NERC
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION

August 15, 2016

VIA ELECTRONIC FILING

Jim Crone
Director, Energy Division
Manitoba Innovation, Energy and Mines
1200-155 Carlton Street
Winnipeg MB R3C 3H8

Re: *North American Electric Reliability Corporation*

Dear Mr. Crone:

The North American Electric Reliability Corporation hereby submits Notice of Filing of the North American Electric Reliability Corporation of Proposed Reliability Standard PRC-012-2. NERC requests, to the extent necessary, a waiver of any applicable filing requirements with respect to this filing.

NERC understands that the Province of Manitoba enacted on April 1, 2012, the Reliability Standards Regulation, which was implemented through an Order of Council. It is NERC's understanding that the Reliability Standards Regulation makes compliance with the NERC reliability standards a legal requirement in Manitoba and adopted the NERC Reliability Standards listed in Schedule 1 of the Regulation for implementation in Manitoba. The Regulation further provides that a reliability standard made by NERC that is listed in Schedule 1 is adopted as a reliability standard for Manitoba.

NERC requests that Manitoba take all necessary action to include Proposed Reliability Standard PRC-012-2 set forth in the filing in Schedule 1 of the Reliability Standards Regulation, so that it may be adopted as a reliability standard for Manitoba, the retirement of Reliability Standards PRC-015-1 and PRC-016-1, and the withdrawal of Reliability Standards PRC-012-1 and PRC-014-1.

Please contact the undersigned if you have any questions concerning this filing.

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Respectfully submitted,

/s/ Holly A. Hawkins

Holly A. Hawkins
Associate General Counsel for the North American Electric Reliability Corporation

Enclosure

BEFORE THE
PROVINCE OF MANITOBA

NORTH AMERICAN ELECTRIC	**)**
RELIABILITY CORPORATION	**)**

NOTICE OF FILING OF THE NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION OF PROPOSED RELIABILITY STANDARD PRC-012-2

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August 15, 2016

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BEFORE THE
PROVINCE OF MANITOBA

NORTH AMERICAN ELECTRIC	**)**
RELIABILITY CORPORATION	**)**

NOTICE OF FILING OF THE
NORTH AMERICAN ELECTRIC RELIABILITY CORPORATION
OF PROPOSED RELIABILITY STANDARD PRC-012-2

The North American Electric Reliability Corporation ("NERC") hereby provides notice of the following[1]:

- Reliability Standard PRC-012-2 (Remedial Action Schemes) (**Exhibit B**);
- retirement of currently effective Reliability Standards PRC-015-1 (Remedial Action Scheme Data and Documentation) and PRC-016-1 (Remedial Action Scheme Misoperation);
- withdrawal of Reliability Standards PRC-012-1 (Remedial Action Scheme Review Procedure), PRC-013-1 (Special Protection System Database), and PRC-014-1 (Remedial Action Scheme Assessment);[2]
- Implementation Plan for PRC-012-2 (**Exhibit C**); and
- associated Violation Risk Factors ("VRFs") and Violation Severity Levels ("VSLs") for PRC-012-2 (**Exhibits D**) (collectively, "NERC's Proposal").

NERC's Proposal was developed in Project 2010-05.3 Phase 3 of Protection Systems: Remedial Action Schemes ("Project") and addresses all aspects of the design, approval,

[1] Unless otherwise designated herein, all capitalized terms shall have the meaning set forth in the *Glossary of Terms Used in NERC Reliability Standards* ("NERC Glossary"), *available at* http://www.nerc.com/files/Glossary_of_Terms.pdf.

[2] NERC notes that Federal Energy Regulatory Commission ("FERC") has never approved or remanded the original versions of Reliability Standards RPC-012-0, PRC-013-0, and PRC-014-0, as FERC deemed these standards "fill-in-the-blank" standards in Order No. 693. *See Mandatory Reliability Standards for the Bulk-Power System*, Order No. 693, FERC Stats. & Regs. ¶ 31,242, *order on reh'g*, Order No. 693-A, 120 FERC ¶ 61,053 (2007). In its filing of the revised definition of Remedial Action Scheme submitted on February 25, 2015, NERC submitted a new version of these standards but did not request approval of these standards. Rather, NERC noted that it was submitting Reliability Standards PRC-012-1, PRC-013-1, and PRC-014-1 "for completeness." *Notice of Filing of the North American Electric Reliability Corporation of Revisions to the Definition of "Remedial Action Scheme" and Proposed Reliability Standards*, at n. 6, 7, 8.

installation, and maintenance of Remedial Action Schemes ("RAS"). The NERC Board of Trustees adopted proposed Reliability Standard PRC-012-2, retirement of Reliability Standards PRC-015-1 (Remedial Action Scheme Data and Documentation) and PRC-016-1 (Remedial Action Scheme Misoperation), and withdrawal of previously unapproved Reliability Standards PRC-012-1 (Remedial Action Scheme Review Procedure), PRC-013-1 (Special Protection System Database), and PRC-014-1 (Remedial Action Scheme Assessment) on May 5, 2016.

NERC's Proposal is just, reasonable, not unduly discriminatory or preferential, and in the public interest. This filing presents the technical basis and purpose of proposed Reliability Standard PRC-012-2, a summary of the development history and the complete record of development (**Exhibit H**), and a demonstration that the proposed Reliability Standard meets the Reliability Standards criteria.

I. EXECUTIVE SUMMARY

RAS are, by definition, critical to preserving the reliability and integrity of the Bulk Electric System ("BES"), as they operate to institute "corrective actions that may include, but are not limited to, adjusting or tripping generation (MW and Mvar), tripping load, or reconfiguring a System(s)."[3] The purpose of a RAS is to mitigate unacceptable System conditions subsequent to fault clearing, thereby reducing the risk of instability. Each RAS is unique in its location, design, and application, yet each RAS must be coordinated with other RAS and protection and control systems to govern BES reliability. Given the need for coordination of RAS, entities with a wide-area operational visibility must oversee the design, approval, installation, and maintenance of these important elements of the interconnected transmission network. In addition, entities with

[3] *NERC Glossary* (updated on June 24, 2016) at 84, *available at* http://www.nerc.com/files/glossary_of_terms.pdf.

operational knowledge of RAS must perform routine tests after the operation or misoperation of a RAS to confirm its continued efficacy. Proposed Reliability Standard PRC-012-2, developed in Project 2010-05.3, addresses these considerations.

The standard drafting team for Project 2010-05.3 ("RAS SDT") developed proposed Reliability Standard PRC-012-2 by combining currently effective Reliability Standards PRC-015-1 and PRC-016-1 and unapproved Reliability Standards PRC-012-1, PRC-013-1, and PRC-014-1 into a single, consolidated, continent-wide Reliability Standard to address all aspects of RAS. Proposed Reliability Standard PRC-012-2 improves upon the existing standards as it removes ambiguity in NERC's original "fill-in-the-blank" standard by assigning responsibility to appropriate functional entities. The proposed standard also streamlines and consolidates the "piecemeal" RAS standards into one clear, effective Reliability Standard.

Specifically, proposed PRC-012-2 implements a centralized review process for each new or functionally modified RAS; obligates entities to complete periodic evaluations, tests, and operational analyses for all RAS; and requires the entity with a wide-area view to establish a database with pertinent information about each RAS. In doing so, the proposed standard vests the responsibility to administer the RAS review process and to create the RAS database with the Reliability Coordinator ("RC"). The standard requires the RAS-entity, which is the entity that "owns all or part of a RAS,"[4] to submit RAS information to the RC for review, address reliability issues identified by the RC, analyze operational performance of each RAS, and perform periodic functional tests of each RAS. Finally, the standard requires the Planning Coordinator ("PC") to periodically evaluate each RAS within its area to verify the continued effectiveness and

[4] RAS-entities include Transmission Owners, Generator Owners, and Distribution Providers.

coordination of the RAS. Proposed Reliability Standard PRC-012-2 establishes these obligations in nine requirements, as follows:

- Requirement R1 requires RAS-entities to submit certain information about each RAS that it intends to place into service to the RC where the RAS is located.
- Requirement R2 requires RCs that receive information about a RAS from a RAS-entity to review the RAS and provide feedback to the RAS-entity.
- Requirement R3 requires the RAS-entity that receives feedback from the RC regarding its RAS to resolve each reliability issue to obtain approval of the RAS from the RC.
- Requirement R4 requires the PC to perform a periodic evaluation of each RAS within its planning area, according to the type of RAS being evaluated.
- Requirement R5 requires each RAS-entity to perform an analysis of each RAS after operation or misoperation of the RAS and to provide the results of the evaluation to the reviewing RC.
- Requirement R6 requires the RAS-entity to develop and submit a Corrective Action Plan ("CAP") to the reviewing RC after learning of a deficiency with its RAS.
- Requirement R7 requires the RAS-entity to implement the CAP, update the CAP as necessary, and notify the RC when any changes are made to the CAP and when the CAP has been fulfilled.
- Requirement R8 requires the RAS-entity to test its RAS to verify continued operation on a timeline according to the type of RAS that is being tested.
- Requirement R9 requires the RC to update its RAS database with information about each RAS on a yearly basis.

As explained in more detail below, proposed Reliability Standard PRC-012-2 integrates seamlessly with other relevant Reliability Standards and does not upend the established performance requirements in Reliability Standard TPL-001-4. Further, the proposed standard identifies a subset of RAS called "limited impact RAS" that represent those RAS that cannot "by inadvertent operation or failure to operate, cause or contribute to BES Cascading, uncontrolled separation, angular instability, voltage instability, voltage collapse, or unacceptably dampened

oscillations."[5] The proposed standard imposes more focused review requirements on RAS that have greater BES reliability impact and unique design.

II. NOTICES AND COMMUNICATIONS

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

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III. BACKGROUND

A. NERC Reliability Standards Development Procedure

NERC's Proposal was developed in an open and fair manner and in accordance with the Reliability Standard development process. NERC develops Reliability Standards in accordance with Section 300 (Reliability Standards Development) and Appendix 3D (NERC Standard Processes Manual) of the NERC Rules of Procedure.[6]

NERC's proposed rules provide for reasonable notice and opportunity for public comment, due process, openness, and a balance of interests in developing Reliability Standards, and thus satisfy certain of the criteria for approving Reliability Standards. The ANSI-accredited development process is open to any person or entity with a legitimate interest in the reliability of

[5] *See* Proposed Reliability Standard PRC-012-2 at 7, 21 (attached herein as **Exhibit B**).

[6] The NERC *Rules of Procedure* are available at http://www.nerc.com/AboutNERC/Pages/Rules-of-Procedure.aspx. The NERC *Standard Processes Manual* is available at http://www.nerc.com/comm/SC/Documents/Appendix_3A_StandardsProcessesManual.pdf.

the Bulk-Power System. NERC considers the comments of all stakeholders, and stakeholders must approve, and the NERC Board of Trustees must adopt a Reliability Standard before NERC submits the Reliability Standard to the applicable governmental authorities.

B. Procedural History of Reliability Standard PRC-012-2

NERC submitted Reliability Standards PRC-012-0 (Special Protection System Review Procedure), PRC-013-0 (Special Protection System Database), PRC-014-0 (Special Protection System Assessment), PRC-015-0 (Special Protection System Data and Documentation), and PRC-016-0 (Special Protection System Misoperations) on April 4, 2006. In Order No. 693, FERC evaluated these standards. [7] While FERC approved Reliability Standard PRC-015-0 and PRC-016-0 as mandatory and enforceable in Order No. 693, FERC neither approved nor remanded Reliability Standards PRC-012-0, PRC-013-0, and PRC-014-0 but identified these as "fill-in-the-blank" standards with an inadequate basis for approval.[8] Along with the abovementioned standards, FERC also approved the NERC Glossary, which included definitions for the terms "Special Protection System" ("SPS") and "Remedial Action Scheme."[9] As these terms were used interchangeably across Interconnections and the ERO Regions, NERC developed the definitions approved in Order No. 693 to ensure that both terms could be used in reference to the same equipment.

