Welcome

SERTP 2013 – 1st Quarter Meeting

"First RPSG Meeting & Interactive Training Session"

2013 SERTP

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 the Meeting

- **2013 SERTP Process Overview**
- **Form the "RPSG"**
  - Regional Planning Stakeholders Group
  - Committee Structure & Requirements
- **Economic Planning Studies**
  - Review Previous Study Selections
  - Review Requested Sensitivities for 2013
  - RPSG to Select the Five Economic Planning Studies
- **Interactive Training Session**
  - Stability Analysis
- **Modeling Assumptions Update**
- **FERC Order No. 1000 Update**
- **Next Meeting's Activities**

2013 SERTP
Process Overview

2013 SERTP Process Overview

- **1st Quarter Meeting**
  - "First RPSG Meeting & Interactive Training Session"
  - Form RPSG
  - Select Five Economic Planning Studies
  - Interactive Training Session
- **2nd Quarter Meeting**
  - "Preliminary Expansion Plan Meeting"
  - Review Modeling Assumptions
  - Discuss Preliminary 10 Year Expansion Plan
  - Stakeholder Input & Feedback Regarding the Plan

2013 SERTP Process Overview

- **3rd Quarter Meeting**
  - "Second RPSG Meeting"
  - Discuss the Preliminary Results of the Five Economic Studies
  - Stakeholder Input & Feedback Regarding the Study Results
  - Discuss Previous Stakeholder Input on the Expansion Plan
- **4th Quarter Meeting**
  - "Annual Transmission Planning Summit & Assumptions Input Meeting"
  - Discuss Final Results of the Five Economic Studies
  - Discuss the 10 Year Transmission Expansion Plan
  - Obtain Stakeholder Input on the Transmission Model Assumptions Used in Developing Next Year's Plan

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 Reformulation

- Reformed annually at each 1st Quarter Meeting
- Sector members will be elected for a term of approximately one year
- Term ends at the start of the 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
- There is 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

- 2012 Sector Representatives
- 2013 Sector Representatives

Economic Studies

- **Attachment K:**

  The operative theory for the Economic Planning Studies is for them to identify meaningful information regarding the requirements for moving large amounts of power beyond that currently feasible, whether such transfers are internal to the Region or from this Region to interconnected regions.

