SERTP – 2015 1st Quarter Meeting

First RPSG Meeting & Interactive Training Session

March 26th, 2015

APC Headquarters

Birmingham, AL

Process Information

- **The SERTP process is a transmission planning process.**

- **Please contact the respective transmission provider for questions related to real-time operations or OATT transmission service.**

Purposes & Goals of Meeting

- **2015 SERTP Process Overview**
- **Form the "RPSG"**
  - Regional Planning Stakeholders Group
  - Committee Structure & Requirements
- **Economic Planning Studies**
  - Review Previous Study Selections
  - Review Requested Sensitivities for 2015
  - RPSG to Select the Five Economic Planning Studies
- **Interactive Training Session**
  - New TPL Standard
- **Miscellaneous Updates**
- **Next Meeting Activities**

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2015 SERTP Process Overview

Upcoming 2015 SERTP Process

- **SERTP 1st Quarter – *1st RPSG Meeting & Interactive Training Session***

  March 2015

  – Form RPSG
  – Select Five Economic Planning Studies
  – Interactive Training Session

- **SERTP 2nd Quarter – *Preliminary Expansion Plan Meeting***

  June 2015

  – Review Modeling Assumptions
  – Discuss Preliminary 10 Year Expansion Plan
  – Stakeholder Input & Feedback Regarding the Plan

Upcoming 2015 SERTP Process

- **SERTP 3rd Quarter – *2nd RPSG Meeting***

  September 2015

  – Discuss the Preliminary Results of the Five Economic Studies
  – Stakeholder Input & Feedback Regarding the Study Results
  – Discuss Previous Stakeholder Input on the Expansion Plan

- **SERTP 4th Quarter – *Annual Transmission Planning Summit & Input Assumptions***

  December 2015

  – Discuss Final Results of the Five Economic Studies
  – Discuss the Regional Transmission Plan
  – Obtain Stakeholder Input on the 2016 Transmission Model Input Assumptions

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Regional Planning Stakeholder Group

The SERTP Stakeholder Group

- **RPSG – Regional Planning Stakeholder Group**

- **Serves Two Primary Purposes**

  1) **The RPSG is charged with determining and proposing up to five (5) Economic Planning Studies on an annual basis**

  2) **The RPSG serves as stakeholder representatives for the eight (8) industry sectors in interactions with the SERTP Sponsors**

RPSG Committee Structure

- **RPSG Sector Representation**
  1) **Transmission Owners / Operators**
  2) **Transmission Service Customers**
  3) **Cooperative Utilities**
  4) **Municipal Utilities**
  5) **Power Marketers**
  6) **Generation Owner / Developers**
  7) **Independent System Operators (ISOs) / Regional Transmission Operators (RTOs)**
  8) **Demand Side Management / Demand Side Response**

RPSG Committee Structure

- **Sector Representation Requirements**
  - **Maximum of two (2) representatives per sector**
  - **Maximum of 16 total sector members**
  - **A single company, and all of its affiliates, subsidiaries, and parent company, is limited to participating in a single sector**

RPSG Committee Structure

- **Annual Reformation**
  - **Reformed annually at 1st Quarter Meeting**
  - **Sector members elected for a term of approximately one year**
  - **Term ends at start of following year's 1st Quarter SERTP Meeting**
  - **Sector Members shall be elected by the Stakeholders present at the 1st Quarter Meeting**
  - **Sector Members may serve consecutive, one-year terms if elected**
  - **No limit on the number of terms that a Sector Member may serve**

RPSG Committee Structure

- **Simple Majority Voting**
  - **RPSG decision-making that will be recognized by the Transmission Provider for purposes of Attachment K shall be those authorized by a simple majority vote by then-current Sector Members**
  - **Voting by written proxy is allowed**

RPSG Formation

- **2014 Sector Representatives**

- **2015 Sector Representatives**

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Economic Planning Studies

SERTP Regional Models

- **SERTP Sponsors developed 12 coordinated regional models***
- **Models include latest transmission planning model information within the SERTP region**

No.	Season	Year
1	SUMMER	2016
2		2018
3		2020
4		2021
5		2023
6		2025
7	SHOULDER	2020
8		2023
9		2025
10	WINTER	2020
11		2025
12	LIGHT LOAD	2016

