February 1, 2012

VIA ELECTRONIC FILING

Ms. Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, N.E.
Washington, D.C. 20426

Re: *North American Electric Reliability Corporation*
Docket No. RD12-___-000

Dear Ms. Bose:

The North American Electric Reliability Corporation ("NERC") hereby submits this petition in accordance with Section 215(d) (1) of the Federal Power Act ("FPA") and Part 39.5 of the Federal Energy Regulatory Commission's ("FERC") regulations seeking approval of proposed Regional Reliability Standard PRC-006-SERC-01 — Automatic Underfrequency Load Shedding Requirements ("UFLS") in the Southeastern Electric Reliability Council ("SERC") Region, associated Violation Severity Levels ("VSL") and Violation Risk Factors ("VRF"), and the implementation plan for PRC-006-SERC-01.

The proposed Regional Reliability Standard was approved by the NERC Board of Trustees during its November 3, 2011, meeting. NERC requests the standard become effective over a 30-month window following the effective date of a Final Rule in this

docket as provided in the implementation plan to allow entities to respond to any changes in UFLS settings.[1]

This petition consists of the following:

- this transmittal letter;
- a table of contents for the entire petition;
- a narrative description explaining how the proposed Regional Reliability Standard meets FERC's requirements;
- Regional Reliability Standard PRC-006-SERC-01 — Automatic Underfrequency Load Shedding Requirements and Implementation Plan, submitted for approval (**Exhibit A**);
- the NERC Board of Trustees' Resolution approving PRC-006-SERC-01 — Automatic Underfrequency Load Shedding Requirements and directing it be filed with FERC (**Exhibit B**);
- the complete Development Record of the proposed Regional Reliability Standard (**Exhibit C**);
- the Standard Drafting Team roster (**Exhibit D**); and
- the Violation Severity Level and Violation Risk Factor Guideline Analysis (**Exhibit E**).

Please contact the undersigned if you have any questions.

Respectfully submitted,

/s/ Willie L Phillips
Willie L. Phillips
Attorney for North American Electric Reliability Corporation

[1] The implementation date of Requirement R1 is dependent on FERC adoption of the continent-wide standard PRC-006-1, which is pending in Docket No. RM11-20-000, available at: http://www.nerc.com/files/Final_PRC-006-1_EOP-003-2_2011.03.31.pdf.

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION	**)**	**Docket No. RD12-__-000**

PETITION OF THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION FOR APPROVAL OF PROPOSED SERC REGIONAL RELIABILITY STANDARD PRC-006-SERC-01 — AUTOMATIC UNDERFREQUENCY LOAD SHEDDING REQUIREMENTS

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February 1, 2012

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I. INTRODUCTION

The North American Electric Reliability Corporation ("NERC")[2] hereby requests the Federal Energy Regulatory Commission ("FERC" or "Commission") to approve, in accordance with Section 215(d)(1) of the Federal Power Act ("FPA")[3] and Section 39.5 of FERC's regulations, 18 C.F.R. § 39.5, proposed Regional Reliability Standard, PRC-006-SERC-01 – Automatic Underfrequency Load Shedding Requirements included in **Exhibit A**.

This petition is the first request for FERC approval of this proposed Regional Reliability Standard. The Regional Reliability Standard proposed will be in effect only for applicable registered entities within the SERC region. NERC continent-wide Reliability Standards do not presently address the issues covered in this proposed Regional Reliability Standard.

On November 3, 2011, the NERC Board of Trustees approved PRC-006-SERC-01 — Automatic Underfrequency Load Shedding Requirements for the SERC region. NERC requests that this Regional Reliability Standard be made effective upon FERC approval. **Exhibit A** to this filing sets forth the proposed Regional Reliability Standard and Implementation Plan. **Exhibit B** is the NERC Board of Trustees' resolution to approve the proposed Regional Reliability Standard. **Exhibit C** contains the complete record of development for the proposed Regional Reliability Standard. **Exhibit D** includes the standard drafting team roster. **Exhibit E** is the Violation Severity Level ("VSL") and Violation Risk Factor ("VRF") guideline analysis.

[2] NERC has been certified by FERC as the Electric Reliability Organization ("ERO") authorized by Section 215 of the Federal Power Act. FERC certified NERC as the ERO in its order issued July 20, 2006 in Docket No. RR06-1-000. 116 FERC ¶ 61,062 (2006) ("ERO Certification Order).
[3] 16 U.S.C. 824o.

II. NOTICES AND COMMUNICATIONS

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

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*Persons to be included on FERC's service list are indicated with an asterisk. NERC requests waiver of FERC's rules and regulations to permit the inclusion of more than two people on the service list.

III. BACKGROUND

a. Regulatory Framework

By enacting the Energy Policy Act of 2005,[4] Congress entrusted FERC 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 FERC approval. Section 215 of the FPA states that all users, owners and operators of the Bulk Power System in the United States will be subject to FERC-approved Reliability Standards.

[4] 16 U.S.C. § 824o.

b. Basis for Approval of Proposed Regional Reliability Standard

Section 39.5(a) of FERC's regulations requires the ERO to file with FERC for its approval each Reliability Standard that the ERO proposes to become mandatory and enforceable in the United States, and each modification to a Reliability Standard that the ERO proposes to be made effective. FERC has the regulatory responsibility to approve standards that protect the reliability of the Bulk Power System. In discharging its responsibility to review, approve, and enforce mandatory Reliability Standards, FERC is authorized to approve those proposed Reliability Standards that meet the criteria detailed by Congress:

> FERC may approve, by rule or order, a proposed reliability standard or modification to a reliability standard if it determines that the standard is just, reasonable, not unduly discriminatory or preferential, and in the public interest.[5]

Order No. 672 provides guidance on the factors FERC will consider when determining whether proposed Reliability Standards meet the statutory criteria. [6] A Regional Reliability Standard proposed by a Regional Entity must meet the same standards that NERC's Reliability Standards must meet, *i.e.*, the Regional Reliability Standard must be shown to be just, reasonable, not unduly discriminatory or preferential, and in the public interest.[7] FERC's Order No. 672 also requires additional criteria that a Regional Reliability Standard must satisfy: A regional difference from a continent-wide Reliability Standard must either be (1) more stringent than the continent-wide Reliability Standard (which includes a regional standard that addresses matters that the continent-

[5] 16 U.S.C. § 824o(d)(2).
[6] *See Rules Concerning Certification of the Electric Reliability Organization; Procedures for the Establishment, Approval and Enforcement of Electric Reliability Standards*, FERC Stats. & Regs., ¶ 31,204 (2006) ("Order No. 672") at P 344, *order on reh'g*, FERC Stats. & Regs. ¶ 31,212 (2006) ("Order No. 672-A").
[7] Section 215(d)(2) of the FPA and 18 C.F.R. §39.5(a).

wide Reliability Standard does not), or (2) necessitated by a physical difference in the Bulk Power System.[8]

As noted in the *SERC Regional Standards Development Procedure,* SERC's standards are developed according to the following characteristic attributes: [9]

- Openness – Participation in the development of a SERC Regional Reliability Standard shall be open to all organizations that are directly and materially affected by the SERC bulk power system reliability.

- Balance – The SERC Regional Reliability Standards Development Procedure strives to have an appropriate balance of interests and shall not be dominated by any two interest categories and no single interest category shall be able to defeat a matter.

- Inclusive – Any entity (person, organization, company, government agency, individual, etc.) with a direct and material interest in the bulk power system in the SERC area shall have a right to participate.

- Fair due process – The SERC Regional Reliability Standards Development Procedure provides for reasonable notice and opportunity for public comment.

- Transparent – All actions material to the development of SERC Regional Reliability Standards are transparent and information regarding the progress is posted on the SERC website as well as through extensive email lists.

- Due Course – Does not unnecessarily delay development of the proposed SERC Regional Reliability Standard.

SERC Regional Standards are subject to approval by NERC, as the ERO, and FERC before becoming mandatory and enforceable under Section 215 of the FPA.[10] NERC Reliability Standards and the SERC Regional Reliability Standards are both enforced through the SERC Compliance Program.

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[8] Order No. 672 at P 291.
[9] The *SERC Regional Standards Development Process* is available at: http://www.serc1.org/Documents/SERC%20Standards%20Committee/SERC%20DA%20Exhibit%20C%20-%20Regional%20Standards%20Development%20Procedure%20(1-3-09).pdf.
[10] 16 U.S.C. 824o.

The proposed SERC Regional Reliability Standard was developed in an open, transparent, and inclusive fashion. Specifically, the proposed Regional Reliability Standard was developed using the *SERC Regional Standards Development Procedure*[11] that enables all parties with an interest in the standard to participate in its development. NERC's public posting of this proposed Regional Reliability Standard did not elicit any significant technical objection. In addition, NERC has determined that the proposed standard meets the criteria for consideration and approval as a Regional Reliability Standard.

IV. JUSTIFICATION FOR APPROVAL OF PROPOSED REGIONAL RELIABILITY STANDARD

This section summarizes the development of the proposed Regional Reliability Standard PRC-006-SERC-01 — Automatic Underfrequency Load Shedding Requirements; describes the reliability objectives to be achieved by the Regional Reliability Standard; explains the development history of the Regional Reliability Standard; and demonstrates how the standard meets the FERC criteria for approval. NERC, in its analysis and approval of the proposed Regional Reliability Standard, determined that the standard is just, reasonable, not unduly discriminatory or preferential, and in the public interest.

The complete development record for the proposed Regional Reliability Standard is provided in **Exhibit C** and includes the development and approval process, comments received during the industry-wide comment period, responses to those comments, ballot information, and NERC's evaluation of the proposed standard.

[11] The SERC *Regional Standards Development Procedure* is available at: http://www.serc1.org/Documents/SERC%20Standards%20Committee/SERC%20DA%20Exhibit%20C%20-%20Regional%20Standards%20Development%20Procedure%20(1-3-09).pdf.

a. Basis and Purpose of Standard PRC-006-SERC-01 — Automatic Underfrequency Load Shedding Requirements

The proposed Regional Reliability Standard, PRC-006-SERC-01 — Automatic Underfrequency Load Shedding Requirements provides regional underfrequency load shedding ("UFLS") requirements for registered entities in the SERC Region. UFLS requirements had been in place at a continent-wide level and within SERC for many years prior to implementation of FERC-approved Reliability Standards in 2007. The SERC regional UFLS standard has been developed to be consistent with the NERC UFLS standard. The purpose of the standard is to establish consistent and coordinated requirements for the design, implementation, and analysis of automatic UFLS schemes among all applicable entities within the SERC Region.

b. Order No. 672 Criteria

In Order No. 672, FERC identified 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.

> Order No. 672 at P 321. The proposed Reliability Standard must address a reliability concern that falls within the requirements of section 215 of the FPA. That is, it must provide for the reliable operation of Bulk-Power System facilities. It may not extend beyond reliable operation of such facilities or apply to other facilities. Such facilities include all those necessary for operating an interconnected electric energy transmission network, or any portion of that network, including control systems. The proposed Reliability Standard may apply to any design of planned additions or modifications of such facilities that is necessary to provide for reliable operation. It may also apply to Cybersecurity protection.

The proposed Regional Reliability Standard, PRC-006-SERC-01, is designed to ensure that automatic UFLS protection schemes designed by Planning Coordinators and implemented by applicable Distribution Providers and Transmission Owners in the SERC region are coordinated so they may effectively mitigate the consequences of an underfrequency event.

2. Proposed Reliability Standards must be applicable to users, owners, and operators of the bulk power system, and not others.

> Order No. 672 at P 322. The proposed Reliability Standard may impose a requirement on any user, owner, or operator of such facilities, but not on others.

The proposed Regional Reliability Standard is only applicable to Generator Owners, Planning Coordinators, and UFLS entities in the SERC region. The term "UFLS entities" (as noted in NERC standard PRC-006-1) means all entities that are responsible for the ownership, operation, or control of automatic UFLS equipment as required by the UFLS program established by the Planning Coordinators.[12] Such entities may include Distribution Providers and Transmission Owners.

3. Proposed Reliability Standards must consider any other relevant factors.

> Order No. 672 at P 323. In considering whether a proposed Reliability Standard is just and reasonable, we will consider the following general factors, as well as other factors that are appropriate for the particular Reliability Standard proposed.

Exhibit C presents an overview of the issues raised in consideration of the proposed standard that demonstrates how industry comments are addressed in this standard development project. All comments and concerns were addressed using the *SERC Regional Standards Development Procedure* which is consensus-based, technically

[12] *See* NERC Reliability Standard PRC-006-1, available at: http://www.nerc.com/files/PRC-006-1.pdf.

sound, and open to the public and bordering entities that may be impacted by a Regional Reliability Standard. No other factors were identified as necessary for consideration by the standard drafting team in the development of the proposed Regional Reliability Standard.

4. Proposed Reliability Standards must contain a technically sound method to achieve the goal.

> Order No. 672 at P 324. The proposed Reliability Standard must be designed to achieve a specified reliability goal and must contain a technically sound means to achieve this goal. Although any person may propose a topic for a Reliability Standard to the ERO, in the ERO's process, the specific proposed Reliability Standard should be developed initially by persons within the electric power industry and community with a high level of technical expertise and be based on sound technical and engineering criteria. It should be based on actual data and lessons learned from past operating incidents, where appropriate. The process for ERO approval of a proposed Reliability Standard should be fair and open to all interested persons.

The proposed Regional Reliability Standard contains a technically sound means to achieve this goal as it adds specificity for development and implementation of UFLS schemes in the SERC Region that is not contained in the NERC UFLS Reliability Standard, PRC-006-1.

5. Proposed Reliability Standards must be clear and unambiguous as to what is required and who is required to comply.

> Order No. 672 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.

- The proposed Regional Reliability Standard establishes clear and unambiguous requirements for all applicable entities, as it detailed below:

  Requirement 1 requires Planning Coordinators to include its SERC

subregion as an identified island when developing criteria for selecting portions of the Bulk Power System that may form islands.

- Requirement 2 requires the Planning Coordinator to 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 specified minimum requirements.
- Requirement 3 requires the Planning Coordinator to conduct simulations of its UFLS scheme for an imbalance between load and generation of 13%, 22%, and 25% for all identified islands.
- Requirement 4 requires each UFLS entity that has a total load of 100 MW or greater in a Planning Coordinator area in the SERC Region to implement the UFLS scheme developed by their Planning Coordinator within specified tolerances.
- Requirement 5 requires each UFLS entity that has a total load less than 100 MW in a Planning Coordinator area in the SERC Region to implement the UFLS scheme developed by their Planning Coordinator within specified tolerances, but specifies that those entities shall not be required to have more than one UFLS step.
- Requirement 6 requires each UFLS entity in the SERC Region to implement changes to the UFLS scheme which involve frequency settings, relay time delays, or changes to the percentage of load in the scheme within 18 months of notification by the Planning Coordinator.

- Requirement 7 requires each Planning Coordinator to provide specified information concerning their UFLS scheme to SERC according to the schedule specified by SERC.
- Requirement 8 requires each Generator Owner to provide specified generator underfrequency and overfrequency protection information within 30 days of a request by SERC to facilitate post-event analysis of frequency disturbances.

6. Proposed Reliability Standards must include clear and understandable consequences and a range of penalties (monetary and/or non-monetary) for a violation.

> Order No. 672 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.

The proposed Regional Reliability Standard includes a VRF and VSL for each requirement. The ranges of penalties for violations will be based on the applicable VRFs and VSLs and will be administered based on the sanctions table and supporting penalty determination process described in the FERC-approved NERC Sanction Guidelines.[13]

SERC developed the VSLs and VRFs proposed for assignment to PRC-006-SERC-01 in accordance with applicable NERC and FERC guidance. **Exhibit E** to this filing contains the VSL and VRF guideline analysis for PRC-006-SERC-01.

7. A proposed Reliability Standard must identify clear and objective criterion or measure for compliance, so that it can be enforced in a consistent and non-preferential manner.

> 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

[13] NERC Rules of Procedure Appendix 4B, available at: http://www.nerc.com/files/NERC_Rules_of_Procedure_EFFECTIVE_20111117.pdf.

compliance so that it can be enforced and so that enforcement can be applied in a consistent and non-preferential manner.

Each requirement of PRC-006-SERC-01 has an associated measure of compliance that will assist those enforcing the standard in enforcing it in a consistent and non-preferential manner. The proposed measures are as follows:

> **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.
>
> **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.
>
> **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.
>
> **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.
>
> **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.
>
> **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.

