A Utility’s Response and Recovery

Marc Butts
Southern Company
03/19/2014
Service territory across four states: 120,000 square miles

Serves approximately 4 million customers

Other Subsidiaries:
- Southern Linc
- Southern Power
- Southern Telecom
- Southern Nuclear
Business Continuity at Southern Company
Southern Company Business Assurance Model

Business Unit Management (Asset Owners)

**Protect**
- Infrastructure Protection
  - Identify critical assets and systems
  - Design and implement security protocols
  - Train & test

**Prepare**
- Business Continuity
  - Identify critical business processes and supporting infrastructure
  - Prepare business continuity plans for restoration and recovery (including disaster recovery)
  - Train & test

**Respond**
- Incident Response
  - Assess and calibrate alert levels
  - Activate incident response teams
  - Implement business plans
  - Train & test
Storm Preparation

• **Yearly**
  – Procedures Revised and Reviewed Each Spring
  – All Employees Have Storm Assignments
  – Storm Centers Are Re-Evaluated

• **Storm Potential Identified**
  – Generation Plan….Pre, During, and Post Impact
  – Resources Secured….Fuel, Material, Logistics, Outside Manpower

• **Storm Forecast Indicates Southern Company Impact**
  – Critical Employees Secured on-site
  – Perishable Storm Supplies Secured

• **Prior To Impact**
  – Logistics Plans Implemented….Restoration Personnel Ready to Come In
  – Implement Generation Plan
  – Minimize Exposure to Transformer Banks and other assets
Physical Recovery Following a Major Disaster
Our Worst Nightmare
Southern Company Electric System

Mississippi Power

1250 Employees

196,000 Customers

2590 MW Load
Mississippi Power Electric System

- **Generating**
  - 1750 MWs Coal
  - 770 MWs CC Gas Steam
  - 400 MWs Gas Steam
  - Two 40 MW CTs (Black Start)

- **Transmission**
  - 500kV: 76 miles
  - 230kV: 585 miles
  - 115kV: 1110 miles
  - 46kV: 300 miles

- **Substations**
  - 140 Transmission Stations
## Three Big Ones – A Comparison

<table>
<thead>
<tr>
<th></th>
<th>Katrina</th>
<th></th>
<th>Camille</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Landfall Date</strong></td>
<td>08.29.05</td>
<td>09.16.04</td>
<td>08.17.69</td>
</tr>
<tr>
<td><strong>Landfall</strong></td>
<td>MS/LA State Line</td>
<td>Eastern Mobile Bay</td>
<td>Waveland/BSL, MS</td>
</tr>
<tr>
<td><strong>Category at Landfall</strong></td>
<td>Category 3</td>
<td>Category 3</td>
<td>Category 5</td>
</tr>
<tr>
<td><strong>Wind Speed/Gusts</strong></td>
<td>140 / 180 mph</td>
<td>115 / 135 mph</td>
<td>190 / 220 mph</td>
</tr>
<tr>
<td><strong>Tidal Surge (Maximum)</strong></td>
<td>35-40’</td>
<td>10-15’</td>
<td>20-28’</td>
</tr>
<tr>
<td><strong>Hurricane Winds (Size of Storm)</strong></td>
<td>125 miles</td>
<td>35-40 miles</td>
<td>60 miles</td>
</tr>
<tr>
<td><strong>Forward Motion</strong></td>
<td>NNE at 15 MPH</td>
<td>NNE at 12 MPH</td>
<td>NNW at 15 MPH</td>
</tr>
<tr>
<td><strong>Strengthening and Expanding at Landfall</strong></td>
<td></td>
<td>Weakening at Landfall</td>
<td>Sustaining at Landfall</td>
</tr>
</tbody>
</table>
Peak Wind Speed Comparison

<table>
<thead>
<tr>
<th>City</th>
<th>Katrina</th>
<th>Camille</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meridian</td>
<td>90 mph</td>
<td>55 mph</td>
</tr>
<tr>
<td>Hattiesburg</td>
<td>110 mph</td>
<td>80 mph</td>
</tr>
<tr>
<td>Gulfport</td>
<td>140 mph</td>
<td>190 mph</td>
</tr>
</tbody>
</table>
August 29th: 9:00 a.m. - 3:00 p.m. CDT
Mississippi Power’s System
# Hurricane Katrina Statistics - Distribution

## Infrastructure Damage – Mississippi Power

<table>
<thead>
<tr>
<th>Category</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poles</td>
<td>9,000 broken poles</td>
</tr>
<tr>
<td>Transformers</td>
<td>2,300 transformers damaged</td>
</tr>
<tr>
<td>Wire</td>
<td>23,500 spans of wire down</td>
</tr>
<tr>
<td>Customers Out of Service</td>
<td>196,000</td>
</tr>
</tbody>
</table>
### Hurricane Katrina Statistics - Transmission

