

November 20, 2015

**VIA ELECTRONIC FILING**

David Erickson  
President and Chief Executive Officer  
Alberta Electric System Operator  
2500, 330 - 5 Avenue SW  
Calgary, Alberta  
T2P 0L4

RE: *North American Electric Reliability Corporation*

Dear Mr. Erickson:

The North American Electric Reliability Corporation (“NERC”) hereby submits Notice of Filing of the North American Electric Reliability Corporation of Proposed Reliability Standard PRC-005-6. NERC requests, to the extent necessary, a waiver of any applicable filing requirements with respect to this filing.

NERC understands the AESO may adopt the proposed reliability standards subject to Alberta legislation, principally as established in the *Transmission Regulation* (“the T Reg.”). Briefly, it is NERC’s understanding that the T Reg. requires the following with regard to the adoption in Alberta of a NERC Reliability Standard:

1. The AESO must consult with those market participants that it considers are likely to be directly affected.
2. The AESO must forward the proposed reliability standards to the Alberta Utilities Commission for review, along with the AESO’s recommendation that the Commission approve or reject them.
3. The Commission must follow the recommendation of the AESO that the Commission approve or reject the proposed reliability standards unless an interested person satisfies the Commission that the AESO’s recommendation is “technically deficient” or “not in the public interest.”

Further, NERC has been advised by the AESO that the AESO practice with respect to the adoption of a NERC Reliability Standard includes a review of the NERC Reliability Standard for applicability to Alberta legislation and electric industry practice. NERC has been advised that, while the objective is to adhere as closely as possible to the requirements of the NERC Reliability Standard, each NERC Reliability Standard

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approved in Alberta (called an “Alberta reliability standard”) generally varies from the similar and related NERC Reliability Standard.

NERC requests the AESO consider Proposed Reliability Standard PRC-005-6 for adoption in Alberta as an “Alberta reliability standard(s),” subject to the required procedures and legislation of Alberta.

Please contact the undersigned if you have any questions.

Respectfully submitted,

/s/ Holly A. Hawkins

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

Enclosure



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- Exhibit A** Proposed Reliability Standard PRC-005-6 and Alternative Proposed Standard PRC-005-5
- Exhibit A-1** Proposed Reliability Standard PRC-005-6 (Clean and Redline [PRC-005-6 to PRC-005-4] & [PRC-005-6 to PRC-005-5])
- Exhibit A-2** Alternative Proposed Reliability Standard PRC-005-5 (Clean and Redline [PRC-005-5 to PRC-005-4])
- Exhibit B** Implementation Plans
- Exhibit B-1a** Implementation Plan PRC-005-6
- Exhibit B-1b** Implementation Plan PRC-005-6 Rationale
- Exhibit B-2** Implementation Plan PRC-005-5 (alternative)
- Exhibit C** Reliability Standards Criteria
- Exhibit D** Draft White Paper, *Proposed Revisions to the Applicability of NERC Reliability Standards to Dispersed Generation Resources*
- Exhibit E** Supplementary Reference and FAQ
- Exhibit F** Consideration of Directives
- Exhibit G** Analysis of Violation Risk Factors and Violation Severity Levels
- Exhibit H** NERC Planning Committee System Analysis and Modeling Subcommittee (“SAMS”) and System Protection and Control Subcommittee (“SPCS”), *Considerations for Maintenance and Testing of Autoreclosing Schemes* (Nov. 2012)
- Exhibit I** Summary of Development and Complete Record of Development
- Exhibit J** Standard Drafting Team Rosters



implementation plan associated with proposed PRC-005-6 (**Exhibit B-1a**). As discussed below, the proposed PRC-005-6 implementation plan is intended to facilitate an orderly and efficient transition from currently-effective PRC-005-2(i) to proposed PRC-005-6 and represents a significant improvement over the previous implementation approach for these standards.

Proposed Reliability Standard PRC-005-6 reflects the dispersed generation applicability resources revisions approved by the NERC Board of Trustees in PRC-005-5 and is intended to supersede PRC-005-5, so that PRC-005-5 need not be independently approved. Should proposed PRC-005-6 or its associated implementation plan not be approved, however, PRC-005-5 (**Exhibit A-2**) and its associated implementation plan (**Exhibit B-2**) should be approved.<sup>3</sup> This will ensure that the PRC-005 standard continues to be applied appropriately to dispersed generation resources while NERC addresses any concerns regarding proposed PRC-005-6.

This filing presents the technical basis and purpose of the proposed Reliability Standard, a demonstration that the proposed Reliability Standard meets the Reliability Standards criteria (**Exhibit C**), and a summary of the standard development history (**Exhibit I**).

## **I. EXECUTIVE SUMMARY**

The PRC-005 Reliability Standard helps ensure that entities have a program for the maintenance of their applicable Protection Systems, Automatic Reclosing, and Sudden Pressure Relaying so that they are kept in working order. The standard has been revised several times since its initial submission on April 4, 2006, to incorporate interpretations, clarify applicability, and respond to FERC directives. Following a restructuring of the standard in PRC-005-2, a

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<sup>3</sup> To allow for an orderly transition from PRC-005-2(i) to PRC-005-6 in the United States, NERC has filed with FERC a Motion to Delay Implementation of the FERC-approved, but not yet effective versions of the PRC-005 Reliability Standards in FERC Docket Nos. RM14-8-000 (PRC-005-3), RD15-3-000 (PRC-005-3(i)), and RM15-9-000 (PRC-005-4) until after FERC issues an order or rule regarding proposed PRC-005-6 and the proposed implementation plan.

number of versions have been developed, including currently-effective PRC-005-2(i), the not yet effective versions PRC-005-3, PRC-005-3(i), and PRC-005-4, and pending versions PRC-005-2(ii) and PRC-005-3(ii).

In this filing, NERC proposes additional modifications that improve upon PRC-005-4, in two respects. First, proposed Reliability Standard PRC-005-6 revises the standard to include supervisory devices and functions associated with applicable autoreclosing relay schemes. Reliability is improved by extending the protections of a strong Protection System Maintenance Program to these devices consistent with FERC Order No. 803.<sup>4</sup>

Second, proposed Reliability Standard PRC-005-6 includes a revision to the PRC-005 standard that was included in prior versions of the standard but, as explained further below, was not carried forward to PRC-005-4 due to the timing of the development of that version. Specifically, proposed Reliability Standard PRC-005-6 includes revisions addressing the applicability of PRC-005 to owners of dispersed generation resources.<sup>5</sup> As explained in greater detail below, these revisions reflect the determination of the standard drafting team for Project 2014-01 Standards Applicability for Dispersed Generation Resources that while the components of dispersed power generation, such as individual wind or solar units, often do not pose a significant risk to the reliability of the Bulk-Power System when evaluated individually, reliability could be improved by ensuring the equipment utilized to aggregate these individual

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<sup>4</sup> Order No. 803 at P 31.

