Impacts of Hurricanes Katrina & Rita Upon Entergy’s Electrical Transmission and Distribution Systems

Presented by:
Jeff Spillyards
Entergy Services, Inc.
Environmental Management
We’re experienced at restoration...

- Andrew (Aug 1992) 250,000 customers
- Ice Storm (Feb 1994) 240,000 customers
- Georges (Sep 1998) 260,000 customers
- Dual Ice Storms (Dec 2000) 236,000 and 247,000
- Lili (Oct 2002) 243,000 customers
- Cindy (Jul 2005) 270,000 customers
...are recognized at being good at it...

- Received the EEI outage response or outage assistance award every year for the last seven consecutive years
- Only utility to have won every year since the awards have been offered.
...utilizing a proven organizational approach...

System Outage Response Command Structure

System Command Center
Jackson

Transmission Command Center
New Orleans/Jackson

Distribution Operations Command Center
(Located at states’ Dist Ops HQs)

Other Entergy Business Units
(Fossil, Nuclear, Cust Service, Corp Communications, HR, Financial, etc.)

Transmission Grid Managers

Transmission Ops Centers

Region Command Centers

Line Area Command Centers

Distribution Ops Centers
...and we strive to continuously improve.

- **Annual drills:** April 2005 drill scenario was Cat 4 impacting New Orleans with 20’ flooding
- **Meetings with local officials & media (May 2005)**
- **Plan Improvements - Spring 2005:**
  - upgraded evacuation process
  - internal “IE StormNet” launched
  - upgraded external web site
  - improved outage mapping applications
  - incorporated lessons of 2004 Florida storms
Environmental Management’s responsibilities: development of environmental emergency response plan...

**Environmental Management’s responsibilities:**

- **Development of Environmental Emergency Response Plan:**

This document details the responsibilities of Environmental Management (EM) and its impact on the prevention and response to environmental emergencies. The EM responsibilities include developing an emergency response plan that outlines procedures for identifying, assessing, and responding to environmental emergencies. This plan must be comprehensive and adaptable to various types of incidents, ensuring that EM personnel are adequately trained and equipped to handle any emergency situation.

**Scope:**

This document focuses on the EM responsibilities related to environmental emergencies, including the development of an emergency response plan. It details the processes and procedures that EM must follow in the event of an environmental emergency, ensuring that necessary actions are taken promptly and effectively. The EM responsibilities are outlined to ensure that environmental emergencies are managed efficiently and safely, minimizing any negative impact on the environment and the community.

**Delineation of Responsibilities:**

In the event of a major environmental emergency, the EM responsibilities are essential in coordinating the efforts of various stakeholders. The EM responsibilities include:

- **Development of Environmental Emergency Response Plan:**
  - This plan outlines the procedures for identifying, assessing, and responding to environmental emergencies. It must be comprehensive and adaptable to various types of incidents, ensuring that EM personnel are adequately trained and equipped to handle any emergency situation.

- **Interface of the EM DOA&TG EO&R Coordinator with the DOA and TG EO&R Organizations:**
  - It is essential that an assessment of the environmental damage within the area affected by the emergency is carried out as soon as possible. This assessment will be conducted by personnel from the EM division, who will communicate the results to the DOA and TG EO&R organizations. The information will be gathered by personnel doing the electrical assessment, if necessary, and communicated to the EM DOA&TG EO&R Coordinator as soon as possible. This information will be required for communication to regulatory agencies, environmental emergency response contractors, and the EM System EO&R Coordinator. The EM DOA&TG EO&R Coordinator(s) may provide direct support to the DOA or Transmission Grid EO&R Organization in compiling this information, as necessary.

- **Interface between EM DOA&TG EO&R Coordinator and Out-of-DO-Area or T Grid EM Support:**
  - If the size and nature of the incident dictate that additional environmental emergency response contractors are needed, EM support will be provided. This support will include coordination with other DO Areas or T Grids that may be affected by the incident. EM will coordinate with these contractors to ensure that support is provided as necessary.