In early 2010, after several years' experience implementing these standards and based on industry input, NERC initiated Project 2010-05 to address issues associated with RAS and SPS. NERC initiated the project to address the inconsistent usage of the terms RAS and SPS across Interconnections and NERC Regions, and to modify the standards to improve the monitoring of

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[7] *Mandatory Reliability Standards for the Bulk-Power System*, Order No. 693, FERC Stats. & Regs. ¶ 31,242, *order on reh'g*, Order No. 693-A, 120 FERC ¶ 61,053 (2007).

[8] *Id*. at PP 1520, 1524, 1528, 1533, and 1539.

[9] *Id.* at P 1893.

BES Protection System events by identifying and correcting the causes of Misoperations. Based on industry input, NERC subdivided the work in Project 2010-05 into two phases, Project 2010-05.1 and Project 2010-05.2, to address issues associated with Misoperations of Protection Systems ahead of the work associated with SPS and RAS.[10] The work in Project 2010-05.1 culminated in the development of proposed Reliability Standard PRC-004-3 (Protection System Misoperation Identification and Correction) and the proposed revised definition of "Misoperations." On September 23, 2014, NERC submitted proposed Reliability Standard PRC-004-3 (Protection System Misoperation Identification and Correction) and the NERC Glossary definition for the term "Misoperations.". FERC approved PRC-004-3 and the definition of Misoperations on May 13, 2015.[11]

While work on Misoperations continued in Project 2010-05.1, NERC simultaneously began its effort to improve the identification and assessment of SPS and RAS in Project 2010-05.2. In the Standards Authorization Request for Project 2010-05.2, NERC stated that the project would address the RAS and SPS definitions, FERC's Order No. 693 findings, and four recommendations related to the "identification and coordination of SPS from the joint FERC-NERC inquiry of the September 2011 Southwest Blackout Event."[12] In the initial stages of development for this project, NERC realized the extent of the work necessary to revise associated definitions and Reliability Standards and to develop a consistent, uniform, and

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[10] *See* NERC Standards Committee Meeting Minutes (Jun. 9, 2011), available at http://www.nerc.com/docs/standards/sc/sc_060911m_package.pdf.

[11] *Order Approving Reliability Standard*, 151 FERC ¶ 61,129 (May 13, 2015).

[12] *Standard Authorization Request for Project 2010-05.2* (Feb. 12, 2014), accessible online at http://www.nerc.com/pa/Stand/Prjct201005_2SpclPrtctnSstmPhs2/SPS_SAR_02042014.pdf (explaining that the project would address FERC's decision in Order No. 693 to neither approve nor remand Reliability Standards PRC-012-0, PRC-013-0, and PRC-014-0, and that the project would address four recommendations from the FERC-NERC inquiry of the September 2011 Southwest Blackout Event. Notably, the recommendations from the FERC-NERC inquiry, which were related to the identification and coordination of SPS, were addressed during the development of the revised definition of RAS, submitted on February 25, 2015.

continent-wide RAS-specific Reliability Standard, and further divided Project 2010-05.2 into two projects. NERC commenced development in these projects, Project 2010-05.2 and Project 2010-05.3, to revise the definition of RAS and to develop a Reliability Standard addressing issues associated with RAS, respectively.

In 2011, NERC began development of a revised definition of RAS in Project 2010-05.2 based on the findings of a System Protection and Control Subcommittee ("SPCS") and System Analysis and Modeling Subcommittee ("SAMS") Technical Report titled "Special Protection Systems (SPS) and Remedial Action Schemes (RAS): Assessment of Definition, Regional Practices, and Application of Related Standards" ("SPCS/SAMS Report").[13] The SPCS/SAMS Report noted the lack of clarity of the definition of SPS, the inconsistent use of the terms SPS and RAS across the eight Regions, and the impact this inconsistent usage would have on identification. Using the information in the SPCS/SAMS Report, the standard drafting team for Project 2010-05.2 developed an improved, revised definition of RAS with more detail than the existing definition of SPS, including a refined core definition and specific inclusions and exclusions. NERC submitted the revised definition and several revised Reliability Standards incorporating the new term, including Reliability Standards PRC-015-1 and PRC-016-1,[14] on

[13] *See Notice of Filing of the North American Electric Reliability Corporation of Revisions to the Definition of "Remedial Action Scheme" and Proposed Reliability Standards* ("RAS Filing"), at Exhibit G.

[14] NERC notes that the only substantive revisions made in the revised standards, PRC-015-1 and PRC-016-1, were to transition from use of the term "Special Protection System" to the newly defined term "Remedial Action Scheme."

February 25, 2015.[15] On November 19, 2015, FERC issued Order No. 818 approving, among other things, the revised RAS definition.[16]

NERC initiated Project 2010-05.3 in 2015 to address all other aspects of RAS and SPS in the RAS/SPS-related Reliability Standards. The RAS SDT concluded its work with the development of proposed Reliability Standard PRC-012-2 (Remedial Action Schemes), which is the subject of this filing, and a revised NERC Glossary definition of SPS. NERC developed the revised definition of SPS to complete the transition from the term "Special Protection System" to "Remedial Action Scheme" initiated by NERC in Project 2010-05.2. As industry approved the revised definition of SPS before proposed PRC-012-2, NERC submitted the revised definition of SPS in a separate filing on May 13, 2016.[17] On June 23, 2016, FERC issued a delegated letter order approving the revised definition of SPS.[18]

Industry approved proposed Reliability Standard PRC-012-2 in a final ballot ending on April 29, 2016.[19] The proposed standard, which addresses the implementation of all new and functionally modified RAS as well as the periodic review of all in-service RAS, combines twoapproved standards and three previously unapproved standards deemed by FERC in Order

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[15] RAS Filing at n. 6, 7, 8 (including revisions to Reliability Standards PRC-012-0, PRC-013-0, and PRC-014-0 to incorporate the term "Remedial Action Scheme," and noting that because FERC neither approved nor remanded these standards in Order No. 693, NERC was not requesting approval of these standards. Rather, NERC noted that it was submitting Reliability Standards PRC-012-1, PRC-013-1, and PRC-014-1 "for completeness.").

[16] *Revisions to Emergency Operations Reliability Standards; Revisions to Undervoltage Load Shedding Reliability Standards; Revisions to the Definition of "Remedial Action Scheme" and Related Reliability Standards* (Order No. 818), 153 FERC ¶ 61,228 (2015).

[17] *Notice of Filing of the North American Electric Reliability Corporation of the Revised Definition of Special Protection System*.

[18] *N. Am. Elec. Reliability Corp.*, Docket No. RD16-5-000 (June 23, 2016) (unpublished letter order).

[19] See NERC, *Standard Announcement,* Project 2010-05.3 Phase 3 of Protection Systems: Remedial Action Schemes (RAS) PRC-12-2 and Definition of "Special Protection System, available at http://www.nerc.com/pa/Stand/Prjct201005_3RmdialActnSchmsPhase3ofPrtctnSystmsDL/2010-05.3_PRC-012-2_FB_Results_Word_Announce_05032016.pdf.

No. 693 to be "fill-in-the-blank" standards. The NERC Board of Trustees approved proposed Reliability Standard PRC-012-2 on May 5, 2016.

IV. JUSTIFICATION

NERC's Proposal represents the technical findings of the RAS SDT based on its review of FERC's findings related to SPS and RAS in Order No. 693, the recommendations related to SPS and RAS from the FERC-NERC inquiry[20] of the September 2011 Southwest Blackout Event, several years' experience monitoring and evaluating SPS and RAS, and stakeholder comments throughout the Project. The purpose of proposed Reliability Standard PRC-012-2 is to "[t]o ensure that [RAS] do not introduce unintentional or unacceptable reliability risks to the [BES]." The nine Requirements of proposed PRC-012-2 accomplish the stated purpose by addressing planning, coordination, design, review, assessment, and documentation of each RAS. The proposed standard, which establishes a continent-wide RAS review and maintenance program, should ensure that each RAS integrates seamlessly and effectively into the BES and contributes to reliability by performing its intended function as designed.

Proposed Reliability Standard PRC-012-2 is intended to supersede unapproved Reliability Standards PRC-012-1, PRC-013-1, and PRC-014-1, as well as retire and replace currently effective Reliability Standards PRC-015-1 and PRC-016-1.[21] NERC has developed a concise comparison of the requirements of several currently effective and pending Reliability

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[20] *See Standards Authorization Request for Project 2010-05.2—Special Protection System* (Feb. 12, 2014), *available at* http://www.nerc.com/pa/Stand/Prjct201005_2SpclPrtctnSstmPhs2/SPS_SAR_02042014.pdf; *see also Arizona-Southern California Outages on September 8, 2011, Causes and Recommendations* (April 2012), *available at* http://www.ferc.gov/legal/staff-reports/04-27-2012-ferc-nerc-report.pdf.

[21] For purposes of this filing, NERC treats Reliability Standards PRC-012-1, PRC-013-1, and PRC-014-1 as if they were part of NERC's original suite of Reliability Standards. These "version 1" Reliability Standards were revised during the development of revisions to the term RAS by changing the term "Special Protection System" to "Remedial Action Scheme." While noting that FERC would not approve Reliability Standards PRC-012-1, PRC-013-1, and PRC-014-1, NERC submitted these standards in the RAS Filing "for completeness." *See* RAS Filing at n. 6, 7, 8.

Standards and the proposed Reliability Standard PRC-012-2 in the Mapping Document for PRC-012-2, attached herein as **Exhibit E**. Proposed Reliability Standard PRC-12-2 represents substantial improvements over these Reliability Standards, as it streamlines and consolidates existing requirements, corrects the applicability of previously unapproved standards, and implements a continent-wide RAS review program.

The following sections provide: (i) an explanation of the applicability of Reliability Standard PRC-012-2, (ii) a requirement by requirement justification of each of the nine Requirements in proposed Reliability Standard PRC-012-2, including an explanation for use of the term "limited impact" RAS to account for the different impacts on reliability of those RAS, and an explanation of the interplay between PRC-012-2 and TPL-001-4, (iii) a summary of the enforceability of PRC-012-2, and (iv) a justification for the proposed retirements and withdrawals associated with the development of PRC-012-2.

A. Applicability

Proposed Reliability Standard PRC-012-2 applies to RCs, PC, and RAS-entities. As the RC maintains the requisite "[w]ide-[a]rea" perspective to "prevent or mitigate emergency operating situations in both next-day analysis and real-time operations,"[22] the RC is the appropriate entity to review each new or functionally modified RAS in its respective area to ensure area-wide reliability and to collect pertinent RAS data in a RAS database. This perspective allows the RC to evaluate interactions among separate RAS and other protection and control systems. Further, given the RC's unique responsibility and the typical business arrangement of an RC with entities within the RC area, the RC is the entity least likely to have

[22] *NERC Glossary* (updated on June 24, 2016) at 81, *available at* http://www.nerc.com/files/glossary_of_terms.pdf.

conflicts of interest, including business relationships, with RAS-entities, PCs, and other relevant entities.