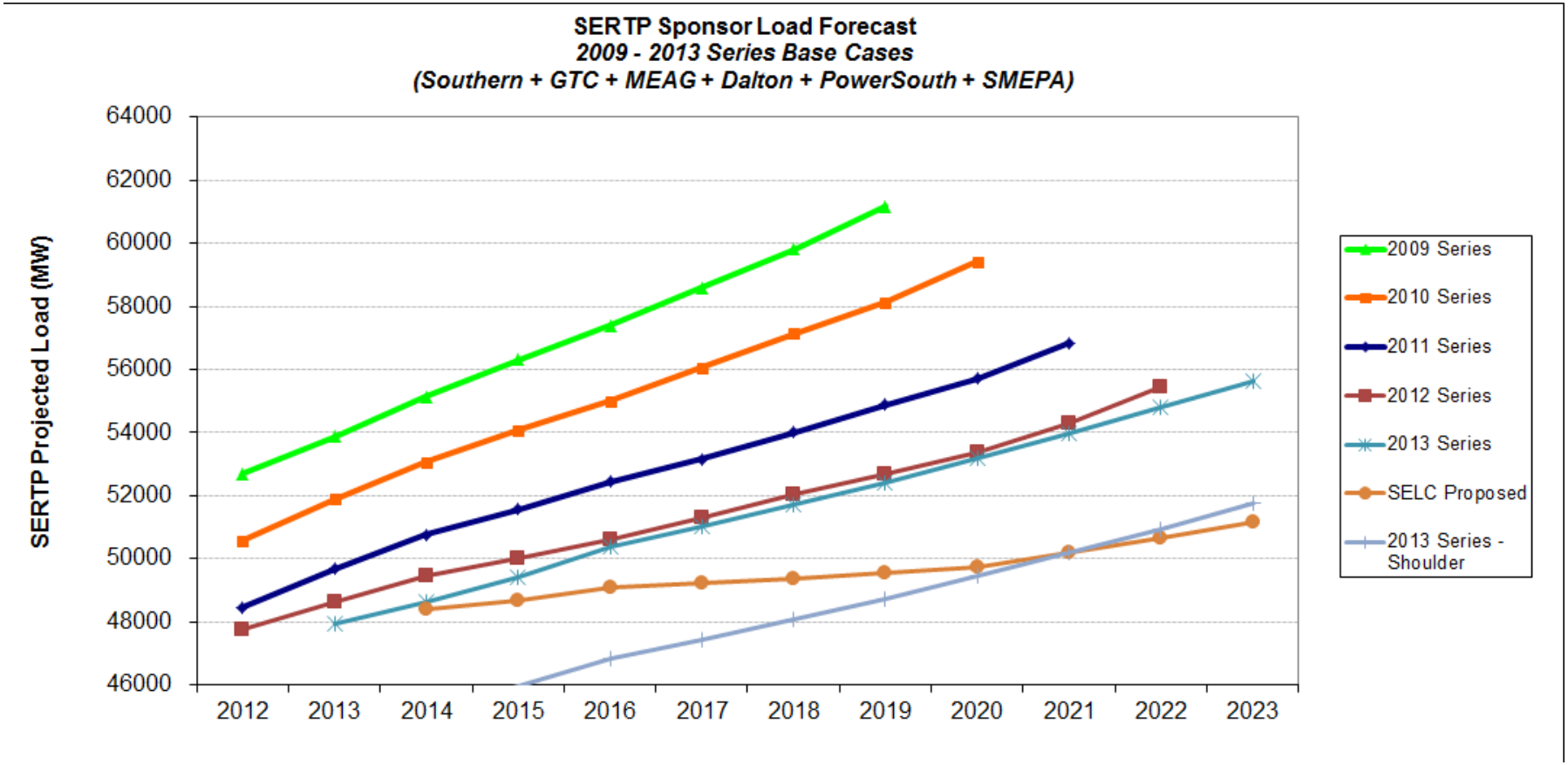
Economic Studies

- **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

2013 Economic Planning Study Requests

- Previous Economic Planning Studies
- Current Economic Planning Study Requests
- Vote on Economic Planning Studies

Load Forecast



Interactive Training Session

Interactive Training Session

- **Explain and discuss the underlying methodology and criteria that will be utilized to develop the transmission expansion plan**

- **Planning Criteria:**
  - On the SERTP Website

Stability Simulations

Bobby Jones

SERTP

March 21, 2013

Stability

- **A condition of equilibrium between opposing forces.**

- **Under steady state conditions for generators, equilibrium is between:**

  - Input mechanical torque and Output electrical torque of each machine.

Stability Analog with Masses & Springs

- Generators are like masses.
- Transmission lines are like springs.

Definitions

- **Transient Stability** - maintain synchronism when subjected to a severe transient disturbance

- **Small Signal Stability** - maintain synchronism under small disturbances and have power oscillations damp out

- **Voltage Stability** – maintain acceptable voltages under normal operating conditions and after being subjected to a disturbance

Factors Influencing Transient Stability

- How heavily the generator is loaded
- Generator output power during the fault depends on fault location and type
- Fault clearing time

Factors Influencing Transient Stability

- Generator inertia. The higher the inertia, the slower the rate of change of angle.
- Generator internal voltage magnitude (E). This depends on field excitation.

Stability Criteria

- **With all lines in service, apply three-phase fault (normal clearing)**
  - Use two cycle margin for this

Stability Criteria

- **With all lines in service, apply three-phase fault with stuck breaker (delayed clearing)**
  - gang operated breaker, all three poles stuck closed
  - IPO breaker, two poles open, one pole stuck

