UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

North American Electric Reliability Corporation	**)** **)**	**Docket No. _____**

JOINT PETITION OF THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION AND SERC RELIABILITY CORPORATION FOR APPROVAL OF PROPOSED REGIONAL RELIABILITY STANDARD PRC-006-SERC-03 AND REQUEST FOR EXPEDITED ACTION

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DECEMBER 14, 2021

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Pursuant to Section 215(d)(1) of the Federal Power Act ("FPA")[1] and 18 C.F.R. § 39.5 (2021), the North American Electric Reliability Corporation ("NERC")[2] and SERC Reliability Corporation ("SERC") respectfully request the Federal Energy Regulatory Commission's ("Commission") approval of proposed regional Reliability Standard PRC-006-SERC-03-Automatic Underfrequency Load Shedding ("UFLS")[3] Requirements. Proposed regional Reliability Standard PR-006-SERC-03 establishes consistent and coordinated requirements for the design, implementation, and analysis of automatic UFLS programs among all SERC applicable entities.

NERC requests that the Commission approve proposed regional Reliability Standard PRC-006-SERC-03 (**Exhibit A**) as just, reasonable, not unduly discriminatory or preferential, and in the public interest. NERC also requests approval of: (i) the proposed Effective Date, as set forth in the proposed regional Reliability Standard and associated implementation plan (**Exhibits A and B**); (ii) the associated Violation Risk Factors ("VRFs") and Violation Severity Levels ("VSLs")

[1] 16 U.S.C. § 824o (2018).
[2] The Commission certified NERC as the electric reliability organization ("ERO") in accordance with Section 215 of the FPA on July 20, 2006. *N. Am. Elec. Reliability Corp.*, 116 FERC ¶ 61,062 (2006) ("ERO Certification Order").
[3] Unless otherwise designated, all capitalized terms shall have the meaning set forth in the *Glossary of Terms Used in NERC Reliability Standards, available at* https://www.nerc.com/pa/Stand/Glossary%20of%20Terms/Glossary_of_Terms.pdf

(**Exhibit A**); and (iii) the retirement of regional Reliability Standard PRC-006-SERC-02. The NERC Board of Trustees adopted proposed regional Reliability Standard PRC-006-SERC-03 on November 4, 2021.

As required by Section 39.5(a)[4] of the Commission's regulations, this petition presents the technical basis and purpose of proposed regional Reliability Standard PRC-006-SERC-03; a demonstration that the proposed regional Reliability Standard meets the criteria identified by the Commission in Order No. 672[5] (**Exhibit C**); and a summary of the development history (**Exhibit D**).

I. EXECUTIVE SUMMARY

The purpose of proposed regional Reliability Standard PRC-006-SERC-03 is to establish consistent and coordinated requirements for the design, implementation, and analysis of automatic UFLS programs among all SERC applicable entities. Proposed regional Reliability Standard PRC-006-SERC-03 incorporates revisions to: (i) provide more flexibility for Planning Coordinators to adjust island boundaries in order to perform more accurate and complete studies; (ii) address the transition of Florida Reliability Coordinating Council ("FRCC") registered entities to SERC following the dissolution of FRCC as a regional entity on July 1, 2019;[6] (iii) clarify a technical term used in the regional Reliability Standard;and (iv) align requirement language with the current continent-wide NERC Reliability Standard, PRC-006-5.

Currently effective regional Reliability Standard PRC-006-SERC-02 was approved by the

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[4] 18 C.F.R. § 39.5(a).

[5] The Commission specified in Order No. 672 certain general factors it would consider when assessing whether a particular Reliability Standard is just and reasonable. *See Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards*, Order No. 672, 114 FERC ¶ 61,104, at P 262, 321-37, *order on reh'g*, Order No. 672-A, 114 FERC ¶ 61,328 (2006) ("Order No. 672").

[6] *Letter Order Approving the Joint Petition Requesting Certain Approvals in connection with the Dissolution of FRCC*, 167 FERC ¶ 61,095, (2019).

Commission on October 16, 2017[7] and became effective on registered entities in the SERC region on January 1, 2018. Following the addition of FRCC's registered entities to SERC in 2019, SERC initiated a project to review PRC-006-SERC-02. SERC's Dynamics Working Group identified the need to revise the regional Reliability Standard to account for UFLS settings that are unique to the Florida peninsula. As part of this project, SERC also identified other opportunities to enhance the regional standard.

For the reasons discussed herein, NERC and SERC respectfully request the Commission approve proposed regional Reliability Standard PRC-006-SERC-03, the associated VRFs and VSLs, the proposed Effective Date as set forth in the implementation plan, and the retirement of currently effective regional Reliability Standard PRC-006-SERC-02. The following petition presents the justification for approval and supporting documentation.

II. REQUEST FOR EXPEDITED COMMISSION ACTION

NERC and SERC respectfully request that the Commission consider this petition on an expedited basis, to allow the issuance of an order in this proceeding by July 1, 2022. The requested timeline will allow Planning Coordinators that are participating in SERC's Dynamic Working Group's UFLS study to incorporate the revisions in proposed regional Reliability Standard PRC-006-SERC-03 in adjusting island boundaries. Incorporating the revisions reflected in proposed PRC-006-SERC-03 into the study will provide more accurate and meaningful results.

[7] *N. Am. Elec. Reliability Corp.*, Docket No. RD17-9-000 (Oct. 16, 2017) (delegated letter order).

III. NOTICES AND COMMUNICATIONS

Notices and communications with respect to this filing may be addressed to the following:[8]

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IV. BACKGROUND

The following background information is provided below: (a) an explanation of the regulatory framework for NERC and regional Reliability Standards; (b) an explanation of the SERC regional Reliability Standards development process; and (c) the history of development of PRC-006-SERC-03.

A. Regulatory Framework

By enacting the Energy Policy Act of 2005,[9] Congress entrusted the Commission with the duties of approving and enforcing rules to ensure the reliability of the Nation's Bulk-Power System, and with the duties of certifying an ERO that would be charged with developing and enforcing mandatory Reliability Standards, subject to Commission approval. Section 215(b)(1)[10] of the FPA states that all users, owners, and operators of the Bulk-Power System in the United

[8] Persons to be included in Commission's official service list. The Petitioners respectfully request a waiver of Rule 203 of the Commission's regulations, 18 C.F.R. § 385.203, to allow the inclusion of more than two persons on the service list in this proceeding.
[9] 16 U.S.C. § 824o.
[10] *Id.* § 824o(b)(1).

States will be subject to Commission-approved Reliability Standards. Section 215(d)(5)[11] of the FPA authorizes the Commission to order the ERO to submit a new or modified Reliability Standards to the Commission. Section 39.5(a)[12] of the Commission's regulations requires the ERO to file with the Commission for its approval each Reliability Standard that the ERO proposes should become mandatory and enforceable in the United States, and each modification to a Reliability Standard that the ERO proposes should be made effective.

The Commission has the regulatory responsibility to approve Reliability Standards that protect the reliability of the Bulk-Power System and to ensure that such Reliability Standards are just, reasonable, not unduly discriminatory or preferential, and in the public interest. Pursuant to Section 215(d)(2) of the FPA[13] and Section 39.5(c)(1)[14] of the Commission's regulations, the Commission will give due weight to the technical expertise of the ERO with respect to the content of a Reliability Standard.

Similarly, the Commission approves regional Reliability Standards proposed by Regional Entities if the regional Reliability Standard is just, reasonable, not unduly discriminatory or preferential, and in the public interest.[15] In addition, Order No. 672 requires further criteria for regional Reliability Standards. A regional difference from a continent-wide Reliability Standard must either be: (1) more stringent than the continent-wide Reliability Standard, including a regional difference that addresses matters that the continent-wide Reliability Standard does not; or (2) necessitated by a physical difference in the Bulk-Power System.[16]

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[11] *Id*. § 824o(d)(5).
[12] 18 C.F.R. § 39.5(a).
[13] 16 U.S.C. § 824o(d)(2).
[14] 18 C.F.R. § 39.5(c)(1).
[15] Section 215(d)(2) of the FPA and 18 C.F.R. §39.5(a).
[16] *Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of the Electric Reliability Standards*, Order No. 672, 114 FERC ¶ 61,104, at P 291, *order on reh'g*, Order No. 672-A, 114 FERC ¶ 61,328 (2006).

B. SERC Regional Reliability Standards Development Process

The proposed regional Reliability Standard was developed in an open and fair manner and in accordance with the Commission-approved SERC Regional Reliability Standards Development Procedure ("RSDP").[17] SERC's RSDP provides for reasonable notice and opportunity for public comment, due process, openness, and a balance of interests in developing Reliability Standards and thus addresses the Commission's criteria for approving Reliability Standards. The development process is open to any person or entity that is an interested stakeholder. SERC considers the comments of all stakeholders, and a vote of stakeholders and the SERC Board of Directors is require to approve a regional Reliability Standard.

In addition, NERC posts each proposed regional Reliability Standard for an additional 45-day public comment period. The NERC Board of Trustees must adopt the proposed regional Reliability Standard before it is submitted to the Commission for approval.

C. The Development History of Proposed PRC-006-SERC-03

As further described in **Exhibit D**, proposed regional Reliability Standard PRC-006-SERC-03 was developed by the SERC Standard Drafting Team in response to a Standard Authorization Request submitted by SERC Dynamics Working Group on February 27, 2020. On May 17, 2021, proposed regional Reliability Standard PRC-006-SERC-03 received the requisite approval from the registered ballot body, with 100 percent affirmative vote. The SERC Board of Directors approved the proposed regional standard on June 24, 2021. NERC posted the regional standard for a 45-day comment period from August 25, 2021 through October 8, 2021. Commenters agreed that the proposed regional standard was developed in a fair and open process

[17] The currently effective SERC RSDP was approved by the Commission on June 15, 2021. *See N. Am. Elec. Reliability Corp.*, Docket No. RR21-2-000 (June 15, 2021) (delegated letter order). The SERC RSDP is available at https://www.serc1.org/docs/default-source/program-areas/standards-regional-criteria/standards-documents/serc-regional-reliability-standards-development-procedure.pdf?sfvrsn=1bc85593_4.

using the SERC RSDP, that there were no concerns that should prevent its adoption, and that it meets at least one of the criteria for approving regional standards. There were no additional changes to the proposed regional standard after this comment period. The NERC Board of Trustees subsequently adopted the proposed regional standard on November 4, 2021.

V. JUSTIFICATION FOR APPROVAL

As discussed in detail in **Exhibit C**, proposed regional Reliability Standard PRC-006-SERC-03 – Automatic Underfrequency Load Shedding Requirements is just, reasonable, not unduly discriminatory or preferential, and in the public interest. Also, as described more fully herein and in **Exhibit C**, the proposed regional Reliability Standard provides reliability benefits for the Bulk-Power System in the SERC region.

The purpose of proposed regional Reliability Standard PRC-006-SERC-03 is to establish consistent and coordinated requirements for the design, implementation, and analysis of automatic UFLS programs among all SERC applicable entities. The provisions of the proposed regional Reliability Standard provide specific requirements for the development, coordination, implementation, and analysis of UFLS schemes in the SERC region that are not included in the continent-wide Reliability Standard that addresses UFLS programs, Reliability Standard PRC-006-5. In approving currently effective regional Reliability Standard PRC-006-SERC-02, the Commission confirmed that the regional standard continues to "work in conjunction with NERC Reliability Standard PRC-006-1 to mitigate the consequences of an underfrequency event effectively while accommodating differences in system transmission and distribution topology among SERC planning coordinator[s] due to historical design criteria, makeup of load demands, and generation resources."[18] Proposed PRC-006-SERC-03 provides this same benefit with

[18] *N. Am. Elec. Reliability Corp.*, Docket No. RD17-9-000 (October 16, 2017) (delegated letter order) (*citing*, via

additional proposed enhancements. Therefore, the proposed regional Reliability Standard meets a reliability need for the SERC region, and as discussed below, the proposed modifications provide additional support for the reliable operation of the Bulk-Power System.

The proposed regional Reliability Standard includes requirements for selecting or developing a UFLS scheme that meets specified criteria (Requirement R2); conducting simulations of the UFLS scheme for an imbalance between load and generation when performing design assessments (Requirement R3); implementing the UFLS scheme in the SERC region for entities with a load of 100 MW or greater (Requirement R4); implementing the UFLS scheme in the SERC region for entities with a load of less than 100 MW (Requirement R5); implementing certain changes to the UFLS scheme within 18 months of notification by the Planning Coordinator (Requirement R6); and providing information for post-event analysis of frequency disturbances to SERC or the Planning Coordinator (Requirement R8). Requirements R1 and R7 of the currently effective standard are proposed for retirement in proposed regional Reliability PRC-006-SERC-03, but the numbering for the remaining Requirements is unchanged in the interest of administrative convenience.

This section of the petition addresses: (a) the justification of the need for the proposed regional Reliability Standard; (b) the description and technical basis of the proposed revisions; and (c) the enforceability of the proposed regional Reliability Standard.

A. Justification for the Need for the Proposed Regional Reliability Standard

Proposed regional Reliability Standard PRC-006-SERC-03 meets the criteria for a regional

NERC's petition, *Regional Reliability Standard PRC-006-SERC-01 – Automatic Underfrequency Load Shedding Requirements*, Order No. 772, 141 FERC ¶ 61,243 at P 14 (2012) ("Order No. 772")). Note that the current version of the continent-wide Reliability Standard PRC-006 is version 5, although at the time of approval of PRC-006-SERC-02 the continent-wide standard was version 2, and at the time of approval of PRC-006-SERC-01 the continent-wide standard was version 1. Proposed-006-SERC-03 continues to work in conjunction with currently-effective Reliability Standard PRC-006-5.

Reliability Standard as set forth in Order No. 672 as it is more stringent than the related continent-wide NERC Reliability Standard PRC-006-5, which does not include a detailed plan criteria or a maximum timeframe to implement changes to a UFLS scheme. As noted above, the Commission previously recognized that the additional specificity in the regional Reliability Standard helps to mitigate the consequences of an Underfrequency event while accommodating differences in SERC system transmission and distribution topology.[19] Registered entities that perform the functions to which the continent-wide Reliability Standard and the proposed regional Reliability Standard apply need to comply with all applicable Reliability Standards. Therefore, the proposed regional Reliability Standard provides a level of reliability support to the SERC region in addition to the continent-wide standard.

B. Description and Technical Basis of Proposed Revisions

First, the proposed revisions provide more flexibility for Planning Coordinators to properly test the capabilities of UFLS settings. Specifically, by eliminating PRC-006-SERC-02 Requirement R1 from proposed regional Reliability Standard PRC-006-SERC-03, it removes the more restrictive requirement that each Planning Coordinator must use its SERC sub-region as an identified island or may only adjust boundaries for the purpose of producing a contiguous sub-regional island. After removing this requirement, Planning Coordinators will be able to build islands in accordance with the continent-wide Reliability Standard PRC-006-5 Requirement R2. As originally proposed as part of PRC-006-SERC-01,[20] the rationale for PRC-006-SERC-02 Requirement R1 was to uncover and fix poorly performing schemes. However, by removing this requirement, Planning Coordinators will be able to better test the capabilities of the UFLS settings

[19] *Id.*
[20] *See Petition for Approval of Regional Reliability Standard PRC-006-SERC-01*, Docket No. RM12-9-000 (Feb. 1, 2012).

as registered entities transition from one Planning Coordinator to another and build islands that reflect current conditions where SERC sub-regions may not be contiguous. These more comprehensive studies are more likely to uncover and fix poorly performing schemes. Thus, the revision to remove PRC-006-SERC-02 Requirement R1 from PRC-006-SERC-03 supports a reliable Bulk-Power System by allowing Planning Coordinators to adjust island boundaries in order to perform more accurate and complete studies.

Second, the proposed revisions incorporate the existing frequency set points that FRCC's former registered entities have in place and provide a second method for calculating the percent of load shed based on these entities' existing practices. Due to the physical nature of the Florida peninsula, UFLS settings are set differently than the rest of SERC entities. When FRCC was dissolved and the registered entities located in the Florida peninsula became subject to SERC's regional Reliability Standard PRC-006-SERC-02, the existing UFLS settings for Florida were in violation of the SERC regional standard. These UFLS settings are unique to the Florida peninsula and have proven to be reliable during several historical events. Thus, the revisions in proposed regional Reliability Standard PRC-006-SERC-03 Requirement R2, Part 2.3 and Part 2.4 incorporate the settings of the former FRCC registered entities, so that the continued application of these historically reliable settings by these entities do not now violate the SERC regional Reliability Standard. Additionally, proposed regional Reliability Standard PRC-006-SERC-03 Requirement R4, Part 4.1 and Requirement R5, Part 5.1 incorporate the former FRCC registered entities' use of the forecasted substation or feeder demand (including losses) of the UFLS entities at the time coincident with the next year's forecasted Peak Demand in the season to determine the percent of load shed. Using forecasted load takes into account the previous year's actual or estimated value and allows a registered entity to make adjustments based on load growth or

decline. The inclusion of the former FRCC's registered entities' method is an additional reliable method in calculating the percent of load shed.

Third, the proposed revision to replace "from frequency reaching the set point to the trip signal" with "0.1 seconds" in Requirement R2, Part 2.6 clarifies the language of the requirement. This clarification supports reliability by ensuring that the proposed regional Reliability Standard language is clear and unambiguous in accordance with Order No. 672 criteria.

Fourth, and lastly, the proposed revisions align requirement language with the current continent-wide NERC Reliability Standard, PRC-006-5. Specifically, the removal of PRC-006-SERC-02 Requirement R7 in proposed regional Reliability Standard PRC-006-SERC-03 eliminates an unnecessary burden on SERC as the custodian of information that is already required to be maintained by the Planning Coordinator in the continent-wide Reliability Standard PRC-006-5 Requirement R6. While originally a SERC UFLS database was believed to be needed to facilitate data sharing across the SERC region, with other regions, and with NERC,[21] information contained in the database was not utilized as SERC, NERC, and the regions could request the same information from the Planning Coordinator. As a result, this requirement created an unnecessary burden on SERC to maintain custody of duplicative information. The removal of this requirement does not create a reliability gap, as continent-wide Reliability Standard PRC-006-5 Requirement 6 still requires the Planning Coordinator to maintain this information in the event it is requested. Additionally, the inclusion of "or Planning Coordinator" in proposed regional Reliability Standard PRC-006-SERC-03 Requirement R8 reflects a Planning Coordinator's ability to collect necessary information on disturbances in the continent-wide Reliability Standard PRC-006-5 Requirements R11 and R13. With the language alignment to the continent-wide standard, proposed regional

[21] *See id.*

Reliability Standard PRC-006-SERC-03 still meets the criteria under Order No. 672, as the remainder of Requirement R8 is unchanged and continues to be more stringent than the continent-wide Reliability Standard.

