



2005 Hurricane Response

INFRASTRUCTURE SECURITY AND ENERGY RESTORATION

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2005 Hurricane Response

INFRASTRUCTURE SECURITY AND ENERGY RESTORATION

- **Timeline**
- **Hurricane impacts to energy infrastructure**
- **DOE's emergency preparedness activities**
- **DOE's ESF-12 responsibilities**
- **DOE's response activities**
- **Lessons learned**





Timeline of Events

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Hurricane Katrina:

Katrina made U.S. landfall on August 25, 2005 as a category 1 hurricane near Miami. However, on **August 29**, the hurricane hit the Central Gulf Coast near New Orleans as a **category 4** hurricane.



August 25, 2005

Hurricane Rita:

Rita measured winds up to 120 mph and caused renewed flooding in New Orleans, which was still recovering from Hurricane Katrina.



September 24, 2005

July 10, 2005

Hurricane Dennis:

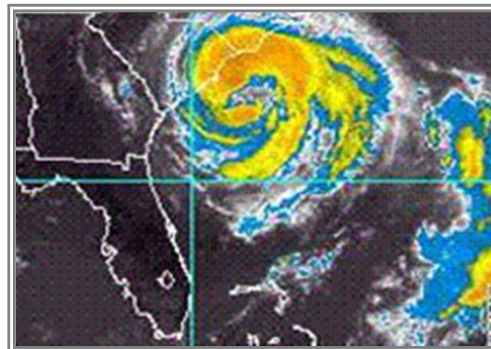
Hurricane Dennis was the fourth named storm and the first hurricane of the 2005 Atlantic hurricane season. It made landfall in Florida as a category 3 hurricane on July 10.



September 14, 2005

Hurricane Ophelia:

On September 14, the hurricane was located about 40 miles south of Wilmington, N.C. Hurricane Ophelia was a slow moving storm changing from tropical storm to hurricane four times.



October 8, 2005

Hurricane Wilma:

On October 15, Wilma was a category 5 hurricane located off the SE coast of Cozumel, Mexico. By October 24, the storm was a category 2 storm located off the coast of West Palm Beach, Florida. It made landfall twice – in Mexico's Yucatan Peninsula and in the Florida Keys.

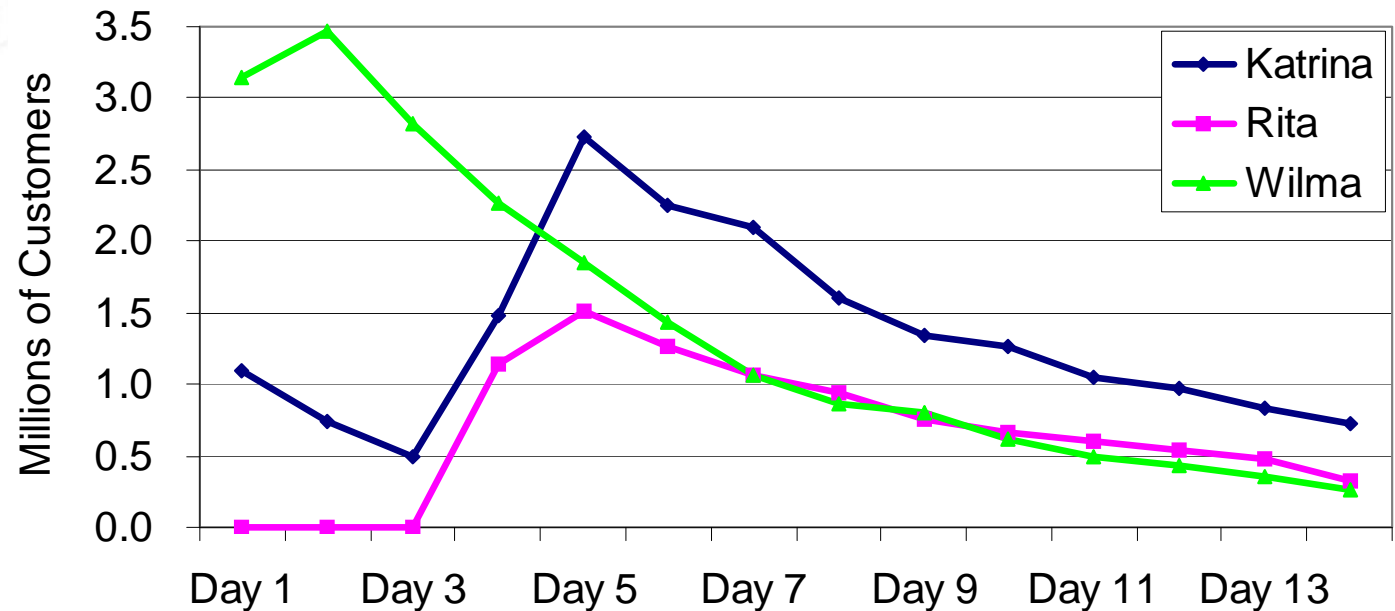


Electricity Outages Caused by Gulf Coast Hurricanes

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Sources: State Emergency Operations Centers
Photo: AP/Taylor Jones.