The PC is the functional entity responsible for assessing the "longer-term reliability" within its area by coordinating, facilitating, integrating, and evaluating transmission facility and service plans within its respective area.[23] As such, the PC is the appropriate functional entity to maintain oversight of each RAS in its PC area so that it continues to function as planned. The PC already fulfills responsibilities similar to the RAS modeling and studies required under proposed PRC-012-2 and can thus perform the responsibilities of PRC-012-2 seamlessly.

Finally, in recognition of the need for a term to describe all entities that are responsible for a RAS, NERC developed the term "RAS-entity" to describe the Transmission Owner(s), Generator Owner(s), or Distribution Provider(s) that "owns all or part of a RAS."[24] This broad term captures each entity involved in RAS ownership. Outside of agreements among responsible entities regarding compliance with applicable standards, the standard remains applicable to each entity that owns all or part of a RAS. Taken together, the proposed Requirements obligate the RC, PC, and RAS-entity to share resources and collaborate to the extent necessary to establish a continent-wide RAS program.

B. Requirement by Requirement Justification

Proposed Reliability Standard PRC-012-2 consists of nine Requirements that individually contribute to its stated purpose. As reflected in **Exhibit G**, NERC's Proposal satisfies the Reliability Standards criteria and is just, reasonable, not unduly discriminatory or preferential, and in the public interest. The subsections below provide additional justification and information regarding each Requirement or group of Requirements, as follows:

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[23] *See id* at 69; *see also Reliability Functional Model* (Version 5) at 22.

[24] Section 4 of Reliability Standard PRC-012-2 (see **Exhibit B**).

i) three Requirements obligating the RC to engage in a RAS review process (Requirements R1, R2, and R3);

ii) one Requirement mandating the PC to engage in a periodic review of each RAS (Requirement R4);

iii) one Requirement ensuring that the RAS-entity continuously reviews its RAS upon operation or misoperation (Requirement R5);

iv) two Requirements enacting a process for RAS-entities to address issues with each RAS identified by the RC in its RAS review (Requirements R6 and R7);

v) one Requirement obligating the RAS-entity to perform a periodic functional test for each of its RAS (Requirement R8); and

vi) one Requirement mandating the RC to establish a RAS database (Requirement R9).

i) Requirements R1, R2, and R3

R1. Prior to placing a new or functionally modified RAS in service or retiring an existing RAS, each RAS-entity shall provide the information identified in Attachment 1 for review to the Reliability Coordinator(s) where the RAS is located. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]*

R2. Each Reliability Coordinator that receives Attachment 1 information pursuant to Requirement R1 shall, within four full calendar months of receipt or on a mutually agreed upon schedule, perform a review of the RAS in accordance with Attachment 2, and provide written feedback to each RAS-entity. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]*

R3. Prior to placing a new or functionally modified RAS in service or retiring an existing RAS, each RAS-entity that receives feedback from the reviewing Reliability Coordinator(s) identifying reliability issue(s) shall resolve each issue to obtain approval of the RAS from each reviewing Reliability Coordinator. *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]*

Proposed Requirements R1, R2, and R3 establish an RC review process for each new or functionally modified RAS that must be completed before a RAS-entity places a RAS into service. The RAS review is the first step towards evaluating and coordinating RAS across the RC area, including those in neighboring RC areas, to ensure that RAS do not introduce "unintentional or unacceptable reliability risks" into the BES. As noted above, the RC is the

appropriate entity to perform the RAS review because the RC has a wide-area reliability perspective and awareness of reliability issues in neighboring RC areas.

Under Requirement R1, a RAS-entity must provide the reviewing RC with the data included in Attachment 1 to the standard before placing the "new or functionally modified" RAS into service or retiring an existing RAS. Attachment 1 identifies a variety of targeted, pertinent information regarding the RAS design, function, and operation that the RC needs to perform the RAS review. As such, the reviewing RC would only review particularized information deemed relevant for purposes of maintaining reliability. NERC designed Attachment 1 to eliminate any ambiguity in the information that a RAS-entity must submit to the RC for review to make a determination about whether the RAS may be approved.

Just as the RC must review new RAS to determine whether the new device would impact operations once implemented, the RC must also review RAS that have been "functionally modified" to ensure that any changes made to the RAS do not introduce new issues into the BES. According to footnote 2 of Attachment 1 and footnote 4 of Attachment 2, a RAS is deemed "functionally modified" if the RAS-entity experiences any of the following:

i) changes to System conditions or Contingencies monitored by the RAS;

ii) changes to the actions that the RAS is designed to initiate;

iii) changes to RAS hardware beyond hardware replacement that matches the original functionality of existing components;

iv) changes to RAS logic beyond correcting existing errors; or

v) addition or removal of redundancy levels.[25]

[25] NERC provides additional information about what constitutes a functional modification in the *Reliability Standard PRC-12-2 Remedial Action Schemes Question & Answer Document*, attached herein as **Exhibit F**.

When an entity submits a "functionally modified" RAS for review, the RC is only required to review details of the proposed modifications; however, the submitting RAS-entity must provide a summary of existing functionality in Attachment 1 to provide sufficient context for the RAS modifications to allow the RC to perform an abbreviated review of the RAS. After the RAS-entity completes and delivers Attachment 1 to the reviewing RC, the RC must begin its comprehensive review of the affected RAS pursuant to proposed Requirement R2.

Under Requirement R2, the RC is required to perform a RAS review in accordance with Attachment 2 within four months of receiving a completed Attachment 1, or on an otherwise agreed upon schedule. Attachment 2 is a detailed checklist of criteria that the RC must use to identify design and implementation aspects of the RAS that are critical to an effective RAS review framework. By requiring the RC to perform the RAS review according to Attachment 2 (*Reliability Coordinator RAS Review Checklist*) of proposed PRC-012-2,[26] Requirement R2 establishes a comprehensive, consistent review process. The RC, when performing the review, may request assistance from other parties that have access to relevant information about the RAS, such as the PC or regional technical groups; however, the RC is ultimately responsible for compliance with Requirement R2. This delineation of responsibility, which holds the RC responsible as an independent party, helps to mitigate any conflict of interest that may exist due to business relationships among the RAS-entity, PC, Transmission Planner ("TP"), or other entities that are likely to be involved in the planning or implementation of a RAS.

In observance of the time needed to complete each review, the RC must perform the Attachment 2 review within four full calendar months, or on an otherwise negotiated basis. This

[26] Examples of issues that the RC may identify with each RAS include, but are not limited to, a lack of dependability, security, or coordination. Notably, the *Reliability Coordinator RAS Review Checklist* warns that the "RC review is not limited to the checklist items and the RC may request additional information on any aspect of the RAS as well as any reliability issue related to the RAS."

periodicity is consistent with industry practice and provides adequate time for a complete review, and it includes additional flexibility for unique or unforeseen circumstances. Upon completion of the review, the RC must provide the RAS-entity with the results of its RAS review identifying reliability issues that must be resolved before the RAS-entity can place the RAS into service. The RAS-entity may place the RAS into service only when the reviewing RC's feedback to each RAS-entity indicates either that no reliability issues were identified during the review or that all reliability issues identified by the RC have been resolved to the satisfaction of the reviewing RC, as required under Requirement R3.

Requirement R3 requires the RAS-entity to resolve any reliability issues with the RAS identified by the RC before the RAS-entity places the RAS into operation. While there is no explicit timeframe for the RAS-entity and the RC to resolve the issues identified by the RC and to approve the RAS, respectively, the RAS-entity and the RC would be motivated to do so on a timely basis. The RAS-entity would not be permitted to place a RAS in service unless the RAS-entity has taken all remedial steps prescribed by the RC as a result of the RAS review. Because the RAS-entity is the party requesting approval of a RAS to be placed into service and would want approval as soon as possible, the RAS-entity is incentivized to address any RC concerns as quickly as possible. Similarly, the RC, the functional entity with significant responsibility for maintaining BES reliability in its area, is motivated to approve new or modified RAS that improve BES reliability. As discussed above, because RAS play an important role in helping to ensure reliable operations, an RC would thus act with expediency to approve a RAS that improves reliability to continue fulfilling its responsibility. Accordingly, a specific period for remediation of the identified issues and approval of each RAS is unnecessary.

ii) Requirement R4

R4. Each Planning Coordinator, at least once every five full calendar years, shall: *[Violation Risk Factor: Medium] [Time Horizon: Long-term Planning]*

4.1. Perform an evaluation of each RAS within its planning area to determine whether:

4.1.1. The RAS mitigates the System condition(s) or Contingency(ies) for which it was designed.

4.1.2. The RAS avoids adverse interactions with other RAS, and protection and control systems.

4.1.3. For limited impact[27] RAS, the inadvertent operation of the RAS or the failure of the RAS to operate does not cause or contribute to BES Cascading, uncontrolled separation, angular instability, voltage instability, voltage collapse, or unacceptably damped oscillations.

4.1.4. Except for limited impact RAS, the possible inadvertent operation of the RAS, resulting from any single RAS component malfunction satisfies all of the following:

4.1.4.1. The BES shall remain stable.
4.1.4.2. Cascading shall not occur.
4.1.4.3. Applicable Facility Ratings shall not be exceeded.
4.1.4.4. BES voltages shall be within post-Contingency voltage limits and post-Contingency voltage deviation limits as established by the Transmission Planner and the Planning Coordinator.
4.1.4.5. Transient voltage responses shall be within acceptable limits as established by the Transmission Planner and the Planning Coordinator.

4.1.5. Except for limited impact RAS, a single component failure in the RAS, when the RAS is intended to operate does not prevent the BES from meeting the same performance requirements (defined in Reliability Standard TPL-001-4 or its successor) as those required for the events and conditions for which the RAS is designed.

4.2. Provide the results of the RAS evaluation including any identified deficiencies to each reviewing Reliability Coordinator and RAS-entity, and each impacted Transmission Planner and Planning Coordinator.

The purpose of Requirement R4 is to ensure that there are periodic reviews of a RAS after the RAS-entity places it in service to confirm that the RAS continues to function as planned

[27] "A RAS designated as limited impact cannot, by inadvertent operation or failure to operate, cause or contribute to BES Cascading, uncontrolled separation, angular instability, voltage instability, voltage collapse, or unacceptably damped oscillations." *See* Reliability Standard PRC-012-2 (attached herein as **Exhibit B**).

and does not adversely affect reliable operations or introduce any "unintentional or unacceptable reliability risks" into the BES.[28] After the RC has reviewed and approved a RAS pursuant to Requirements R1-R3, and the RAS-entity places it into service, the RAS-entity may experience changes in System topology or operating conditions that necessitate an additional evaluation of affected RAS. As such, Requirement R4 creates an affirmative obligation on the PC to conduct periodic evaluations of each in-service RAS.

As discussed above, because the PC is the entity that "coordinates and integrates transmission Facilities and service plans, resource plans, and Protection Systems" with a wide area planning perspective, the PC is the appropriate entity to conduct this continuous oversight of each in-service RAS pursuant to Requirement R4. The PC is responsible for conducting the evaluation of RAS in its area under Requirement R4. If the RAS crosses PC boundaries, each affected PC is responsible under Requirement R4 for conducting either individual evaluations or participating in a coordinated evaluation.[29]

The PC must evaluate each RAS in its area every five years. As provided in the Implementation Plan associated with proposed PRC-012-2, the PC must complete initial performance of this requirement for each new and functionally modified RAS within five years after the date of RC approval of the RAS.[30] For each existing RAS, the PC must complete initial performance of this requirement within five years after the effective date of the proposed standard. Five years is an appropriate periodicity for PC review of each RAS as it corresponds to

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[28] The purpose of Requirement R4 is consistent with the purpose of proposed Reliability Standard PRC-012-2, which is "[t]o ensure that Remedial Action Schemes (RAS) do not introduce unintentional or unacceptable reliability risks to the Bulk Electric System (BES)."