Line Outage Stability Criteria

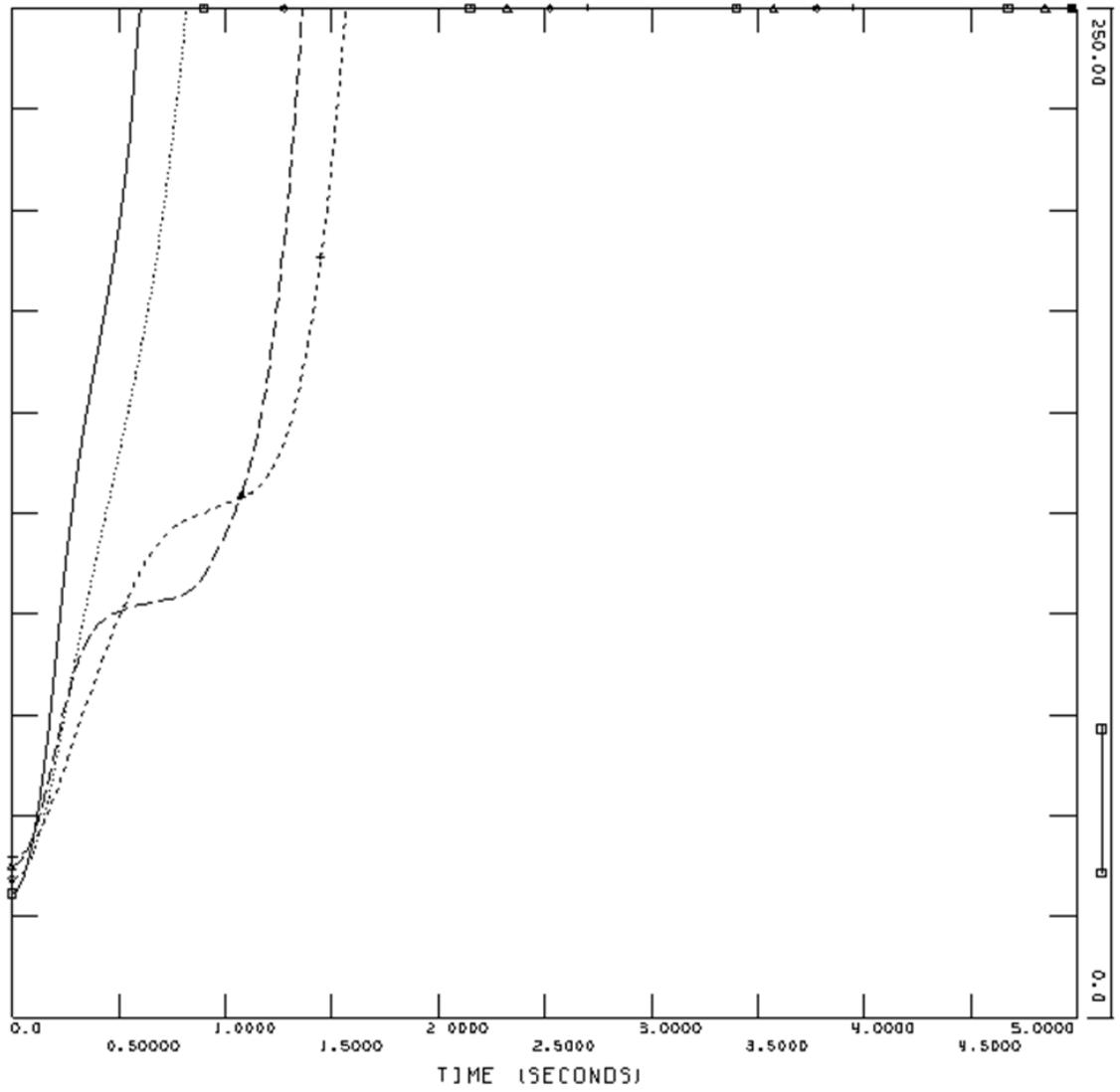
- **With one line out of service, apply three-phase fault (normal clearing)**
  - Use no margin for this

Types of Stability Concerns

- Units pulling out of synchronism
- Units with power oscillations that do not damp out properly
- Excessive transient voltage dips
- Voltages not recovering fast enough

Interactive Training Session

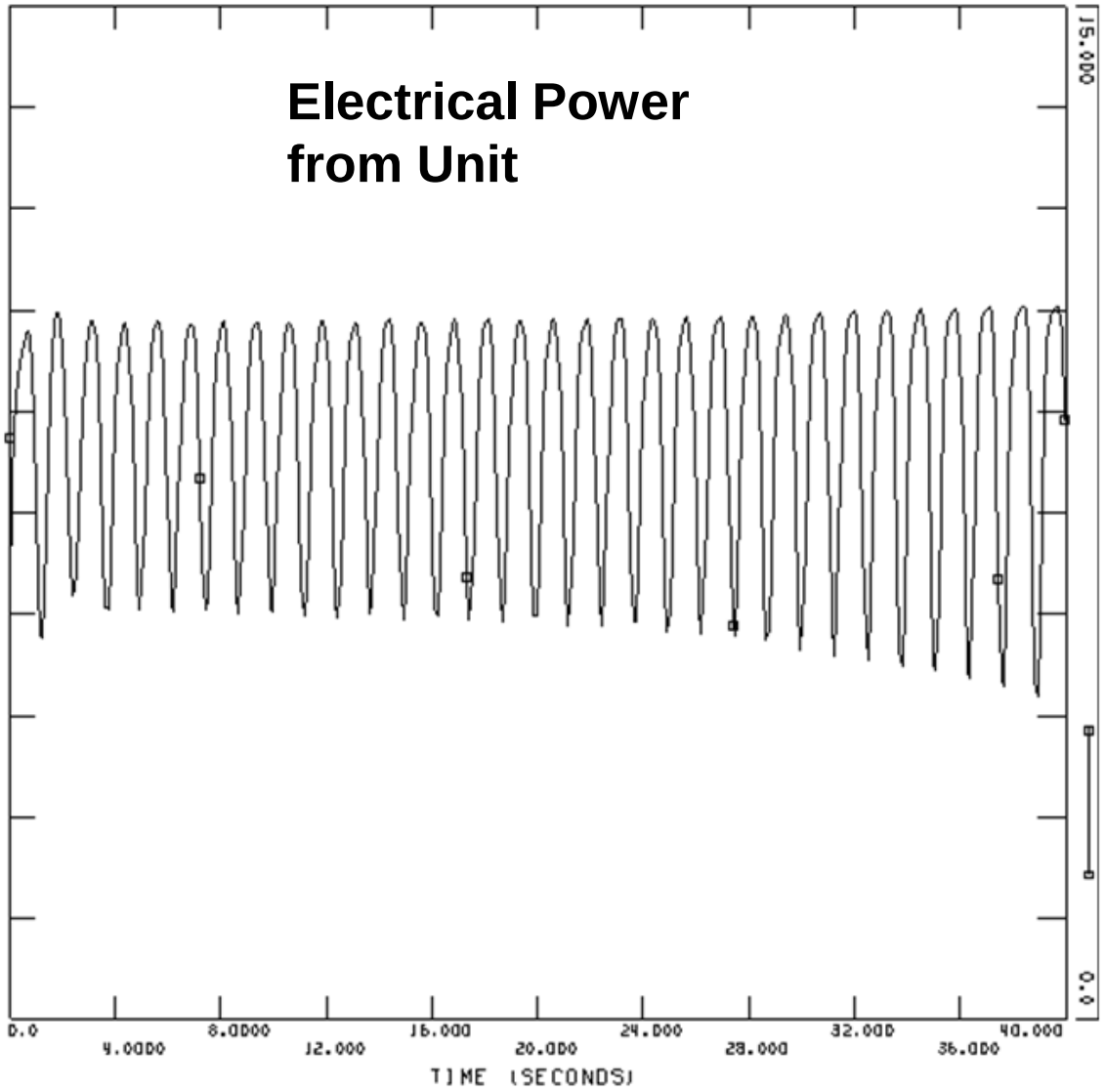
Example of Units Pulling Out of Synchronism