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.

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.

8. 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.

> Order No. 672 at P 328. The proposed Reliability Standard does not necessarily have to reflect the optimal method, or "best practice," for achieving its reliability goal without regard to implementation cost or historical regional infrastructure design. It should however achieve its reliability goal effectively and efficiently.

Regional Reliability Standard PRC-006-SERC-01 achieves its reliability goal effectively and efficiently. The proposed standard sets minimum automatic UFLS design requirements which are equivalent to the design requirements in the SERC UFLS program that has been in effect since September 3, 1999. The one change is the addition of a minimum time delay requirement to prevent spurious operations. This will allow Planning Coordinators to use current UFLS schemes if those schemes meet the performance requirements specified in the NERC UFLS standard. That will in turn require applicable Distribution Providers and Transmission Owners to make minimal changes to implement their portions of the UFLS schemes.

9. Proposed Reliability Standards cannot be "lowest common denominator," *i.e.*, cannot reflect a compromise that does not adequately protect bulk power system reliability.

> Order No. 672 at P 329. The proposed Reliability Standard must not simply reflect a compromise in the ERO's Reliability Standard development process based on the least effective North American practice — the so-called "lowest common denominator" — if such practice does not adequately protect Bulk-Power System reliability. Although [FERC] will give due weight to the technical expertise of the ERO, [FERC] will

> not hesitate to remand a proposed Reliability Standard if [FERC is] convinced it is not adequate to protect reliability.

This proposed Regional Reliability Standard does not reflect a "lowest common denominator" approach. PRC-006-SERC-01 achieves its reliability goal of providing for the last resort system preservation measures. The standard was designed to be consistent with the NERC automatic UFLS standard, while adding specificity not contained in the NERC standard for the development, coordination, implementation, and analysis of UFLS schemes in the SERC Region.

10. Proposed Reliability Standards may consider costs to implement for smaller entities but not at consequence of less than excellence in operating system reliability.

> Order No. 672 at P 330. A proposed Reliability Standard may take into account the size of the entity that must comply with the Reliability Standard and the cost to those entities of implementing the proposed Reliability Standard. However, the ERO should not propose a "lowest common denominator" Reliability Standard that would achieve less than excellence in operating system reliability solely to protect against reasonable expenses for supporting this vital national infrastructure. For example, a small owner or operator of the Bulk-Power System must bear the cost of complying with each Reliability Standard that applies to it.

The cost to implement for smaller entities was considered during the development of the proposed Regional Reliability Standard, PRC-006-SERC-01. The NERC automatic UFLS standard (PRC-006-1) requires the Planning Coordinator to identify which entities will participate in their UFLS scheme, including the number of steps and percent load an entity will shed. The SERC UFLS standard drafting team recognized 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.

Accordingly, Requirement R5 states that such entities shall not be required to have more than one UFLS step, and sets their implementation tolerance to a wider level.

This should limit any additional cost required of smaller entities to comply with the standard, but with minimal consequence to operating system reliability.

11. 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 area or approach.

> Order No. 672 at P 331. A proposed Reliability Standard should be designed to apply throughout the interconnected North American Bulk-Power System, to the maximum extent this is achievable with a single Reliability Standard. The proposed Reliability Standard should not be based on a single geographic or regional model but should take into account geographic variations in grid characteristics, terrain, weather, and other such factors; it should also take into account regional variations in the organizational and corporate structures of transmission owners and operators, variations in generation fuel type and ownership patterns, and regional variations in market design if these affect the proposed Reliability Standard.

The proposed Regional Reliability Standard is designed on a regional basis and will only apply to the SERC region. It is not intended to be applied throughout North America.

12. Proposed Reliability Standards should cause no undue negative effect on competition or restriction of the grid.

> Order No. 672 at P 332. As directed by section 215 of the FPA, [FERC] itself will give special attention to the effect of a proposed Reliability Standard on competition. The ERO should attempt to develop a proposed Reliability Standard that has no undue negative effect on competition. Among other possible considerations, a proposed Reliability Standard should not unreasonably restrict available transmission capability on the Bulk-Power System beyond any restriction necessary for reliability and should not limit use of the Bulk-Power System in an unduly preferential manner. It should not create an undue advantage for one competitor over another.

This proposed Regional Reliability Standard does not cause undue negative effects on competition or restriction of the grid. Because this standard will be applied

equally across the SERC region, PRC-006-SERC-01 will not negatively affect competition, or restrict available transmission capability within the SERC footprint.

13. The implementation time for the proposed Reliability Standards must be reasonable.

> Order No. 672 at P 333. In considering whether a proposed Reliability Standard is just and reasonable, [FERC] will consider also the timetable for implementation of the new requirements, including how the proposal balances any urgency in the need to implement it against the reasonableness of the time allowed for those who must comply to develop the necessary procedures, software, facilities, staffing or other relevant capability.

The proposed Reliability Standard will become fully effective 30 months after the first day of the first quarter following regulatory approval. The implementation time for the proposed Reliability Standard is reasonable, as it balances the need for reliability with the practicability of implementation, as detailed below:

- Requirement R1 shall become effective 12 months after the first day of the first quarter following regulatory approval, but no sooner than 12 months following regulatory approval of NERC PRC-006-1. This 12-month period is consistent with the effective date of R2 of PRC-006-1.
- Requirement R2 shall become effective 12 months after the first day of the first quarter following regulatory approval. This 12-month period is needed to allow time for entities to ensure a minimum time delay of six cycles on existing automatic UFLS relays as specified in part 2.6.
- Requirements R3 shall become effective 18 months after the first day of the first quarter following regulatory approval. This additional six-month period is needed to allow time to perform and coordinate studies necessary

to assess the overall effectiveness of the UFLS schemes in the SERC Region.

- Requirements R4, R5, and R6 shall become effective 30 months after the first day of the first quarter following regulatory approval. This additional 18 months is needed to allow time for any necessary changes to be made to the existing UFLS schemes in the SERC Region.
- Requirement R7 shall become effective six months following the effective date of R8 of the NERC standard PRC-006-1, but no sooner than one year following the first day of the first calendar quarter after applicable regulatory approval of PRC-006-SERC-01. R8 of the NERC standard requires each UFLS entity to provide UFLS data to the Planning Coordinator. R7 of the SERC standard requires the Planning Coordinator to provide this data to SERC.
- Requirement R8 shall become effective 12 months after the first day of the first quarter following regulatory approval. This 12-month period is needed to allow time for Generator Owners to collect and make an initial data filing.

14. The Reliability Standard development process must be open and fair.

> Order No. 672 at P 334. Further, in considering whether a proposed Reliability Standard meets the legal standard of review, we will entertain comments about whether the ERO implemented its [FERC]-approved Reliability Standard development process for the development of the particular proposed Reliability Standard in a proper manner, especially whether the process was open and fair. However, we caution that we will not be sympathetic to arguments by interested parties that choose, for whatever reason, not to participate in the ERO's Reliability Standard development process if it is conducted in good faith in accordance with the procedures approved by [FERC].

SERC develops Regional Reliability Standards in accordance with **Exhibit C** (*SERC Regional Standards Development Procedure*), which is part of SERC's Regional Delegation Agreement with NERC. The development process is open to any person or entity with a legitimate interest in the reliability of the Bulk Power System. SERC considers the comments of all stakeholders and an affirmative vote of the stakeholders and the SERC Board of Directors are both required to approve a Regional Reliability Standard for submission to NERC and FERC.

The proposed Regional Reliability Standard has been developed and approved by industry stakeholders using SERC's *Regional Standards Development Procedure* and was approved by the Executive Committee of the SERC Board of Directors on September 19, 2011. The standard was subsequently presented to, and approved by the NERC Board of Trustees November 3, 2011. Therefore, SERC has utilized its standard development process in good faith and in a manner that is open and fair. No commenters disagreed with the open and fair implementation of the SERC process.

15. Proposed Reliability Standards must be balanced against other vital public interests.

> Order No. 672 at P 335. Finally, we understand that at times development of a proposed Reliability Standard may require that a particular reliability goal must be balanced against other vital public interests, such as environmental, social and other goals. We expect the ERO to explain any such balancing in its application for approval of a proposed Reliability Standard.

There are no competing public interests with the request for approval of this proposed Regional Reliability Standard. No comments were received that indicated the proposed standard conflicts with other vital public interests. Therefore, it is not

necessary to balance this Reliability Standard against any other competing public interests.

16. Proposed Reliability Standard must not conflict with prior FERC Rules or Orders.

> Order No. 672 at P 444. A potential conflict between a Reliability Standard under development and a Transmission Organization function, rule, order, tariff, rate schedule, or agreement accepted, approved, or ordered by the Commission should be identified and addressed during the ERO's Reliability Standard Development Process.

The proposed PRC-006-SERC-01 Regional Reliability Standard does not conflict with any other prior FERC Rules or Orders and adequately addresses the directives identified in FERC Order No. 693.

c. Additional Order No. 672 Criteria for Regional Reliability Standards

FERC Order No. 672 also establishes additional criteria that a Regional Reliability Standard must satisfy: "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 the continent-wide Reliability Standard does not, or (2) a Regional Reliability Standard that is necessitated by a physical difference in the Bulk-Power System."[14] The proposed standard satisfies these additional criteria.

The existing NERC continent-wide standard, PRC-006-1 applies only to Planning Coordinators, Transmission Owners, and Distribution Providers. The proposed SERC standard, PRC-006-SERC-01, adds specificity not contained in the NERC UFLS standard for UFLS schemes in the SERC Region. Specifically, it is designed to work in conjunction with the NERC standard to effectively mitigate the consequences of an

[14] Order No. 672 at P 291.

underfrequency event, while accommodating differences in system transmission and distribution topology among SERC Planning Coordinators due to historical design criteria, makeup of load demands, and generation resources.

V. SUMMARY OF THE REGIONAL RELIABILITY STANDARD DEVELOPMENT PROCEEDINGS

On June 24, 2011, SERC submitted the proposed Regional Reliability Standard for evaluation and approval to NERC in accordance with NERC's *Rules of Procedure* and *Regional Reliability Standards Evaluation Procedure* that was approved by NERC's Regional Reliability Standards Working Group. [15] NERC provided its evaluation of the proposed PRC-006-SERC-01 standard to SERC on July 11, 2011, included in **Exhibit C**. In this report, NERC provided minor formatting and wording suggestions to several requirements. SERC modified the proposed standard in response to NERC's suggestions.

A. Key Issues

During the 45-day NERC posting, three key issues were raised. One entity commented that they were concerned that PRC-006-SERC-001, R2, is too prescriptive and may not allow Planning Coordinators the flexibility and discretion needed to ensure reliability. SERC responded that 18 different schemes are already being used within the SERC footprint. Removing the requirements specified in R2 may lead to even more diverse schemes and increase the probability of non-coordination within SERC. The requirements specified in R2 are presently included within approved SERC Regional Criteria. These requirements allow for a high degree of flexibility in developing a UFLS scheme while promoting proper coordination among neighboring schemes both within

[15] *Regional Reliability Standards Evaluation Procedure, Version 1* (2009). Available at: http://www.nerc.com/docs/sac/rrswg/NERC_Regional_Reliability_Evaluation_Procedure.pdf.

and outside SERC. There should be no coordination issues with schemes in other regions since all of the schemes have to meet the performance characteristics in the NERC continent-wide Standard PRC-006-1.

Another entity commented that it was not clear that the criteria proposed in this standard are really more specific than the performance criteria proposed in the NERC Standard PRC-006-1. It was not apparent to the commenter that there is an issue particular to the SERC Region that is different than the rest of the Eastern Interconnection. SERC responded that the primary purpose of the SERC regional Standard was to provide region specific requirements for the implementation of NERC standard PRC-006-1 requirements with the goal of adding clarity and providing consistency. The requirements already included in the NERC UFLS standard were not repeated in the SERC standard. In addition to providing regional consistency and coordination, the requirements of the SERC Standard also are more stringent than the national standard.

Finally, one entity commented that Generator Owners will only be subject to PRC-006-SERC-01 Requirement R8 and its three sub-requirements. These requirements and sub-requirements call for Generator Owners to provide SERC with their generator frequency relay set points, clearing times, and maximum MW that could be separated from the system; within 30 days of a request. Requirement R8 further qualifies the reliability need is to "facilitate post-event analysis of frequency disturbances." However, the commenter noted that SERC already has the authority to gather disturbance-related information from Generator Operators under EOP-004-1. If this is not sufficient, the commenter argued, MOD-010-0 and MOD-012-0 require Generator Owners to provide

static and dynamic generator modeling data in accordance with the Regional Entity's specification. Thus, it would seem that SERC's specification could be modified to accommodate frequency relay data without creating any new enforceable reliability requirements.

SERC responded that, while Attachment 1-EOP-004 NERC Disturbance Report Form requires a report to be filed in response to an event where frequency or voltage goes "below the under-frequency or under-voltage load shed" set points, the form does not include the requirement to report the information spelled out in requirement R8 of PRC-006-SERC-01. In addition, the MOD-010-0, MOD-012-0, and associated SERC regional criteria, do not require that generator underfrequency and overfrequency protective setpoints be provided. The inclusion of this requirement in the proposed standard ensures that the SERC region receives necessary information. Including this requirement in the standard also provides adequate notification to entities regarding providing specific data upon request to facilitate post-event analysis of frequency disturbances.

B. Violation Risk Factors and Violation Severity Levels

The VRFs and VSLs for this standard were developed and reviewed for consistency with NERC and FERC guidelines.[16] Analyses of the assigned VRFs and VSLs to this standard are included in **Exhibit E**.

[16] *See Order on Violation Risk Factors*, 119 FERC ¶ 61,145 (2007) and *Order on Violation Severity Levels Proposed by the Electric Reliability Organization*, 123 FERC ¶ 61,284 (2008).

VI. CONCLUSION

For the reasons stated above, NERC respectfully requests that FERC approve the proposed PRC-006-SERC-01 Regional Reliability Standard, the associated proposed definitions, and the associated Implementation Plan included in **Exhibit A** to this filing in accordance with Section 215(d)(1) of the FPA and Part 39.5 of FERC's regulations. NERC requests that these approvals be made effective in accordance with the Implementation Plan for PRC-006-SERC-01 included in **Exhibit A** to this filing.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that I have served a copy of the foregoing document upon all parties listed on the official service list compiled by the Secretary in this proceeding.

Dated at Washington, D.C. this 1st day of February, 2012.

/s/ Willie L. Phillips
Willie L. Phillips
Attorney for North American Electric Reliability Corporation

Exhibit A

Proposed Regional Reliability Standard PRC-006-SERC-01 — Automatic Underfrequency Load Shedding Requirements and Implementation Plan for Approval

Effective Dates

Requirement	Jurisdiction									
	Alberta	British Columbia	Manitoba	New Brunswick	Newfound-land	Nova Scotia	Ontario	Quebec	Saskatch-ewan	USA
R1	NA	NA	NA	NA	NA	NA	NA	NA	NA	TBD
R2	NA	NA	NA	NA	NA	NA	NA	NA	NA	TBD
R3	NA	NA	NA	NA	NA	NA	NA	NA	NA	TBD
R4, R5, and R6	NA	NA	NA	NA	NA	NA	NA	NA	NA	TBD
R7	NA	NA	NA	NA	NA	NA	NA	NA	NA	TBD
R8	NA	NA	NA	NA	NA	NA	NA	NA	NA	TBD

Requirement R1 shall become effective 12 months after the first day of the first quarter following regulatory approval, but no sooner than 12 months following regulatory approval of NERC PRC-006-1. This 12-month period is consistent with the effective date of R2 of PRC-006-1.

Requirement R2 shall become effective 12 months after the first day of the first quarter following regulatory approval. This 12-month period is needed to allow time for entities to ensure a minimum time delay of six cycles on existing UFLS relays as specified in part 2.6.

Requirements R3 shall become effective 18 months after the first day of the first quarter following regulatory approval. This additional six-month period is needed to allow time to perform and coordinate studies necessary to assess the overall effectiveness of the UFLS schemes in the SERC Region.

Requirements R4, R5, and R6 shall become effective 30 months after the first day of the first quarter following regulatory approval. This additional 18 months is needed to allow time for any necessary changes to be made to the existing UFLS schemes in the SERC Region.

