you an opportunity for the deployment of new technologies and do some things differently than you've done before? And give me an idea of what those would be.

Mr. SMITH. I'll give you one example to start with. We do intend to build back anything that needs to be replaced with state-of-the-art infrastructure. That will include packet-based including voice-over IP systems, fiberoptic systems. So what we're doing right now is we're in the phase of trying to provide immediate restoration for emergency services. In Pass Christian, for example, we had a 5,600 line office. There's very little left other than police and fire and emergency services. So we're trying to get their service back and have established that. Then we'll come back and put state of the art facilities in that will be packet-based and fiber-based, and we think it does provide new opportunity.

Senator BURNS. Interoperability?

Mr. SMITH. Absolutely.

Senator BURNS. Mr. Roth.

Mr. ROTH. Senator Burns, we intend to rebuild the area, and we will build it with the technology that we were currently using which is state of the art in the wireless network.

Senator BURNS. Mr. Citron.

Mr. CITRON. Sure. I think there's an interesting opportunity for an industry as a whole to look at how you might go about rebuilding New Orleans and other affected areas, giving the opportunity for new players and new technology into the markets to build additional redundant systems so that we don't have one network owned by one operator, even several networks owned by a limited number of operators. Some of the infrastructure might include the ability to deploy new and competing fiberoptic network, new and competing WiFi networks, new and competing WiMax networks, and new networks to take advantage of additional frequencies that might be opened up.

Senator BURNS. We've got the complaints about your E–911, your 9-1-1 calls do not go through on voice-over IP. What's the barrier there?

Mr. CITRON. The primary issue with voice-over IP, E–911 and its deployment largely rests with our ability to access that infrastructure. As I had mentioned earlier and have testified to as such, there's no statutory obligation for infrastructure owners to provide us access to all the necessary elements in order to complete voice-over IP E–911 calls. This has been the largest barrier to Vonage's deployment. Only recently under the help of the FCC and its encouragement have other operators been able to open up their networks and start allowing entry into commercial arrangements. For example, we do have a commercial arrangement with BellSouth. Mr. Smith and I have worked very hard on making that commercial relationship a reality, but there are over 6,000-plus different individual local first responder locations known as PSAPs that we still need to contract with and work through in order to get this entire nation online and we are making great progress in that area.

Senator BURNS. Is the barrier at the PSAPs?

Mr. CITRON. The barrier is everywhere. It starts with access to the selective routers that switch the calls, the trunking facilities necessary to access those facilities, the requirements of meeting different, very different and very local standards for PSAP activity, the testing of all 6,000 PSAPs in this country to provide reliable service, and the lack of liability protection.

Senator BURNS. Mr. Eslambolchi.

Mr. ESLAMBOLCHI. We have been transforming our AT&T network for many years. We have been moving to an IP and MPLS infrastructure. So it's primarily we carry more IP traffic today than we carry voice traffic across the network, but clearly New Orleans offers a green field approach as we try to rebuild that infrastructure itself and there are many dimensions. You can take a look at that infrastructure itself. At the network layer, you can look at fiberoptic cables, you can think about new technology such as passive optical network and this is used in terms of fiber to the home, for example, environment itself. I also have a strong belief system around the wireless technology, not only in this country but also globally, because I think the wireless technology will dominate the telecommunications for many decades to come. There are ad hoc

mesh wireless networks, so if one link fails there's a resilience and redundancy built into the wireless infrastructure. There are new technologies such as cognitive radios. Chairman Martin talked about smart antennas. I think these cognitive radios primarily eliminate the need for any licensed spectrum, so you really don't necessarily have to rely on FCC. The technology is very sophisticated, enough that it will detect the best signal as you're trying to relay the traffic. You can do it very, very quickly. On the power line also I think the question came up earlier on the power line infrastructure, clearly, the power is the most dominant factor for any telecommunications, and most of our power lines were actually built almost a hundred years ago. We have built our cities for horses and buggies, and we're trying to put the 21st Century technology and application into a 20th Century infrastructure. Directly burying the fiberoptic cable and directly burying the power lines I think becomes very important with the very sophisticated dock system that will protect you against the flooding and all kind of attributes becomes a very important technological aspect.

There's one other technology if I may just kind of add on is what I call the sensor networks, wireless sensor networks. For example, in the event of the logistical problem for us to get fuel to specific locations was a big problem because we didn't know which roads are closed, which roads are open, which roads there are trees on that we can't get the trucks into and get fuel into a location. If there are sensor networks available and including ultra-wideband imaging type technologies, we can correlate all that information and make that available to the carriers so we can get the fuel, we can get support directly out to the right people, the right infrastructure, and that was kind of a lessons learned from this infrastructure that hopefully we can apply for all the disasters. Hopefully, nothing will happen, but clearly we have to be prepared for any kind of disaster as we go forward.

Senator BURNS. I want to reiterate what I thought before because you made a remarkable recovery down there in a very short time after that storm, more than we could ever do as a Federal Government, and what I have always said, you know, we should step back and get out of the way and let you all do it and then if you need some help, well, let us know and we'll help you. I've said that and I think local governments and state governments work much more efficiently than the Federal Government and there again the same statement would be true, whatever your shortcomings are, whatever replacements you have to be made or whatever, we can handle that from up here. But as an initial person going back into restoring some sort of way to make our communities work, you all do it quicker than anybody. And your people are to be congratulated. I know of people that work for telephone companies and power companies, they do have that mentality. They just seem like they forget everything when they hit the pole, so to speak. They're just—that's that mind-set. We have to get it up, we got to get it going. And I congratulate you for that and I think we'll be in dialogue as we move along on legislation regarding how voice-over IP is going to affect and how it works with, your system and your system, and your system and how we can make this work in an area where communications is our life blood al-

