**June 2011 NERC Planning Committee Status Report to the SPP Regional Entity Trustees**

**July 25, 2011**

- **PC Elections – Elections of Chair and Vice Chair:**
- Election of Chair - Approved – Jeff Mitchell
- Election of Vice Chair - Approved – Ben Crisp
- **Eastern Interconnection Wide Area SynchroPhasor Angles Baselining Study :**
- The primary goal of this project was to:
    - Investigate phasor angle differences between site pairs
    - Characterize typical patterns
    - Identify atypical events
    - Recommend upper and lower limits for "normal" operation
- Understanding these issues will likely result in:
    - Increased understanding of the significance of Phasor Angle Differences as a metric of grid stress & health
    - Increased grid reliability
    - Ability to understand the nuances of the grid during varying operating conditions
    - Extracted voltage Phasors (Mag. & Angle) from Data (15 months, every 5 min)
- Conclusions
    - 15 months of data analyzed and results are very promising.
    - This research appears to result in an analytical tool that may help understand how to use the Phase Angle pair differences to monitor the grid.
- Recommended Next Steps:
    - Review the technical details of the techniques and results with domain experts. Identify appropriate refinements to the estimation and assessment techniques to investigate.
    - Investigate Methods of determining Bus Angle Pairs to Monitor
- Expand the basic technique to include:
    - Additional site pairs from the wider area of the Interconnection
    - Analyze other data variables in addition to Phasor angle differences
- **Improved Processes and Procedures for Interconnection-wide Modeling:**
- It is important to have good quality steady-state and dynamic bulk power system models available for industry action
- Development of power flow and dynamic models will be through coordinated regional efforts
- Reviewed several different options for this effort and the following option was chosen:

- Leverage existing structures: Assign NERC staff to lead ERO-RAPA oversight of model development activities in each interconnection. Support enhancements and improvements.

- Have a meeting on June 29th with EPRI to leverage the information and involvement of the folks that actually build the models.

- Concerns that this could potentially impact other groups and the work that they do – intent is to support their efforts and improve the overall accuracy of the models and help the modeling effort.

- Concern that there is an overall lack of expertise within the companies to do modeling, maybe work on providing education and sharing of best practices between the regions.

- **Consolidating Various Reliability Assessments, Measures, and Reports:**
- Currently have 6 to 8 different reports coming out each year. How do these reports all come together?

- Can some of these reports be consolidated?

- Many of these potential report consolidations options will be presented with a recommendation at the September meeting.

- **ERCOT February 2, 2011 Grid Emergency Events:**
- ERCOT provided a very good overview analysis of this event.

  - An interesting observation: they used load shedding as a way to control/limit frequency decay.

  - Exploring the interdependence of electric service for gas supply but have not yet identified any specific issues

- Next Steps and findings:

  - ERCOT:

    - continue to review the actions leading up to this event and the handling of event itself.

  - is providing information to assist in the investigations currently underway.

  - will be an active participant in the discussion related to the adequate weatherization of generation units.

  - will work with transmission providers to study the potential use of advanced meters in selective load reduction.

  - is reviewing all communications policies related to grid emergencies.

- has already implemented changes that will provide automated notice to the State Operations Center (SOC) and the PUC.
- will implement a "phone bank" that will temporarily increase staff during emergency situations to respond to incoming calls.

- **PC Strategic Plan and PC Charter changes:**
- PC approved their Strategic Plan and modifications made to the Charter to align with the Strategic Plan
- Strategic Plan and Charter will be taken to the BOT for approval in August
- **Reliability Assessment Subcommittee:**
- Publish one annual report on ERO historic reliability performance:
  - Streamline data collection and analysis functions
  - Provide sound technical analysis
  - Standards changes and project prioritization
  - Build confidence the ERO model is working
  - Feedback on trends