C. Enforceability of Proposed Regional Reliability Standard PRC-006-SERC-03

The proposed regional Reliability Standard includes VRFs and VSLs for each requirement. The VRFs remain unchanged from PRC-006-SERC-02, and the only proposed change to the VSLs is a conforming change (changing "to SERC" to "to SERC or Planning Coordinator" to match the proposed language in Requirement R8) that does not alter the substance of the VSLs. The VSLs provide guidance on the way that NERC will enforce the requirements of the proposed regional Reliability Standard. The VRFs are one of several elements used to determine an appropriate sanction when the associated requirement is violations. The VRFs assess the impact to reliability of violating a specific requirement. The VRFs and VSLs for the proposed regional Reliability Standard comport with NERC and Commission guidelines related to their assignment.

The proposed regional Reliability Standard also includes measures that support each requirement by clearly identifying what is required and how the requirement will be enforced. These measures help ensure that the requirements will be enforced in a clear, consistent, and non-preferential manner and without prejudice to any party.[22] The measures remain unchanged from PRC-006-SERC-02.

VI. EFFECTIVE DATE

NERC respectfully requests that the Commission approve the proposed regional Reliability Standard PRC-006-SERC-03 and the retirement of PRC-006-SERC-02 to become effective as set

[22] Order No. 672 at P 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.").

forth in the proposed regional Reliability Standard and associated implementation plan (**Exhibits A and B**). SERC and NERC propose that regional Reliability Standard PRC-006-SERC-03 become effective on the first day of the first calendar quarter after approval by the Commission.

VII. CONCLUSION

For the reasons set forth above, NERC and SERC respectively request that the Commission approve:

- the proposed regional Reliability Standard PRC-006-SERC-03 in **Exhibit A**;
- the other associated elements in the Reliability Standard in **Exhibit A**, including the VRFs and VSLs (**Exhibits A and C**);
- the retirement of existing regional Reliability Standard PRC-006-SERC-02; and
- the Effective Date, included in **Exhibit A** and the associated implementation plan **(Exhibit B)**.

Respectfully submitted,

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Date: December 14, 2021

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Exhibit A-1

Proposed Regional Reliability Standard, PRC-006-SERC-03 – Automatic Underfrequency Load Shedding Requirements and Effective Date
Clean

Effective Date

Effective for SERC Region applicable Registered Entities on the first day of the first calendar quarter after approved by FERC.

Introduction

1. **Title:** Automatic Underfrequency Load Shedding Requirements

2. **Number:** PRC-006-SERC–3

3. **Purpose:** To establish consistent and coordinated requirements for the design, implementation, and analysis of automatic underfrequency load shedding (UFLS) programs among all SERC applicable entities.

4. **Applicability:**

   4.1 Planning Coordinators

   4.2 UFLS entities shall mean all entities that are responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the Planning Coordinators. Such entities may include one or more of the following:

   4.2.1 Transmission Owners

   4.2.2 Distribution Providers

   4.3 Generator Owners

5. **Background**

   The SERC UFLS Standard: PRC-006-SERC-01 ("SERC UFLS Standard") was developed to provide regional UFLS requirements to entities in SERC. UFLS requirements have been in place at a continent-wide level and within SERC for many years prior to implementation of federally mandated reliability compliance standards in 2007.

   When reliability standards were implemented in 2007, the Federal Energy Regulatory Commission ("FERC"), which is the government body with regulatory responsibility for electric reliability, issued FERC Order 693, recognizing 83 NERC Reliability Standards as enforceable by FERC and applicable to users, owners, and operators of the bulk power system (BPS). FERC did not approve the NERC UFLS standard, PRC-006-0 in Order 693. FERC's reason for not approving PRC-006-0 was that it recognized PRC-006-0 as a "fill-in the blank standard," and regional procedures associated with the standard were not submitted along with the standard. FERC's ruling in Order 693 required Regional Entities to provide the regional requirements necessary for completing the UFLS standard.

In 2008, SERC commenced work on PRC-006-SERC-01. NERC also began work on revising PRC-006-0 at a continent-wide level. The SERC standard has been developed to be consistent with the NERC UFLS standard. PRC-006-SERC-02 was developed per periodic review of the standard.

PRC-006-1 clearly defines the roles and responsibilities of parties to whom the standard applies. The standard identifies the Planning Coordinator ("PC") as the entity responsible for developing UFLS schemes within their PC area. The regional standard adds specificity not contained in the NERC standard for development and implementation of a UFLS scheme in the SERC Region that effectively mitigates the consequences of an underfrequency event.

Requirements and Measures

R2. Each Planning Coordinator shall select or develop an automatic UFLS scheme (percent of load to be shed, frequency set points, and time delays) for implementation by UFLS entities within its area that meets the following minimum requirements: *[Violation Risk Factor: Medium] [Time Horizon: Long-term Planning]*

2.1. Have the capability of shedding at least 30 percent of the Peak Demand (MW) served from the Planning Coordinator's transmission system. The Peak Demand may be either summer or winter as determined by the Planning Coordinator.

2.2. Shed load with a minimum of three frequency set points.

2.3. The highest frequency set point for relays used to arrest frequency decline shall be no lower than 59.3 Hz and not higher than 59.6 Hz.

2.3.1 This does not apply to UFLS relays with time delay of one second or longer and a higher frequency setpoint applied to prevent the frequency from stalling at less than 60 Hz when recovering from an underfrequency event.

2.4. The lowest frequency set point shall be no lower than 58.2 Hz.

2.4.1 At least 30% of peak demand shall be set greater than or equal to 58.4 Hz

2.5. The difference between frequency set points shall be at least 0.2 Hz but no greater than 0.5 Hz.

2.6. Time delay setting shall be at least six cycles (0.1 seconds).

M2. Each Planning Coordinator shall have evidence such as reports or other documentation that the UFLS scheme for its area meets the design requirements specified in Requirement R2.

R3. Each Planning Coordinator, when performing design assessments specified in the NERC PRC standard on UFLS, shall conduct simulations of its UFLS scheme for an imbalance between load and generation of 13%, 22%, and 25% for all identified island(s) where such imbalance equals [(load minus actual generation output) / load]. *[Violation Risk Factor: High] [Time Horizon: Long-term Planning]*

M3. Each Planning Coordinator shall have evidence such as reports or other documentation that it performed the simulations of its UFLS scheme as required in Requirement R3.

R4. Each UFLS entity that has a total load of 100 MW or greater in a Planning Coordinator area in the SERC Region shall implement the UFLS scheme developed by their Planning Coordinator. UFLS entities may implement the UFLS scheme developed by the Planning Coordinator by coordinating with other UFLS entities. The UFLS scheme shall meet the following requirements on May 1 of each calendar year. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]*

4.1. The percent of load shedding to be implemented shall be based on either:

A. The actual or estimated substation or feeder demand (including losses) of the UFLS entities at the time coincident with the previous year's actual Peak Demand in the season specified by the Planning Coordinator in R2.

B. The forecasted substation or feeder demand (including losses) of the UFLS entities at the time coincident with the next year's forecasted Peak Demand in the season specified by the Planning Coordinator in R2.

4. 2. The amount of load in each load shedding step shall be within -1.0 and +3.0 of the percentage specified by the Planning Coordinator (for example, if the specified percentage step load shed is 12%, the allowable range is 11 to 15%).

4. 3. The amount of total UFLS load of all steps combined shall be within -1.0 and +5.0 of the percentage specified by the Planning Coordinator for the total UFLS load in the UFLS scheme.

M4. Each UFLS entity that has a total load of 100 MW or greater in a Planning Coordinator area in the SERC Region shall have evidence such as reports or other documentation demonstrating that its implementation of the UFLS scheme on May 1 of each calendar year meets the requirements of Requirement R4

(including all the data elements in Parts 4.1, 4.2, and 4.3) unless scheme changes per Requirement R6 are in process.

R5. Each UFLS entity that has a total load less than 100 MW in a Planning Coordinator area in the SERC Region shall implement the UFLS scheme developed by their Planning Coordinator, but shall not be required to have more than one UFLS step. UFLS entities may implement the UFLS scheme developed by the Planning Coordinator by coordinating with other UFLS entities. The UFLS scheme shall meet the following requirements on May 1 of each calendar year. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning].*

5.1. The percent of load shedding to be implemented shall be based on either:

A. The actual or estimated substation or feeder demand (including losses) of the UFLS entities at the time coincident with the previous year's actual Peak Demand in the season specified by the Planning Coordinator in R2.

B. The forecasted substation or feeder demand (including losses) of the UFLS entities at the time coincident with the next year's forecasted Peak Demand in the season specified by the Planning Coordinator in R2.

5.2. The amount of total UFLS load shall be within ± 5.0 of the percentage specified by the Planning Coordinator for the total UFLS load in the UFLS scheme.

M5. Each UFLS entity that has a total load less than 100 MW in a Planning Coordinator area in the SERC Region shall have evidence such as reports or other documentation demonstrating that its implementation of the UFLS scheme on May 1 of each calendar year meets the requirements of Requirement R5 (including all the data elements in Parts 5.1and 5.2) unless scheme changes per Requirement R6 are in process.

R6. Each UFLS entity shall implement changes to the UFLS scheme which involve frequency settings, relay time delays, changes to the percentage of load in the scheme, or changes to the peak season selected in R2.1 within 18 months of notification by the Planning Coordinator. *[Violation Risk Factor: High] [Time Horizon: Long-term Planning]*

M6. Each UFLS entity shall have evidence such as reports or other documentation demonstrating that it has made the appropriate scheme changes within 18 months per Requirement R6. Such evidence is only required if the Planning Coordinator makes changes to the UFLS scheme as specified in Requirement R6.

R8. Each Generator Owner shall provide the following information within 30 days of a request by SERC or Planning Coordinator to facilitate post-event analysis of frequency disturbances. *[Violation Risk Factor: Lower] [Time Horizon: Long-term Planning]*

8.1. Generator protection automatic underfrequency and overfrequency trip set points (Hz).

8.2. Total clearing time associated with each set point (sec). This is defined as the time that begins when frequency reaches the set point and ends when the breaker opens. If inverse time underfrequency relays are used, provide the total clearing time at 59.0, 58.5, 58.0, and 57.0 Hz.

8.3. Maximum generator net MW that could be tripped automatically due to an underfrequency or overfrequency condition.

M8. Each Generator Owner shall have evidence such as reports or other documentation that data specified in Requirement R8 was provided to SERC as requested.

Compliance

Compliance enforcement authority

SERC Reliability Corporation

Compliance monitoring and assessment process

- Compliance Audit
- Self-Certification
- Spot Checking
- Compliance Violation Investigation
- Self-Reporting
- Complaint

Evidence retention

Each Planning Coordinator, UFLS Entity and Generator Owner shall keep data or evidence to show compliance as identified below unless directed by SERC to retain specific evidence for a longer period of time as part of an investigation.

Each Planning Coordinator, UFLS Entity and Generator Owner shall retain the current evidence of each Requirement and Measure as well as any evidence necessary to show compliance since the last compliance audit.

If a Planning Coordinator, UFLS Entity or Generator Owner is found non-compliant, it shall keep information related to the non-compliance until found compliant or for the retention period specified above, whichever is longer.

The compliance enforcement authority shall keep the last audit records and all requested and submitted subsequent audit records.

Time Horizons, Violation Risk Factors, and Violation Severity Levels

Table 1						
R#	Time Horizon	VRF	Violation Severity Level			
			Lower	Moderate	High	Severe
R2	Long-term Planning	Medium	The Planning Coordinator's scheme did not meet one of the UFLS system design requirements identified in 2.2 through 2.6	The Planning Coordinator's scheme did not meet two of the UFLS system design requirements identified in 2.2 through 2.6.	The Planning Coordinator's scheme did not meet three of the UFLS system design requirements identified in 2.2 through 2.6.	The Planning Coordinator's scheme did not meet 2.1 **OR** Four or more of the UFLS system design requirements identified in 2.2 through 2.6.
R3	Long-term Planning	High	N/A	The Planning Coordinator failed to conduct one of the required simulations of its UFLS scheme.	N/A	The Planning Coordinator failed to conduct two of the required simulations of its UFLS scheme.

R4	Operations Planning	Medium	The UFLS entity's implemented UFLS scheme had one load shedding step outside the range specified in 4.	The UFLS entity's implemented UFLS scheme had two load shedding steps outside the range specified in 4.	The UFLS entity's implemented UFLS scheme had three or more load shedding steps outside the range	The UFLS entity's implemented UFLS scheme had three or more load shedding steps outside the range

Table 1						
R#	**Time Horizon**	**VRF**	**Violation Severity Level**			
			Lower	**Moderate**	**High**	**Severe**
			2.	2.	specified in 4.2. **OR** The UFLS entity's implemented UFLS scheme had a total load outside the range specified in 4.3.	specified in 4.2. **AND** The UFLS entity's implemented UFLS scheme had a total load outside the range specified in 4.3.
R5	Operations Planning	Medium	N/A	N/A	N/A	The UFLS entity's implemented UFLS scheme had a total load outside the range specified in 5.2.

R6	Long-term Planning	High	The UFLS entity implemented required scheme changes but made them 1 to 30 days after the scheduled date.	The UFLS entity implemented required scheme changes but made them 31 to 40 days after the scheduled date.	The UFLS entity implemented required scheme changes but made them 41 to 50 days after the scheduled date.	The UFLS entity implemented required scheme changes but made them more than 50 days after the scheduled date OR The UFLS entity failed to implement the required scheme changes.

Table 1						
R#	**Time Horizon**	**VRF**	**Violation Severity Level**			
			Lower	**Moderate**	**High**	**Severe**
			after the scheduled submittal date.	after the scheduled submittal date. **OR** The Planning Coordinator did not provide to SERC one piece of information listed in R7.	after the scheduled submittal date. **OR** The Planning Coordinator did not provide to SERC two pieces of information listed in R7.	days after the scheduled submittal date. **OR** The Planning Coordinator did not provide to SERC any of the information listed in R7.

R8	Long-term Planning	Lower	The Generator Owner provided the data required in R8 to SERC or Planning Coordinator 1 to 10 days after the requested submittal date.	The Generator Owner provided the data required in R8 to SERC or Planning Coordinator 11 to 20 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC or Planning Coordinator one piece of information listed in R8.	The Generator Owner provided the data required in R8 to SERC or Planning Coordinator 21 to 30 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC or Planning Coordinator two pieces of information listed in R8.	The Generator Owner provided the data required in R8 to SERC or Planning Coordinator more than 30 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC or Planning Coordinator any of the information listed in R8.

Regional Variances

None

Interpretations

None

Guideline and Technical Basis

1. **Existing UFLS schemes**
   Each Planning Coordinator should consider the existing UFLS programs which are in place and should consider input from the UFLS entities in developing the UFLS scheme.

2. **Basis for SERC standard requirements**
   SERC Standard PRC-006-SERC-02 is not a stand-alone standard, but was written to be followed in conjunction with NERC Standard PRC-006-1. The primary focus of SERC Standard PRC-006-SERC-02 was to provide region-specific requirements for the implementation of the higher tier NERC standard requirements with the goals of a) adding clarity and b) providing for consistency and a coordinated UFLS scheme for the SERC Region as a whole.
   Generally speaking, requirements already in the NERC standard were not repeated in the SERC standard. Therefore, both the NERC and SERC standards must be followed to ensure full compliance.

3. **Basis for applying a percentage load shedding value to Forecast Load versus Actual Load** The Planning Coordinator will develop a UFLS scheme to meet the performance requirements of NERC Standard PRC-006-2 Requirement R3 and SERC Standard PRC-006- SERC-02 Requirement R2. This development will result in certain percentages of load for each UFLS entity in the Planning Coordinator's area for which automatic under frequency load shedding must be implemented. The Planning Coordinator develops these percentages based on forecast peak load demand. However, the UFLS entity implements these percentages based on the previous year's actual peak demand in the season specified by the Planning Coordinator in R2. Applying the same percentage to these different base values was intentional to ensure that both the Planning Coordinator and UFLS entities had a clear, measurable value to use in performing their respective roles in meeting the standard. Planning Coordinators typically use forecast demands in their work. Whereas the previous year's actual (or estimated) demand is typically more available to UFLS entities. Additionally, the use of percentages based on t h e s e different base values tends to minimize the error due to the time lag between design and actual field implementation. Since a percentage is provided by the Planning Coordinator to the UFLS entities, any differences between the design values (i.e., forecast load) and the implemented values (i.e., previous year's actual) would naturally tend to match up reasonably well. For example, if the total planning area load in MW for which UFLS was installed during the time of implementation was slightly higher or lower than the MW value used in the design by the Planning Coordinator, multiplying by the specified percentage

would result in an implemented load shedding scheme that also had a reasonably similar higher or lower MW value.

4. **Basis for May 1 and 18 month time frames**
   Each UFLS entity must annually review that the amount of UFLS load shedding implemented is within a certain tolerance as specified by SERC Standard PRC-006-SERC-02 Requirement R 4 or Requirement R5 by May 1 of the current year. May 1 was chosen to allow sufficient time after the previous year's peak occurred to make adjustments in the field to the implementation if necessary to meet the tolerances specified in Requirement R4 or Requirement R5. Therefore, the May 1 date applies only to implementation of the existing percentages of load shedding specified by the Planning Coordinator. On the other hand, the 18-month time frame specified in PRC-006-SERC-02 Requirement R6 is intended to allow sufficient budgeting, procurement, and installation time for additional equipment, or for significant setting changes to existing equipment necessary to meet a revised load shedding scheme design that has been specified by the Planning Coordinator. During this 18-month transition period, the May 1 measurement of R4 or Requirement R5 would not apply.

5. **Basis for smaller entity threshold of 100 MW**
   Most distribution substations have transformers rated in the range of 10 to 40 MVA. Usually most transformers would serve 1 to 4 feeders and each feeder will normally carry between 8 and 10 MVA. In general, assuming that each feeder would carry 10 MW, an entity with a load slightly greater than 100 MW would have at least 10 feeders available. For a program with three 10 % steps, only 3 feeders would be required to have under frequency load shed capabilities. The 100 MW threshold seems to provide adequate flexibility for implementing load shedding in three steps for entities slightly greater than 100 MW.

Version History

Version	Date	Action	Change Tracking
1	September 19, 2011	SERC Board Approved	
1	November 3, 2011	Adopted by NERC Board of Trustees	

1	December 20, 2012	FERC Order issued approving PRC-006-SERC–01	
1	March 11, 2013	Modified the Rationale and changed the VRF for Requirement R6 from “Medium” to “High” per a compliance filing (Filed on 3/11/13)	
2	June 28, 2017	SERC Board Approved	
2	August 10, 2017	Adopted by NERC Board of Trustees	
2	October 16, 2017	FERC Order issued approving PRC-006-SERC-02	

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Exhibit A-2

Proposed Regional Reliability Standard, PRC-006-SERC-03 – Automatic Underfrequency Load Shedding Requirements and Effective Date
Redline

Effective Date

Effective for SERC Region applicable Registered Entities on the first day of the first calendar quarter after approved by FERC.

