NERC

NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standard Authorization Request Form

Title of Proposed Standard: Project 2008-01 VAR-001-2 — Voltage and Reactive Control VAR-002-2 — Generator Operation for Maintaining Network Voltage Schedules
Request Date 7/15/09
Approved for Posting 8/7/09
Revision Date 2/22/10

SAR Requester Information	**SAR Type** (*Check a box for each one that applies.*)	
Name: Eric Mortenson (TIS Chair) on behalf of TIS - Reactive Support and Control Subteam	☒	New Standard (possible)
Primary Contact Jim Robinson (RSCS Chair) Relion Associates LLC	☒	Revision to existing Standards VAR-001-1 – Voltage and Reactive Control VAR-002--1.1a - Generator Operation for Maintaining Network Voltage Schedules The following standards contain reference to voltage and/or reactive control and may need to be revised based on VAR SDT future recommendations: MOD-025-1 – Verification of Generator Gross and Net Reactive Power Capability MOD-026-1 – Verification of Models and Data for Generator Excitation System Functions. PRC-10-0 –Assessment of the Design and Effectiveness of UVLS Program PRC-011-0 – Under Voltage Load Shedding System Maintenance and Testing.

		PRC-022-1 – Under voltage Load Shedding Program Performance. EOP-003-1 – Load Shedding Plans IRO-004-1 –Reliability Coordination – Operations Planning TOP-002-2 -- Normal Operations Planning TOP-006-1 – Monitoring System Conditions TPL-001-1-Transmission System Planning Performance Requirements (Project 2006-02)
Telephone 610-841-3362 Fax	☐	Withdrawal of existing Standard
E-mail JKRobinson@ieee.org	☐	Urgent Action

Purpose

~~Improve~~Revise the VAR Standards to require that appropriate functional ~~entity review of~~ entities develop and coordiate voltage and reactive planning and operating ~~protocols necessary~~criteria to ensure that there are sufficient reactive resources, ~~acceptable~~ and voltage and reactive margins, ~~and prevent~~ to manage the risk of voltage instability. ~~Also to require an annual review and update of a five-year reactive support and control plan.~~

Industry Need

Reactive power planning and operational techniques vary across the United States and Canada. In some areas voltage is a major concern and requires extensive study, while in other areas voltage problems rarely arise. However, in all cases reactive power planning and operational ~~techniques~~criteria and methodology should be well documented and made available to those functional entities which have a reliability role within an interconnection.

Reactive support and control involves numerous functional entities. ~~However,~~Although bulk reactive power cannot be transmitted ~~as far as real power. Therefore~~over long distances, the ~~functional~~effect of reactive power deficiencies can be felt throughout the entire interconnected system as was observed in the 2003 northeast blackout. Functional entities which need to plan, operate, and control reactive power are more localized and ~~close~~ coordination is required. ~~-~~ Existing Standards identify many of the functional entities involved but explicit reactive support and control requirements are ~~often~~ not clear, and ~~not well coordinated within the existing Standards.~~don't require specific coordination. This has led to a variety of ~~implicit understanding of~~ interpretations on what needs to be done~~, and resulted in gaps in the Standards regarding which functional entities should be involved in the analysis, planning, and operation of reactive support and control.~~ .

The existing Standards related to reactive ~~energy~~ power support and voltage control do not require reactive margins, operating criteria and expectations to be established among key functional entities. ~~The NERC Standards should identify what criteria must be documented for distribution of an interconnection's reactive resource needs among transmission, distribution, and generation facilities. As described in FERC Order 693 directives[1], the~~

[1] ~~FERC Order 693 directives; paragraphs 1868-1871, 1854-1858, 1861-1863, 1875-1876, 1879-1880, 1884-1885.~~

~~planning criteria must include~~ The revised standards should address the reactive resource demand needed to control voltages within bulk power facilities. The demand should include the demands placed on the system by both PSEs and LSEs. FERC Order 693 directed the ERO to treat LSEs and PSEs on a comparable basis. [paragraph 1858]. . "to address the reactive power requirements for LSEs on a comparable basis with purchasing-selling entities." . . and paragraph 1861 . . "We direct the ERO to develop appropriate modifications to this Reliability Standard [VAR-001-1] to address the power factor range at the interface between LSEs and the Bulk-Power System."] Order 693 also directed the ERO [paragraph 1868 "to modify VAR-001-1 to include more detailed and definitive requirements on "established limits" and "sufficient reactive resources" and ~~must~~ identify acceptable margins (i.e. voltage and/or reactive power margins) above voltage instability points to prevent voltage instability and to ensure reliable operations~~. The standard must include requirements for the appropriate functional entities to~~ ."] As stated by FERC Order 693 [paragraph 1870], "the Reliability Standard would benefit from having more defined requirements that clearly define what voltage limits are used and how much reactive resources are needed to ensure voltage instability will not occur under normal and emergency conditions".

Brief Description

~~The~~ Modification of existing VAR standards will ~~be modified to~~ address the FERC directives in Order 693~~,~~. Review and ~~to reflect~~modifications to the existing VAR standards will also consider the Transmission Issues Subcommittee's ~~"~~"Reactive Support & Control Whitepaper" dated 05/18/2009~~, which identifies~~. This review will address the technical requirements needed to determine the reactive resources required under each system state. ~~The report identifies~~There should be requirements to document the criteria and ~~associated rationale required to be documented to determine the split of~~ methodology for dynamic reactive power supply (such as reactive power provided by generators and other dynamic devices) and static reactive power supply (such as static capacitors and other static devices). ~~The report also identifies what criteria must be documented for distribution of the Interconnection's reactive resource needs among transmission, distribution, and generation facilities.~~In addition, the standard should require plans that address the reactive load demand, and the reactive resources needed among bulk power facilities. New requirements may be added to the existing VAR standards, may be added to a new VAR standard, or may be added to a ~~new VAR~~TPL standard.

Detailed Description

The VAR Standards should require ~~-~~specific functional entities to ~~develop~~ have a set of system planning and operations planning ~~protocols.~~criteria and methodologies. Planning Coordinators (PCs) and associated Transmission Planners (TPs) should have documented ~~protocols~~criteria and methodology regarding expectations among the functional entities within the associated Transmission Owner (TO) footprints. Explicit reactive power planning criteria may be combined by multiple PC/TPs with other longer term PC/TPs' planning criteria. However, every ~~logical group of PC/~~neighboring PC and its associated TPs should have a coordinated set of reactive power planning criteria. ~~The PC/TP reactive planning criteria~~ Each PC and its associated TPs should ~~be~~ have a set of reactive power planning criteria that is reviewed and updated periodically with input from best practices of other PC~~/~~s and their associated TPs.

All NERC board approved interpretations of VAR-001 and VAR-002 shall be ~~included~~considered in ~~these Standards~~this project..

