June 8, 2012

Blake Williams
Chair, ERCOT Reliability and Operations Subcommittee

RE: 2011 Southwest Blackout Recommendations

Blake, ROS Members:

The NERC/FERC Joint Staff Inquiry report on the September 8, 2011 Southwest outages affecting the California-Arizona grid contains various findings and recommendations that may have application in the other NERC Regions including ERCOT. Operational and long term planning, situational awareness, and protection systems are among the topics in the report. Each of the NERC Regions, through its Regional Entities, is preparing a review this summer, as part of its responsibility under Section 800 of the NERC Rules of Procedure.

Texas Reliability Entity (Texas RE) requests that ROS working groups assist in evaluating the findings and recommendations of the report, in order to determine:

1) The extent to which each recommendation is applicable, if at all, in the ERCOT Region.
2) Practices in place for the applicable findings and recommendations;
3) In cases in which a gap may exist, the evaluation should identify the potential issue(s) and develop an action plan and timetable to address them or suggest the additional work needed to do so.

If other issues arise during the evaluation, a possible action plan and timetable should be provided.

Attached are summary categories of the 27 recommendations with specific questions to be addressed, arranged in two groups. NERC expects responses and action plans this summer according to this schedule: Group A, August 3 and Group B, September 1, 2012. This short timeframe should still allow for most ROS working groups to meet and provide input. Texas RE will use this input along with the ERCOT ISO's to draft overall responses.

Sincerely,

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GROUP A

Next-Day Planning
Suggested Working Group: OWG, NDSWG

Recommendations 1 – 4 address the responsibilities of RCs, TOPs, and BAs in the next-day planning timeframe. They stress the importance of accuracy in next-day planning models, including sharing, across the entire RC footprint, generation and transmission outages and transactions that could impact the reliability of the bulk power system (BPS); comprehensiveness of studies with respect to facilities that can impact bulk power system reliability, including sub-100 kV facilities; and the free and unrestricted exchange of next-day operations data and studies between and among operating reliability entities.

1. How do the TOPs in the ERCOT Region conduct next-day studies and freely share with each other and the RC, the status of planned outages of generation and transmission, expected transactions, and study results?
2. Which TOPs have completed studies identifying the sub-100 kV facilities that can have significant impacts on BPS reliability and model those facilities in their next-day studies? How often are studies performed to evaluate the effect on sub-100 kV facilities when new transmission or generation facilities are added to the system?
3. When and how are TOPs alerted to contingencies on neighboring systems that could impact their internal system and the need to plan for such contingencies? When do TOPs include contingencies in next-day studies on neighboring systems that could impact their internal system?

Situational Awareness
Suggested Working Group: OWG, NDSWG

Recommendations 11 – 16 cover a broad range of situational awareness issues, including: real-time visibility of external systems; adequacy of real-time tools; reliance on post-contingency mitigation measures; communicating the need for backup when RTCA capabilities are lost or impaired; and inconsistencies between real-time and planning models.

1. Which TOPs in the ERCOT Region have RTCA or State Estimator (SE) tools and visibility of external systems, and what potential gaps are left? How many TOPs have real-time tools versus having other entities that perform real time analysis for them? What is procedure for each TOP for the following:
   a. Procedure and notifications used when a contingency fails to solve in RTCA
   b. Procedures used to document reasons why a contingency failed to solve
   c. Notifications and sharing of information between entities for differing results in RTCA or SE
   d. Procedures used to remove or disable a contingency from being analyzed

   e. Communication process used to inform ERCOT/other TOPs upon a failure of RTCA or SE or failure for a single contingency.
2. Post-contingency mitigation measures:
   a. To what extent do TOPs and the RC rely on post-contingency mitigation measures? If so, how are these measures evaluated to ensure they do not lead to cascading outages under severe or unusual system conditions?
   b. How are affected neighboring TOPs notified of possible ramifications of these post-contingency measures?
   c. How do post-contingency mitigation measures take into consideration the effects of protective relay actions (e.g. PRC-023 settings, UVLS system response, etc.)?
   d. How can the post-contingency mitigation plans be implemented by System Operators in a time-frame necessary to take the mitigating actions, considering the effects of these relay actions?
3. What steps are taken to ensure consistency between real-time and planning models?
4. To what extent have the TOPs in your region incorporated the recommendations of the NERC Real-Time Tools Best Practices Task Force?

Consideration of BES Equipment
Suggested Working Group: OWG

Recommendation 17 addresses the need for consideration, both in advanced studies and in real-time operations, of sub-100 kV facilities operated in parallel with the BES that can have an impact on bulk power system reliability.

1. What steps are taken to ensure that sub-100 kV facilities that could impact bulk power system reliability are considered in both real-time and advanced studies, especially during severe or unusual system conditions?

Interconnection Reliability Operating Limits
Suggested Working Group: OWG and PLWG and NDSWG

Recommendation 18 refers to the identification and recognition of Interconnection Reliability Operating Limits (IROLs), both in day-ahead studies and in real-time operations.