Requirement R7 shall become effective six months following the effective date of R8 of the NERC standard PRC-006-1, but no sooner than one year following the first day of the first calendar quarter after applicable regulatory approval of PRC-006-SERC-01. R8 of the NERC standard requires each UFLS entity to provide UFLS data to the Planning Coordinator (PC). R7 of the SERC standard requires the PC to provide this data to SERC.

Requirement R8 shall become effective 12 months after the first day of the first quarter following regulatory approval. This 12-month period is needed to allow time for Generator Owners (GO) to collect and make an initial data filing.

Introduction

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

2. **Number:** PRC-006-SERC–01

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-1 ("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-006-1 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.

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 59.5 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 58.4 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) shall be at least six cycles.

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 the actual or estimated distribution substation or feeder demand (including losses) of the UFLS entities at the time coincident with the previous year actual Peak Demand.

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 distribution substation or feeder demand (including losses) of the UFLS entities at the time coincident with the previous year actual Peak Demand.

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, or changes to the percentage of load in the scheme within 18 months of notification by the Planning Coordinator. *[Violation Risk Factor: Medium] [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 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	Medium	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 1 to 10 days after the requested submittal date.	The Generator Owner provided the data required in R8 to SERC 11 to 20 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC one piece of information listed in R8.	The Generator Owner provided the data required in R8 to SERC 21 to 30 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC two pieces of information listed in R8.	The Generator Owner provided the data required in R8 to SERC more than 30 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC 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-01 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-01 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-006-1 Requirement R3 and SERC Standard PRC-006-SERC-01 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. 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 these 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-01 Requirement R4 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-01 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 made. This requirement specifies that changes must be made 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. 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 desires that changes to the UFLS scheme be made faster than that, then the PC may request the implementation to be done sooner than 18 months. The UFLS entity may oblige but will not be required to do so.

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	

SERC Reliability Corporation
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Charlotte, NC 28217
704.357.7372 | Fax 704.357.7914 | www.serc1.org

Implementation Plan for Standard PRC-006-SERC-01
Automatic Underfrequency Load Shedding (UFLS) Requirements

Summary
The SERC UFLS Standard was developed to establish consistent and coordinated requirements for the design, implementation, and analysis of automatic underfrequency load shedding (UFLS) programs among all SERC applicable entities.

Prerequisite approvals
None

Modified standards
None

Compliance with standards
This standard is applicable to the Planning Coordinator (PC), Generator Owner (GO), and UFLS entities. 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 Transmission Owners (TO) and Distribution Providers (DP).

Proposed effective dates
Requirement R1 shall become effective 12 months after the first day of the first quarter following regulatory approval, but no sooner than 12 months following regulatory approval of NERC PRC-006-1. This 12-month period is consistent with the effective date of R2 of PRC-006-1.

Requirement R2 shall become effective 12 months after the first day of the first quarter following regulatory approval. This 12-month period is needed to allow time for entities to ensure a minimum time delay of six cycles on existing UFLS relays as specified in part 2.6.

Requirements R3 shall become effective 18 months after the first day of the first quarter following regulatory approval. This additional six-month period is needed to allow time to perform and coordinate studies necessary to assess the overall effectiveness of the UFLS schemes in the SERC Region.

Requirements R4, R5, and R6 shall become effective 30 months after the first day of the first quarter following regulatory approval. This additional 18 months is needed to allow time for any necessary changes to be made to the existing UFLS schemes in the SERC Region.

Requirement R7 shall become effective six months following the effective date of R8 of the NERC standard PRC-006-1, but no sooner than one year following the first day of the first calendar quarter after applicable regulatory approval of PRC-006-SERC-1. R8 of the NERC standard requires each UFLS entity to provide UFLS data to the Planning Coordinator (PC). R7 of the SERC standard requires the PC to provide this data to SERC.

Requirement R8 shall become effective 12 months after the first day of the first quarter following regulatory approval. This 12-month period is needed to allow time for Generator Owners (GO) to collect and make an initial data filing.

Retired standards
None

Exhibit B

The NERC Board of Trustees' Resolution on the PRC-006-SERC-01 — Automatic Underfrequency Load Shedding Requirements Regional Reliability Standard

FURTHER RESOLVED, that the board approves the associated implementation plan, which provides the following **(Exhibit J)**:

(a) Upon regulatory approval, the standard will be mandatory and enforceable (with monetary penalties for non-compliance) to all applicable NERC registered entities within the Reliability*First* footprint;

FURTHER RESOLVED, that the board approves the Violation Risk Factors and the Violation Severity Levels for the proposed MOD-025-1-RFC-1 – Reactive Power Capability Reliability Standard **(Exhibit K)**;

FURTHER RESOLVED, that NERC Staff shall make the appropriate filings with ERO governmental authorities.

Reliability Standards: IRO-006-TRE-1: IRO and SOL Mitigation in the ERCOT Interconnection
On motion of Paul Barber, the board approved the following resolutions:

RESOLVED, that the board approves the IRO-006-TRE-1: IRO and SOL Mitigation in the ERCOT Interconnection Regional Reliability Standard **(Exhibit L)**;

FURTHER RESOLVED, that the board approves the associated implementation plan, which provides the following **(Exhibit M)**:

(a) An effective date of the first day of the first calendar quarter after applicable regulatory approval.

FURTHER RESOLVED, that the board approves the Violation Risk Factors and the Violation Severity Levels for the proposed IRO-006-TRE-1: IRO and SOL Mitigation in the ERCOT Interconnection Regional Reliability Standard d **(Exhibit N)**;

FURTHER RESOLVED, that NERC Staff shall make the appropriate filings with ERO governmental authorities.

Reliability Standards: PRC-006-SERC-1: Automatic Underfrequency Load Shedding (UFLS) Requirements
On motion of Paul Barber , the board approved the following resolutions:

RESOLVED, that the board approves the PRC-006-SERC-01 – Automatic Underfrequency Load Shedding (UFLS) Requirements Regional Reliability Standard **(Exhibit O)**;

FURTHER RESOLVED, that the board approves the associated implementation plan, which provides the following **(Exhibit P)**:

(b) The implementation is staged over a 30-month window to allow entities to respond to any changes in UFLS settings due to this standard. In addition, the implementation date of Requirement R1 is dependent on FERC adoption of the continent-wide standard PRC-006-1.

FURTHER RESOLVED, that the board approves the Violation Risk Factors and the Violation Severity Levels for the proposed PRC-006-SERC-01 – Automatic Underfrequency Load Shedding (UFLS) Requirements Regional Reliability Standard **(Exhibit Q)**;

FURTHER RESOLVED, that NERC Staff shall make the appropriate filings with ERO governmental authorities.

NERC Rules of Procedure Nonsubstantive Capitalization and Definition Changes
Rebecca Michael, associate general counsel, presented for approval the nonsubstantive capitalization and definition changes to NERC's Rules of Procedure.

On motion of Bruce Scherr , the board approved the following resolutions:

RESOLVED, that the board approves the proposed revisions to the NERC Rules of Procedure as set out in Agenda Item 7 to the board's November 3, 2011 agenda **(Exhibit R);**

FURTHER RESOLVED, that the board approves the proposed changes to all existing Appendices to the Rules of Procedure (Appendices 3A, 3B, 3C, 4A, 4B, 4C, 4D, 4E, 5A, 5B, 6, and 8) **(Exhibit S)**;

FURTHER RESOLVED, that the board approves the proposed new Appendix 2, Definitions of Terms Used in the Rules of Procedure **(Exhibit T)**;

FURTHER RESOLVED, that NERC Staff shall make the appropriate filings with ERO governmental authorities.

At the conclusion of this presentation, Chair Anderson invited discussion regarding the recommended substantive changes to the Rules of Procedure following the discussion occurring the previous day at the Member Representatives Committee meeting. No trustee responded.

Reinstatement of NERC Rules of Procedure Section 402.1.3.2
Ms. Michael reviewed and requested board approval for the reinstatement of NERC Rules of Procedure Section 402.1.3.2

On motion of Dave Goulding, the board approved the following resolution:

WHEREAS, the October 7, 2011 order of the Federal Energy Regulatory Commission ("FERC") denied NERC's request to remove Section 402.1.3.2 from NERC's Rules of Procedure and directed NERC to reinstate Section 402.1.3.2; and

Exhibit C

Complete Development Record of Proposed PRC-006-SERC-01 — Automatic Underfrequency Load Shedding Requirements Regional Reliability Standard

Regional Reliability Standards - Under Development				
Standard No.	**Title**	**Regional Status**	**Dates**	**NERC Status**
SERC Reliability Corporation (SERC)				
PRC-006-SERC-01	Automatic Underfrequency Load Shedding	NERC Board Adopted November 3, 2011	06/29/11 - 08/15/11	Info**(6)** Submit Comments Comment Form**(5)** PRC-006-SERC-01**(4)** Implementation Plan**(3)** Comments Received**(2)** Consideration of Comments**(1)**

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Consideration of Comments on Regional Reliability Standard Automatic Underfrequency Load Shedding - PRC-006-SERC-01

The Regional Reliability Standards Working Group thanks all commenter's who submitted comments on the Regional Reliability Standard Automatic Underfrequency Load Shedding. These standards were posted for a 45-day public comment period from June 29, 2011 through August 15, 2011. The stakeholders were asked to provide feedback on the standards through a special Electronic Comment Form. There were 9 sets of comments, including comments from 15 different people from approximately 13 companies representing 5 of the 10 Industry Segments as shown in the table on the following pages.

http://www.nerc.com/filez/regional_standards/regional_reliability_standards_under_development.html

If you feel that your comment has been overlooked, please let us know immediately. Our goal is to give every comment serious consideration in this process! If you feel there has been an error or omission, you can contact the Vice President and Director of Standards, Herb Schrayshuen, at 404-446-2560 or at herb.schrayshuen@nerc.net. In addition, there is a NERC Reliability Standards Appeals Process.[1]

[1] The appeals process is in the Reliability Standards Development Procedures: http://www.nerc.com/standards/newstandardsprocess.html.

Index to Questions, Comments, and Responses

The Industry Segments are:

1 — Transmission Owners
2 — RTOs, ISOs
3 — Load-serving Entities
4 — Transmission-dependent Utilities
5 — Electric Generators
6 — Electricity Brokers, Aggregators, and Marketers
7 — Large Electricity End Users
8 — Small Electricity End Users
9 — Federal, State, Provincial Regulatory or other Government Entities
10 — Regional Reliability Organizations, Regional Entities

<table>
<tr><th colspan="2">Group/Individual</th><th>Commenter</th><th>Organization</th><th colspan="10">Registered Ballot Body Segment</th></tr>
<tr><td colspan="2"></td><td></td><td></td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr>
<tr><td>1.</td><td>Group</td><td>Brent Ingebrigtson</td><td>LG&E and KU Energy</td><td>X</td><td></td><td>X</td><td></td><td>X</td><td>X</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="14">No additional members listed.</td></tr>
<tr><td>2.</td><td>Group</td><td>Louis Slade</td><td>Dominion</td><td>X</td><td></td><td>X</td><td></td><td>X</td><td>X</td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="14"><table>
<tr><th></th><th>Additional Member</th><th>Additional Organization</th><th>Region</th><th>Segment Selection</th></tr>
<tr><td>1.</td><td>Michael Gildea</td><td>EMP NERC Compliance</td><td>MRO</td><td>5, 6</td></tr>
<tr><td>2.</td><td>Mike Garton</td><td>EMP NERC Compliance</td><td>NPCC</td><td>5, 6</td></tr>
<tr><td>3.</td><td>Connie Lowe</td><td>EMP NERC Compliance</td><td>SERC</td><td>1, 3, 5, 6</td></tr>
<tr><td>4.</td><td>Michael Crowley</td><td>ET Compliance</td><td>SERC</td><td>1, 3</td></tr>
<tr><td>5.</td><td>Matt Woodzell</td><td>F&H</td><td>SERC</td><td>5</td></tr>
<tr><td>6.</td><td>Chip Humphrey</td><td>F&H</td><td>RFC</td><td>5</td></tr>
</table></td></tr>
<tr><td>3.</td><td>Group</td><td>Howard Gugel</td><td>NERC Staff Technical Review</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td colspan="14">No additional members listed.</td></tr>
</table>

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
4.	Individual	Laura Lee	Duke Energy	X		X		X	X				
5.	Individual	John Bee	Exelon	X		X		X					
6.	Individual	RoLynda Shumpert	South Carolina Electric and Gas	X		X		X	X				
7.	Individual	Jason Snodgrass	Georgia Transmission Corporation	X									
8.	Individual	Kelsey Colvin	MISO		X								
9.	Individual	Michelle R. D'Antuono	Occidental Chemical Corporation					X					

1. Was the proposed standard developed in a fair and open process, using the associated Regional Reliability Standards Development Procedure?

Summary Consideration:

Organization	Yes or No	Question 1 Comment
LG&E and KU Energy	Yes	
Dominion	Yes	
NERC Staff Technical Review	Yes	
Duke Energy	Yes	
Exelon	Yes	
South Carolina Electric and Gas	Yes	
Georgia Transmission Corporation	Yes	
MISO		
Occidental Chemical Corporation	Yes	

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

Summary Consideration:

Organization	Yes or No	Question 2 Comment
LG&E and KU Energy	No	
Dominion	No	
NERC Staff Technical Review	No	
Duke Energy	No	
Exelon		
South Carolina Electric and Gas	No	
Georgia Transmission Corporation	No	
MISO		MISO is concerned that PRC-006-SERC-001 R2 is too prescriptive and may not allow Planning Coordinators the flexibility and discretion needed to ensure reliability. The Planning Coordinator is tasked with designing the UFLS system and coordinating that system with neighboring systems. PRC-006-SERC-001 R2 specifies acceptable ranges and limits in R2.3, R2.4, R2.5 and R2.6 for the UFLS design. The standard makes no provisions to accommodate a determination by a PC that the best performing design does not fit in with the specified set points and ranges in the standard. As noted in the standard, the set points specified in R2 reflect historic practice, but there may be sound technical justification to deviate from the set points scheme PRC-006-SERC-001 R2 proscribes. It is possible that effective coordination with neighboring systems may require a different approach (e.g. entities in MRO are investigating the reliability benefits of setting the frequency set point blocks at

Organization	Yes or No	Question 2 Comment
		less than 0.2 Hz apart to create finer system control). The explicit set point requirements in R2 would prohibit innovation/coordination of system design that deviated from standard without regard to the reliability benefits of deviating from historic practice.
Response: This is a technical comment that was previously addressed. **Based on the 2007 UFLS study there are already 18 different schemes being used within the SERC footprint. Removing the requirements specified in R2 may lead to even more diverse schemes and increase the probability of non-coordination within SERC. The requirements specified in R2 are presently included within approved SERC Regional Criteria. These SDT believes these requirements allow for a high degree of flexibility in developing a UFLS scheme while promoting proper coordination among neighboring schemes both within and outside SERC. The SDT does not believe there will be coordination issues with schemes in other regions since all of the schemes have to meet the performance characteristics in the NERC Standard.**		
Occidental Chemical Corporation	No	

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

Summary Consideration:

Organization	Yes or No	Question 3 Comment
LG&E and KU Energy	No	
Dominion	No	
NERC Staff Technical Review	No	
Duke Energy	No	
Exelon	No	
South Carolina Electric and Gas	No	
Georgia Transmission Corporation	No	
MISO		
Occidental Chemical Corporation	No	

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

Summary Consideration:

Organization	Yes or No	Question 4 Comment
LG&E and KU Energy	No	
Dominion	No	
NERC Staff Technical Review	No	
Duke Energy	No	
Exelon		
South Carolina Electric and Gas	No	
Georgia Transmission Corporation	No	
MISO		
Occidental Chemical Corporation	No	

5. Does the proposed regional reliability standard meet at least one of the following criteria?

- **The proposed standard has more specific criteria for the same requirements covered in a continent-wide standard**
- **The proposed standard has requirements that are not included in the corresponding continent-wide reliability standard**
- **The proposed regional difference is necessitated by a physical difference in the bulk power system.**

Summary Consideration:

Organization	Yes or No	Question 5 Comment
LG&E and KU Energy	Yes	
Dominion	Yes	
NERC Staff Technical Review	Yes	
Duke Energy	Yes	
Exelon	No	**[A]** This regional standard is not necessary for GOs due to the work that is being done under NERC Project 2007-09, PRC-024, "Generator Performance During Frequency and Voltage Excursions," and therefore suggest that the SERC UFLS Standard remove GOs from applicability section. **[B]** It is not clear that the criteria proposed in this standard are really more specific than the performance criteria proposed in the NERC Standard PRC-006,"Development and Documentation of Regional UFLS Programs," currently at the FERC. The intent of the threshold for additional Regional Standards is to address a Regional issue. There doesn't appear to be a particular issue to the SERC Region that is different than the rest of the Eastern Interconnection. Changing a setpoint value that already is an outcome of the performance criteria doesn't necessarily provide additional specificity. For a Region to have requirements that are not included in the continent-wide Standard

Organization	Yes or No	Question 5 Comment
		is problematic, there should be some geographic or electric justification for such a difference, otherwise the Requirements should be incorporated into the continent-wide Standard. Simply adding a Requirement that is not in the pending NERC Standard does not make the Regional Standard necessary. It is not clear that there is a physical difference between the power system of the SERC Region as compared with the rest of the Eastern Interconnection.
Response: This same concern was previously addressed. **A. Requirement R7 of the SERC UFLS standard requires additional generator data be provided to SERC above what is included in the current draft of PRC-024. The SDT feels this additional data is needed to adequately perform post event analysis of frequency disturbances. The SDT therefore believes that this standard should be applicable to GO's** **B. The primary purpose of the SERC regional Standard was to provide region specific requirements for the implementation of NERC standard PRC-006-1 requirements with the goal of adding clarity and providing consistency. The requirements already in the NERC standard were not repeated in the SERC standard. Not only do the requirements of the SERC Standard provide regional consistency and coordination, they also are more stringent than the national standard.**		
South Carolina Electric and Gas	Yes	The proposed standard has more specific criteria for the same requirements covered in a continent-wide standard
Response: Thank you for your comments.		
Georgia Transmission Corporation	Yes	
MISO		
Occidental Chemical Corporation	Yes	As a Generator Owner, Occidental Chemical will only be subject to PRC-006-SERC-01 Requirement R8 and its three sub-requirements. These call for GOs to provide SERC their generator frequency relay set points, clearing times, and maximum MW that could be separated from the system; within 30 days of a request. R8 further qualifies the reliability need is to "facilitate post-event analysis of frequency disturbances."However, SERC already has the authority to gather

Organization	Yes or No	Question 5 Comment
		disturbance-related information from Generator Operators under EOP-004-1. As with many Generator Owners, Occidental Chemical is also registered as a GOP, and would have to provide such information in support of Regional disturbance investigations. However, even organizations which do not support both functions would have to coordinate with each other to supply any system event-related information requests from SERC. If this is not sufficient, MOD-010-0 and MOD-012-0 require Generator Owners to provide static and dynamic generator modeling data in accordance with the Regional Entity's specification. It would seem that SERC's specification could be modified to accommodate frequency relay data without creating any new enforceable reliability requirements. We understand that the proposed requirements are not onerous and the data can be easily supplied. However, Occidental Chemical is uneasy about applying a Standard related to underfrequency Load shedding to generation. It implies a connection with other entities that does not exist and a protective function that serves a very different purpose.

Response:

The SDT disagrees. While Attachment 1-EOP-004 NERC Disturbance Report Form requires a report to be filed in response to an event where frequency or voltage goes "below the under-frequency or under-voltage load shed" set points, the form does not include the requirement to report the information spelled out in requirement R7 of PRC-006-SERC-01.

The MOD-010, MOD-012, and associated SERC regional criteria do not require that generator underfrequency and overfrequency protective setpoints be provided. Inclusion of this requirement in the standard ensures that the region receives necessary information. The SDT believes that including this requirement in the standard provides adequate notification to entities regarding providing specific data upon request to facilitate post-event analysis of frequency disturbances.

The SDT believes that this connection between generator underfrequency and overfrequency protection and UFLS protection does exist. While the generator protective function may serve a very different purpose, protection of the generating unit versus protecting the transmission system, both must be coordinated since units that trip offline during an under frequency event remove generation which may aggravate the event.

6. If you have any other comments that you have not already provided in the response to the prior questions, please provide them here.

Summary Consideration:

Organization	Yes or No	Question 6 Comment
LG&E and KU Energy		In R8, LG&E and KU Energy's GO would recommend 45 days, rather than 30 days, simply because while a Company is performing their post-event analysis it normally takes longer than 30 days to collect data with appropriate approvals. As an example, if an event happened in early December of a given year, it might prove difficult to get the appropriate agreement/approvals on data to submit within 30 days in a month that typically has personnel on holiday/vacations. Providing for a 45-day response would minimize this possible occurrence without harming overall system reliability.
Response: **The SDT feels that 30 days is adequate for the Generator Owner to provide the information required in R8.1, R8.2 and R8.3. This information should be readily available from the GO and does not require the GO to perform a post event analysis. In the event of an actual frequency disturbance it is imperative that SERC receives this information in a timely manner in order to perform an event analysis within the 90 day requirement specified by NERC.**		
Dominion		
NERC Staff Technical Review		We support the following observations made during the Quality Review: General Observations **[A]** o The standard references the SERC sub-region but it is not defined. **[B]** o The SERC Region is referenced in the requirements. The RE is not normally referenced in each of the requirements. **[C]** Requirement R1: 1.1 should be a bullet since it is not a requirement.

Organization	Yes or No	Question 6 Comment
		[D] Requirement R2: Is (percent of load to be shed, frequency set points, and time delays) needed in the main requirement since they are spelled out in the sub-requirements? **[E]** 2.3.1 is not a sub-requirement because it is an exclusion. Consider making it the last sentence in 2.3 Requirement **[F]** R3: Imbalance is used two times. Consider referring back to first imbalance and clarifying second imbalance by adding 'such' before the second imbalance. **[G]** R3 references a specific NERC standard and requirement within that standard - it is generally best not to have a specific reference to another standard. If the referenced standard changes then the standard making the references needs to be updated. **[H]** General observation: Since the SERC standard does not replace the NERC standard and it is noted in the Guideline and Technical Basis that both the SERC and NERC standards must be followed to ensure full compliance does R3 have the potential for double jeopardy? Requirement **[I]** R4: 'Shall be responsible for implementing' is passive - consider changing to 'shall implement'. Requirement **[J]** R5: 'Shall be responsible for implementing' is passive - consider changing to 'shall implement'. Requirement **[K]** R6: The requirement lists 'which involve frequency settings, relay time delays, and changes'. Are there settings that do not involve the above? Since the above was listed are there settings that do not have to be changed within 18 months? The requirement reads like those are the only settings that will need changes within 18 months. Is the intent to limit it to these parameters or are they examples? **[L]** Requirement R7: Is it clear to the PC who within SERC this requirement is referencing? Should this be more specific about what department or area in SERC? Requirement **[M]** R8: General Observation: This is the only requirement that references the Generator Owner. The GO only has to provide information and does not have not to make any changes. Is there another standard that provides the responsibilities of the GO other than providing information?
Response: **A. A note on subregions was added to the text box for R1 referencing the SERC Bylaws.**		

Organization	Yes or No	Question 6 Comment
B. The phrase "in the SERC Region" does not appear in R1 and R8, but did appear and has been deleted from R2, R3, R6, and R7. The phrase is needed in R4 and R5 since a UFLS Entity may have load in more than one Regional Entity. C. Part 1.1 was changed to a bullet. D. The phrase was added to provide clarity for what is meant by "the UFLS scheme." E. Part 2.3.1 was the last sentence of 2.3 in Draft 7, but was separated into a separate part based on a recommendation from a quality review by SERC Legal. The concern was that this exclusion distracted from the main focus of 2.3, and caused some confusion. Part 2.3.1 was changed to a bullet to make it consistent with R1. F. The word "such" was added before the second 'imbalance." G. References to the specific requirement and the NERC standard number was removed for the requirement and added to the text box for R3. H. The SDT was concerned with possible double jeopardy and tried to avoid any such issues in the design of the SERC standard. However, the SDT also felt strongly that more specificity was needed on what addressed the "up to" 25% imbalance requirement in R3 of the NERC standard. By specifying the three imbalance levels that are to be simulated, R3 of the SERC standard defines what is required in the SERC region to meet the "up to" requirement in R3 of the NERC standard. However, R3 was revised to clarify the intent. I. The phrase has been changed to "shall implement." Other revisions were made to R4 to clarify the intent. J. The phrase has been changed to "shall implement." Other revisions were made to R5 to clarify the intent. K. These three parameters generally define a UFLS scheme. Typically a UFLS Entity annually only needs to make changes to a few UFLS relays due to load growth to ensure both the load shed per step and total load shed is within scheme tolerances. However, if the PC makes changes to frequency settings, relay time delays, and/or changes to the percentage of load in the scheme, it typically could require the UFLS Entities to make field adjustments to a majority of their UFLS relays, and may require installation of addition UFLS relaying. This could be a significant effort which would require much more time to complete than that allowed in R4 and R5. L. This should not be a problem for the PC. SERC has data reporting processes which involve entity notification of data requirements and data submittal through SERC portal forms or bulk upload templates. SERC stakeholders currently report this same UFLS data through a SERC compliance data reporting process. M. SERC has no other standards and no current plans to develop additional standards. While the GO has only a data reporting requirement in this standard, it is felt that this standard is the appropriate place to document that requirement.		

Organization	Yes or No	Question 6 Comment
Duke Energy		
Exelon		**[A]** For GOs there needs to be close integration with Standards being developed by NERC. Similar to other Regions, SERC PRC-006-01 should be suspended until NERC Project 2007-09 and NERC Project 2007-01 are complete. PRC-006-FRCC-01 is currently on hold in the FRCC Region with the status "pending the completion of the NERC Reliability Standard Development Project 2007-01 "Underfrequency Load Shedding."PRC-006-MRO-01 is currently on hold in the MRO Region with the status "suspended."PRC-006-TRE-01 is also currently on hold in the TRE Region with the status "following the progress of the NERC UFLS SDT."Exelon suggests that the SERC SDT also suspend progress on SERC PRC-006-01 and similarly follow the progress of NERC Projects 2007-09 and 2007-01. At that time SERC should reevaluate if additional Regional guidance is necessary. **[B]** Consideration should be given to ensure that Planning Coordinators not be given the ability to develop defacto NERC Requirements without due process. For example; the Planning Coordinator will have the sole discretion to determine what an island is, determine needed remediation, and determine the UFLS scheme in general without a process for stakeholders to formally interact. **[C]** For SERC PRC-006-01 the settings should align with the pending NERC Standard PRC-006-1, for the load shedding setting the error bandwidth is too broad and the criteria determination for an island is not clear. As stated previously, Exelon does not see the need for Regional Standard when a NERC Standard will likely be approved by FERC.

Response:

A. While some regions have suspended work on their regional UFLS standards, other regions (e.g. RFC, SPP, and NPCC) are proceeding. The SDT believes that the current NERC PRC-006-1 standard is sufficiently well developed such that moving forward with SERC Standard PRC-006-SERC-01 is beneficial, even though the NERC standard, which was Board Approved November 10, 2010, is still in the final regulatory approval process. SERC Standard PRC-006-SERC-01 provides additional clarity and specificity to the requirements stated in the NERC UFLS standard that the SDT believes are necessary for effective implementation of UFLS within the SERC Region (as is stated in the Guideline and Technical Basis item #1 of PRC-006-SERC-01). The guidance and direction provided in SERC Standard PRC-006-SERC-01 is beneficial. With respect to the comment that "For GOs there needs to be close coordination," the SERC UFLS standard imposes a reporting only requirement for a limited number of existing generator parameters.

Organization	Yes or No	Question 6 Comment
B. The SERC UFLS standard does not give the Planning Coordinator the ability to develop defacto NERC (or SERC) requirements. The SERC UFLS standard simply provides more specific guidance on how the Planning Coordinator is to execute its essential responsibilities, which have been assigned by the NERC UFLS standard. **C. The NERC UFLS standard does not specify any bandwidth for the amount of load to be shed by various UFLS entities. SERC Standard PRC-006-SERC-01 attempts to provide a reasonable margin for the amount of load to enable for UFLS, with additional margin given to smaller UFLS entities which may have difficulty in achieving a precise load percentage due to a limited number of loads and/or feeders. The SDT believes that the bandwidths specified are reasonable, given the practical considerations of implementing the settings in the field. The criteria for determining islands are addressed in the NERC PRC-006-1 standard.**		
South Carolina Electric and Gas		
Georgia Transmission Corporation		**1.** R1 seems to have subject/verb confusion as written and the terms "when developing criteria" suggests that the PC would only have to comply ever so often "when developing criteria". The measurement and VSL suggests the intent of the requirement is for each PC to "develop criteria". The following is suggested: R1. Each Planning Coordinator shall develop criteria for selecting portions of the BPS that may form islands. The criteria shall: 1.1 include its SERC subregion as an identified island 1.1.1 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. **2.** M4 identifies a specific target implementation date of "May 1 of each calendar year" which is not identified in the requirement. **3.** Should R2 identify a time qualifier to compliment M4...such as "the PC shall annually select or develop an automatic UFLS scheme"? **4.** There is circular confusion within M4 and R5. It appears that the PC will develop a UFLS scheme on an annual basis and expect the UFLS entity to implement it. The UFLS entity could then implement it by May 1 according to M4, or recognize it as a change from the previous year's scheme and implement it within 18 months according to R5. Additionally, It seems based on M4, that the annually developed UFLS scheme target date of May 1 could come before a previously

Organization	Yes or No	Question 6 Comment
		"changed" UFLS scheme with an 18 month target date.
Response: **1. The requirement to develop criteria for selecting portions of the BPS that may form islands is in NERC Standard PRC-006-1. The SERC Requirement R1 says that the criteria must include the subregion as an island. The SDT revised R1 to provide additional clarity.** **2. May 1 is the date that the implementation of the UFLS scheme will be measured each year. The SDT revised R4 and R5 to provide additional clarity.** **3. No. It is not anticipated that the UFLS scheme will change annually. R2 requires the PC's UFLS scheme to meet certain requirements. The scheme does not have to be updated annually. The implementation of the scheme will be checked annually as indicated by R4 and R5.** **4. The PC will not annually develop a UFLS scheme. Changes to the scheme will be rare. As indicated in M4, if scheme changes are in progress (the 18 month period), the requirements of R4 do not have to be met. A more detailed explanation is provided in item # 4 of the Guideline and Technical Basis section located at the end of the standard.**		
MISO		MISO believes that the prescriptive requirements for setting frequency set points in PRC-006-SERC-001 are inconsistent with NERC Standard PRC-006-1. The NERC standard requires each Planning Coordinator to develop a UFLS program for its area, and gives the PC substantial discretion to devise specific frequency set points and UFLS block schemes to achieve system condition or performance goals. PRC-006-SERC-001 R2 usurps this grant of discretion by mandating that frequency set points be within a prescriptive range that limits not only the highest and lowest points, but also the number and range of set point blocks that a PC can establish without regard to unique system conditions or coordination with neighboring systems.
Response: See response to your comment on Question 2 above.		
Occidental Chemical Corporation		

END OF REPORT

Individual or group. (9 Responses)
Name (6 Responses)
Organization (6 Responses)
Group Name (3 Responses)
Lead Contact (3 Responses)
Question 1 (8 Responses)
Question 1 Comments (9 Responses)
Question 2 (7 Responses)
Question 2 Comments (9 Responses)
Question 3 (8 Responses)
Question 3 Comments (9 Responses)
Question 4 (7 Responses)
Question 4 Comments (9 Responses)
Question 5 (8 Responses)
Question 5 Comments (9 Responses)
Question 6 (0 Responses)
Question 6 Comments (9 Responses)