[29] *See* Reliability Standard PRC-012-2 at 34 (Technical Justification).

[30] NERC notes that five (5) years is the maximum allowable interval in between evaluations under Requirement R4, so even if a RAS is functionally modified during the initial five (5) year period, the responsible entity must continue to fulfill the performance obligation within the initial five (5) year period. *See* Implementation Plan for PRC-012-2 (**Exhibit C**) at 2.

the five-year performance period required under Reliability Standards PRC-006, PRC-010, and PRC-014. These standards require responsible entities to perform effectiveness evaluations on remedial equipment similar to the evaluation required under Requirement R4 of proposed PRC-012-2, so alignment with PRC-006, PRC-010, and PRC-014 would improve consistency and would streamline various evaluation processes.[31] While this is the maximum allowable interval between PC reviews, the PC may evaluate a RAS more frequently if necessary in response to a new generator interconnection, transmission system changes, changes in load, etc. This periodic RAS evaluation should lead the PC to provide one of the following determinations: 1) affirmation that the existing RAS is effective; 2) identification of changes needed to the existing RAS; or, 3) justification for RAS retirement.

Using a risk-based approach, the nature of the evaluation mandated by Requirement R4 depends on whether the relevant RC has designated the RAS as a "limited-impact RAS." Attachment 2 of PRC-012-2 provides that RCs may designate a RAS as "limited impact" if the RC determines that the RAS is incapable of causing significant adverse BES reliability impacts. As described in footnote 1 of Reliability Standard PRC-012-2, a "limited impact RAS" is a RAS that "cannot, by inadvertent operation or failure to operate, cause or contribute to BES Cascading, uncontrolled separation, angular instability, voltage instability, voltage collapse, or unacceptably damped oscillations."

The proposed standard imposes more detailed evaluation requirements on RAS that are not designated as "limited impact," consistent with the greater risks they present to BES reliability. For non-limited impact RAS, the PC must perform an evaluation consistent with all

[31] Reliability Standard PRC-010-2 requires the PC and TP is required to perform an effectiveness evaluation of its UVLS program once every five years. Reliability Standard PRC-006-2 requires the PC to conduct a UFLS assessment every five years to ensure compliance with certain criteria. Reliability Standard PRC-014-1 (which FERC has not approved or remanded) requires the responsible entity to assess each RAS in its respective area.

the subparts of Requirement R4 except Part 4.1.3. The evaluation requirements contained in Parts 4.1.1, 4.1.2, 4.1.4, and 4.1.5, obligate the PC to confirm that:

- the RAS mitigates the System condition(s) or Contingency(ies) for which it was designed;
- the RAS avoids adverse interactions with other RAS, and protection and control systems;
- when inadvertent operation of the RAS occurs, the BES remains stable, cascading does not occur, ratings are not exceeded, voltages are within limits, and voltage responses are within limits; and
- a single component failure in the RAS does not prevent the BES from meeting requirements in TPL-001-4 as required for the events and conditions for which the RAS is designed.

For limited impact RAS, the PC must only conduct an evaluation consistent with Parts 4.1.1, 4.1.2, and 4.1.3 to confirm that: (1) the RAS mitigates the System condition(s) or Contingency(ies) for which it was designed; (2) the RAS avoids adverse interactions with other RAS, and protection and control systems; and (3) the inadvertent operation of the RAS or the failure of the RAS to operate does not cause or contribute to BES Cascading, uncontrolled separation, angular instability, voltage instability, voltage collapse, or unacceptably damped oscillations. The SDT determined that the additional elements of the evaluations for non-limited impact RAS provided in Parts 4.1.4 and 4.1.5 should not be required for "limited impact" RAS given that they present a lower risk to BPS reliability, as further discussed below.

The following discussion provides (i) additional technical justification for distinguishing "limited impact" RAS from all other RAS, and (ii) an explanation of the relationship between Requirement R4 of proposed PRC-012-2 and currently-effective Reliability Standard TPL-001-4.

a) Limited Impact RAS

This section provides an explanation of: (1) the need for the "limited impact" RAS designation; (2) the process by which the RC may designate a RAS as "limited impact; and (3)

the process by which the PC is obligated to periodically evaluate whether the "limited impact" RAS should continue to be designated as limited impact.

Need for Limited Impact Designation: Each RAS is unique in geography, purpose, design, and complexity. Depending on these characteristics and the problems that the RAS are designed to mitigate, there may be significant differences amongst RAS as to their potential impact on the reliability of the BES. A RAS would have a small impact if the RAS-entity designs or implements the RAS such that it cannot, by inadvertent operation or failure to operate, cause or contribute to major reliability issues. While these smaller impact RAS are important for reliability, they are technically incapable of causing critical issues that could impact operations across a large area.

An example of a limited impact RAS is a scheme applied on an interconnection between two utilities, with one side of the tie consisting of a 230 kV line in parallel with a long 115 kV line that does not provide significant support to the intertie. The other side of the intertie is a 345 kV line. Depending on pre-contingency magnitude and direction of flow, the scheme is armed to do one of the following upon loss of the 230 kV line: (i) nothing;[32] (ii) switch a shunt reactor; or (iii) open the 345 kV tie. This RAS mitigates voltage deviation greater than 5%, but it is not designed to address voltage level, overload, Cascading, or other serious operational issues that would exclude the RAS from being "limited impact."

In contrast, an example of a non-limited impact RAS is one that separates the WECC system into two planned islands following loss of three parallel 500 kV lines connecting Oregon and California. This islanding scheme is armed depending on pre-event flows. In addition to islanding and other actions, the RAS may drop more than 2000 MW of generation, a similar

[32] There are some system conditions for which no action is required.

amount of load shedding, and switch shunt reactive devices at multiple locations across most of the WECC system. The non-limited impact RAS mitigates problems including Cascading, unplanned islanding, angular and voltage instability and possible collapse of major parts of the System, each result substantially more critical than those mitigated by the limited impact RAS described above.

Recognizing the significant differences amongst RAS and the need to focus industry resources on those RAS that present greater risk to BES reliability, proposed Reliability Standard PRC-012-2 (1) establishes a process whereby the RC may designate a RAS as "limited impact" based on its characteristics, and (2) subjects limited impact RAS to a different set of requirements than RAS that are not limited impact to account for the varying levels of risks presented. The purpose of the designation is thus to maintain the risk-based nature of NERC Reliability Standards by requiring applicable entities to review RAS in a manner that is commensurate with the potential impact of the RAS on reliability.

Process for RC Designation of Limited Impact RAS: As noted above, under Requirement R1, prior to placing a RAS into service, the RAS-entity must submit the information contained in Attachment 1 to the RC for its review. In completing Attachment 1, the RAS-entity must identify whether the RAS is limited impact and provide the reviewing RC with technical justification establishing that the RAS is "limited impact." Pursuant to Requirement R2, the reviewing RC must review the RAS based on criteria in Attachment 2, which requires the RC to consider the studies and information provided to the RC in Attachment 1 and determine whether the RAS identified by the RAS-entity should be designated as a "limited impact" RAS.

The RC would designate the RAS as a limited impact RAS if it determines, based on its review under Requirement R2, that the RAS "cannot, by inadvertent operation or failure to

operate, cause or contribute to BES Cascading, uncontrolled separation, angular instability, voltage instability, voltage collapse, or unacceptably damped oscillations."[33] When the RC agrees that the RAS-entity has addressed each of the reliability issues identified by the RC, the RC would approve the RAS, and if applicable, would designate it as "limited impact." The RAS-entity may place the RAS into service only after the RC is satisfied that all reliability issues have been addressed.

Diversity among the different types, functions, and placements of RAS make it difficult to establish a bright line rule for correctly and consistently identifying (existing and future) RAS that are "limited impact" and RAS that are not "limited impact." As such, proposed Reliability Standard PRC-012-2 requires the RC to make this determination on a case-by-case basis based on its review of the RAS. The RC is already required to approve a RAS based on various criteria under Requirement R2, and the RC has the benefit of having all technical criteria included in Attachment 1 for each RAS. Further, the RC is the appropriate entity to designate a RAS as "limited impact" as it has the wide-area view and understanding of the BES to determine whether a RAS "cannot, by inadvertent operation or failure to operate, cause or contribute to BES Cascading, uncontrolled separation, angular instability, voltage instability, voltage collapse, or unacceptably damped oscillations."

Prior to development of proposed PRC-012-2, two NERC Regions, the Northeast Power Coordinating Council ("NPCC") and the Western Electric Coordinating Council ("WECC"), used individual RAS classification regimes to identify RAS that would meet similar criteria described as "limited impact" in proposed PRC-012-2. Specifically, the standard drafting team

[33] As the term "BES" in the explanation of "Limited Impact" modifies each of the conditions referenced therein, "Limited Impact" RAS may not contribute to BES Cascading, BES uncontrolled separation, BES angular instability, BES voltage instability, BES voltage collapse, or unacceptably dampened BES oscillations.

identified the Local Area Protection Scheme ("LAPS") classification in WECC and the Type III classification in NPCC as consistent with the "limited impact" designation. A RAS that was implemented prior to the effective date of PRC-012-2 that has been through the regional review processes of WECC or NPCC, and that is classified as either a LAPS by WECC or a Type III by NPCC, would be considered a "limited impact" RAS for purposes of PRC-012-2 initially. Accordingly, if WECC or NPCC has designated a RAS as "limited impact," the RC does not need to designate the RAS as "limited impact" through an initial review because the RAS is already in service and was subject to the relevant regional review process. Notably, any LAPS or Type III RAS is still subject to the periodic PC evaluation to confirm that the RAS still meets the "limited impact" qualifications under Part 4.1.3. As provided in the Implementation Plan, the PC must conduct an evaluation within 5 years of the effective date of the proposed Reliability Standard. If PC finds that a LAPS or Type III RAS is not a limited impact RAS, the LAPS or Type III RAS will no longer retain that designation. NERC has provided a series of examples of currently active LAPS and Type III schemes in **Exhibit A**.

PC Evaluation of Limited Impact RAS: While the RC is responsible for performing the initial designation of limited impact RAS, Requirement R4 of proposed PRC-012-2 requires the PC to review the limited impact RAS to confirm its continued status as "limited impact" as part of its periodic evaluation. Specifically, Requirement R4, Part 4.1.3 explicitly requires the PC to evaluate all "limited impact" RAS to verify that the RAS does not, "by inadvertent operation or failure to operate, cause or contribute to BES Cascading, uncontrolled separation, angular instability, voltage instability, voltage collapse, or unacceptably damped oscillations." The PC may use its discretion as to the method used to evaluate each limited impact RAS.

The PC is the appropriate entity to verify that a RAS continues to be "limited impact" because the PC maintains a wide-area planning perspective to determine whether the designation still applies, and the PC can provide the results of the evaluation to each impacted TP, PC, RC, and RAS-entity. If the PC determines that the RAS maintains this qualification, the limited impact designation remains applicable; however, if the PC determines that this is no longer applicable to the RAS, then the RC may choose to withdraw the limited impact designation at which point the RAS would become subject to the single component failure and malfunction tests under R4.1.4 and R4.1.5. All limited impact RAS, whether designated by the RC or under a preexisting regional process described above, would be periodically reviewed under the verification provision in Requirement R4.