- **EM EO&R Organization Standard of Support:**
  - Environmental support actions pursuant to the EO&R will be conducted in accordance with all applicable federal, state, and local regulations. Typically, regulatory agencies are preemptively notified when major storm incidents occur and are periodically updated as to the status of the recovery process and the magnitude of environmental damage sustained in the storm area.

**Entergy Logo:**

[Entergy Logo]
Environmental Management's responsibilities:

Emphasizes pre-storm notifications to:

- Environmental response contractors
- Material/equipment suppliers
- Salvage/disposal vendors
- Analytical laboratories
- Regulatory agencies
Environmental Management's responsibilities:

- Develop drill scenarios
- Parallel and independent of main drill
- Parallel and dependent on the mail drill
- X Part of the mail drill
- Day One PM
- Day Two AM
- Day Two PM

Message for Group: **AFFECTED NETWORK(S)**
Scenario Time: **POST LANDFALL**

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**Message Statement**

Crews are scheduled to restore service into a large petrochemical complex. This facility has sustained heavy damage to its chemical storage facility. Cleanup of released chemicals has not been completed.

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**Expected Actions to be observed**

What actions need to be taken?

Explain/Demonstrate the process for contacting your Environmental Support representative.
Katrina’s projected path changed late

After crossing lower FL peninsula, originally projected to hit panhandle...

...but moved much further west.
Landfall
And then the breach...
Aftermath...
Aftermath: impacts to the electrical system...
The destruction was widespread…

17,000 square miles affected in Louisiana, 20,000 in Mississippi
Unprecedented impact on Entergy

1.1 million customers out; severe flooding

800,000
Louisiana
outages

Katrina Storm surge approaches Michoud plant,
photo by Entergy Michoud plant manager Don McCroskey

300,000
Mississippi
outage
Katrina’s unique challenges…

- Corporate HQ evacuated
- Employees’ homes destroyed
- Resources pre-dedicated to Florida
- Security threats in New Orleans
- Flooded gas facilities
- Contractors’ bankruptcy fears
- Inoculations for workforce
- Severe substation flooding
- Communications knocked out
- Massive scale/logistics challenge
- Gasoline/Diesel shortages
- Inaccessibility
- DOE/DHS coordination & reporting
...were followed by Rita...

Initial landfall at TX/LA border as predicted...

...but tracked northeast after landfall, damaging all jurisdictions.
...and Rita’s challenges.

- Second worst storm in company’s history - 800,000 outages
- Massive damage to transmission system; generation plants damaged & isolated
- Three days of rolling blackouts for 142,000 Texas customers
- Exhausted workforce
- Another huge logistical challenge
- Material shortages following Katrina
- Continued coordination with DOE
- Texas PUC “Tiger Team”
Total system impacts

- “SAFETY TRUMPS SPEED”
- 1.87 million total electric customers
- 145,000 gas customers
- 28,900 Distribution poles replaced
- 522 Transmission lines out of service
- 715 Substations out of service
- 29 fossil/1 nuclear units shut down
Initial Challenges:

- Communication in impacted areas (all forms)
- Environmental response contractors domiciled in the impacted areas were displaced by the storms
- Domiciled response contractor equipment damaged by floodwater
- Analytical laboratories in the impacted areas were unavailable
- Fuel, lodging and meals for “out-of-area” response contractors sent to impacted areas
Potential Major Environmental Issues

- Threat of chemical and infectious agent exposure to workforce
- Damage to oil-filled electrical devices
  - Overhead and pad-mount distribution transformers
  - Substations
- Much of transmission line damage occurred in coastal marsh areas
  - Emergency permits required from USACE and Louisiana Dept. of Natural Resources Coastal Management Division
  - Some of the line damage resulted in power outages to Port Fourchon “LOOP”, and the Plantation and Colonial pipelines
A monumental support effort is launched

Recruited 13,000 tool workers and over 4500 support personnel.