Introduction

1. **Title:** Automatic Underfrequency Load Shedding Requirements

2. **Number:** PRC-006-SERC–032

3. **Purpose:** To establish consistent and coordinated requirements for the design, implementation, and analysis of automatic underfrequency load shedding (UFLS) programs among all SERC applicable entities.

4. **Applicability:**

   4.1 Planning Coordinators

   4.2 UFLS entities shall mean all entities that are responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the Planning Coordinators. Such entities may include one or more of the following:

   4.2.1 Transmission Owners

   4.2.2 Distribution Providers

   4.3 Generator Owners

5. **Background**

   The SERC UFLS Standard: PRC-006-SERC-01 ("SERC UFLS Standard") was developed to provide regional UFLS requirements to entities in SERC. UFLS requirements have been in place at a continent-wide level and within SERC for many years prior to implementation of federally mandated reliability compliance standards in 2007.

   When reliability standards were implemented in 2007, the Federal Energy Regulatory Commission ("FERC"), which is the government body with regulatory responsibility for electric reliability, issued FERC Order 693, recognizing 83 NERC Reliability Standards as enforceable by FERC and applicable to users, owners, and operators of the bulk power system (BPS). FERC did not approve the NERC UFLS standard, PRC-006-0 in Order 693. FERC's reason for not approving PRC-006-0 was that it recognized PRC-006-0 as a "fill-in the blank standard," and regional procedures associated with the standard were not submitted along with the standard. FERC's ruling in Order 693 required Regional Entities to provide the regional requirements necessary for completing the UFLS standard.

In 2008, SERC commenced work on PRC-006-SERC-01. NERC also began work on revising PRC-006-0 at a continent-wide level. The SERC standard has been developed to be consistent with the NERC UFLS standard. PRC-006-SERC-02 was developed per periodic review of the standard.

PRC-006-1 clearly defines the roles and responsibilities of parties to whom the standard applies. The standard identifies the Planning Coordinator ("PC") as the entity responsible for developing UFLS schemes within their PC area. The regional standard adds specificity not contained in the NERC standard for development and implementation of a UFLS scheme in the SERC Region that effectively mitigates the consequences of an underfrequency event.

Requirements and Measures

~~**R1.** Each Planning Coordinator shall include its SERC subregion as an identified island in the criteria (required by the NERC PRC standard on UFLS) for selecting portions of the BPS that may form islands. *[Violation Risk Factor: Medium] [Time Horizon: Long-term Planning]*~~

~~**1.1** A Planning Coordinator may adjust island boundaries to differ from subregional boundaries where necessary for the sole purpose of producing a contiguous subregional island more suitable for simulation.~~

~~**M1.** Each Planning Coordinator shall have evidence such as a methodology, procedure, report, or other documentation indicating that its criteria included selection of its SERC subregion(s) as an island per Requirement R1.~~

R2. Each Planning Coordinator shall select or develop an automatic UFLS scheme (percent of load to be shed, frequency set points, and time delays) for implementation by UFLS entities within its area that meets the following minimum requirements: *[Violation Risk Factor: Medium] [Time Horizon: Long-term Planning]*

2.1. Have the capability of shedding at least 30 percent of the Peak Demand (MW) served from the Planning Coordinator's transmission system. The Peak Demand may be either summer or winter as determined by the Planning Coordinator.

2.2. Shed load with a minimum of three frequency set points.

2.3. The highest frequency set point for relays used to arrest frequency decline shall be no lower than 59.3 Hz and not higher than 59.65 Hz.

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2.3.1 This does not apply to UFLS relays with time delay of one second or longer and a higher frequency setpoint applied to prevent the frequency from stalling at less than 60 Hz when recovering from an underfrequency event.

2.4. The lowest frequency set point shall be no lower than 58.24 Hz.

2.4.1 At least 30% of peak demand shall be set greater than or equal to 58.4 Hz

2.5. The difference between frequency set points shall be at least 0.2 Hz but no greater than 0.5 Hz.

2.6. Time delay ~~(from frequency reaching the set point to the trip signal)~~setting shall be at least six cycles (0.1 seconds).

M2. Each Planning Coordinator shall have evidence such as reports or other documentation that the UFLS scheme for its area meets the design requirements specified in Requirement R2.

R3. Each Planning Coordinator, when performing design assessments specified in the NERC PRC standard on UFLS, shall conduct simulations of its UFLS scheme for an imbalance between load and generation of 13%, 22%, and 25% for all identified island(s) where such imbalance equals [(load minus actual generation output) / load]. *[Violation Risk Factor: High] [Time Horizon: Long-term Planning]*

M3. Each Planning Coordinator shall have evidence such as reports or other documentation that it performed the simulations of its UFLS scheme as required in Requirement R3.

R4. Each UFLS entity that has a total load of 100 MW or greater in a Planning Coordinator area in the SERC Region shall implement the UFLS scheme developed by their Planning Coordinator. UFLS entities may implement the UFLS scheme developed by the Planning Coordinator by coordinating with other UFLS entities. The UFLS scheme shall meet the following requirements on May 1 of each calendar year. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]*

4.1. The percent of load shedding to be implemented shall be based on either:

A. T~~t~~he actual or estimated substation or feeder demand (including losses) of the UFLS entities at the time coincident with the previous year's actual Peak Demand in the season specified by the Planning Coordinator in R2.

B. The forecasted substation or feeder demand (including losses) of the UFLS entities at the time coincident with the next year's forecasted Peak Demand in the season specified by the Planning Coordinator in R2.

4. 2. The amount of load in each load shedding step shall be within -1.0 and +3.0 of the percentage specified by the Planning Coordinator (for example, if the specified percentage step load shed is 12%, the allowable range is 11 to 15%).

4. 3. The amount of total UFLS load of all steps combined shall be within -1.0 and +5.0 of the percentage specified by the Planning Coordinator for the total UFLS load in the UFLS scheme.

M4. Each UFLS entity that has a total load of 100 MW or greater in a Planning Coordinator area in the SERC Region shall have evidence such as reports or other documentation demonstrating that its implementation of the UFLS scheme on May 1 of each calendar year meets the requirements of Requirement R4 (including all the data elements in Parts 4.1, 4.2, and 4.3) unless scheme changes per Requirement R6 are in process.

R5. Each UFLS entity that has a total load less than 100 MW in a Planning Coordinator area in the SERC Region shall implement the UFLS scheme developed by their Planning Coordinator, but shall not be required to have more than one UFLS step. UFLS entities may implement the UFLS scheme developed by the Planning Coordinator by coordinating with other UFLS entities. The UFLS scheme shall meet the following requirements on May 1 of each calendar year. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning].*

5.1. The percent of load shedding to be implemented shall be based on ~~the actual or estimated substation or feeder demand (including losses) of the UFLS entities at the time coincident with the previous year actual Peak Demand in the season specified by the Planning Coordinator in R2..~~ either:

A. The actual or estimated substation or feeder demand (including losses) of the UFLS entities at the time coincident with the previous year's actual Peak Demand in the season specified by the Planning Coordinator in R2.

B. The forecasted substation or feeder demand (including losses) of the UFLS entities at the time coincident with the next year's forecasted Peak Demand in the season specified by the Planning Coordinator in R2.

5.2. The amount of total UFLS load shall be within ± 5.0 of the percentage specified by the Planning Coordinator for the total UFLS load in the UFLS scheme.

M5. Each UFLS entity that has a total load less than 100 MW in a Planning Coordinator area in the SERC Region shall have evidence such as reports or other documentation demonstrating that its implementation of the UFLS scheme on May 1 of each calendar year meets the requirements of Requirement R5 (including all the data elements in Parts 5.1and 5.2) unless scheme changes per Requirement R6 are in process.

R6. Each UFLS entity shall implement changes to the UFLS scheme which involve frequency settings, relay time delays, changes to the percentage of load in the scheme, or changes to the peak season selected in R2.1 within 18 months of notification by the Planning Coordinator. *[Violation Risk Factor: High] [Time Horizon: Long-term Planning]*

M6. Each UFLS entity shall have evidence such as reports or other documentation demonstrating that it has made the appropriate scheme changes within 18 months per Requirement R6. Such evidence is only required if the Planning Coordinator makes changes to the UFLS scheme as specified in Requirement R6.

~~**R7.** Each Planning Coordinator shall provide the following information to SERC according to the schedule specified by SERC. *[Violation Risk Factor: Lower] [Time Horizon: Long- term Planning]*~~

~~**7.1.** Underfrequency trip set points (Hz)~~

~~**7.2.** Total clearing time associated with each set point (sec). This includes the time from when frequency reaches the set point and ends when the breaker opens.~~

~~**7.3.** Amount of previous year actual or estimated load associated with each set point, both in percent and in MW. The percentage and the Load demand (MW) shall be based on the time coincident with the previous year actual Peak Demand.~~

~~**M7.** Each Planning Coordinator shall have evidence such as reports or other documentation that data specified in Requirement R7 was provided to SERC in accordance with the schedule.~~

R8. Each Generator Owner shall provide the following information within 30 days of a request by SERC or Planning Coordinator to facilitate post-event analysis of frequency disturbances. *[Violation Risk Factor: Lower] [Time Horizon: Long-term Planning]*

8.1. Generator protection automatic underfrequency and overfrequency trip set points (Hz).

8.2. Total clearing time associated with each set point (sec). This is defined as the time that begins when frequency reaches the set point and ends when the breaker opens. If inverse time underfrequency relays are used, provide the total clearing time at 59.0, 58.5, 58.0, and 57.0 Hz.

8.3. Maximum generator net MW that could be tripped automatically due to an underfrequency or overfrequency condition.

M8. Each Generator Owner shall have evidence such as reports or other documentation that data specified in Requirement R8 was provided to SERC as requested.

Compliance

Compliance enforcement authority

SERC Reliability Corporation

Compliance monitoring and assessment process

- Compliance Audit
- Self-Certification
- Spot Checking
- Compliance Violation Investigation
- Self-Reporting
- Complaint

Evidence retention

Each Planning Coordinator, UFLS Entity and Generator Owner shall keep data or evidence to show compliance as identified below unless directed by SERC to retain specific evidence for a longer period of time as part of an investigation.

Each Planning Coordinator, UFLS Entity and Generator Owner shall retain the current evidence of each Requirement and Measure as well as any evidence necessary to show compliance since the last compliance audit.

If a Planning Coordinator, UFLS Entity or Generator Owner is found non-compliant, it shall keep information related to the non-compliance until found compliant or for the retention period specified above, whichever is longer.

The compliance enforcement authority shall keep the last audit records and all requested and submitted subsequent audit records.

Time Horizons, Violation Risk Factors, and Violation Severity Levels

Table 1						
R#	Time Horizon	VRF	Violation Severity Level			
			Lower	Moderate	High	Severe
~~R1~~	~~Long-term Planning~~	~~Medium~~	~~N/A~~	~~N/A~~	~~N/A~~	~~The Planning Coordinator did not have evidence that its criteria included selection of its SERC subregion(s) as an island, with or without adjusted boundaries.~~
R2	Long-term Planning	Medium	The Planning ~~C~~Coordinator's scheme did not meet one of the UFLS system design requirements identified in 2.2 through 2.6	The Planning Coordinator's scheme did not meet two of the UFLS system design requirements identified in 2.2 through 2.6.	The Planning Coordinator's scheme did not meet three of the UFLS system design requirements identified in 2.2 through 2.6.	The Planning Coordinator's scheme did not meet 2.1 **OR** Four or more of the UFLS system design requirements identified in 2.2 through 2.6.
R3	Long-term Planning	High	N/A	The Planning Coordinator failed to conduct one of the required simulations of its UFLS scheme.	N/A	The Planning Coordinator failed to conduct two of the required simulations of its UFLS scheme.

Table 1						
R#	Time Horizon	VRF	Violation Severity Level			
			Lower	Moderate	High	Severe
R4	Operations Planning	Medium	The UFLS entity's implemented UFLS scheme had one load shedding step outside the range specified in 4.2.	The UFLS entity's implemented UFLS scheme had two load shedding steps outside the range specified in 4.2.	The UFLS entity's implemented UFLS scheme had three or more load shedding steps outside the range specified in 4.2. **OR** The UFLS entity's implemented UFLS scheme had a total load outside the range specified in 4.3.	The UFLS entity's implemented UFLS scheme had three or more load shedding steps outside the range specified in 4.2. **AND** The UFLS entity's implemented UFLS scheme had a total load outside the range specified in 4.3.
R5	Operations Planning	Medium	N/A	N/A	N/A	The UFLS entity's implemented UFLS scheme had a total load outside the range specified in 5.2.
R6	Long-term Planning	High	The UFLS entity implemented required scheme changes but made them 1 to 30 days after the scheduled date.	The UFLS entity implemented required scheme changes but made them 31 to 40 days after the scheduled date.	The UFLS entity implemented required scheme changes but made them 41 to 50 days after the scheduled date.	The UFLS entity implemented required scheme changes but made them more than 50 days after the scheduled date. **OR** The UFLS entity failed to implement the required scheme changes.

Table 1						
R#	Time Horizon	VRF	Violation Severity Level			
			Lower	Moderate	High	Severe
~~R7~~	~~Long-term Planning~~	~~Lower~~	~~The Planning Coordinator provided data required in R7 to SERC 1-10 days after scheduled submittal date~~	~~The Planning Coordinator provided data required in R7 to SERC 11-20 days after scheduled submittal date~~ ~~OR~~ ~~The Planning Coordinator did not provide to SERC one piece of information listed in R7.~~	~~The Planning Coordinator provided data required in R7 to SERC 21-30 days after scheduled submittal date~~ ~~OR~~ ~~The Planning Coordinator did not provide to SERC two pieces of information listed in R7.~~	~~The Planning Coordinator provided data required in R7 to SERC more than 30 days after scheduled submittal date~~ ~~OR~~ ~~The Planning Coordinator did not provide to SERC any of the information listed in R7.~~
R8	Long-term Planning	Lower	The Generator Owner provided the data required in R8 to SERC or Planning Coordinator 1 to 10 days after the requested submittal date.	The Generator Owner provided the data required in R8 to SERC or Planning Coordinator 11 to 20 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC or Planning Coordinator one piece of information listed in R8.	The Generator Owner provided the data required in R8 to SERC or Planning Coordinator 21 to 30 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC or Planning Coordinator two pieces of information listed in R8.	The Generator Owner provided the data required in R8 to SERC or Planning Coordinator more than 30 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC or Planning Coordinator any of the information listed in R8.

Regional Variances

None

Interpretations

None

Guideline and Technical Basis

1. **Existing UFLS schemes**
   Each Planning Coordinator should consider the existing UFLS programs which are in place and should consider input from the UFLS entities in developing the UFLS scheme.

2. **Basis for SERC standard requirements**
   SERC Standard PRC-006-SERC-02 is not a stand-alone standard, but was written to be followed in conjunction with NERC Standard PRC-006-1. The primary focus of SERC Standard PRC-006-SERC-02 was to provide region-specific requirements for the implementation of the higher tier NERC standard requirements with the goals of a) adding clarity and b) providing for consistency and a coordinated UFLS scheme for the SERC Region as a whole.
   Generally speaking, requirements already in the NERC standard were not repeated in the SERC standard. Therefore, both the NERC and SERC standards must be followed to ensure full compliance.

3. **Basis for applying a percentage load shedding value to Forecast Load versus Actual Load**
   The Planning Coordinator will develop a UFLS scheme to meet the performance requirements of NERC Standard PRC-006-2 Requirement R3 and SERC Standard PRC-006-SERC-02 Requirement R2. This development will result in certain percentages of load for each UFLS entity in the Planning Coordinator's area for which automatic under frequency load shedding must be implemented. The Planning Coordinator develops these percentages based on forecast peak load demand. However, the UFLS entity implements these percentages based on the previous year's actual peak demand in the season specified by the Planning Coordinator in R2. Applying the same percentage to these different base values was intentional to ensure that both the Planning Coordinator and UFLS entities had a clear, measurable value to use in performing their respective roles in meeting the standard. Planning Coordinators typically use forecast demands in their work. Whereas the previous year's actual (or estimated) demand is typically more available to UFLS entities. Additionally, the use of percentages based on t h e s e different base values tends to minimize the error due to the time lag between design and actual field implementation. Since a percentage is provided by the Planning Coordinator to the UFLS entities, any differences between the design values (i.e., forecast load) and the implemented values (i.e., previous year's actual) would naturally tend to match up

reasonably well. For example, if the total planning area load in MW for which UFLS was installed during the time of implementation was slightly higher or lower than the MW value used in the design by the Planning Coordinator, multiplying by the specified percentage would result in an implemented load shedding scheme that also had a reasonably similar higher or lower MW value.

4. **Basis for May 1 and 18 month time frames**

   Each UFLS entity must annually review that the amount of UFLS load shedding implemented is within a certain tolerance as specified by SERC Standard PRC-006-SERC-02 Requirement R 4 or Requirement R5 by May 1 of the current year. May 1 was chosen to allow sufficient time after the previous year's peak occurred to make adjustments in the field to the implementation if necessary to meet the tolerances specified in Requirement R4 or Requirement R5. Therefore, the May 1 date applies only to implementation of the existing percentages of load shedding specified by the Planning Coordinator. On the other hand, the 18-month time frame specified in PRC-006-SERC-02 Requirement R6 is intended to allow sufficient budgeting, procurement, and installation time for additional equipment, or for significant setting changes to existing equipment necessary to meet a revised load shedding scheme design that has been specified by the Planning Coordinator. During this 18-month transition period, the May 1 measurement of R4 or Requirement R5 would not apply.

5. **Basis for smaller entity threshold of 100 MW**

   Most distribution substations have transformers rated in the range of 10 to 40 MVA. Usually most transformers would serve 1 to 4 feeders and each feeder will normally carry between 8 and 10 MVA. In general, assuming that each feeder would carry 10 MW, an entity with a load slightly greater than 100 MW would have at least 10 feeders available. For a program with three 10 % steps, only 3 feeders would be required to have under frequency load shed capabilities. The 100 MW threshold seems to provide adequate flexibility for implementing load shedding in three steps for entities slightly greater than 100 MW.

~~**Rationale:**~~

~~During development of this standard, text boxes were embedded within the standard to explain the rationale for various parts of the standard. Upon BOT approval, the text from each of the rationale text boxes was moved to this section.~~

~~**Rationale for R1:**~~

~~Studying the Region as an island is required by the NERC standard. Most regions have only one or a few different UFLS schemes. Where there is more than one scheme, studying this island demonstrates that the schemes are coordinated and performing adequately. Because there are so many different UFLS schemes in SERC (18 different schemes were represented in the~~

2007 SERC UFLS study), the SDT believes that applying the schemes to each subregion as an island is a necessary additional test of the coordination of the various UFLS schemes. Without this additional test, a poorly performing scheme may be masked by the large number of good performing schemes in the Region. A subregion island study, which would have a smaller number of schemes, would be more likely to uncover the poorly performing scheme and therefore get it fixed. This approach will result in a much better overall performance of the UFLS programs in SERC. The SDT recognized that there may be simulation problems due to opening the ties to utilities outside the subregion. Therefore, the subregion island boundaries are allowed to be adjusted to produce an island more suitable for simulation.

