PJM – SERTP

Order 1000 Biennial Regional Transmission Plan Review Meeting

April 26th, 2016
Georgia Power Headquarters
Atlanta, GA
Agenda

• SERTP – Process Overview
  – Background
  – SERTP Region Scope
  – Processes and Timelines

• 2015 SERTP Regional Transmission Plan – PJM Seam

• SERTP Modeling Input Assumptions
SERTP

Process Overview
Southeastern Regional Transmission Planning Process (SERTP)

- Originally formed in 2007 to comply with FERC Order 890
- Provides open and transparent transmission planning forum for transmission providers to engage with stakeholders regarding transmission plans in the region
- Region has expanded several times in both size and scope since formation (most recently in 2014) to currently include 10 Sponsor utilities
- Began regional implementation of Order 1000 requirements on June 1, 2014
- Began interregional implementation of Order 1000 on January 1, 2015
SERTP Region

SERTP Overview

- Spans portions of 14 states
- Includes 9 BAAs
- ~90,000 miles of transmission lines

SERTP Sponsors

- AECI
- Dalton
- Duke Energy
- GTC
- LG&E / KU
- MEAG
- OVEC
- PowerSouth
- Southern
- TVA
Interregional Seams
SERTP Regional Models

- SERTP Sponsors develop 12 coordinated regional models
- Models include latest transmission planning model information within the SERTP region
- Typically 3 versions created annually
- Available on the Secure Area of the SERTP website upon satisfying access requirements

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Economic Planning Studies

- SERTP stakeholders can request up to five economic planning studies be performed annually.
- These studies represent analyses of hypothetical scenarios requested by the stakeholders and do not represent an actual transmission need or commitment to build.
- SERTP Sponsors identify the transmission requirements needed to move large amounts of power above and beyond existing long-term, firm transmission service commitments.
  - Analysis is consistent with NERC standards and company-specific planning criteria.
- [2015 SERTP Economic Planning Study Report]
Regional Transmission Analyses

- Regional Transmission Analyses are performed during the course of each transmission planning cycle in order to:
  
  1) Assess if the then current regional transmission plan addresses the Transmission Provider’s transmission needs
  
  2) Assess whether there may be more efficient or cost effective transmission projects to address transmission needs

- [2015 SERTP Regional Analyses Summary]
2015 Regional Transmission Analyses

- Choctaw – Midway – S. Bessemer 500 kV T.L.
- Choctaw – Midway – Greene County 500 kV T.L.
- North Brewton – Billingsley 500 kV T.L.
- South Hall – Oconee 500 kV T.L. (2nd Circuit)
- Oconee – McGrau Ford 500 kV T.L.
- Widow’s Creek – Mostellar Springs 500 kV T.L.
- Wadley – Hatch 500 kV T.L.
- Shawnee – West New Madrid 500 kV T.L.
- Pleasant Garden – Person 500 kV T.L.
Regional Transmission Plan

2015 SERTP Regional Transmission Plan

- Project Descriptions, Drivers, Contingencies
- Generation Assumptions/Changes
- Project Totals (Mileage, $, etc.)
SERTP Quarterly Stakeholder Meetings

Q1: 1st RPSG Meeting & Interactive Training Session
- Form RPSG
- Select Five Economic Planning Studies
- Stakeholder Training Session

Q2: Preliminary Expansion Plan Meeting
- Review Modeling Assumptions
- Preliminary 10 Year Expansion Plan
- Stakeholder Input & Feedback Regarding the Plan

Q3: 2nd RPSG Meeting
- Preliminary Results of the Economic Planning Studies
- Stakeholder Input & Feedback
- Previous Stakeholder Input on the Expansion Plan

Q4: Annual Transmission Planning Summit & Input Assumptions Meeting
- Final Results of the Economic Planning Studies
- Regional Transmission Plan
- Regional Analyses
- Stakeholder Input on Upcoming Year Transmission Model Input Assumptions
Regional/Interregional Process Timing

**Cost Allocation Project Proposal Deadline**
- (60 days after Q4 Meeting)

**Pre-Qualification Application Deadline for Upcoming Year**
- (Aug. 1st)

**Typical Timeline for Regional Analyses:**
- Regional/Interregional Project Evaluation, Model Assessment, and Final Regional Plan Development

**Typical Interregional Annual Data Exchange:**
- Regional Plan & Models

**Typical Interregional Biennial Review:**
- Regional Plans & Project Identification

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1. If a potential transmission project proposed for cost allocation satisfies the initial evaluation, a schedule will be developed in consultation with the transmission developer to provide additional detailed information for further detailed analysis.
Regional Cost Allocation

- **Scope of a Regional Project Eligible for Cost Allocation**
  - Transmission line located in the SERTP region
  - 300 kV or greater
  - Spans at least 50 miles
  - Must have significant electrical or geographical differences from projects already under consideration

- **Benefits Considered**
  - Avoided costs of displaced transmission
  - Real power loss savings (regional only)

- **Evaluations**
  - Qualitative & Quantitative – 1.25 Benefit-to-Cost (BTC) Ratio
  - Feasibility
  - State jurisdictional and/or governance authorities opportunity for review
**Beneficiary “A”**

- Proposed Regional Facility
- Displaced Transmission Facility – **Beneficiary “A”**

**Beneficiary “B”**

- Proposed Regional Facility
- Displaced Transmission Facility – **Beneficiary “B”**

### Simplified Cost Allocation Example

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<th>Regional Benefit-to-Cost Ratio</th>
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Interregional Project for Cost Allocation Must:

• Interconnect to facilities in both the SERTP and PJM regions
• Meet regional qualifications
• Be proposed in both regional processes
Interregional Coordination

- Meet annually to facilitate coordination procedures
- Website postings
- Annually exchange power-flow models
- Annually exchange regional transmission plans
- Meet biennially to review regional transmission plans
- Coordinate on any joint evaluations of potential interregional transmission projects
SERTP
Regional Modeling Assumptions

SERTP
Regional Transmission Plan
SERTP Regional Modeling Assumptions

Balancing Authority Areas

- AECI
- DUKE – Carolinas
- DUKE – Progress East
- DUKE – Progress West
- LG&E/KU
- OVEC
- PowerSouth
- Southern
- TVA
SERTP Cumulative Summer Peak Load Forecast

- 2012 Cumulative
- 2013 Cumulative
- 2014 Cumulative
- 2015 Cumulative
- 2016 Cumulative
DUKE CAROLINAS Balancing Authority

SERTP Regional Transmission Plan
DESCRIPTION: Add a third 448 MVA 230/100 kV transformer at Parkwood substation.

SUPPORTING STATEMENT: The Parkwood 230/100 kV transformer overloads under contingency.
DESCRIPTION:
Add a fourth 448 MVA 230/100 kV transformer at Oakboro Tie.

SUPPORTING STATEMENT:
The Oakboro 230/100 kV transformer overloads under contingency.
RIVERBEND STEAM STATION

DESCRIPTION:
Add two 230/100 kV 400 MVA transformers at Riverbend Steam Station.

SUPPORTING STATEMENT:
Retirement of Riverbend Steam Station generation causes multiple transmission lines to overload under contingency and causes the need for additional voltage support in the Riverbend area.
DESCRIPTION:
Add a fourth 448 MVA 230/100 kV transformer at North Greensboro substation.

SUPPORTING STATEMENT:
North Greensboro 230/100 kV transformers overload under contingency.
DESCRIPTION:
Install a 3% series reactor on the Peach Valley – Riverview 230 kV transmission line.

SUPPORTING STATEMENT:
The Peach Valley – Riverview 230 kV transmission line overloads under contingency.
DESCRIPTION:
Add a third 448 MVA 230/100 kV transformer at Cliffside Steam Station.

SUPPORTING STATEMENT:
Cliffside Steam Station 230/100 kV transformers overload under contingency.
DESCRIPTION:
Reconductor approximately 18 miles of the Central – Shady Grove 230 kV transmission line with bundled 954 ACSR at 120°C.

SUPPORTING STATEMENT:
The Central – Shady Grove 230 kV transmission line overloads under contingency.
DUKE CAROLINAS Balancing Authority

Upcoming 2016
Generation Assumptions
The following diagram depicts the location of generation assumptions that change throughout the ten year planning horizon for the 2016 SERTP Process.
DUKE CAROLINAS — Generation Assumptions

The following table depicts the generation assumptions that change throughout the ten year planning horizon for the 2016 SERTP Process. The years shown represent Summer Peak conditions.