Individual
Laura Lee
Duke Energy
Yes
No
No
No
Yes
Individual
John Bee
Exelon
Yes
No
No
This regional standard is not necessary for GOs due to the work that is being done under NERC Project 2007-09, PRC-024, "Generator Performance During Frequency and Voltage Excursions," and therefore suggest that the SERC UFLS Standard remove GOs from applicability section. It is not clear that the criteria proposed in this standard are really more specific than the performance criteria proposed in the NERC Standard PRC-006,"Development and Documentation of Regional UFLS Programs," currently at the FERC. The intent of the threshold for additional Regional Standards is to address a Regional issue. There doesn't appear to be a particular issue to the SERC Region that is different than the rest of the Eastern Interconnection. Changing a setpoint value that already is an outcome of the performance criteria doesn't necessarily provide additional specificity. For a Region to have requirements that are not included in the continent-wide Standard is problematic, there should

be some geographic or electric justification for such a difference, otherwise the Requirements should be incorporated into the continent-wide Standard. Simply adding a Requirement that is not in the pending NERC Standard does not make the Regional Standard necessary. It is not clear that there is a physical difference between the power system of the SERC Region as compared with the rest of the Eastern Interconnection.
For GOs there needs to be close integration with Standards being developed by NERC. Similar to other Regions, SERC PRC-006-01 should be suspended until NERC Project 2007-09 and NERC Project 2007-01 are complete. PRC-006-FRCC-01 is currently on hold in the FRCC Region with the status "pending the completion of the NERC Reliability Standard Development Project 2007-01 "Underfrequency Load Shedding." PRC-006-MRO-01 is currently on hold in the MRO Region with the status "suspended." PRC-006-TRE-01 is also currently on hold in the TRE Region with the status "following the progress of the NERC UFLS SDT." Exelon suggests that the SERC SDT also suspend progress on SERC PRC-006-01 and similarly follow the progress of NERC Projects 2007-09 and 2007-01. At that time SERC should reevaluate if additional Regional guidance is necessary. Consideration should be given to ensure that Planning Coordinators not be given the ability to develop defacto NERC Requirements without due process. For example; the Planning Coordinator will have the sole discretion to determine what an island is, determine needed remediation, and determine the UFLS scheme in general without a process for stakeholders to formally interact. For SERC PRC-006-01 the settings should align with the pending NERC Standard PRC-006-1, for the load shedding setting the error bandwidth is too broad and the criteria determination for an island is not clear. As stated previously, Exelon does not see the need for Regional Standard when a NERC Standard will likely be approved by FERC.
Group
LG&E and KU Energy
Brent Ingebrigtson
Yes
No
No
No
Yes
In R8, LG&E and KU Energy's GO would recommend 45 days, rather than 30 days, simply because while a Company is performing their post-event analysis it normally takes longer than 30 days to collect data with appropriate approvals. As an example, if an event happened in early December of a given year, it might prove difficult to get the appropriate agreement/approvals on data to submit within 30 days in a month that typically has personnel on holiday/vacations. Providing for a 45-day response would minimize this possible occurrence without harming overall system reliability.
Group
Dominion
Louis Slade
Yes
No
No
No
Yes

Individual
RoLynda Shumpert
South Carolina Electric and Gas
Yes
No
No
No
Yes
The proposed standard has more specific criteria for the same requirements covered in a continent-wide standard
Individual
Jason Snodgrass
Georgia Transmission Corporation
Yes
No
No
No
Yes
1. R1 seems to have subject/verb confusion as written and the terms “when developing criteria” suggests that the PC would only have to comply ever so often “when developing criteria”. The measurement and VSL suggests the intent of the requirement is for each PC to “develop criteria”. The following is suggested: R1. Each Planning Coordinator shall develop criteria for selecting portions of the BPS that may form islands. The criteria shall: 1.1 include its SERC subregion as an identified island 1.1.1 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. 2. M4 identifies a specific target implementation date of “May 1 of each calendar year” which is not identified in the requirement. 3. Should R2 identify a time qualifier to compliment M4…such as “the PC shall annually select or develop an automatic UFLS scheme”? 4. There is circular confusion within M4 and R5. It appears that the PC will develop a UFLS scheme on an annual basis and expect the UFLS entity to implement it. The UFLS entity could then implement it by May 1 according to M4, or recognize it as a change from the previous year’s scheme and implement it within 18 months according to R5. Additionally, It seems based on M4, that the annually developed UFLS scheme target date of May 1 could come before a previously “changed” UFLS scheme with an 18 month target date.
Individual
Kelsey Colvin
MISO
MISO is concerned that PRC-006-SERC-001 R2 is too prescriptive and may not allow Planning

Coordinators the flexibility and discretion needed to ensure reliability. The Planning Coordinator is tasked with designing the UFLS system and coordinating that system with neighboring systems. PRC-006-SERC-001 R2 specifies acceptable ranges and limits in R2.3, R2.4, R2.5 and R2.6 for the UFLS design. The standard makes no provisions to accommodate a determination by a PC that the best performing design does not fit in with the specified set points and ranges in the standard. As noted in the standard, the set points specified in R2 reflect historic practice, but there may be sound technical justification to deviate from the set points scheme PRC-006-SERC-001 R2 proscribes. It is possible that effective coordination with neighboring systems may require a different approach (e.g. entities in MRO are investigating the reliability benefits of setting the frequency set point blocks at less than 0.2 Hz apart to create finer system control). The explicit set point requirements in R2 would prohibit innovation/coordination of system design that deviated from standard without regard to the reliability benefits of deviating from historic practice.

MISO believes that the prescriptive requirements for setting frequency set points in PRC-006-SERC-001 are inconsistent with NERC Standard PRC-006-1. The NERC standard requires each Planning Coordinator to develop a UFLS program for its area, and gives the PC substantial discretion to devise specific frequency set points and UFLS block schemes to achieve system condition or performance goals. PRC-006-SERC-001 R2 usurps this grant of discretion by mandating that frequency set points be within a prescriptive range that limits not only the highest and lowest points, but also the number and range of set point blocks that a PC can establish without regard to unique system conditions or coordination with neighboring systems.

Group

NERC Standards Staff

Howard Gugel

Yes

No

No

No

Yes

We support the following observations made during the Quality Review: General Observations • The standard references the SERC sub-region but it is not defined. • The SERC Region is referenced in the requirements. The RE is not normally referenced in each of the requirements. Requirement R1: 1.1 should be a bullet since it is not a requirement. Requirement R2: Is (percent of load to be shed, frequency set points, and time delays) needed in the main requirement since they are spelled out in the sub-requirements? 2.3.1 is not a sub-requirement because it is an exclusion. Consider making it the last sentence in 2.3 Requirement R3: Imbalance is used two times. Consider referring back to first imbalance and clarifying second imbalance by adding ‘such’ before the second imbalance. R3 references a specific NERC standard and requirement within that standard – it is generally best not to have a specific reference to another standard. If the referenced standard changes then the standard making the references needs to be updated. General observation: Since the SERC standard does not replace the NERC standard and it is noted in the Guideline and Technical Basis that both the SERC and NERC standards must be followed to ensure full compliance does R3 have the potential for double jeopardy? Requirement R4: ‘Shall be responsible for implementing’ is passive – consider changing to ‘shall implement’. Requirement R5: ‘Shall be responsible for implementing’ is passive – consider changing to ‘shall implement’. Requirement R6: The requirement lists ‘which involve frequency settings, relay time delays, and changes’. Are there settings that do not involve the above? Since the above was listed are there settings that do not have to be changed within 18 months? The

requirement reads like those are the only settings that will need changes within 18 months. Is the intent to limit it to these parameters or are they examples? Requirement R7: Is it clear to the PC who within SERC this requirement is referencing? Should this be more specific about what department or area in SERC? Requirement R8: General Observation: This is the only requirement that references the Generator Owner. The GO only has to provide information and does not have not to make any changes. Is there another standard that provides the responsibilities of the GO other than providing information?
Individual
Michelle R. D'Antuono
Occidental Chemical Corporation
Yes
No
No
No
Yes
As a Generator Owner, Occidental Chemical will only be subject to PRC-006-SERC-01 Requirement R8 and its three sub-requirements. These call for GOs to provide SERC their generator frequency relay set points, clearing times, and maximum MW that could be separated from the system; within 30 days of a request. R8 further qualifies the reliability need is to “facilitate post-event analysis of frequency disturbances.” However, SERC already has the authority to gather disturbance-related information from Generator Operators under EOP-004-1. As with many Generator Owners, Occidental Chemical is also registered as a GOP, and would have to provide such information in support of Regional disturbance investigations. However, even organizations which do not support both functions would have to coordinate with each other to supply any system event-related information requests from SERC. If this is not sufficient, MOD-010-0 and MOD-012-0 require Generator Owners to provide static and dynamic generator modeling data in accordance with the Regional Entity’s specification. It would seem that SERC’s specification could be modified to accommodate frequency relay data without creating any new enforceable reliability requirements. We understand that the proposed requirements are not onerous and the data can be easily supplied. However, Occidental Chemical is uneasy about applying a Standard related to underfrequency Load shedding to generation. It implies a connection with other entities that does not exist and a protective function that serves a very different purpose.

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Implementation Plan for Standard PRC-006-SERC-01
Automatic Underfrequency Load Shedding (UFLS) Requirements

Summary
The SERC UFLS Standard was developed to establish consistent and coordinated requirements for the design, implementation, and analysis of automatic underfrequency load shedding (UFLS) programs among all SERC applicable entities.

Prerequisite approvals
None

Modified standards
None

Compliance with standards
This standard is applicable to the Planning Coordinator (PC), Generator Owner (GO), and UFLS entities. 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 Transmission Owners (TO) and Distribution Providers (DP).

Proposed effective dates
Requirement R1 shall become effective 12 months after the first day of the first quarter following regulatory approval, but no sooner than 12 months following regulatory approval of NERC PRC-006-1. This 12-month period is consistent with the effective date of R2 of PRC-006-1.

Requirement R2 shall become effective 12 months after the first day of the first quarter following regulatory approval. This 12-month period is needed to allow time for entities to ensure a minimum time delay of six cycles on existing UFLS relays as specified in part 2.6.

Requirements R3 shall become effective 18 months after the first day of the first quarter following regulatory approval. This additional six-month period is needed to allow time to perform and coordinate studies necessary to assess the overall effectiveness of the UFLS schemes in the SERC Region.

Requirements R4, R5, and R6 shall become effective 30 months after the first day of the first quarter following regulatory approval. This additional 18 months is needed to allow time for any necessary changes to be made to the existing UFLS schemes in the SERC Region.

Requirement R7 shall become effective six months following the effective date of R8 of the NERC standard PRC-006-1, but no sooner than one year following the first day of the first calendar quarter after applicable regulatory approval of PRC-006-SERC-1. R8 of the NERC standard requires each UFLS entity to provide UFLS data to the Planning Coordinator (PC). R7 of the SERC standard requires the PC to provide this data to SERC.

Requirement R8 shall become effective 12 months after the first day of the first quarter following regulatory approval. This 12-month period is needed to allow time for Generator Owners (GO) to collect and make an initial data filing.

Retired standards
None

Standard Development Roadmap

This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.

Development steps completed:

1. SAR accepted by SERC Standards Committee (February 27, 2008).
2. SAR approved by EC Executive Committee (April 25, 2008).
3. SAR posted for comment (April 25, 2008 through May 27, 2008).
4. Revised SAR and response to comments approved by EC Executive Committee (June 16, 2008).
5. SDT appointed on (June 19, 2008).
6. Draft 1 of proposed standard posted (September 19, 2008 through October 20, 2008).
7. Draft 2 of proposed standard posted (November 21, 2008 through December 22, 2008).
8. Draft 3 of proposed standard posted for information (February 9, 2009).
9. Draft 3a of proposed standard posted (September 15, 2009 through October 15, 2009).
10. Draft 4 of proposed standard posted for a 15-day pre-ballot review (October 27, 2009 through November 10, 2009).
11. Draft 4 of proposed standard ballot open (November 13 through 23, 2009). Ballot made quorum with 92.9% votes (minimum of 66.7%). Approval of 48.5% (minimum of 66.7% of weighted sector votes required). Standard was not approved.
12. Draft 5 of proposed standard posted (September 21, 2010 through October 21, 2010).
13. Draft 6 of proposed standard posted for a 15-day pre-ballot review (November 22, 2010 through December 8, 2010).
14. Draft 6 ballot open December 9 through 20, 2010: Quorum count of 65.7% (minimum of 66.7% of ballot pool votes required, 23 of a possible 35 votes received, did not make quorum). Approval vote of 61.1% (minimum of 66.7% of weighted sector votes required, standard would not have been approved).
15. Draft 7 of proposed standard posted (February 22 through March 24, 2011).
16. Draft 8 of proposed standard posted for pre-ballot review (April 29 through May 23, 2011).
17. Draft 8 ballot open May 24 through June 6, 2011: Quorum count of 91.2% (minimum of 66.7% of ballot pool votes required) 31 of a possible 34 votes received, made quorum. Approval vote of 77.2% (minimum of 66.7% of weighted sector votes required). Standard was approved.

Proposed action plan and description of current draft:
This is Draft 8 of the proposed standard which received Ballot Pool approval on June 6, 2011.

Future Development Plan:

Anticipated Actions	Anticipated Date
1. Request NERC to review and post for comments.	June 22, 2011
2. Resolve comments from NERC posting.	August 26, 2011
3. SERC Board Executive Committee adopts standard.	September 21, 2011
4. Submit request to NERC for approval and filing with FERC.	September 29, 2011
5. NERC files standard with FERC.	To be determined.

Effective dates:

Requirement R1 shall become effective 12 months after the first day of the first quarter following regulatory approval, but no sooner than 12 months following regulatory approval of NERC PRC-006-1. This 12-month period is consistent with the effective date of R2 of PRC-006-1.

Requirement R2 shall become effective 12 months after the first day of the first quarter following regulatory approval. This 12-month period is needed to allow time for entities to ensure a minimum time delay of six cycles on existing UFLS relays as specified in part 2.6.

Requirements R3 shall become effective 18 months after the first day of the first quarter following regulatory approval. This additional six-month period is needed to allow time to perform and coordinate studies necessary to assess the overall effectiveness of the UFLS schemes in the SERC Region.

Requirements R4, R5, and R6 shall become effective 30 months after the first day of the first quarter following regulatory approval. This additional 18 months is needed to allow time for any necessary changes to be made to the existing UFLS schemes in the SERC Region.

Requirement R7 shall become effective six months following the effective date of R8 of the NERC standard PRC-006-1, but no sooner than one year following the first day of the first calendar quarter after applicable regulatory approval of PRC-006-SERC-1. R8 of the NERC standard requires each UFLS entity to provide UFLS data to the Planning Coordinator (PC). R7 of the SERC standard requires the PC to provide this data to SERC.

Requirement R8 shall become effective 12 months after the first day of the first quarter following regulatory approval. This 12-month period is needed to allow time for Generator Owners to collect and make an initial data filing.

Revision History

Version	Date	Action	Change Tracking
Draft 1	September 19 2008 thru October 20, 2008	Posted for 1st comment period	Initial version
Draft 2	November 21, 2008 thru December 22, 2008	Posted for 2nd comment period	Revised to address comments received on Draft 1 and to include measures and compliance sections
Draft 3	February 9, 2009	Posted for information	Revised to address comments received on Draft 2
Draft 3a	September 15, 2009 thru October 15, 2009	Posted for 3rd comment period	Revised to make consistent with Draft 2 of NERC continent-wide standard
Draft 4	October 27, 2009 thru November 10, 2009	Posted for pre-ballot review	Revised to address comments received on Draft 3a
Draft 5	September 21, 2010 thru October 21, 2010	Posted for 30-day comment period	Revised to address comments received on Draft 4 ballot and to make consistent with latest draft of NERC continent-wide standard
Draft 6	November 23, 2010 thru December 8, 2010	Posted for pre-ballot review	Revised to address comments received on Draft 5
Draft 7	February 22 thru March 24, 2011	Posted for 30-day comment period	Revised to address comments received on ballot of Draft 6
Draft 8	April 29, 2011 thru May 23, 2011	Posted for pre-ballot review	Revised to address comments received on Draft 7

Definitions of terms used in standard

This section includes all newly-defined or revised terms used in the proposed standard. Terms already defined in the NERC Reliability Standards Glossary of Terms are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these defined terms will be removed from the individual standard and added to the Glossary.

There are no new or revised definitions proposed in this standard revision.

Introduction

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

2. **Number:** PRC-006-SERC–01

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-1 ("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-006-1 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 when developing criteria 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.

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.

R2. Each Planning Coordinator in the SERC Region 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.

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 59.5 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 58.4 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) shall be at least six cycles.

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.

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.

R3. Each Planning Coordinator in the SERC Region 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 imbalance equals [(load minus actual generation output) / load]. These simulation requirements apply to the UFLS assessments specified in R4 of the NERC UFLS standard PRC-006-1. *[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.