(Note: The SERC Subregions are identified in paragraph 4.2 of the SERC Reliability Corporation Bylaws: "The Region is currently geographically divided into five subregions that are identified as Southeastern, Central, VACAR, Delta, and Gateway.")

Rationale for R2:

These requirements for the UFLS schemes in SERC have been in place for many years (except 2.6). The SDT believes that these requirements are still needed to ensure consistency for the various schemes which are used in SERC. Part 2.6 is designed to prevent spurious operations due to transient frequency swings.

Rationale for R3:

R4 of the NERC standard PRC-006-1 requires the PC to conduct assessments of UFLS schemes through dynamic simulations to verify that they meet performance requirements for generation/load imbalances of up to 25%. This requirement defines specific imbalances that are to be studied within SERC. The 13% and 22% levels were determined from simulations of the worst case frequency overshoot for the UFLS schemes in SERC.

Rationale for R4:

The SDT believes it is necessary to put a requirement on how well the UFLS scheme is implemented. This requirement specifies how close the actual load shedding amounts must be to the percentage of load called for in the scheme. A 4 percentage point range is allowed for each individual step, but the allowed range for all steps combined is 6 percentage points.

Rationale for R5:

The SDT believes it is necessary to put a requirement on how well the UFLS scheme is implemented. This requirement specifies how close the actual load shedding amounts must be to the percentage of load called for in the scheme. The SDT recognizes that UFLS entities with a load of less than 100 MW may have difficulty in implementing more than one UFLS step and in meeting a tight tolerance. The basis of the 100 MW comes from typical feeder load dropped by UFLS relays, and the use of a 100 MW threshold in other regional UFLS standards.

Rationale for R6:

~~The SDT believes it is necessary to put a requirement on how quickly changes to the scheme should be implemented. This requirement specifies that changes must be implemented within 18 months of notification by the PC. The 18 month interval was chosen to give a reasonable amount of time for making changes in the field. All of the SERC Region has existing UFLS schemes which, based on periodic simulations, have provided reliable protection for years. Events which result in islanding and an activation of the UFLS schemes are extremely rare in SERC. Therefore, the SDT does not believe that changes to an existing UFLS scheme will be needed in less than 18 months. However, if a PC determines there is a need for changing the UFLS scheme faster than 18 months, then the PC may require the implementation to be done sooner as allowed by NERC Reliability Standard PRC-006-1.~~

~~**Rationale for R7:**~~

~~The NERC standard requires that a UFLS database be maintained by the Planning Coordinator. This requirement specifies what data must be reported to SERC. A SERC UFLS database is needed to facilitate data sharing across the SERC Region, with other regions, and with NERC.~~

~~**Rationale for R8:**~~

~~The SDT believes that generator over and under frequency tripping data is needed to supplement the UFLS data provided by the Planning Coordinator for post-event analysis of frequency disturbances. This requirement states what data must be reported to SERC by the Generator Owners.~~

~~Since the inverse time curve cannot easily be placed into the SERC database, four clearing times based on data from the curve are requested. These clearing times are intended to cover a range of frequencies needed for event replication as well as provide information about generators that trip at a higher frequency than is allowed by the NERC standard.~~

Version History

Version	Date	Action	Change Tracking
1	September 19, 2011	SERC Board Approved	
1	November 3, 2011	Adopted by NERC Board of Trustees	
1	December 20, 2012	FERC Order issued approving PRC-006-SERC–01	
1	March 11, 2013	Modified the Rationale and changed the VRF for Requirement R6 from “Medium” to “High” per a compliance filing (Filed on 3/11/13)	
2	June 28, 2017	SERC Board Approved	
2	August 10, 2017	Adopted by NERC Board of Trustees	

Version	Date	Action	Change Tracking
2	October 16, 2017	FERC Order issued approving PRC-006-SERC-02	

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Exhibit B

Implementation Plan

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Charlotte, NC 28273
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www.serc1.org

Implementation Plan

Regional Reliability Standard PRC-006-SERC-3 – Automatic Underfrequency Load Shedding

Applicable Standard(s)

- PRC-006-SERC-3 – Automatic Underfrequency Load Shedding Requirements

Requested Retirement(s)

- PRC-006-SERC-2 – Automatic Underfrequency Load Shedding Requirements

Applicable Entities

- Generator Owners
- Planning Coordinators
- UFLS entities shall mean all entities that are responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the Planning Coordinators. Such entities may include one or more of the following:
    - Transmission Owners
    - Distribution Providers

Background

The revisions to the PRC-006-SERC-2 Automatic Underfrequency Load Shedding have been developed to address the following concerns.

1. Elimination of the SERC UFLS Database to remove an unnecessary burden on the entities
2. Due to entities moving from one Planning Coordinator to another and no longer being contiguous with the existing island, need to remove the requirement to allow PC's to build a contiguous island
3. Due to the geography of the Florida peninsula, UFLS settings are set differently than the rest of the SERC entities. These settings are in violation of the SERC UFLS standard and thus the standard needed to be modified to ensure the reliable settings of Florida peninsula entities do not violate the standard.

Effective Date

All requirements will be enforceable on the first day of the first calendar quarter following the applicable governmental and regulatory approvals. Former FRCC RE registered entities will have an

additional three (3) years after this date to implement any changes to their obligations under the Reliability Standard.

Retirement Date

The SERC Regional Reliability Standard PRC-006-SERC-2 shall be retired immediately prior to the Effective Date of PRC-006-SERC-3.

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Exhibit C

Order No. 672 Criteria for Proposed Regional Reliability Standard PRC-006-SERC-03

Exhibit C

Order No. 672 Criteria for Proposed PRC-006-SERC-03

In Order No. 672,[1] the Commission identified a number of criteria it will use to analyze Reliability Standards proposed for approval to ensure they are just, reasonable, not unduly discriminatory or preferential, and in the public interest. The discussion below identifies these factors and explains how the proposed regional Reliability Standard has met or exceeded the criteria:

1. **Proposed Reliability Standards must be designed to achieve a specified reliability goal and must contain a technically sound means to achieve that goal.[2]**

The purpose of proposed regional Reliability Standard PRC-006-SERC-03 is to establish consistent and coordinated requirements for the design, implementation, and analysis of automatic UFLS programs among all SERC applicable entities. The proposed PRC-006-SERC-03 regional Reliability Standard is technically sound and improves upon the currently effective regional standard by: i) providing more flexibility for Planning Coordinators to adjust island boundaries in order to perform more accurate and complete studies; (ii) addressing the transition of Florida Reliability Coordinating Council's ("FRCC") registered entities to SERC following FRCC's July 1, 2019, dissolution as a regional entity; (iii) clarifying a technical term used in the regional Reliability Standard; and (iv) aligning requirement language with the current continent-wide NERC Reliability Standard, PRC-006-5.[3] Proposed PRC-006-SERC-03 is more stringent than the related continent-wide NERC Reliability Standard PRC-006-5, which does not include detailed plan criteria or a maximum timeframe to implement changes to a UFLS scheme.

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[1] *Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards*, Order No. 672, 114 FERC 61,104, *order on reh'g*, Order No. 672-A, 114 FERC 61,328 (2006) ("Order No. 672").

[2] Order No. 672 at P 321. See also, *Id*. at P 324.

[3] PRC-006-SERC-02 was approved by the Commission on October 16, 2017. *See N. Am. Elec. Reliability Corp.*, Docket No. RD17-9-000 (October 16, 2017) (delegated letter order)

2. **Proposed Reliability Standards must be applicable only to users, owners and operators of the Bulk-Power System, and must be clear and unambiguous as to what is required to comply.[4]**

Proposed PRC-006-SERC-03 does not change the existing Applicability section of PRC-006-SERC-02, which states that the Reliability Standard is only applicable to Planning Coordinators, UFLS entities, and Generator Owners within the SERC region. It is clear and unambiguous as to what is required to comply.

3. **Proposed Reliability Standards must include clear and understandable consequences and a range of penalties (monetary and/or non-monetary) for a violation.[5]**

Proposed PRC-006-SERC-03 does not have any material changes to the VRFs and VSLs approved for PRC-006-SERC-02. The only proposed change to the VSLs is a conforming change (changing "to SERC" to "to SERC or Planning Coordinator" to match the proposed language in Requirement 8) that does not alter the substance of the VSLs. The VSLs assigned for each Requirement ensure uniformity and consistency in the determination of penalties. The VSLs do not use any ambiguous terminology. For these reasons, the proposed regional Reliability Standard includes clear and understandable consequences in accordance with Order No. 672. Upon approval by the Commission, the ranges of penalties for violations will continue to be based on the applicable VRF and VSL in accordance with the sanctions table and the supporting penalty determination process described in the Commission-approved NERC Sanction Guidelines, Appendix 4B to the NERC Rules of Procedure.

[4] Order No. 672 at P 322. See also, *Id.* at P 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] *Id*. at P 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.

4. **Proposed Reliability Standards must identify clear and objective criterion or measure to compliance, so that it can be enforced in a consistent and non-preferential manner.[6]**

Proposed PRC-006-SERC-03 identifies clear and objective criterion or measure for compliance so that it can be enforced in a consistent and non-preferential manner. The regional Reliability Standard contains individual measures that support the Requirements by plainly identifying how the Requirements will be assessed and enforced. These measures continue to ensure that the Requirements will be assessed and enforced in a clear, consistent, and non-preferential manner, without prejudice to any party.

5. **Proposed Reliability Standards should achieve a reliability goal effectively and efficiently- but do not necessarily have to reflect "best practices" without regard to implementation cost or historical regional infrastructure design.[7]**

Proposed PRC-006-SERC-03 achieves its reliability goals effectively and efficiently. The proposed revisions provide greater flexibility and clarity to registered entities responsible for compliance. The proposed regional Reliability Standard builds on the Bulk-Power System reliability protections provided by the NERC automatic UFLS standard by adding specificity for the SERC region.

6. **Proposed Reliability Standards cannot be "lowest common denominator," i.e., cannot reflect a compromise that does not adequately protect Bulk-Power System reliability. Proposed Reliability Standards can consider costs to implement for smaller entities, but not at consequence of less than excellence in operating system reliability.[8]**

Proposed PRC-006-SERC-03 does not reflect a compromise that does not adequately protect Bulk-Power System reliability.

7. **Proposed Reliability Standards must be designed to apply throughout North America to the maximum extent achievable with a single Reliability Standard while not favoring one geographic area or regional model. It should take into account regional variations in the organization and corporate structures of transmission owners and**

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[6] *Id*. at P 327.
[7] *Id*. at P 328.
[8] *Id*. at P 329-30.

operators, variations in generation fuel type and ownership patterns, and regional variations in market design if these affect the proposed Reliability Standard.[9]

As a regional Reliability Standard, proposed PRC-006-SERC-03 is designed to work in conjunction with NERC Reliability Standard PRC-006-5 while accommodating differences in system transmission and distribution topology among SERC Planning Coordinators and will be enforceable for registered entities within the SERC region.

8. **Proposed Reliability Standards should cause no undue negative effect on competition or restriction of the grid beyond any restriction necessary for reliability.**[10]

The proposed regional Reliability Standard would not restrict competition or available transmission capability beyond what is necessary for reliability.

9. **The implementation time for the proposed Reliability Standard is reasonable.**[11]

The implementation time for the proposed regional Reliability Standard is reasonable. Because proposed PRC-006-SERC-03 provides additional flexibility and clarity rather than imposing any new obligations on registered entities, an effective date of the first day of the first calendar quarter after FERC approval is reasonable.

10. **The Reliability Standard was developed in an open and fair manner and in accordance with the Commission-approved Reliability Standard development process.**[12]

The proposed regional Reliability Standard was developed in accordance with NERC's and SERC's Commission-approved processes for developing and approving Reliability Standards. SERC develops regional Reliability Standards in accordance with the SERC regional Reliability Standards Development Procedure. The development process is open to any person who is an

[9] *Id*. at P 331.
[10] *Id*. at P 332.
[11] *Id*. at P 333.
[12] *Id*. at P 334.

interested stakeholder. For more detail, please see the complete development history included as **Exhibit D**.

11. NERC must explain any balancing of vital public interests in the development of proposed Reliability Standards.[13]

NERC and SERC have not identified competing vital public interests with respect to the request for approval of the proposed regional Reliability Standard, and no comments were received during the development of the proposed regional Reliability Standard indicating conflicts with other vital public interests.

12. Proposed Reliability Standards must consider any other appropriate factors.[14]

No other factor relevant to whether the proposed regional Reliability Standard is just and reasonable was identified.

[13] *Id*. at P 335.
[14] *Id*. at P 323.

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Exhibit D

Summary of Development History and Complete Record of Development

Exhibit D

Summary of Development History

The development record for proposed regional Reliability Standard PRC-006-SERC-03 is summarized below.

I. Overview of the SERC Standards Drafting Team Review

When evaluating a proposed Reliability Standard, the Commission is expected to give "due weight" to the technical expertise of the ERO.[1] For proposed regional Reliability Standard PRC-006-SERC-03, the technical expertise of the ERO is derived from the SERC Standards Drafting Team ("SDT") that reviewed the submitted Standard Authorization Request ("SAR"). A roster of the SERC SDT is included in Exhibit E.

II. Standard Development History

A. Standard Authorization Request Development

The submission of the SAR by SERC's Dynamics Working Group resulted from a review of PRC-006-SERC-02 after the addition of FRCC's registered entities to SERC and prior to the regional Reliability Standard's periodic five year review. On February 27, 2020, SERC's Dynamics Working Group submitted the SAR for modification to PRC-006-SERC-02. The SERC SDT then reviewed the SAR and recommended the proposed revisions in PRC-006-SERC-03 as a result.

B. Initial Comment Period and Ballot

SERC posted proposed regional Reliability Standard PRC-006-SERC-03, a draft implementation plan, and supporting documents for comment from February 19, 2021 through March 22, 2021. SERC received one set of favorable comments that supported the revisions to the

[1] Section 215(d)(2) of the Federal Power Act; 16 U.S.C. §824o(d)(2) (2018).

proposed regional Reliability Standard. The submission also included a minor, non-substantive comment regarding a typographical error in a headings version numbering and update to Table 1. The SDT considered and adopted these changes to proposed regional Reliability Standard PRC-006-SERC-03.

C. Final Ballot and SERC Board of Directors Approval

On April 21, 2021, notice was provided to SERC's Registered Ballot Body that voting would occur electronically from May 6, 2021, through May 17, 2021. On May 17, 2021, proposed regional Reliability Standard PRC-006-SERC-03 received 100 percent affirmative votes from SERC stakeholders participating in the final balloting. During the final ballot SERC received three sets of non-substantive comments. One of the comments was identical to the comment received during the initial commenting period, in which the SDT considered and adopted. Additionally, one of the remaining comments was in support of the proposed revisions, and the other was a non-material suggestion regarding the numbering of the Requirements after the retirement of Requirement R1 and R7. The SDT determined that no further changes were needed in consideration of the non-substantive comments as they had either previously been incorporated or the revision would lead to inconsistent NERC Standard drafting practices when Requirements are removed. The SERC Board of Directors approved the standard on June 24, 2021.

D. NERC Comment Period and Board of Trustees Approval

NERC posted proposed regional Reliability Standard PRC-006-SERC-03 for a 45-day public comment period from August 25, 2021 to October 8, 2021. Six sets of comments supporting the proposed regional Reliability Standard were received. The NERC Board of Trustees adopted proposed regional Reliability Standard PRC-006-SERC-03 on November 4, 2021.

Complete Record of Development

SERC Reliability Corporation (SERC)				
PRC-006-SERC-03	Automatic Underfrequency Load Shedding	SERC Regional Reliability Standards	08/25/21 - 10/08/21	Info [1] PRC-006-SERC-03 Clean[2] | Redline[3] Summary of Changes [4] Implementation Plan [5] Unofficial Comment Form (Word) [6] Submit Comments Comments Received [7]

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Regional Reliability Standards Announcement

SERC Reliability Corporation | PRC-006-SERC-03

Comment Period Open through October 8, 2021

Now Available

The SERC Reliability Corporation requested that NERC post **Regional Reliability Standard, PRC-006-SERC-03** – **Automatic Underfrequency Load Shedding** for industry review and comment in accordance with the NERC Rules of Procedure.

Background

The revisions to the PRC-006-SERC-02 Automatic Underfrequency Load Shedding (UFLS) include:

1. Removal of the requirement to allow Planning Coordinators to build a contiguous island;
2. Changes to account for the Florida peninsula, including: (i)modification of UFLS settings; and Addition of a second method to calculate the percent of load shed;
3. Elimination of the SERC UFLS Database; and
4. Addition of Planning Coordinator as a requestor in Requirement R8 to facilitate post-event analysis of frequency disturbances.

Commenting

Use the Standards Balloting and Commenting System (SBS) to submit comments by **8 p.m. Eastern, Friday, October 8, 2021.** An unofficial Word version of the comment form is posted on the Regional Reliability Standards Under Development page.

- *Contact NERC IT support directly at https://support.nerc.net/ (Monday – Friday, 8 a.m. - 5 p.m. Eastern) for problems regarding accessing the SBS due to a forgotten password, incorrect credential error messages, or system lock-out.*
- *Passwords expire every **6 months** and must be reset.*
- *The SBS **is not** supported for use on mobile devices.*
- *Please be mindful of ballot and comment period closing dates. We ask to **allow at least 48 hours** for NERC support staff to assist with inquiries. Therefore, it is recommended that users try logging into their SBS accounts **prior to the last day** of a comment/ballot period.*

Regional Reliability Standards Development Process

Section 300 of NERC's Rules of Procedures of the Electric Reliability Organization governs the regional reliability standards development process. Although the technical aspects of this Regional Reliability Standard have been vetted through SERC Regional Standards development process, the final approval

process for a Regional Reliability Standard requires NERC publicly to notice and request comment on the criteria outlined in the unofficial comment form.

Documents and information about this project are available on the SERC Reliability Corporation (SERC) Standards page.

For more information or assistance, contact Reliability Standards Analyst, Kimberlin Harris (via email) or at (404) 446-9794.

North American Electric Reliability Corporation
3353 Peachtree Rd, NE
Suite 600, North Tower
Atlanta, GA 30326
404-446-2560 | www.nerc.com

Effective Date

Effective for SERC Region applicable Registered Entities on the first day of the first calendar quarter after approved by FERC.

Introduction

1. **Title:** Automatic Underfrequency Load Shedding Requirements

2. **Number:** PRC-006-SERC–3

3. **Purpose:** To establish consistent and coordinated requirements for the design, implementation, and analysis of automatic underfrequency load shedding (UFLS) programs among all SERC applicable entities.

4. **Applicability:**

   4.1 Planning Coordinators

   4.2 UFLS entities shall mean all entities that are responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the Planning Coordinators. Such entities may include one or more of the following:

   4.2.1 Transmission Owners

   4.2.2 Distribution Providers

   4.3 Generator Owners

5. **Background**

   The SERC UFLS Standard: PRC-006-SERC-01 ("SERC UFLS Standard") was developed to provide regional UFLS requirements to entities in SERC. UFLS requirements have been in place at a continent-wide level and within SERC for many years prior to implementation of federally mandated reliability compliance standards in 2007.