RAS designated as "limited impact" RAS are not subject to the single component malfunction and failure evaluations in Parts 4.1.4 and 4.1.5 of proposed Reliability Standard PRC-012-2, respectively. Under Requirement R4, Part 4.1.4, the PC must review individual RAS components to determine whether an inadvertent operation of a RAS would have a BES-wide impact (i.e., Cascading, failure to meet Applicable Facility Ratings, etc.). Similarly, Requirement R4, Part 4.1.5 requires the PC to review single component failures in RAS to confirm that the failure does not prevent the BES from meeting the performance requirements of TPL-001-4. RAS that are "limited impact" cannot, by inadvertent operation or failure to operate, "cause or contribute to BES Cascading, uncontrolled separation, angular instability, voltage instability, voltage collapse, or unacceptably damped oscillations." In its initial review of the RAS, the RC designated the RAS as limited impact because it met these qualifications. As limited impact RAS cannot, by definition, fail the evaluations in Requirement R4, Parts 4.1.4 and 4.1.5, the PC does not need to perform the inadvertent operation analysis or single component

failure analysis under these parts. Accordingly, requiring a limited impact RAS to meet these tests would provide little to no benefit to BES reliability.

b) Relationship to Reliability Standard TPL-001-4

Requirement R4 of proposed PRC-012-2 does not supersede or modify PC responsibilities under Reliability Standard TPL-001-4 but works with Reliability Standard TPL-001-4 to require the inadvertent operation of certain RAS to meet, at a minimum, performance requirements common to all planning events listed in TPL-001-4.

Reliability Standard TPL-001-4 sets forth Transmission system planning performance requirements for various System conditions and probable Contingencies. Table 1 of Reliability Standard TPL-001-4 explains the specific performance requirements that a RAS must meet according to the Contingency or System condition. Similarly, under Parts 4.1.1, 4.1.2, 4.1.3, 4.1.4, and 4.1.5 of Requirement R4 of proposed PRC-012-2, the PC must complete an evaluation of each RAS to ensure that it operates appropriately and that it meets certain performance criteria. While the requirements under TPL-001-4 and PRC-012-2 are similar, proposed PRC-012-2 introduces the possibility of RAS failure to operate and RAS inadvertent operation, matters on which TPL-001-4 is silent.

Specifically, Part 4.1.4 of Requirement R4 requires the PC to verify that the possible inadvertent operation of the RAS, except for a limited impact RAS, meets the minimum System performance requirements in Table 1 of Reliability Standard TPL-001-4. Instead of referring to TPL-001-4, however, the Requirement lists the System performance requirements that a potential inadvertent operation must satisfy, which account for the performance requirements common to all planning events P0-P7 in TPL-001-4.[34] Similarly, Part 4.1.5 of proposed PRC-012-2

[34] Requirement R4, Parts 4.1.4.1 and 4.1.4.5, require the PC to confirm that the BES remains stable and that voltage is within acceptable limits, respectively.

mandates that the PC evaluate whether the RAS, except for limited impact RAS, upon the occurrence of a single component failure, continues to meet "the same performance requirements (defined in Reliability Standard TPL-001-4 or its successor) as those required for the events and conditions for which the RAS is designed." Even though Part 4.1.5 exempts limited impact RAS, the standard does not exempt limited impact RAS from meeting each of the performance requirements in TPL-001-4.[35]

Thus, while limited impact RAS are exempt from RC evaluation under Parts 4.1.4 and 4.1.5, these RAS are not exempt from performance requirements in TPL-001-4. The performance requirements under TPL-001-4 and PRC-012-2 are thus designed to support one another and are not mutually exclusive.

iii) Requirement R5

> **R5.** Each RAS-entity, within 120 full calendar days of a RAS operation or a failure of its RAS to operate when expected, or on a mutually agreed upon schedule with its reviewing Reliability Coordinator(s), shall: *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning]*
>
> > **5.1.** Participate in analyzing the RAS operational performance to determine whether:
> >
> > > **5.1.1.** The System events and/or conditions appropriately triggered the RAS.
> > >
> > > **5.1.2.** The RAS responded as designed.
> > >
> > > **5.1.3.** The RAS was effective in mitigating BES performance issues it was designed to address.
> > >
> > > **5.1.4.** The RAS operation resulted in any unintended or adverse BES response.
> >
> > **5.2.** Provide the results of RAS operational performance analysis that identified any deficiencies to its reviewing Reliability Coordinator(s).

Pursuant to Requirement R5, RAS-entities must complete a performance analysis of each of its RAS upon the operation or failure to operate of that RAS. This Requirement is necessary

[35] As an example of the coordinated nature of TPL-001-4 and PRC-012-2, the RC may use the analysis completed under the TPL Requirements in its evaluation of whether a RAS qualifies as "limited impact" under Requirements R1, R2, and R3.

for BES integrity and reliability as it verifies that each RAS operation (or misoperation) is consistent with its intended functionality and design. More specifically, the RC and PC reviews performed under Requirements R2 and R4, respectively, RAS are designed to verify the technical integrity of the RAS, not to analyze the operation or misoperation of RAS. An analysis of the actual operation of the RAS according to its design is critical to maintaining the reliability and integrity of the BES. As such, in addition to the reviews required under Requirements R2 and R4, Requirement R5 creates an affirmative obligation for RAS-entities to analyze a RAS after each operation or misoperation. A RAS-entity would be in the best position to review a RAS directly after an event to determine whether the RAS operates correctly and as intended.

Under Requirement R5, each RAS-entity must complete an operational performance analysis after each operation or failure of a RAS to operate to verify that the RAS operated as designed and to identify any deficiencies that occurred during operation, including any adverse effect on the BES. The RAS-entity must analyze RAS performance and provide the details of any deficiencies to the relevant reviewing RC within 120 days of a RAS operation or a failure of the RAS to operate when expected, or on another schedule agreed to by the RC. The 120-day period is consistent with the amount of time required for responsible entities to complete the Protection System Misoperation investigation under Requirements R1, R2, and R3 of Reliability Standard PRC-004-5.

It is important for proposed PRC-012-2 and PRC-004-5 to operate contemporaneously, as both standards require the entity responsible for the RAS to perform an analysis when a RAS misoperates. Specifically, Requirements R1, R2, and R3 of Reliability Standard PRC-004-5 focuses on identification, communication and mitigating reoccurrence of a misoperation of a RAS. Requirement R5 of proposed PRC-012-2 focuses on analysis and communication of

operation or misoperation of a RAS. Aligning the timeframes for both standards and providing the flexibility for the RAS-entity and RC to agree upon an alternative schedule ensures that, after a RAS misoperation, responsible entities can perform the required analyses on a consistent schedule. Finally, consistent with NERC's Proposal, which requires the RC to maintain continued oversight of each in-service RAS (i.e., the requirements for the RC to review and approve each RAS and for the RC to maintain a database of each RAS in its area) Part 5.2 of Requirement R5 requires the RAS-entity to provide the results of all RAS operational performance analyses that identify deficiencies to its reviewing RC(s).

As the TP may have access to information needed to perform the analysis under Requirement R5,[36] RAS-entities may need to collaborate with their associated TP to verify that the RAS was triggered correctly, responded as designed, and affected the BES as intended. Regardless, the RAS-entity continues to be the responsible entity for purposes of compliance with Requirement R5. RAS-entities with a common RAS (i.e., more than one RAS-entity is responsible for a single RAS) may collaborate to conduct and submit a single, coordinated operational performance analysis.

iv) Requirements R6 and R7

> **R6.** Each RAS-entity shall participate in developing a Corrective Action Plan (CAP) and submit the CAP to its reviewing Reliability Coordinator(s) within six full calendar months of: *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning, Long-term Planning]*
>
> - Being notified of a deficiency in its RAS pursuant to Requirement R4, or
> - Notifying the Reliability Coordinator of a deficiency pursuant to Requirement R5, Part 5.2, or
> - Identifying a deficiency in its RAS pursuant to Requirement R8.

[36] The TP is responsible for developing a long-term reliability plan for the interconnection BES, and information in the reliability plan may be useful to determine whether, according to this plan, the RAS was triggered correctly, responded as designed, and affected the BES as intended. As such, the TP may have useful information for conducting the analysis.

R7. Each RAS-entity shall, for each of its CAPs developed pursuant to Requirement R6: *[Violation Risk Factor: Medium] [Time Horizon: Operations Planning, Long-term Planning]*

7.1. Implement the CAP.
7.2. Update the CAP if actions or timetables change.
7.3. Notify each reviewing Reliability Coordinator if CAP actions or timetables change and when the CAP is completed.

The reliability objective of Requirements R6 and R7 is to require a RAS-entity to take all necessary steps to address deficiencies associated with its RAS after becoming aware of the deficiency. Under these Requirements, RAS-entities are required to create a CAP to respond to deficiencies with the affected RAS, implement the CAP, update the CAP, and inform the RC of the status of updates and implementation of the CAP.

A RAS-entity may discover deficiencies with its RAS in one of three ways. First, the PC may notify the RAS-entity of an issue with a RAS as a result of its evaluation under Requirement R4. Second, the RAS-entity may discover an issue with its RAS based on its performance analysis after the operation of the RAS or failure of the RAS to operate. Third, the RAS-entity may discover a deficiency with its RAS during its periodic functional test under Requirement R8.

Pursuant to Requirement R6, the RAS-entity must develop a CAP to address any identified deficiency to mitigate potential reliability risks associated with this deficiency. A CAP is defined in the NERC Glossary as "[a] list of actions and an associated timetable for implementation to remedy a specific problem." Accordingly, the RAS-entity must design the CAP to facilitate the corrective measures in the plan by describing all actions necessary to address the deficiency with the RAS and by providing an associated timetable to complete these actions. NERC anticipates that the RAS-entity may design the CAP with information obtained from other parties such as the TP or PC, but the RAS-entity is the entity responsible for

compliance with Requirement R6. Depending on the complexity of the identified deficiency(ies), the RAS-entity may need to perform studies or other engineering or consulting work to adequately develop the CAP.

The RAS-entity must develop and submit the CAP to the relevant RC within six months of one of the following: (i) the PC notifies the RAS-entity of the deficiency under Requirement R4, (ii) the RAS-entity notifies the RC of a deficiency under Requirement R5, or (iii) the RAS-entity identifies a deficiency under Requirement R8. NERC designed Requirement R6 as a careful balance between the need for RAS-entity collaboration with other RAS-entities or the relevant TP or PC with the need to address the deficiencies in a reasonable, effective time. Based on this calculation, Requirement R6 specifies a maximum period of six full calendar months for RAS-entity collaboration on the CAP development. Ideally, when there is more than one RAS-entity for a RAS, the RAS-entities would collaborate to develop and submit a single, coordinated CAP.

