
Planning Implementation Task Team (PITT)

Leaders:

Navin Bhatt (AEP)

Dmitry Kosterev (BPA)

Facilitators:

Eric Allen (NERC)

NASPI WG Meeting

June 2008

Seattle, WA

PITT Work Plan

Finalized, posted on NAPS I web-site

www.naspi.org/resources/pitt/pittresources.stm

Task 1: Phase Angle Analysis for Wide Area Situational Awareness

- Purpose: To explore the use of phase angles in transmission operations environment

Task 2: Small Signal Stability Analysis (SSSA)

- Purpose: To identify dominant frequency modes in EI, ERCOT and WECC and their impact on interconnected power systems

Task 3: Primary Frequency (Governing) Response Analysis

- Purpose: To identify the trend of governing response in EI, WECC and ERCOT

Planning Implementation Task Team

<u>Role</u>	<u>Responsible Individual(s)</u>
Overall Coordination	Navin Bhatt (AEP), Dmitry Kosterev (BPA)
Coordination of Task1	Joe Chow (RPI), Sanjoy Sarawgi (AEP), Paul Taylor (FPL)
Coordination of Task 2	Eric Allen (NERC)
Coordination of Task 3	Terry Bilke (MISO)
Data Management & Quality	Ritchie Carroll (TVA)
Data Analysis Tools & Procedures	Manu Parashar, Jay (PJM)
Load Flow Studies	Jeff Dagle (PNNL), Dmitry Kosterev, Mahendra Patel (PJM)
Small Signal Stability Studies	Brian Archer (Manitoba Hydro), Mahendra Patel, Nan Liu (CAISO)
Event Notification Procedures	
Preparation of Study Results, Deliverables and Reports	Tony Johnson (SCE), Dmitry Kosterev, Navin Bhatt

Task 1: Phase Angle Analysis for Wide Area Situational Awareness

- Analyze actual PMU data to understand trending of phase angle separation among areas within EI, WECC and ERCOT
- Conduct rigorous technical analysis of phase angle data for EI, WECC and ERCOT
 - Conduct load flow, contingency analysis and transient stability studies to understand relationship between phase angles and power system performance

Task 1: Phase Angle Analysis for Wide Area Situational Awareness

- Next Steps in Baselining actual Phasor Data:
- RTDMS will add a functionality to archive in a database key phase angles, line flows, voltages as well as computed quantities such as (a) oscillation frequency and damping, (b) power-angle sensitivities; (c) power-voltage sensitivities (Manu)
- This work will be performed for both, Eastern and Western Interconnection, AEP is already trending phase angles for their service area.
- Perform data analysis to find correlation between measurements and performance (Joe Chow, Sanjoy Sarawgi, Dmitry Kosterev)
- Pier review of the analysis by the team

Task 1: Phase Angle Analysis for Wide Area Situational Awareness

- Next Steps in Studies:
- Eastern Interconnection. Basecase confidentiality issues (Mahendra Patel and PNNL)
- Western Interconnection. BPA did baselining studies in 1997 and 2001 for Pacific Northwest area. BPA will update studies and expand to California and Canada (Dmitry Kosterev).

Task 2: Small Signal Stability Analysis (SSSA)

- Get familiarized with tools & techniques to perform SSSA using PMU data.
- Perform SSSA on Phasor data to identify dominant frequency modes, their damping and mode shapes:
 - ambient conditions
 - system events involving low frequency oscillations
- Dan Trudnowski is performing comprehensive modal analysis for Western Interconnection
- Brian Archer performed modal analysis for Eastern Interconnection using Florida event data, confirmed damping of several key modes

Task 3: Primary Frequency (Governing) Response Analysis

- Western Interconnection:
 - WECC is working towards Frequency Responsive Reserve Standard
 - Standard development is directed by WECC Board of Directors in 2007
 - Analysis of historic performance is done by WECC staff
 - System studies are currently under way to identify required governor response: (relationship between reserve amount and system performance)
 - SAR is approved, drafting team is being assembled
 - Field test is currently under way and shows major challenges with using SCADA data
 - Resolution
 - Synchronization
 - Etc

Data Quality

- PMU calibration remains concern
- AEP validates PMU calibration by comparing the measurements with state estimation

Data Analysis Tools & Procedures

- Variety of Tools for Data Analysis:
 - Visualization:
 - RTDMS
 - Visualization tools developed by SCE
 - Power World
 - Oscillation Damping:
 - Prony Tool
 - Mode Meter
- Need to keep separate fundamental techniques and its implementation in a specific tool
- Dan Trudnowski and Manu Parashar are setting up a web-cast on small signal stability analysis

Event Notification Procedures

- WECC has an established procedure on disturbance event notification.
- WECC has criteria for disturbance data retention
- Armando Salazar will work with WECC staff on making the documents available to PITT.

Upcoming Events

- June 19 11:00 – 12:00 ET PITT Conference Call.
- August 1, 12:00-2:00 PM ET - Small Signal Stability Analysis web-cast

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Thank You!