   When reliability standards were implemented in 2007, the Federal Energy Regulatory Commission ("FERC"), which is the government body with regulatory responsibility for electric reliability, issued FERC Order 693, recognizing 83 NERC Reliability Standards as enforceable by FERC and applicable to users, owners, and operators of the bulk power system (BPS). FERC did not approve the NERC UFLS standard, PRC-006-0 in Order 693. FERC's reason for not approving PRC-006-0 was that it recognized PRC-006-0 as a "fillin the blank standard," and regional procedures associated with the standard were not submitted along with the standard. FERC's ruling in Order 693 required Regional Entities to provide the regional requirements necessary for completing the UFLS standard.

In 2008, SERC commenced work on PRC-006-SERC-01. NERC also began work on revising PRC-006-0 at a continent-wide level. The SERC standard has been developed to be consistent with the NERC UFLS standard. PRC-006-SERC-02 was developed per periodic review of the standard.

PRC-006-1 clearly defines the roles and responsibilities of parties to whom the standard applies. The standard identifies the Planning Coordinator ("PC") as the entity responsible for developing UFLS schemes within their PC area. The regional standard adds specificity not contained in the NERC standard for development and implementation of a UFLS scheme in the SERC Region that effectively mitigates the consequences of an underfrequency event.

Requirements and Measures

R2. Each Planning Coordinator shall select or develop an automatic UFLS scheme (percent of load to be shed, frequency set points, and time delays) for implementation by UFLS entities within its area that meets the following minimum requirements: *[Violation Risk Factor: Medium] [Time Horizon: Long-term Planning]*

2.1. Have the capability of shedding at least 30 percent of the Peak Demand (MW) served from the Planning Coordinator's transmission system. The Peak Demand may be either summer or winter as determined by the Planning Coordinator.

2.2. Shed load with a minimum of three frequency set points.

2.3. The highest frequency set point for relays used to arrest frequency decline shall be no lower than 59.3 Hz and not higher than 59.6 Hz.

2.3.1 This does not apply to UFLS relays with time delay of one second or longer and a higher frequency setpoint applied to prevent the frequency from stalling at less than 60 Hz when recovering from an underfrequency event.

2.4. The lowest frequency set point shall be no lower than 58.2 Hz.

2.4.1 At least 30% of peak demand shall be set greater than or equal to 58.4 Hz

2.5. The difference between frequency set points shall be at least 0.2 Hz but no greater than 0.5 Hz.

2.6. Time delay setting shall be at least six cycles (0.1 seconds).

M2. Each Planning Coordinator shall have evidence such as reports or other documentation that the UFLS scheme for its area meets the design requirements specified in Requirement R2.

R3. Each Planning Coordinator, when performing design assessments specified in the NERC PRC standard on UFLS, shall conduct simulations of its UFLS scheme for an imbalance between load and generation of 13%, 22%, and 25% for all identified island(s) where such imbalance equals [(load minus actual generation output) / load]. *[Violation Risk Factor: High] [Time Horizon: Long-term Planning]*

M3. Each Planning Coordinator shall have evidence such as reports or other documentation that it performed the simulations of its UFLS scheme as required in Requirement R3.

R4. Each UFLS entity that has a total load of 100 MW or greater in a Planning Coordinator area in the SERC Region shall implement the UFLS scheme developed by their Planning Coordinator. UFLS entities may implement the UFLS scheme developed by the Planning Coordinator by coordinating with other UFLS entities. The UFLS scheme shall meet the following requirements on May 1 of each calendar year. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]*

4.1. The percent of load shedding to be implemented shall be based on either: **A.** The actual or estimated substation or feeder demand (including losses) of the UFLS entities at the time coincident with the previous year's actual Peak Demand in the season specified by the Planning Coordinator in R2.

B. The forecasted substation or feeder demand (including losses) of the UFLS entities at the time coincident with the next year's forecasted Peak Demand in the season specified by the Planning Coordinator in R2.

4. 2. The amount of load in each load shedding step shall be within -1.0 and +3.0 of the percentage specified by the Planning Coordinator (for example, if the specified percentage step load shed is 12%, the allowable range is 11 to 15%).

4. 3. The amount of total UFLS load of all steps combined shall be within -1.0 and +5.0 of the percentage specified by the Planning Coordinator for the total UFLS load in the UFLS scheme.

M4. Each UFLS entity that has a total load of 100 MW or greater in a Planning Coordinator area in the SERC Region shall have evidence such as reports or other documentation demonstrating that its implementation of the UFLS scheme on May 1 of each calendar year meets the requirements of Requirement R4 (including all the data elements in Parts 4.1, 4.2, and 4.3) unless scheme changes per Requirement R6 are in process.

R5. Each UFLS entity that has a total load less than 100 MW in a Planning Coordinator area in the SERC Region shall implement the UFLS scheme developed by their Planning Coordinator, but shall not be required to have more than one UFLS step. UFLS entities may implement the UFLS scheme developed by the Planning Coordinator by coordinating with other UFLS entities. The UFLS scheme shall meet the following requirements on May 1 of each calendar year. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning].*

5.1. The percent of load shedding to be implemented shall be based on either: **A.** The actual or estimated substation or feeder demand (including losses) of the UFLS entities at the time coincident with the previous year's actual Peak Demand in the season specified by the Planning Coordinator in R2.

B. The forecasted substation or feeder demand (including losses) of the UFLS entities at the time coincident with the next year's forecasted Peak Demand in the season specified by the Planning Coordinator in R2.

5.2. The amount of total UFLS load shall be within ± 5.0 of the percentage specified by the Planning Coordinator for the total UFLS load in the UFLS scheme.

M5. Each UFLS entity that has a total load less than 100 MW in a Planning Coordinator area in the SERC Region shall have evidence such as reports or other documentation demonstrating that its implementation of the UFLS scheme on May 1 of each calendar year meets the requirements of Requirement R5 (including all the data elements in Parts 5.1and 5.2) unless scheme changes per Requirement R6 are in process.

R6. Each UFLS entity shall implement changes to the UFLS scheme which involve frequency settings, relay time delays, changes to the percentage of load in the scheme, or changes to the peak season selected in R2.1 within 18 months of notification by the Planning Coordinator. *[Violation Risk Factor: High] [Time Horizon: Long-term Planning]*

M6. Each UFLS entity shall have evidence such as reports or other documentation demonstrating that it has made the appropriate scheme changes within 18 months per Requirement R6. Such evidence is only required if the Planning Coordinator makes changes to the UFLS scheme as specified in Requirement R6.

R8. Each Generator Owner shall provide the following information within 30 days of a request by SERC or Planning Coordinator to facilitate post-event analysis of frequency disturbances. *[Violation Risk Factor: Lower] [Time Horizon: Long-term Planning]*

8.1. Generator protection automatic underfrequency and overfrequency trip set points (Hz).

8.2. Total clearing time associated with each set point (sec). This is defined as the time that begins when frequency reaches the set point and ends when the breaker opens. If inverse time underfrequency relays are used, provide the total clearing time at 59.0, 58.5, 58.0, and 57.0 Hz.

8.3. Maximum generator net MW that could be tripped automatically due to an underfrequency or overfrequency condition.

M8. Each Generator Owner shall have evidence such as reports or other documentation that data specified in Requirement R8 was provided to SERC as requested.

Compliance

Compliance enforcement authority

SERC Reliability Corporation

Compliance monitoring and assessment process

- Compliance Audit
- Self-Certification
- Spot Checking
- Compliance Violation Investigation
- Self-Reporting
- Complaint

Evidence retention

Each Planning Coordinator, UFLS Entity and Generator Owner shall keep data or evidence to show compliance as identified below unless directed by SERC to retain specific evidence for a longer period of time as part of an investigation.

Each Planning Coordinator, UFLS Entity and Generator Owner shall retain the current evidence of each Requirement and Measure as well as any evidence necessary to show compliance since the last compliance audit.

If a Planning Coordinator, UFLS Entity or Generator Owner is found non- compliant, it shall keep information related to the non-compliance until found compliant or for the retention period specified above, whichever is longer.

The compliance enforcement authority shall keep the last audit records and all requested and submitted subsequent audit records.

Time Horizons, Violation Risk Factors, and Violation Severity Levels

Table 1						
R#	Time Horizon	VRF	Violation Severity Level			
			Lower	Moderate	High	Severe
R2	Long-term Planning	Medium	The Planning Coordinator's scheme did not meet one of the UFLS system design requirements identified in 2.2 through 2.6	The Planning Coordinator's scheme did not meet two of the UFLS system design requirements identified in 2.2 through 2.6.	The Planning Coordinator's scheme did not meet three of the UFLS system design requirements identified in 2.2 through 2.6.	The Planning Coordinator's scheme did not meet 2.1 **OR** Four or more of the UFLS system design requirements identified in 2.2 through 2.6.

R3	Long-term Planning	High	N/A	The Planning Coordinator failed to conduct one of the required simulations of its UFLS scheme.	N/A	The Planning Coordinator failed to conduct two of the required simulations of its UFLS scheme.
R4	Operations Planning	Medium	The UFLS entity's implemented UFLS scheme had one load shedding step outside the range specified in 4.	The UFLS entity's implemented UFLS scheme had two load shedding steps outside the range specified in 4.	The UFLS entity's implemented UFLS scheme had three or more load shedding steps outside the range	The UFLS entity's implemented UFLS scheme had three or more load shedding steps outside the range

Table 1						
R#	**Time Horizon**	**VRF**	**Violation Severity Level**			
			Lower	**Moderate**	**High**	**Severe**
			2.	2.	specified in 4.2. **OR** The UFLS entity's implemented UFLS scheme had a total load outside the range specified in 4.3.	specified in 4.2. **AND** The UFLS entity's implemented UFLS scheme had a total load outside the range specified in 4.3.

R5	Operations Planning	Medium	N/A	N/A	N/A	The UFLS entity's implemented UFLS scheme had a total load outside the range specified in 5.2.
R6	Long-term Planning	High	The UFLS entity implemented required scheme changes but made them 1 to 30 days after the scheduled date.	The UFLS entity implemented required scheme changes but made them 31 to 40 days after the scheduled date.	The UFLS entity implemented required scheme changes but made them 41 to 50 days after the scheduled date.	The UFLS entity implemented required scheme changes but made them more than 50 days after the scheduled date OR The UFLS entity failed to implement the required scheme changes.

Table 1						
R#	Time Horizon	VRF	Violation Severity Level			
			Lower	Moderate	High	Severe

			after the scheduled submittal date.	after the scheduled submittal date. **OR** The Planning Coordinator did not provide to SERC one piece of information listed in R7.	after the scheduled submittal date. **OR** The Planning Coordinator did not provide to SERC two pieces of information listed in R7.	days after the scheduled submittal date. **OR** The Planning Coordinator did not provide to SERC any of the information listed in R7.

R8	Long-term Planning	Lower	The Generator Owner provided the data required in R8 to SERC or Planning Coordinator 1 to 10 days after the requested submittal date.	The Generator Owner provided the data required in R8 to SERC or Planning Coordinator 11 to 20 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC or Planning Coordinator one piece of information listed in R8.	The Generator Owner provided the data required in R8 to SERC or Planning Coordinator 21 to 30 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC or Planning Coordinator two pieces of information listed in R8.	The Generator Owner provided the data required in R8 to SERC or Planning Coordinator more than 30 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC or Planning Coordinator any of the information listed in R8.

Regional Variances

None

Interpretations

None

Guideline and Technical Basis

1. **Existing UFLS schemes**

   Each Planning Coordinator should consider the existing UFLS programs which are in place and should consider input from the UFLS entities in developing the UFLS scheme.

2. **Basis for SERC standard requirements**

   SERC Standard PRC-006-SERC-02 is not a stand-alone standard, but was written to be followed in conjunction with NERC Standard PRC-006-1. The primary focus of SERC Standard PRC-006-SERC-02 was to provide region-specific requirements for the implementation of the higher tier NERC standard requirements with the goals of a) adding clarity and b) providing for consistency and a coordinated UFLS scheme for the SERC Region as a whole.

   Generally speaking, requirements already in the NERC standard were not repeated in the SERC standard. Therefore, both the NERC and SERC standards must be followed to ensure full compliance.

3. **Basis for applying a percentage load shedding value to Forecast Load versus Actual Load** The Planning Coordinator will develop a UFLS scheme to meet the performance requirements of NERC Standard PRC-006-2 Requirement R3 and SERC Standard PRC-006- SERC-02 Requirement R2. This development will result in certain percentages of load for each UFLS entity in the Planning Coordinator's area for which automatic under frequency load shedding must be implemented. The Planning Coordinator develops these percentages based on forecast peak load demand. However, the UFLS entity implements these percentages based on the previous year's actual peak demand in the season specified by the Planning Coordinator in R2. Applying the same percentage to these different base values was intentional to ensure that both the Planning Coordinator and UFLS entities had a clear, measurable value to use in performing their respective roles in meeting the standard. Planning Coordinators typically use forecast demands in their work. Whereas the previous year's actual (or estimated) demand is typically more available to UFLS entities. Additionally, the use of percentages based on t h e s e different base values tends to minimize the error due to the time lag between design and actual field implementation. Since a percentage is provided by the Planning Coordinator to the UFLS entities, any differences between the design values (i.e., forecast load) and the implemented values (i.e., previous year's actual) would naturally tend to match up reasonably well. For example, if the total planning area load in MW for which UFLS was installed during the time of implementation was slightly higher or lower than the MW value used in the design by the Planning Coordinator, multiplying by the specified percentage

would result in an implemented load shedding scheme that also had a reasonably similar higher or lower MW value.

4. Basis for May 1 and 18 month time frames

Each UFLS entity must annually review that the amount of UFLS load shedding implemented is within a certain tolerance as specified by SERC Standard PRC-006-SERC-02 Requirement R 4 or Requirement R5 by May 1 of the current year. May 1 was chosen to allow sufficient time after the previous year's peak occurred to make adjustments in the field to the implementation if necessary to meet the tolerances specified in Requirement R4 or Requirement R5. Therefore, the May 1 date applies only to implementation of the existing percentages of load shedding specified by the Planning Coordinator. On the other hand, the 18-month time frame specified in PRC-006-SERC-02 Requirement R6 is intended to allow sufficient budgeting, procurement, and installation time for additional equipment, or for significant setting changes to existing equipment necessary to meet a revised load shedding scheme design that has been specified by the Planning Coordinator. During this 18-month transition period, the May 1 measurement of R4 or Requirement R5 would not apply.

5. Basis for smaller entity threshold of 100 MW

Most distribution substations have transformers rated in the range of 10 to 40 MVA. Usually most transformers would serve 1 to 4 feeders and each feeder will normally carry between 8 and 10 MVA. In general, assuming that each feeder would carry 10 MW, an entity with a load slightly greater than 100 MW would have at least 10 feeders available. For a program with three 10 % steps, only 3 feeders would be required to have under frequency load shed capabilities. The 100 MW threshold seems to provide adequate flexibility for implementing load shedding in three steps for entities slightly greater than 100 MW.

Version History

Version	Date	Action	Change Tracking
1	September 19, 2011	SERC Board Approved	
1	November 3, 2011	Adopted by NERC Board of Trustees	

1	December 20, 2012	FERC Order issued approving PRC-006-SERC–01	
1	March 11, 2013	Modified the Rationale and changed the VRF for Requirement R6 from “Medium” to “High” per a compliance filing (Filed on 3/11/13)	
2	June 28, 2017	SERC Board Approved	
2	August 10, 2017	Adopted by NERC Board of Trustees	
2	October 16, 2017	FERC Order issued approving PRC-006-SERC-02	
3	June 24, 2021	SERC Board Approved	
3	TBD	Adopted by NERC Board of Trustees	
3	TBD	FERC Order issued approving PRC-006-SERC-03	

Effective Date

Effective for SERC Region applicable Registered Entities on the first day of the first calendar quarter after approved by FERC.

Introduction

1. **Title:** Automatic Underfrequency Load Shedding Requirements

2. **Number:** PRC-006-SERC–~~03~~2

3. **Purpose:** To establish consistent and coordinated requirements for the design, implementation, and analysis of automatic underfrequency load shedding (UFLS) programs among all SERC applicable entities.

4. **Applicability:**

   4.1 Planning Coordinators

   4.2 UFLS entities shall mean all entities that are responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the Planning Coordinators. Such entities may include one or more of the following:

   4.2.1 Transmission Owners

   4.2.2 Distribution Providers

   4.3 Generator Owners

5. **Background**

The SERC UFLS Standard: PRC-006-SERC-01 ("SERC UFLS Standard") was developed to provide regional UFLS requirements to entities in SERC. UFLS requirements have been in place at a continent-wide level and within SERC for many years prior to implementation of federally mandated reliability compliance standards in 2007.

When reliability standards were implemented in 2007, the Federal Energy Regulatory Commission ("FERC"), which is the government body with regulatory responsibility for electric reliability, issued FERC Order 693, recognizing 83 NERC Reliability Standards as enforceable by FERC and applicable to users, owners, and operators of the bulk power system (BPS). FERC did not approve the NERC UFLS standard, PRC-006-0 in Order 693. FERC's reason for not approving PRC-006-0 was that it recognized PRC-006-0 as a "fillin the blank standard," and regional procedures associated with the standard were not submitted along with the standard. FERC's ruling in Order 693 required Regional Entities to provide the regional requirements necessary for completing the UFLS standard.

In 2008, SERC commenced work on PRC-006-SERC-01. NERC also began work on revising PRC-006-0 at a continent-wide level. The SERC standard has been developed to be consistent with the NERC UFLS standard. PRC-006-SERC-02 was developed per periodic review of the standard.

PRC-006-1 clearly defines the roles and responsibilities of parties to whom the standard applies. The standard identifies the Planning Coordinator ("PC") as the entity responsible for developing UFLS schemes within their PC area. The regional standard adds specificity not contained in the NERC standard for development and implementation of a UFLS scheme in the SERC Region that effectively mitigates the consequences of an underfrequency event.

Requirements and Measures

~~**R1.** Each Planning Coordinator shall include its SERC subregion as an identified island in the criteria (required by the NERC PRC standard on UFLS) for selecting portions of the BPS that may form islands. *[Violation Risk Factor: Medium] [Time Horizon: Long-term Planning]*~~

~~**1.1** A Planning Coordinator may adjust island boundaries to differ from subregional boundaries where necessary for the sole purpose of producing a contiguous subregional island more suitable for simulation.~~

~~**M1.** Each Planning Coordinator shall have evidence such as a methodology, procedure, report, or other documentation indicating that its criteria included selection of its SERC subregion(s) as an island per Requirement R1.~~

R2. Each Planning Coordinator shall select or develop an automatic UFLS scheme (percent of load to be shed, frequency set points, and time delays) for implementation by UFLS entities within its area that meets the following minimum requirements: *[Violation Risk Factor: Medium] [Time Horizon: Long-term Planning]*

2.1. Have the capability of shedding at least 30 percent of the Peak Demand (MW) served from the Planning Coordinator's transmission system. The Peak Demand may be either summer or winter as determined by the Planning Coordinator.