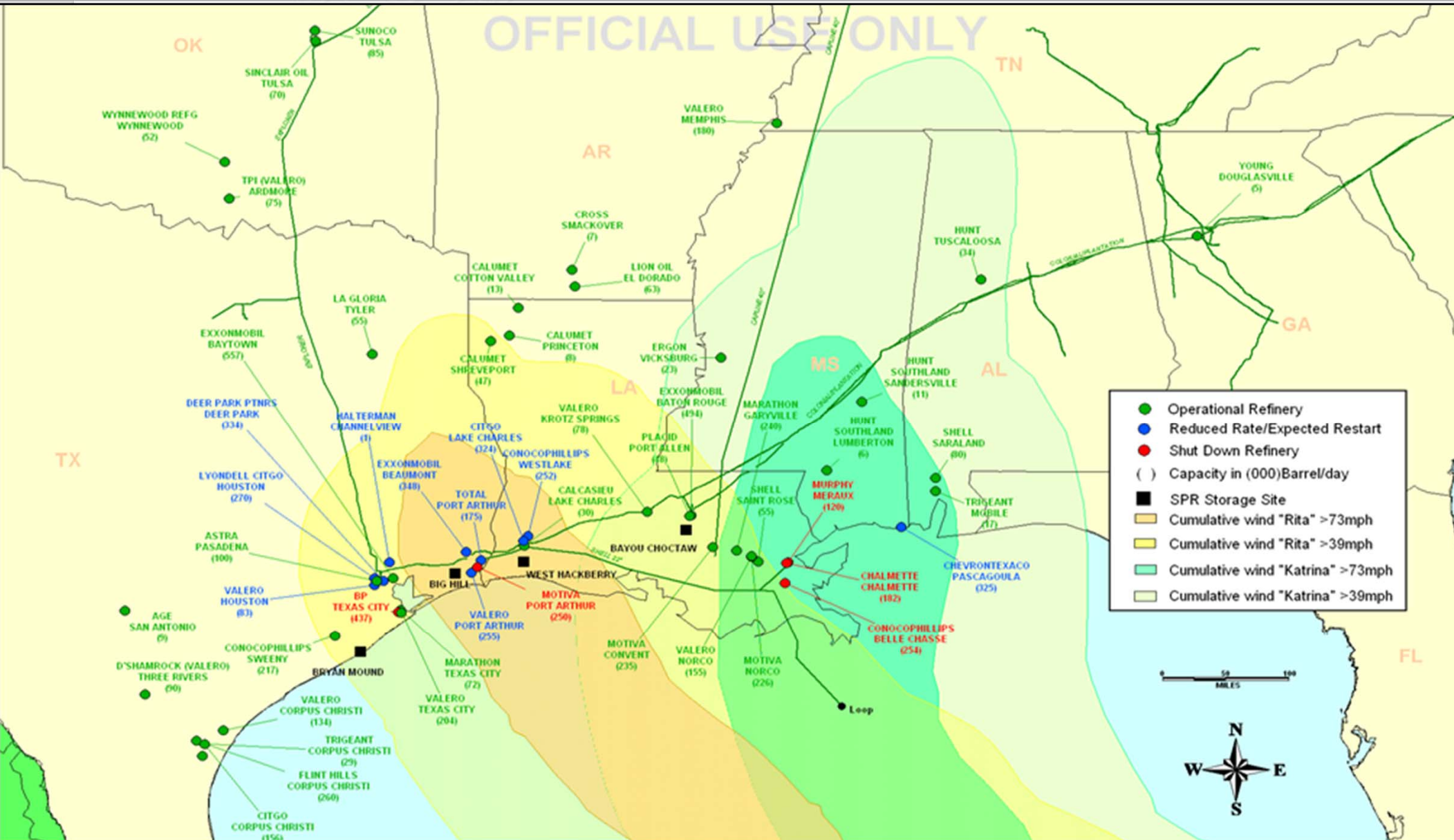


State	Million Residential Customers	Worst Day Outages by Hurricane		
		Katrina 8/30/05	Rita 9/25/05	Wilma 10/25/05
Alabama	2.0	0.8	-	-
Arkansas	1.2	-	-	-
Florida	7.7	0.2	-	3.5
Louisiana	1.9	0.8	0.7	-
Mississippi	1.2	0.9	-	-
Texas	8.5	-	0.8	-
Total	22.5	2.7	1.5	3.5