<sup>5</sup> See Letter Order, *N. Am. Elec. Reliability Corp.*, 151 FERC ¶ 61,186 (2015) (approving Reliability Standards PRC-005-2(i), PRC-005-3(i), and certain other Reliability Standards containing revisions to address applicability to owners of dispersed generation resources.). As discussed more fully herein, at the same time the Project 2014-01 Standards Applicability for Dispersed Generation Resources standard drafting team was developing PRC-005-2(i) and PRC-005-3(i) to clarify the applicability of the PRC-005 standard to dispersed generation resources, a separate standard drafting team was developing PRC-005-4 to address the inclusion of Sudden Pressure Relaying. After both sets of revisions were approved by their respective ballot pools and the NERC Board of Trustees, the Project 2014-01 standard drafting team initiated revisions to PRC-005-4 to ensure that the PRC-005 standard would be applied consistently to dispersed generation resources going forward.

units to a common point of interconnection with the Bulk-Power System is operated and maintained as required by the PRC-005 Reliability Standard.<sup>6</sup>

Additionally, as there are now multiple versions of the PRC-005 Reliability Standard pending enforcement or approval, the implementation plan for proposed PRC-005-6 is designed to assist registered entities and the ERO Enterprise in their transition efforts by simplifying and streamlining the implementation approach for all of the newly-applicable systems introduced in the versions of PRC-005 not yet in effect. As discussed below, the proposed implementation plan retains the reasonable, phased-in implementation approach of past plans, which require registered entities to gradually ensure compliance of a percentage of their devices until they reach 100% compliance. However, NERC proposes to replace the patchwork implementation of requirements for the systems introduced by each successive PRC-005 version with an implementation plan that aligns compliance dates for all newly applicable systems.

Aligning the dates by which registered entities must be compliant for all newly applicable systems necessitates a slight delay from the staggered timeframe contemplated by previous PRC-005 implementation plans. However, the proposed approach advances reliability by: (1) allowing entities sufficient time to develop comprehensive Protection System Maintenance Programs to address all new applicable systems, thereby decreasing the number of opportunities for misidentified and missed devices across successive program revisions and across multiple compliance schedules; (2) promoting the efficient use of entity and ERO Enterprise resources by eliminating the need to create and audit multiple, successive revisions to entity Protection System Maintenance Programs; and (3) providing NERC additional time to provide additional

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<sup>6</sup> As described below, these revisions to PRC-005-4 were approved by the NERC Board of Trustees as PRC-005-5. Proposed Reliability Standard PRC-005-6 incorporates these revisions without further modification.

education and outreach to industry regarding the implementation of this important Reliability Standard.

## **II. NOTICES AND COMMUNICATIONS**

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

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## **III. BACKGROUND**

### **A. NERC Reliability Standards Development Procedure**

The proposed Reliability Standard 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) of its Rules of Procedure and the NERC Standard Processes Manual.<sup>7</sup>

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 the criteria for approving Reliability Standards. The development process is open

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<sup>7</sup> 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](http://www.nerc.com/comm/SC/Documents/Appendix_3A_StandardsProcessesManual.pdf).

to any person or entity with a legitimate interest in the reliability of the Bulk-Power System. NERC considers the comments of all stakeholders, and a vote of stakeholders and the NERC Board of Trustees is required to approve a Reliability Standard before the Reliability Standard is submitted to the applicable governmental authorities for approval.

## **B. History of the PRC-005 Reliability Standard**

The PRC-005 Reliability Standard has been revised several times since its initial submission on April 4, 2006, to incorporate interpretations, clarify applicability, and respond to FERC directives. NERC provides a brief history of the PRC-005 standard below.

### **1. PRC-005-1**

NERC submitted on April 4, 2006 initial versions of four protection system maintenance and load-shedding-related maintenance standards: Reliability Standards PRC-005-1, PRC-008-0, PRC-011-0, and PRC-017-0. Interpretation PRC-005-1a was submitted on June 8, 2011, and PRC-005-1a was later updated to PRC-005-1b. On August 27, 2012, NERC submitted PRC-005-1.1b, which clarified the standard's applicability to protection systems associated with generator interconnection facilities.

### **2. PRC-005-2**

NERC submitted PRC-005-2 on March 11, 2013. PRC-005-2 combined four standards that addressed maintenance and testing of protection and control systems (PRC-005-1b, PRC-008-0, PRC-011-0, and PRC-017-0) into one comprehensive Reliability Standard. Consistent with certain directives from FERC Order No. 693, PRC-005-2 included specific minimum maintenance activities and maximum time intervals for testing Protection System components. PRC-005-2 also established criteria for developing and maintaining a performance-based maintenance program.

The PRC-005-2 implementation plan required entities to develop a PRC-005-2-compliant Protection System Maintenance Program for its applicable Protection Systems by April 1, 2015. However, the PRC-005-2 implementation plan established a phased compliance schedule for allowing entities to transition their maintenance activities for Protection System components to PRC-005-2 over time.

3. PRC-005-3

NERC submitted PRC-005-3 on February 21, 2014. PRC-005-3 revised PRC-005-2 to require applicable entities to test and maintain certain autoreclosing relays as part of their Protection System Maintenance Programs.<sup>8</sup> In Order No. 803, FERC also directed further revisions to the PRC-005 Reliability Standard which are, in part, the subject of this filing.

NERC carried forward the phased implementation approach of PRC-005-2 in the PRC-005-3 implementation plan, adding new provisions to address the addition of Automatic Reclosing Components. Under this plan, applicable entities continue to calculate their compliance dates for Protection System Components based on the regulatory approval date of PRC-005-2, but calculate their compliance dates for Automatic Reclosing Components based on the regulatory approval date of PRC-005-3.