2.2. Shed load with a minimum of three frequency set points.

2.3. The highest frequency set point for relays used to arrest frequency decline shall be no lower than 59.3 Hz and not higher than 59.65 Hz.

2.3.1 This does not apply to UFLS relays with time delay of one second or longer and a higher frequency setpoint applied to prevent the frequency from stalling at less than 60 Hz when recovering from an underfrequency event.

2.4. The lowest frequency set point shall be no lower than 58.24 Hz.

2.4.1 At least 30% of peak demand shall be set greater than or equal to 58.4 Hz

2.5. The difference between frequency set points shall be at least 0.2 Hz but no greater than 0.5 Hz.

2.6. Time delay ~~(from frequency reaching the set point to the trip signal)~~setting shall be at least six cycles (0.1 seconds).

M2. Each Planning Coordinator shall have evidence such as reports or other documentation that the UFLS scheme for its area meets the design requirements specified in Requirement R2.

R3. Each Planning Coordinator, when performing design assessments specified in the NERC PRC standard on UFLS, shall conduct simulations of its UFLS scheme for an imbalance between load and generation of 13%, 22%, and 25% for all identified island(s) where such imbalance equals [(load minus actual generation output) / load]. *[Violation Risk Factor: High] [Time Horizon: Long-term Planning]*

M3. Each Planning Coordinator shall have evidence such as reports or other documentation that it performed the simulations of its UFLS scheme as required in Requirement R3.

R4. Each UFLS entity that has a total load of 100 MW or greater in a Planning Coordinator area in the SERC Region shall implement the UFLS scheme developed by their Planning Coordinator. UFLS entities may implement the UFLS scheme developed by the Planning Coordinator by coordinating with other UFLS entities. The UFLS scheme shall meet the following requirements on May 1 of each calendar year. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]*

4.1. The percent of load shedding to be implemented shall be based on either: **A.** T~~t~~he actual or estimated substation or feeder demand (including losses) of the UFLS entities at the time coincident with the previous year's actual Peak Demand in the season specified by the Planning Coordinator in R2.

B. The forecasted substation or feeder demand (including losses) of the UFLS entities at the time coincident with the next year's forecasted Peak Demand in the season specified by the Planning Coordinator in R2.

4. 2. The amount of load in each load shedding step shall be within -1.0 and +3.0 of the percentage specified by the Planning Coordinator (for example, if the specified percentage step load shed is 12%, the allowable range is 11 to 15%).

4. 3. The amount of total UFLS load of all steps combined shall be within -1.0 and +5.0 of the percentage specified by the Planning Coordinator for the total UFLS load in the UFLS scheme.

M4. Each UFLS entity that has a total load of 100 MW or greater in a Planning Coordinator area in the SERC Region shall have evidence such as reports or other documentation demonstrating that its implementation of the UFLS scheme on May 1 of each calendar year meets the requirements of Requirement R4 (including all the data elements in Parts 4.1, 4.2, and 4.3) unless scheme changes per Requirement R6 are in process.

R5. Each UFLS entity that has a total load less than 100 MW in a Planning Coordinator area in the SERC Region shall implement the UFLS scheme developed by their Planning Coordinator, but shall not be required to have more than one UFLS step. UFLS entities may implement the UFLS scheme developed by the Planning Coordinator by coordinating with other UFLS entities. The UFLS scheme shall meet the following requirements on May 1 of each calendar year. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning].*

5.1. The percent of load shedding to be implemented shall be based on ~~the actual or estimated substation or feeder demand (including losses) of the UFLS entities at the time coincident with the previous year actual Peak Demand in the season specified by the Planning Coordinator in R2..~~ either:

A. The actual or estimated substation or feeder demand (including losses) of the UFLS entities at the time coincident with the previous year's actual Peak Demand in the season specified by the Planning Coordinator in R2.

B. The forecasted substation or feeder demand (including losses) of the UFLS entities at the time coincident with the next year's forecasted Peak Demand in the season specified by the Planning Coordinator in R2.

5.2. The amount of total UFLS load shall be within ± 5.0 of the percentage specified by the Planning Coordinator for the total UFLS load in the UFLS scheme.

M5. Each UFLS entity that has a total load less than 100 MW in a Planning Coordinator area in the SERC Region shall have evidence such as reports or other

documentation demonstrating that its implementation of the UFLS scheme on May 1 of each calendar year meets the requirements of Requirement R5 (including all the data elements in Parts 5.1and 5.2) unless scheme changes per Requirement R6 are in process.

R6. Each UFLS entity shall implement changes to the UFLS scheme which involve frequency settings, relay time delays, changes to the percentage of load in the scheme, or changes to the peak season selected in R2.1 within 18 months of notification by the Planning Coordinator. *[Violation Risk Factor: High] [Time Horizon: Long-term Planning]*

M6. Each UFLS entity shall have evidence such as reports or other documentation demonstrating that it has made the appropriate scheme changes within 18 months per Requirement R6. Such evidence is only required if the Planning Coordinator makes changes to the UFLS scheme as specified in Requirement R6.

~~**R7.** Each Planning Coordinator shall provide the following information to SERC according to the schedule specified by SERC. *[Violation Risk Factor: Lower] [Time Horizon: Long-term Planning]*~~

~~**7.1.** Underfrequency trip set points (Hz)~~

~~**7.2.** Total clearing time associated with each set point (sec). This includes the time from when frequency reaches the set point and ends when the breaker opens.~~

~~**7.3.** Amount of previous year actual or estimated load associated with each set point, both in percent and in MW. The percentage and the Load demand (MW) shall be based on the time coincident with the previous year actual Peak Demand.~~

~~**M7.** Each Planning Coordinator shall have evidence such as reports or other documentation that data specified in Requirement R7 was provided to SERC in accordance with the schedule.~~

R8. Each Generator Owner shall provide the following information within 30 days of a request by SERC or Planning Coordinator to facilitate post-event analysis of frequency disturbances. *[Violation Risk Factor: Lower] [Time Horizon: Long-term Planning]*

8.1. Generator protection automatic underfrequency and overfrequency trip set points (Hz).

8.2. Total clearing time associated with each set point (sec). This is defined as the time that begins when frequency reaches the set point and ends when the breaker

opens. If inverse time underfrequency relays are used, provide the total clearing time at 59.0, 58.5, 58.0, and 57.0 Hz.

8.3. Maximum generator net MW that could be tripped automatically due to an underfrequency or overfrequency condition.

M8. Each Generator Owner shall have evidence such as reports or other documentation that data specified in Requirement R8 was provided to SERC as requested.

Compliance

Compliance enforcement authority

SERC Reliability Corporation

Compliance monitoring and assessment process

- Compliance Audit
- Self-Certification
- Spot Checking
- Compliance Violation Investigation
- Self-Reporting
- Complaint

Evidence retention

Each Planning Coordinator, UFLS Entity and Generator Owner shall keep data or evidence to show compliance as identified below unless directed by SERC to retain specific evidence for a longer period of time as part of an investigation.

Each Planning Coordinator, UFLS Entity and Generator Owner shall retain the current evidence of each Requirement and Measure as well as any evidence necessary to show compliance since the last compliance audit.

If a Planning Coordinator, UFLS Entity or Generator Owner is found non- compliant, it shall keep information related to the non-compliance until found compliant or for the retention period specified above, whichever is longer.

The compliance enforcement authority shall keep the last audit records and all requested and submitted subsequent audit records.

Time Horizons, Violation Risk Factors, and Violation Severity Levels

Table 1						
R#	Time Horizon	VRF	Violation Severity Level			
			Lower	Moderate	High	Severe
~~R1~~	~~Long-term Planning~~	~~Medium~~	~~N/A~~	~~N/A~~	~~N/A~~	~~The Planning Coordinator did not have evidence that its criteria included selection of its SERC subregion(s) as an island, with or without adjusted boundaries.~~
R2	Long-term Planning	Medium	The Planning Coordinator's scheme did not meet one of the UFLS system design requirements identified in 2.2 through 2.6	The Planning Coordinator's scheme did not meet two of the UFLS system design requirements identified in 2.2 through 2.6.	The Planning Coordinator's scheme did not meet three of the UFLS system design requirements identified in 2.2 through 2.6.	The Planning Coordinator's scheme did not meet 2.1 **OR** Four or more of the UFLS system design requirements identified in 2.2 through 2.6.
R3	Long-term Planning	High	N/A	The Planning Coordinator failed to conduct one of the required simulations of its UFLS scheme.	N/A	The Planning Coordinator failed to conduct two of the required simulations of its UFLS scheme.

R4	Operations Planning	Medium	The UFLS entity's implemented UFLS scheme had one load shedding step outside the range specified in 4.	The UFLS entity's implemented UFLS scheme had two load shedding steps outside the range specified in 4.	The UFLS entity's implemented UFLS scheme had three or more load shedding steps outside the range	The UFLS entity's implemented UFLS scheme had three or more load shedding steps outside the range

Table 1						
R#	**Time Horizon**	**VRF**	**Violation Severity Level**			
			Lower	**Moderate**	**High**	**Severe**
			2.	2.	specified in 4.2. **OR** The UFLS entity's implemented UFLS scheme had a total load outside the range specified in 4.3.	specified in 4.2. **AND** The UFLS entity's implemented UFLS scheme had a total load outside the range specified in 4.3.
R5	Operations Planning	Medium	N/A	N/A	N/A	The UFLS entity's implemented UFLS scheme had a total load outside the range specified in 5.2.

R6	Long-term Planning	High	The UFLS entity implemented required scheme changes but made them 1 to 30 days after the scheduled date.	The UFLS entity implemented required scheme changes but made them 31 to 40 days after the scheduled date.	The UFLS entity implemented required scheme changes but made them 41 to 50 days after the scheduled date.	The UFLS entity implemented required scheme changes but made them more than 50 days after the scheduled date OR The UFLS entity failed to implement the required scheme changes.
~~**R7**~~	~~Long-term Planning~~	~~Lower~~	~~The Planning Coordinator provided the data required in R7 to SERC 1 to 10 days~~	~~The Planning Coordinator provided the data required in R7 to SERC 11 to 20 days~~	~~The Planning Coordinator provided the data required in R7 to SERC 21 to 30 days~~	~~The Planning Coordinator provided the data required in R7 to SERC more than 30~~

Table 1

R#	Time Horizon	VRF	Violation Severity Level			
			Lower	**Moderate**	**High**	**Severe**
			after the scheduled submittal date.	after the scheduled submittal date. **OR** The Planning Coordinator did not provide to SERC one piece of information listed in R7.	after the scheduled submittal date. **OR** The Planning Coordinator did not provide to SERC two pieces of information listed in R7.	days after the scheduled submittal date. **OR** The Planning Coordinator did not provide to SERC any of the information listed in R7.

R8	Long-term Planning	Lower	The Generator Owner provided the data required in R8 to SERC or Planning Coordinator 1 to 10 days after the requested submittal date.	The Generator Owner provided the data required in R8 to SERC or Planning Coordinator 11 to 20 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC or Planning Coordinator one piece of information listed in R8.	The Generator Owner provided the data required in R8 to SERC or Planning Coordinator 21 to 30 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC or Planning Coordinator two pieces of information listed in R8.	The Generator Owner provided the data required in R8 to SERC or Planning Coordinator more than 30 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC or Planning Coordinator any of the information listed in R8.

Regional Variances

None

Interpretations

None

Guideline and Technical Basis

1. **Existing UFLS schemes**

   Each Planning Coordinator should consider the existing UFLS programs which are in place and should consider input from the UFLS entities in developing the UFLS scheme.

2. **Basis for SERC standard requirements**

   SERC Standard PRC-006-SERC-02 is not a stand-alone standard, but was written to be followed in conjunction with NERC Standard PRC-006-1. The primary focus of SERC Standard PRC-006-SERC-02 was to provide region-specific requirements for the implementation of the higher tier NERC standard requirements with the goals of a) adding clarity and b) providing for consistency and a coordinated UFLS scheme for the SERC Region as a whole.

   Generally speaking, requirements already in the NERC standard were not repeated in the SERC standard. Therefore, both the NERC and SERC standards must be followed to ensure full compliance.

3. **Basis for applying a percentage load shedding value to Forecast Load versus Actual Load**

   The Planning Coordinator will develop a UFLS scheme to meet the performance requirements of NERC Standard PRC-006-2 Requirement R3 and SERC Standard PRC-006-SERC-02 Requirement R2. This development will result in certain percentages of load for each UFLS entity in the Planning Coordinator's area for which automatic under frequency load shedding must be implemented. The Planning Coordinator develops these percentages based on forecast peak load demand. However, the UFLS entity implements these percentages based on the previous year's actual peak demand in the season specified by the Planning Coordinator in R2. Applying the same percentage to these different base values was intentional to ensure that both the Planning Coordinator and UFLS entities had a clear, measurable value to use in performing their respective roles in meeting the standard. Planning Coordinators typically use forecast demands in their work. Whereas the previous year's actual (or estimated) demand is typically more available to UFLS entities. Additionally, the use of percentages based on t h e s e different base values tends to minimize the error due to the time lag between design and actual field implementation. Since a percentage is provided by the Planning Coordinator to the UFLS

entities, any differences between the design values (i.e., forecast load) and the implemented values (i.e., previous year's actual) would naturally tend to match up reasonably well. For example, if the total planning area load in MW for which UFLS was installed during the time of implementation was slightly higher or lower than the MW value used in the design by the Planning Coordinator, multiplying by the specified percentage would result in an implemented load shedding scheme that also had a reasonably similar higher or lower MW value.

4. Basis for May 1 and 18 month time frames

Each UFLS entity must annually review that the amount of UFLS load shedding implemented is within a certain tolerance as specified by SERC Standard PRC-006-SERC-02 Requirement R 4 or Requirement R5 by May 1 of the current year. May 1 was chosen to allow sufficient time after the previous year's peak occurred to make adjustments in the field to the implementation if necessary to meet the tolerances specified in Requirement R4 or Requirement R5. Therefore, the May 1 date applies only to implementation of the existing percentages of load shedding specified by the Planning Coordinator. On the other hand, the 18-month time frame specified in PRC-006-SERC-02 Requirement R6 is intended to allow sufficient budgeting, procurement, and installation time for additional equipment, or for significant setting changes to existing equipment necessary to meet a revised load shedding scheme design that has been specified by the Planning Coordinator. During this 18-month transition period, the May 1 measurement of R4 or Requirement R5 would not apply.

5. Basis for smaller entity threshold of 100 MW

Most distribution substations have transformers rated in the range of 10 to 40 MVA. Usually most transformers would serve 1 to 4 feeders and each feeder will normally carry between 8 and 10 MVA. In general, assuming that each feeder would carry 10 MW, an entity with a load slightly greater than 100 MW would have at least 10 feeders available. For a program with three 10 % steps, only 3 feeders would be required to have under frequency load shed capabilities. The 100 MW threshold seems to provide adequate flexibility for implementing load shedding in three steps for entities slightly greater than 100 MW.

~~Rationale:~~

~~During development of this standard, text boxes were embedded within the standard to explain the rationale for various parts of the standard. Upon BOT approval, the text from each of the rationale text boxes was moved to this section.~~

~~Rationale for R1:~~

Studying the Region as an island is required by the NERC standard. Most regions have only one or a few different UFLS schemes. Where there is more than one scheme, studying this island demonstrates that the schemes are coordinated and performing adequately. Because there are so many different UFLS schemes in SERC (18 different schemes were represented in the 2007 SERC UFLS study), the SDT believes that applying the schemes to each subregion as an island is a necessary additional test of the coordination of the various UFLS schemes. Without this additional test, a poorly performing scheme may be masked by the large number of good performing schemes in the Region. A subregion island study, which would have a smaller number of schemes, would be more likely to uncover the poorly performing scheme and therefore get it fixed. This approach will result in a much better overall performance of the UFLS programs in SERC. The SDT recognized that there may be simulation problems due to opening the ties to utilities outside the subregion. Therefore, the subregion island boundaries are allowed to be adjusted to produce an island more suitable for simulation.

(Note: The SERC Subregions are identified in paragraph 4.2 of the SERC Reliability Corporation Bylaws: "The Region is currently geographically divided into five subregions that are identified as Southeastern, Central, VACAR, Delta, and Gateway.")

Rationale for R2:

These requirements for the UFLS schemes in SERC have been in place for many years (except 2.6). The SDT believes that these requirements are still needed to ensure consistency for the various schemes which are used in SERC. Part 2.6 is designed to prevent spurious operations due to transient frequency swings.

Rationale for R3:

R4 of the NERC standard PRC-006-1 requires the PC to conduct assessments of UFLS schemes through dynamic simulations to verify that they meet performance requirements for generation/load imbalances of up to 25%. This requirement defines specific imbalances that are to be studied within SERC. The 13% and 22% levels were determined from simulations of the worst case frequency overshoot for the UFLS schemes in SERC.

Rationale for R4:

The SDT believes it is necessary to put a requirement on how well the UFLS scheme is implemented. This requirement specifies how close the actual load shedding amounts must be to the percentage of load called for in the scheme. A 4 percentage point range is allowed for each individual step, but the allowed range for all steps combined is 6 percentage points.