* Available on the secure area of the SERTP website upon satisfying access requirements

Economic Planning Study Process

- **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
- **Models used to perform the analysis incorporate the load forecasts and resource decisions as provided by LSEs**
  - Power flow models are made available to stakeholders to perform additional screens or analysis
- **Scoping Meeting typically held in April/May**

Economic Planning Study Requests

- **2014 Economic Planning Studies**
- **2015 Economic Planning Study Requests**
- **Vote on 2015 Economic Planning Studies**

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Interactive Training Session

New NERC TPL Standard

Main Driver for Change in TPL

- **FERC Order 693**
  - Sensitivity studies to be carried out
  - Should use event-based contingencies
  - Clarify footnote b
- **SDT began work in early 2006**

Standard Drafting Team (SDT) Actions

- **Merged four standards into one**
- **Kept table of contingencies / events**
  - Category A,B,C contingencies became P0-P7 events
  - Category D contingencies became Extreme Events
- **“Raised the Bar” in some areas**
- **TPL-001-4**

New Contingency Categories

Category	Initial Condition	Event [1]	Fault Type [2]	BES Level [3]	Interruption of Firm Transmission Service Allowed [4]	Non-Consequential Load Loss Allowed
P0 No Contingency	Normal System	None	N/A	EHV, HV	No	No
P1 Single Contingency	Normal System	Loss of one of the following: 1. Generator 2. Transmission Circuit 3. Transformer [5] 4. Shunt Device [6]	3Ø	EHV, HV	No[9]	No[12]
		5. Single Pole of a DC line	SLG			
P2 Single Contingency	Normal System	1. Opening of a line section w/o a fault [7]	N/A	EHV, HV	No[9]	No[12]
		2. Bus Section Fault	SLG	EHV	No[9]	No
				HV	Yes	Yes
		3. Internal Breaker Fault [8] (non-Bus-tie Breaker)	SLG	EHV	No[9]	No
				HV	Yes	Yes
		4. Internal Breaker Fault (Bus-tie Breaker) [8]	SLG	EHV, HV	Yes	Yes
P3 Multiple Contingency	Loss of generator unit followed by System adjustments[9]	Loss of one of the following: 1. Generator 2. Transmission Circuit 3. Transformer [5] 4. Shunt Device [6]	3Ø	EHV, HV	No[9]	No[12]
		5. Single pole of a DC line	SLG			

New Contingency Categories

P4 Multiple Contingency *(Fault plus stuck breaker[10])*	Normal System	Loss of multiple elements caused by a stuck breaker [10](non-Bus-tie Breaker) attempting to clear a Fault on one of the following: 1. Generator 2. Transmission Circuit 3. Transformer [5] 4. Shunt Device [6] 5. Bus Section	SLG	EHV	No[9]	No
				HV	Yes	Yes
		6. Loss of multiple elements caused by a stuck breaker[10] (Bus-tie Breaker) attempting to clear a Fault on the associated bus	SLG	EHV, HV	Yes	Yes
P5 Multiple Contingency *(Fault plus relay failure to operate)*	Normal System	Delayed Fault Clearing due to the failure of a non-redundant relay[13] protecting the Faulted element to operate as designed, for one of the following: 1. Generator 2. Transmission Circuit 3. Transformer [5] 4. Shunt Device [6] 5. Bus Section	SLG	EHV	No[9]	No
				HV	Yes	Yes
P6 Multiple Contingency *(Two overlapping singles)*	Loss of one of the following followed by System adjustments.[9] 1. Transmission Circuit 2. Transformer [5] 3. Shunt Device[6] 4. Single pole of a DC line	Loss of one of the following: 1. Transmission Circuit 2. Transformer [5] 3. Shunt Device [6]	3Ø	EHV, HV	Yes	Yes
		4. Single pole of a DC line	SLG	EHV, HV	Yes	Yes
P7 Multiple Contingency *(Common Structure)*	Normal System	The loss of: 1. Any two adjacent (vertically or horizontally) circuits on common structure [11] 2. Loss of a bipolar DC line	SLG	EHV, HV	Yes	Yes

TPL-001-4

- **Requirement R1**
  - Requirements on system models to be used
- **Requirement R2**
  - Requirements for the annual Planning Assessment
- **Requirement R3**
  - Requirements for the Steady State portion of the Planning Assessment
- **Requirement R4**
  - Requirements for the Stability portion of the Planning Assessment

