A satellite image of a hurricane, showing a distinct eye and swirling cloud patterns over a dark ocean surface.

Entergy's Response to Hurricanes Katrina & Rita

George Bartlett

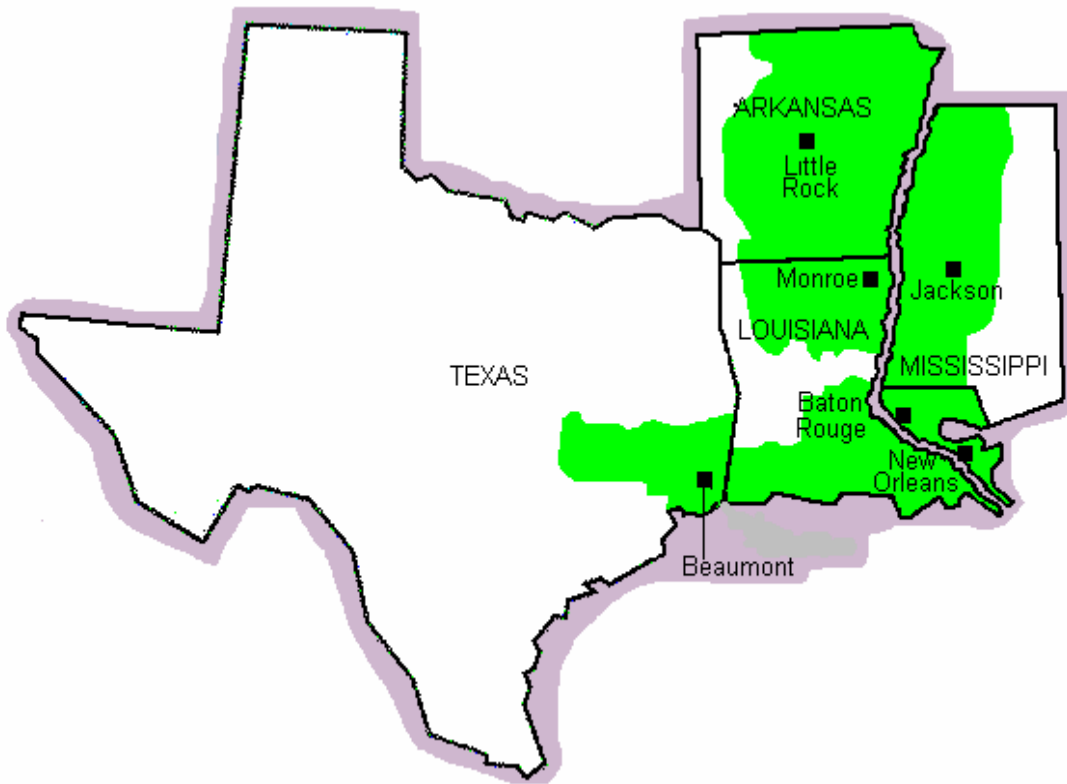
**2007
TULANE
Engineering Forum**

**Hurricane Impact:
Damage, Recovery, and Rebuilding**





Entergy



Headquarters - New Orleans

2.6 Million Electric Customers

240, 000 Gas Customers

4 States - LA, AR, MS ,TX

15,500 Miles Transmission