Possible Solutions to Transient Stability Problem

- **Speed up relaying**
  - add pilot relaying
  - adjust BFCT
- **IPO breakers**
- **Trip generator**
- **Build transmission line**

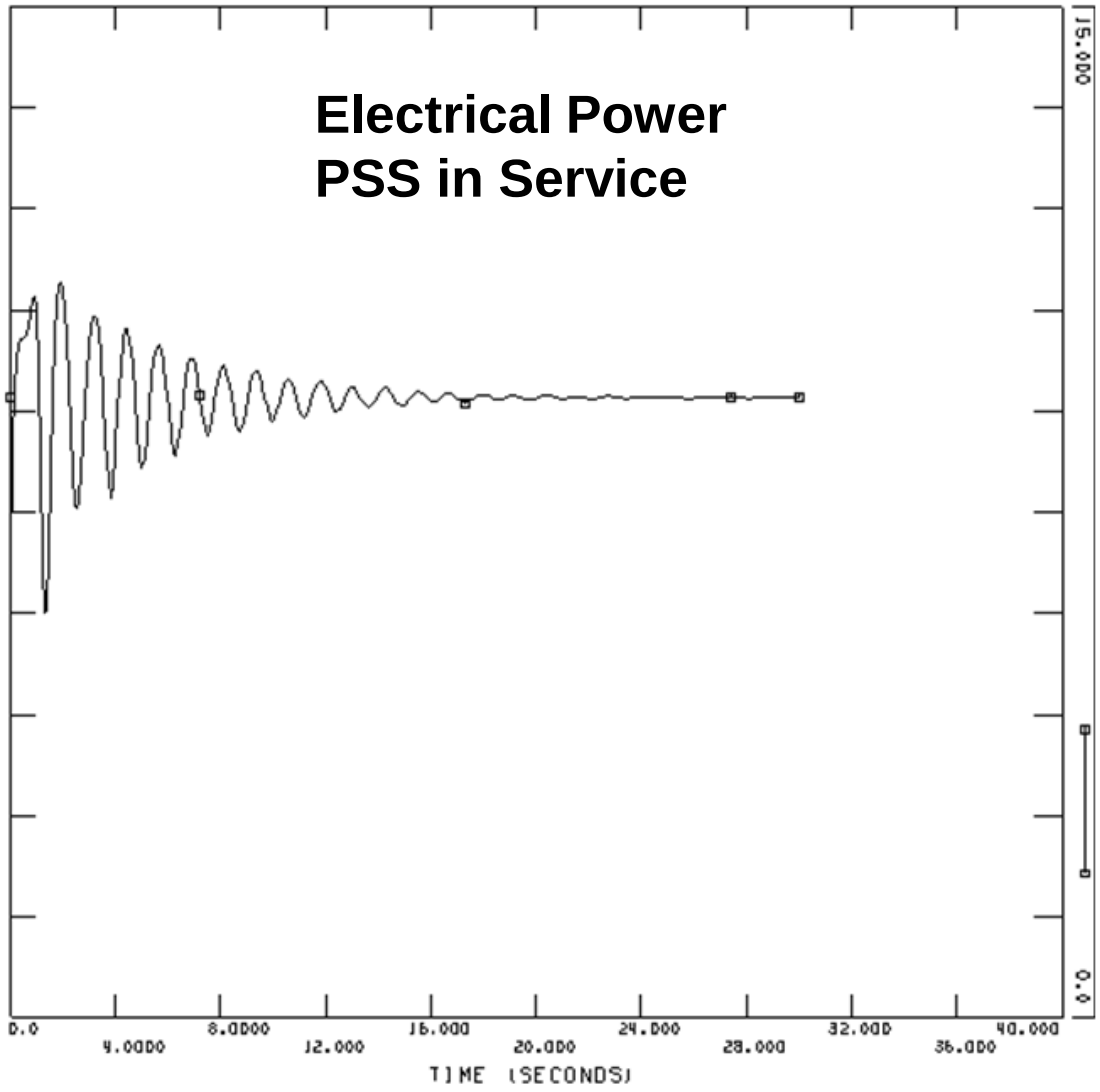
Example of Power Oscillation Problem



Possible Solutions to Power Oscillation Problem

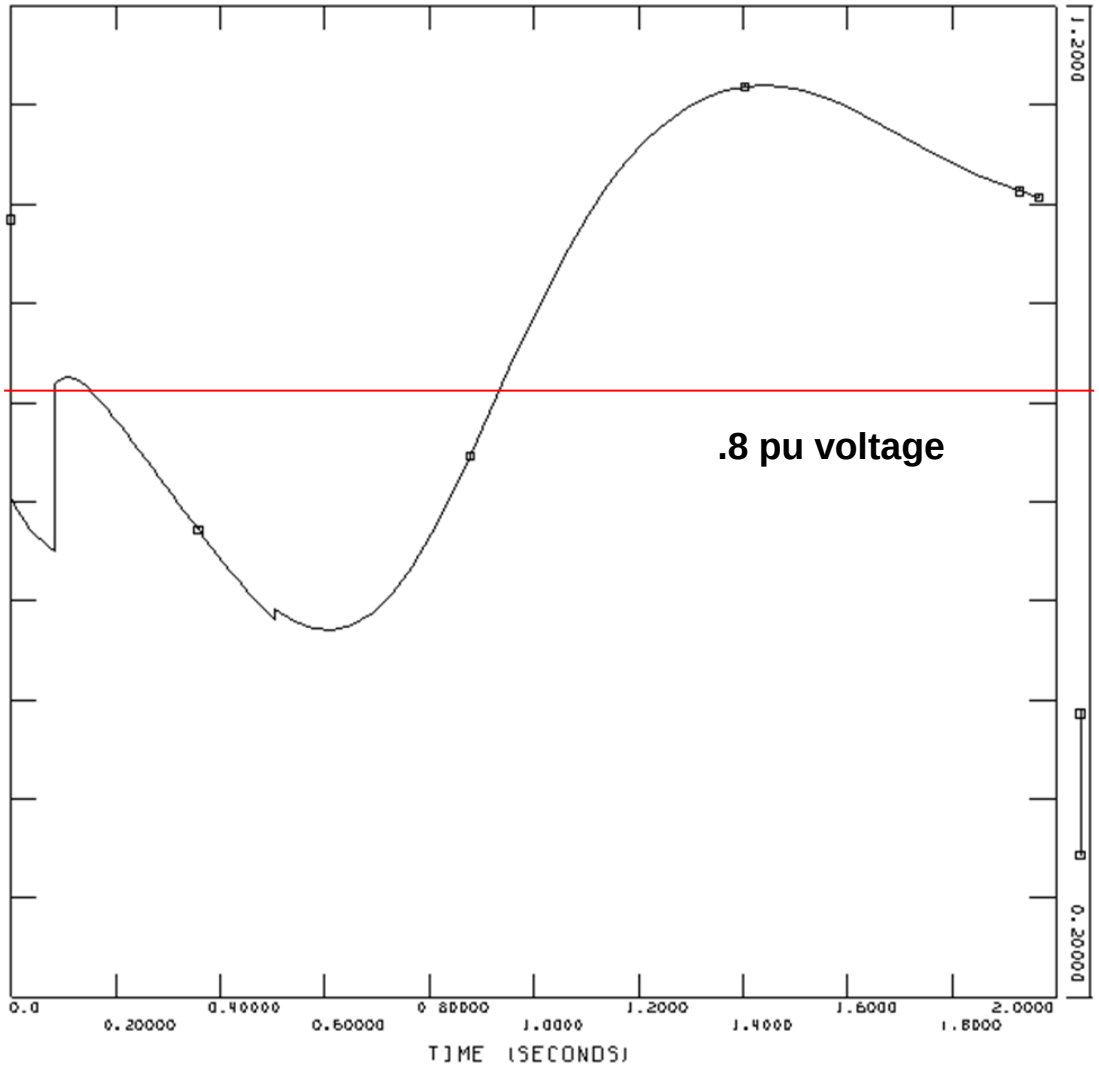
- Add power system stabilizer (PSS)
- Limit amount of generation

Interactive Training Session



Interactive Training Session

Example of Excessive Transient Voltage Dip



Issue

- **Severe transient voltage dips imply**
  - potential for dropping loads
  - standard load model used in stability simulations may not be accurate enough