TPL-001-4

- **Requirement R5**
  - Requires criteria for acceptable:
    - System steady state voltage limits
    - Post- Contingency voltage deviations
    - Transient voltage response
- **Requirement R6**
  - Requires criteria or methodology used in the analysis to identify System instability for conditions such as Cascading, voltage instability, or uncontrolled islanding

TPL-001-4

- **Requirement R7**
  - PC and TP to identify each entity's individual and joint responsibilities for performing the required studies for the Planning Assessment
- **Requirement R8**
  - Requires you to distribute the Planning Assessment to adjacent PC's and TP's
  - Respond to comments in 90 days

Additional Work Required

- **Requires study assuming a transformer or other equipment which does not have a spare is out (1 year or more lead time)**

- **Requires coordination with adjacent PCs and TPs to ensure contingencies on adjacent system which impact your system are on your contingency list**

Additional Work Required

- **Perform single contingency analysis for system including known outages of 6 months duration or longer**
- **Additional requirements for contingencies related to non-consequential load**
- **Requires sensitivity cases to be studied**

Additional Work Required

- **Contingency analyses shall simulate the removal of all elements that the Protection System and other automatic controls are expected to disconnect**

- **Trip generators where simulations show generator bus voltages or high side of the GSU voltages are less than known or assumed minimum generator steady state or ride through voltage limitations**

Stability

- **Requires off-peak and peak studies**
  - Peak studies must include effects of induction motor loads
- **Successful and unsuccessful high speed reclosing must be simulated (where utilized)**
- **Include tripping of Transmission lines and transformers where transient swings cause Protection System operation based on generic or actual relay models**

Contingencies

- **Treat internal breaker fault as single contingency**
  - For >300 kV, no loss of load allowed
- **Fault with stuck breaker or fault with relay failure**
  - For >300 kV, no loss of load allowed

Status of TPL-001-4

- **FERC issued final order approving TPL-001-4 on Oct 17, 2013**
- **Effective dates**
  - R1 and R7 effective 1-1-2015
  - R2, R3, R4, R5, R6, R8 effective 1-1-2016
- **For certain "Raising the Bar" events, you have until 1-1-2021 to get improvements in place**
  - Can drop Non-Consequential load until then

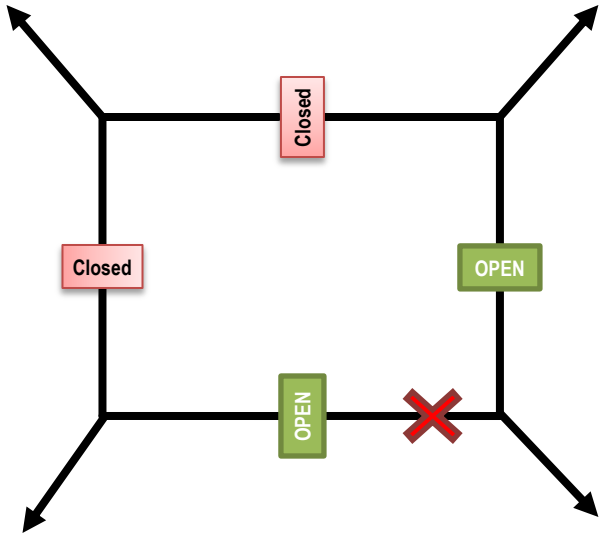
Some "Raising the Bar" Examples

- **Contingency Examples:**
  - **P2-2 (above 300 kV)**
    - EHV – "Bus Section Fault" w/o Interruption of Firm Transmission Service or Non-Consequential Load Loss"
  - **P2-3 (above 300 kV)**
    - EHV – "Internal Breaker Fault" w/o Interruption of Firm Transmission Service or Non-Consequential Load Loss"
  - **P3-1 through P3-5**
    - *"N-G-1"*
  - **P4-1 through P4-5 (above 300 kV)**
    - Fault plus "stuck breaker"
  - **P5 (above 300 kV)**
    - Fault plus "delayed fault clearing – relay failure"

