NERC Compliance Gap Analysis Services

Entities in the power industry are faced with the challenge to comply with the FERC-approved reliability standards of the North American Electric Reliability Corporation (NERC), applicable to their line of business. Siemens PTI is often called upon to assist organizations with their NERC standards compliance. Our core competencies are a powerful ally for any registered organization that is subject to any part of NERC or regional reliability standards. We are expanding our offerings related to NERC standards compliance and the following is a summary of our knowledge, skills and experience in providing critical thinking in identifying gaps in compliance documentation.

For an organization subject to compliance audits, the challenge can be subdivided into two distinct steps. The first is to have the substance that demonstrates compliance and the second is to have the ability to demonstrate that the substance is used and useful.

Siemens PTI excels at assisting clients in developing, maintaining or reviewing the substance of the most complex requirements in the NERC standards that include studies, analyses and processing data. We frequently assist clients in the development of complex analyses subject to compliance audits, but our services also extend to assisting in the administrative portion of documenting compliance, preparing mitigation plans and establishing operating procedures.

These core competencies cut across many of the NERC standards, but constitute some of the more difficult and complex reports and records that need to be available to the audit team. Our core competencies can also be applied to unique, customized one-of-a-kind studies; or in performing a large volume of study work necessary to support the reliable operation of the grid.

Transmission Planning (TPL)

The NERC standards require multiple levels of contingency analysis and are the area in which Siemens PTI has excelled over the years in software tools, consulting and professional training. Allow Siemens PTI to provide an independent assessment of the following:

- Evaluation of steady state and transient stability performance in the near- and long-term planning horizons (normal conditions and under contingencies)
- Evaluation of reliability threats for the system under planned maintenance outages
- Evaluation of reliability threats for Categories A, B, C and D events
- Reliability evaluation of existing and proposed new generation clusters.

When appropriate, Siemens PTI will prepare remedial solution proposals and mitigation plans for correction of non-compliances for submission to the NERC.
Emergency Preparedness and Operations (EOP)

Emergency Preparedness and Operations require identification of threats to system reliability and identification of effective mitigation measures. Siemens PTI’s forte is identifying credible initiating events, simulating the events, identifying and simulating solutions and ranking solution methods to find the optimized approach. We are also able to develop, simulate or identify gaps in System Restoration Plans. Some of the specific items that Siemens PTI can tackle include:

- Identification of emergency conditions to be considered
- Analysis and remediation of issues related to insufficient generation or transmission capacity
- Preparation of capacity and energy emergency plans
- Preparation of plans for automatic and manual load shedding for underfrequency or undervoltage conditions
- Technical assistance in testing the effectiveness of load shedding plans
- Preparation of restoration plans for partial or total shutdown of power systems, including system restoration plans from black start resources
- Training of operating personnel in the implementation of restoration plans
- Technical assistance in testing the effectiveness of restorations plans.

Facilities Design, Connection and Maintenance (FAC)

Siemens PTI can provide an independent assessment of an organization’s facilities standards from the perspective of reliability to the grid as well as by providing quantitative reliability metrics. Siemens PTI can contribute in the following areas:

- Technical assistance to the establishment of facility connection and performance requirements
- Evaluation of the reliability impact of new facilities’ interconnection to the power system
- Establishment of methodologies for evaluation of transmission facility ratings
- Establishment for the Planning Horizon of methodologies for evaluation of system operating limits
- Establishment for the Operation Horizon of methodologies for evaluation of system operating limits
- Establishment of methodologies for evaluation of inter- and intra-regional power transfer capabilities.

Interconnection Reliability Operations and Coordination (IRO)

Interconnected reliability requires identification of threats to system reliability and identification of effective mitigation measures. Siemens PTI has the knowledge, skills and abilities to identify credible initiating events, simulate the events, identify solutions, simulate solutions and rank solution methods to find the optimized approach. Siemens PTI is also excellent at developing, simulating and identifying conflicts or gaps in operating procedures and plans. Siemens PTI provides support in these specific areas:

- Conflict and gap analysis of roles and responsibilities
- Broad guidelines for Transmission Loading Relief
- Processes if the data is not available
- Review coordination between reliability coordinators
- Conduction of next-day reliability analysis based upon normal and contingency conditions with identification of potential violations and remedial solutions for them
- Establishment of next-day operations plan
- Training and technical assistance to utility personnel in all aspects of current-day operation activities
- Development of plans for transmission loading relief or procedures for congestion mitigation, such as system reconfiguration, re-dispatch, load shedding and interchange transaction scheduling
- Development of plans to support coordination between reliability coordinators.
Transmission Operations (TOP)
Those entities registered as TOPs are challenged to assure real-time reliable operation of the grid. Siemens PTI can assist in:

- Preparation of plans and procedures for the reliable operation of the power system in normal conditions and under unplanned events
- Preparation of Maintenance Outage Plans
- Preparation of Transmission Operation Plans aimed to ensure that the transmission system is operated so that instability, uncontrolled separation or cascading outages will not occur as a result of the most severe single contingency and specified multiple contingencies
- Collection of operational reliability information and performance of planning and operation reliability studies
- Training of transmission system operators to properly respond to transmission limit violations and ensure that the operating transfer capability limits are respected.

Protection and Control (PRC)
Protection and Control has the potential to make tremendous impacts on the reliability of the grid, from the transient time frame to the dynamic time frame to the steady-state time frame. The system must be compliant with NERC standards in real time and future conditions. Siemens PTI is highly experienced in indentifying strengths, weaknesses, opportunities and threats in existing and proposed system scenarios in order to mitigate future vulnerabilities. Siemens PTI is also experienced in performing unique complex roles, such as:

- Evaluating existing and future fault duty impacts of proposed new generation and generation clusters
- Preparation of functional specifications for under frequency, under voltage, Special Protection Schemes or load shedding schemes
- Evaluation of the performance of under frequency, under voltage, special protection or load shedding schemes.

Modeling, Data and Analysis (MOD)
The tools and abilities to provide confirmation or independent review of the capabilities of the high voltage network is one of our specialties. Some of our specific capabilities are as follows:

- Independent evaluation of Available Transfer Capability (ATC), Capacity Benefit Margin (CBM) and Transmission Reliability Margin (TRM)
- Counterflow and accounting methodologies
- Allocation and allocation methods
- Create, review, distribute and maintain steady state data
- Create, review, distribute and maintain dynamics modeling data
- Document and accounting methodologies for effects of Demand Side Management (DSM) and load uncertainty
- Following Regional Reliability Organization (RRO) procedures
- Verifying and reporting gross and net reactive capabilities
- Determining flow-gate and path rating interactions
- Technical assistance for implementation of Area Interchange Methodology.

Resource and Demand Balancing (BAL)
Balancing is being impacted by the increase in renewable generation, bringing to question the adequacy of existing balancing criteria and the need for additional operating reserves and fast responding generation. If you are concerned about future impacts to your ability to balance, or with your ability to satisfactorily document balancing capabilities, allow Siemens PTI to independently evaluate your capabilities, including production cost simulations (Siemens PTI has license to PROMOD) for resource
and reserve adequacy. Siemens PTI will deliver valuable insight into your balancing adequacy, suitable for addressing any BAL standard.

**Personnel Performance, Training and Qualifications (PER)**
Organizations are faced with the challenge to keep operators current to retain their NERC operators certifications. Many operations planning personnel have also acquired NERC operator certifications. Siemens PTI has a history and reputation for excellence in training. Many of Siemens PTI’s courses are NERC certified and will assist operators in keeping their certifications current. If customized training is of interest, we are available to collaborate and develop training of operational and planning personnel on the various aspects of power system planning, operation and reliability through a large variety of NERC certified courses.

**Critical Infrastructure Protection (CIP)**
In addition to the software experts who have developed programs such as PSS®E, PSS®MUST, MOD® and PSS®ODMS, Siemens PTI has access to some of the most accomplished practitioners of network security, assuring the Siemens energy management systems comply with CIP standards. Siemens PTI can assist in identifying critical power system and cyber assets and appropriate mitigation measures.

**Voltage and Reactive (VAR)**
Specific capabilities include the following:

- Establishment of generator operation strategy for maintaining network voltage schedules
- Analyses and recommendations for voltage control and reactive power planning
- Performance analysis of automatic voltage regulators and power system stabilizers.

As the advisor to your organization guiding you through NERC compliance, Siemens PTI possesses the skills in system analysis, modeling and software design to assure that your organization has implemented the soundest engineering principles possible. With 40 years of system analysis experience, we have developed steady state and dynamic models for hundreds of devices and systems and the leading global simulation package PSS®E.