4. PRC-005-2(i), PRC-005-3(i)

On February 25, 2015, NERC submitted PRC-005-2(i) and PRC-005-3(i), which revised PRC-005-2 and PRC-005-3 to address applicability to dispersed power producing resources. Under the PRC-005-2(i) implementation plan, PRC-005-2(i) immediately became mandatory and enforceable and is the currently-effective version of the PRC-005 standard. Under its

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<sup>8</sup> In Order No. 758, FERC directed NERC to “include maintenance and testing of reclosing relays that can affect the reliable operation of the Bulk-Power System” within its PRC-005 standard revision efforts. Order No. 758 at P 27.

implementation plan, PRC-005-3(i) is to become effective the first day following the effective date of PRC-005-3.

The implementation plans for PRC-005-2(i) and PRC-005-3(i) incorporated by reference the phased implementation plans of PRC-005-2 and PRC-005-3 respectively, which are described above.

5. PRC-005-2(ii) and PRC-005-3(ii)

On February 25, 2015, NERC submitted proposed PRC-005-2(ii) and PRC-005-3(ii). The proposed standards, which were developed as part of a broader effort to develop a clearer, more detailed definition of “Remedial Action Scheme,” replace the term “Special Protection System” with “Remedial Action Scheme” where it appears in PRC-005.

The implementation of these proposed versions is addressed in the proposed Remedial Action Scheme implementation plan.

6. PRC-005-4

NERC submitted PRC-005-4 on January 22, 2015. PRC-005-4 revised PRC-005-3 to require applicable entities to maintain certain sudden pressure relays that can affect the reliable operation of the Bulk-Power System as part of their Protection System Maintenance Programs.

While PRC-005-4 was in development, a separate standard drafting team was developing revisions to versions 2 and 3 of the standard to address applicability to dispersed power producing resources (PRC-005-2(i) and PRC-005-3(i)). However, due to the timing of the various ballot and comment periods and approvals, PRC-005-4 did not reflect the applicability revisions that were ultimately reflected in PRC-005-2(i) and PRC-005-3(i).<sup>9</sup> Both PRC-005-4

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<sup>9</sup> PRC-005-4 was first posted for comment and ballot from April 17, 2014 – June 3, 2014, and again from July 30, 2014 – September 12, 2014, with the final ballot in October 2014. PRC-005-2(i) and PRC-005-3(i) were first posted for comment and ballot from June 12, 2014 through July 29, 2014, with the final ballot from August 27, 2014 – September 5, 2014.

and PRC-005-2(i)/-3(i) were adopted by the NERC Board of Trustees on November 13, 2014 and filed with the applicable governmental authorities soon after. Development then began on PRC-005-5, discussed below, to revise PRC-005-4 to incorporate the dispersed generation resources applicability revisions.

In the PRC-005-4 implementation plan, NERC carried forward the phased implementation approach of previous PRC-005 plans. Pursuant to the PRC-005-4 implementation plan, PRC-005-4 will become effective on January 1, 2016. Entities continue to calculate their compliance dates for Protection System Components and Automatic Reclosing Components based on the regulatory approval dates of PRC-005-2 and PRC-005-3 respectively, while compliance dates for Sudden Pressure Relaying Components are based on the regulatory approval date of PRC-005-4.

#### 7. PRC-005-5

As discussed above, PRC-005-5 was developed to carry forward the dispersed generation resources applicability revisions reflected in PRC-005-2(i) and PRC-005-3(i), but not reflected in PRC-005-4. All three versions were developed through Project 2014-01 Standards Applicability for Dispersed Generation Resources. A brief history of this project and a brief summary of the design and operational characteristics of dispersed generation resources are provided below for reference. For additional information regarding this project and revisions developed to other Reliability Standards as part of this project, please refer to FERC Docket No. RD15-3-000.

##### *a) History of Project 2014-01*

Project 2014-01 Standards Applicability for Dispersed Generation Resources was initiated in response to industry request and designed to ensure that the Generator Owners and Generator Operators of dispersed generation resources are appropriately assigned responsibility for performance in NERC Reliability Standard requirements that impact the reliability of the

Bulk-Power System, given the unique operating characteristics of these resources. The goal of Project 2014-01 was to review and revise the applicability of all of the Generator Owner- and Generator Operator-related Reliability Standards and ensure that only those dispersed generation resources that could affect the reliability of the Bulk-Power System are subject to applicable Reliability Standards.

To ensure continuity, Project 2014-01 initiated applicability revisions in three versions of the PRC-005 Reliability Standard. PRC-005-2(i) and PRC-005-3(i) revised the applicability of PRC-005-2 and PRC-005-3 respectively. The Project 2014-01 standard drafting team also developed PRC-005-5 to ensure that the PRC-005 standard would continue to be applied appropriately to dispersed generation resources. PRC-005-5 revised the applicability of PRC-005-4, which was developed concurrently with PRC-005-2(i) and PRC-005-3(i) in a separate project. The applicability revisions made in PRC-005-5 were carried through without modification in proposed Reliability Standard PRC-005-6.

*b) Design and Operational Characteristics of Dispersed Power Producing Resources*

As discussed further in FERC Docket No. RD15-3-000 and the DGR White Paper,<sup>10</sup> the Project 2014-01 standard drafting team concluded that the design and operational characteristics of dispersed power producing resources are different than traditional generation. Dispersed power producing resources are typically comprised of many individual generating units and in most cases, the units are similar in design and produced by the same manufacturer. The equipment is often geographically dispersed and the generating capacity of individual generating modules can be as small as a few hundred watts to as large as several megawatts. Dispersed

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<sup>10</sup> Draft White Paper, *Proposed Revisions to the Applicability of NERC Reliability Standards to Dispersed Generation Resources* (“DGR White Paper”), appended hereto as **Exhibit D**.

generation resources interconnected to the transmission system typically have a control system that controls voltage and power output of the aggregate facility. The control system is capable of recognizing the capability of each individual unit or inverter included in the facility, to appropriately distribute the volume of generation contribution required of the facility across the available units or inverters and to recognize and account for the variation of uncontrollable factors that affect the individual units, such as wind speed and solar irradiance levels. For efficiency, the facilities are designed to provide the system requirements at the point of interconnection to the transmission system and not at the individual unit level.<sup>11</sup>

Based on a consideration of the design and operating characteristics of dispersed generation resources, the Project 2014-01 standard drafting team determined that the unavailability or failure of any one individual generating resource may have a negligible impact on the aggregated capability of the facility, and individual resources have limited effect on the reliability of the Bulk-Power System. However, as the aggregated capability of the facility may in some cases contribute to the reliability of the Bulk-Power System, there can be a reliability benefit from ensuring that the equipment utilized to aggregate the individual units to a common point of interconnection with the transmission system is operated and maintained as required by the PRC-005 Reliability Standard.<sup>12</sup>

**C. Project 2007-17.4 PRC-005 FERC Order No. 803 Directive (PRC-005-6)**

As noted above, in Order No. 803, FERC approved Reliability Standard PRC-005-3, which brought certain automatic reclosing devices within the scope of the PRC-005 standard. Automatic reclosing equipment is equipment that provides for automatic reclosing of a switching

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<sup>11</sup> For this discussion, *see id.* at Section 3.2.

