Southern Company Transmission
Georgia Control Center
North American Electric Reliability Corporation (NERC)

Eastern Interconnect
- ~700,000 MWs interconnected and operated synchronously.
- Operations and transactions must be closely coordinated.
- Ability to “lean” on others aids the reliability of all participants.
- However, distant events can have widespread impacts.
Georgia Power Company Transmission

- **Transmission Lines**
  - 46 kV & 69 kV – 3,520 miles
  - 115 kV – 5,553 miles
  - 230 kV – 2,158 miles
  - 500 kV – 1,100 miles

- **Substations**
  - 227 Trans. and Gen.
  - 1955 Distribution

- **Load Data**
  - So. Control Area: 48,000 MW
  - GPC: 29,800 MW
Tie Lines and Control Centers

- Tie Lines are the transmission lines connecting electric utilities
- There are 53 Tie Lines that connect Southern Company to neighboring utilities in the Southeast
Southern Company Operations

- **Power Coordination Center**
  - System Balancing Authority
  - Reliability Coordinator
  - Monitor Interface Flows
  - Facilitate Transmission Transactions

- **Local Transmission Control Centers**
  - Monitor and Control the Transmission System
  - Facilitate Work Requests
  - Local Security
  - Restoration

- **Distribution Control Centers**
  - Monitor and Control Distribution Breakers and Feeders
  - Communicate with distribution customers
How Does the GCC Function?

- **Pre-Arrange**: process requests, write safe switching orders, communicate with personnel
- **Security**: study transmission work requests to ensure the work is done in a way to keep grid reliable
- **Support Engineers**: provide technical guidance as needed
- **Floor Operators**
  - **System Operators (SO)**: ensure reliability and security of the transmission grid in GA
  - **Area Operators**: monitor and control the transmission grid in GA in real-time
Desk Responsibilities

• Area Desks
  o Monitor system conditions
  o Monitor and respond to alarms
  o Issue switching orders
    ➢ More than 27,000 in 2010
  o Respond to emergency conditions
  o Dispatch field personnel as needed
• System Operator Desk
  o Perform contingency analysis and security studies
  o Develop operating solutions for identified contingencies
  o Monitor system voltage schedule
  o Analyze outages and assist Area desk with restoration plans
  o Communicate with PCC and external entities
Other Functions

• Pre-Arrange
  o Coordinate all work requests for facility outages
    ➢ More than 12,000 in 2010
  o Verify feasibility of work requests through System Security
  o Write accurate and safe switching orders
  o Notify all impacted parties of work requests
  o Compile and distribute the daily work summary
Other Functions Continued

• System Security
  o Conduct security studies/perform contingency analysis for outage requests
  o Develop necessary operating solutions to facilitate major construction projects
  o Coordinate with Transmission Planning group to help plan to build reliable system
  o Conduct annual Summer Operating Study and report results
Other Functions Continued

• **Support Engineers**
  - Provide technical support to other GCC groups
  - Collect and distribute data from the field
  - Verify equipment data with field personnel and other operating companies
  - Produce and maintain operating procedures (e.g. Blackstart)
  - Fault Data Analysis
Operator Tools

- **Energy Management System (EMS)**
  - PNA (Power Network Analysis) – view real-time data from EMS and also perform and build case studies
  - OPNA (Offline PNA) – perform studies and N-1 contingency analysis
  - EMo (Electronic Monitor) – view real-time status to get the “big picture” quickly
  - Dynamic Line Rating
  - Fault Location
Operator Tools

• Other Simulation and Viewing Tools
  o PowerWorld – view real-time flows, also “big picture”
  o PSS/E – perform studies and in-depth contingency analysis using modified planning model
  o TransMap
  o GenVarr
  o Situational Awareness
Operator Tools

EMS Real-time Screenshot Example
Software Tools

PowerWorld Real-time Screenshot Example
Reliability Tools

- Weather Forecasts
- Lightning Tracker
- Fault Data Analysis
- Geographic Information System
- Summer Operating Study
- Sub-Transmission Automation
Weather Reports
Determine Location of Lightning Event

- FALLS... Fault Analysis and Lightning Location System
Operator Tools

EMS Real-time Screenshot Example
### OVERLOADED LINE OR TRANSFORMER

**DUM JON - WEST AUGUSTA 115 KV**

#### OVERLOADED LINE SEGMENTS OR TRANSFORMERS

<table>
<thead>
<tr>
<th>% OL</th>
<th>Bus#</th>
<th>From Segment</th>
<th>kW</th>
<th>Bus#</th>
<th>To Segment</th>
<th>kW</th>
<th>Chi</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>118.6</td>
<td>525</td>
<td>DUMJN115</td>
<td>115</td>
<td>534</td>
<td>WESTAUG</td>
<td>115</td>
<td>1</td>
<td>Contingency Problem - 95F ambient (Rate B) &amp; &lt;95% pu voltage, No Hydro running, Normal Weather, 93% summer peak load, contract sales, Talbot County Units 1-6 Out (640MW)</td>
</tr>
<tr>
<td>118.3</td>
<td>525</td>
<td>DUMJN115</td>
<td>115</td>
<td>534</td>
<td>WESTAUG</td>
<td>115</td>
<td>1</td>
<td>Contingency Problem - 95F ambient (Rate B) &amp; &lt;95% pu voltage, No Hydro running, Normal Weather, 93% summer peak load, contract sales, McDonough Unit 1 Out (238MW)</td>
</tr>
<tr>
<td>118.2</td>
<td>525</td>
<td>DUMJN115</td>
<td>115</td>
<td>534</td>
<td>WESTAUG</td>
<td>115</td>
<td>1</td>
<td>Contingency Problem - 95F ambient (Rate B) &amp; &lt;95% pu voltage, No Hydro running, Normal Weather, 93% summer peak load, contract sales, Hammond Unit 1-3 Out (336MW)</td>
</tr>
</tbody>
</table>

This table shows the %Overload, the From Segment Bus #, the From Segment Name, the From Segment kW, the To Segment Bus #, the To Segment Name, the To Segment kV, the Circuit #, the Limiting Element, the Rating (MVA), and the Case Name of the Overloaded Line Segment.

#### OPERATING PROCEDURE

1. Bring on hydro generation at Thurmond dam. 2. Swap Double Branches from Thurmond Dam to Anthony Shoals. 3. Open Dum Jon 230 / 115 KV bank.

#### PLANNING NOTES

#### FUTURE PROJECTS

Record: ◀ ◀ ◀ 1 ◀ ▶ ◀ ◀ of 2
Current Issues

- Reliability Standards
- Cyber Security
- Employee Skills and Training
- Staffing
Questions?