Rationale for R5:

The SDT believes it is necessary to put a requirement on how well the UFLS scheme is implemented. This requirement specifies how close the actual load shedding amounts must be to the percentage of load called for in the scheme. The SDT recognizes that UFLS entities with a load of less than 100 MW may have difficulty in implementing more than one UFLS step and

~~in meeting a tight tolerance. The basis of the 100 MW comes from typical feeder load dropped by UFLS relays, and the use of a 100 MW threshold in other regional UFLS standards.~~

~~Rationale for R6:~~

~~The SDT believes it is necessary to put a requirement on how quickly changes to the scheme should be implemented. This requirement specifies that changes must be implemented within 18 months of notification by the PC. The 18 month interval was chosen to give a reasonable amount of time for making changes in the field. All of the SERC Region has existing UFLS schemes which, based on periodic simulations, have provided reliable protection for years. Events which result in islanding and an activation of the UFLS schemes are extremely rare in SERC. Therefore, the SDT does not believe that changes to an existing UFLS scheme will be needed in less than 18 months. However, if a PC determines there is a need for changing the UFLS scheme faster than 18 months, then the PC may require the implementation to be done sooner as allowed by NERC Reliability Standard PRC-006-1.~~

~~**Rationale for R7:**~~

~~The NERC standard requires that a UFLS database be maintained by the Planning Coordinator. This requirement specifies what data must be reported to SERC. A SERC UFLS database is needed to facilitate data sharing across the SERC Region, with other regions, and with NERC.~~

~~**Rationale for R8:**~~

~~The SDT believes that generator over and under frequency tripping data is needed to supplement the UFLS data provided by the Planning Coordinator for post-event analysis of frequency disturbances. This requirement states what data must be reported to SERC by the Generator Owners.~~

~~Since the inverse time curve cannot easily be placed into the SERC database, four clearing times based on data from the curve are requested. These clearing times are intended to cover a range of frequencies needed for event replication as well as provide information about generators that trip at a higher frequency than is allowed by the NERC standard.~~

Version History

Version	Date	Action	Change Tracking
1	September 19, 2011	SERC Board Approved	
1	November 3, 2011	Adopted by NERC Board of Trustees	
1	December 20, 2012	FERC Order issued approving PRC-006-SERC–01	
1	March 11, 2013	Modified the Rationale and changed the VRF for Requirement R6 from “Medium” to “High” per a compliance filing (Filed on 3/11/13)	
2	June 28, 2017	SERC Board Approved	

2	August 10, 2017	Adopted by NERC Board of Trustees	

SERC UFLS Standard: PRC-006-SERC-02

2	October 16, 2017	FERC Order issued approving PRC-006-SERC-02	
3	June 24, 2021	SERC Board Approved	
3	TBD	Adopted by NERC Board of Trustees	
3	TBD	FERC Order issued approving PRC-006-SERC-03	

The Summary of the changes to the *PRC-006-SERC-02 Automatic Underfrequency Loading Shedding (UFLS)* include the following:

1. Removal of the requirement (Requirement R1) to allow Planning Coordinators to build a contiguous island, due to entities moving from one Planning Coordinator to another and no longer being contiguous with the existing island;
2. Modification of UFLS settings to account for the existing settings of the Florida peninsula in Requirement R2;
3. Addition of a second method to calculate the percent of load shed based on existing Florida peninsula practices in Requirements R4 and R5;
4. Removal of the SERC UFLS Database requirement, Requirement R7, to remove an unnecessary burden on entities; and
5. Addition of Planning Coordinator as a requestor in Requirement R8 to facilitate post-event analysis of frequency disturbances.

3701 Arco Corporate Drive, Suite 300
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O: 704-357-7372, F: 704-357-7914
www.serc1.org

Implementation Plan

Regional Reliability Standard PRC-006-SERC-3 – Automatic Underfrequency Load Shedding

Applicable Standard(s)

- PRC-006-SERC-03 – Automatic Underfrequency Load Shedding Requirements

Requested Retirement(s)

- PRC-006-SERC-02 – Automatic Underfrequency Load Shedding Requirements

Applicable Entities

- Generator Owners
- Planning Coordinators
- UFLS entities shall mean all entities that are responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the Planning Coordinators. Such entities may include one or more of the following:
    - Transmission Owners
    - Distribution Providers

Background

The revisions to the PRC-006-SERC-02 Automatic Underfrequency Load Shedding have been developed to address the following concerns.

1. Elimination of the SERC UFLS Database to remove an unnecessary burden on the entities
2. Due to entities moving from one Planning Coordinator to another and no longer being contiguous with the existing island, need to remove the requirement to allow PC's to build a contiguous island
3. Due to the geography of the Florida peninsula, UFLS settings are set differently than the rest of the SERC entities. These settings are in violation of the SERC UFLS standard and thus the standard needed to be modified to ensure the reliable settings of Florida peninsula entities do not violate the standard.

Effective Date

All requirements will be enforceable on the first day of the first calendar quarter following the applicable governmental and regulatory approvals.

Retirement Date

The SERC Regional Reliability Standard PRC-006-SERC-02 shall be retired immediately prior to the Effective Date of PRC-006-SERC-03.

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Implementation Plan

Regional Reliability Standard PRC-006-SERC-3 – Automatic Underfrequency Load Shedding

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- PRC-006-SERC-03 – Automatic Underfrequency Load Shedding Requirements

Requested Retirement(s)

- PRC-006-SERC-02 – Automatic Underfrequency Load Shedding Requirements

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- UFLS entities shall mean all entities that are responsible for the ownership, operation, or control of UFLS equipment as required by the UFLS program established by the Planning Coordinators. Such entities may include one or more of the following:
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    - Distribution Providers

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The revisions to the PRC-006-SERC-02 Automatic Underfrequency Load Shedding have been developed to address the following concerns.

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Retirement Date

The SERC Regional Reliability Standard PRC-006-SERC-02 shall be retired immediately prior to the Effective Date of PRC-006-SERC-03.

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Unofficial Comment Form

Regional Reliability Standard | PRC-006-SERC-03

DO NOT use this form for submitting comments. Use the Standards Balloting and Commenting System (SBS) to submit comments on the **Regional Reliability Standard, PRC-006-SERC-03 – Automatic Underfrequency Load Shedding** by **8 p.m. Eastern, Friday, October 8, 2021.**

Documents and information about this project are available on the SERC Regional Reliability Standards page. If you have questions, contact Senior Reliability Standards Analyst, Kimberlin Harris (via email) or at (404) 446-9794.

Background Information

The revisions to the PRC-006-SERC-02 Automatic Underfrequency Load Shedding (UFLS) include:

1. Removal of the requirement (Requirement R1) to allow Planning Coordinators to build a contiguous island, due to entities moving from one Planning Coordinator to another and no longer being contiguous with the existing island;
2. Modification of UFLS settings to account for the existing settings of the Florida peninsula in Requirement R2;
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4. Removal of the SERC UFLS Database requirement, Requirement R7, to remove an unnecessary burden on entities; and
5. Addition of Planning Coordinator as a requestor in Requirement R8 to facilitate post-event analysis of frequency disturbances.

NERC Criteria for Developing or Modifying a Regional Reliability Standard

Each regional difference (i.e. Regional Reliability Standard or Variance) shall be: (1) is more stringent than the continent-wide Reliability Standard, including a regional difference that addresses matters that the continent-wide reliability standard does not; or (2) necessitated by a physical difference in the bulk power system. Regional Reliability Standards and Variances shall provide for as much uniformity as possible with Reliability Standards across the interconnected bulk power system of the North American continent. Regional Reliability Standards and Variances, when approved by FERC and applicable authorities in Mexico and Canada, shall be made part of the body of NERC Reliability Standards and shall be enforced upon all applicable Bulk Power System owners, operators, and users within the applicable area, regardless of membership in the region.

The approval process for a proposed Regional Reliability Standard or Variance, or the retirement of an existing standard or Variance, requires NERC to publicly notice and request comment. Comments shall be

permitted only on the following criteria (technical aspects of the standard are vetted through the regional standards development process):

Unfair or Closed Process – The Regional Reliability Standard was not developed in a fair and open process that provided an opportunity for all interested parties to participate. Although a NERC-approved Regional Reliability Standards development procedure shall be presumed to be fair and open, objections could be raised regarding the implementation of the procedure.

Adverse Reliability or Commercial Impact on Other Interconnections – The Regional Reliability Standard would have a significant adverse impact on reliability or commerce in other interconnections.

Deficient Standard – The Regional Reliability Standard fails to provide a level of reliability of the Bulk Power System such that the Regional Reliability Standard would be likely to cause a serious and substantial threat to public health, safety, welfare, or national security.

Adverse Impact on Competitive Markets within the Interconnection – The Regional Reliability Standard would create a serious and substantial burden on competitive markets within the interconnection that is not necessary for reliability.

Questions

1. Do you agree the proposed Regional Reliability Standard was developed in a fair and open process, using the associated Regional Reliability Standards Development Procedure**?**

   ☐ Yes
   ☐ No

   Comments:

2. Does the proposed Regional Reliability Standard pose an adverse impact to reliability or commerce in a neighboring region or interconnection?

   ☐ Yes
   ☐ No

   Comments:

3. Does the proposed Regional Reliability Standard pose a serious and substantial threat to public health, safety, welfare, or national security?

   ☐ Yes
   ☐ No

   Comments:

4. Does the proposed Regional Reliability Standard pose a serious and substantial burden on competitive markets within the interconnection that is not necessary for reliability?

   ☐ Yes
   ☐ No

   Comments:

5. Does the proposed Regional Reliability Standard meet at least one of the following criteria?

   - The proposed Regional Reliability Standard has more specific criteria for the same requirements covered in a continent-wide standard.
   - The proposed Regional Reliability Standard has requirements that are not included in the corresponding continent-wide standard.
   - The proposed regional difference is necessitated by a physical difference in the Bulk Power System.

   ☐ Yes
   ☐ No

   Comments:

Comment Report

Project Name:	Regional Reliability Standard (SERC) | PRC-006-SERC-03
Comment Period Start Date:	8/25/2021
Comment Period End Date:	10/8/2021
Associated Ballots:	

There were 6 sets of responses, including comments from approximately 27 different people from approximately 16 companies representing 5 of the Industry Segments as shown in the table on the following pages.

Questions

1. Do you agree the proposed Regional Reliability Standard was developed in a fair and open process, using the associated Regional Reliability Standards Development Procedure?

2. Does the proposed Regional Reliability Standard pose an adverse impact to reliability or commerce in a neighboring region or interconnection?

3. Does the proposed Regional Reliability Standard pose a serious and substantial threat to public health, safety, welfare, or national security?

4. Does the proposed Regional Reliability Standard pose a serious and substantial burden on competitive markets within the interconnection that is not necessary for reliability?

5. Does the proposed Regional Reliability Standard meet at least one of the following criteria?

- **The proposed Regional Reliability Standard has more specific criteria for the same requirements covered in a continent-wide standard.**
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- **The proposed regional difference is necessitated by a physical difference in the Bulk Power System.**

Organization Name	Name	Segment(s)	Region	Group Name	Group Member Name	Group Member Organization	Group Member Segment(s)	Group Member Region
Duke Energy	Kim Thomas	1,3,5,6	FRCC,RF,SERC,Texas RE	Duke Energy	Laura Lee	Duke Energy	1	SERC
					Dale Goodwine	Duke Energy	5	SERC
					Greg Cecil	Duke Energy	6	RF
Southern Company - Southern Company Services, Inc.	Pamela Hunter	1,3,5,6	SERC	Southern Company	Matt Carden	Southern Company - Southern Company Services, Inc.	1	SERC
					Joel Dembowski	Southern Company - Alabama Power Company	3	SERC
					Ron Carlsen	Southern Company - Southern Company Generation	6	SERC
					Jim Howell	Southern Company - Southern Company Services, Inc. - Gen	5	SERC
Associated Electric Cooperative, Inc.	Todd Bennett	1,3,5,6		AECI	Michael Bax	Central Electric Power Cooperative (Missouri)	1	SERC
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Todd Bennett - Associated Electric Cooperative, Inc. - 1,3,5,6, Group Name AECI	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Richard Gilbert - Florida Reliability Coordinating Council – Member Services Division - 8 - SERC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Dennis Chastain - Tennessee Valley Authority - 1,3,5,6 - SERC	
Answer	Yes

Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Pamela Hunter - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	Yes
Document Name	
Comment	
Likes 0	
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Response	
Carl Pineault - Hydro-Qu?bec Production - 1,5	
Answer	
Document Name	
Comment	
Hydro-Quebec Production reviewed the current project and have no comments since Hydro-Quebec is not part of the SERC	
Likes 0	
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Response	

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Answer	No
Document Name	
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Answer	No

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Answer	
Document Name	
Comment	
Hydro-Quebec Production reviewed the current project and have no comments since Hydro-Quebec is not part of the SERC	
Likes 0	
Dislikes 0	
Response	

4. Does the proposed Regional Reliability Standard pose a serious and substantial burden on competitive markets within the interconnection that is not necessary for reliability?	
Pamela Hunter - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Dennis Chastain - Tennessee Valley Authority - 1,3,5,6 - SERC	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Richard Gilbert - Florida Reliability Coordinating Council – Member Services Division - 8 - SERC	
Answer	No

Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Todd Bennett - Associated Electric Cooperative, Inc. - 1,3,5,6, Group Name AECI	
Answer	No
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Carl Pineault - Hydro-Qu?bec Production - 1,5	
Answer	
Document Name	
Comment	
Hydro-Quebec Production reviewed the current project and have no comments since Hydro-Quebec is not part of the SERC	
Likes 0	
Dislikes 0	
Response	

5. Does the proposed Regional Reliability Standard meet at least one of the following criteria?

- **The proposed Regional Reliability Standard has more specific criteria for the same requirements covered in a continent-wide standard.**
- **The proposed Regional Reliability Standard has requirements that are not included in the corresponding continent-wide standard.**
- **The proposed regional difference is necessitated by a physical difference in the Bulk Power System.**

Todd Bennett - Associated Electric Cooperative, Inc. - 1,3,5,6, Group Name AECI	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Richard Gilbert - Florida Reliability Coordinating Council – Member Services Division - 8 - SERC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Kim Thomas - Duke Energy - 1,3,5,6 - SERC,RF, Group Name Duke Energy	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	

Dennis Chastain - Tennessee Valley Authority - 1,3,5,6 - SERC	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Pamela Hunter - Southern Company - Southern Company Services, Inc. - 1,3,5,6 - SERC, Group Name Southern Company	
Answer	Yes
Document Name	
Comment	
Likes 0	
Dislikes 0	
Response	
Carl Pineault - Hydro-Qu?bec Production - 1,5	
Answer	
Document Name	
Comment	
Hydro-Quebec Production reviewed the current project and have no comments since Hydro-Quebec is not part of the SERC	
Likes 0	
Dislikes 0	
Response	

Standard Authorization Request (SAR) Form

Complete and please email this form, with attachment(s) to: SERC Regional Standards

The SERC Reliability Corporation welcomes suggestions to improve the reliability of the bulk power system through improved Reliability Standards.

Requested information			
SAR Title:	Modification to PRC-006-SERC-02		
Date Submitted:	February 27, 2020		
SAR Requester			
Name:	SERC Dynamics Working Group (Chair Ken Wofford)		
Organization:	SERC		
Telephone:	770-270-7819	Email:	Ken.wofford@gatrans.com
SAR Type (Check as many as apply)			
☐ New Standard ☒ Revision to Existing Standard ☐ Add, Modify or Retire a Glossary Term ☐ Withdraw/retire an Existing Standard		☐ Imminent Action/ Confidential Issue (SPM Section 10) ☐ Variance development or revision ☐ Other (Please specify)	
Justification for this proposed standard development project (Check all that apply to help SERC prioritize development)			
☒ Regulatory Initiation ☐ Emerging Risk (Reliability Issues Steering Committee) Identified ☐ Reliability Standard Development Plan		☒ SERC Technical Committee Identified ☐ Enhanced Periodic Review Initiated ☒ Industry Stakeholder Identified	
Industry Need (What Bulk Electric System (BES) reliability benefit does the proposed project provide?):			
The changes being requested address three issues. The first is the elimination of the SERC UFLS database. SERC is no longer required to maintain the database and no entity uses it. The second change allows the Planning Coordinators to build their study islands such that they are contiguous. Finally, with the inclusion of the former FRCC entities into SERC, changes were needed to ensure the UFLS settings for Florida entities weren't in violation of the SERC standard.			
Purpose or Goal (How does this proposed project provide the reliability-related benefit described above?):			
Elimination of the UFLS database removes an unnecessary burden on the entities and SERC to maintain data that is neither used nor required. When entities move from one Planning Coordinator to another, they may no longer be physically contiguous with existing island definitions within the UFLS study. The proposed change would allow the PCs to build the islands that better tests the capabilities of the UFLS settings. Due to the geography of the Florida peninsula, UFLS settings are set differently than the rest of the SERC entities. These settings have proved to be reliable under several historical events. These settings are in violation of the SERC UFLS standard and thus the standard should be modified to ensure the reliable settings of the former FRCC entities do not violate the standard.			
Project Scope (Define the parameters of the proposed project):			
Modification to PRC-006-SERC-02			

Requested information
Detailed Description (Describe the proposed deliverable(s) with sufficient detail for a drafting team to execute the project. If you propose a new or substantially revised Reliability Standard or definition, provide: (1) a technical justification[1]which includes a discussion of the reliability-related benefits of developing a new or revised Reliability Standard or definition, and (2) a technical foundation document (*e.g.* research paper) to guide development of the Standard or definition):
Removal of R1 requirement – SERC sub-regions may not be contiguous so the islands should not be defined as such. Due to the UFLS settings in Florida, it is proposed to (1) increase the highest setting (R2.3) from 59.5 Hz to 59.6 Hz and (2) lower the value in R2.4 from 58.4 Hz to 58.2 Hz by adding a sub-bullet stating at least 30% of Peak Demand should be set no lower than 58.4Hz. Change R2.6 to say "Time delay setting shall be at least six cycles (0.1 seconds)" for clarity. When referring to what percentage of load should be included (R4.1 and R5.1), add a second choice to use "the forecasted substation or feeder demand (including losses) of the UFLS entities at the time coincident with the next year's forecasted Peak Demand in the season specified by the PC." Removal of R7 requirement – Removes the requirement for SERC to maintain a UFLS database.
Cost Impact Assessment, if known (Provide a paragraph describing the potential cost impacts associated with the proposed project):
Minimal, the only costs are associated with administrative overhead.
Please describe any unique characteristics of the BES facilities that may be impacted by this proposed standard development project (*e.g*. Dispersed Generation Resources):
N/A
To assist the SERC Standards Committee in appointing a drafting team with the appropriate members, please indicate to which Functional Entities the proposed standard(s) should apply (*e.g*. Transmission Operator, Reliability Coordinator, etc. See the most recent version of the NERC Functional Model for definitions):
SERC Planning Coordinators, Transmission Planners, Distribution Providers, Transmission Owners, Generator Owners
Do you know of any consensus building activities[2] in connection with this SAR? If so, please provide any recommendations or findings resulting from the consensus building activity.
None
Are there any related standards or SARs that should be assessed for impact as a result of this proposed project? If so which standard(s) or project number(s)?
None
Are there alternatives (e.g. guidelines, white paper, alerts, etc.) that have been considered or could meet the objectives? If so, please list the alternatives.

[1] The NERC Rules of Procedure require a technical justification for new or substantially revised Reliability Standards. Please attach pertinent information to this form before submittal to SERC.

[2] Consensus building activities are occasionally conducted by SERC and/or project review teams. They typically are conducted to obtain industry inputs prior to proposing any standard development project to revise, or develop a standard or definition.

Reliability Principles	
Does this proposed standard development project support at least one of the following Reliability Principles (Reliability Interface Principles)? Please check all those 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.

Market Interface Principles	
Does the proposed standard development project 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

Identified Existing or Potential Regional or Interconnection Variances	
Region(s)/ Interconnection	Explanation
e.g. SERC	

For Use by SERC Only

SAR Status Tracking (Check off as appropriate)	
☐ Draft SAR reviewed by SERC Staff ☐ Draft SAR presented to SC for acceptance ☐ DRAFT SAR approved for posting by the SC	☐ Final SAR endorsed by the SC ☐ SAR assigned a Standards Project by SERC ☐ SAR denied or proposed as Guidance document

Version History

Version	Date	Owner	Change Tracking
1	April 18, 2017	SERC Standards	Modified NERC SAR form to create revised SERC SAR form.