Gulf Coast Refineries in Path of Hurricanes

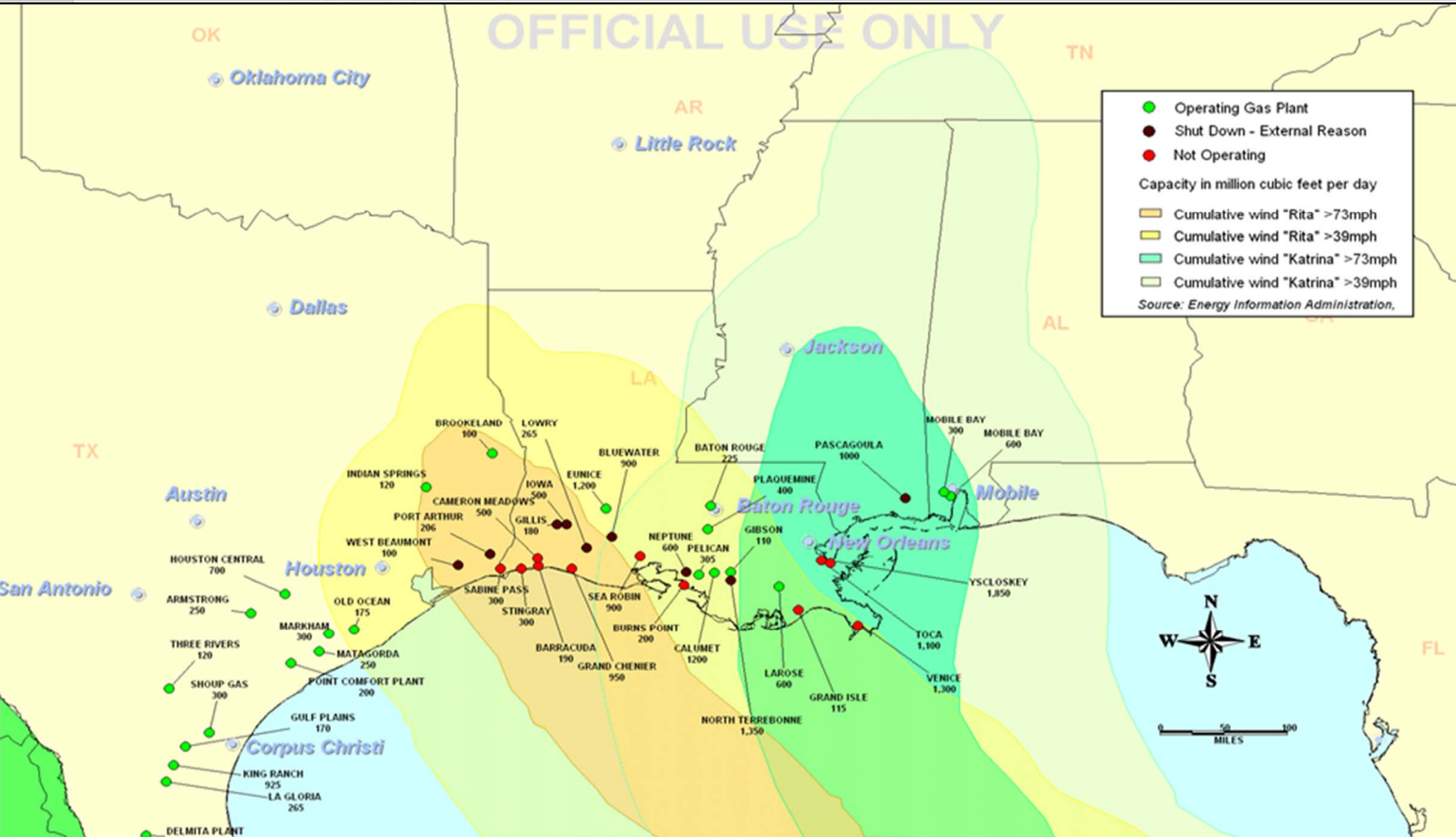
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Gulf Coast Natural Gas Plants in Path of Hurricanes