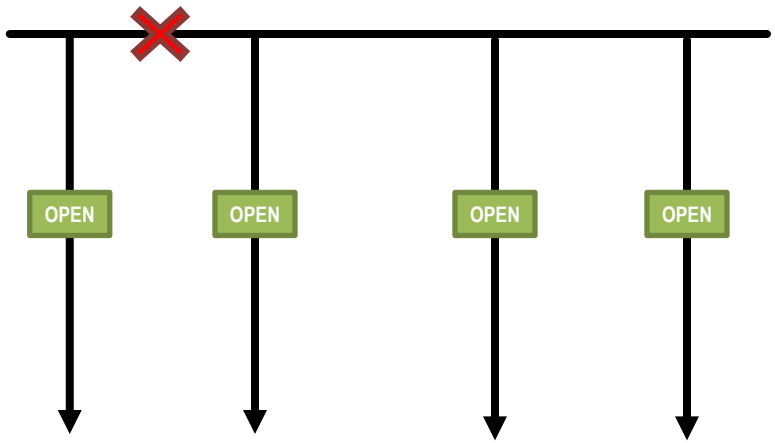
Some "Raising the Bar" Examples

- **Bus Section Fault**

"Ring Bus Configuration"



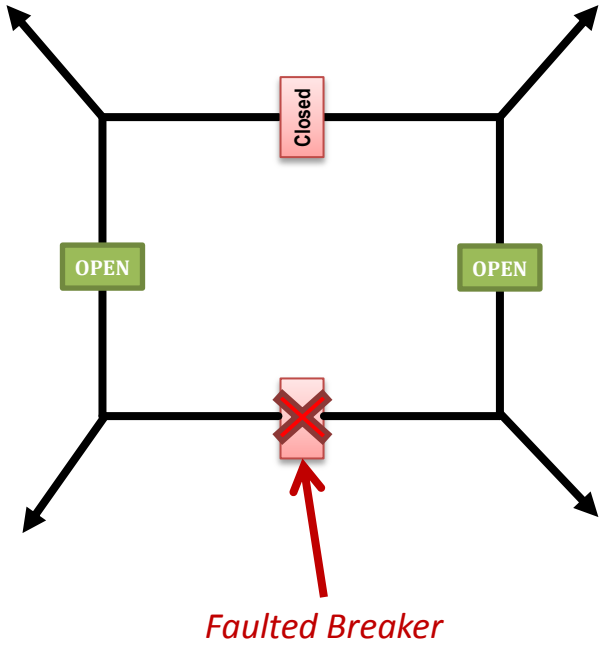
"Straight Bus Configuration"



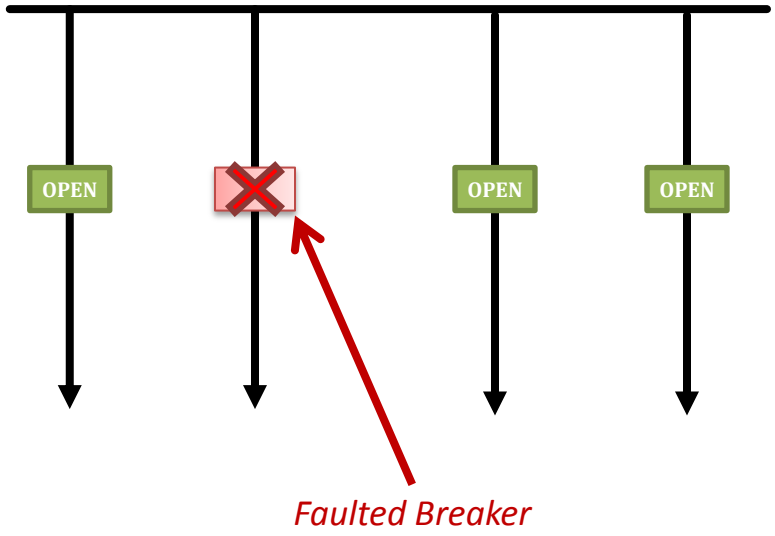
Some "Raising the Bar" Examples

- **Internal Breaker Fault**

"Ring Bus Configuration"