Loads

- **Standard load model**
  - P constant current - Q constant admittance
  - voltage down, P down, Q way down

- **Induction motor load**
  - voltage down, P almost constant, Q way up

Possible Solution for Transient Voltage Dip Problem

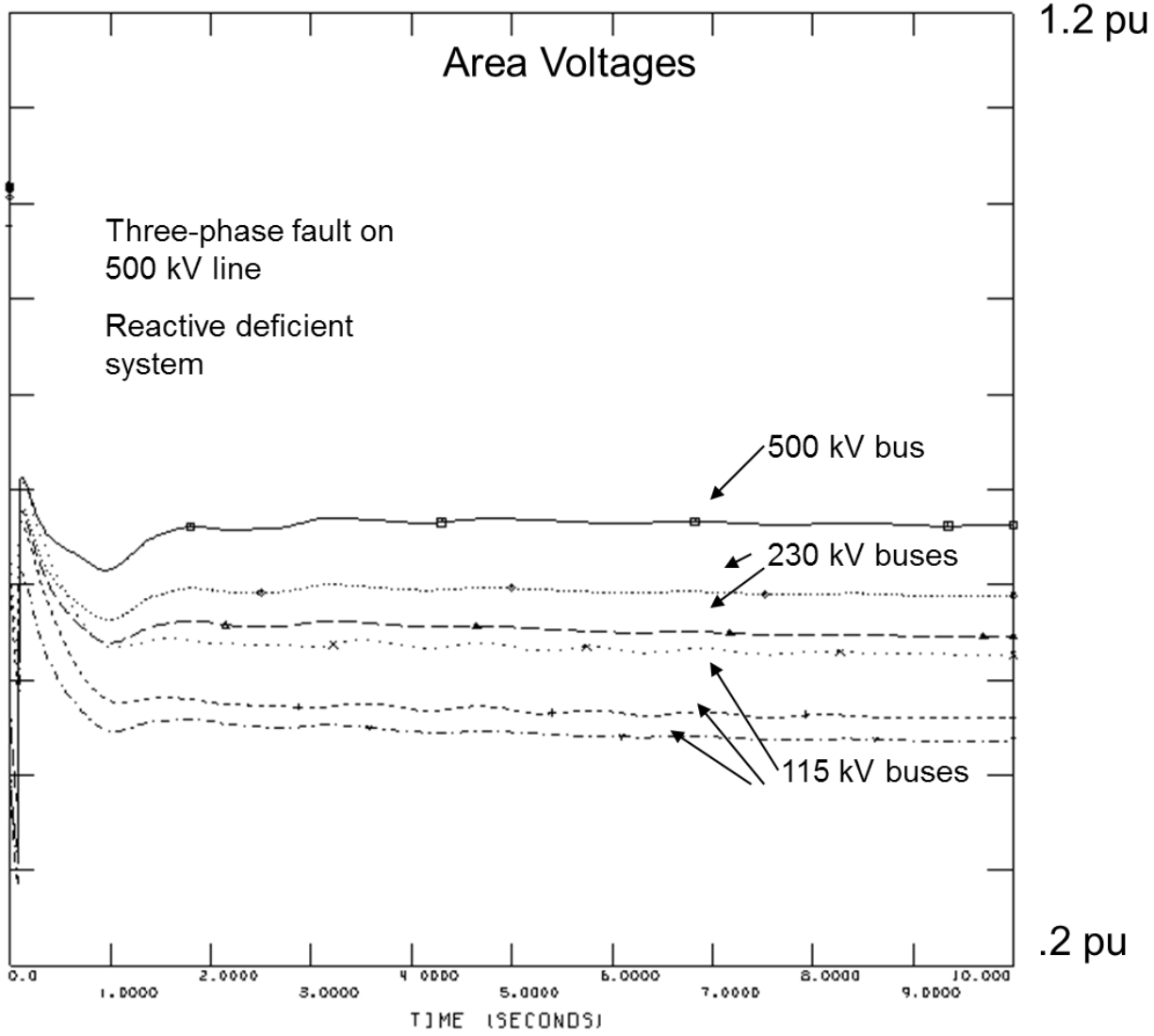
- Add static var compensator
- Reduce amount of generation in an area

Voltage Stability

- **Short time voltage collapse**
  - Fault Induced Delayed Voltage Recovery (FIDVR)

