NERC Reliability Assessment Process

Introduction

Requested by the Data Coordination Working Group, the material below was obtained from the 2006 Long-Term Reliability Assessment. It provides, with a varying degree of detail, the reliability assessment process used in each regional entity.

Of course, these processes may have changed since the 2006 report, and improvements in the materials below can be used as a starting point towards a broader understanding of current approaches, to develop consistent reliability assessments in the future.

The material is provided by region, with a preamble on the NERC process.

A. NERC Peer Review Process

The RAS uses a three-phase approach in its peer reviews process during the preparation of reliability assessments. First, prior to the subcommittee meeting(s), each regional self-assessment is individually assigned to a subcommittee member (from another region) for an in depth, comprehensive review of the self-assessment. The results of that analysis are reviewed with the writer(s) of the respective self-assessment, and refinements/adjustments are made as necessary prior to the subcommittee meeting. Second, during the subcommittee meeting(s), each regional self-assessment is subjected to a group scrutiny and review by the entire subcommittee. Finally, at each meeting a region is selected on a rotating basis to present a review of the assessment process used in their region following a broad set of questions aimed towards providing the subcommittee with a thorough understanding of that region’s assessment procedures and practices.

B. Regional Assessment Process

ERCOT

ERCOT prepares five- and ten-year projections of capacity, demand, and reserves at least annually to evaluate whether the system will meet the reserve margin target of 12.5 percent (11 percent capacity margin). ERCOT also performs power flow analyses required to assess compliance with ERCOT Planning Criteria, which comply with NERC Planning Standards. An annual study and report is made to the PUCT highlighting congested areas of the transmission system and recommended projects to mitigate that congestion. ERCOT facilitates an open planning process through three regional planning groups made up of transmission owners and operators and other ERCOT market participants. Any party can comment on ERCOT planning studies and propose new projects or additional studies for review by the appropriate regional planning group.

FRCC
FRCC members plan for facility additions on an individual basis. However, they also provide data to FRCC to update and maintain the regional databases. These regional databases are used in the reliability assessment process to ensure the continued reliability of the bulk power system. FRCC follows a formal reliability assessment process by which it uses a committee and working group structure to annually review and assess reliability issues that either exist or have the potential to develop. This process determines which areas deserve closer scrutiny in the planning and operating studies that will be performed during the year. FRCC members use the results of these studies to ensure that the FRCC region is able to meet the reliability needs of the future.

Study results are also provided to the Florida PSC, which has the authority to require installation or repair of generating plants and transmission facilities, if it has reason to believe that inadequacies exist with respect to grid reliability.

In April 2005, FRCC adopted a very comprehensive and in-depth transmission planning process for the region. This process begins with the annual consolidation of the individual long-term transmission plans of all of the transmission owners in FRCC. A detailed analysis of the resulting regional plan will be conducted annually by the FRCC Planning Committee. The assessment will be a robust analysis and will include an examination of multiple expected system conditions and other sensitivities.

The Planning Committee will report its findings, including recommendations for changes or additions to individual transmission owner’s plans, to the FRCC Board of Directors for approval. The process also provides for resolution of any identified unresolved issues. The resolution may include the use of an independent evaluator to study and provide input to FRCC. A final report will be sent to the Florida PSC.

**MRO**

The MRO Reliability Assessment Committee (RAC) is responsible for the MRO submittal to the NERC Long-Term Reliability Assessment. The MAPP Transmission Reliability Assessment and Composite System Reliability Working Groups jointly prepare the MRO Ten-Year Reliability Assessment, which is used as input by the MRO RAC. The MAPP Reliability Studies, Design Review, and Transmission Operations Subcommittees review MRO reliability from mid- and long-term perspectives and contribute to the MRO submittal to NERC.

**NPCC**

The NPCC Reliability Assessment Program (RAP) brings together the efforts of the Council and its members in the assessment of the reliability of the bulk power system. The Reliability Coordinating Committee (RCC), as the primary technical arm of the Council, directs the RAP and monitors the compliance with all aspects of the program. The RCC is served by the five NPCC task forces, which address
the major disciplines of planning, operations, protection, and communications as follows:

- Task Force on Coordination of Operation
- Task Force on Coordination of Planning
- Task Force on Infrastructure Security and Technology
- Task Force on System Protection
- Task Force on System Studies

The task forces in turn develop and administer the documents, which define reliable operation and planning within NPCC, and with which compliance is mandatory on the part of all NPCC members. The assessment of transmission reliability and resource adequacy is directed to the five NPCC areas.

**RFC**

Transition to a single set of assessment processes is still in progress for all of the previous heritage regional activities. Consequently, this long-term assessment reflects an aggregation of three separate assessment activities, conducted by using the assessment processes of ECAR, MAAC, and MAIN.

Within RFC, each individual company along with its RTO performs planning analyses for facility additions. Regional reliability assessments are performed to determine the adequacy of the existing and future bulk power system to serve projected load, given the proposed changes or additions to generation capacity and transmission facilities. The operating reliability impact of interactions with neighboring regions is assessed by participation in the MEN, MET, MMS, MSW, and VEM interregional groups.

For the RFC members that were ECAR members, ECAR’s assessment procedures were applied to all generation and transmission facilities within the former ECAR portion of the RFC footprint that might significantly impact bulk power system reliability. These assessments consider ECAR as a single integrated system. Generation resource assessments of the ECAR systems on a region-wide basis have been performed annually for a planning horizon of up to ten years, and semiannual assessments have been made for the upcoming summer and winter peak-demand seasons. Transmission assessments have been performed regularly for selected future years out to the planning horizon and semiannually for the summer and winter peak-demand seasons. If transmission deficiencies are discovered during this process, the member system with the deficiency will determine the actions to be taken.