More than 130 companies aided Entergy during Katrina and Rita restoration

What are the chemical exposure risks?
Safety is #1 —Always!
Subchapter B. Requirements for Emergency Notification

§3915. Notification Requirements for Discharges Which Cause a Hazard

A. Notification to the DPS Emergency Hazardous Materials Hotline

1. In the event of an unauthorized discharge which cause an emergency condition, the discharge must be reported immediately to the DPS Emergency Hazardous Materials Hotline by telephone at (225) 925-3813 (accepted 24 hours a day) immediately after learning of the time after taking prompt means to identify the nature, quantity, and potential off-site consequences considering the exigency of the circumstances. This report must be made within one hour after learning that an emergency condition is any condition reasonably be expected to endanger the public, cause significant adverse effects on water, or air environment, or cause damage to property.) Notification required by this Subsection will be made regardless of the amount of the discharge.
Entergy preemptive notification process...

Pre-emptive notifications made to Regulatory Agencies

USEPA (Affected Region)
DEQs or TNRCC
SERC--State Police
or OES
USACE
F&W
GLO

EM STORM RESPONSE PROCESS
- Franchise/Grid Storm Center Activated
  Call Received by EM Franchise/Grid
  OR
- System Storm Center Activated
  Call Received by EM System Storm
SPILLYARDS, JEFFREY

From: SPILLYARDS, JEFFREY
Sent: Tuesday, August 30, 2005 9:41 AM
To: 'LA State Police - Bob Hayes'
Cc: CALLE, FERNANDO J; HAYDEN, ROBERT M; BOURGEOIS, JASON
Subject: Entergy release reporting
Importance: High

Bob,

Regarding transformer spill reporting, we are attempting to satisfy DPS reporting requirements; however, as you can imagine, we’re going to have a lot of stuff to report. To avoid bogging down the SPOC, do you prefer that we do daily verbal summaries until things get less chaotic? The same question applies to the follow-up written reports. Can we do daily spreadsheet summaries of activities as opposed to individual written reports? Also, I called last weekend and requested to be put on the DPS haz mat release notification e-mail list like you arranged for the last hurricane alert. Can you please follow-up on that request? This is going to be a fun one.

Thanks and take care—Jeff
** (INITIAL REPORT) DETAIL**

Hurricane Katrina damaged three pole-mounted transformers, causing them to lose their contents... Mineral oil spilled onto pavement... Cleanup will be completed this morning...
In contrast with Texas process…

…resulted in the timeframe for notification being expanded to 72 hours. Consequently, there was not a similar governmental process available for more “real-time” notifications for utilities engaged in infrastructure repair in Texas.

Attested by:

ROGER WILLIAMS
Secretary of State
~6000 transformers sent to salvage vendor

~150 contract personnel engaged in oil spill response

~300 (?) oil spills requiring excavation
And as to substation damage…

ELI Avenue C Substation—Low Voltage Oil Circuit Breaker

Substation: AVENUE C   Component: HV OIL CIRCUIT BREAKER   Sub Position: N0423

Oil Circuit Breaker Data...

<table>
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<th>Gallons PerTank</th>
<th>Number ofTanks</th>
<th>Total Gallons</th>
</tr>
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<tbody>
<tr>
<td>710.00</td>
<td>1 ▼ 3 ▼</td>
<td>2,130.00</td>
</tr>
</tbody>
</table>

Ave. C--112.4(a) Report
Electrical infrastructure repair in coastal marsh...
"COMpletely Shut Down," Unusual for St. James," he says. "The terminal has a reliable estimate on restoring power, but "unless something catastrophic happens," he said.

Placid was awarded a deal to take 72 million-barrel Barataria crude from Aug. 29. SPR's fourth crude vessel remained open and undamaged. Refiners awaited receipt of the crude, which remained in storage in St. James. We expect imported crude, about 10% of U.S. weekly imports.

Louisiana coast, has its own power source.

"Power is our biggest need... It shouldn't take us terribly long to get back once we get power," he says. LOOP could resume offloading vessels once power is restored "probably within a matter of hours."

FURTHER ASSESSMENT. A more extensive assessment of LOOP will be carried out shortly, the spokesman says. Additional testing of the offshore terminal can be done only once power is restored.