100,000 Miles Distribution

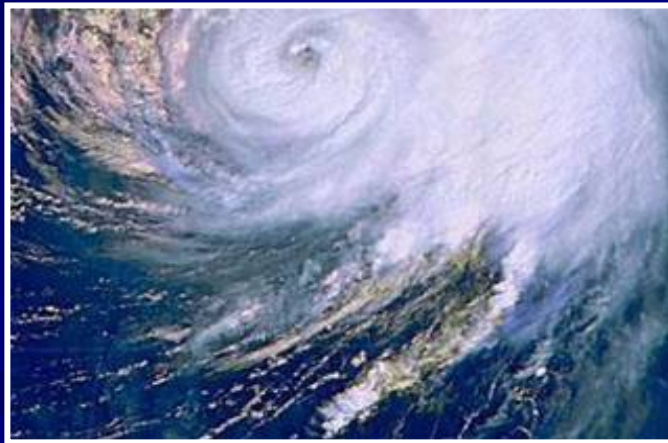
26 Fossil Plants; 9 Nuclear

14,000 Employees

125,000 square miles of service territory

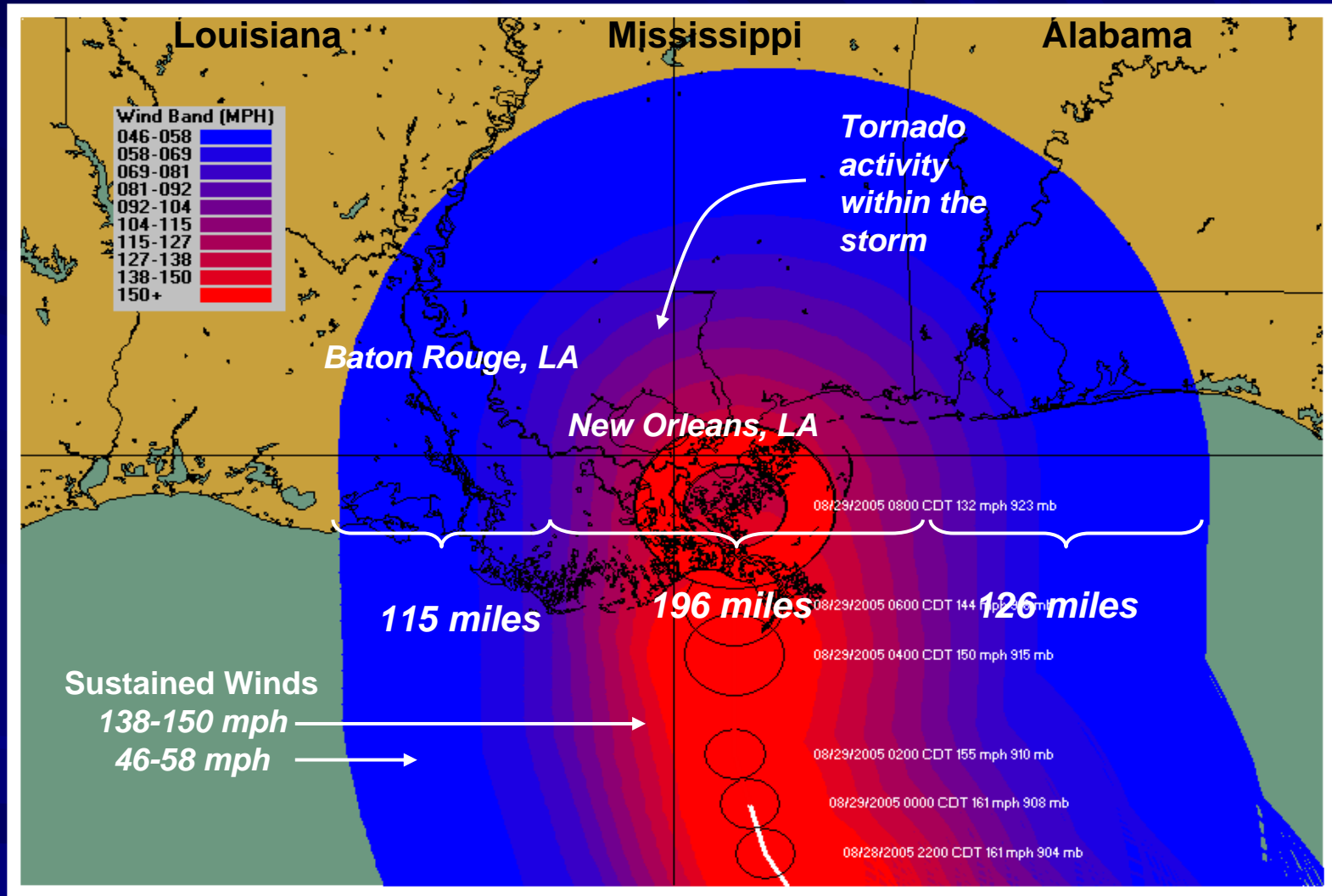
We're experienced at restoration

- *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*



Katrina's projected path changed late

After crossing lower FL peninsula, originally projected to hit panhandle... but moved much further west.