The NERC standard requires that schemes 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.

R4. Each UFLS entity that has a total load of 100 MW or greater in a Planning Coordinator area in the SERC Region shall be responsible for implementing the UFLS scheme developed by their Planning Coordinator. UFLS entities may coordinate with other UFLS entities to implement the UFLS scheme developed by the Planning Coordinator responsible for their collective systems. The UFLS scheme shall meet the following requirements. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]*

4.1. The percent of load shedding to be implemented shall be based on the actual or estimated distribution substation or feeder demand (including losses) of the UFLS entities at the time coincident with the previous year actual Peak Demand.

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 unless scheme changes per Requirement R6 are in process.

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.

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

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5.1. The percent of load shedding to be implemented shall be based on the actual or estimated distribution substation or feeder demand (including losses) of the UFLS entities at the time coincident with the previous year actual Peak Demand.

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 unless scheme changes per Requirement R6 are in process.

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.

R6. Each UFLS entity in the SERC Region shall implement changes to the UFLS scheme which involve frequency settings, relay time delays, or changes to the percentage of load in the scheme within 18 months of notification by the Planning Coordinator. *[Violation Risk Factor: Medium] [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.

The SDT believes it is necessary to put a requirement on how quickly changes to the scheme should be made. This requirement specifies that changes must be made 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. 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 desires that changes to the UFLS scheme be made faster than that, then the PC may request the implementation to be done sooner than 18 months. The UFLS entity may oblige but will not be required to do so.

R7. Each Planning Coordinator in the SERC Region 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.

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.

R8. Each Generator Owner shall provide the following information within 30 days of a request by SERC 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.

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.

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.

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. 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.	The UFLS entity's implemented UFLS scheme had three or more load shedding steps outside the range specified in 4.2.

Table 1						
R#	Time Horizon	VRF	Violation Severity Level			
			Lower	Moderate	High	Severe
					OR The UFLS entity's implemented UFLS scheme had a total load outside the range specified in 4.3.	**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	Medium	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 R6 to SERC 1 to 10 days after the scheduled submittal date.	The Planning Coordinator provided the data required in R6 to SERC 11 to 20 days after the scheduled submittal date.	The Planning Coordinator provided the data required in R6 to SERC 21 to 30 days after the scheduled submittal date.	The Planning Coordinator provided the data required in R6 to SERC more than 30 days after the scheduled submittal date.

Table 1						
R#	Time Horizon	VRF	Violation Severity Level			
			Lower	Moderate	High	Severe
				OR The Planning Coordinator did not provide to SERC one piece of information listed in R7.	**OR** The Planning Coordinator did not provide to SERC two pieces of information listed in R7.	**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 R7 to SERC 1 to 10 days after the requested submittal date.	The Generator Owner provided the data required in R7 to SERC 11 to 20 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC one piece of information listed in R8.	The Generator Owner provided the data required in R6 to SERC 21 to 30 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC two pieces of information listed in R8.	The Generator Owner provided the data required in R7 to SERC more than 30 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC any of the information listed in R8.

Administrative Procedure

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-01 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-01 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-006-1 Requirement R3 and SERC Standard PRC-006-SERC-01 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. 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 these 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-01 Requirement R4 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-01 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.

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Unofficial Comment Form for Regional Reliability Standard PRC-006-SERC-01

Please **DO NOT** use this form. Please use the electronic form located at the link below to submit comments on the Regional Reliability Standard **Automatic Underfrequency Load Shedding PRC-006-SERC-01**. Comments must be submitted by **August 15, 2011.** If you have questions please contact Howard Gugel at howard.gugel@nerc.net or Barb Nutter at barbara.nutter@nerc.net.

http://www.nerc.com/filez/regional_standards/regional_reliability_standards_under_development.html

Background Information
A regional reliability standard shall be: (1) a regional reliability standard that is more stringent than the continent-wide reliability standard, including a regional standard that addresses matters that the continent-wide reliability standard does not; or (2) a regional reliability standard that is necessitated by a physical difference in the bulk power system. Regional reliability standards 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, 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.

PRC-006-SERC-1 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.

Each SERC Regional Reliability Standard shall enable or support one or more of the NERC reliability principles, thereby ensuring that each standard serves a purpose in support of the reliability of the regional bulk electric system. Each of those standards shall also be consistent with all of the NERC reliability principles, thereby ensuring that no standard undermines reliability through an unintended consequence. The NERC reliability principles supported by this standard are the following:

- **Reliability Principle 1** — Interconnected bulk electric systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions as defined in the NERC Standards.
- **Reliability Principle 2** — The frequency and voltage of interconnected bulk electric systems shall be controlled within defined limits through the balancing of real and reactive power supply and demand.
- **Reliability Principle 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.

The proposed SERC Regional Reliability Standard is not inconsistent with, or less stringent than established NERC Reliability Standards. Once approved by the appropriate authorities,

the SERC Regional Reliability Standard obligates the SERC to monitor and enforce compliance, apply sanctions, if any, consistent with any regional agreements and the NERC rules.

The SERC PRC-006-SERC-01 standard contains eight main requirements for applicable entities within the SERC geographic area. The standard contains the following:

> **Requirement 1** Each Planning Coordinator shall include its SERC subregion as an identified island when developing criteria for selecting portions of the BPS that may form islands.
>
> **Requirement 2** Each Planning Coordinator in the SERC Region 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.
>
> **Requirement 3** Each Planning Coordinator in the SERC Region 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 imbalance equals [(load minus actual generation output) / load]. These simulation requirements apply to the UFLS assessments specified in R4 of the NERC UFLS standard PRC-006-1.
>
> **Requirement 4** Each UFLS entity that has a total load of 100 MW or greater in a Planning Coordinator area in the SERC Region shall be responsible for implementing the UFLS scheme developed by their Planning Coordinator. UFLS entities may coordinate with other UFLS entities to implement the UFLS scheme developed by the Planning Coordinator responsible for their collective systems. The UFLS scheme shall meet the following requirements.
>
> **Requirement 5** Each UFLS entity that has a total load less than 100 MW in a Planning Coordinator area in the SERC Region shall be responsible for implementing the UFLS scheme developed by their Planning Coordinator, but shall not be required to have more than one UFLS step. UFLS entities may coordinate with other UFLS entities to implement the UFLS scheme developed by the Planning Coordinator responsible for their collective systems. The UFLS scheme shall meet the following requirements.
>
> **Requirement 6** Each UFLS entity in the SERC Region shall implement changes to the UFLS scheme which involve frequency settings, relay time delays, or changes to the percentage of load in the scheme within 18 months of notification by the Planning Coordinator.
>
> **Requirement 7** Each Planning Coordinator in the SERC Region shall provide the following information to SERC according to the schedule specified by SERC.
>
> **Requirement 8** Each Generator Owner shall provide the following information within 30 days of a request by SERC to facilitate post-event analysis of frequency disturbances.

The approval process for a regional reliability standard requires NERC to publicly notice and request comment on the proposed standard. 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.

1. **Was the proposed standard developed in a fair and open process, using the associated Regional Reliability Standards Development Procedure?**

   ☐ Yes

   ☐ No

   Comments:

2. **Does the proposed standard pose an adverse impact to reliability or commerce in a neighboring region or interconnection?**

   ☐ Yes

   ☐ No

   Comments:

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

   ☐ Yes
   ☐ No

   Comments:

4. **Does the proposed 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 standard has more specific criteria for the same requirements covered in a continent-wide standard**
- **The proposed standard has requirements that are not included in the corresponding continent-wide reliability standard**
- **The proposed regional difference is necessitated by a physical difference in the bulk power system.**

☐ Yes

☐ No

Comments:

6. If you have any other comments that you have not already provided in the response to the prior questions, please provide them here.

NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

Regional Reliability Standards Announcement

Comment Period Open for PRC-006-SERC-01
June 29-August 15, 2011

Now available at:
http://www.nerc.com/filez/regional_standards/regional_reliability_standards_under_development.html

Proposed Standard for the SERC Reliability Corporation (SERC)

SERC has requested NERC to post regional reliability standard PRC-006-SERC-01 — Automatic Underfrequency Load Shedding for a 45-day industry review as permitted by the NERC Rules of Procedure.

Instructions
Please use this electronic form to submit comments. If you experience any difficulties in using the electronic form, please contact Monica Benson at monica.benson@nerc.net. An off-line, unofficial copy of the comment form is posted on the regional standards development page:
http://www.nerc.com/filez/regional_standards/regional_reliability_standards_under_development.html

Background
The SERC UFLS Standard: PRC-006-SERC-1 ("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-006-1 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.

Regional Reliability Standards Development Process
Section 300 of the *Rules of Procedure for the Electric Reliability Organization* governs the regional reliability standards development process. The success of the NERC standards development process depends on stakeholder participation. We extend our thanks to all those who participate.

For more information or assistance,
please contact Monica Benson at monica.benson@nerc.net or at 404.446.2573

Exhibit D

Standard Drafting Team Roster

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SERC UFLS Standard Drafting Team Roster
(September 19, 2011)

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Anthony Williams (Resigned from SDT on August 5, 2009)	Duke Energy Carolinas *Senior Engineer*	400 South Tryon Street Mail Code: ST11F Charlotte, NC 28202 (704) 382-8310 Anthony.Williams@duke-energy.com

SERC UFLS Standard Drafting Team Biographies

Rick Foster: Rick has a MSEE from University of Missouri (Rolla Campus) and an MBA from Illinois State University. He is licensed as a Professional Engineer in the State of Illinois. He worked for Illinois Power Company in Decatur, Illinois from 1983 through 2004 in the System Planning, Bulk Power Marketing and Operations Groups. In 2004 he joined Ameren Services where he is currently a Transmission Planning Consulting Engineer. Rick has over 28 years of experience in the Planning and Bulk Power Marketing area and is actively involved in several SERC subcommittees and working groups. His main areas of interest are power system planning and voltage, steady state, small signal and transient stability.

Venkat (Sharma) Kolluri: Sharma has a MSEE from West Virginia University, Morgantown and an MBA from University of Dayton. He worked for AEP Service Corporation in Columbus, Ohio from 1977 through 1984 in the Bulk Transmission Planning Group. In 1984 he joined Entergy Services Inc., where he is currently the Manager of Transmission Planning. Sharma has over 25 years of experience in Planning and Operations area and is actively involved in several IEEE subcommittees, NERC Standards Development Task Forces, and CIGRE working groups. His main areas of interest are power system planning and operations, voltage and dynamic stability, and reactive power planning. Sharma was recently selected as IEEE Fellow for innovative contributions to the stability area.

Greg Davis: Greg received a Bachelor of Science in Electrical Engineering from North Carolina Agricultural & Technical State University, Greensboro NC in 1996. He has worked for Georgia Transmission Corporation (GTC) from 2000 to the present. From 2000-2003 Greg began his career as a Test Engineer working in Substation Maintenance. In 2004 he started working in the System Protection Department, working as a regional Protection Engineer. Greg is currently the ERO Compliance Specialist for the P&C Department, where he serves as the subject matter expert for PRC standards and represents the Corporation on internal and external teams, committees and industry groups.

Ernesto Paon: Ernesto has a BSEE from the University of Illinois, Champaign-Urbana, Illinois, and completed graduate work towards MSEE from Iowa State University, Ames, Iowa. He worked for Illinois Power Company from 1975 through 1985 in the substation design and system protection departments. He worked for LEMCO / Y&A Consulting Engineers in St. Louis, Missouri from 1985 through 1988 as a project engineer. In 1988 he joined the Municipal Electric Authority of Georgia where he is currently the Manager of System Protection and Testing. Ernesto has over 33 years experience in protection & control. He is a member of IEEE.

John O'Connor: John O'Connor has over 30 years of experience in the operation, maintenance and engineering of electric power systems. He graduated from N.C. State University with a BS in Electrical Engineering, is a registered professional engineer in North Carolina, and holds an electrical contractor license. John is currently a Principal Engineer in Progress Energy Carolinas' Transmission Planning group, where he is responsible for stability studies.

Bob Jones: Bob is currently the Planning Manager for Stability and Special Studies in the Transmission Planning Department at Southern Company Services. Bob obtained a BSEE degree from the University of Alabama in 1973 and an MSEE degree from University of Alabama – Birmingham in 1978. He has worked for 38 years for Southern Company Services. Earlier in his career, Bob was involved in transient voltage analysis, harmonics studies, power quality, and surge protection. For the last 17 years, he has worked in Transmission Planning and has been responsible for stability studies for the Southern Company.

Jonathan Glidewell: Jonathan is currently a Project Manager in Transmission Planning with Southern Company Services. Jonathan began working in the Transmission Planning Department as an Engineer in 2001. He has worked in Transmission Planning since 2001 except for one year during 2008 – 2009 where he worked in Operations Planning. His main areas of interest are power system planning and operations, voltage and dynamic stability, and reactive power planning. Jonathan received a Bachelor of Science in Electrical and Computer Engineering from the University of Alabama at Birmingham in 2001 and is a registered Professional Engineer in the state of Alabama.

Tom Cain: Tom obtained a BS in Engineering Physics at Cornell University and then an MSEE degree from Georgia Tech. Tom worked for GM and the Southwest Research Institute before coming to TVA in 1994. Tom has been working in the Transmission Planning Department since in 1999 where he has been responsible for stability studies.

Andrew Fusco: Andrew is the Manager of Planning at ElectriCities of North Carolina, Inc. In his role at ElectriCities, Andrew is responsible resource planning, load forecasting, transmission planning, renewable energy strategy, and compliance with NERC Reliability Standards. He has 10 years of electric utility experience and 18 years of professional experience, which includes experience with nuclear facilities at Los Alamos National Laboratory. Andrew has served on a number of NERC and SERC Committees including the NERC Planning Committee, the NERC Compliance and Certification Committee, the SERC Engineering Committee, and the SERC Reliability Review Subcommittee. Andrew holds Bachelor and Master of Science Degrees from the Massachusetts Institute of Technology and a Master of Business Administration from Duke University.

Anthony Williams: Anthony is a Senior Engineer at Duke Energy where he specializes in dynamic studies and transmission system reactive power studies. He is a registered Professional Engineer with 12 years Transmission Planning experience and over 20 years of power system experience. Anthony has served in various positions on several inter-utility groups including the SERC Dynamics Review Subcommittee, the SERC Intra-Regional Dynamics Study Group and the VACAR Stability Working Group. During his Transmission Planning career, Anthony provided project leadership and technical expertise on several large projects including generator testing, SVC sizing studies, and automating transmission study processes.

Pat Huntley: Pat is currently the Manager, Reliability Standards with SERC Reliability Corporation. Pat joined SERC in 2000 and provided support to the Engineering Committee for seven years. Pat had the lead in drafting the SERC Regional Reliability Standards Development Procedure, which became part of the Regional Entity delegation between SERC and NERC. Pat

moved to his current position when SERC transitioned to a Regional Entity. He serves as the SERC representative on the ERO Regional Standards Group and serves on the Communications and Planning Subcommittee of the NERC Standards Committee. Prior to joining SERC, Pat worked for Duke Energy for 30 years and retired in 1999. He started in field transmission operations and served in a number of positions including transmission power quality supervisor, System Operating engineer, and Manager of Transmission Planning. Pat received a Bachelor of Science in Electrical Engineering from Clemson University in 1968, a Master of Engineering in Electrical Engineering in 1979, and is a registered Professional Engineer in the states of NC and SC.

Exhibit E

PRC-006-SERC-01 – Violation Severity Level and Violation Risk Factor Analysis

SERC Regional UFLS Standard (PRC-006-SERC-01)
VRF and VSL Justification

This document provides the justification for assignment of VRFs and VSLs, identifying how each proposed VRF and VSL meets NERC's criteria and FERC's Guidelines. NERC's criteria for setting VRFs and VSLs; FERC's five guidelines (G1 – G5) for approving VRFs; and FERC's four guidelines (G1-G4) for setting VSLs are provided at the end of this document.

VRF and VSL Justifications		
R1	Proposed VRF	Medium
	NERC VRF Discussion	*Violation of this requirement could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly and adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. However, violation of this requirement is unlikely, under emergency, abnormal, or restoration conditions anticipated by the preparations, to lead directly to bulk electric system instability, separation, or cascading failures, nor to hinder restoration to a normal condition.* *This requirement specifies that the Planning Coordinator shall include its SERC subregion(s) as an identified island in the design of its UFLS scheme. This in turn requires simulation of the subregion to verify that it meets the performance characteristics specified in R3 of PRC-006-1. Failure to comply with this requirement could allow a poorly performing UFLS scheme or a UFLS scheme that does not coordinate well with others in the subregion to go undetected.*
	FERC VRF G1 Discussion	Guideline 1- Consistency w/ Blackout Report *The team did not address Guideline 1 directly because of an apparent conflict between Guidelines 1 and 4. Whereas Guideline 1 identifies a list of topics that encompass nearly all topics within NERC's Reliability Standards and implies that these requirements should be assigned a "High" VRF, Guideline 4 directs assignment of VRFs based on the impact of a specific requirement to the reliability of the system. The SDT believes that Guideline 4 is reflective of the intent of VRFs and therefore concentrated its approach on the reliability impact of the requirements.*
	FERC VRF G2 Discussion	Guideline 2- Consistency within a Reliability Standard *This guideline is not applicable since this requirement does not have sub-requirement VRF assignments.*
	FERC VRF G3 Discussion	Guideline 3- Consistency among Reliability Standards *The VRF assigned to this requirement is consistent with the VRF assignment to R2 (part 2.3) of PRC-006-1 which addresses a similar reliability goal.*
	FERC VRF G4	Guideline 4- Consistency with NERC Definitions of VRFs

	Discussion	*Violation of this requirement could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly and adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. However, violation of this requirement is unlikely, under emergency, abnormal, or restoration conditions anticipated by the preparations, to lead directly to bulk electric system instability, separation, or cascading failures, nor to hinder restoration to a normal condition.*
	FERC VRF G5 Discussion	Guideline 5- Treatment of Requirements that Co-mingle More than One Obligation *This requirement does not comingle a higher risk reliability objective and a lesser risk reliability objective.*
	Proposed Lower VSL	N/A
	Proposed Moderate VSL	N/A
	Proposed High VSL	N/A
	Proposed Severe VSL	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.
	VSL Discussion	*This is a binary requirement. Therefore, the VSL is Severe for failure to perform.*
	FERC VSL G1 Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance	*The VSL assignment complies with Guideline 1 because it does not have the unintended consequence of lowering the current or historic level of compliance.*
	FERC VSL G2 Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent Guideline 2b: Violation Severity Level	*This is a binary requirement. The VSL for failure to perform is Severe in compliance with Guideline 2A. The VSL is written in clear and unambiguous language in compliance with Guideline 2B.*

	Assignments that Contain Ambiguous Language	
	FERC VSL G3 Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement	*The VSL aligns with the language of the requirement, and does not add to nor take away from it. The VSL does not redefine or undermine the requirement's reliability goal. In accordance with Guideline 3, the VSL assignment is consistent with the requirement and the degree of compliance can be determined objectively and with certainty.*
	FERC VSL G4 Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations	*The VSL assignment complies with Guideline 4, because it is based on a single violation of a Reliability Standard and is not based on a cumulative number of violations of the same requirement over a period of time.*

VRF and VSL Justifications		
R2	Proposed VRF	Medium
	NERC VRF Discussion	*Violation of this requirement could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly and adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. However, violation of this requirement is unlikely, under emergency, abnormal, or restoration conditions anticipated by the preparations, to lead directly to bulk electric system instability, separation, or cascading failures, nor to hinder restoration to a normal condition.* *This requirement sets minimum requirements for the Planning Coordinator UFLS scheme. Failure to comply with this requirement could result in a lack of consistency and poor coordination for the various UFLS schemes which are used in SERC*
	FERC VRF G1 Discussion	Guideline 1- Consistency w/ Blackout Report *The team did not address Guideline 1 directly because of an apparent conflict between Guidelines 1 and 4. Whereas Guideline 1 identifies a list of topics that encompass nearly all topics within NERC's Reliability Standards and implies that these requirements should be assigned a "High" VRF, Guideline 4 directs assignment of VRFs based on the impact of a specific requirement to the reliability of the system. The SDT believes that Guideline 4 is reflective of the intent of VRFs and therefore concentrated its approach on the reliability impact of the requirements.*
	FERC VRF G2 Discussion	Guideline 2- Consistency within a Reliability Standard *This guideline is not applicable since this requirement does not have sub-requirement VRF assignments.*
	FERC VRF G3 Discussion	Guideline 3- Consistency among Reliability Standards *The VRF assigned to this requirement is consistent with the VRF assignment to R5 of PRC-006-1 which addresses a similar reliability goal.*
	FERC VRF G4 Discussion	Guideline 4- Consistency with NERC Definitions of VRFs *Violation of this requirement could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly and adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. However, violation of this requirement is unlikely, under emergency, abnormal, or restoration conditions anticipated by the preparations, to lead directly to bulk electric system instability, separation, or cascading failures, nor to hinder restoration to a normal condition.*

	FERC VRF G5 Discussion	Guideline 5- Treatment of Requirements that Co-mingle More than One Obligation *This requirement does not comingle a higher risk reliability objective and a lesser risk reliability objective.*
	Proposed Lower VSL	The Planning Coordinator's scheme did not meet one of the UFLS system design requirements identified in 2.2 through 2.6
	Proposed Moderate VSL	The Planning Coordinator's scheme did not meet two of the UFLS system design requirements identified in 2.2 through 2.6.
	Proposed High VSL	The Planning Coordinator's scheme did not meet three of the UFLS system design requirements identified in 2.2 through 2.6.
	Proposed Severe VSL	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.
	VSL Discussion	*This requirement has multiple parts. Part 2.1 is considered to be more important and Parts 2.2 through 2.6 contribute relatively equally to meeting the requirement. Therefore, the VSLs are based on the number of parts missing. Missing one of Parts 2.2 through 2.6 is Lower. Missing two of Parts 2.2 through 2.6 is Moderate. Missing three of Parts 2.2 through 2.6 is High. Missing Part 2.1 or four or more of Parts 2.1 through 2.6 is Severe.*
	FERC VSL G1 Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance	*The VSL assignments comply with Guideline 1 because they do not have the unintended consequence of lowering the current or historic level of compliance.*
	FERC VSL G2 Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous	*This is not a binary requirement, therefore Guideline 2A does not apply. The VSL is written in clear and unambiguous language in compliance with Guideline 2B.*

	Language	
	FERC VSL G3 Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement	*The VSL aligns with the language of the requirement, and does not add to nor take away from it. The VSL does not redefine or undermine the requirement's reliability goal. In accordance with Guideline 3, the VSL assignment(s) are consistent with the requirement and the degree of compliance can be determined objectively and with certainty.*
	FERC VSL G4 Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations	*The VSL assignments comply with Guideline 4, because they are based on a single violation of a Reliability Standard and are not based on a cumulative number of violations of the same requirement over a period of time.*

VRF and VSL Justifications		
R3	Proposed VRF	High
	NERC VRF Discussion	*Violation of this requirement could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures, or could hinder restoration to a normal condition.* *This requirement specifies simulation of the UFLS scheme that the Planning Coordinator must conduct to satisfy R4 of PRC-006-1. Failure to comply with this requirement could result in a UFLS scheme that does not meet the performance requirements specified in R3 of the NERC UFLS standard (PRC-001-1) for all imbalance conditions between load and generation of up to 25%.*
	FERC VRF G1 Discussion	Guideline 1- Consistency w/ Blackout Report *The team did not address Guideline 1 directly because of an apparent conflict between Guidelines 1 and 4. Whereas Guideline 1 identifies a list of topics that encompass nearly all topics within NERC's Reliability Standards and implies that these requirements should be assigned a "High" VRF, Guideline 4 directs assignment of VRFs based on the impact of a specific requirement to the reliability of the system. The SDT believes that Guideline 4 is reflective of the intent of VRFs and therefore concentrated its approach on the reliability impact of the requirements.*
	FERC VRF G2 Discussion	Guideline 2- Consistency within a Reliability Standard *This guideline is not applicable since this requirement does not have sub-requirements.*
	FERC VRF G3 Discussion	Guideline 3- Consistency among Reliability Standards *The VRF assigned to this requirement is consistent with the VRF assignment to R3 of PRC-006-1 which addresses a similar reliability goal.*
	FERC VRF G4 Discussion	Guideline 4- Consistency with NERC Definitions of VRFs *Violation of this requirement could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures, or could hinder restoration to a normal condition.*
	FERC VRF G5 Discussion	Guideline 5- Treatment of Requirements that Co-mingle More than One Obligation *This requirement comingles a higher risk reliability objective (High for 25% imbalance simulation) and lesser risk reliability objectives (Medium for 13% and 22% imbalance simulations).*

	Proposed Lower VSL	N/A
	Proposed Moderate VSL	The Planning Coordinator failed to conduct one of the required simulations of its UFLS scheme.
	Proposed High VSL	N/A
	Proposed Severe VSL	The Planning Coordinator failed to conduct two of the required simulations of its UFLS scheme.
	VSL Discussion	*There are at least six simulations required - a minimum of two islands and three imbalance levels. Each simulation contributes relatively equally to meeting the requirement. Therefore, the VSLs are based on the number of simulations missing. Missing one simulation is considered to be Moderate. Missing two or more simulations is considered to be Severe.*
	FERC VSL G1 Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance	*The VSL assignments comply with Guideline 1 because they do not have the unintended consequence of lowering the current or historic level of compliance.*
	FERC VSL G2 Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous Language	*This is not a binary requirement, therefore Guideline 2A does not apply. The VSL is written in clear and unambiguous language in compliance with Guideline 2B.*
	FERC VSL G3 Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement	*The VSL aligns with the language of the requirement, and does not add to nor take away from it. The VSL does not redefine or undermine the requirement's reliability goal. In accordance with Guideline 3, the VSL assignment(s) are consistent with the requirement and the degree of compliance can be determined objectively and with certainty.*

	FERC VSL G4 Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations	*The VSL assignments comply with Guideline 4, because they are based on a single violation of a Reliability Standard and are not based on a cumulative number of violations of the same requirement over a period of time.*

VRF and VSL Justifications		
R4	Proposed VRF	Medium
	NERC VRF Discussion	*Violation of this requirement could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly and adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. However, violation of this requirement is unlikely, under emergency, abnormal, or restoration conditions anticipated by the preparations, to lead directly to bulk electric system instability, separation, or cascading failures, nor to hinder restoration to a normal condition.* *This requirement specifies the tolerances for implementation of the UFLS scheme by UFLS entities that have a total load of 100 MW or greater in a Planning Coordinator area in the SERC Region. Failure to comply with this requirement could result in a degradation of the expected performance of the UFLS scheme.*
	FERC VRF G1 Discussion	Guideline 1- Consistency w/ Blackout Report *The team did not address Guideline 1 directly because of an apparent conflict between Guidelines 1 and 4. Whereas Guideline 1 identifies a list of topics that encompass nearly all topics within NERC's Reliability Standards and implies that these requirements should be assigned a "High" VRF, Guideline 4 directs assignment of VRFs based on the impact of a specific requirement to the reliability of the system. The SDT believes that Guideline 4 is reflective of the intent of VRFs and therefore concentrated its approach on the reliability impact of the requirements.*
	FERC VRF G2 Discussion	Guideline 2- Consistency within a Reliability Standard *This guideline is not applicable since this requirement does not have sub-requirement VRF assignments.*
	FERC VRF G3 Discussion	Guideline 3- Consistency among Reliability Standards *This requirement is consistent with R9 of PRC-006-1 which addresses a similar reliability goal and has a VRF of "High." However, while R9 of PRC-006-1 requires implementation, this requirement only addresses the tolerance for implementation. It is therefore assigned a "Medium" VRF.*
	FERC VRF G4 Discussion	Guideline 4- Consistency with NERC Definitions of VRFs *Violation of this requirement could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly and adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. However, violation of this requirement is unlikely, under emergency, abnormal, or restoration conditions anticipated by the preparations, to lead directly to bulk electric system instability,*

		separation, or cascading failures, nor to hinder restoration to a normal condition.
	FERC VRF G5 Discussion	Guideline 5- Treatment of Requirements that Co-mingle More than One Obligation *This requirement does not comingle a higher risk reliability objective and a lesser risk reliability objective.*
	Proposed Lower VSL	The UFLS entity's implemented UFLS scheme had one load shedding step outside the range specified in 4.2.
	Proposed Moderate VSL	The UFLS entity's implemented UFLS scheme had two load shedding steps outside the range specified in 4.2.
	Proposed High VSL	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.
	Proposed Severe VSL	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.
	VSL Discussion	*There are ranges set for the three load shedding steps required and for the total amount of load. The ranges on the three steps contribute relatively equally to meeting the requirement. The range on the total amount of load is considered to be more important. Therefore, having one step out of range is considered to be Lower. Having two steps out of range is considered to be Moderate. Having three steps out of range or the total amount out of range is considered to be High. Having three steps out of range and the total amount out of range is considered to be Severe.*
	FERC VSL G1 Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance	*The VSL assignments comply with Guideline 1 because they do not have the unintended consequence of lowering the current or historic level of compliance.*
	FERC VSL G2 Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties Guideline 2a: The Single Violation	*This is not a binary requirement, therefore Guideline 2A does not apply. The VSL is written in clear and unambiguous language in compliance with Guideline 2B.*

	Severity Level Assignment Category for "Binary" Requirements Is Not Consistent Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous Language	
	FERC VSL G3 Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement	*The VSL aligns with the language of the requirement, and does not add to nor take away from it. The VSL does not redefine or undermine the requirement's reliability goal. In accordance with Guideline 3, the VSL assignment(s) are consistent with the requirement and the degree of compliance can be determined objectively and with certainty.*
	FERC VSL G4 Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations	*The VSL assignments comply with Guideline 4, because they are based on a single violation of a Reliability Standard and are not based on a cumulative number of violations of the same requirement over a period of time.*

VRF and VSL Justifications		
R5	Proposed VRF	Medium
	NERC VRF Discussion	*Violation of this requirement could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly and adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. However, violation of this requirement is unlikely, under emergency, abnormal, or restoration conditions anticipated by the preparations, to lead directly to bulk electric system instability, separation, or cascading failures, nor to hinder restoration to a normal condition.* *This requirement specifies the tolerances for implementation of the UFLS scheme by UFLS entities that have a total load less than 100 MW in a Planning Coordinator area in the SERC Region. Failure to comply with this requirement could result in some degradation of the expected performance of the UFLS scheme.*
	FERC VRF G1 Discussion	Guideline 1- Consistency w/ Blackout Report *The team did not address Guideline 1 directly because of an apparent conflict between Guidelines 1 and 4. Whereas Guideline 1 identifies a list of topics that encompass nearly all topics within NERC's Reliability Standards and implies that these requirements should be assigned a "High" VRF, Guideline 4 directs assignment of VRFs based on the impact of a specific requirement to the reliability of the system. The SDT believes that Guideline 4 is reflective of the intent of VRFs and therefore concentrated its approach on the reliability impact of the requirements.*
	FERC VRF G2 Discussion	Guideline 2- Consistency within a Reliability Standard *This guideline is not applicable since this requirement does not have sub-requirement VRF assignments.*
	FERC VRF G3 Discussion	Guideline 3- Consistency among Reliability Standards *This requirement is consistent with R9 of PRC-006-1 which addresses a similar reliability goal and has a VRF of "High." However, while R9 of PRC-006-1 requires implementation, this requirement only addresses the tolerance for implementation. It is therefore assigned a "Medium" VRF.*
	FERC VRF G4 Discussion	Guideline 4- Consistency with NERC Definitions of VRFs *Violation of this requirement could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly and adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. However, violation of this requirement is unlikely, under emergency, abnormal, or restoration conditions anticipated by the preparations, to lead directly to bulk electric system instability,*

		separation, or cascading failures, nor to hinder restoration to a normal condition.
	FERC VRF G5 Discussion	Guideline 5- Treatment of Requirements that Co-mingle More than One Obligation *This requirement does not comingle a higher risk reliability objective and a lesser risk reliability objective.*
	Proposed Lower VSL	N/A
	Proposed Moderate VSL	N/A
	Proposed High VSL	N/A
	Proposed Severe VSL	The UFLS entity's implemented UFLS scheme had a total load outside the range specified in 5.2.
	VSL Discussion	*This is a binary requirement. Therefore, the VSL is Severe for failure to perform.*
	FERC VSL G1 Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance	*The VSL assignment complies with Guideline 1 because it does not have the unintended consequence of lowering the current or historic level of compliance.*
	FERC VSL G2 Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous Language	*This is a binary requirement. The VSL for failure to perform is Severe in compliance with Guideline 2A. The VSL is written in clear and unambiguous language in compliance with Guideline 2B.*
	FERC VSL G3 Violation Severity Level Assignment Should Be Consistent with the	*The VSL aligns with the language of the requirement, and does not add to nor take away from it. The VSL does not redefine or undermine the requirement's reliability goal. In accordance with Guideline 3, the VSL assignment is consistent with the requirement and the degree of compliance can be determined*