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DUKE PROGRESS EAST/WEST
Balancing Authorities

2015 Generation Assumptions
DUKE PROGRESS EAST Balancing Authority

SERTP Regional Transmission Plan
ASHEBORO – ASHEBORO EAST (SOUTH) 115 KV T.L.

DESCRIPTION:
Reconduct 34 approximately 3 miles of the Asheboro – Asheboro East (South) 115 kV transmission line using 3-1590 ACSR. Replace disconnect switches at Asheboro 230 kV and both the breaker and the disconnect switches at Asheboro East 115 kV with equipment of at least 2000 A capability.

SUPPORTING STATEMENT:
The Asheboro – Asheboro East (South) 115 kV transmission line overloads under contingency.
DUKE PROGRESS EAST
describing the project to replace the existing 150 MVA, 230/115 kV transformer at the Ft. Bragg Woodruff Street 230 kV substation with two 300 MVA, 230/115 kV transformers. Reconductor approximately 4.42 miles along the Ft. Bragg Woodruff Street – Manchester 115 kV transmission line with 3-1590 ACSR.

Supporting statement:
The Manchester 115 kV transmission line and Ft. Bragg Woodruff Street 230/115 kV transformer overloads under contingency.
RAEFORD 230 KV SUBSTATION

DESCRIPTION:
Loop in the Richmond – Ft. Bragg Woodruff St. 230 kV transmission line at Raeford 230/115 kV substation and add a 300 MVA transformer.

SUPPORTING STATEMENT:
The Raeford 230/115 kV transformers and Weatherspoon – Raeford 115 kV transmission line overload under contingency.
**DESCRIPTION:**
Rebuild approximately 8 miles of the Sutton Plant – Castle Hayne 115 kV North transmission line using 1272 ACSR rated for 239 MVA.

**SUPPORTING STATEMENT:**
The Sutton Plant – Castle Hayne 115 kV North transmission line overloads under contingency.
ASHEBORO – ASHEBORO EAST (NORTH) 115 KV T.L.

DESCRIPTION:
Rebuild approximately 6.45 miles of the Asheboro – Asheboro East (North) 115 kV transmission line using 3-1590 ACSR rated for 307 MVA. Replace disconnect switches at Asheboro 230 kV and both the breaker and the disconnect switches at Asheboro East 115 kV with equipment of at least 2000 A capability.

SUPPORTING STATEMENT:
The Asheboro – Asheboro East (North) 115 kV transmission line overloads under contingency.
DESCRIPTION:
Construct approximately 12 miles of new 230 kV transmission line from Jacksonville 230 kV substation to a new 230 kV substation at Grant’s Creek with bundled 6-1590 ACSR rated for 1195 MVA. Build the new 230 kV Grant’s Creek substation with four 230 kV breakers and a new 300 MVA 230/115 kV transformer.

SUPPORTING STATEMENT:
The Havelock – Jacksonville 230 kV transmission line overloads under contingency and voltage support is needed in the Jacksonville area.
DESCRIPTION:
Construct a new 230 kV switching station at Newport, construct a new 230 kV substation in the Harlowe Area, and construct approximately 10 miles of new 230 kV transmission line from the Harlowe Area – Newport Area with 3-1590 ACSR rated for 680 MVA.

SUPPORTING STATEMENT:
Voltage support is needed in Havelock – Morehead area.
RECONDUCTOR 10 MILES OF 230 KV T.L. WITH 6-1590 ACSR

DESCRIPTION:
Reconductor approximately 10 miles of the Durham – RTP 230 kV transmission line with bundled 6-1590 ACSR rated for 1195 MVA.

SUPPORTING STATEMENT:
The Durham – RTP 230 kV transmission line overloads under contingency.
DUKE PROGRESS WEST Balancing Authority

SERTP Regional Transmission Plan
**DESCRIPTION:**
Reconductor approximately 2.69 miles of the Vanderbilt – West Asheville 115 kV transmission line with 3-795 ACSR rated for 300 MVA. Replace one 115 kV breaker, two 115 kV disconnect switches, and one 115 kV switch at Vanderbilt.

