NERC Standards under Revision Affecting Generation Facilities

The North American Reliability Corporation (NERC) has formed various task forces to revise reliability standards and introduce additional reliability standards affecting generation facilities. Two projects, namely Project 2010-07 – Generator Requirements at the Transmission Interface, and Project 2007-09 – Generator Verification, are underway with members of each standards drafting team collecting comments and votes from ballot pool membership towards the finality of the revised standards. When these projects are completed and approved, generation facilities will have to comply with these new or revised standards.

Generator operation has a significant effect on the reliability of the Bulk Electric System (BES). Even though generating interconnection facilities may be connected in a radial manner to the power system and may not be subject to the same required reliability level as power transmission components, they will still be subject to these standards when appropriate.

The main goal of Project 2010-07 is to ensure that the appropriate reliability standards are applied to generation interconnection facilities in order to maintain an acceptable level of reliability of the BES.

The following standards are addressed in Project 2010-07:

- FAC-001-1 — Facility Connection Requirements
- FAC-003-3 — Transmission Vegetation Management
- FAC-003-X — Transmission Vegetation Management Program.

Standard FAC-001-01, addressing facility connection requirements, will be revised; this standard currently applies to generating facilities. Standards FAC-003-03 and FAC-003-X, regarding vegetation management, will now apply existing NERC reliability standards to generator-owned facilities; generator-owned facilities are not currently held to these standards.

Standard FAC-001-1 requires that generator owners establish facility connection and performance requirements. This is done through power system studies to investigate the impact of generation facility interconnection. These studies include [1]:

- Procedures for the coordinated joint studies of new facilities and their impacts on the interconnected transmission systems
- Breaker duty and surge protection
- System protection and coordination
- Grounding and safety issues
- Insulation and insulation coordination
- Voltage, reactive power and power factor control
- Power quality impacts.

Siemens PTI has extensive experience in analysis of generation interconnection including system impact studies, feasibility studies, short circuit and breaker duty, lightning and surge protection, insulation coordination, grounding, voltage control and power quality impacts all in support of generation developers. Whether the generation project is a conventional resource or a renewable energy resource, Siemens PTI has unparalleled expertise to provide technical collaboration accounting for existing and proposed generation facilities, to help ensure compliance with these revised reliability standards.
Project 2007-09 [2], a four year undertaking thus far, aims to introduce new standards and to revise existing standards which regulate generators to remain in operation and connected to the power system in the event of acceptable voltage and frequency oscillations. This project also introduces new standards and revises existing standards which seek to prevent a generation unit’s disconnection from the power grid due to improper coordination of a generation unit’s capabilities and generator control functions with the generator protection system. This project strives for accurate modeling of generating units so that the models correctly reflect the actual operating characteristics. The table below presents the NERC standards included in this project.

<table>
<thead>
<tr>
<th>Standard ID</th>
<th>Standard Title</th>
<th>Remarks</th>
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<tr>
<td>PRC-019</td>
<td>Coordination of Generator Voltage Regulator Controls with Unit Capabilities and Protection</td>
<td>New</td>
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<tr>
<td>PRC-024</td>
<td>Generator Performance During Frequency and Voltage Excursions</td>
<td>New</td>
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<tr>
<td>MOD-024</td>
<td>Verification of Generator Gross and Net Real Power Capability</td>
<td>Revision</td>
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<tr>
<td>MOD-025</td>
<td>Verification of Generator Gross and Net Reactive Power Capability</td>
<td>Revision</td>
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<tr>
<td>MOD-026</td>
<td>Verification of Models and Data for Generator Excitation System Functions</td>
<td>New</td>
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<tr>
<td>MOD-027</td>
<td>Verification of Generator Unit Frequency Response</td>
<td>New</td>
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This set of standards requires generator owners to validate models of a generating unit’s capabilities and generator controls, in order to replicate the actual performance and response. Revision and/or tuning of existing models must be done to attain fitting precision between the generator’s simulated and actual response [3].

Siemens PTI consulting work centers on power system reliability impacted by generation, transmission and distribution facilities. We have conducted numerous studies of modeling of generators as well as modeling and tuning of controls (e.g., governors, exciters and power system stabilizers). Furthermore, Siemens PTI consultants actively participate in professional task forces on dynamic modeling of renewable generation and conventional generation and modeling of their controls.

Siemens PTI has worked with and continues to cooperate with generation owners, operators and developers to help ensure compliance with the new and changing NERC reliability standards.

References:

