NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Standards Authorization Request Form

When completed, please email this form to:
sarcomm@nerc.com

NERC welcomes suggestions to improve the reliability of the bulk power system through improved reliability standards. Please use this form to submit your request to propose a new or a revision to a NERC's Reliability Standard.

Request to propose a new or a revision to a Reliability Standard			
Title of Proposed Standard:	Undervoltage Load Shedding		
Date Submitted:	Revised SAR posted for informal comment September 2013 and March 2014		
SAR Requester Information			
Name:	Undervoltage Load Shedding Standard Drafting Team (UVLSSDT)		
Organization:			
Telephone:	404-823-1132	E-mail:	Erika.Chanzes@nerc.net
SAR Type (Check as many as applicable)			
☐ New Standard		☒ Withdrawal of existing Standard	
☒ Revision to existing Standard		☐ Urgent Action	

SAR Information
Industry Need (What is the industry problem this request is trying to solve?):
A need for clear and comprehensive requirements for the application and coordination of undervoltage loading shedding (UVLS) as an option to mitigate or address a number of different voltage control concerns, as evidenced by the following: **Of the events analyzed by NERC over the last 10 years, voltage issues have continued to contribute to disturbances.** **NERC SPCS Report to the Planning Committee: Technical Review of UVLS-Related Standards: PRC-010-**

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0, PRC-020-1, PRC-021-1, and PRC-022-1 (December 2010): *"Specifically include a requirement for assessment of coordination between UVLS programs and all other protection systems, generator protection and control systems (including generator low voltage ride-through performance), UFLS systems, and other UVLS systems."* **FERC Order No. 693, Paragraph 1509:** *". . . the Commission directs the ERO to develop a modification to PRC-010-0 through the Reliability Standards development process that requires that an integrated and coordinated approach be included in all protection systems on the Bulk-Power System, including generators and transmission lines, generators' low voltage ride through capabilities, and UFLS and UVLS programs."* **August 14 Blackout: Causes and Recommendations, Blackout Recommendation 21:** *"[NERC should] determine the goals and principles needed to establish an integrated approach to relay protection for generators and transmission lines and the use of under-frequency and under-voltage load shedding (UFLS and UVLS) programs. An integrated approach is needed to ensure that at the local and regional level these interactive components provide an appropriate balance of risks and benefits in terms of protecting specific assets and facilitating overall grid survival."*
Purpose or Goal (How does this request propose to address the problem described above?):
1) Establish a results-based standard with requirements that ensure an integrated approach to the design, evaluation, and reliable operation of applicable UVLS programs. 2) Ensure coordination with generator voltage ride-through capabilities and other protection and control systems, including, but not limited to, transmission line protection, auto-reclosing, Special Protection Systems (SPSs), and other UVLS programs.
Identify the Objectives of the proposed standard's requirements (What specific reliability deliverables are required to achieve the goal?):
• Address the FERC directive in Order No. 693, Paragraph 1509 to modify PRC-010-0 to require an integrated approach to all protection systems. • Replace the applicability to and involvement of the Regional Reliability Organization (RRO) in PRC-020-1 and PRC-021-1. • Consolidate the UVLS-related standards into one comprehensive standard (similar to the construct of FERC-approved PRC-006-1– Automatic Underfrequency Load Shedding). • Clearly identify and separate centrally-controlled undervoltage-based load shedding due to the