<sup>12</sup> *Id.* at Sections 3.2.1, 3.2.3 and 4.10.7.

device as desired after it has opened under abnormal conditions. In the PRC-005-3 standard, Automatic Reclosing is defined as having the following two Components: reclosing relay and control circuitry associated with the reclosing relay. In Order No. 803, FERC directed NERC to develop modifications to the PRC-005-3 Reliability Standard “to include supervisory devices associated with autoreclosing relay schemes to which the Reliability Standard applies.”<sup>13</sup> Project 2007-17.4 PRC-005 FERC Order No. 803 Directive was initiated in response to this directive.

As explained by FERC in its Notice of Proposed Rulemaking proposing to approve PRC-005-3, supervisory devices, such as synchronism check or voltage relays, “essentially ‘supervise’ the actions of an autoreclosing scheme. That is, they allow reclosing for desirable conditions or block autoreclosing for undesirable conditions.”<sup>14</sup> FERC expressed concern that the PRC-005-3 standard did not include supervisory devices that may be critical to the operation of a reclosing scheme.<sup>15</sup> Therefore, FERC proposed to direct that NERC develop modifications to PRC-005-3 to address the appropriateness of including supervisory relays under the maintenance and testing provisions of the PRC-005 Reliability Standard.

In its comments on the PRC-005-3 NOPR, NERC acknowledged the issues cited by FERC and suggested modifying PRC-005-3 to include maintenance of supervision functions for which a failure can result in autoreclosing into a fault and potentially cause generating unit or plant instability. NERC stated that it would support the addition of voltage supervision,

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<sup>13</sup> Order No. 803 at P 31.

<sup>14</sup> *Protection System Maintenance Reliability Standard*, Notice of Proposed Rulemaking, 148 FERC ¶ 61,041 at P 28 (2014) (“PRC-005-3 NOPR”) at 30.

<sup>15</sup> *Id.* at P 30 (citing Order No. 758 at P 24). In Order No. 758, FERC stated, “a misoperating or miscoordinated reclosing relay may result in the reclosure of a Bulk-Power System element back onto a fault or that a misoperating or miscoordinated reclosing relay may fail to operate after a fault has been cleared, thus failing to restore the element to service.” Misoperated or miscoordinated relays, FERC explained, may result in damage to the Bulk-Power System, such as excessive shaft torques and winding stresses and exposure of circuit breakers to systems conditions less than optimal for correct operation.

supervisory inputs associated with selective autoreclosing (where used), and synchronism check supervision in the PRC-005 Reliability Standard.<sup>16</sup>

In Order No. 803, FERC adopted its NOPR proposal and directed NERC to “develop modifications to PRC-005-3 to include supervisory devices associated with autoreclosing relay schemes to which the Reliability Standard applies.”<sup>17</sup> FERC stated that it found “acceptable” NERC’s proposal to limit the scope of supervisory devices to those providing voltage supervision, supervisory inputs associated with selective autoreclosing, and sync-check relays that are part of a reclosing scheme covered by PRC-005-3.<sup>18</sup>

The revisions developed in response to this Order No 803 directive are discussed in the following section.

#### **IV. JUSTIFICATION**

As discussed in **Exhibit C** and below, proposed Reliability Standard PRC-005-6 satisfies the Reliability Standards criteria, and is just, reasonable, not unduly discriminatory or preferential, and in the public interest. The purpose of the proposed Reliability Standard is to document and implement programs for the maintenance of all Protection Systems, Automatic Reclosing, and Sudden Pressure Relaying affecting the reliability of the Bulk Electric System (or “BES”) so that they are kept in working order. The proposed Reliability Standard enhances

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<sup>16</sup> *Comments of the North American Electric Reliability Corporation in Response to Notice of Proposed Rulemaking*, Dkt. No. RM14-8-000 (Sep. 29, 2014) at 4. In its comments, NERC explained that it reviewed the report of the NERC Planning Committee System Analysis and Modeling Subcommittee (“SAMS”) and System Protection and Control Subcommittee (“SPCS”) titled *Considerations for Maintenance and Testing of Autoreclosing Schemes* (“SAMS/SPCS Report”) and consulted with its internal subject matter experts “on which supervisory devices should be included within NERC’s PRC-005 standard to meet the Commission’s concerns raised in the NOPR and ensure entities properly maintain the devices in order to minimize the risk of failure.” *See id.* at n. 4. The SAMS and SPCS jointly performed a technical study to determine which reclosing relays should be addressed within PRC-005 and provided advice to the PRC-005-3 standard drafting team regarding appropriate maintenance intervals and activities for those relays. This report, which was also included as Exhibit D to NERC’s February 14, 2014 petition for approval of PRC-005-3, is appended hereto as **Exhibit H** for ease of reference.

<sup>17</sup> Order No. 803 at P 31.

<sup>18</sup> *Id.*

reliability and improves upon prior versions of the standard by: (i) extending the coverage of an entity's Protection System Maintenance Program to include supervisory devices and functions associated with applicable Automatic Reclosing, consistent with FERC Order No. 803; and (ii) ensuring that owners and operators of dispersed generation resources are appropriately subject to the requirements of the PRC-005 standard, consistent with prior revisions to the PRC-005 standard. Proposed Reliability Standard PRC-005-6 adds detailed information regarding minimum maintenance activities and maximum maintenance intervals for supervisory devices or functions associated with Automatic Reclosing, extending the benefits of a strong maintenance program to those Components.