SERC RELIABILITY CORPORATION

February 19, 2021

PRC-006-SERC STANDARD COMMENTS & REGISTERED BALLOT BODY

FROM THE DESK OF: Dave Krueger

TO: Primary & Alternate Compliance Contacts, Engineering Committee, Operating Committee, and Critical Infrastructure Protection Committee Members

Commenting is now available for the proposed PRC-006-SERC-03 changes. The clean and red-line standard, Implementation Plan, and Mapping document are accessible from the link below.

Formation of the Registered Ballot Body is available now through **Monday, March, 22, 2021** at 8:00 p.m. Eastern. The Registered Ballot Body form may be accessed from the link below.

Background:
The requested changes address the following three issues:

1. Elimination of the SERC UFLS database. SERC is no longer required to maintain the database and no entity uses it.
2. The change allows the Planning Coordinators the opportunity to build their study islands so they are contiguous.
3. With the inclusion of the former Florida Reliability Coordinating Council entities into SERC, changes are needed to ensure the UFLS settings for Florida entities are not in violation of the SERC standard.

Link to the Clean and Redlined of the Standard and associated documentation, Commenting form, and Registered Ballot Body Form.

Please complete and submit to regstd@serc1.org by **March 22, 2021**.

Questions may be directed to: Dave Krueger / 704-414-5260

All other questions may be directed to SERC Support.

3701 Arco Corporate Drive, Suite 300, Charlotte, NC 28273 • Office: 704-357-7372 • Fax: 704-357-7914 • www.serc1.org

SERC RELIABILITY CORPORATION

Comment Form for PRC-006-SERC-03

Please use this form to submit comments on the PRC-006-SERC-03 Standard. Comments must be submitted by March 18, 2021. You must submit the completed form via email to SERC Regional Standards (regstd@serc1.org) with the words PRC-006-SERC-03 in the subject line. If you have questions, please contact James (Dave) Krueger, jkrueger@serc1.org.

DO: **Do** use punctuation and capitalization as needed.
Do use more than one form if responses do not fit in the spaces provided.
Do submit any formatted text or markups in a separate WORD file.

DO NOT: **Do not** submit a response in an unprotected copy of this form.

Commenter Information	
Group Name (if applicable):	
Contact Name:	**Dennis Chastain**
Organization:	**Tennessee Valley Authority**
Telephone:	**423-751-3950**
Email:	**dwchastain@tva.gov**

Background:
The revisions to the PRC-006-SERC-2 Automatic Underfrequency Load Shedding address the following concerns.

1. Due to entities moving from one Planning Coordinator to another and no longer being contiguous with the existing island, there is no longer a need for the requirement that allows PCs to build a contiguous island.
2. Due to the geography of the Florida peninsula, UFLS settings (of Florida peninsula entities) are different from the rest of the SERC entities. These settings are in violation of the SERC UFLS standard; modifying the standard will ensure the reliable settings of Florida peninsula entities do not violate the standard.
3. Elimination of the SERC UFLS Database will remove an unnecessary burden on the entities.

Comment Form for PRC-006-SERC-03

Please Enter All Comments in Simple Text Format.

Insert a "check" mark in the appropriate boxes by double-clicking the gray areas.

1. Do you agree with the revisions to the standard to remove R1, the requirement to make each island contiguous?

   ☒ **Yes**

   ☐ **No**

   ☐ **Comments:**

2. Do you agree with the revisions to the standard to update R2, R4, and R5 to ensure Florida peninsula entities' settings are reliable?

   ☒ **Yes**

   ☐ **No**

   ☐ **Comments:**

3. Do you agree with the revisions to the standard to remove R7 and the SERC UFLS Database?

   ☒ **Yes**

   ☐ **No**

   ☐ **Comments:**

4. Please identify anything you believe needs to be modified before this revision of the document can be approved.

   ☐ **Comments:**

5. Please provide any other comments on this revision of the document.

   ☒ **Comments:** The header on pdf pages 8-17 needs to be updated to show version - 03. All the information in the row for Requirement R7 in Table 1 needs to be completely deleted (see the bottom of pdf page 10). The row for Requirement R8 in Table 1 needs to be updated to show the changes for R8 – i.e. adding the Planning Coordinator.

SERC RELIABILITY CORPORATION

April 21, 2021

PRC-006-SERC-03 | NOTICE OF FINAL BALLOT MAY 6, 2021 THROUGH MAY 17, 2021

FROM THE DESK OF: Dave Krueger

TO: SERC Registered Ballot Body

You are receiving this notification as a member of the SERC Registered Ballot Body and in accordance with SERC's Regional Reliability Standards Development Procedure. All interested members of the Registered Ballot Body are invited to join the Ballot Pool and cast a vote on changes to PRC-006-SERC-03. Voting will take place electronically beginning **8:00 a.m. Eastern, Thursday, May 6, 2021, through 8:00 p.m. Eastern, Monday, May 17, 2021**.

The current Registered Ballot Pool can be viewed here. Any member of the Registered Ballot Body may join or drop out of the Ballot pool until the ballot period begins at 8:00 a.m. Eastern, Thursday, May 6, 2021.

The changes and associated documents can be found here.

A link to vote on PRC-006-SERC-03 will be sent to the Ballot Pool participates no later than 8:00 a.m. Eastern on Thursday, May 6, 2021.

Questions may be directed to: Dave Krueger / 704-414-5260

All other questions may be directed to SERC Support.

3701 Arco Corporate Drive, Suite 300, Charlotte, NC 28273 • Office: 704-357-7372 • Fax: 704-357-7914 • www.serc1.org

Q1 What is your name (first and last)?

Answered: 31 Skipped: 0

#	RESPONSES	DATE
1	Tony Kroskey	5/17/2021 5:04 PM
2	Scott Miller	5/17/2021 12:27 PM
3	Scott Brame	5/17/2021 9:12 AM
4	Truong Le	5/14/2021 11:32 AM
5	Lawrence D Hopkins Jr	5/13/2021 11:35 AM
6	Marjorie Parsons	5/13/2021 11:14 AM
7	Dennis Chastain	5/13/2021 10:58 AM
8	Donna Johnson	5/13/2021 10:49 AM
9	Rene' Free	5/13/2021 8:19 AM
10	Larry Watt	5/13/2021 7:15 AM
11	Charles Hill	5/13/2021 6:57 AM
12	Silvia Mitchell	5/12/2021 1:45 PM
13	Eric Lorigan	5/12/2021 9:29 AM
14	Nestor Vega	5/12/2021 7:46 AM
15	Amber Skillern	5/11/2021 10:15 AM
16	David Byrne	5/10/2021 2:14 PM
17	Linn Oelker	5/10/2021 10:02 AM
18	Jay Farrington	5/9/2021 7:27 PM
19	Laura Lee	5/8/2021 2:38 PM
20	Keith Steinmetz	5/7/2021 1:38 PM
21	Dania Colon	5/7/2021 11:51 AM
22	Lee Shuster	5/7/2021 10:39 AM
23	Todd Bennett	5/7/2021 9:46 AM
24	Daniel Fain	5/7/2021 8:49 AM
25	Bryan Garnett	5/7/2021 8:23 AM
26	Joe Spencer	5/6/2021 3:30 PM
27	Thomas Lyons	5/6/2021 3:15 PM
28	John Babik	5/6/2021 9:27 AM
29	Scott McGough	5/6/2021 9:22 AM
30	Greg Davis	5/6/2021 8:46 AM
31	Richard Gilbert	5/6/2021 8:12 AM

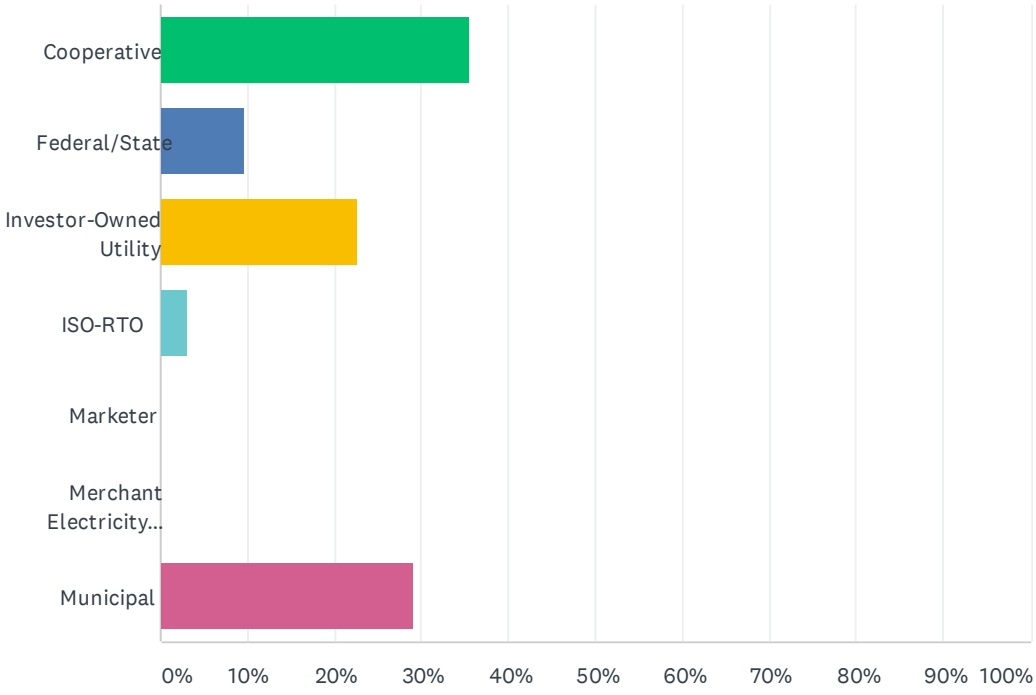
Q2 What is the name of your company?

Answered: 31 Skipped: 0

#	RESPONSES	DATE
1	Brazos Electric Power Cooperative	5/17/2021 5:04 PM
2	MEAG Power	5/17/2021 12:27 PM
3	North Carolina Electric Membership Corporation	5/17/2021 9:12 AM
4	FMPA	5/14/2021 11:32 AM
5	Piedmont EMC	5/13/2021 11:35 AM
6	Tennessee Valley Authority	5/13/2021 11:14 AM
7	Tennessee Valley Authority	5/13/2021 10:58 AM
8	Oglethorpe Power Corporation	5/13/2021 10:49 AM
9	South Carolina Public Service Authority (Santee Cooper)	5/13/2021 8:19 AM
10	Lakeland Electric	5/13/2021 7:15 AM
11	Washington-St. Tammany Electric Cooperative	5/13/2021 6:57 AM
12	NextEra Energy	5/12/2021 1:45 PM
13	Seminole Electric Cooperative	5/12/2021 9:29 AM
14	City of Bartow	5/12/2021 7:46 AM
15	East Kentucky Power Cooperative	5/11/2021 10:15 AM
16	City of Tallahassee	5/10/2021 2:14 PM
17	LG&E and KU Services Company	5/10/2021 10:02 AM
18	PowerSouth Energy Cooperative	5/9/2021 7:27 PM
19	Duke Energy	5/8/2021 2:38 PM
20	LG&E/KU	5/7/2021 1:38 PM
21	Orlando Utilities Commission	5/7/2021 11:51 AM
22	Duke Energy Florida	5/7/2021 10:39 AM
23	AECI	5/7/2021 9:46 AM
24	Duke Energy Carolinas	5/7/2021 8:49 AM
25	Duke Energy	5/7/2021 8:23 AM
26	ElecriCities	5/6/2021 3:30 PM
27	Owensboro Municipal Utilities	5/6/2021 3:15 PM
28	JEA	5/6/2021 9:27 AM
29	Georgia System Operations Corporation	5/6/2021 9:22 AM
30	Georgia Transmission Corporation (GTC)	5/6/2021 8:46 AM
31	Florida Reliability Coordinating Council, Inc.	5/6/2021 8:12 AM

Q3 Choose your company's sector from the list.

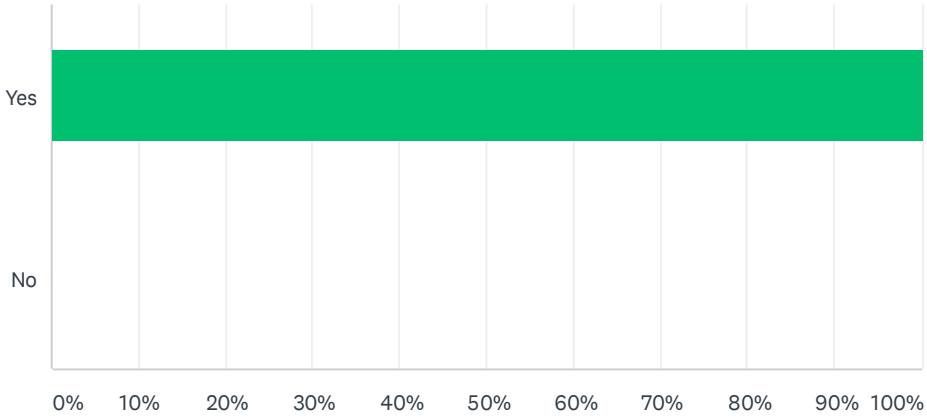
Answered: 31 Skipped: 0



ANSWER CHOICES	RESPONSES	
Cooperative	35.48%	11
Federal/State	9.68%	3
Investor-Owned Utility	22.58%	7
ISO-RTO	3.23%	1
Marketer	0.00%	0
Merchant Electricity Generator	0.00%	0
Municipal	29.03%	9
TOTAL		31

Q4 Do you approve of the proposed changes in PRC-006-SERC-03?

Answered: 31 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	100.00%	31
No	0.00%	0
Total Respondents: 31		

Q5 Please list any comments below.

Answered: 3 Skipped: 28

#	RESPONSES	DATE
1	The header on pdf pages 8-17 needs to be updated to show version -03. All the information in the row for Requirement R7 in Table 1 needs to be completely deleted (see the bottom of pdf page 10). The row for Requirement R8 in Table 1 needs to be updated to show the changes for R8 – i.e. adding the Planning Coordinator. See Dennis Chastain (Federal sector) for further comments from Tennessee Valley Authority	5/13/2021 11:14 AM
2	I suggest that R1 and R7 be retained in the standard as placeholders with the word “Reserved” by them (reference FAC-008-5 R4, R5 and R7 as a NERC standard example). Alternatively, renumber the requirements as R1-R6. Also suggest that the rows formerly addressing R1 and R7 be removed from Table 1. The row where R1 used to be is blank, and the row where R7 used to be is still partially filled in with Violation Severity Level descriptions for the retired R7.	5/13/2021 10:58 AM
3	Yes, agree with Standard language	5/7/2021 8:49 AM

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Exhibit E

Standard Drafting Team Roster for PRC-006-SERC-03 - Automatic Underfrequency Load Shedding

PRC-006-SERC Standard Drafting Team Committee Members

Name	Company	Position
Alex Graffeo	Tallahassee, City of	Member
Amy Duffield	Seminole Electric Cooperative	Member
Andrew Arana	Florida Power & Light Company	Member
Andrew Underwood	Dominion Energy South Carolina, Inc.	Member
Anthony Noisette	South Carolina Public Service Authority	Member
Armin Karabegovic	City of Columbia, MO	Member
Austin McLimore	Owensboro, KY Municipal Utilities	Member
Benjamin Garffie	LG&E and KU Services Company	Member
Brian Bell	City of Springfield, IL - CWLP	Member
Brian Leach	Owensboro, KY Municipal Utilities	Member
Brian Ulmer	Dominion Energy South Carolina, Inc.	Member
Bryan Garst	Big Rivers Electric Corporation	Member
Carl Turner	City of Ocala Electric Utility	Member
Chris Bradley	Big Rivers Electric Corporation	Member
Chris Daniels	City of Springfield, IL - CWLP	Member
Darrin Adams	Subregion	Member
Edin Bajagilovic	JEA	Member
Ejovi Ovhori	Duke Energy Carolinas, LLC	Member
Eric Worts	City of Columbia, MO	Member
Fabio Rodriguez	Duke Energy Florida, LLC	Member
Hanna Georgos	Tampa Electric Company	Member
Hasan Matin	Orlando Utilities Commission	Member
Hugues Balde	Tallahassee, City of	Member
Ian Gray	Cleco Corporate Holdings LLC	Member
James Simms	Cleco Corporate Holdings LLC	Member
James Vermillion	Associated Electric Cooperative, Inc.	Member
Jason Goar	Cooperative Energy	Member
Jeff Jones	Southern Illinois Power Cooperative	Member
Jennifer Bell	Southern Company Services, Inc. - Trans	Member
John Lee	Florida Municipal Power Agency	Member
John Sullivan	Ameren Services Company	Member
Jonathan Glidewell	Southern Company Services, Inc. - Trans	Member

Kanchan Saxena	Entergy	Member
Kayla Allemang	Seminole Electric Cooperative	Member
Ken Wofford	Officer	Member
Ken Wofford	Georgia Transmission Corporation	Member
Khalid Osman	Alcoa Power Generating Inc. - Tapoco Division	Member
Khalid Osman	Cube Hydro Carolinas, LLC	Member
Kristy Baksh	Tampa Electric Company	Member
Kyle Clifford	PJM Interconnection, LLC	Member
Larry Burns	Southern Illinois Power Cooperative	Member
Matthew Fullerton	Alcoa Power Generating Inc. - Tapoco Division	Member
Michael Norman	East Kentucky Power Cooperative	Member
Nathan Bradley	East Kentucky Power Cooperative	Member
Patrick Harwood	Florida Reliability Coordinating Council, Inc.	Member
Paul Geer	Florida Power & Light Company	Member
Pranaya Neupane	JEA	Member
Rachel Ibuado	GridLiance Holdco, LP	Member
Rick Foster	Ameren Services Company	Member
Robbie Bottoms	Tennessee Valley Authority	Member
Robert Bartley	Dominion Energy South Carolina, Inc.	Member
Robert DeMelo	Seminole Electric Cooperative	Member
Scott Goodwin	Midcontinent Independent System Operator, Inc.	Member
Stephen Lowe	South Carolina Public Service Authority	Member
Tao He	PJM Interconnection, LLC	Member
Timothy Poole	Cube Hydro Carolinas, LLC	Member
Tom Cain	Tennessee Valley Authority	Member
Venkat Kolluri	Entergy	Member
William Quaintance	Duke Energy Progress, LLC	Member
Yan Xia	LG&E and KU Services Company	Member
Yishan Zhao	Duke Energy Carolinas, LLC	Member
Youn Chu	Officer	Member
Youn Chu	Duke Energy Progress, LLC	Member
Zack Stica	Associated Electric Cooperative, Inc.	Member
Zakia El Omari	Georgia Transmission Corporation	Member
Anton Salib	Midcontinent Independent System Operator, Inc.	Member

Steven Hataway	Florida Power & Light Company	Member
Juan Villar	FERC	Observer
Dennis Fuentes Pedrosa	FERC	Observer
Dave Krueger	SERC	SERC Support Staff
Courtney Ballard	SERC	SERC Support Staff
Gaurav Karandikar	SERC	SERC Support Staff