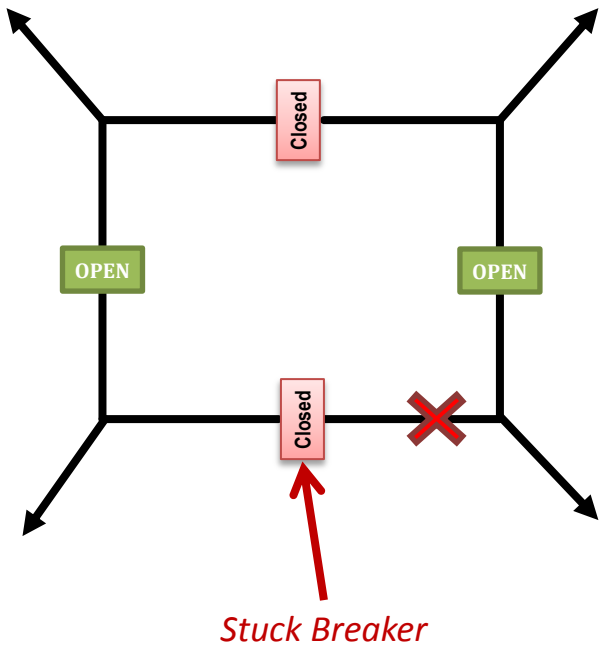
"Straight Bus Configuration"



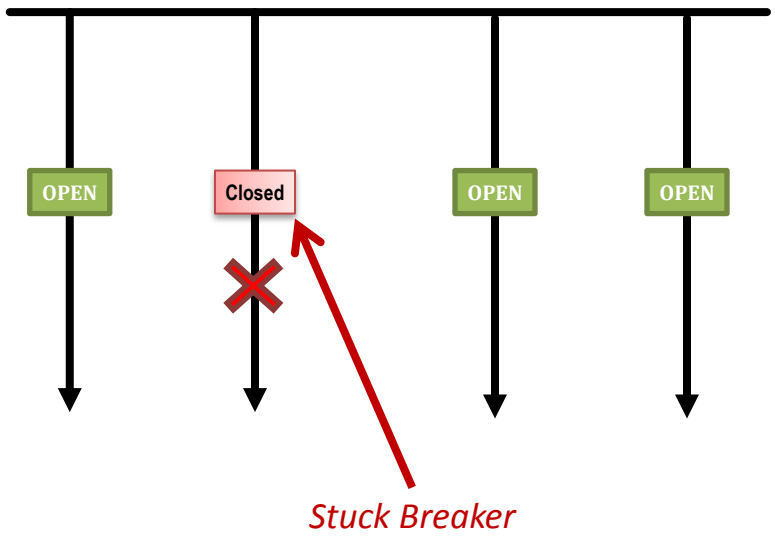
Some "Raising the Bar" Examples

- **Fault Plus Stuck Breaker or Delayed Clearing**

"Ring Bus Configuration"