Wind Field Image Map on August 29 at 4:00 A.M.

Unprecedented impact on Entergy

1.1 million customers out; 37,000 sq miles affected



Katrina Storm surge approaches Michoud plant, photo by Entergy Michoud plant manager Donald G McCrosky

**300,000
ETR Mississippi
outages**

**800,000
ETR Louisiana
outages**



Katrina's unique challenges...

- Safety and health of work force
- *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*

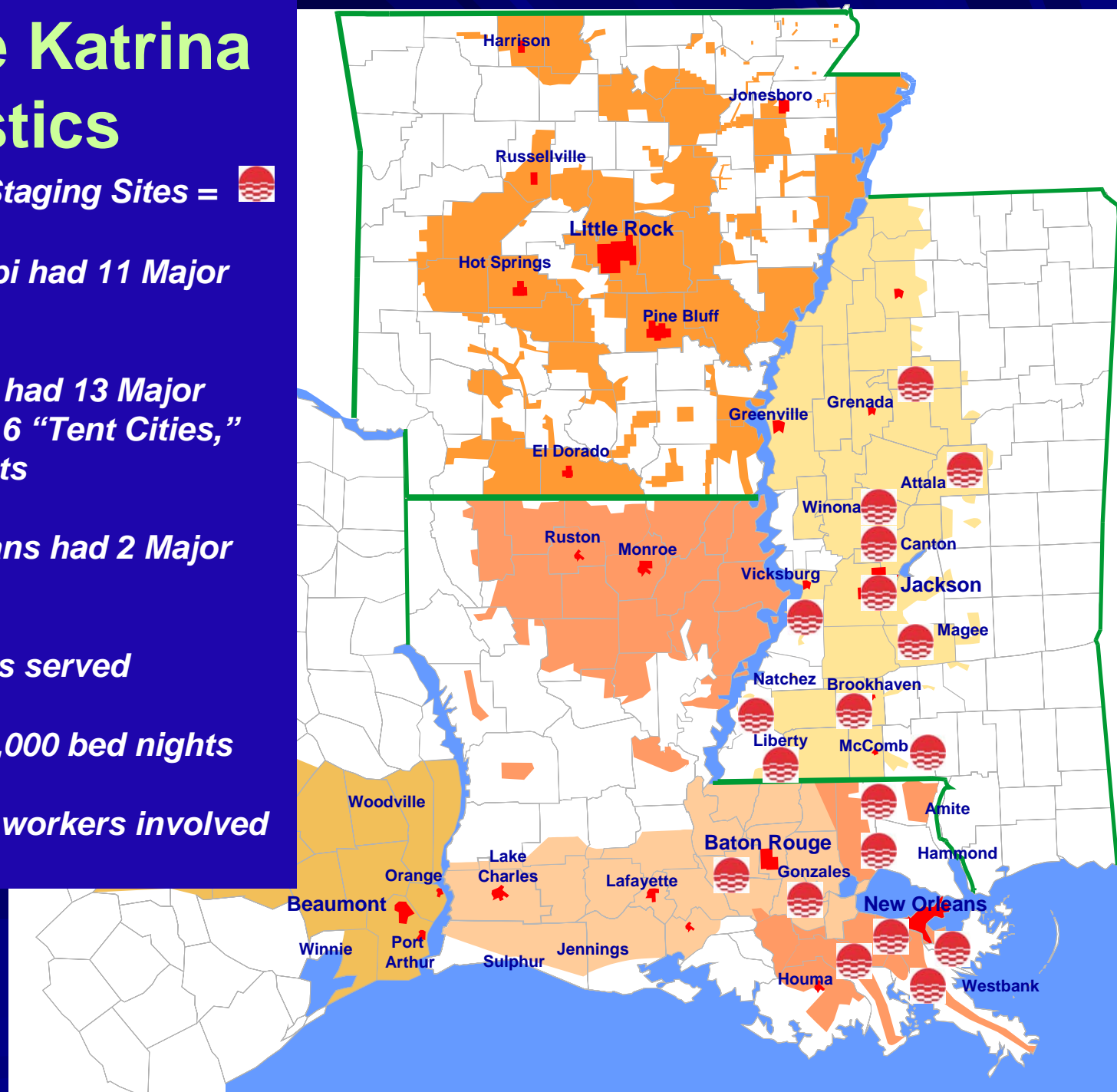


Hurricane Katrina Logistics

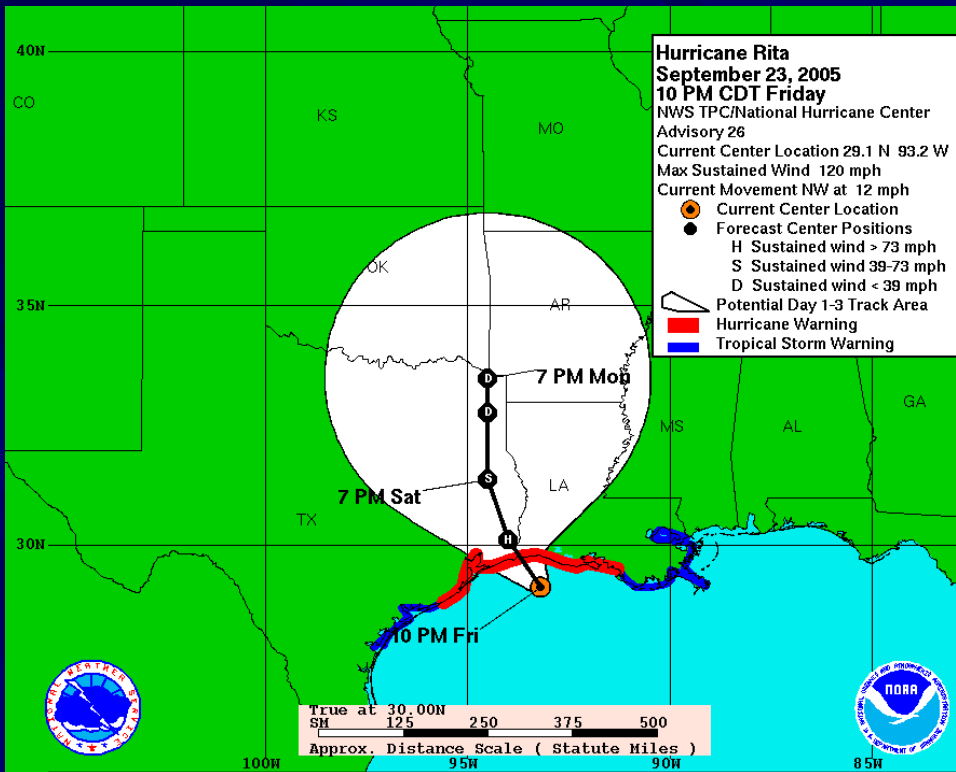
Cities with Major Staging Sites =



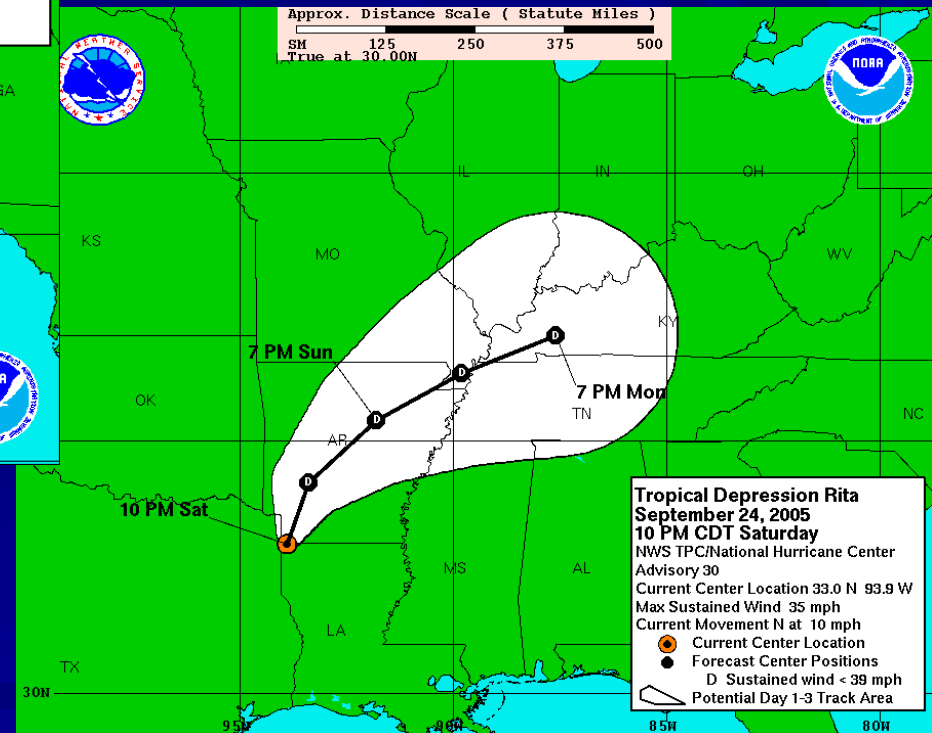
- *Entergy Mississippi had 11 Major Staging Sites*
- *Entergy Louisiana had 13 Major Staging Sites with 6 “Tent Cities,” providing 4,500 cots*