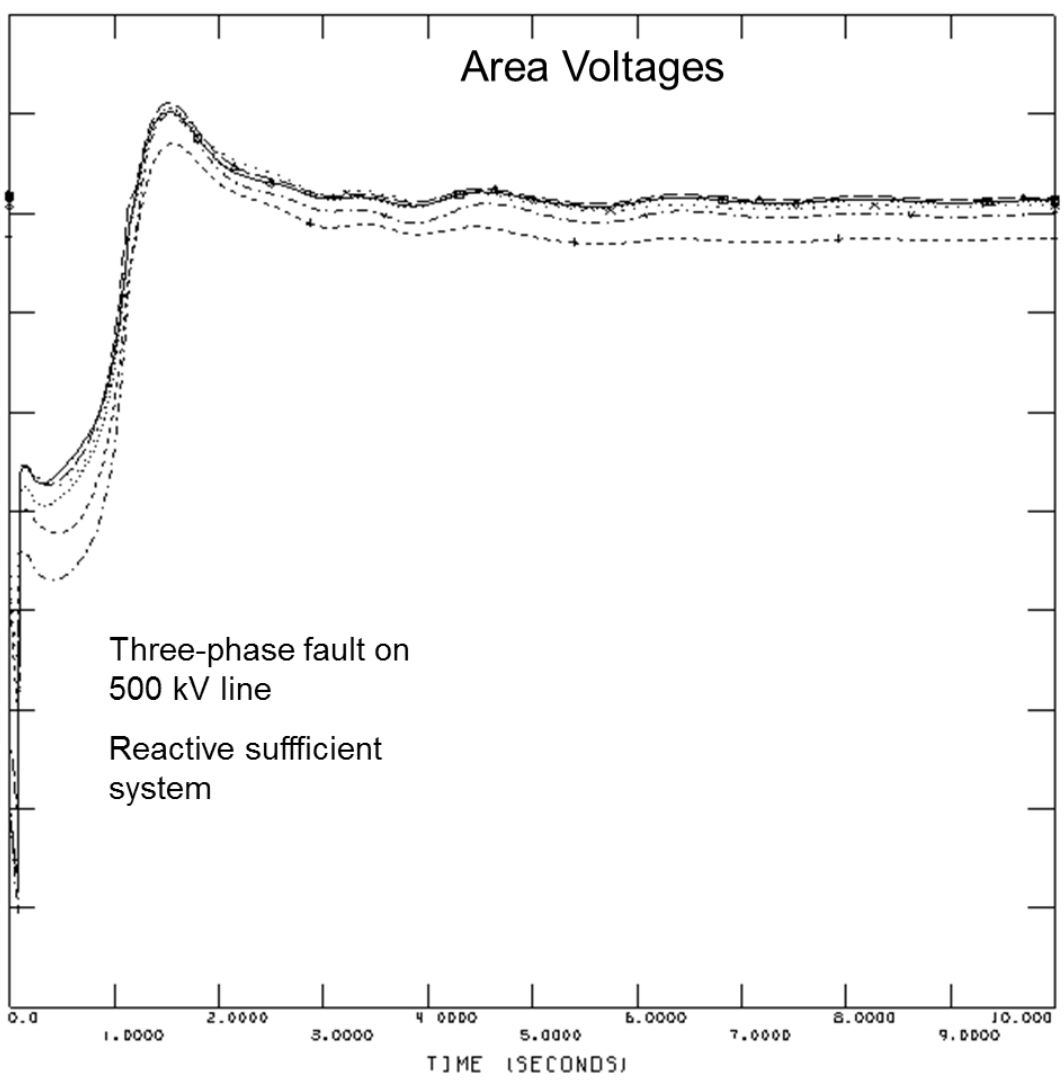
Interactive Training Session

FIDVR Simulation



Interactive Training Session

FIDVR Simulation



Summary

- **Stability involves making sure units**
  - do not lose synchronism with the system
  - do not oscillate forever
- **Stability involves making sure voltages recover after faults**

Modeling Assumptions Update

2013 Regional Generation Assumptions

The following tables depict changes in the generation assumptions for the 2013 Transmission Expansion Planning Process[1]

SOUTHERN

Site	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
McDonough CC 6	841	841	841	841	841	841	841	841	841	841	841
Central Alabama CC	885	885	885	885	885	885	885	885	885	885	0
Piedmont Biomass	50	50	50	50	50	50	50	50	50	50	50
Vogtle 1	538	538	538	538	538	538	538	538	538	538	538
Greenway Biomass	--	--	50	50	50	50	50	50	50	50	50
Baconton CT	197	0	--	--	--	--	--	--	--	--	--
Dahlberg CT	584	292	367	367	367	367	367	367	367	367	367
Kemper IGCC	--	510	510	510	510	510	510	510	510	510	510
Branch 2	325	0	--	--	--	--	--	--	--	--	--

[1]The years shown in the following tables represent Summer Peak conditions

2013 Regional Generation Assumptions

SOUTHERN (Cont.)

Site	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
NSR Biomass	--	--	20	20	20	20	20	20	20	20	20
Branch 1	266	266	0	--	--	--	--	--	--	--	--
Branch 3-4	1016	1016	0	--	--	--	--	--	--	--	--
McManus 1-2	122	122	0	--	--	--	--	--	--	--	--
Yates 1-5	470	470	0	--	--	--	--	--	--	--	--
Yates 6-7	572	572	642	642	642	642	642	642	642	642	642
Vogtle 2	584	584	540	540	540	540	540	540	540	540	540
West Georgia CT	--	--	298	298	298	298	298	298	298	298	298
Kraft 1-4	333	333	333	0	--	--	--	--	--	--	--
Franklin 2 CC	--	--	625	0	--	--	--	--	--	--	--

2013 Regional Generation Assumptions

SOUTHERN (Cont.)