~~As described in~~ FERC Order 693 ~~directives,~~directed the ~~planning criteria must~~ ERO to modify VAR-001 to include more detailed and definitive requirements on "established limits" and "sufficient reactive resources" and identify acceptable margins (i.e. voltage and/or reactive

power margins) above voltage instability points to prevent voltage instability and to ensure reliable operations. ~~-~~The criteria must clearly define what voltage limits are used and how ~~much reactive resources are needed to ensure~~ voltage instability will ~~not occur~~be avoided under normal and emergency conditions.

~~Because reacti~~Reactive power needs vary significantly based on system characteristics, and ~~since the vast majority of~~because reactive power ~~must~~needs to be supplied locally, it ~~is~~may not be appropriate to establish a ~~NERC~~ continent-wide reactive reserve requirement. The local supply and reactive power requirements must be analyzed and documented on a ~~more~~ local level, possibly consisting of an area the size of a TP or smaller, up to a Reliability Coordinator footprint or ~~a logical cluster of~~ multiple neighboring PCs/TPs. ~~This electrically nearby group of PC/TPs~~The neighboring PCs/TPs and their associated functional entities ~~could be called a "Transmission Planning Reactive Cluster" (TPRC). The TPRC coordinators~~ must establish ~~criteria to determine the~~ appropriate ~~TPRC~~ criteria for the area ~~for~~ under consideration. ~~TPRC~~Such areas ~~would likely~~ may have differing detailed criteria and requirements for static and dynamic reactive support, based on the ~~TPRC~~ area's characteristics.

In addition to establishing reactive planning criteria, the ~~VAR~~ standards should require a ~~*five-year reactive*~~*reactive power support and control plan ('VAR Plan').* ~~Multiple TPRCs~~Neighboring PCs/TPs should review and coordinate plans developed by the functional entities involved. This includes functional entity local plans for reactive power support and control to maintain local system reliability and avoid permanent damage to equipment. ~~The~~

The *VAR Plan* needs to be specific in defining voltage and reactive power schedules~~. The short range (one year) operations planning protocol should include a requirement for the Transmission Operator (TOP) and Reliability Coordinator (RC) to monitor and take action if reactive power or voltage falls outside identified limits.~~ as appropriate.

If any portion of the criteria cannot be met by the *VAR Plan*, such exceptions should be identified by the PCs/TPs in their *VAR Plan*.

The above criteria and methodology, and *VAR Plan* should include, but not be limited to, the following:

- Criteria for reactive planning and operating
- *VAR Plan* to meet the criteria (and identify any exceptions which can not be resolved within above specified time frame).
- Planning documentation and operations review cycle

Topics which must be considered in the criteria and *VAR Plan*:

- Equipment limits to prevent permanent damage to bulk power equipment
- Local automatic and manual control design (TO, GO and DP)
- System bus voltage collapse control
- Reactive power conservation plan
- Demand and reactive resources needed among bulk power facilities
- Dynamic var requirements

The standard should include a requirement for peer review of the VAR Plans and their associated criteria. This review cycle should continue on an annual basis.

GO and GOP functional entities may have no expansion plans within a ~~5 year~~ planning horizon. However, ~~such forecasts of no expansion or no~~planned reactive capability ~~changes within 5 years~~decreases (or increases if any) must be made known to ~~each TPRC. Collectively, within a region, multiple TPRCs need to coordinate~~ the ~~development of an~~

~~integrated 5 year reactive support and control plan.~~PCs/TPs.

~~The following topics must be covered in the reactive planning criteria, and in the Plan.~~

~~The TPRC criteria and VAR Plan shall address the following:~~

- ~~Criteria for Reactive Planning and Operating Technique~~
- ~~Five-Year VAR Plan~~
- ~~Planning Documentation and Operations Review Cycle~~

~~Topics which must be covered in the criteria and VAR Plan:~~

- ~~"Equipment Limits"to prevent permanent damage to TO, GO, DP equipment~~
- ~~"Local Automatic and Manual Control" design (TO, GO and DP)~~
- ~~"System Bus Voltage Collapse Control"~~
- ~~"Reactive Energy Conservation Plan"~~

~~Distribution of the Interconnection's Reactive Resource Needs;~~

- ~~Transmission to Distribution boundary~~
- ~~Transmission to Generation boundary~~
- ~~TPRC to TPRC boundary~~
- ~~Dynamic Var Requirements~~

The requirements in the existing standards need to be more specific in defining voltage and reactive power schedules.

The standard should include requirements for the Transmission Operator (TOP) and Reliability Coordinator (RC) to monitor and take action if reactive power or voltage falls outside identified limits.

The whitepaper provides ~~the~~ reliability concepts ~~and foundation for the SAR and subsequent work~~ for consideration and reference by the Standards ~~development team and includes the directives contained in FERC Order 693.~~Drafting Team (SDT). As this Project 2008-01 progresses to modify the VAR Standards, the VAR SDT may recommend changes to other related Standards and the NERC *Glossary of Terms Used in Reliability Standards (Glossary~~)~~).* Such recommendations will need to be reviewed and updated for consistency with ~~Version 2 of the VAR Standards.~~other Projects and SDT teams. The creation of new SARs for other Standards may cause work to overlap with Project 2008-01. However, the ~~VAR Standards~~Standards revised under this project should contain all the necessary explicit Requirements for the planning horizon and reference other existing explicit Standard requirements as appropriate. Explicit reactive ~~energy~~power and control related Requirements should not be duplicated in ~~other~~multiple Standards. However, during the overlapping SAR work, such duplication may occur until the other related Standards and NERC *Glossary* are updated for consistency ~~with VAR Standards Version 2~~. As a reference document, the complete whitepaper can be found at the following link:

http://www.nerc.com/docs/pc/tis/Reactive%20Support%20and%20Control%20Whitepaper%20&%20SAR.zip

The VAR Standard Drafting Team should also be cognizant of all regional standards such as:

WECC Standard VAR-STD-002a-1 – Automatic Voltage Regulators

TPL – (001 thru 004) – WECC – 1 – CR — System Performance Criteria

The following standards contain references to voltage and/or reactive control and may need to be revised based on VAR Standard Drafting Team future recommendations:

MOD-025-1 – Verification of Generator Gross and Net Reactive Power Capability

MOD-026-1 – Verification of Models and Data for Generator Excitation System Functions.

PRC-10-0 –Assessment of the Design and Effectiveness of UVLS Program

PRC-011-0 – Under Voltage Load Shedding System Maintenance and Testing.

PRC-022-1 – Under voltage Load Shedding Program Performance.

EOP-003-1 – Load Shedding Plans

IRO-004-1 –Reliability Coordination – Operations Planning

TOP-002-2 -- Normal Operations Planning

TOP-006-1 – Monitoring System Conditions

TPL-001-1-Transmission System Planning Performance Requirements (Project 2006-02)

All of the above listed Standards are being considered for revision by other Drafting Teams. The VAR Standard Drafting Team will work with these other teams to coordinate revisions as appropriate.

The VAR Standard Drafting Team is also expected to address FERC Order 693 Directives as well as issues that other NERC teams have identified for the VAR standards. These are shown in Attachment 1 to the SAR.

The standard drafting team will also review the applicable standards and modify them to conform to the latest version of NERC's Reliability Standards Development Procedure, the NERC Standard Drafting Team Guidelines, and the ERO Rules of Procedure as described in the "Global Improvements" section of Volume I of the Reliability Standards Development Plan (Attachment 2).

Reliability Functions

The Standard will Apply to the Following Functions *(Check box for each one that applies.)*		
☒	Reliability Coordinator	Responsible for the real-time operating reliability of its Reliability Coordinator Area in coordination with its neighboring Reliability Coordinator's wide area view.
☒	Balancing Authority	Integrates resource plans ahead of time, and maintains load-interchange-resource balance within a Balancing Authority Area and supports Interconnection frequency in real time.
☐	Interchange Authority	Ensures communication of interchange transactions for reliability evaluation purposes and coordinates implementation of valid and balanced interchange schedules between Balancing Authority Areas.
☒	Planning Coordinator	Assesses the longer-term reliability of its Planning Coordinator Area.
☒	Resource Planner	Develops a >one year plan for the resource adequacy of its specific loads within a Planning Coordinator area.
☒	Transmission Planner	Develops a >one year plan for the reliability of the interconnected Bulk Electric System within its portion of the Planning Coordinator area.
☐	Transmission Service Provider	Administers the transmission tariff and provides transmission services under applicable transmission service agreements (e.g., the pro forma tariff).
☒	Transmission Owner	Owns and maintains transmission facilities.
☒	Transmission Operator	Ensures the real-time operating reliability of the transmission assets within a Transmission Operator Area.
☒	Distribution Provider	Delivers electrical energy to the End-use customer.
☒	Generator Owner	Owns and maintains generation facilities.
☒	Generator Operator	Operates generation unit(s) to provide real and reactive power.
☒	Purchasing-Selling Entity	Purchases or sells energy, capacity, and necessary reliability-related services as required.
☒	Market Operator	Interface point for reliability functions with commercial functions.
☒	Load-Serving Entity	Secures energy and transmission service (and reliability-related services) to serve the End-use Customer.

Reliability and Market Interface Principles

Applicable Reliability Principles *(Check box for all that apply.)*	
☒	1. Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
☒	2. The frequency and voltage of interconnected bulk power systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
☒	3. Information necessary for the planning and operation of interconnected bulk power systems shall be made available to those entities responsible for planning and operating the systems reliably.
☒	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
☒	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
☒	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
☒	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.
☐	8. Bulk power systems shall be protected from malicious physical or cyber attacks.

Does the proposed Standard comply with all of the following Market Interface Principles? *(Select 'yes' or 'no' from the drop-down box.)*
1. A reliability standard shall not give any market participant an unfair competitive advantage. Yes
2. A reliability standard shall neither mandate nor prohibit any specific market structure. Yes
3. A reliability standard shall not preclude market solutions to achieving compliance with that standard. Yes
4. A reliability standard shall not require the public disclosure of commercially sensitive information. All market participants shall have equal opportunity to access commercially non-sensitive information that is required for compliance with reliability standards. Yes

Related Standards

Standard No.	Explanation
MOD-025-1 MOD-026-1	*Project 2007-09 Generator Verification* includes reactive control related standards; MOD-025-1 – Verification of Generator Gross and Net Reactive Power Capability and MOD-026-1 – Verification of Models and Data for Generator Excitation System Functions.
PRC-011-0	*Project 2007-17 Protection System Maintenance and Testing* includes voltage control related standards; PRC-011-0 – Under Voltage Load Shedding System Maintenance and Testing.
PRC-10-0 PRC-022-1	*Project 2008-02 Under voltage Load Shedding* includes voltage control related standards; PRC-10-0 –Assessment of the Design and Effectiveness of UVLS Program and PRC-022-1 – Under voltage Load Shedding Program Performance.
TPL-001-1	Project 2006-02 Transmission System Planning Performance Requirements TPL-001-1
EOP-003-1 IRO-004-1 TOP-002-2 TOP-006-1 VAR-001-1a	*Project 2009-02 Real-time Tools* includes several voltage and reactive control related standards including but not limited to; EOP-003-1 – Load Shedding Plans, IRO-004-1 –Reliability Coordination – Operations Planning, TOP-002-2 -- Normal Operations Planning, TOP-006-1 – Monitoring System Conditions, and VAR-001-1a – Voltage and Reactive Control

Related SARs

SAR ID	Explanation
Several	See above.

Regional Variances

Region	Explanation
ERCOT	

FRCC	
MRO	
NPCC	
SERC	
RFC	
SPP	
WECC	

Attachment 1 — Issues to be considered by the Standard Drafting Team:

Source	Language
VAR-001-1 — Voltage and Reactive Control	
Project 2008-01 Order 693	Expand the applicability to include LSEs and reliability coordinators and define the reliability coordinators monitoring responsibilities. i. Applicability to LSEs and Reliability Coordinators Determination: Paragraph 1854. "In a complex power grid such as the one that exists in North America, reliable operations can only be ensured by coordinated efforts from all operating entities in long-term planning, operational planning and real-time operations. To that end, the Staff Preliminary Assessment recommended and the NOPR proposed that the applicability of VAR-001-1 extend to reliability coordinators and LSEs. 1855. Since a reliability coordinator is the highest level of authority overseeing the reliability of the Bulk-Power System, the Commission believes that it is important to include the reliability coordinator as an applicable entity to assure that adequate voltage and reactive resources are being maintained. As MISO points out, other Reliability Standards address responsibilities of reliability coordinators, but we agree with EEI that it is important to include reliability coordinators in VAR-001-1 as well. Reliability coordinators have responsibilities in the IRO and TOP Reliability Standards, but not the specific responsibilities for voltage levels and reactive resources addressed by VAR-001-1, which have a great impact on system reliability. For example, voltage levels and reactive resources are important factors to ensure that IROLs are valid and operating voltages are within limits, and that reliability coordinators should have responsibilities in VAR-001-1 to monitor that sufficient reactive resources are available for reliable system operations. Accordingly, the ERO should modify VAR-001-1 to include reliability coordinators as applicable entities and include a new requirement(s) that identifies the reliability coordinator's monitoring responsibilities."
Project 2008-01 Order 693	Address reactive power requirements for LSEs on a comparable basis with purchasing-selling entities. Determination: Paragraph 1856. "The Commission agrees with SoCal Edison that not all LSEs are purchasing selling entities, because not all LSEs purchase or sell power from outside of their balancing authority area. This understanding is consistent with the NERC functional model and NERC glossary. Both LSEs and purchasing-selling entities should have some requirements to provide reactive power to appropriately compensate for the demand they are meeting for their customers. Neither a purchasing-selling entity nor a LSE should depend on the transmission operator to supply reactive power for their loads during normal or emergency conditions. 1857. VAR-001-1 recognizes that energy purchases of purchasing-selling entities can increase reactive power consumption on the Bulk-Power System and the purchasing-selling entities must supply what they consume. The Commission agrees with APPA that LSEs would provide data for voltage stability assessments. However, the Commission also believes that LSEs have an active role in voltage and reactive control, since LSEs are responsible for maintaining an agreed-to power factor at the interface with the Bulk- Power System. 1858. While the Commission recognizes the point made by TAPS, that purchasing-selling entities are required to satisfy any reactive requirements through purchasing Ancillary Service #2 under the OATT or self-supply, the Commission disagrees that

Source	Language
	adding LSEs to this Reliability Standard serves no reliability purpose. As discussed in the NOPR and the Staff Preliminary Assessment, LSEs are responsible for significantly more load than purchasing-selling entities.[471] The reactive power requirements can have significant impact on the reliability of the system and LSEs should be accountable for that impact in the same ways that purchasing-selling entities are accountable, by providing reactive resources, and also by providing information to transmission operators to allow transmission operators to accurately study the reactive power needs for both the LSEs' and purchasing-selling entities' load characteristics.[472] The Commission recognizes that all transmission customers of public utilities are required to purchase Ancillary Service No. 2 under the OATT or self-supply, but the OATT does not require them to provide information to transmission operators needed to accurately study reactive power needs. The Commission directs the ERO to address the reactive power requirements for LSEs on a comparable basis with purchasing-selling entities."
Project 2008-01 Order 693	Include APPA's comments regarding varying power factor requirements due to system conditions and equipment in the standards development process. ii. Acceptable ranges of net power factor range Comments: Paragraph 1860. "APPA contends that it may be difficult to reach an agreement on acceptable ranges of net power factors at the interfaces where LSEs receive service from the Bulk-Power System because the acceptable range of power factors at any particular point on the electrical system varies based on many location-specific factors. APPA further states that system power factors will be affected by the transmission infrastructure used to supply the load. As an example, APPA states that an overhead circuit may operate at a higher power factor than an underground cable due to a substantial amount of reactive line charging, and that a transmission circuit carrying low levels of real power will tend to provide more reactive power, which will affect the need to switch off capacitor banks at the delivery point to manage delivery power factors."
Project 2008-01 Order 693	Address the power factor range at the interface between LSEs and the transmission grid. Determination: Paragraph 1861. "In the NOPR, the Commission asked for comments on acceptable ranges of net power factor at the interface at which the LSEs receive service from the Bulk-Power System during normal and extreme load conditions. The Commission asked for these comments in response to concerns that during high loads, if the power factor at the interface between many LSEs and the Bulk-Power System is so low as to result in low voltages at key busses on the Bulk-Power System, then there is risk for voltage collapse. The Commission believes that Reliability Standard VAR-001-1 is an appropriate place for the ERO to take steps to address these concerns by setting out requirements for transmission owners and LSEs to maintain an appropriate power factor range at their interface. We direct the ERO to develop appropriate modifications to this Reliability Standard to address the power factor range at the interface between LSEs and the Bulk-Power System. 1862. We direct the ERO to include APPA's concern in the Reliability Standards development process. We note that transmission operators currently have access to data through their energy management systems to determine a range of power factors at which load operates during various conditions, and we suggest that the ERO use this type of data as a starting point for developing this modification. 1863. The Commission expects that the appropriate power factor range developed for the interface between the bulk electric system and the LSE from VAR-001-1 would be used as an input to the transmission and operations

Source	Language
Project 2008-01	planning Reliability Standards. The range of power factors developed in this Reliability Standard provides the input to the range of power factors identified in the modifications to the TPL Reliability Standards. In the NOPR, the Commission suggested that sensitivity studies for the TPL Reliability Standards should consider the range of load power factors."
Order 693	Address the concerns of Dynegy, EEI, and MISO through the standards development process. iii. Requirements on "established limits" and "sufficient reactive resources" Comments: Paragraph 1864. "Dynegy supports the Commission's proposal to include more definitive requirements on "established limits" and "sufficient reactive resources." It recommends that VAR-001-1 be further modified to require the transmission operator to have more detailed and definitive requirements when setting the voltage schedule and associated tolerance band that is to be maintained by the generator operator. Dynegy states that the transmission operator should not be allowed to arbitrarily set these values, but rather should be required to have a technical basis for setting the required voltage schedule and tolerance band that takes into account system needs and any limitations of the specific generator. Dynegy believes that such a requirement would eliminate the potential for undue discrimination, as well as the possibility of imposing overly conservative and burdensome voltage schedules and tolerance bands on generator operators that could be detrimental to grid reliability, or conversely, the imposition of too low a voltage schedule and too wide a tolerance band that could also be detrimental to grid reliability. 1865. While MISO supports the concept of including more detailed requirements, it believes that there needs to be a definitive reason for establishing voltage schedules and tolerances, and that any situations monitored in this Reliability Standard need to be limited to core reliability requirements. 1866. EEI seeks clarification about whether the Commission is suggesting that reactive requirements should aim for significantly greater precision, especially in terms of planning for various emergency conditions. If so, EEI cautions the Commission against "'putting too many eggs' in the reactive power 'basket.'" To the extent compliance takes place pursuant to all other modeling and planning assessments under the other Reliability Standards, EEI strongly believes that the Commission should have some high level of confidence that the system's reactive power needs can be met satisfactorily across a broad range of contingencies that planners might reasonably anticipate. Moreover, EEI believes that requirements to successfully predict reactive power requirements in conditions of near-system collapse would require significantly more creative guesswork than solid analysis and contingency planning. For example, EEI notes that the combinations and permutations of how a voltage collapse could occur on a system as large as the eastern Interconnection are numerous. 1867. EEI suggests that, alternatively, the Commission should consider that reactive power evaluations should be conducted within a process that is documented in detail and includes a range of contingencies that might be reasonably anticipated, because this would avoid the 'one size fits all' problem, where a prescriptive analytical methodology does not fit with a particular system configuration. EEI believes that this flexible approach would provide a more effective planning tool for the industry, while satisfying the Commission's concerns over potentially inadequate reactive reserves. MRO notes that the need for, and method of providing for, reactive resources varies greatly, and if this Reliability Standard is expanded it must be done carefully. MRO believes that all entities should not be required to follow the same methodology to accomplish the
Project 2008-01	