- *Entergy New Orleans had 2 Major Staging Sites*
- *Over 715,000 meals served*
- *Acquired over 224,000 bed nights*
- *Over 185 logistics workers involved*



Then came Rita



Initial landfall at TX/LA border as predicted... but tracked northeast, impacting all jurisdictions.



800,000 customers out

421,000 in Louisiana

287,000 in Texas

62,000 in Arkansas

30,000 in Mississippi

...and Rita's challenges.

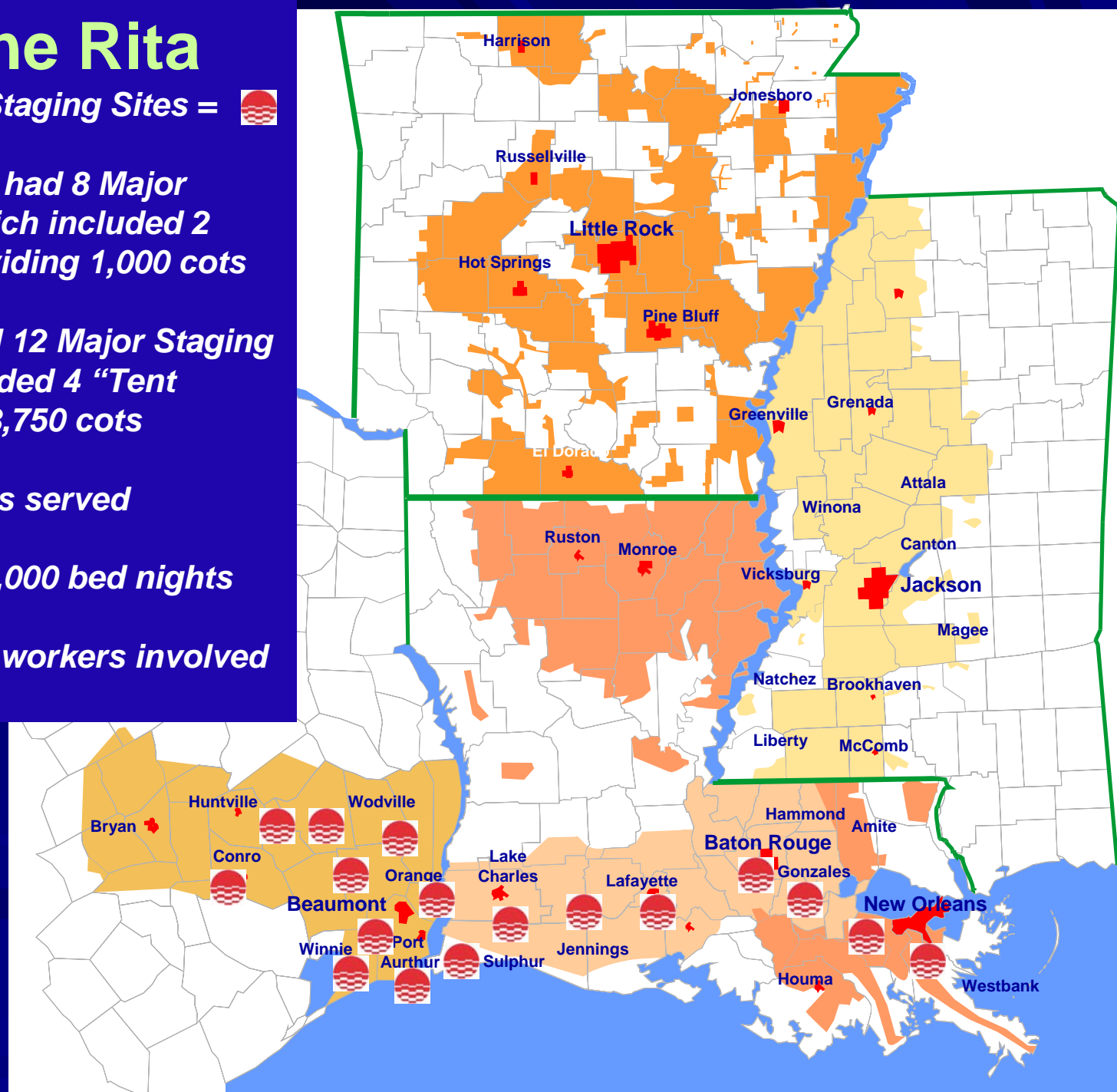
- *Second worst storm in company's history - 800,010 outages*
- *Massive damage to transmission system; generation plants damaged & isolated*
- *Three days of rolling blackouts for 142,000 Texas customers*
- *Exhausted workforce*
- *Another huge logistical challenge*
- *Material shortages following Katrina*
- *Continued coordination with DOE*