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Hurricane Impacts to Offshore Infrastructure & Access Roads

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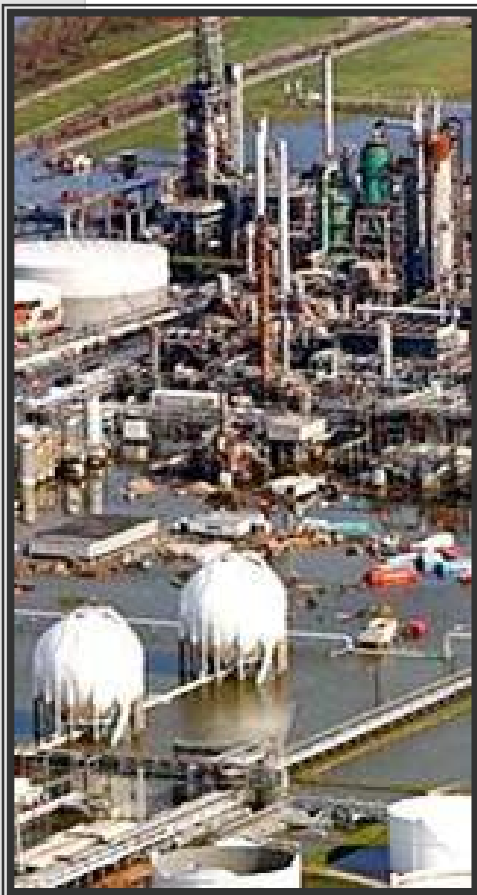


Sources: U.S. Coast Guard, DHV International, AP, and PennWell.



Oil & Gas Outages Caused by Gulf Coast Hurricanes

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Oil & Gas Production & Refining	Pre-Katrina Production	Worst Day Outages		Latest Outages
		Katrina	Rita	
	8/24/2005	8/30/2005	9/25/2005	1/26/2006
Crude Oil Production				
Million Barrels per Day	1.5	1.4	1.5	0.4
% of Gulf Production	100%	93%	100%	25%
% of U.S. Production	29%	27%	29%	8%
Natural Gas Production				
Billion Cubic Feet per Day	10	8.8	8.05	1.3
% of Gulf Production	100%	88%	81%	13%
% of U.S. Production	19%	17%	15%	3%
Refining				
Gulf refineries (number)	46	11	20	2
Million Barrels per Day	7.9	2.5	4.9	0.6
% of Gulf Capacity	100%	32%	62%	7%
% of U.S. Capacity	46%	15%	29%	3%
Petroleum Pipelines				
Crude Pipelines Shutdown	None	LOOP; Capline	LOOP; Sun; Seaway; TEPPCO	None
Crude Pipelines Reduced	None		Capline	None
Product Pipelines Shutdown	None	Colonial; Plantation; Dixie	Explorer; TEPPCO; Longhorn; Dixie	None
Product Pipelines Reduced	None		Colonial	None

Sources: EIA, MMS, and DOE Hurricane Situation Reports

Photos: MSNBC and IllinoisPhoto



DOE's Emergency Preparedness Activities

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- **Lead agency responsible for coordinating the Infrastructure Security requirements of the Energy Sector (HSPD-7)**
 - **Lead agency for energy under the National Response Plan**
 - **Provide guidance to states in the development of energy assurance plans**
 - **Integrate into Federal and State Emergency Operations Centers**
 - **Work directly with utilities to help with the restoration and rebuilding efforts to include incorporation of best practices and emerging technologies**
 - **Perform pre-storm predictive analysis on infrastructure impacts**
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DOE's Emergency Support Function 12