For the RFC members that were MAAC members, PJM’s assessment practices continue to apply. PJM’s assessments cover the entire expanded PJM RTO footprint, which now includes the transmission systems in all or part of Pennsylvania, New Jersey, Maryland, Ohio, Kentucky, Delaware, Virginia, West Virginia, Illinois, North Carolina, and the District of Columbia. In addition to the
former MAAC members, this PJM footprint also includes several former ECAR and MAIN members. The PJM RTO is operated and planned employing one security-constrained economic dispatch protocol using the applicable criteria of the respective region, local criteria, the PJM deliverability requirements, and PJM market rules. Through the operation and planning of the total PJM footprint reliability is ensured.

The PJM planning process has been expanded to evaluate reliability, economic, and operational performance projects. The reliability projects are designed to meet reliability criteria, while the economic projects are justified based on a cost-benefit analysis, which considers congestion costs and takes into account various financial hedging instruments. PJM performs these economic analyses for the PJM members’ information only to point to areas where development of transmission or generation may be financially beneficial. Operational performance projects are intended to address events that are observed by the PJM operators, but were not predicted in the planning studies.

The PJM market rules include a capacity market and the use of a locational marginal pricing mechanism to make congestion transparent. Making congestion transparent through locational marginal pricing provides a market mechanism to allow for mitigation of congestion. A reserve requirement is presently set for a planning period two years into the future so that the market can provide sufficient capacity or for the load-serving entities to construct generation. A future reserve construct, which values the quantity, quality, and location of generation, is presently going through the stakeholder process.

The MISO market rules also include the use of a locational marginal pricing mechanism to make congestion transparent. The MISO energy market tariff requires LSEs to comply with their applicable RRO or state resource adequacy standards. Load and capability information is reported to MISO annually. To monitor compliance a planned reserve sharing group (PRSG) for the MISO LSE is currently under development. The PRSG will be designed to meet planned resource requirements of RFC.

Finally, for those RFC members that were MAIN members, the former MAIN transmission assessments included a 2009 dynamic stability-based study for a 2014 screening, and studies completed by the former MAIN Future System Study Group.

**SERC**

Although SERC members plan for facility (transmission and generation) additions on an individual basis, SERC performs many assessment functions at the regional level in order to provide coordination and ensure reliability.

An extensive data collection effort is required as part of the reliability assessment effort performed by SERC. Data collection is accomplished through a staff-facilitated Data Collection Task Force consisting of representatives from each
SERC’s relational database (Portal) is utilized extensively as the mechanism, via surveys and compliance and data forms, for gathering and compiling data. The collection of data for the EIA-411 has historically been a part of these reliability assessment activities as well.

In 2006 SERC consolidated a number of regional studies activities under the direction of the SERC Engineering Committee. These regional studies groups are responsible for the development of models and associated studies to ensure that planning activities in SERC are coordinated.

SERC utilizes its staff-facilitated Reliability Review Subcommittee (RRS) to perform assessments of future reliability and adequacy of the region and to prepare reports. Using information from the region’s data collection efforts, the RRS makes an independent assessment of the ability of the region and subregions to serve their obligations given the demand growth projections, the amount of uncommitted or contracted capacity, etc. The RRS determines if the resource information submitted represents a reasonable and attainable plan. Also, the RRS annually performs a transmission assessment based on regional, interregional, and subregional reliability studies. The studies are reviewed and analyzed. If any additional study(ies) are required, the RRS will request the appropriate regional studies group(s) to perform the study(ies). The RRS’s assessment provides a judgment on the ability of the SERC power system to operate securely under the expected range of operating conditions over the assessment period as required by the NERC Reliability Standards. The SERC Supplement on Reliability Assessments outlines SERC’s interpretation and clarifies SERC’s expectations of members with regard to the NERC Standards on Regional and Interregional Self-Assessment Reliability Reports, TPL-005 through 006.

SPP
The SPP engineering group prepares SPP’s submittal to the NERC Long-Term Reliability Assessment. The Transmission Working Group (TWG), a committee that is represented by SPP members and other stakeholders is responsible for publication of seasonal and future reliability assessment studies on the transmission system of the SPP region. TWG also provides oversight of coordinated planning efforts and transmission contingency evaluations. The long-range planning models used for the NERC Long-Term Reliability Assessment are developed by SPP’s Model Development Working Group (MDWG) which is also represented by SPP members.

WECC
Each year WECC prepares a transmission study report that provides an ongoing reliability-security assessment of the WECC interconnected system in its existing state and for system configurations planned through the next ten years. The disturbance simulation study results are examined relative to NERC and WECC planning standards. If study results do not meet expected performance levels established in the criteria, the responsible organizations are obligated to provide a
written response that specifies how and when they expect to achieve compliance with the criteria. Other measures that have been implemented to reduce the likelihood of widespread system disturbances include: an islanding scheme for loss of the AC Pacific Intertie that separates the Western Interconnection into two islands and drops load in the generation-deficit southern island; a coordinated off-nominal frequency load shedding and restoration plan; measures to maintain voltage stability; a comprehensive generator testing program; enhancements to the processes for conducting system studies; and a reliability management system.

- Operating Transfer Capability Policy Committee Process

  Operating studies are reviewed to ensure that simultaneous transfer limitations of critical transmission paths are identified and managed through nomograms and operating procedures.
  
  Four subregional study groups prepare seasonal transfer capability studies for all major paths in a coordinated subregional approach for submission to WECC’s Operating Transfer Capability Policy Committee.

On the basis of these ongoing activities, transmission system reliability within the Western Interconnection is expected to meet NERC and WECC standards throughout the ten-year period.