Source	Language
	goal of a reliable system.""
Order 693	Include detailed and definitive requirements on "established limits" and "sufficient reactive resources", and identifies acceptable margins above the voltage instability points. Determination: Paragraph 1868. "In the NOPR, the Commission expressed concern that the technical requirements containing terms such as "established limits" or "sufficient reactive resources" are not definitive enough to address voltage instability and ensure reliable operations. To address this concern, the NOPR proposed directing the ERO to modify VAR-001-1 to include more detailed and definitive requirements on "established limits" and "sufficient reactive resources" and identify acceptable margins (i.e. voltage and/or reactive power margins) above voltage instability points to prevent voltage instability and to ensure reliable operations. We will keep this direction, and direct the ERO to include this modification in this Reliability Standard. 1869. We recognize that our proposed modification does not identify what definitive requirements the Reliability Standard should use for "established limits" and "sufficient reactive resources." Rather, the ERO should develop appropriate requirements that address the Commission's concerns through the ERO Reliability Standards development process. The Commission believes that the concerns of Dynegy, EEI and MISO are best addressed by the ERO in the Reliability Standards development process. 1870. In response to EEI's concerns about a prescriptive analytical methodology, we clarify that the Commission is not asking that the Reliability Standard dictate what methodology must be used to determine reactive power needs. Rather, the Commission believes that the Reliability Standard would benefit from having more defined requirements that clearly define what voltage limits are used and how much reactive resources are needed to ensure voltage instability will not occur under normal and emergency conditions. For example, in the NOPR, the Commission suggested that NERC consider WECC's Reliability Criteria, which contain specific and definitive technical requirements on voltage and margin application. While we are not directing that the WECC reliability criteria be adopted, we believe they represent a good example of clearly-defined requirements for voltage and reactive margins. 1871. In sum, the Commission believes that minimum requirements for voltage levels and reactive resources should be clearly defined by placing more detailed requirements on the terms "established limits" and "sufficient reactive resources" in the Reliability Standard as discussed in the NOPR and the Staff Preliminary Assessment. As mentioned above, EEI's concerns should be considered in the ERO's Reliability Standards development process."
Project 2008-01	
Order 693	Perform voltage analysis periodically, using on-line techniques where commercially available and off-line techniques where not available on-line, to assist real-time operations, for areas susceptible to voltage instability. iv. Periodic voltage stability analysis in real-time operations Determination: Paragraph 1875. "In response to the concerns of APPA, SDG&E and EEI on the availability of tools, the Commission recognizes that transient voltage stability analysis is often conducted as an offline study, and that steady-state voltage stability analysis can be done online. The Commission clarifies that it does not wish to require anyone to use tools that are not validated for real-time operations. Taking these comments into consideration, the Commission clarifies its proposed modification from the NOPR. For the Final Rule, we direct the ERO, through its

Source	Language
Project 2008-01 Order 693	Reliability Standards development process, to modify Reliability Standard VAR-001-1 to include Requirements to perform voltage stability analysis periodically, using online techniques where commercially-available, and offline simulation tools where online tools are not available, to assist real-time operations. The ERO should consider the available technologies and software as it develops this modification to VAR-001-1 and identify a process to assure that the Reliability Standard is not limiting the application of validated software or other tools. 1876. With respect to MidAmerican's suggestion of exempting areas that are not susceptible to voltage instability from the requirement to perform voltage stability analysis, the Commission notes that such exemption is not appropriate. We draw an analogy between transient stability limits and voltage stability limits. The requirement to perform voltage stability analysis is similar to existing operating practices for IROLs that are dictated by transient stability. Transient stability IROLs are determined using the results of off-line simulation studies, and no areas are exempt. In real-time operations, these IROLs are monitored to ensure that they are not violated. Similarly, voltage stability is conducted in the same manner, determining limits with off-line tools and monitoring limits in real-time operations. Areas that are susceptible to voltage instability are expected to run studies frequently, and areas that have not been susceptible to voltage instability are expected to periodically update their study results to ensure that these limits are not encountered during real-time operations."
Order 693	Include controllable load among the reactive resources to satisfy reactive requirements, considering the comments of Southern California Edison and SMA in the development of the standard. v. Controllable Load Comments: Paragraph 1877. "SMA supports adoption of the proposal to include controllable load as a reactive resource. SMA notes that its members' facilities often include significant capacitor banks, and further, reducing load can reduce local reactive requirements. 1878. SoCal Edison suggests caution regarding the Commission's proposal to include controllable load as a reactive resource. It agrees that, when load is reduced, voltage will increase and for that reason controllable load can lessen the need for reactive power. However, SoCal Edison believes that controllable load is typically an energy product and there are other impacts not considered by the Commission's proposal to include controllable load as a reactive resource. For example, activating controllable load for system voltage control lessens system demand, requiring generation to be backed down. It is not clear to SoCal Edison whether any consideration has been given to the potential reliability or commercial impacts of the Commission's proposal. Determination: Paragraph 1879. The Commission noted in the NOPR that in many cases, load response and demand-side investment can reduce the need for reactive power capability in the system. Based on this assertion, the Commission proposed to direct the ERO to include controllable load among the reactive resources to satisfy reactive requirements for incorporation into Reliability Standard VAR-001-1. While we affirm this requirement, we expect the ERO to consider the comments of SoCal Edison with regard to reliability and SMA in its process for developing the technical capability requirements for using controllable load as a reactive resource in the applicable Reliability Standards." Summary Determination: Paragraph 1880. . . . . the Commission directs the ERO to develop a modification to VAR-001-1 through the Reliability Standards development process that:

Source	Language
	(1) expands the applicability to include reliability coordinators and LSEs; (2) includes detailed and definitive requirements on "established limits" and "sufficient reactive resources" as discussed above, and identifies acceptable margins above the voltage instability points; (3) includes Requirements to perform voltage stability analysis periodically, using online techniques where commercially available and offline techniques where online techniques are not available, to assist real-time operations, for areas susceptible to voltage instability; (4) includes controllable load among the reactive resources to satisfy reactive requirements and (5) addresses the power factor range at the interface between LSEs and the transmission grid."
Frank Gaffney (Florida Municipal Power Agency) as input to the Reliability Standards Development Plan: 2010-2012	Requirement R2 requires the TOP to acquire sufficient reactive resources. The statement probably ought to clearly delineate that this requirement is applicable to the operating horizon only and that the TP is responsible for adequate reactive resources in the planning horizon.
NERC Audit Observation Team	If the TOP does not supply the GOP with a voltage or reactive power schedule is that a noncompliance for the TOP?
Phase III/IV Team	Consolidate R8 and R9
	No criteria for what is an acceptable reactive margin.
	No requirement for verifying that the reactive resources are truly available.
	R10 remove "first" so as not to limit this requirement to first contingency conditions. As written with or without removing "first", R10 provides no additional information not already required in R3.
	R10.1 does 'disperse and locate' mean the same as 'dispatch'? If so, changing the wording to 'dispatch' would make the meaning clearer.
	R11 — Redundant with TOP-007
	R3 covers normal and contingency conditions, while R10 mentions only first contingency conditions. Is there a reason for this difference?
	R3 Suggest changing the phrase…"to protect the voltage"…. To "maintain the voltage"
	R3, R6, R10 go beyond the control of the responsible entity noted.
	R3, the Transmission Operator only has the reactive resources that exist in the area — how does the TO "acquire sufficient reactive resources" if existing resources are not adequate?
	R5 This requirement is an Open Access Transmission Tariff requirement and does not belong in a reliability standard.
	R6 and R10.1 presume that sufficient reactive resources are available.
	R7 and R8 — consider adding more specificity to distinguish the TOP's authority to direct others to operate (Each Transmission Operator shall operate owned devices or direct the operation of, within their normal operating parameters and capabilities, capacitive and inductive reactive resources within its area-including