To assist responsible entities in understanding the addition of supervisory devices and functions to the scope of the standard, the Project 2007-17.4 standard drafting team revised the Supplementary Reference and FAQ document (**Exhibit E**) developed concurrently with proposed PRC-005-6. This revised document will be posted with the proposed PRC-005-6 Reliability Standard following approval.

Provided below is a summary of the proposed revisions, including their technical basis and a discussion of prior proceedings, and a discussion of the proposed implementation plan.

**A. Revisions to Address the Inclusion of Supervisory Devices**

To address FERC's Order No. 803 directive, the definition of Automatic Reclosing in Section 6, Definitions Used in this Standard, has been revised to add supervisory relays or functions, the associated voltage sensing devices, and the associated control circuitry. In addition, tables have been revised, and one new table added, to address maintenance activities and testing for Automatic Reclosing with supervisory relays. Other than reflecting the addition of this new table, no substantive revisions are proposed to the Reliability Standard Requirements.

1. Revised Definitions for Use in the Proposed Standard

The definition of Automatic Reclosing, which is used only within the PRC-005 Reliability Standard and is not proposed for addition to the *Glossary of Terms Used in NERC Reliability Standards*, is revised as follows to address FERC’s Order No. 803 directive:

**6. Definitions Used in this Standard:**

**Automatic Reclosing** – Includes the following Components<sup>[19]</sup>

- Reclosing relay
- Supervisory relay(s) or function(s) – relay(s) or function(s) that perform voltage and/or sync check functions that enable or disable operation of the reclosing relay
- Voltage sensing devices associated with the supervisory relay(s) or function(s)
- Control circuitry associated with the reclosing relay or supervisory relay(s) or function(s)

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As there are now four specific elements of Automatic Reclosing instead of the previous two, the standard-only definition of Component Type is revised accordingly. In addition, the standard-only definition of Countable Event has been updated to refer to a newly-added table.

The analysis in the SAMS/SPCS Report identified that the failure mode of concern is associated with premature autoreclosing into a fault, which creates the potential for generating unit or plant instability. This may occur due to a timing failure in the autoreclosing relay or when a supervision failure results in autoreclosing into a dead-line with a fault when this closing is not intended. Autoreclosing into a fault when dead-line closing is not intended could result from

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<sup>19</sup> The definition of Component as used in the proposed PRC-005-5 and PRC-005-6 standards remains unchanged from the PRC-005-4 Reliability Standard. Component is defined in the PRC-005 standard as follows: “Any individual discrete piece of equipment included in a Protection System, Automatic Reclosing, or Sudden Pressure Relaying.”

failure of voltage supervision or, when used, failure of a selective autoreclosing input, such as a protective relay output that blocks autoreclosing following a three-phase fault.<sup>20</sup> Therefore, to address this concern, NERC proposes to add voltage supervision and where used, supervisory inputs associated with selective reclosing, to the list of Automatic Reclosing Components. This will bring these devices within the scope of the PRC-005 Reliability Standard in response to FERC's directive.

NERC also proposes to add synchronism check supervision to the list of Automatic Reclosing Components. A synchronizing or synchronism ("sync") check relay is a synchronizing device that produces an output that supervises closure of a circuit breaker between two circuits whose voltages are within prescribed limits of magnitude and within the prescribed phase angle for the prescribed time. It may or may not include voltage or speed control. A sync-check relay permits the paralleling of two circuits that are within prescribed (usually wider) limits of voltage magnitude and phase angle for the prescribed time.<sup>21</sup> Including such devices within the PRC-005 standard provides a reliability benefit. For example, a sync-check device may prevent reclosing of a line into a fault that could cause damage to generator equipment. Maintenance of these devices helps to ensure that they operate correctly in the autoreclosing scheme.

## 2. Revisions to Tables

The following PRC-005 Tables are revised to include maintenance activities and intervals for supervisory relays:

- Table 4-1, Maintenance Activities and Intervals for Automatic Reclosing Components Component Type – Reclosing and Supervisory Relay;

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<sup>20</sup> See SAMS/SPCS Report (Exhibit H) at 5-7.

<sup>21</sup> See Ex. E (Supplementary Reference and FAQ – October 2015) at 8.

- Table 4-2(a), Maintenance Activities and Intervals for Automatic Reclosing Components Component Type – Control Circuitry Associated with Reclosing and Supervisory Relays that are NOT an Integral Part of an RAS; and
- Table 4-2(b), Maintenance Activities and Intervals for Automatic Reclosing Components, Component Type – Control Circuitry Associated with Reclosing and Supervisory Relays that ARE an Integral Part of an RAS.

In addition, proposed PRC-005-6 adds a new Table 4-3, Maintenance Activities and Intervals for Automatic Reclosing Components, Component Type – Voltage Sensing Devices Associated with Supervisory Relays. Table references have been updated throughout the standard to reflect the addition of Table 4-3.

The Project 2007-17.4 standard drafting team determined that it was appropriate to assign the same maintenance intervals for the supervisory relays or functions as their associated automatic reclosing relay. The maintenance activity provisions in these tables for supervisory relays or functions are similar in nature to those for other protective functions already existing in the PRC-005 standard.

In addition, a note is added to each of these tables to provide that where Components of Automatic Reclosing are common to Components listed in another specific PRC-005 table, the Components only need to be tested once during a distinct maintenance interval. This note was added to clarify that entities do not need to perform multiple tests on supervisory relays associated with more than one Component.

### 3. Use of Abbreviation “PSMP”

For readability, PRC-005-6 abbreviates Protection System Maintenance Program as “PSMP” following its first mention in the standard.

#### **B. Dispersed Generation Resources Applicability Revisions (Section 4.2)**

Proposed Reliability Standard PRC-005-6 carries forward certain revisions to Section 4, Applicability that were previously proposed in PRC-005-2(i) and PRC-005-3(i) and approved by

the NERC Board of Trustees in PRC-005-5. These applicability revisions, which were developed through Project 2014-01 Standards Applicability for Dispersed Generation Resources based on the findings of the DGR White Paper, are intended to clarify and provide for consistent application of the standard requirements to Bulk Electric System generator Facilities included in the Bulk Electric System through Inclusion I4 – Dispersed Power Producing Resources.

To accomplish this purpose, PRC-005-4 was modified as follows. Section 4.2.5 was separated, Section 4.2.6 was added, and PRC-005-4 Section 4.2.6 Automatic Reclosing was renumbered to Section 4.2.7, with its subsections renumbered accordingly.