	Corresponding Requirement	*objectively and with certainty.*
	FERC VSL G4 Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations	*The VSL assignment complies with Guideline 4, because it is based on a single violation of a Reliability Standard and is not based on a cumulative number of violations of the same requirement over a period of time.*

VRF and VSL Justifications		
R6	Proposed VRF	Medium
	NERC VRF Discussion	*Violation of this requirement could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly and adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. However, violation of this requirement is unlikely, under emergency, abnormal, or restoration conditions anticipated by the preparations, to lead to bulk electric system instability, separation, or cascading failures, nor to hinder restoration to a normal condition.* *This requirement specifies the maximum time for a UFLS entity to complete implementation of a major change in a Planning Coordinator's UFLS scheme. Failure to comply with this requirement could result in degradation of the expected performance of the UFLS scheme.*
	FERC VRF G1 Discussion	Guideline 1- Consistency w/ Blackout Report *The team did not address Guideline 1 directly because of an apparent conflict between Guidelines 1 and 4. Whereas Guideline 1 identifies a list of topics that encompass nearly all topics within NERC's Reliability Standards and implies that these requirements should be assigned a "High" VRF, Guideline 4 directs assignment of VRFs based on the impact of a specific requirement to the reliability of the system. The SDT believes that Guideline 4 is reflective of the intent of VRFs and therefore concentrated its approach on the reliability impact of the requirements.*
	FERC VRF G2 Discussion	Guideline 2- Consistency within a Reliability Standard *This guideline is not applicable since this requirement does not have sub-requirements.*
	FERC VRF G3 Discussion	Guideline 3- Consistency among Reliability Standards *This requirement is consistent with R9 of PRC-006-1 which addresses a similar reliability goal. However, while R9 of PRC-006-1 addresses UFLS scheme implementation and has a VRF of "High," this requirement only addresses the timing of implementation. It therefore is assigned a "Medium" VRF.*
	FERC VRF G4 Discussion	Guideline 4- Consistency with NERC Definitions of VRFs *Violation of this requirement could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly and adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. However, violation of this requirement is unlikely, under emergency, abnormal, or restoration conditions anticipated by the preparations, to lead to bulk electric system instability, separation, or cascading failures, nor to hinder restoration to a*

		normal condition.
	FERC VRF G5 Discussion	Guideline 5- Treatment of Requirements that Co-mingle More than One Obligation *This requirement does comingle a higher risk reliability objective and a lesser risk reliability objective.*
	Proposed Lower VSL	The UFLS entity implemented required scheme changes but made them 1 to 30 days after the scheduled date.
	Proposed Moderate VSL	The UFLS entity implemented required scheme changes but made them 31 to 40 days after the scheduled date.
	Proposed High VSL	The UFLS entity implemented required scheme changes but made them 41 to 50 days after the scheduled date.
	Proposed Severe VSL	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.
	VSL Discussion	*This requirement is based on meeting a schedule. Therefore, the VSLs are based on number of days late. Missing the schedule by up to 30 days is Lower. Missing the schedule by 31 - 40 days is Moderate. Missing the schedule by 41 - 50 days is High. Missing the schedule by more than 50 days or failed to implement the required scheme changes is Severe.*
	FERC VSL G1 Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance	*The VSL assignments comply with Guideline 1 because they do not have the unintended consequence of lowering the current or historic level of compliance.*
	FERC VSL G2 Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous	*This is not a binary requirement, therefore Guideline 2A does not apply. The VSL is written in clear and unambiguous language in compliance with Guideline 2B.*

	Language	
	FERC VSL G3 Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement	*The VSL aligns with the language of the requirement, and does not add to nor take away from it. The VSL does not redefine or undermine the requirement's reliability goal. In accordance with Guideline 3, the VSL assignment(s) are consistent with the requirement and the degree of compliance can be determined objectively and with certainty.*
	FERC VSL G4 Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations	*The VSL assignments comply with Guideline 4, because they are based on a single violation of a Reliability Standard and are not based on a cumulative number of violations of the same requirement over a period of time.*

VRF and VSL Justifications		
R7	Proposed VRF	Lower
	NERC VRF Discussion	*Violation of this requirement would not, under the emergency, abnormal, or restorative conditions anticipated by the preparations, be expected to adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. This is a planning requirement that is administrative in nature.* *This requirement specifies UFLS implementation data that the Planning Coordinator must supply to SERC. This will be used to maintain a database for post-event analysis of frequency disturbances. Failure to comply with this requirement could result in a delay in performing post-event analysis of frequency disturbances.*
	FERC VRF G1 Discussion	Guideline 1- Consistency w/ Blackout Report *The team did not address Guideline 1 directly because of an apparent conflict between Guidelines 1 and 4. Whereas Guideline 1 identifies a list of topics that encompass nearly all topics within NERC's Reliability Standards and implies that these requirements should be assigned a "High" VRF, Guideline 4 directs assignment of VRFs based on the impact of a specific requirement to the reliability of the system. The SDT believes that Guideline 4 is reflective of the intent of VRFs and therefore concentrated its approach on the reliability impact of the requirements.*
	FERC VRF G2 Discussion	Guideline 2- Consistency within a Reliability Standard *This guideline is not applicable since this requirement does not have sub-requirement VRF assignments.*
	FERC VRF G3 Discussion	Guideline 3- Consistency among Reliability Standards *The VRF assigned to this requirement is consistent with the VRF assignment to R6, R7, and R8 of PRC-006-1 which addresses a similar reliability goal.*
	FERC VRF G4 Discussion	Guideline 4- Consistency with NERC Definitions of VRFs *Violation of this requirement would not, under the emergency, abnormal, or restorative conditions anticipated by the preparations, be expected to adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. This is a planning requirement that is administrative in nature.*
	FERC VRF G5 Discussion	Guideline 5- Treatment of Requirements that Co-mingle More than One Obligation *This requirement does not comingle a higher risk reliability objective and a lesser risk reliability objective.*
	Proposed Lower VSL	The Planning Coordinator provided the data required in R7 to SERC 1 to 10 days after the scheduled submittal date.
	Proposed Moderate	The Planning Coordinator provided the data required in R7 to

	VSL	SERC 11 to 20 days after the scheduled submittal date. **OR** The Planning Coordinator did not provide to SERC one piece of information listed in R7.
	Proposed High VSL	The Planning Coordinator provided the data required in R7 to SERC 21 to 30 days after the scheduled submittal date. **OR** The Planning Coordinator did not provide to SERC two pieces of information listed in R7.
	Proposed Severe VSL	The Planning Coordinator provided the data required in R7 to SERC more than 30 days after the scheduled submittal date. **OR** The Planning Coordinator did not provide to SERC any of the information listed in R7.
	VSL Discussion	*This requirement has timing elements associated with meeting it and has multiple parts that contribute relatively equally to meeting it. Therefore, the VSLs have one component based on number of days late and it has another component based on the number of parts missing. The SDT thought that missing one part was more significant than being up to 10 days late. Therefore, missing the schedule by up to 10 days is Lower. Missing one part or missing the schedule by 11 - 20 days is Moderate. Missing two parts or missing the schedule by 21 - 30 days is High. Missing all three parts or missing the schedule by more than 30 days is Severe.*
	FERC VSL G1 Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance	*The VSL assignments comply with Guideline 1 because they do not have the unintended consequence of lowering the current or historic level of compliance.*
	FERC VSL G2 Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent Guideline 2b: Violation Severity Level	*This is not a binary requirement, therefore Guideline 2A does not apply. The VSL is written in clear and unambiguous language in compliance with Guideline 2B.*

	Assignments that Contain Ambiguous Language	
	FERC VSL G3 Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement	*The VSL aligns with the language of the requirement, and does not add to nor take away from it. The VSL does not redefine or undermine the requirement's reliability goal. In accordance with Guideline 3, the VSL assignment(s) are consistent with the requirement and the degree of compliance can be determined objectively and with certainty.*
	FERC VSL G4 Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations	*The VSL assignments comply with Guideline 4, because they are based on a single violation of a Reliability Standard and are not based on a cumulative number of violations of the same requirement over a period of time.*

VRF and VSL Justifications		
R8	Proposed VRF	Lower
	NERC VRF Discussion	*Violation of this requirement would not, under the emergency, abnormal, or restorative conditions anticipated by the preparations, be expected to adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. This is a planning requirement that is administrative in nature.* *This requirement specifies generator underfrequency and overfrequency protection data that the Generator Owner must supply to SERC. This will be to facilitate post-event analysis of frequency disturbances. Failure to comply with this requirement could result in a delay in performing post-event analysis of frequency disturbances.*
	FERC VRF G1 Discussion	Guideline 1- Consistency w/ Blackout Report *The team did not address Guideline 1 directly because of an apparent conflict between Guidelines 1 and 4. Whereas Guideline 1 identifies a list of topics that encompass nearly all topics within NERC's Reliability Standards and implies that these requirements should be assigned a "High" VRF, Guideline 4 directs assignment of VRFs based on the impact of a specific requirement to the reliability of the system. The SDT believes that Guideline 4 is reflective of the intent of VRFs and therefore concentrated its approach on the reliability impact of the requirements.*
	FERC VRF G2 Discussion	Guideline 2- Consistency within a Reliability Standard *This guideline is not applicable since this requirement does not have sub-requirement VRF assignments.*
	FERC VRF G3 Discussion	Guideline 3- Consistency among Reliability Standards *The VRF assigned to this requirement is consistent with the VRF assignment to R6, R7, and R8 of PRC-006-1 which addresses a similar reliability goal.*
	FERC VRF G4 Discussion	Guideline 4- Consistency with NERC Definitions of VRFs *Violation of this requirement would not, under the emergency, abnormal, or restorative conditions anticipated by the preparations, be expected to adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. This is a planning requirement that is administrative in nature.*
	FERC VRF G5 Discussion	Guideline 5- Treatment of Requirements that Co-mingle More than One Obligation *This requirement does not comingle a higher risk reliability objective and a lesser risk reliability objective.*
	Proposed Lower VSL	The Generator Owner provided the data required in R8 to SERC 1 to 10 days after the requested submittal date.
	Proposed Moderate	The Generator Owner provided the data required in R8 to

	VSL	SERC 11 to 20 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC one piece of information listed in R8.
	Proposed High VSL	The Generator Owner provided the data required in R8 to SERC 21 to 30 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC two pieces of information listed in R8.
	Proposed Severe VSL	The Generator Owner provided the data required in R8 to SERC more than 30 days after the requested submittal date. **OR** The Generator Owner did not provide to SERC any of the information listed in R8.
	VSL Discussion	*This requirement has timing elements associated with meeting it and has multiple parts that contribute relatively equally to meeting it. Therefore, the VSLs have one component based on number of days late and it has another component based on the number of parts missing. The SDT thought that missing one part was more significant than being up to 10 days late. Therefore, missing the requested submittal date by up to 10 days is Lower. Missing one part or missing the requested submittal date by 11 - 20 days is Moderate. Missing two parts or missing the requested submittal date by 21 - 30 days is High. Missing three parts or missing the requested submittal date by more than 30 days is Severe.*
	FERC VSL G1 Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance	*The VSL assignments comply with Guideline 1 because they do not have the unintended consequence of lowering the current or historic level of compliance.*
	FERC VSL G2 Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent Guideline 2b: Violation	*This is not a binary requirement, therefore Guideline 2A does not apply. The VSL is written in clear and unambiguous language in compliance with Guideline 2B.*

	Severity Level Assignments that Contain Ambiguous Language	
	FERC VSL G3 Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement	*The VSL aligns with the language of the requirement, and does not add to nor take away from it. The VSL does not redefine or undermine the requirement's reliability goal. In accordance with Guideline 3, the VSL assignment(s) are consistent with the requirement and the degree of compliance can be determined objectively and with certainty.*
	FERC VSL G4 Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations	*The VSL assignments comply with Guideline 4, because they are based on a single violation of a Reliability Standard and are not based on a cumulative number of violations of the same requirement over a period of time.*

NERC's VRF Criteria:

High Risk Requirement
A requirement that, if violated, could directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures; or, a requirement in a planning time frame that, if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures, or could hinder restoration to a normal condition.

Medium Risk Requirement
A requirement that, if violated, could directly affect the electrical state or the capability of the bulk electric system, or the ability to effectively monitor and control the bulk electric system. However, violation of a medium risk requirement is unlikely to lead to bulk electric system instability, separation, or cascading failures; or, a requirement in a planning time frame that, if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly and adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. However, violation of a medium risk requirement is unlikely, under emergency, abnormal, or restoration conditions anticipated by the preparations, to lead to bulk electric system instability, separation, or cascading failures, nor to hinder restoration to a normal condition.

Lower Risk Requirement
A requirement that is administrative in nature and a requirement that, if violated, would not be expected to adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor and control the bulk electric system; or, a requirement that is administrative in nature and a requirement in a planning time frame that, if violated, would not, under the emergency, abnormal, or restorative conditions anticipated by the preparations, be expected to adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. A planning requirement that is administrative in nature.

FERC's VRF Guidelines:
VRF G1 – Consistency with the Conclusions of the Final Blackout Report
The Commission seeks to ensure that Violation Risk Factors assigned to Requirements of Reliability Standards in these identified areas appropriately reflect their historical critical impact on the reliability of the Bulk-Power System. From footnote 15 of the May 18, 2007 Order, FERC's list of critical areas (from the Final Blackout Report) where violations could severely affect the reliability of the Bulk-Power System includes:

- Emergency operations
- Vegetation management
- Operator personnel training
- Protection systems and their coordination
- Operating tools and backup facilities
- Reactive power and voltage control
- System modeling and data exchange
- Communication protocol and facilities
- Requirements to determine equipment ratings

- Synchronized data recorders
- Clearer criteria for operationally critical facilities
- Appropriate use of transmission loading relief.

VRF G2 – Consistency within a Reliability Standard
The Commission expects a rational connection between the sub-Requirement Violation Risk Factor assignments and the main Requirement Violation Risk Factor assignment.

VRF G3 – Consistency among Reliability Standards
The Commission expects the assignment of Violation Risk Factors corresponding to Requirements that address similar reliability goals in different Reliability Standards would be treated comparably.

VRF G4 – Consistency with NERC's Definition of the Violation Risk Factor Level
Guideline (4) was developed to evaluate whether the assignment of a particular Violation Risk Factor level conforms to NERC's definition of that risk level.

VRF G5 –Treatment of Requirements that Co-mingle More Than One Obligation
Where a single Requirement co-mingles a higher risk reliability objective and a lesser risk reliability objective, the VRF assignment for such Requirements must not be watered down to reflect the lower risk level associated with the less important objective of the Reliability Standard.

NERC's Criteria for VSLs:

Lower VSL	Moderate VSL	High VSL	Severe VSL
The performance or product measured almost meets the full intent of the requirement.	The performance or product measured meets the majority of the intent of the requirement.	The performance or product measured does not meet the majority of the intent of the requirement, but does meet some of the intent.	The performance or product measured does not substantively meet the intent of the requirement.

FERC's VSL Guidelines:
VSL G1: Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance (Compare the VSLs to any prior Levels of Non-compliance and avoid significant changes that may encourage a lower level of compliance than was required when Levels of Non-compliance were used.)

VSL G2: Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties (A violation of a "binary" type requirement must be a "Severe" VSL. Avoid using ambiguous terms such as "minor" and "significant" to describe noncompliant performance.)

VSL G3: Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement (VSLs should not expand on what is required in the requirement.)

VSL G4: Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations (. . . unless otherwise stated in the requirement, each instance of non-compliance with a requirement is a separate violation. Section 4 of the Sanction Guidelines states that assessing penalties on a per violation per day basis is the “default” for penalty calculations.)