Hurricane Rita

Cities with Major Staging Sites = 

- *Entergy Louisiana had 8 Major Staging Sites, which included 2 “Tent Cities,” providing 1,000 cots*
- *Entergy Texas had 12 Major Staging Sites, which included 4 “Tent Cities” providing 3,750 cots*
- *Over 551,000 meals served*
- *Acquired over 255,000 bed nights*
- *Over 145 logistics workers involved*



Logistical Challenges

Storm destroyed infrastructure normally used to support crews

Competition with government and public for logistical support services

Uncertainty in forecast leads to delays in committing for resources

Large logistical resource requirements of everything imaginable

Huge need for alternative lodging

Crews slept in trucks

Sanitary facilities were critical

Tent cities were set up

Lodging and logistical support will become an increasingly less available and competitive commodity in the future

Logistic Solutions



Electrical Restoration

- ***“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***



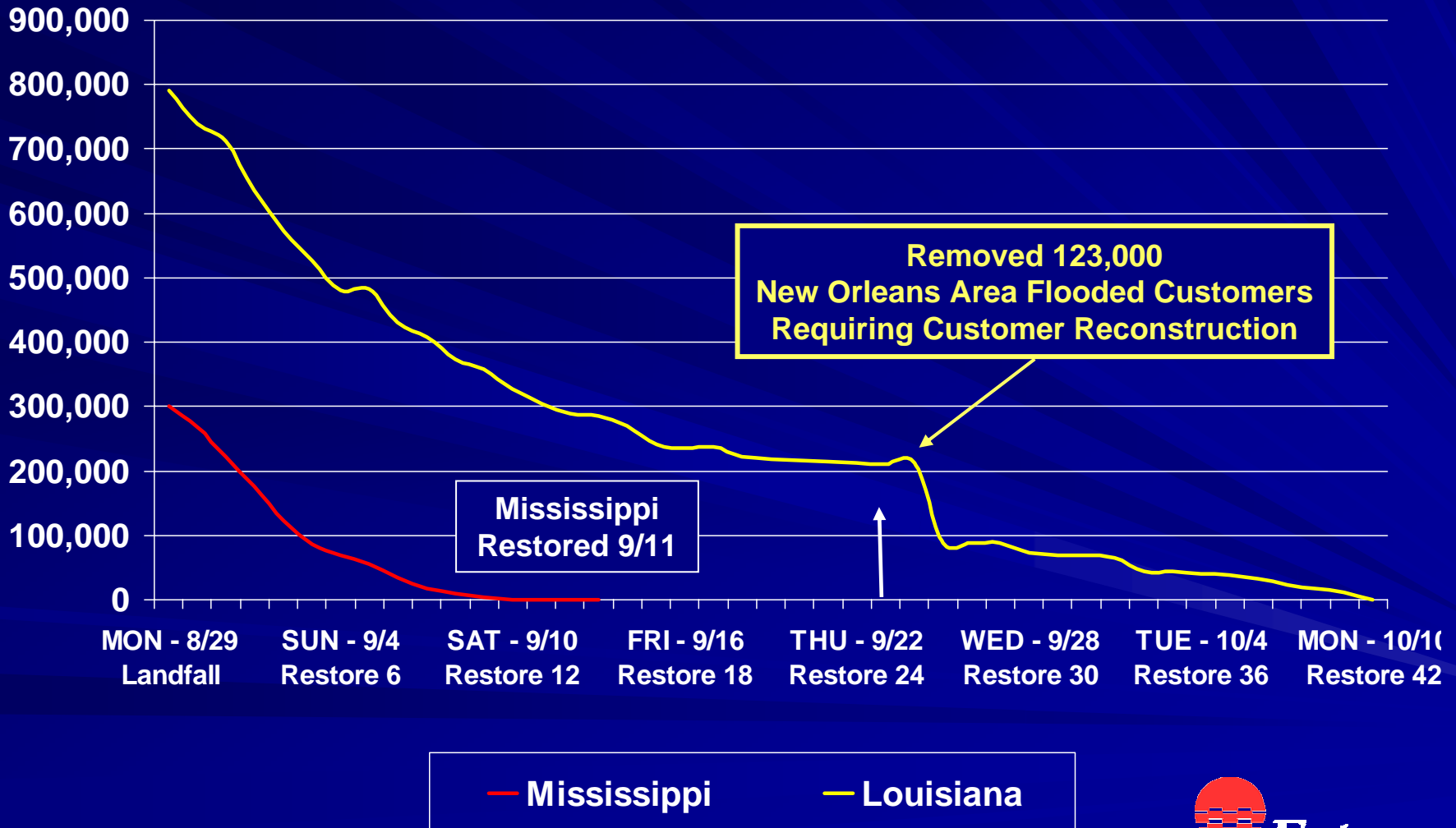
Katrina's Gas Restoration

- Maintaining continuous, safe gas delivery to the N.O. Sewerage & Water Board, which uses natural gas to power its drainage pumps was paramount to the city's initial recovery efforts.
- Use of divers to secure damaged gas pipes and meters
- Use of an infra-red gas leakage detection
- Walked every street & visited every building to secure over 144,000 gas service valves
- Over 4 million gallons of water removed
- To re-establish service, Gas Ops entered each building to perform a safety test and re-light the gas pilot lights
- Even with the unprecedented challenges, most areas had gas available by January 2006!