Sections 4.2.5, 4.2.6, and 4.2.7 of PRC-005-4 are revised as follows:

**4. Applicability:**

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**4.2. Facilities:**

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**4.2.5** Protection Systems and Sudden Pressure Relaying for generator Facilities that are part of the BES, except for generators identified through Inclusion I4 of the BES definition, including:<sup>[22]</sup>

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**4.2.5.1** Protection Systems that act to trip the generator either directly or via lockout or auxiliary tripping relays.

**4.2.5.2** Protection Systems and Sudden Pressure Relaying for generator step-up transformers for generators that are part of the BES.

~~**4.2.5.3.** Protection Systems and Sudden Pressure Relaying for transformers connecting aggregated generation, where the aggregated generation is part of the BES (e.g., transformers connecting facilities such as wind farms to the BES).~~

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<sup>22</sup> In PRC-005-2(i) and PRC-005-3(i), this section reads, “Protection Systems for the following BES generator Facilities for generators not identified through Inclusion I4 of the BES definition”. Based on the comments received, the Project 2014-01 standard drafting team made minor clarification revisions to this section when drafting PRC-005-5. The changes do not alter the intent or operation this section.

**4.2.5.4. 4.2.5.3** Protection Systems and Sudden Pressure Relaying for station service or excitation transformers connected to the generator bus of generators which are part of the BES, that act to trip the generator either directly or via lockout or tripping auxiliary relays.

**4.2.6** Protection Systems and Sudden Pressure Relaying for the following BES generator Facilities for dispersed power producing resources identified through Inclusion I4 of the BES definition:

**4.2.6.1** Protection Systems and Sudden Pressure Relaying for Facilities used in aggregating dispersed BES generation from the point where those resources aggregate to greater than 75 MVA to a common point of connection at 100kV or above.

**4.2.6 4.2.7** Automatic Reclosing, including:

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As described further in FERC Docket No. RD15-3-000 and the DGR White Paper,<sup>23</sup> the Project 2014-01 standard drafting team concluded that maintenance activities on each individual generating unit at a dispersed generation Facility would not provide any additional reliability benefits to the Bulk-Power System, but maintenance activities on Facilities where generation aggregates to 75 MVA or more would. The proposed revisions are consistent with the revised Bulk Electric System definition and prior revisions made to the PRC-005 standard as reflected in PRC-005-2(i) and PRC-005-3(i).

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<sup>23</sup> See *Petition of the North American Electric Reliability Corporation for Approval of Proposed Reliability Standards PRC-004-2.1(i)a, PRC-004-4, PRC-005-2(i), PRC-005-3(i), and VAR-002-4*, Docket No. RD15-3-000 (Feb. 6, 2015) at p. 18-22; see also DGR White Paper at P 4.10.7.

## **C. Proposed Implementation Plan**

### **1. Proposed PRC-005-6 Implementation Plan**

The proposed PRC-005-6 implementation plan improves upon previous PRC-005 implementation plans by aligning the dates by which entities must be compliant for all newly-applicable systems. Specifically, the compliance deadlines for the new systems and Components introduced in PRC-005-3, PRC-005-4, and PRC-005-6 would be measured from the regulatory approval date of PRC-005-6, instead of the regulatory approval date of the PRC-005 standard that first brought them in scope. As entities have already begun work to implement protections for Protection System Components under PRC-005-2 and currently-effective PRC-005-2(i), the proposed PRC-005-6 implementation plan would continue implementation for those devices in accordance with the schedule set forth in the PRC-005-2 implementation plan (which is incorporated by reference in the implementation plan for currently-effective PRC-005-2(i)).

Beginning with PRC-005-2, PRC-005 implementation plans have provided a phased implementation approach. Depending on the type of device and specific requirement, implementation is divided into phases, requiring registered entities to gradually ensure compliance of a percentage of their devices until they reach 100% compliance. In the PRC-005-3 and PRC-005-4 implementation plans, NERC carried forward this phased approach. However, recognizing that entities would need a reasonable period of time to incorporate Automatic Reclosing and Sudden Pressure Relaying into their Protection System Maintenance Programs, these implementation plans also provided a phased approach for compliance based on the date of regulatory approval for the standard version that brought these systems in scope. To demonstrate, in the implementation plan for PRC-005-4, entities would be required to calculate their compliance dates for their Protection System, Automatic Reclosing, and Sudden Pressure

Relaying Components from the regulatory approval dates of PRC-005-2, PRC-005-3, and PRC-005-4, respectively.

NERC now proposes to include additional in-scope Components in proposed Reliability Standard PRC-005-6. If the previous implementation approach was continued for PRC-005-6, registered entities would be required to perform three consecutive updates to their Protection System Maintenance Programs to address applicable systems and Components added by PRC-005-3, PRC-005-4, and proposed PRC-005-6 within a short time frame; depending on dates of approval, this could potentially be as short as 12-18 months. Updating Protection System Maintenance Programs is expected to be a time-consuming task for many entities. This short period of time for review and identification of all assets subject to the various PRC-005 versions could lead to errors, omissions, and misidentification of devices. In addition, this approach would require entities to manage multiple PRC-005 compliance schedules for a number of years, increasing the potential for confusion and missed devices which could in turn lead to a decrease in the reliability of the affected devices.

The Project 2007-17.4 standard drafting team determined that a more streamlined implementation approach was needed to govern implementation of proposed PRC-005-6. As proposed PRC-005-6 reflects all revisions in prior versions of PRC-005 (PRC-005-2(ii),<sup>24</sup> PRC-005-3, PRC-005-3(i), PRC-005-3(ii), PRC-005-4, and PRC-005-5), NERC proposes to transition directly from currently-effective PRC-005-2(i) to proposed PRC-005-6.

To allow entities sufficient time to address all new applicable systems in their Protection System Maintenance Program revisions, including the supervisory devices introduced in

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<sup>24</sup> Specifically, proposed Reliability Standard PRC-005-6 – like approved Reliability Standard PRC-005-4 – uses the defined term “Remedial Action Scheme” instead of the defined term “Special Protection System” that was used in previous PRC-005 standard versions.

proposed PRC-005-6, this approach necessitates a slight delay in implementing requirements for applicable systems that were introduced in previous PRC-005 versions.<sup>25</sup> As a corresponding change, the revised definition of Protection System Maintenance Program (PSMP), which in its most recent form was approved for inclusion in the Glossary in Docket No. RM15-9-000 (PRC-005-4),<sup>26</sup> would become effective when PRC-005-6 becomes effective.