1. What is the procedure for identifying IROLs within ERCOT and how are these limits shared and coordinated with TOPs within the Region?
2. What is the process to consider whether any System Operating Limits (SOLs) constitute an IROL in real-time, day-ahead, and seasonal studies?
3. What is the process to validate existing SOLs and ensure that they take into account all transmission and generation facilities that impact BPS reliability?
4. What are the limitations to tools necessary to identify and monitor all SOLs (including IROLs) in real-time, day-ahead, and seasonal studies? Examples may be multi-element SOL's in RTCA or SPS modeling in RTCA.

Protection Systems
Suggested Working Group: SPWG, PDCWG

Recommendations 19 – 26 address multiple issues related to Protection Systems, including: regular review, analysis, and coordination of Special Protection Systems with and among interconnected systems, especially under adverse system conditions; sensitivity of turbine control systems during extreme events; communicating to neighboring systems and RCs equipment when overload relay settings are below or only marginally above applicable ratings; reflecting overload relay settings in the determination of System Operating Limits (SOLs) (including IROLs).

1. How do TOPs share with the RC and neighboring TOPs overload relay trip settings on transformers and transmission lines that could impact the reliability of the BPS?
2. How do TOPs share with neighboring TOPs, overload trip settings below 150% of the normal rating or below 115% of the highest emergency rating, whichever of these two values is greater? If these conditions exist, do TOPs share their operating procedures for mitigating the problem? Are these operating procedures pre- or post-contingency? For post-contingency procedures, how is it established that there is enough time for operators to initiate the procedures based on the time delays associated with the relay settings?
3. How frequently do the TOPs review Special Protection Systems for their continued necessity and their coordination with other similar systems and within the Interconnection?
4. What efforts are underway to evaluate the performance of generators under severe or unusual system conditions, especially with regard to the behavior of turbine control systems and underfrequency relay coordination?

Angular Separation
Suggested Working Group: SPWG, DWG, NDSWG

Recommendation 27 addresses the need for tools to determine, in advance of contingencies, the angular separation following line trips under a wide range of system conditions, as well as the need for plans for reclosing lines with large phase angle differences.

1. Which TOPs or the RC have identified or can identify , from seasonal and operational planning studies and in real time, the standing angles that would result following major transmission line outages?
2. Where are there PMUs or PMU-capable digital relays located and streaming data such that post-contingency angles can be seen directly in SCADA/EMS systems of the TOPs or RC?
3. Where does the RC have predetermined plans for reducing angles to within synchro-check relay settings to allow prompt reclosing of lines?

GROUP B

Seasonal Planning
Suggested Working Groups: PLWG, OWG, NDSWG, DWG, SPWG

Recommendations 5 – 8 address the responsibilities of TOPs/TPs for seasonal planning, especially in terms expanding the scope of their seasonal planning studies to include external facilities and the impact of sub-100 kV facilities, both internal and external to the TOP/TP's system, on bulk power system reliability. The recommendations also stress the importance of sharing information with neighboring TOPs and the RC regarding overload relay trip settings that fall below or near the emergency ratings of their facilities.

1. How are TOP operators alerted to and prepared to respond to first contingency conditions on their own and their neighbors' systems?
2. How do seasonal studies evaluate the entire region whereby TOPs can see the effect on one area from a contingency occurring in another area? How does the seasonal planning process ensure there are no study gaps/seams between parts of the region?
3. In the seasonal study process, which elements, including those below 100 kV that can affect the reliability of the BPS, are deemed appropriate for study in contingency analysis (i.e. included as contingencies and the impacts of contingencies)?
4. Under what conditions are seasonal studies performed by TOPs for shoulder periods such as Spring and Fall when load can still be high but transmission elements and generators may be scheduled out of service for maintenance? What load levels are considered?
5. What is the process to share overload trip settings on transformers and transmission lines between neighboring TOPs, the RC, neighboring TPs, and the PC to ensure that the settings are incorporated into the next-day and seasonal planning process?
6. How does the ERCOT Region ensure that seasonal planning studies address the interaction of various Protection Systems, especially Special Protection Systems and UVLS systems that are designed to operate post-contingency?

Near- and Long-Term Planning
Suggested Working Group: PLWG, DWG

Recommendations 9 – 10 focus on the importance of addressing gaps in the planning processes of TPs, and PCs, especially where these gaps result in a lack of consideration for critical system conditions, impact of sub-100 kV facilities, interaction of Protection Systems, and failure to benchmark models against actual system conditions that occur during unusual system events.

1. How do the near- and long-term planning studies conducted by TPs and PCs evaluate the impacts of major transmission outages under heavy transfer conditions?

2. How do these studies evaluate the impact of such outages on sub-100 kV facilities, especially those operated in parallel with the BES, to determine whether any potential exists for system cascading?
3. How does the ERCOT Region ensure that near- and long-term planning studies address the interaction of various Protection Systems, especially Special Protection Systems and UVLS systems that are designed to operate post-contingency?
4. What does the Region do to benchmark its planning models against real system conditions, especially severe and unusual system conditions? When does the Region benchmark its planning models?
5. How do system dynamic studies take into account protective relay (PRC-023), UVLS, and UFLS schemes?