Source	Language
	reactive generation scheduling; transmission line and reactive resource switching; and, if necessary, load shedding- to maintain system and Interconnection voltages within established limits.)
	R7 obligates Transmission Operators to know the status of all reactive power sources including AVRs and PSSs. Clarify that this means the generator is available and if dispatched will operate in voltage control mode and with the PSS active.
	R9.1 This requirement is not feasible. Cannot dictate where generation resources are to be disbursed or located.
	Should R3 be assigned to the TP?
	Should the word "acquire" in R3 be replaced with the word "operate"?
	The language in the measures and compliance sections such as "2.1.2 One incident of failing to maintain a voltage or reactive power schedule" is too vague and does not specify any duration that is acceptable or unacceptable to be off schedule.
	VAR-001 requirements (R1, R2, R7, R8, R9, R10, and R12) are redundant to the TOP standards
	What does the second sentence in R3 mean by the phrase 'transmission operator's share of the reactive requirements of interconnecting transmission circuits'? What would be the reactive requirements of transmission circuits?
	Will R6 also apply to wind generation absorbing reactive power at the point of interconnection?
Version 0 Team	• Add BA (R1 & 3)and RA (R5, 7, 8, 10 & 11) • Add GO as entity • Clarify if this includes distribution • Clarify responsibility for voltage support • Define high probability • Define voltage levels • Delete SOL violations • Expand to include relays • Mention power factor requirements for distribution • Move R9 to 5.2 • Not a standard but a business practice
VAR-002-1 — Generator Operation for Maintaining Network Voltage Schedules	
FERC Order 693	Consider Dynegy's suggestion to improve the standard. Comments: Paragraph 1883. "Dynegy believes that VAR-002-1 should be modified to require more detailed and definitive requirements when defining the time frame associated with an "incident" of non compliance (i.e., each 4-second scan, 10-minute integrated value, hourly integrated value). Dynegy states that, as written, this Reliability Standard does not define the time frame associated with an "incident" of non-compliance, but apparently leaves this decision to the transmission operator. Dynegy believes that either more detail should be added to the Reliability Standard to cure this omission, or the Reliability Standard should

Source	Language
	require the transmission operator to have a technical basis for setting the time frame that takes into account system needs and any limitations of the generator. Dynegy believes that this approach will eliminate the potential for undue discrimination and the imposition of overly conservative or excessively wide time frame requirements, both of which could be detrimental to grid reliability." Determination: Paragraph 1884. In the NOPR, the Commission commended NERC and industry for its efforts in expanding on the Requirements of VAR-002-1 from the predecessor standard, and noted that the submitted Reliability Standard includes Measures and Levels of Non-Compliance to ensure appropriate generation operation to maintain network voltage schedules. Accordingly, the Commission approves Reliability Standard VAR-002-1 as mandatory and enforceable. 1885. Dynegy has suggested an improvement to Reliability Standard VAR-002-1, and NERC should consider this in its Reliability Standards development process.
NERC Audit Observation Team	If a generator does not have an automatic voltage regulator do they need to install one?
Phase III/IV Team	R5 of VAR-002: Recognizing that such action would require the generator to change its loading level or cycle, the transmission operator should not rely on tap position changes on a step-up transformer with a no-load tap changer (NLTC) for periodic or seasonal system control, unless there is an explicit voluntary arrangement with the Generator Operator. For each instance of an urgent directive for such action, the transmission operator must justify its action to affected parties

Attachment 2 — Global Improvements

Global Improvements

The standard drafting team for each of the projects identified in this plan is expected to review the assigned standards and modify the standards to conform to the latest version of NERC's Reliability Standards Development Procedure, the NERC Standard Drafting Team Guidelines, and the ERO Rules of Procedure as described in this "Global Improvements" section.

Statutory Criteria

In accordance with Section 215 of the Federal Power Act, FERC may approve, by rule or order, a proposed reliability standard or modification to a reliability standard if it determines that "the standard is just, reasonable, not unduly discriminatory or preferential, and in the public interest."

The first three of these criteria can be addressed in large part by the diligent adherence to NERC's *Reliability Standards Development Procedure*, which has been certified by the ANSI as being open, inclusive, balanced, and fair. Users, owners, and operators of the bulk power system that must comply with the standards, as well as the end-users who benefit from a reliable supply of electricity and the public in general, gain some assurance that standards are just, reasonable, and not unduly discriminatory or preferential because the standards are developed through an ANSI-accredited procedure.

The remaining portion of the statutory test is whether the standard is "in the public interest." Implicit in the public-interest test is that a standard is technically sound and ensures a level of reliability that should be reasonably expected by end-users of electricity. Additionally, each standard must be clearly written, so that bulk power system users, owners, and operators are put on notice of the expected behavior. Ultimately, the standards should be defensible in the event of a governmental authority review or court action that may result from enforcing the standard and applying a financial penalty.

The standards must collectively provide a comprehensive and complete set of technically sound requirements that establish an acceptable threshold of performance necessary to ensure the reliability of the bulk power system. "An adequate level of reliability" would argue for both a complete set of standards addressing all aspects of bulk power system design, planning, and operation that materially affect reliability, and for the technical efficacy of each standard. The Commission directed NERC to define the term, "adequate level of reliability" as part of its January 18, 2007 Order on Compliance Filing. Accordingly, NERC's Operating and Planning Committees prepared the definition and the NERC Board approved it at its February 2008 meeting for filing with regulatory authorities. The NERC Standards Committee was then tasked to integrate the definition into the development of future reliability standards.