This proposed implementation approach would provide several important benefits that would justify any delay necessary for its implementation. First, by aligning compliance dates for all newly-applicable systems, NERC's proposed PRC-005-6 implementation plan would provide for the development of comprehensive Protection System Maintenance Programs informed by the whole of NERC's PRC-005 efforts to date. These comprehensive programs would be less likely to contain errors, omissions, and misidentified devices, thereby promoting reliability. Second, this approach would streamline the PRC-005 compliance date schedules for all new

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<sup>25</sup> In Order No. 803 approving PRC-005-3, FERC directed NERC "to obtain, maintain, and make available to the Commission upon request, one year following the effective date of the standard and on an annual basis thereafter, data sufficient to analyze the effectiveness of PRC-005-3 . . . ." Under the proposed implementation plan for PRC-005-6, implementation of requirements for Automatic Reclosing would be governed according to a new, consolidated implementation timeline. Therefore, NERC requested in its filing to FERC that, if FERC approves the proposed PRC-005-6 implementation plan, FERC also clarify that NERC's Order No. 803 data collection obligations would begin one year following the effective date of PRC-005-6.

<sup>26</sup> The approved revised definition of Protection System Maintenance Program revises the currently-effective definition to provide for Automatic Reclosing and Sudden Pressure Relaying Components. The definition is as follows:

An ongoing program by which Protection System, Automatic Reclosing, and Sudden Pressure Relaying Components are kept in working order and proper operation of malfunctioning Components is restored. A maintenance program for a specific Component includes one or more of the following activities:

- Verify — Determine that the Component is functioning correctly.
- Monitor — Observe the routine in-service operation of the Component.
- Test — Apply signals to a Component to observe functional performance or output behavior, or to diagnose problems.
- Inspect — Examine for signs of Component failure, reduced performance or degradation.
- Calibrate — Adjust the operating threshold or measurement accuracy of a measuring element to meet the intended performance requirement.

systems, decreasing the potential for confusion and missed device testing. Third, by eliminating the need to create and audit multiple, successive revisions to entity Protection System Maintenance Programs, this approach would promote the efficient use of both registered entity and ERO Enterprise resources. Lastly, this approach would allow NERC additional time to conduct outreach and provide training to registered entities so that they are well aware and prepared to meet their obligations under this important Reliability Standard, further promoting reliability.

The proposed PRC-005-6 implementation plan represents a reasonable approach that balances the urgency in the need to implement these important protections while recognizing the challenges that multiple, successive program revisions and compliance date schedules may pose to registered entities.

## 2. Retirement of Previous PRC-005 Standards

As NERC proposes transition directly to PRC-005-6 from currently-effective PRC-005-2(i), NERC proposes to retire all intermediate PRC-005 standard versions. This includes currently-effective PRC-005-2(i), the not yet effective versions PRC-005-3, PRC-005-3(i), and PRC-005-4, pending versions PRC-005-2(ii) and PRC-005-3(ii), and PRC-005-5, which is addressed in this filing. The implementation plan continues to reflect that the retirement of the legacy Reliability Standards PRC-005-1.1b,<sup>27</sup> PRC-008-0, PRC-011-0, and PRC-017-0 will be based off the regulatory approval date of PRC-005-2.

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<sup>27</sup> PRC-005-1.1b, which was submitted on August 27, 2012 and became mandatory and enforceable on November 25, 2013, retired the prior version PRC-005-1b referenced in previous PRC-005 implementation plans. Therefore, the proposed PRC-005-6 implementation refers to PRC-005-1.1b.

#### **D. Alternate Proposal to Approve PRC-005-5**

As noted above, PRC-005-5 was adopted by the NERC Board of Trustees to carry forward the dispersed generation resources applicability provisions from PRC-005-2(i) and PRC-005-3(i) with only minor clarification revisions. These revisions, which are incorporated without further modifications in proposed PRC-005-6, are described in Section IV.B above.

Should proposed PRC-005-6 not be approved for reasons specific to that version of the standard, such as the inclusion of supervisory devices or the proposed implementation plan, then PRC-005-5 (**Exhibit A-2**) and the PRC-005-5 implementation plan (**Exhibit B-2**) should be approved.<sup>28</sup> The PRC-005-5 implementation plan provides that PRC-005-5 shall become effective the later of the first day following the effective date of PRC-005-4, the first day following approval by an applicable governmental authority or as otherwise provided for in a jurisdiction where approval by an applicable governmental authority is required for a standard to go into effect. Where approval by an applicable governmental authority is not required, the standard shall become effective on the later of the first day following the Effective Date of PRC-005-4 or the first day of the first calendar quarter after the date the standard is adopted by the Board or as otherwise provided for in that jurisdiction. Approving PRC-005-5 would ensure that the PRC-005 standard would continue to be applied consistently and appropriately to dispersed generation resources while NERC is addressing any issues specific to PRC-005-6.

#### **V. ENFORCEABILITY OF THE PROPOSED RELIABILITY STANDARD**

The proposed Reliability Standards contain Violation Risk Factors (“VRFs”) and Violation Severity Levels (“VSLs”). The VSLs provide guidance on the way that NERC will

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<sup>28</sup> In its filing to FERC, NERC has asked FERC to approve PRC-005-5 and the PRC-005-5 implementation plan should FERC decline to approve PRC-005-6.

enforce the Requirements of the proposed Reliability Standard. The VRFs are one of several elements used to determine an appropriate sanction when the associated Requirement is violated. The VRFs assess the impact to reliability of violating a specific Requirement.

The proposed Reliability Standard also includes Measures that support each Requirement by clearly identifying what is required and how the Requirement will be enforced. These Measures help ensure that the Requirements will be enforced in a clear, consistent, and non-preferential manner and without prejudice to any party.

Proposed PRC-005-6 includes corresponding changes, where necessary, to the VRFs and VSLs to align with the revisions in proposed PRC-005-6. The VRFs and VSLs comport with NERC and FERC guidelines related to their assignment. A detailed review of the VRFs, VSLs, and the analysis of how the VRFs and VSLs were determined using these guidelines is provided in **Exhibit G**.