- The Annual State of Reliability Report will:
  - Communicate the effectiveness of reliability improvement programs
  - Provide an integrated view of risk
  - Critical Infrastructure Protection
  - Standards Development
  - Compliance
  - Event Analysis
  - Report bulk power system and equipment performance
  - Integrated view using GADS, TADS, DADS, & Event data
  - Plan to transition From "*2011 Reliability Performance Analysis Report*" to "*State of Reliability Report 2012*"
  - Include equipment performance (TADS and GADS) and EA section if available
  - Possible post-winter assessment section

- Validate assessment with Regional Entities for accuracy and completeness
- Reviewed and will provide recommendations by July 30, 2011 on the Risk Factors to be used in the Reliability Assessments
- Reviewed the schedule for seasonal/post seasonal assessments
- Post season – looking at lessons learned

- **BES Definition and Exemption Process - Issues and Questions:**

- Should facilities and equipment located on the distribution system be considered part of the BES based on their BES reliability function; e.g., demand response controls; UFLS; UVLS; etc.

- Transition plan for newly identified facilities and elements; need for "grandfathering"?
- Can responsibility for BES facilities of small entities be assigned to other entities; can JRO and CFR procedures provide for this?

- **<u>ALR Issues and Questions:</u>**
- *Should ALR address resilience to and recovery from physical and/or cyber attacks?*
- *Should cost/benefit be factored into ALR? How and by whom should decisions be made?*
- *Is impact of all load loss equal; e.g., load shed in response to EEA-3 vs. system disturbances?*
- *How should "cascading" be defined?*
- *Doe we have adequate metrics for current attributes of ALR?*

- **<u>ALR Recommendations:</u>**
- How should cost/benefit be factored into ALR? How and by whom should decisions be made?
    - **Recommendation:** *Assess the reliability benefits of ALR criteria and explicitly calculate the cost-effectiveness of requirements within a reliability standard to meet the reliability objectives*
- Is the impact of all load loss equal?
    - **Recommendation:** *Revise ALR defining criteria to address loss of supply, transmission and controlled/uncontrolled load loss as a function of operational planning and operator preparations, as well as the resulting normal and abnormal operating states.*
- How should "cascading" be defined?
    - **Recommendation:** *No change*

- **<u>Emerging/Standing Issues</u>**:
- Reliability – PC will be asked to review and vote on the incorporation/study of the top six issues for future studies.
- PC will be requested to perform a risk analysis of the top six issues – request sent out June 16th with response back by July 15th - seek input and then rank the issues and provide our view of the consequences (1-5 yrs and 1-10 yrs)
- The results will help develop a list of scenarios to analyze
- A final scope on the Gas/Electric interdependency report will be sent to PC for our review. Phase II – will do some more simulations as to impacts of a gas delivery failure.
- Reviewed the LTRA schedule

- **<u>Events Analysis Working Group:</u>**

- Field test is in second phase
- Phase 2 document is on NERC website
- 3 month field test started May 2nd
- 3rd version by Oct 1, 2011
- Plan to include CPS in phase 3
- 51 events – 6 published
- Reviewed 51 and they are quality and will provide lessons learned

- 321 issues recorded and tracked, 128 of those qualified as cat 1-4 , no 5 , 1 cat4 , 5 cat 3, 40 cat 2 , 80 cat 1 and 93 cat 0.

- **<u>Spare Equipment Database Task Force (SED):</u>**
- Participation:
    - Voluntary by ALL NERC registered TOs and GOs
- Content:
    - Long-lead time (6 months-plus ) transformers including:
        - transmission: low side rating of 100kV or higher & max nameplate rating of 100 MVA or higher (all 3 phases)
        - GSU: high side voltage of 100KV or higher and max nameplate rating of 75 MVA or higher (all 3 phases)
- Operations:
    - 24x7 online program operated by NERC vendor; start 2012
    - Confidentiality:
        - Secure database with mandatory SED confidentiality agreement
            - Submitting Whitepaper for approval at the Sept. 13-14 PC meeting.
            - Developing by Sept. 30th a functional specification for use in selecting an SED vendor.
            - Initiating a one-year trial program amongst SED participants in 2012.

- **<u>Potential Bulk System Reliability Impacts of Distributed Resources Report Development:</u>**

- Scope and Objectives:
- Assess potential adverse bulk system reliability impacts of high levels of DR
    - include all distributed resources, whether variable or not
    - distributed generation, including PV
    - demand response
    - distributed stationary storage
    - plug-in electric vehicles
- Conclusions/Recommendations:
- Evaluate whether distributed resource owners/operators should have to register as part of NERC Functional Model
- At high penetrations, DR can adversely impact bulk system reliability if not properly planned and operated
- Potential adverse impacts can be mitigated:
    - Visibility and controllability of DR from bulk system needed
    - New standards to ensure compatible interconnection of DR
    - Compatibility with existing standards such as IEEE 1547
- No specific recommendations for standards or NERC Registry Criteria changes are made, but rather recommended steps:
    - NERC and/or industry should develop an analytical basis for understanding the magnitude of adverse reliability impacts

- Based this understanding, specific recommendations for changes to NERC standards should be developed

- **<u>Transmission Availability Data Systems Working Group:</u>**

- Approve TADSWG to work on a draft request for comments (under Rules of Procedure 1600) on reporting 100-199kV outages in webTADS beginning January 1, 2014.
  - This will be consistent with the updated EIA-411
  - This will capture an additional 127 TO's who do not currently report (196 existing TO)
  - This will increase the AC circuits by 2.5 times will increase by ~17,400 elements (current 6,694)
- Current TADS Format:
  - Utilize existing webTADS data structure for collecting individual outages and add new100-199kV voltage class
  - Advantages**:** Builds on existing webTADS platform and summary reporting including…
    - Providing data for ALR6-11 to ALR6-16 metrics
    - Automated consistent error checking
    - Supporting Event analysis for common & dependant mode Events
    - Supporting analysis of near simultaneous outages
    - Cross-references to EOP Disturbance Reports, PRC mis-operations reports, GADS events & DADS events
    - Supporting computation of standard deviation and confidence limits
- Schedule**:** TADSWG to prepare draft Data Request for PC approval by May 2012 for implementation by January 1, 2014.

- **<u>System Protection and Control Subcommittee:</u>**
- Approved – posting of SPCS guideline: "Transmission System Phase Backup Protection"
  - *Conclusions:*
    - Events have shown that backup protection can play a significant role in preventing or mitigating the effects of Protection System or equipment failures
    - The design of the power system and local protection design practices dictate whether local or remote backup protection can be securely and dependably applied to meet NERC standards for power system and Protection System performance
    - Careful examination of the overall interaction of Protection Systems may provide insight as to where additional local or remote backup can be applied to help mitigate the spread of an outage.
- *Recommendation from guideline*

    - The SPCS recommends that back up Protection Systems be applied to large autotransformers to reduce the likelihood of damage due to prolonged through fault currents caused by the failure of local or remote Protection Systems to clear the fault
    - Large autotransformers are major capital investments and play a large role in the reliability and flexibility of the Bulk Electric System
    - Lead times for obtaining replacements are typically a minimum of six to twelve months; therefore, failures of these transformers can result in prolonged reduction in Bulk Electric System reliability and flexibility
- Approved – Coordination with TIS to address failure of special protection systems
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- **<u>Transmission Issues Subcommittee:</u>**
- TIS recommendation of the frequency response criteria
- Believe that for the eastern IC the loss of 10,000 MW would trigger UFLS. However no single event would rise to this level:
    - The largest category C event is Eastern IC at 3420 MW
    - The Largest Total Plant with Common Voltage Switchyard Eastern IC at 4779 MW
    - Largest Resource Event in Last 10 Years Eastern IC at 4500MW
- Std Committee is looking at a probabilistic approach to the standard.
- Eastern interconnection is currently running at 2,200 MW – freq response calculated using historical method.
- Approved frequency response obligation as recommended