Quality Objectives

To achieve the goals outlined above, NERC has developed 10 quality objectives for the development of reliability standards. Drafting teams working on assigned projects are charged to ensure their work adheres to the following quality objectives:

1. **Applicability** — Each reliability standard shall clearly identify the functional classes of entities responsible for complying with the reliability standard, with any specific additions or exceptions noted. Such functional classes[2] include: ERO, Regional Entities, reliability coordinators, balancing authorities, transmission operators, transmission owners, generator operators, generator owners, interchange authorities, transmission service providers, market operators, planning coordinators, transmission planners, resource planners, load-serving entities, purchasing-selling entities, and distribution providers. Each reliability standard that does not apply to the entire North American bulk power system shall also identify the geographic applicability of the standard, such as an interconnection, or within a regional entity area. The applicability section of the standard should also include any limitations on the applicability of the standard based on electric facility characteristics, such as a requirement that applies only to the subset of distribution providers that own or operate underfrequency load shedding systems.
2. **Purpose** — Each reliability standard shall have a clear statement of purpose that shall describe how the standard contributes to the reliability of the bulk power system.
3. **Performance Requirements** — Each reliability standard shall state one or more performance requirements, which if achieved by the applicable entities, will provide for a reliable bulk power system, consistent with good utility practices and the public interest. Each requirement is not a "lowest common denominator" compromise, but instead achieves an objective that is the best approach for bulk power system reliability, taking account of the costs and benefits of implementing the proposal.
4. **Measurability** — Each performance requirement shall be stated so as to be objectively measurable by a third party with knowledge or expertise in the area addressed by that requirement. Each performance requirement shall have one or more associated measures used to objectively evaluate compliance with the requirement. If performance results can be practically measured quantitatively, metrics shall be provided within the requirement to indicate satisfactory performance.
5. **Technical Basis in Engineering and Operations** — Each reliability standard shall be based upon sound engineering and operating judgment, analysis, or experience, as determined by expert practitioners in that particular field.
6. **Completeness** — Each reliability standard shall be complete and self-contained. The standards shall not depend on external information to determine the required level of performance.
7. **Consequences for Noncompliance** — Each reliability standard shall make clearly known to the responsible entities the consequences of violating a standard, in combination with guidelines for penalties and sanctions, as well as other ERO and Regional Entity compliance documents.
8. **Clear Language** — Each reliability standard shall be stated using clear and unambiguous language. Responsible entities, using reasonable judgment and in keeping with good utility practices, are able to arrive at a consistent interpretation of the required performance.

[2] These functional classes of entities are derived from NERC's Reliability Functional Model. When a standard identifies a class of entities to which it applies, that class must be defined in the Glossary of Terms Used in Reliability Standards.

9. **Practicality** — Each reliability standard shall establish requirements that can be practically implemented by the assigned responsible entities within the specified effective date and thereafter.

10. **Consistent Terminology** — Each reliability standard, to the extent possible, shall use a set of standard terms and definitions that are approved through the NERC Reliability Standards Development Process.

In addition to these factors, standard drafting teams also contemplate the following factors the Commission uses to approve a proposed reliability standard as outlined in Order No. 672. A standard proposed to be approved:

1. **Must be designed to achieve a specified reliability goal**
   "321. The proposed Reliability Standard must address a reliability concern that falls within the requirements of section 215 of the FPA. That is, it must provide for the reliable operation of bulk power system facilities. It may not extend beyond reliable operation of such facilities or apply to other facilities. Such facilities include all those necessary for operating an interconnected electric energy transmission network, or any portion of that network, including control systems. The proposed Reliability Standard may apply to any design of planned additions or modifications of such facilities that is necessary to provide for reliable operation. It may also apply to cyber security protection."

   "324. The proposed Reliability Standard must be designed to achieve a specified reliability goal and must contain a technically sound means to achieve this goal. Although any person may propose a topic for a Reliability Standard to the ERO, in the ERO's process, the specific proposed Reliability Standard should be developed initially by persons within the electric power industry and community with a high level of technical expertise and be based on sound technical and engineering criteria. It should be based on actual data and lessons learned from past operating incidents, where appropriate. The process for ERO approval of a proposed Reliability Standard should be fair and open to all interested persons."

2. **Must contain a technically sound method to achieve the goal**
   "324. The proposed Reliability Standard must be designed to achieve a specified reliability goal and must contain a technically sound means to achieve this goal.

   Although any person may propose a topic for a Reliability Standard to the ERO, in the ERO's process, the specific proposed Reliability Standard should be developed initially by persons within the electric power industry and community with a high level of technical expertise and be based on sound technical and engineering criteria. It should be based on actual data and lessons learned from past operating incidents, where appropriate. The process for ERO approval of a proposed Reliability Standard should be fair and open to all interested persons."

3. **Must be applicable to users, owners, and operators of the bulk power system, and not others**
   "322. The proposed Reliability Standard may impose a requirement on any user, owner, or operator of such facilities, but not on others."

4. **Must be clear and unambiguous as to what is required and who is required to comply**
   "325. The proposed Reliability Standard should be clear and unambiguous regarding what is required and who is required to comply. Users, owners, and operators of the Bulk-Power System must know what they are required to do to maintain reliability."

5. **Must include clear and understandable consequences and a range of penalties (monetary and/or non-monetary) for a violation**
   "326. The possible consequences, including range of possible penalties, for violating a proposed Reliability Standard should be clear and understandable by those who must comply."

6. **Must identify clear and objective criterion or measure for compliance, so that it can be enforced in a consistent and non-preferential manner**
   "327. There should be a clear criterion or measure of whether an entity is in compliance with a proposed Reliability Standard. It should contain or be accompanied by an objective measure of compliance so that it can be enforced and so that enforcement can be applied in a consistent and non-preferential manner."

7. **Should achieve a reliability goal effectively and efficiently - but does not necessarily have to reflect "best practices" without regard to implementation cost**
   "328. The proposed Reliability Standard does not necessarily have to reflect the optimal method, or "best practice," for achieving its reliability goal without regard to implementation cost or historical regional infrastructure design. It should however achieve its reliability goal effectively and efficiently."

8. **Cannot be "lowest common denominator," i.e., cannot reflect a compromise that does not adequately protect bulk power system reliability**
   "329. The proposed Reliability Standard must not simply reflect a compromise in the ERO's Reliability Standard development process based on the least effective North American practice — the so-called "lowest common denominator"—if such practice does not adequately protect Bulk-Power System reliability. Although the Commission will give due weight to the technical expertise of the ERO, we will not hesitate to remand a proposed Reliability Standard if we are convinced it is not adequate to protect reliability."

9. **Costs to be considered for smaller entities but not at consequence of less than excellence in operating system reliability**
   "330. A proposed Reliability Standard may take into account the size of the entity that must comply with the Reliability Standard and the cost to those entities of implementing the proposed Reliability Standard. However, the ERO should not propose a "lowest common denominator" Reliability Standard that would achieve less than excellence in operating system reliability solely to protect against reasonable expenses for supporting this vital national infrastructure. For example, a small owner or operator of the Bulk-Power System must bear the cost of complying with each Reliability Standard that applies to it."

10. **Must be designed to apply throughout North American to the maximum extent achievable with a single reliability standard while not favoring one area or approach**

"331. A proposed Reliability Standard should be designed to apply throughout the interconnected North American Bulk-Power System, to the maximum extent this is achievable with a single Reliability Standard. The proposed Reliability Standard should not be based on a single geographic or regional model but should take into account geographic variations in grid characteristics, terrain, weather, and other such factors; it should also take into account regional variations in the organizational and corporate structures of transmission owners and operators, variations in generation fuel type and ownership patterns, and regional variations in market design if these affect the proposed Reliability Standard."