Power loss to the area surrounding the Capline and LOCAP crude pipelines were keeping both lines down on Aug. 30, according to a source close to the lines' operations. The Shell-operated (RD) 1.1 million b/d Capline was shut late Aug. 28.

It's not clear when LOCAP, which connects Capline to LOOP, was shut.

LOCAP is operated by LOOP and has a capacity in excess of 1 million b/d. Capline carries crude from St. James, La., to Patoka, Ill. Shell and LOOP officials couldn't be reached for comment.
Tankers offload at LOOP by pumping crude oil through hoses connected to a Single Point Mooring (SPM) base. Some of these vessels require water depths of 85 feet—the water depth at each of LOOP’s SPMs is 115 feet. Three SPMs are located 8,000 feet from the Marine Terminal. The SPMs are designed to handle ships up to 700,000 deadweight tons. The SPMs are 21 feet in diameter, 46 feet high and are anchored to a seabed base with an anchor chain. Mooring lines connect the bow of a tanker to the buoy and flexible hoses are used to transport crude oil from the tanker to a submarine pipeline. The buoy and hoses can rotate a full 360 degrees allowing the tanker to maintain a heading of least resistance to wind and waves.
The “LOOP”
The “LOOP”—to get electrical power here...
lines have to go through a lot of this...
and this.
Major dilemma:

--How does Entergy balance the need for expedited infrastructure repair with protection of the marsh?

--How does Entergy avoid being assessed mitigation responsibilities for impacts from the hurricane?
I understand. We are in the process of flying the lines to assess damage. In the marsh areas we are attempting to obtain pre-work video for photodocumentation. The major concern is, due to what can be extremely expensive on-site, in-kind mitigation for such work, that could add an additional, very significant, cost burden to what we're already up against if we expedite the work. Is a per acre “fee-in-lieu of” mitigation an option here? That would allow for more accurate cost projections for the work. One of the concerns is defending, from the reconstruction cost recovery perspective, why we did, what we did. --Jeff

-----Original Message-----
From: Rocky Hinds [mailto:rockyh@dnr.state.la.us]
Sent: Thursday, September 01, 2005 11:29 AM
To: SPILLYARDS, JEFFREY; raymond.b.gonzales@mvn02.usace.army.mil
Cc: David Evans--EPA Oil Program; LONGINOTTI, JAMES C; BARLOW, CHUCK D; SAVOYE, MARGARET JENKINS; HIMEL, EDMOND E; ZEMANEK, JOHN H; MCMANUS, LAURA S; LABORDE, MICHAEL J; SMITH, WALTER D; Bill Pittman; Honker.William@epamail.epa.gov
Subject: RE: Fourchon oil terminal power restoration

I can give you authorization to do the work, but I can't waive state laws requiring mitigation for impacts to vegetated wetlands. We will assess the impacts following the work, rather than the usual up front determination. I'd encourage pre/post-construction photos (not necessarily aerals) to help document what was at the site. As we've discussed before, contractor sensitivity to the environment and the possible impacts caused by the equipment will be paramount.
Entergy preemptive notification process...

-----Original Message-----
From: Rocky Hinds [mailto:rockyh@dnr.state.la.us]
Sent: Friday, September 02, 2005 2:17 PM
To: Guynes, Beth S MVK; Susan.Hampton@mvd02.usace.army.mil; Traci.Johnson@dotd.louisiana.gov; info@lmoga.com; SPILLYARDS, JEFFREY; Michael Barbella; John Parker; Yarlow Etheredge; hammer@lsu.edu; John.F.ettenger@MVNO2.USACE.ARMY.MIL; lgremm@gremminger.com; Tre.Wharton@c-ka.com; (Mr.) Kelly Haggard; Aaron Bass; Andrew MacIntess; Anna Gray; Ben Summerlin; Brad DeHart; Cale LeBlanc; Claudia Schull; Daniel.Bollich@c-ka.com; Dave Richard; David Lewis; Dennis Manuel; Donna Holler; Faye Talbot; Greg Rials; Gregory DuCote; Jeff DeBlieux; Jess Curole; Jill Mastrottaro; Jim Rives; John Mattingly; Jon Truxillo; Judge Edwards; Karl Morgan; Kasey Hebert; Kenneth Babin; Linda Pace; Lori Hodge; Marnie Winter; Mike Wascou; Pam Mattingly; pamela@ucteam.com; Paul Clifton; Randy Moertle; Richard Greig; Rick Hartman; Rocky Hinds; Rosalind; sglegal@lsu.edu; Shirley Rondeno; Terry Howey; Thomas August; tim allen; Vicki Murillo; Vickie Dufforc
Subject: Special public notice for Hurricane Katrina