Pursuant to Requirement R7, each RAS-entity must implement the CAP developed according to Requirement R6 (or, more plainly stated, take the actions described in the CAP within the associated timeframe) to address the identified deficiencies. To satisfy its obligations pursuant to Requirements R6 and R7, the RAS entity must develop a CAP designed to mitigate any deficiencies with the RAS in a timely manner. If the RAS-entity makes any change to the actions or schedule in its CAP, the RAS-entity must update the CAP and submit the revised CAP to the RC. In addition, the RAS-entity must notify the RC when the actions under the CAP have been complete and the deficiencies have been addressed. Finally, in the event that the RAS-entity designs a CAP that requires the RAS-entity to make a functional modification to the RAS to address the deficiency, the RAS-entity must resubmit the RAS to the RC for review by

submitting information identified in Attachment 1 according to proposed Requirement R1. This is consistent with a RAS-entity's continued obligation under Requirement R1 to obtain RC approval for each "new or functionally modified" RAS.

v) Requirement R8

> **R8.** Each RAS-entity shall participate in performing a functional test of each of its RAS to verify the overall RAS performance and the proper operation of non-Protection System components: *[Violation Risk Factor: High] [Time Horizon: Long-term Planning]*
>
> - At least once every six full calendar years for all RAS not designated as limited impact, or
> - At least once every twelve full calendar years for all RAS designated as limited impact.

In addition to the operational analysis that each RAS-entity must complete after operation or misoperation of a RAS under Requirement R5 of proposed PRC-012-2, the RAS-entity must perform a functional test of its RAS on a periodic basis pursuant to Requirement R8. This functional test serves as additional confirmation that the RAS and the non-Protection System components of the RAS operate as designed.

Responsible entities must test Protection System components that are part of a RAS pursuant to Reliability Standard PRC-005; however, RAS-entities are not required to test the non-protection RAS device (e.g., controller) under any other currently effective Reliability Standard. As each RAS placed in service by a RAS-entity is unique in its operation, location, and design, and role in BES reliability, periodic functional testing of the actual RAS is necessary to maintain reliability across the BES. NERC designed Requirement R8 to require each RAS-entity, as the party with knowledge of the design, installation, and functionality of the RAS, to perform periodic functional testing of each of its RAS to ensure that it continues to operate as designed. A successful functional test that meets the criteria in Requirement R8 to "verify the overall RAS performance and the proper operation of non-Protection System components"

would gauge the effectiveness of the device and ensure that the RAS continues to function properly and as designed.

In performing the test, the RAS-entity may test the RAS using an end-to-end testing method or a segmented approach to perform a functional test on all RAS non-protection system components or other components of the RAS not already covered in PRC-005-6. If the RAS-entity employs a segmented approach to testing, the RAS-entity must test each segment of a RAS and may test overlapping segments individually. This individual segment testing, as opposed to testing all segments at the same time, eliminates the need for complex maintenance schedules and outages that may be necessary otherwise. A successful test of one segment only resets the test interval clock for that segment.

Further, when a RAS operates and the RAS-entity performs the analysis under Requirement R5, Part 5.1, the RAS-entity may use the evidence for compliance with Part 5.1 as evidence for compliance with Requirement R8 (i.e., the RAS would be deemed "tested" for purposes of Requirement R8). If one or more segments does not operate, however, the segments that did not operate must be tested within the maximum interval beginning on the date of the previous successful test of the segment(s) that did not operate.

The RAS-entity must perform a functional test for each RAS that is not designed as "limited impact"[37] at least once "every six full calendar years," and for each limited impact RAS at least once "every twelve full calendar years." NERC developed this timeline to ensure that entities have adequate time and resources to acquire and develop the testing framework and to address the potential reliability impacts to the BES created by undiscovered or latent issues that

[37] NERC characterizes a "limited impact RAS" in footnote 1 of proposed PRC-012-2 as a "RAS designated as limited impact cannot, by inadvertent operation or failure to operate, cause or contribute to BES Cascading, uncontrolled separation, angular instability, voltage instability, voltage collapse, or unacceptably damped oscillations."

may have an adverse impact on the operation of a RAS. As explained in the Implementation Plan for PRC-012-2 (attached herein as **Exhibit C**), the initial performance obligation for entities responsible for compliance with Requirement R8 must be completed within either six (6) or twelve (12) years after the effective date for PRC-012-2, depending on the type of RAS being tested. This six- and twelve-year timeframe is also consistent with the timeframes for component maintenance requirements related to protection systems, automatic reclosing, and sudden pressure relaying in Table 1-1 of Reliability Standard PRC-005-6.[38]

vi) Requirement R9

> **R9.** Each Reliability Coordinator shall update a RAS database containing, at a minimum, the information in Attachment 3 at least once every twelve full calendar months. *[Violation Risk Factor: Lower] [Time Horizon: Operations Planning]*

Under Requirement R9, each RC is required to create a comprehensive RAS database including all relevant information for each RAS in its RC area and to update this database every twelve months. The RAS database would serve as a tool for the RC to organize necessary RAS data for the needs within its own area and to provide high-level RAS data to relevant entities to identify vulnerabilities and to aid in reliability-related needs across the system.

Requirement R9 obligates the RC to collect information about each RAS in the relevant RC Area identified in Attachment 3. NERC designed Attachment 3 to require the RC to update the minimum information required for the RAS database, including a summary of conditions that trigger a RAS, the corrective actions performed by a RAS, and System issues that are mitigated through corrective action taken by the RAS. The collection of the necessary database

[38] Requirement R1 of PRC-005-6 requires each Transmission Owner, Generator Owner, and Distribution Provider to establish a Protection System Maintenance Program (PSMP) for its Protection Systems, Automatic Reclosing, and Sudden Pressure Relaying based on a schedule consistent with the maintenance intervals specified in Table 1-1 of PRC-005-6. Table 1-1 defines the intervals for maintenance and the types of maintenance activities which must be performed on components with particular attributes.

information is not onerous on the RC, as the data required in Attachment 3 is similar in scope and substance to the information provided to the RC in Attachment 1 pursuant to Requirement R1.

The RC would use the RAS data it collects under Requirement R9 to fulfill its reliability-related responsibilities and to provide other entities with information about each existing RAS that may impact the other entity's operational and planning activities. While the RC may collect more information than just the data nodes requested in Attachment 3, the RC must, at a minimum, update the information in Attachment 3. Again, given its wide-area view and its responsibility to receive relevant information about each RAS before the RAS-entity places the RAS into service, the RC is the appropriate entity to compile RAS-related information specific to each RAS for reliability planning and system analysis across the system.

Operational modeling information is regularly used in the development of NERC powerflow base cases and reliability assessments, and it is provided yearly as required under Reliability Standard MOD-032-1. Thus, consistent with established industry practice, Requirement R9 obligates RCs to update its RAS database with all the information required in Attachment 3 at least once every twelve months to ensure consistency and accuracy of pertinent data. This timeframe provides sufficient time for RAS-entities to provide, and for RCs to collect, all RAS information identified in Attachment 3.

Finally, RCs that do not have an established RAS database upon the effective date of proposed PRC-012-2 would not be able to update information that has not yet been collected and are thus not obligated to "update" the RAS database with the information included in Attachment 3. As described in the Implementation Plan and in *Section IV.C* of this filing, RCs that have not created a RAS database for collection of pertinent RAS information upon the effective date of

proposed Reliability Standard PRC-012-2 are required to create a RAS database by the effective date of PRC-012-2. Upon this initial compliance obligation, the RC would be required to continue to perform the obligation under Requirement R9 every twelve (12) calendar months.

C. Enforceability of Proposed Reliability Standard PRC-012-2

Proposed Reliability Standard PRC-012-2 includes nine Measures to individually support each Requirement, to clarify necessary evidence or actions for compliance, and to help ensure that the Requirements are enforced in a clear, consistent, non-preferential manner, and without prejudice to any party. Each of the nine associated Measures are provided below.

> **M1.** Acceptable evidence may include, but is not limited to, a copy of the Attachment 1 documentation and the dated communications with the reviewing Reliability Coordinator(s) in accordance with Requirement R1.
>
> **M2.** Acceptable evidence may include, but is not limited to, dated reports, checklists, or other documentation detailing the RAS review, and the dated communications with the RAS-entity in accordance with Requirement R2.
>
> **M3.** Acceptable evidence may include, but is not limited to, dated documentation and communications with the reviewing Reliability Coordinator that no reliability issues were identified during the review or that all identified reliability issues were resolved in accordance with Requirement R3.
>
> **M4.** Acceptable evidence may include, but is not limited to, dated reports or other documentation of the analyses comprising the evaluation(s) of each RAS and dated communications with the RAS-entity(ies), Transmission Planner(s), Planning Coordinator(s), and the reviewing Reliability Coordinator(s) in accordance with Requirement R4.
>
> **M5.** Acceptable evidence may include, but is not limited to, dated documentation detailing the results of the RAS operational performance analysis and dated communications with participating RAS-entities and the reviewing Reliability Coordinator(s) in accordance with Requirement R5.
>
> **M6.** Acceptable evidence may include, but is not limited to, a dated CAP and dated communications among each reviewing Reliability Coordinator and each RAS-entity in accordance with Requirement R6.
>
> **M7.** Acceptable evidence may include, but is not limited to, dated documentation such as CAPs, project or work management program records, settings sheets, work orders,

maintenance records, and communication with the reviewing Reliability Coordinator(s) that documents the implementation, updating, or completion of a CAP in accordance with Requirement R7.

M8. Acceptable evidence may include, but is not limited to, dated documentation detailing the RAS operational performance analysis for a correct RAS segment or an end-to-end operation (Measure M5 documentation), or dated documentation demonstrating that a functional test of each RAS segment or an end-to-end test was performed in accordance with Requirement R8.

M9. Acceptable evidence may include, but is not limited to, dated spreadsheets, database reports, or other documentation demonstrating a RAS database was updated in accordance with Requirement R9.

Proposed Reliability Standard PRC-012-2 also include VRFs and VSLs for each Requirement. The VSLs and VRFs are part of several elements used to determine an appropriate sanction when the associated Requirement is violated and each comports with the NERC and FERC guidelines relate to their assignment. The VSLs provide guidance on the way that NERC would enforce the Requirements of the proposed Reliability Standards. The VRFs assess the impact to reliability of violating a specific Requirement and represent one of several elements used to determine an appropriate sanction when the associated Requirement is violated.

As further explained in **Exhibit D** of this filing, seven of the Requirements in proposed Reliability Standard PRC-012-2 have been assigned a "Medium" VRF, while Requirement R8 has been assigned a VRF of "High" and Requirement R9 a VRF of "Lower." Reflective of the nature of the required action, each of the Requirements have been assigned Time Horizons of either "Operational Planning" or "Long-term Planning." As described in **Exhibit D**, the VRFs and VSLs for the proposed Reliability Standard comport with NERC and FERC guidelines.[39]

[39] *See, e.g.*, *N. Am. Elec. Reliability Corp*., 119 FERC ¶ 61,145, *order on reh'g and compliance filing*, 120 FERC ¶ 61,145 (2007).

D. Proposed Retirements and Withdrawals

In an ongoing effort to consolidate and to remove unnecessary or redundant Requirements or Reliability Standards from its currently effective suite of standards, NERC proposes to retire two currently effective Reliability Standards and withdraw three Reliability Standards that are currently pending. As described in the Mapping Document for PRC-012-2, attached herein as **Exhibit E**, proposed PRC-012-2 effectively clarifies and streamlines a variety of existing Requirements applicable to Remedial Action Schemes (formerly known as a "Special Protection System[s]"). As a result of this consolidation, NERC proposes to retire currently effective Reliability Standards PRC-015-1 and PRC-016-1 and withdraw pending "fill-in-the-blank" Reliability Standards PRC-012-1, PRC-013-1, and PRC-014-1.[40]

i) Reliability Standard PRC-012-1

In Order No. 693, FERC did not approve, deny, or remand Reliability Standard PRC-012-1, as FERC deemed this standard a "fill-in-the-blank" standard. Reliability Standard PRC-012-1, which is the basis for NERC's development of proposed Reliability Standard PRC-012-2, required Regional Entities to create a RAS review process and establish RAS design criteria. As explained in the Mapping Document (**Exhibit E**), all of the Requirements in PRC-012-1 except R2 are now covered in Requirements R1, R2, R3, R4, R5, R6, and R8 of PRC-012-2, as these proposed Requirements obligate the RC, PC, and RAS-entity to create a RAS review process and require the RAS-entity to design corrective measures to correct deficiencies with its respective RAS. Requirement R2 of PRC-012-1 obligated the Regional Reliability Organization to provide its RAS review procedures to other Regional Reliability Organizations and to NERC. In Order

[40] *See* Paragraph 81 Criteria at Exhibit A (proposing to retire standards as "Administrative" if the "Reliability Standard requirement requires responsible entities to perform a function that is administrative in nature, does not support reliability and is needlessly burdensome."); *see also* FERC Order No. 788.