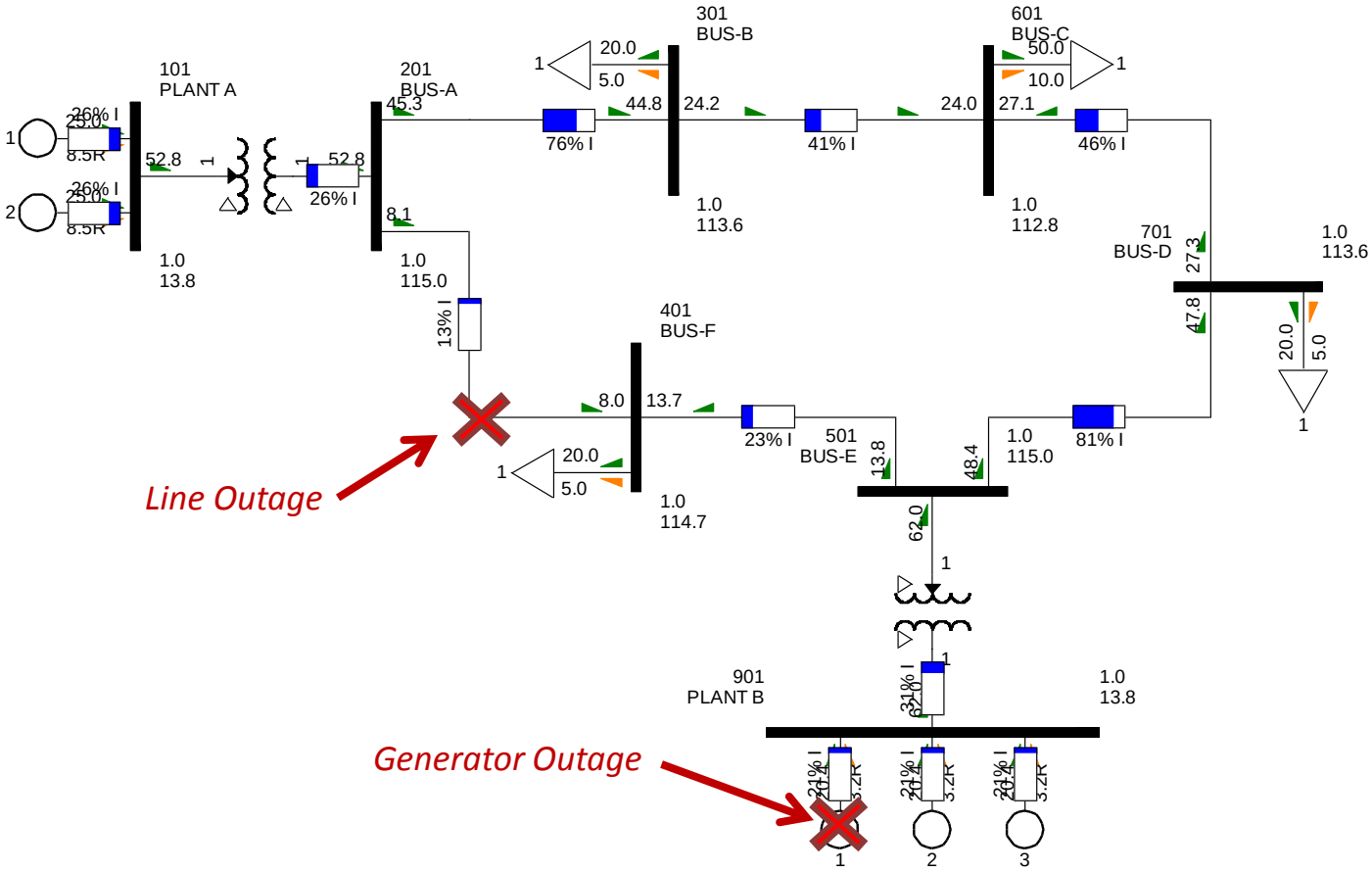


"Straight Bus Configuration"



Some "Raising the Bar" Examples

- **N-G-1**



Some "Raising the Bar" Examples

- **See the 2014 Interactive Training Session for more detailed information on how to outage equipment in PSS/E.**