Responsibilities

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- **Consult with and provide guidance to Public Service Commissions and utilities for restoration of energy during response and recovery operations**
 - **Serve as the federal focal point for issues and policy decisions relating to energy in all response and restoration efforts**
 - **Collect, assess, and provide information on energy supply, demand, and prices as well as contribute to situation and after-action reports**
 - **Monitor energy system damage and repair work and identify the supporting resources needed for their restoration**
 - **Deploy DOE response teams to affected areas to assist in response and restoration efforts**
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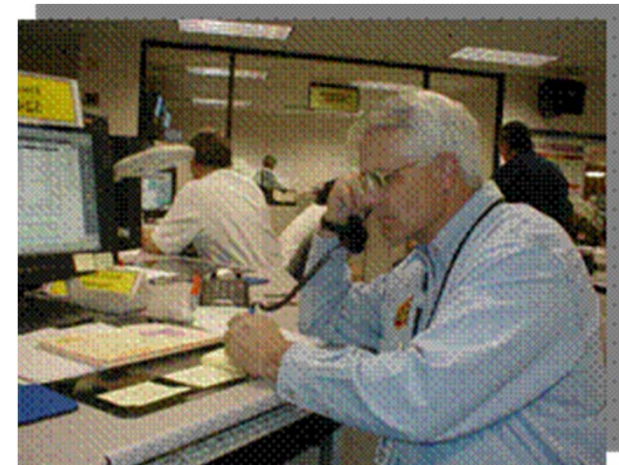


DOE Hurricane Deployment

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DOE and OE deployed over 50 energy emergency response experts

- Responders were deployed from DOE Headquarters, the National Energy Technology Laboratory (NETL), DOE's Richland Field Office, DOE's HAMMER facility, Pacific Northwest Site Office, Bonneville Power Administration, Energy Information Agency, Oak Ridge National Laboratory, and the DOE Regional Field Office in Atlanta.
- OE staff were deployed at the following locations:
 - Interagency Incident Management Group at DHS Headquarters
 - National Response Coordination Center (NRCC) at FEMA HQ
 - FEMA Regions RRCC IV in Atlanta, GA and VI in Denton, Texas
 - **State EOC in Clanton, Alabama**
 - State EOC and the FEMA Joint Federal Office in Baton Rouge, Louisiana
 - **State EOC in Jackson, Mississippi**
 - **State EOC in Tallahassee, Florida**
 - Interim Field Office in Orlando, Florida
 - **State EOC in Austin, Texas**
 - **State EOC in Columbia, South Carolina**
 - State EOC in Raleigh, North Carolina
 - U.S. Northcom in Colorado Springs, Colorado
 - **FEMA PFO in New Orleans, Louisiana**
 - **New Orleans EOC in New Orleans, Louisiana**





DOE Hurricane Response Activities

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Waivers

- **Worked with Environmental Protection Agency (EPA) to issue gasoline and diesel fuel waivers nationwide**
- **Worked with Department of Transportation to secure driver and weight limited waivers for delivery of fuel and generators to affected areas**
- **Worked with Department of Homeland Security to waive Jones Act restrictions on tankers**





DOE Hurricane Response Activities

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Texas PUC Tiger Team

- **Helped coordinate restoring power for the Lake Livingston pump station, a major supply source for the Houston area**
 - **Issued an emergency power order to provide power in Eastern Texas while electricity infrastructure was being repaired**
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DOE Hurricane Response Activities

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- **Performed damage assessments of energy infrastructure**
- **Monitored developments and issued authoritative Situation Reports**
 - Reports issued once or twice a day documenting facility shut-ins, outages, post-event assessments, and restoration efforts.





DOE Hurricane Response Activities

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Assisted with coordinating restoration of power to Collins, Mississippi Fuel Terminal

- Collins is home to numerous fuel terminals serving consumers in Alabama and Mississippi
- Home to the both the Colonial Pipeline and Plantation Pipeline, which provide petroleum products to the East Coast



Source: Colonial Pipeline



DOE Hurricane Response Activities

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- **Ensured #2 diesel was provided to utility pole companies to ensure the uninterrupted production/treating of poles.**





DOE Hurricane Response Activities

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- **Coordinated restoration priorities (involving national impacts)**
- **DOE does not set restoration priorities**





Technology Opportunities

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- **Communications and Controls**
 - **Wireless and Sensor Networks**
 - **Microgrids**
 - **Energy Storage**
 - **Substation Design**
 - **Advanced Planning Models**
 - **Energy Efficiency Improvements**
-



Lessons Learned

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Plans for near and long-term recovery:

- Provide electricity suppliers with access to DOE R&D capability to facilitate transmission response and restoration efforts
- Work with States to assess natural gas curtailment plans for winter heating season
- Work with States to implement State Energy Assurance and Preparedness Guidelines
- Examine the lessons learned for the energy sector
 - *2006 Energy Leadership Forum*





Lessons Learned

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DOE emergency response:

- **Transportation and lodging difficulties**
 - **Flood damage models not available**
 - **Communication issues at all levels**
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Questions?

<http://www.oe.netl.doe.gov>

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