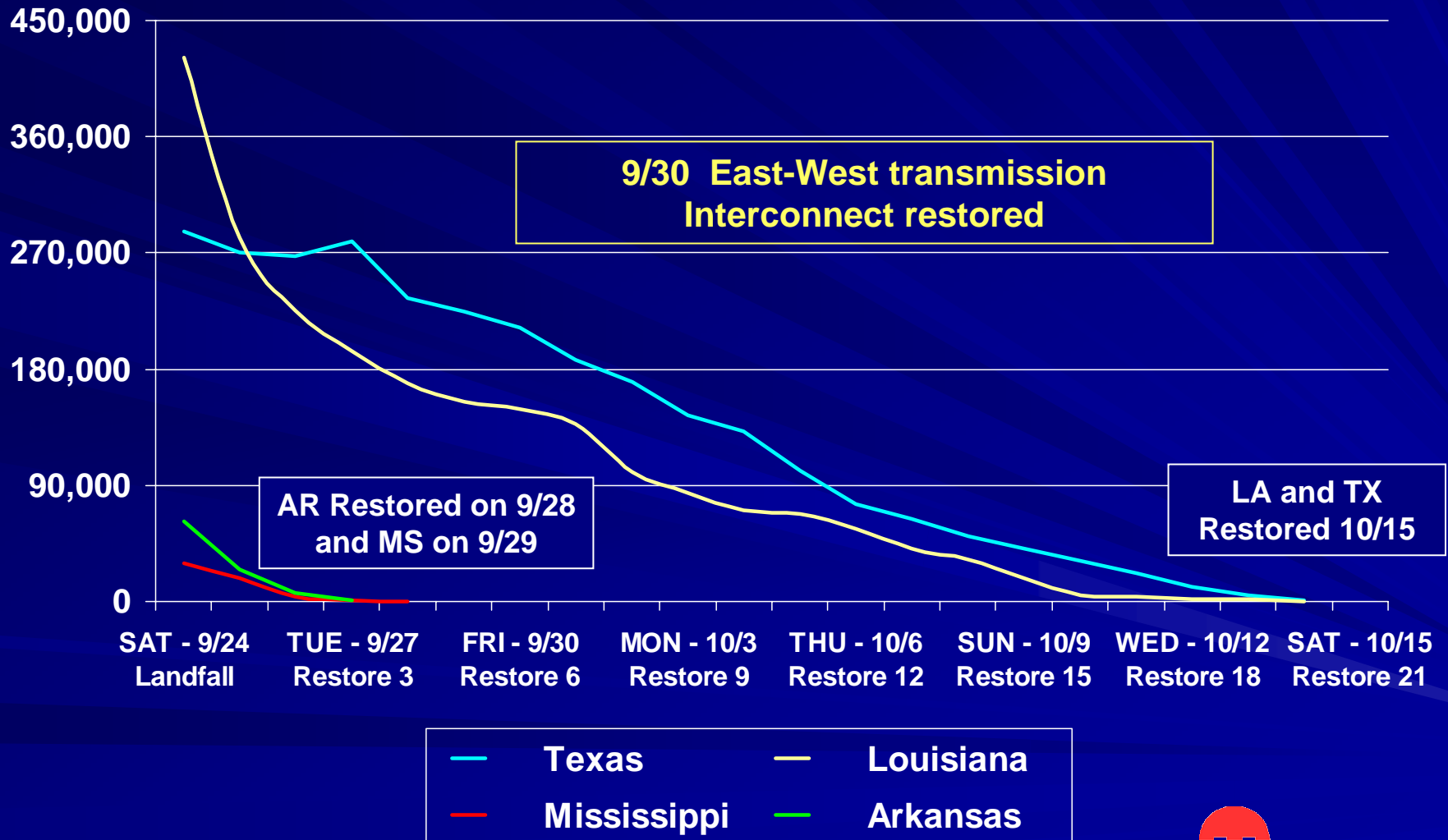
Katrina Restoration

75% (729,400) restored in 11 days



Rita Restoration

75% (597,000) restored in 10 days



Resources- a monumental support effort

Katrina ...

- 10,200 tool workers
- 100 companies from
- 29 states
- 3500 support personnel

Hurricane Katrina Nationwide Response



Hurricane Rita Nationwide Response



Rita ...

- 13,000 tool workers
- 130 companies from
- 33 states
- 4500 support personnel



Key Success Factors

- *Advance planning for “worst case scenarios”*
- *Practice*
- *Organization experience & culture*
- *Clear command structure*
- *Willingness to take timely action*
- *Capability to improvise and adjust*
- *High-level management support & confidence*
- *Strong Mutual Assistance*

Logistical Future: Self-Contained Crews

SEE Mutual Assistance Committee formed a Logistics Subcommittee

Entergy (Lead), BG&E, CLECO, Georgia Power

Established levels of logistical support for mutual assistance

All companies participated in review

LEVEL of logistical support

0 – Support for travel only (e.g. trucks and equipment)

1 – Includes catering and/or fueling for crews

2 – Includes catering/fueling and lodging for crews

3 – Includes catering/fueling, lodging, and other logistical support (showers, laundry, medical personnel, generators, restrooms, etc.)



Entergy received tremendous help and support