11. **No undue negative effect on competition or restriction of the grid**
"332. As directed by section 215 of the FPA, the Commission itself will give special attention to the effect of a proposed Reliability Standard on competition. The ERO should attempt to develop a proposed Reliability Standard that has no undue negative effect on competition. Among other possible considerations, a proposed Reliability Standard should not unreasonably restrict available transmission capability on the Bulk-Power System beyond any restriction necessary for reliability and should not limit use of the Bulk-Power System in an unduly preferential manner. It should not create an undue advantage for one competitor over another."

12. **Implementation time**
"333. In considering whether a proposed Reliability Standard is just and reasonable, the Commission will consider also the timetable for implementation of the new requirements, including how the proposal balances any urgency in the need to implement it against the reasonableness of the time allowed for those who must comply to develop the necessary procedures, software, facilities, staffing or other relevant capability."

13. **Whether the reliability standard process was open and fair**
"334. Further, in considering whether a proposed Reliability Standard meets the legal standard of review, we will entertain comments about whether the ERO implemented its Commission-approved Reliability Standard development process for the development of the particular proposed Reliability Standard in a proper manner, especially whether the process was open and fair. However, we caution that we will not be sympathetic to arguments by interested parties that choose, for whatever reason, not to participate in the ERO's Reliability Standard development process if it is conducted in good faith in accordance with the procedures approved by the Commission."

14. **Balance with other vital public interests**
"335. Finally, we understand that at times development of a proposed Reliability Standard may require that a particular reliability goal must be balanced against other vital public interests, such as environmental, social and other goals. We expect the ERO to explain any such balancing in its application for approval of a proposed Reliability Standard."

15. **Any other relevant factors**
"323. In considering whether a proposed Reliability Standard is just and reasonable, we will consider the following general factors, as well as other factors that are appropriate for the particular Reliability Standard proposed."

"337. In applying the legal standard to review of a proposed Reliability Standard, the Commission will consider the general factors above. The ERO should explain in its application for approval of a proposed Reliability Standard how well the proposal meets these factors and explain how the Reliability Standard balances conflicting factors, if any. The Commission may consider any other factors it deems appropriate for determining if the proposed Reliability Standard is just and reasonable, not unduly discriminatory or preferential, and in the public interest. The ERO applicant may, if it chooses, propose other such general factors in its ERO application and may propose additional specific factors for consideration with a particular proposed reliability standard."

Issues Related to the Applicability of a Standard

In Order No. 672, the Commission states that a proposed reliability standard should be clear and unambiguous regarding what is required and who is required to comply. Users, owners, and operators of the bulk power system must know what they are required to do to maintain reliability. Section 215(b) of the FPA requires all "users, owners and operators of the bulk power system" to comply with Commission-approved reliability standards.

The term "users, owners, and operators of the bulk power system" defines the statutory applicability of the reliability standards. NERC's Reliability Functional Model (Functional Model) further refines the set of users, owners, and operators by identifying categories of functions that entities perform so the applicability of each standard can be more clearly defined. Applicability is clear if a standard precisely states the applicability using the functions an entity performs. For example, "Each Generator Operator shall verify the reactive power output capability of each of its generating units" states clear applicability compared with a standard that states "a bulk power system user shall verify the reactive power output capability of each generating unit." The use of the Functional Model in the standards narrows the applicability of the standard to a particular class or classes of bulk power system users, owners, and operators. A standard is more clearly enforceable when it narrows the applicability to a specific class of entities than if the standard simply references a wide range of entities, e.g., all bulk power system users, owners, and operators.

In determining the applicability of each standard and the requirements within a standard, the drafting team should follow the definitions provided in the NERC Glossary of Terms Used in Reliability Standards and should also be guided by the Functional Model.

In addition to applying definitions from the Functional Model, the revised standards must address more specific applicability criteria that identify only those entities and facilities that are material to bulk power system reliability with regard to the particular standard.

The drafting team should review the registration criteria provided in the NERC Statement of Compliance Registry Criteria, which is the criteria for applicability. The registration criteria identify the criteria NERC uses to identify those entities responsible for compliance to the reliability standards. Any deviations from the criteria used in the Statement of Compliance Registry Criteria must be identified in the applicability section of the. It is also important to note that standard drafting teams cannot set the applicability of reliability standards to extend to entities beyond the scope established by the criteria for inclusion on NERC's Compliance Registry. This is expressly prohibited by Commission Order No. 693-A.

The goal is to place obligations on the entities whose performance will impact the reliability of the bulk power system, but to avoid painting the applicability with such a broad brush that entities are obligated even when meeting a requirement will make no material contribution to bulk power system reliability.

Every entity class described in the Functional Model performs functions that are essential to the reliability of the bulk power system. This point is best highlighted with the example that might be the most difficult to understand, the inclusion of distribution providers. Section 215 of the FPA specifically excludes facilities used in the local distribution of electric energy. Nonetheless, some of the NERC standards apply to a class of entities called Distribution Providers. Distribution Providers are covered because, although they own and operate facilities in the local distribution of electric energy, they also perform functions affecting and essential to the reliability of the bulk power system. With regard to these facilities and functions that are material to the reliability of the bulk power system, a distribution provider is a bulk power system user. For example, requirements for distribution providers in the reliability standards apply to the underfrequency load shedding relays that are maintained and operated within the distribution system to protect the reliability of the bulk power system. There are also requirements for distribution providers to provide demand forecast information for the planning of reliable operations of the bulk power system.

A similar line of thinking can apply to every other entity in the Functional Model, including Load-serving Entities and Purchasing-selling Entities, which are users of the bulk power system to the extent they transact business for the use of transmission service or to transfer power across the bulk power system. NERC has specific requirements for these entities based on how these uses may impact the reliability of the bulk power systems. Other functional entities are more obviously bulk power system owners and operators, such as Reliability Coordinators, Transmission Owners and Operators, Generator Owners and Operators, Planning Coordinators, Transmission Planners, and Resource Planners. It is the extent to which these entities provide for a reliable bulk power system or perform functions that materially affect the reliability of the bulk power system that these entities fall under the jurisdiction of Section 215 of the FPA and the reliability standards. The use of the Functional Model simply groups these entities into logical functional areas to enable the standards to more clearly define the applicability.

Issues Related to Regional Entities and Reliability Organizations

Because of the transition from voluntary reliability standards to mandatory reliability standards, confusion has occurred over the distinction between Regional Entities and Regional Reliability Organizations. The regional councils have traditionally been the owners and members of NERC. They have been referred to as Regional Reliability Organizations in the Functional Model and in the reliability standards. In an era of voluntary standards and guides, it was acceptable that a number of the standards included requirements for Regional Reliability Organizations to develop regional criteria, procedures, and plans, and included requirements for entities within the region to follow those requirements. Section 215 of the FPA introduced a new term, called "Regional Entity." Regional Entities have specific delegated authorities, under agreements with NERC, to propose and enforce reliability standards within the region, and to perform other functions in support of the electric reliability organization. The former Regional Reliability Organizations have entered into delegation agreements with NERC to become Regional Entities for this purpose.