No. 693, FERC did not approve or remand this standard because the standard assigned responsibilities to Regional Reliability Organizations and was "fill-in-the-blank" because it did not properly assign a defined responsibility to a responsible entity.[41] Accordingly, Requirement R2 is administrative in nature and does not contribute to reliability, so NERC did not include the requirement in proposed Reliability Standard PRC-012-2.[42]

Notably, Requirements R1.3 and R1.4 of PRC-012-1 require responsible entities to ensure that failure of a RAS to operate "does not prevent the interconnected transmission system from meeting…TPL-001-0, TPL-002-2, and TPL-003-0" and that an inadvertent operation of the RAS shall "[m]eet the same performance requirement (TPL-001-0, TPL-002-0, and TPL-003-0) as that required of the contingency for which it was designed, and not exceed TPL-003-0." As NERC explained in the Mapping Document (**Exhibit E**), the performance obligation in these Requirements would be required under Requirements R1, R2, and R4 of proposed PRC-12-2. As explained in *Section IV.B(ii)(b)* of this filing, while the proposed requirements do not explicitly state that entities must continue to comply with the TPL requirements, responsible

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[41] NERC developed proposed Reliability Standard PRC-012-2 in consideration of the fact that FERC neither approved or denied PRC-012-1 and deemed it a "fill-in-the-blank" Reliability Standard. The revised, proposed standard removes the obligation on "Regional Reliability Organizations," and instead places the responsibility on appropriate NERC functional entities.

[42] *See* Paragraph 81 Criteria at Exhibit A. The proposed Reliability Standard does not include a requirement similar to Requirement R2 of PRC-012-1, as this requirement is "administrative" in nature based on the Paragraph 81 Criteria B1. Pursuant to NERC's Paragraph 81 Criteria, a requirement may be retired if it "requires responsible entities ("entities") to conduct an activity or task that does little, if anything, to benefit or protect the reliable operation of the BES," and it meets another one of the criteria described in Criteria B of that document. One of those criteria, Criteria B1 (Administrative), states that a Reliability Standard requirement may be retired if it "requires responsible entities to perform a function that is administrative in nature, does not support reliability and is needlessly burdensome."[42] Criteria B1 also states that it is "designed to identify requirements that can be retired or modified with little effect on reliability and whose retirement or modification will result in an increase in the efficiency of the ERO compliance program…Strictly administrative functions do not inherently negatively impact reliability directly and, where possible, should be eliminated or modified for purposes of efficiency and to allow the ERO and entities to appropriately allocate resources."

entities must continue to comply with these Reliability Standards. Based on the foregoing, NERC proposes to withdraw PRC-012-1 in its entirety.

ii) Reliability Standard PRC-013-1

Similar to Reliability Standard PRC-012-1, FERC declared that Reliability Standard PRC-13-1 is a "fill-in-the-blank" standard and neither approved, denied, or remanded the standard in Order No. 693.[43] Still, NERC considers the purpose of PRC-013-1, to require responsible entities to maintain a RAS database with pertinent technical information for each RAS, vital to an effective RAS review and maintenance standard. Accordingly, in developing proposed Reliability Standard PRC-012-2, NERC established Requirement R9 to require RCs to maintain a RAS database with specific design information. NERC designed Attachment 3 to support Requirement R9 to ensure that the RAS database includes all relevant technical information about each RAS in its database. The RC must maintain information about each RAS as prescribed in Attachment 3 when creating a RAS database under Requirement R9, as Attachment 3 addresses all information deemed relevant for each RAS in its RAS database. Finally, similar to its treatment of Requirement R2 of Reliability Standard PRC-012-1, NERC declines to include Requirement R2 of PRC-013-1 in proposed PRC-012-2, as it assigns responsibility to a Regional Reliability Organization, establishes a "fill-in-the-blank" standard, and is thus unnecessary. Based on the foregoing, NERC proposes to withdraw PRC-013-1 in its entirety.

[43] NERC developed proposed Reliability Standard PRC-012-2 in consideration of the fact that FERC neither approved or denied PRC-013-1 and deemed it a "fill-in-the-blank" Reliability Standard. The revised, proposed standard removes the obligation on "Regional Reliability Organizations," and instead places the responsibility on appropriate NERC functional entities.

iii) Reliability Standard PRC-014-1

In Order No. 693, FERC neither approved, denied, or remanded Reliability Standard PRC-14-1 and declared that it was a "fill-in-the-blank" standard.[44] However, NERC believes that the performance obligation in PRC-014-1, which required responsible entities to oversee each RAS installed in the respective Regions every five years to ensure that the RAS meets certain criteria and to take correction actions to remediate any RAS that did not meet those criteria, is necessary for an effective RAS program. NERC developed Requirement R4 as a vestige of Reliability Standard PRC-14-1 by requiring the PC to provide oversight of each RAS within the PC area. NERC also developed Requirement R6 based on PRC-014-1 to mandate that each RAS-entity design a CAP to address issues identified in its RAS review. As the obligations under Reliability Standard PRC-014-1 are now covered in Requirements R4 and R6 of proposed PRC-012-2, NERC proposes to withdraw Reliability Standard PRC-014-1.

iv) Reliability Standards PRC-015-1 and PRC-016-1

As the relevant performance requirements in currently effective Reliability Standards PRC-015-1 and PRC-016-1 are subsumed in proposed Reliability Standard PRC-012-2, NERC proposes to retire PRC-015-1 and PRC-016-1.

The purpose of currently effective Reliability Standard PRC-015-1 is "[t]o ensure that all Remedial Action Schemes (RAS) are properly designed, meet performance requirements, and are coordinated with other protection systems. To ensure that maintenance and testing programs are developed and misoperations are analyzed and corrected." The performance obligations of PRC-015-1 require responsible entities to collect data regarding each RAS, review each new or

[44] NERC developed proposed Reliability Standard PRC-012-2 in consideration of the fact that FERC neither approved or denied PRC-014-1 and deemed it a "fill-in-the-blank" Reliability Standard. The revised standard removes the obligation on "Regional Reliability Organizations," and instead places the responsibility on appropriate NERC functional entities.

functionally modified RAS, and to provide the RAS data to NERC and to Regional Reliability Organizations as necessary. Each of the requirements in PRC-015-1 are vital to ensuring that responsible entities document critical information about each RAS and review each new or functionally modified RAS before placing the RAS into service. Accordingly, NERC has integrated these requirements into Requirements R1, R2, and R3 of proposed Reliability Standard PRC-012-2.

As explained above, these Requirements ensure that (i) each RAS-entity provide specific and detailed information to the relevant RC for review, (ii) each relevant RC review the sufficiency of the RAS design and implementation and provide feedback to the respective RAS-entity, and (iii) each RAS-entity resolves all issues identified by the RC in its RAS review. In Order No. 693, FERC directed NERC to remove all references to the Regional Reliability Organization as a responsible entity.[45] Also, under proposed Reliability Standard PRC-012-2, the RC reviews each RAS and collects information about each RAS in a RAS database under the proposed Reliability Standard. Requirement R3 of PRC-015-1, which requires responsible entities to provide information about each RAS directly to the Regional Reliability Organization and to NERC, is unnecessary and duplicative and is not included in proposed PRC-012-2.[46]

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[45] Order No. 693 at P 157.

[46] *See* Paragraph 81 Criteria at Exhibit A. The proposed Reliability Standard does not include a requirement similar to Requirement R3 of PRC-015-1, as this requirement is "administrative" in nature based on Paragraph 81 Criteria B1. Pursuant to NERC's Paragraph 81 Criteria, a requirement may be retired if it "requires responsible entities ("entities") to conduct an activity or task that does little, if anything, to benefit or protect the reliable operation of the BES," and it meets another one of the criteria described in Criteria B of that document. One of those criteria, Criteria B1 (Administrative), states that a Reliability Standard requirement may be retired if it "requires responsible entities to perform a function that is administrative in nature, does not support reliability and is needlessly burdensome."[46] Criteria B1 also states that it is "designed to identify requirements that can be retired or modified with little effect on reliability and whose retirement or modification will result in an increase in the efficiency of the ERO compliance program…Strictly administrative functions do not inherently negatively impact reliability directly and, where possible, should be eliminated or modified for purposes of efficiency and to allow the ERO and entities to appropriately allocate resources."

Similar to the purpose of Reliability Standard PRC-015-1, the purpose of currently effective Reliability Standard PRC-016-1 is "[t]o ensure that all Remedial Action Schemes (RAS) are properly designed, meet performance requirements, and are coordinated with other protection systems. To ensure that maintenance and testing programs are developed and misoperations are analyzed and corrected." Under this standard, however, responsible entities are required to analyze and record RAS operations, take corrective actions to avoid future misoperations, and provide documentation regarding RAS operation analyses to the relevant Regional Reliability Organizations and NERC as necessary. As these performance requirements are important to establishing an effective and successful RAS program, NERC proposes to move these obligations to Requirements R5, R6, and R7 of proposed Reliability Standard PRC-012-2. Under proposed Requirements R5, R6, and R7, the RAS-entity must analyze RAS operations and provide the results of that analysis to the relevant RC, design a CAP to address any issues identified by the RC, and implement the CAP. The RC, as the entity with the wide-area perspective, is the appropriate entity to oversee RAS, maintain data relevant to operations, use this data to assist responsible entities in operating reliability, and intervene when necessary.

V. EFFECTIVE DATE

Reliability Standard PRC-012-2 shall become effective on the first day of the first calendar quarter that is thirty-six (36) months after the effective date of the applicable governmental authority's approval, or as otherwise provided for by the applicable governmental authority, pursuant to the respective Implementation Plan included as **Exhibit C** herein. Where approval by an applicable governmental authority is not required, the standard shall become effective on the first day of the first calendar quarter that is thirty-six (36) months after the date the standard is adopted by the NERC Board of Trustees, or as otherwise provided for in that jurisdiction. The Implementation Plan provides additional instructions for specific initial

performance obligations of certain entities under Requirements R4, R8, and R9 to address any ambiguity that may exist for initial performance obligations related to existing RAS or to RAS designated as "limited impact," and to address responsibilities related to the creation of a RAS database.

The proposed implementation period of thirty-six (36) months for PRC-012-2 is appropriate because the affected RCs may choose to redesign the Regional approval processes currently in existence, which will require considerable time and resources. When establishing a new system for reviewing and approving RAS under proposed PRC-012-2, the RC would be required to develop significant infrastructure, including hiring experts to perform any services that the responsible entities do not currently have available. Entities may desire to continue using existing regional processes to review RAS, but this would still require entities to establish contractual relationships with regional volunteers participating in existing regional processes. Responsible entities would need a thirty-six month implementation period to lay the foundation for an effective, efficient RAS review process to meet obligations under proposed Reliability Standard PRC-012-2.