#### Number of Transmission Lines Affected

<table>
<thead>
<tr>
<th>Voltage Level</th>
<th>Alabama Power</th>
<th>Mississippi Power</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>500 kV</td>
<td>0</td>
<td>1</td>
<td>67</td>
</tr>
<tr>
<td>230 kV</td>
<td>8</td>
<td>21</td>
<td>120</td>
</tr>
<tr>
<td>115 kV</td>
<td>32</td>
<td>80</td>
<td></td>
</tr>
<tr>
<td>46 kV</td>
<td>27</td>
<td>18</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>67</strong></td>
<td><strong>120</strong></td>
<td><strong>187</strong></td>
</tr>
</tbody>
</table>
MPC Transmission
“green” = 500kV
“blue” = 230kV
“yellow” = 115kV
## Transmission Impact

<table>
<thead>
<tr>
<th></th>
<th>Generators</th>
<th>Transmission Lines</th>
<th>Transmission Substations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>15 Units</td>
<td>2073 miles</td>
<td>140</td>
</tr>
<tr>
<td></td>
<td>3075 MWs</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Affected</strong></td>
<td>6 Key Units</td>
<td>1914 miles</td>
<td>None Hot</td>
</tr>
<tr>
<td></td>
<td>1040 MWs</td>
<td>92%</td>
<td>12 Flooded</td>
</tr>
<tr>
<td></td>
<td></td>
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</tbody>
</table>
Restoring The System
August 29 – September 7
Critical Issues – 1st Hours

- Determine System State and Formulate 1st Steps
  - All Transmission De-energized Except 3 Sources In From Alabama
  - No Customer Load Being Served
  - One Generator at Plant Daniel Online Holding Station Service

- Begin Extending 230kV Path from APC Sources to Key Subs & Load Centers
  - Stations With Hospitals
  - Stations Serving Public & Emergency Response Support

- 1st Night and Morning Spent Inspecting and Clearing Target Subs and Transmission ROW
Aug 31st - Day 2

Meridian Colonial PL & Plantation PL

Plantation PL 1 & 2
Sept 5th - Day 7

Closed the N-S 230 kV Corridor

Brought up Generation at Plant Daniel
Service restored to all substations where customers could take service.
Employee Parking at Plant Watson
Pass Christian Area - 20 Miles East of the Eye Wall
Biloxi Area – 50 Miles East of the Eye Wall
Moss Point East – Ocean Springs
230kV
April 27th, 2011
April’s Fury
Lessons Learned

- Be Prepared to set up a temporary/mobile emergency operating center
- Plan to operate with no communications for at least 48 hours
- Plan to operate without SCADA/EMS
- Maintain Detailed Non-Electronic System Diagrams or Mapboard
- Identify 2 alternates for every critical storm assignment
- Reassess and identify all critical customers
What Was It Like Before SCADA and Telephones?
Lessons Learned

• Substantially increase logistics, procurement and management support capabilities
• Be prepared to be as self-sufficient as possible for some period of time
• Prepare for potential hostilities and civil unrest
• Prepare for substantial employee property losses and family crises
• Store Enough Potable Water For Showers & Flushing – At Least 5 Days
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>Homes Destroyed</td>
<td>86</td>
<td>7%</td>
</tr>
<tr>
<td>Homes Flooded</td>
<td>196</td>
<td>16%</td>
</tr>
<tr>
<td>Homes Damaged</td>
<td>441</td>
<td>35%</td>
</tr>
<tr>
<td>Total</td>
<td>721</td>
<td>58%</td>
</tr>
</tbody>
</table>
Facing Realities

- Realize the electrical system - by its very nature - cannot be protected from all catastrophic events – may need backup source
- The only thing certain about catastrophic events is that they cannot be predicted with accuracy - prepare for anything
- Table-top exercises with various scenarios conducted on a regular basis can and will better prepare you for what can happen
- Meaningful communication throughout your organization before, during, and after an event will increase everyone’s effectiveness
- An empowered and committed work force is key to success
Questions to ask:

1. How robust is your overall Business Continuity Plan?
2. Have you identified your critical assets and service requirements?
3. Is there an organization like SEE that mutual assistance can be called upon?
4. Have you created a partnership with your energy suppliers?
5. What is your response time to major events like Hurricanes, Ice Storms or Tornadoes?
6. What type of emergency plans do you or your providers have in place for Transmission and Distribution?
Recipe For Success

- **Leadership**
  “at all levels”

- **Plan, Plan and Plan again**
  “the ability to adapt and expand plans to meet the objective”

- **Expertise and Knowledge**
  “employees that know the system and how it operates”
  “employees that understand and know their storm assignment”

- **Commitment and Dedication**
  “from management, from each employee”

- **Pride**
  “self pride, company pride”

- **Teamwork, Teamwork, and more Teamwork**
  “working as one with common goals”
Easy Questions?