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Miscellaneous Updates

Order No.1000 Interregional Update

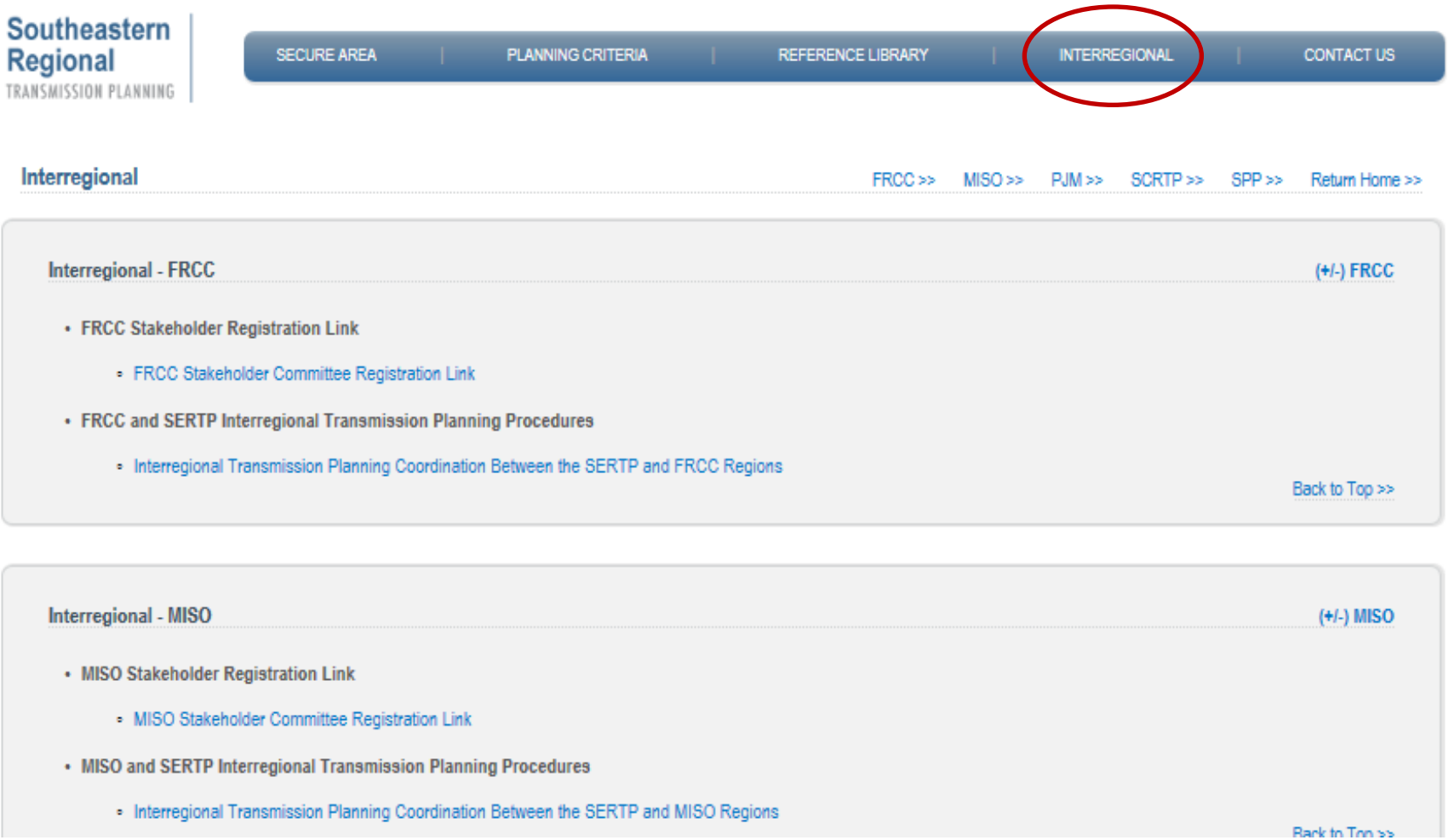
- **1/23/15 - Interregional orders issued for four SERTP seams**
  - SCRTP, FRCC, PJM, MISO
  - SERTP interregional filings were largely accepted
- **3/24/15 - SERTP interregional compliance filings on SERTP seams with SCRTP and FRCC**
- **Extensions granted for SERTP seams with PJM and MISO**
  - PJM: 5/26/15
  - MISO: 6/22/15
- **3/19/15 - Interregional order issued for SERTP seam with SPP**

Order No.1000 Interregional Update

- **SERTP has begun implementing the FERC Order No.1000 interregional requirements**
  - Interregional coordination procedures posted
  - Performing initial outreach with seams

Order No.1000 Interregional Update

www.southeasternrtp.com



Order No.1000 Regional Update

Transmission Needs Driven by Public Policy Requirements (PPRs)

- **Three (3) stakeholder proposals submitted for the 2015 planning cycle for the following proposed PPRs:**
    1) *Carbon Pollution Emission Guidelines for Existing Electric Utility Generating Units*
    2) *National Primary Ambient Air Quality Standards for S02, National Pollutant Discharge Elimination System Requirements for Cooling Water Intake, Cross-State Air Pollution Rule, Disposal of Coal Combustion Residuals*
    3) *North Carolina Renewable Energy and Energy Efficiency Portfolio Standard*
- **None of the stakeholder proposed transmission needs driven by PPRs were identified for further evaluation of potential transmission solutions in the 2015 planning cycle.**
- **Response posted on the SERTP website.**

Next Meeting Activities

- **2015 SERTP 2nd Quarter Meeting**
  - **Location: TBD**
  - **Date: June 2015**
  - **Purpose:**
    - Review Modeling Assumptions
    - Discuss Preliminary 10 Year Expansion Plan
    - Stakeholder Input & Feedback Regarding the Plan

Questions?