Hello ladies and gentlemen,
I've been asked to transmit this special public notice to you. Please feel free to distribute it to your co-workers and other interested parties as you see appropriate.

r.

Special Public Notice

The Secretary of the Department of Natural Resources has determined that damage done to the infrastructure in that part of the Louisiana Coastal Zone impacted by Hurricane Katrina and its aftermath has resulted in an emergency situation and that damage is covered by the emergency use provisions of the Rules and Procedure For Coastal Use Permits. Further, the Secretary has determined that due to fact that Hurricane Katrina has caused an impact of statewide significance, all emergency uses under the jurisdiction of the Louisiana Coastal Resources Program which are necessitated for response to Hurricane Katrina and its aftermath shall be considered to be uses of state concern

Because of the overwhelming destruction associated with Hurricane Katrina, the Department of Natural Resources, Coastal Management Division is temporarily modifying its usual emergency authorization procedures for storm related repair/restoration projects located east of and including Terrebonne Parish. This modification applies ONLY to those activities needed to restore infrastructure. The Department requests that emergency users be as environmentally sensitive as possible in conducting repair operations.

The Secretary is also authorizing those activities necessary to prevent additional damages. In the event that new construction is needed, an after-the-fact permit application might be required.

In the event that emergency repairs are needed, emergency users are authorized to commence the necessary work at the earliest opportunity. The Coastal Management Division reminds emergency users to provide the Department with notification via letter, email, or fax as soon as possible for documentation purposes. The notification should include the
SPILLYARDS, JEFFREY

From: Hampton, Susan MVD [Susan.Hampton@mvd02.usace.army.mil]
Sent: Friday, September 02, 2005 5:25 PM
To: SPILLYARDS, JEFFREY
Subject: RE: Special public notice for Hurricane Katrina

Give me a call please – 601-634-5821. I am working on the emergency permit for local, State and Federal agencies and am considering adding utilities, etc. Thanks.

Susan P. Hampton
Vicksburg and Memphis District Support Team
Regulatory Community of Practice Leader
Environmental Compliance Community of Practice Leader
(601)634-5821 (601)634-5816 fax (601)831-5821 Cell
The result…

The boundaries of the Mississippi Valley Division in the New Orleans and Vicksburg Districts. This emergency procedure is also being extended to utility companies, electrical, phone, and pipelines, including natural gas distribution systems. In addition, road and railroad transportation projects are included.

3. By regulation, “an emergency” is defined as a situation which would result in an unacceptable hazard to life, a significant loss of property, or an immediate, unforeseen, and significant economic hardship if corrective action requiring a permit is not undertaken within a time period less than the normal time needed to process the application under standard procedures. These emergency procedures are being put in place to save lives and property and to restore some infrastructure.

4. This Emergency Permitting Procedure has been coordinated with the following Federal and state agencies:
   a. EPA Regions IV and VI
   b. U.S. Fish and Wildlife Service, Lafayette Office
   c. FEMA
   d. Council on Environmental Quality
To reduce damage to marsh Entergy utilized helicopters where possible.

Attempts were made to minimized travel through marsh by surface vehicles.

Before and after photos were taken of work areas for the purpose of documenting impacts.
Equipment used--airboats
Equipment used—marsh buggies
And a lot of very dedicated people...
Questions?