

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 Reliability Standard.

Request to propose a new or a revision to a Reliability Standard

Title of Proposed Standard:	Undervoltage Load Shedding (UVLS) Underfrequency Load Shedding (UFLS)
Date Submitted:	Revised SAR posted for informal comment September 2013, March 2014 and May 23, 2014

SAR Requester Information

Name:	Undervoltage Load Shedding Standard Drafting Team (UVLSSDT) Underfrequency Load Shedding Standard Drafting Team (UFLS SDT)		
Organization:			
Telephone:	404-823-1132 404-446-2581	E-mail:	Erika.Chanzas@nerc.net Lacey.Ourso@nerc.net

SAR Type (Check as many as applicable)

<input type="checkbox"/> New Standard	<input checked="" type="checkbox"/> Withdrawal of existing Standard
<input checked="" type="checkbox"/> Revision to existing Standard	<input type="checkbox"/> Urgent Action

SAR Information

Industry Need (What is the industry problem this request is trying to solve?):

Undervoltage Load Shedding

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:

SAR Information

- **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-010-0, 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.”*

Underfrequency Load Shedding

Address the outstanding FERC directive and review the standard to determine if any steady state modifications are appropriate (*i.e.*, Paragraph 81 criteria and recommendations of the Independent Expert Review Panel).

Purpose or Goal (How does this request propose to address the problem described above?):**Undervoltage Load Shedding**

- 1) Establish a results-based standard with requirements that ensure an integrated approach to the design, evaluation, and reliable operation of applicable UVLS programs.

SAR Information

- 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.

Underfrequency Load Shedding

This SAR proposes to revise PRC-006-1 to address an outstanding FERC directive and review the standard to determine if any steady state modifications are appropriate (*i.e.*, Paragraph 81 criteria and recommendations of the Independent Expert Review Panel). Specifically, the SDT should address the directive from FERC Order No. 763 Paragraph 48, which provides, in part, “Notwithstanding NERC’s comments, the Commission is not persuaded that Requirement R9 requires corrective action in accordance with a schedule established by the planning coordinator. Based on its comments, however, NERC has expressed no opposition to such a requirement. We accept NERC’s comments that Requirement R9 requires a schedule established by the planning coordinator, but NERC’s reading of Requirement R9 should be made clear in the Requirement itself. Accordingly, we direct NERC to make that requirement explicit in future versions of the Reliability Standard.”

Identify the objectives of the proposed standard’s requirements (What specific reliability deliverables are required to achieve the goal?):**Undervoltage Load Shedding**

- 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 reliability requirements needed for this type of load shedding as compared to other UVLS programs.

SAR Information

- Create a single, results-based standard that addresses current reliability issues associated with UVLS programs.

Underfrequency Load Shedding

The objective is to revise PRC-006-1 to address the directive included in FERC Order No. 763 and to provide for clear, unambiguous design and documentation requirements for automatic underfrequency load shedding programs that arrest declining frequency and assist recovery of frequency following system events leading to frequency degradation.

Brief Description (Provide a paragraph that describes the scope of this standard action.)**Undervoltage Load Shedding**

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.

Underfrequency Load Shedding

PRC-006-1 should be revised to address the FERC directive included in FERC Order No. 763 and review the standard to determine if any steady state modifications are appropriate (*i.e.*, Paragraph 81 criteria and recommendations of the Independent Expert Review Panel).

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.)**Undervoltage Load Shedding**

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,

SAR Information

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.
- 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.

Underfrequency Load Shedding

The SDT shall revise PRC-006-1 to address the FERC directive included in FERC Order No. 763 and review the standard to determine if any steady state modifications are appropriate (*i.e.*, Paragraph 81 criteria and recommendations of the Independent Expert Review Panel).

Reliability Functions

The Standard will Apply to the Following Functions (Check each one that applies.)

<input type="checkbox"/>	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.
<input type="checkbox"/>	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.
<input type="checkbox"/>	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.
<input type="checkbox"/>	Interchange Authority	Ensures communication of interchange transactions for reliability evaluation purposes and coordinates implementation of valid and balanced interchange schedules between Balancing Authority Areas.
<input checked="" type="checkbox"/>	Planning Coordinator	Assesses the longer-term reliability of its Planning Coordinator Area.
<input type="checkbox"/>	Resource Planner	Develops a >one year plan for the resource adequacy of its specific loads within a Planning Coordinator area.
<input checked="" type="checkbox"/>	Transmission Planner	Develops a >one year plan for the reliability of the interconnected Bulk Electric System within its portion of the Planning Coordinator area.
<input type="checkbox"/>	Transmission Service Provider	Administers the transmission tariff and provides transmission services under applicable transmission service agreements (e.g., the pro forma tariff).
<input checked="" type="checkbox"/>	Transmission Owner	Owns and maintains transmission facilities.
<input type="checkbox"/>	Transmission Operator	Ensures the real-time operating reliability of the transmission assets within a Transmission Operator Area.
<input checked="" type="checkbox"/>	Distribution Provider	Delivers electrical energy to the End-use customer.
<input type="checkbox"/>	Generator Owner	Owns and maintains generation facilities.
<input type="checkbox"/>	Generator Operator	Operates generation unit(s) to provide real and reactive power.

Reliability Functions	
<input type="checkbox"/> Purchasing-Selling Entity	Purchases or sells energy, capacity, and necessary reliability-related services as required.
<input type="checkbox"/> Market Operator	Interface point for reliability functions with commercial functions.
<input type="checkbox"/> 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).	
<input checked="" type="checkbox"/>	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.
<input checked="" type="checkbox"/>	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.
<input checked="" type="checkbox"/>	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.
<input checked="" type="checkbox"/>	4. Plans for emergency operation and system restoration of interconnected bulk power systems shall be developed, coordinated, maintained and implemented.
<input checked="" type="checkbox"/>	5. Facilities for communication, monitoring and control shall be provided, used and maintained for the reliability of interconnected bulk power systems.
<input type="checkbox"/>	6. Personnel responsible for planning and operating interconnected bulk power systems shall be trained, qualified, and have the responsibility and authority to implement actions.
<input checked="" type="checkbox"/>	7. The security of the interconnected bulk power systems shall be assessed, monitored and maintained on a wide area basis.
<input type="checkbox"/>	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

Reliability and Market Interface Principles

<p>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.</p>	<p>Yes</p>
---	------------

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 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	PRC-006-NPCC-1
RFC	None
SERC	PRC-006-SERC-02
SPP	None
WECC	None