**SUPPORTING STATEMENT:**
The Vanderbilt – West Asheville 115 kV transmission line overloads under contingency.
DUKE PROGRESS EAST/WEST
Balancing Authorities

Upcoming 2016
Generation Assumptions
DUKE PROGRESS – Generation Assumptions

The following diagram depicts the location of generation assumptions that change throughout the ten year planning horizon for the 2016 SERTP Process.
DUKE PROGRESS – Generation Assumptions

The following table depicts the generation assumptions that change throughout the ten year planning horizon for the 2016 SERTP Process. The years shown represent Summer Peak conditions.

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LG&E/KU Balancing Authority

SERTP Regional Transmission Plan
DESCRIPTION:
Construct a second Elizabethtown – Hardin Co 138 kV transmission line by overbuilding the existing Elizabethtown – Hardin Co 69 kV transmission line and install a 138 kV breaker on the Elizabethtown 138/69 kV transformer.

SUPPORTING STATEMENT:
The Hardin County 138/69 kV transformer overloads under contingency.
**DESCRIPTION:**
Reconductor approximately 5.19 miles of 795 ACSR conductor in the West Lexington – Viley Road section of the West Lexington – Viley Road – Haefling 138 kV transmission line, using high temperature conductor capable of at least 358 MVA.

**SUPPORTING STATEMENT:**
The West Lexington – Viley Road 138 kV transmission line overloads under contingency.
DESCRIPTION:
Reconductor 7.34 miles of 795 ACSR conductor on the West Lexington – Haefling 138 kV line, using high temperature conductor capable of at least 358 MVA.

SUPPORTING STATEMENT:
The West Lexington – Haefling 138 kV transmission line overloads under contingency.
DESCRIPTION:
Upgrade approximately 1.67 miles of 795 ACSR conductor on the Higby Mill – Reynolds 138 kV transmission line to 100°C operation.

SUPPORTING STATEMENT:
The Higby Mill – Reynolds 138 kV transmission line overloads under contingency.
TVA Balancing Authority

SERTP Regional Transmission Plan
DESCRIPTION:
Install an additional 1344 MVA, 500/161 kV transformer bank at the Pin Hook 500 kV substation. Reconductor the Nolensville Road – Elysian Fields 161 kV T.L. with 636 ACSS at 150°C. Reconductor the Murfreesboro Road – Airport 161 kV T.L. with 636 ACSS at 150°C. Reconductor the Blackman Tap – Smyrna 161 kV T.L. with 636 ACSS at 150°C. Construct the Montgomery – Clarksville #3 161 kV T.L. with 1590 ACSS at 150°C.

SUPPORTING STATEMENT:
Thermal overloads and additional voltage support needed in the Nashville area under contingency.
DESCRIPTION:
Construct the Plateau 500 kV substation by looping in the Wilson – Roane 500 kV and West Cookeville – Rockwood 161 kV transmission lines.

SUPPORTING STATEMENT:
Thermal overload and need for additional voltage support in the Murfreesboro, TN and Knoxville, TN areas under contingency.
ALCOA SS – NIXON ROAD 161 KV T.L.

DESCRIPTION:
Rebuild approximately 12 miles of the Alcoa North – Nixon Road 161 kV transmission line with 1590 ACSR at 100°C and construct approximately 2 miles of new transmission line to create the Alcoa SS – Nixon Rd 161 kV #2 transmission line.

SUPPORTING STATEMENT:
The Alcoa Switching Station – Nixon Road 161 kV transmission line overloads under contingency.
**DESCRIPTION:**
Construct approximately 12 miles of 161 kV transmission line from Bluff City to Elizabethton with 954 ACSR at 100°C.

**SUPPORTING STATEMENT:**
Additional voltage support is needed in the Elizabethton, TN area under contingency.
Upcoming 2016 Generation Assumptions
The following diagram depicts the location of generation assumptions that change throughout the ten year planning horizon for the 2016 SERTP Process.
# TVA – Generation Assumptions

The following table depicts the generation assumptions that change throughout the ten year planning horizon for the 2016 SERTP Process. The years shown represent Summer Peak conditions.

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Questions?

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