most. So I congratulate you on this, but I think it offers us some opportunities, some real opportunities, that when we build back we will be better and we will—our technologies, but if we need some policy changes to make some things happen that's what we're about up here. Give us an idea of how these systems, how they do interoperate and some of the barriers that have to be taken down and redone in order to make all your systems work and talk to one another. The smart radio I've always said we've always had the ability to build a smart radio to change frequencies and to talk to one another. I've always said the State police could always talk to the sheriff's department if they just could flip a switch and get on their frequency. My gosh, we do that in an airplane every day. If you're sitting up there flying an airplane, we change frequencies for every control center, every ATC, every departure, and every landing. We know the technology's available. Now, the next thing is getting I suppose enough money into those centers—I hear you pecking over there, Mr. Chairman, I want to make a point here—that the reason we passed E–911 was to let those PSAPs and these people who depend on interoperability to buy the equipment. It's not that we don't have it. It is just putting it in a little box. I mean, you don't need a big console like you've got on your board on an airplane. But, in other words, you can change frequencies and talk to one another. We have that capability now, and now it's getting the money to them to make sure that it works. We've even had—we had one company down there that was integrated, telephone, wireless, and wireless and radios, they were set up in an hour and a half down there and were clearing for the emergency situations. Those—they're available and what we have to do is make sure the policy is right so it's deployed. Thank you very much, Mr. Chairman. I just wanted to make that point. There, now you can peck all you want to over there. Thank you for your testimony today.

The CHAIRMAN. Thank you very much for joining us. Again, I would urge that if you do, as you return to your offices, discover there are things that we should know that we might be able to assist you with future actions, let us know. And I think Senator Burns speaks for all of us, your people handle the life-line to not only those who are in danger, but those who want to know if their family, their people have survived, and it's a fantastic capability that you've developed. So we thank you for what you've done in this emergency. We hope that you're prepared for the next one, but in any event we're here to try and make changes in the law to ensure that, as we go forward we've learned from these disasters. We're going to have a hearing on interoperability. As I said it's scheduled for next Thursday morning. If you have any suggestions concerning that hearing, we'd be pleased to have them.

Senator Inouye and others have asked if they could submit some technical questions to you for your assistance. I would appreciate it if we do that if you'd respond to them so we can try to include your remarks in the record. The record will remain open for seven days to make sure that we've got a chance to put those responses in the record and we will use them as we mark up these bills.

Again, we thank you very much for your cooperation and for your service to the country.

[Whereupon, at 12:25 p.m., the Committee adjourned.]

APPENDIX

PREPARED STATEMENT OF HON. GORDON H. SMITH, U.S. SENATOR FROM OREGON

Thank you. Mr. Chairman, for holding this important hearing to examine the Nation's critical communications infrastructure and how it can be protected before, during, and after a disaster.

I would like to welcome Chairman Kevin J. Martin of the Federal Communications Commission (FCC) our esteemed witnesses from BellSouth, Cingular Wireless. Vonage, and AT&T. Thank you all for your dedication to the difficult task of rebuilding the various communications networks damaged by Hurricane Katrina in the Gulf region.

As we begin this review of our Nation's communications capability in the event of a disaster, I would like to highlight the importance of ensuring that the unique needs of the elderly are incorporated into all emergency communications plans.

Many elderly citizens live alone and suffer from physical ailments or mental diseases. As a result, widely used forms of communications are not always an effective means of informing the elderly of a disaster and the need to quickly take action and reach safety.

For example, some elderly individuals have hearing impairments that prevent them from clearly hearing a siren or other urgent communication messages, while others suffer from mental conditions like Alzheimer's and are unable to comprehend the message being communicated and the need to take immediate action.

It is imperative that we effectively reach out to the elderly citizens who live by themselves and address the specific needs of the elderly as we move forward in crafting emergency communication plans for our citizens.

I would also like to draw attention to the important role the Universal Service Fund plays in supporting our critical communications infrastructure, particularly in times of disaster.

Recently, the FCC announced its intention to use universal service funds to rebuild communications networks in Louisiana, Mississippi, and other areas affected by Hurricane Katrina. The FCC's proposal would make approximately $211 million available to consumers, schools, libraries, healthcare providers, and telecommunications carriers affected by the hurricane.

I join Chairman Stevens in commending the FCC, under Chairman Martin, for its leadership in directing the Universal Service program to play a significant role in the reconstruction effort. The FCC's rapid response to the hurricane crisis is indeed laudable, and an important first step in rebuilding the communications infrastructure.

Unfortunately, the heightened demands on the fund are likely to further threaten its long-term solvency. For some time, the pool of money from which the fund draws—interstate revenues—has been shrinking, while demand for support from consumers, schools, libraries, healthcare facilities, and telecommunications carriers has increased.

Now more than ever, the Committee must take up reform of the Universal Service system to ensure that it is robust and sustainable in the long term. A bill I introduced in July with Senators Dorgan and Pryor addresses this critical need.

The "Universal Service for the 21st Century Act" does two important things. First. it directs the FCC to revise the Universal Service Fund contribution mechanism to ensure the sustainability of the fund. Second, it creates a new account within the Universal Service Fund that will be used to build broadband networks in unserved areas of the country.

By reforming universal service and spurring the deployment of broadband, our legislation will ensure that our nation's communications infrastructure will continue to grow, and to be the robust and connected network that Americans expect and deserve. These considerations are particularly important in light of the damage visited on communications networks in the Gulf region by Hurricane Katrina.

Again, I would like to thank our witnesses for their efforts in this difficult time, and I look forward to their testimony.

○