As written, three of the Requirements, Requirements R4, R8, and R9, are recurring or periodic requirements. As such, the Implementation Plan for PRC-012-2 includes special instructions for the initial implementation of three Requirements. First, Requirement R4 requires the PC to evaluate each RAS every five years. For those RAS that are already in service at the time of implementation and operating as an integrated component of the BES, the Implementation Plan for PRC-012-2, attached herein as **Exhibit C**, explains that the PC must perform the initial performance evaluation of each existing RAS within five (5) years after the effective date of PRC-012-2. In addition, the PC must perform the initial evaluation of each

"new or functionally modified RAS" within five (5) years after the date that the reviewing RC approves the RAS.

Second, Requirement R8 requires the RAS-entity to perform a functional test on a periodic basis according to whether the RC has designated the RAS as "limited impact." For added clarity, the Implementation Plan for PRC-012-2 explicitly states that responsible entities must perform the initial functional test of RAS not designated as "limited impact" at least once within six (6) years after the effective date of PRC-012-2 and at least once within twelve (12) years after the effective date if the RAS has been designated as "limited impact."

Finally, certain RCs may not have an established RAS database as anticipated under Requirement R9 and thus may not be able to "update" the database as mandated under that Requirement. The Implementation Plan for PRC-012-2 explains (i) that the initial obligation for RCs without established RAS databases is to establish a database by the effective date of PRC-012-2, and (ii) that the first obligation for all RCs under Requirement R9 must be fulfilled within 12 months of the effective date of PRC-012-2.

Respectfully submitted,

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Date: August 15, 2016

Exhibit A: Examples of WECC Local Area Protection Systems (LAPS) and NPCC Type III RAS

WECC Local Area Protection Systems[1]

Scheme Name	**Design Objectives** (Contingencies and system conditions for which the scheme was designed)	**Operation** (The actions taken by the scheme in response to Disturbance conditions)	**Modeling** (Information on detection logic or relay settings that control operation of the scheme)
Unit Dropping Scheme	Loss of 345 kV line	Trip generation units to avoid thermal overload of 138 kV line and 230/138 kV transformers	Shed generation for loss of either end of 345 kV line
138 kV Line tripping	Scheme is designed to eliminate overload on the 138 kV line during loss of 345 kV line	Open 138 kV Line during loss of 345 kV line to eliminate overload on the 138 kV line	Transfer trip scheme that will trip the 138 kV line for loss of the 345 kV line
115kV Overload SPS	Prevent overload of 115kV lines in the event of a double line outage of and two 115kV lines.	Opens circuit breaker (CB) 122 and CB 123 which will shed substation load	Open Clear CB 122 and CB 123 if Clear CB 113 and CB 112 are open, and CB 122 and CB 123 are loaded above 215A
Cold	Prevent overload of 500/230kV T1 Transformer	Trips or ramps back generation at Generation Station to prevent overload of the 500/230kV T1 Transformer for a 500 kV single line outage, or a #1 and #2 500kV double line outage.	The RAS actions at Generation Station are as follows: (1) Trip generation to 0 MW level for 500/230kV T1 transformer emergency overload condition and #1 and #2 500kV double line outage. (2) Trip generation to 300 MW level for 500/230kV T1 transformer emergency overload condition and 500kV line outage. (3) Ramp back generation for 500/230kV T1 transformer normal overload condition and 500kV line outage.
Sargent	Thermal overload of the 220 kV Line following N-2 loss of the Units 3 and 4, 220 kV lines	Pre-selected Units 5-8 are tripped to relieve the thermal overload	Line loss logic for the critical line terminals, EMS performs arming calculations every four seconds.
Winter Lake	Loss of 345 kV line with heavy southbound schedule (> ~ 350 MW) on Path XX.	Trip line terminal (#123) for flow > 650 A lasting longer than 8000 cycles	Detect line flow > 650 A with fixed delay of 8000 cycles (2 m 13 s)

[1] The WECC LAPS examples have been redacted to protect Critical Energy Infrastructure Information data and any other Confidential Information.

NPCC Type III Local SPS Examples[2]

Type[3]	Reason for Installation	Initiating Condition	Action Resulting
Generation Rejection	Reclosing Breaker may result in damaging shaft torques on Generator Unit	345 kV Breaker open due to line relaying.	Open Generator Breaker
Transmission Cross Tripping	Prevent low voltage and overloads on the Maine 115 kV system Canadian source contingency with a line out of service	>80 MW reverse power flow on a Maine Autotransformer	Trip the Orrington T1 Autotransformer
Generation Rejection	Overload protection of two underground cables and two overhead lines	Overload of either of two parallel 115 kV lines.	Runback a generating Unit to 150 MW
Generation Rejection	Prevent thermal overload to the remaining line in service	Loss of a 115 kV line with overcurrent on the remaining parallel line	Runback a generating unit to 168 MW
Load Rejection	Prevent overloading a 115 kV line	Loss of Double Circuit Tower Lines	Trip load and disable automatic transfer of load

[2] The NPCC Type III examples have been redacted to protect Critical Energy Infrastructure Information data and any other Confidential Information.

[3] *Note-the majority of Type III SPS (Limited Impact RAS) installed are Generation Rejection schemes installed to alleviate local overloads for specific system conditions and contingencies.

EXHIBITS B – G and I

(Available on the NERC Website at

http://www.nerc.com/FilingsOrders/ca/Canadian%20Filings%20and%20Orders%20DL/PRC-012-2_Attachments_August2016.pdf)

EXHIBIT H

Summary of Development History

The development record for proposed Reliability Standard PRC-012-2 is summarized below.

I. Overview of the Standard Drafting Team

When evaluating a proposed Reliability Standard, the Commission is expected to give "due weight" to the technical expertise of the ERO.[1] The technical expertise of the ERO is derived from the standard drafting team selected to lead each project in accordance with Section 4.3 of the NERC Standards Process Manual.[2] For this project, the standards drafting team consisted of industry experts, all with a diverse set of experiences. A roster of the standard drafting team members is included in **Exhibit I.**

II. Standard Development History

A. Standards Authorization Request Development

On February 12, 2014, NERC submitted a Standard Authorization Request ("SAR") to the NERC Standards Committee ("SC") to revise the NERC Glossary definition for Special Protection System ("SPS") and to revise or develop SPS-related Reliability Standards. The SC authorized the posting of the SAR for Project 2010-05.2 on February 12, 2014, and NERC posted the SAR for a 30-day comment period from February 18, 2014 through March 19, 2014. NERC later divided the work anticipated by the SAR for Project 2010-05.2 into two phases, Project 2010-05.2 and Project 2010-05.3, to address NERC Glossary definition revisions ahead

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[1] Section 215(d)(2) of the Federal Power Act; 16 U.S.C. § 824(d)(2) (2012).

[2] The NERC *Standard Processes Manual* is available at http://www.nerc.com/comm/SC/Documents/Appendix_3A_StandardsProcessesManual.pdf.

of developing a Reliability Standard for planning, coordination, and design of Remedial Action Schemes ("RAS").

B. Unofficial Comment Period

Proposed Reliability Standard PRC-012-2 was posted for an initial comment period from April 30, 2015 through May 20, 2015.[3]

C. First Posting - Comment Period and Initial Ballot

After the unofficial comment period, the first official draft of proposed Reliability Standard PRC-012-2 was posted for a 45-day public comment period from August 20, 2015, through October 5, 2015, with an initial ballot and non-binding poll held from September 25, 2015, through October 5, 2015. Several documents were posted with the first draft, including the Implementation Plan for Reliability Standard PRC-012-2, an associated Question and Answer Document, the Mapping Document for PRC-012-2, and the Violation Risk Factor and Violation Severity Level Justification Document. There were 60 responses, including comments from approximately 155 different people, and approximately 104 different companies representing nine of the ten Industry Segments.[4] The initial ballot reached quorum at 83.96% of the ballot pool and received votes of approval from 48.11% of the voters.

D. Second Posting – Comment Period and Additional Ballot

Proposed Reliability Standard PRC-012-2 was posted for a 45-day formal comment period from November 25, 2015, through January 8, 2018, with an additional parallel 10-day ballot and Non-binding Poll held from December 30, 2015, until January 8, 2016. Updated

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[3] NERC, *Survey Report*, Project 2010-05.3 (May 20, 2015) available at http://www.nerc.com/pa/Stand/Prjct201005_3RmdialActnSchmsPhase3ofPrtctnSystmsDL/2010-05.3_Phase_3_of%20Protection_Systems_RAS_Comments_Received_Report_05272015.pdf.

[4] NERC, *Consideration of Comments*, Project 2010-05.3 (Nov. 25, 2015), *available at* http://www.nerc.com/pa/Stand/Prjct201005_3RmdialActnSchmsPhase3ofPrtctnSystmsDL/2010-05_3_RAS_PRC-012-2_Consideration_of_Comments_11252015_final.pdf.

versions of the associated Implementation Plan, Question and Answer Document, Mapping Document, and the Violation Risk Factor and Violation Severity Level Justification Document were also posted with the second draft. There were 46 responses, including comments from approximately 150 different people from approximately 98 different companies representing nine of the ten Industry Segments.[5] The additional ballot reached quorum at 83.39% of the ballot pool and received votes of approval from 60.39% of the voters.

E. Third Posting – Comment Period and Additional Ballot

Proposed Reliability Standard PRC-012-2 was posted for a 45-day formal comment period from February 3, 2016, through March 18, 2016, with an additional parallel ballot held from March 9, 2016 through March 18, 2016. Updated versions of the associated Implementation Plan, the Question and Answer Document, Mapping Document, Violation Risk Factor and Violation Severity Level Justification Document, and Unofficial Comment Form were also posted with the third draft. There were 43 sets of responses, including comments from approximately 41 different people, approximately 39 companies representing eight of the Industry Segments.[6] The additional ballot reached quorum at 75.55% of the ballot pool and received votes of approval from 78.87% of the voters.

F. Final Ballot

Proposed Reliability Standard PRC-012-2 was posted for a 10-day final ballot period from April 20, 2016, through April 29, 2016. The proposed Reliability Standard received

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[5] NERC, *Consideration of Comments*, Project 2010-05.3 (Feb. 3, 2016), *available at* http://www.nerc.com/pa/Stand/Prjct201005_3RmdialActnSchmsPhase3ofPrtctnSystmsDL/2010-05_3_RAS_PRC-012-2_C_of_C_02032016.pdf.

[6] NERC, *Consideration of Comments*, Project 2010-05.3 (Apr. 20, 2016), *available at* http://www.nerc.com/pa/Stand/Prjct201005_3RmdialActnSchmsPhase3ofPrtctnSystmsDL/2010-05.3_RAS_Comments_Received_Report_03222016.pdf.

adequate votes for approval, reaching quorum at 81.19% of the ballot body and receiving votes of approval from 80.36% of the voters.[7]

G. Board of Trustees Adoption

Proposed Reliability Standard PRC-012-2 was adopted by the NERC Board of Trustees on May 5, 2016.

[7] NERC, *Standards Announcement*, Project 2010-05.3, available at http://www.nerc.com/pa/Stand/Prjct201005_3RmdialActnSchmsPhase3ofPrtctnSystmsDL/2010-05.3_PRC-012-2_FB_Results_Word_Announce_05032016.pdf.