Site	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Gaston 1-4	411	411	465	465	465	465	465	465	465	465	465
Hammond 1	89	89	89	110	110	110	110	110	110	110	110
Hammond 3	89	89	89	110	110	110	110	110	110	110	110
Harris CC 1	--	--	--	625	625	625	625	625	625	625	625
Wansley CC 6	561	561	561	561	0	--	--	--	--	--	--
Vogtle 3	--	--	--	--	--	504	504	504	504	504	504
Vogtle 4	--	--	--	--	--	--	504	504	504	504	504
Harris CC 2	628	628	628	628	628	628	0	--	--	--	--
Calhoun CT 1-4	632	632	632	632	632	632	632	632	632	632	0
Crist CT	--	--	--	--	--	--	--	--	--	--	300
Yates CC	--	--	--	--	--	--	--	--	--	--	940

2013 Regional Generation Assumptions

GTC

Site	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Tiger Creek CT	300	300	300	300	300	300	300	300	300	300	300
Effingham CC	500	500	0	--	--	--	--	--	--	--	--
Lindsay Hill CC	265	65	273	273	300	300	300	300	300	0	--
Franklin CC 2	625	625	0	625	625	625	625	625	625	625	625
Dahlberg CT	--	75	262	375	375	375	375	375	375	375	375
Branch	90	0	--	--	--	--	--	--	--	--	--
Hammond 2	21	0	--	--	--	--	--	--	--	--	--
Gaston 1&2	104	104	0	--	--	--	--	--	--	--	--
Santa Rosa	225	225	0	--	--	--	--	--	--	--	--
McManus CT	30	30	0	--	--	--	--	--	--	--	--
Mitchell	38	38	0	--	--	--	--	--	--	--	--

2013 Regional Generation Assumptions

GTC (Cont.)

Site	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Scherer 3	280	280	132	132	132	132	132	56	56	56	56
Wilson 5 CT	21	21	0	--	--	--	--	--	--	--	--
Yates	244	244	0	--	--	--	--	--	--	--	--
Franklin CC 3	620	620	620	620	620	620	620	620	620	620	620
Warthen CT	552	552	552	552	552	552	552	552	552	552	552
Hillabee CC	--	--	--	300	300	300	300	300	300	300	300
T.A. Smith I CC	620	620	620	620	620	620	620	620	620	620	620
T.A. Smith II CC	620	620	620	620	620	620	620	620	620	620	620
Wansley CC 6	--	--	--	--	561	561	561	561	561	561	561
Vogtle 3	--	--	--	--	--	330	330	330	330	330	330
Vogtle 4	--	--	--	--	--	--	330	330	330	330	330
Washington County	--	--	--	--	--	--	850	850	850	850	850

2013 Regional Generation Assumptions

MEAG

Site	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Vogtle 1	248	248	248	248	248	248	248	248	248	248	248
Vogtle 2	204	204	248	248	248	248	248	248	248	248	248
Vogtle 3	--	--	--	--	--	250	250	250	250	250	250
Vogtle 4	--	--	--	--	--	--	250	250	250	250	250

Dalton

Site	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Vogtle 3	--	--	--	--	--	16	16	16	16	16	16
Vogtle 4	--	--	--	--	--	--	16	16	16	16	16

2013 Regional Generation Assumptions

PowerSouth

Site	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
McIntosh CC 6	--	--	--	--	--	--	--	--	328	328	328

SMEPA:

Site	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Kemper IGCC	--	90	90	90	90	90	90	90	90	90	90

FERC Order No. 1000 Update

FERC Order No. 1000 Update

- **The SERTP region was expanded during 2012. Subject to an acceptable Order by FERC on the Order 1000 Compliance Filings made by the Jurisdictional Sponsors of the SERTP region, all the Sponsors intend to participate in the regional planning process once it is effective (expected January 2014).**

FERC Order No. 1000 Update

- **FERC extended the Order No. 1000 interregional compliance deadline from April 11, 2013 to July 10, 2013**

- **The SERTP plans to post an initial strawman on or about March 27, 2013**

- **An interim stakeholder meeting will be held to discuss the strawman and obtain stakeholder feedback**
  - Location: GTC HQ, Tucker, GA
  - Date: April 10th, 2013

Next Meeting Activities

Next Meeting Activities

- **2013 SERTP 2nd Quarter Meeting**
  - Location: TBD
  - Date: June 2013
  - Purpose:
    - Discuss preliminary 10 year expansion plan
    - Obtain stakeholder input and feedback regarding the plan

Wrap Up