SAR Information
reliability requirements needed for this type of load shedding as compared to other UVLS programs. • Create a single, results-based standard that addresses current reliability issues associated with UVLS programs.
Brief Description (Provide a paragraph that describes the scope of this standard action.)
PRC-010-0 will absorb appropriate requirements from PRC-020-1, PRC-021-1, and PRC-022-1 and be revised to PRC-010-1, which will provide specific requirements for the design, evaluation, and coordinated operation of the UVLS programs to which the standard is applicable. The revised standard will be accompanied by a recommendation to retire PRC-010-0, PRC-020-1, PRC-021-1, and PRC-022-1.
Detailed Description (Provide a description of the proposed project with sufficient details for the standard drafting team to execute the SAR. Also provide a justification for the development or revision of the standard, including an assessment of the reliability and market interface impacts of implementing or not implementing the standard action.)
The four existing NERC UVLS standards will be consolidated to create one comprehensive standard, which will reduce the total number of standards and eliminate PRC-020-1 and PRC-021-1's applicability to and involvement of the RRO. PRC-010-0 will absorb appropriate requirements from PRC-020-1, PRC-021-1, and PRC-022-1, and the existing requirements and measures will be revised to establish a results-based standard that clearly defines the responsibilities of applicable entities to: • Pursue an integrated and coordinated approach to the design, evaluation, and reliable operation of UVLS programs to which the standard is applicable. • Ensure the coordination of these UVLS programs with generator voltage ride-through capabilities and other protection and control systems, including, but not limited to, transmission line protection, auto-reclosing, SPSs, and other UVLS programs. • Perform periodic program assessment and performance analysis. • Establish proper and meaningful database requirements for these UVLS programs. The revised standard **WILL**: • Establish continent-wide requirements applicable to entities responsible for the design and implementation of the UVLS programs to which the standard is applicable. • Address requirements for these programs after the need for UVLS has been determined by the appropriate planning studies.

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• Be developed with due consideration to any necessary coordinating changes with other standards or standards projects to meet its design. The revised standard **WILL NOT**: • Require a UVLS program. • Apply to centrally-controlled undervoltage-based load shedding programs (see Related SARs section below). • Apply to the Generator Owner or Generator Operator; Generator Owner data reporting necessary for UVLS coordination is addressed in PRC-024-1. • Include the previously applicable Load-Serving Entity since this function does not own physical assets. If a Load-Serving Entity is also registered as a Distribution Provider, the entity will be included under that applicable function. • Include the previously applicable Transmission Operator because the requirements are more accurately applicable to asset owners (Transmission Owner and Distribution Provider). No market interface impacts are anticipated.

Reliability Functions	
The Standard will Apply to the Following Functions (Check each one that applies.)	
☐ Regional Reliability Organization	Conducts the regional activities related to planning and operations, and coordinates activities of Responsible Entities to secure the reliability of the Bulk Electric System within the region and adjacent regions.
☐ 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.

Reliability Functions		
☒	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 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

Reliability and Market Interface Principles	
	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?	Enter (yes/no)
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
TPL-001-4	Development of PRC-010-1 is based on implementation of FERC-approved TPL-001-4.
EOP-003-2	Project 2009-03 Emergency Operations (proposed EOP-011-1) will retire EOP-003-2, and Requirements R2, R4, and R7 will be moved to Project 2008-02 UVLS (proposed PRC-010-1). The UVLSSDT will address these overlapping requirements as part of the revision and mapping process.
PRC-004-2.1a	The UVLSSDT will consider if PRC-004 is the more appropriate standard to

Related Standards	
	address UVLS Misoperations and will coordinate with Project 2010-05.1 Protection Systems (Misoperations) (proposed PRC-004-3).
PRC-005-2 and other standards as identified	The UVLSSDT will evaluate the use of references to UVLS with respect to any proposed defined terms by PRC-010-1 and will coordinate with Project 2007-17.3 Protection System Maintenance and Testing (Sudden Pressure Relays) (proposed PRC-005-4) and other standards or standard development projects as necessary.

Related SARs	
Project	Explanation
Project 2010-05.2 Protection Systems (Special Protection Systems)	The UVLSSDT is recommending that Project 2010-05.2 Protection Systems (Special Protection Systems) adjust the definition of Special Protection System to include centrally-controlled undervoltage-based load shedding.

Regional Variances	
Region	Explanation
ERCOT	None
FRCC	None
MRO	None
NPCC	None
RFC	None
SERC	None
SPP	None
WECC	None