Because the Requirements contained in proposed Reliability Standard PRC-005-6 track with those contained in the previous versions, the Project 2007-17.4 standard drafting team determined that no revisions were necessary to the VRFs for the proposed Reliability Standard.

The VSLs in PRC-005-6 have been revised accordingly to address the supervisory devices now included in the proposed Reliability Standard as Automatic Reclosing Components in the levels of severity. The changes are consistent with the approach taken for the VSLs in Reliability Standard PRC-005-4. The VSLs provide guidance on the way that NERC will enforce the Requirements of the proposed Reliability Standard for each of the Component Types. The Measures for proposed PRC-005-6 have been similarly revised.

Respectfully submitted,

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November 20, 2015

**EXHIBITS A—B and D – J**

(Available on the NERC Website at

*<http://www.nerc.com/FilingsOrders/ca/Canadian%20Filings%20and%20Orders%20DL/PRC-005-6%20exhibits.pdf>*)

**Reliability Standards Criteria**

The discussion below explains how the proposed Reliability Standard has met or exceeded the Reliability Standards criteria:

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

The purpose of proposed Reliability Standards PRC-005-5 and PRC-005-6 is to document and implement programs for the maintenance of all Protection Systems, Automatic Reclosing, and Sudden Pressure Relaying affecting the reliability of the Bulk Electric System (BES) so that they are kept in working order. Proposed Reliability Standard PRC-005-5 enhances reliability by ensuring that owners and operators of dispersed generation resources are appropriately subject to the requirements of the PRC-005 standard, consistent with prior approved and currently-effective versions of the PRC-005 standard. The DGR White Paper (**Exhibit D**), provides a detailed description of the standard drafting team considerations for these applicability revisions.

Proposed PRC-005-6 revises proposed PRC-005-5 to add detailed information regarding minimum maintenance activities and maximum maintenance intervals for supervisory devices associated with Automatic Reclosing, extending the benefits of a strong maintenance program to those Components and thereby satisfying FERC's directive in Order No. 803.<sup>30</sup> The scope of supervisory devices included in proposed PRC-005-6 is based on the findings of the

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<sup>29</sup> In the filing, NERC submits proposed PRC-005-6 and requests that, if PRC-005-6 is not approved, then PRC-005-5 be approved in the alternative. Therefore, this discussion addresses how both PRC-005-5 and PRC-005-6 meet the Reliability Standards criteria.

<sup>30</sup> *Protection System Maintenance Reliability Standard*, Order No. 803, 150 FERC 61,039 at P 31 (2015) (“Order No. 803”).

SAMS/SPCS Report, attached hereto as **Exhibit H**, and was found acceptable by FERC in Order No. 803.<sup>31</sup>

**2. Proposed Reliability Standards must be applicable only to users, owners and operators of the bulk power system, and must be clear and unambiguous as to what is required and who is required to comply.**

The proposed Reliability Standards are clear and unambiguous as to what is required and who is required to comply.

Proposed Reliability Standard PRC-005-5 carries forward a clarification made to the applicability of PRC-005 to dispersed power producing resources (also called dispersed generation resources), consistent with prior revisions to the PRC-005 standard. Proposed Reliability standard PRC-005-6 revises proposed PRC-005-5 to include supervisory devices associated with applicable autoreclosing relay schemes within the scope of the standard. Aside from minor modifications to facilitate coverage of these devices and promote readability, the Requirements in PRC-005-4 remain unchanged.

The proposed Reliability Standards apply to Generator Owners, Transmission Owners, and Distribution Providers and clearly articulate the actions that each entity must take to comply with the proposed Reliability Standards.

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<sup>31</sup> See Order No. 803 at P 31 (“Specifically, NERC proposed in its NOPR comments, and we find acceptable, that the scope of the supervisory devices to be encompassed in the Reliability Standard are those providing voltage supervision, supervisory inputs associated with selective autoreclosing, and sync-check relays that are part of a reclosing scheme covered by PRC-005-3.”).

**3. A proposed Reliability Standard must include clear and understandable consequences and a range of penalties (monetary and/or non-monetary) for a violation.**

The Violation Risk Factors (“VRFs”) and Violation Severity Levels (“VSLs”) for the proposed Reliability Standards comport with NERC and FERC guidelines related to their assignment. The assignment of the severity level for each VSL is consistent with the corresponding requirement. The VSLs do not use any ambiguous terminology, thereby supporting uniformity and consistency in the determination of similar penalties for similar violations. For these reasons, the proposed Reliability Standards include clear and understandable consequences.

Because the Requirements contained in proposed PRC-005-5 track with those contained in the already approved or proposed versions of the PRC-005 Reliability Standards, the Project 2014-01 Standards Applicability for Dispersed Generation Resources standard drafting team determined that no revisions were necessary to the VSLs and VRFs for proposed PRC-005-5.

With respect to proposed Reliability Standard PRC-005-6, because the Requirements contained track with those contained in the previous versions, the Project 2007-17.4 PRC-005 FERC Order No. 803 Directive standard drafting team determined that no revisions were necessary to the VRFs.

The VSLs in PRC-005-6 have been revised accordingly to address the supervisory relay devices now included in the proposed Reliability Standard in the levels of severity. The changes are consistent with the approach taken for the VSLs in Reliability Standard PRC-005-4.

A detailed review of the proposed PRC-005-6 VRFs, VSLs, and the analysis of how the VRFs and VSLs were determined using these guidelines is provided in **Exhibit G**.

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

The proposed Reliability Standards continue to include Measures that support the Requirements by clearly identifying what is required and how the Requirement will be enforced. The Measures have not changed since Reliability Standard PRC-005-4, except that in PRC-005-6 Protection System Maintenance Program is abbreviated as “PSMP” for readability and the table references are updated to include the addition of a new table to address supervisory devices. The proposed Measures are as follows:

**M1.** Each Transmission Owner, Generator Owner and Distribution Provider shall have a documented PSMP in accordance with Requirement R1.

For each Protection System, Automatic Reclosing, and Sudden Pressure Relaying Component Type, the documentation shall include the type of maintenance method applied (time-based, performance-based, or a combination of these maintenance methods), and shall include all batteries associated with the station dc supply Component Types in a time-based program as described in Table 1-4 and Table 3. (Part 1.1)

For Component Types that use monitoring to extend the maintenance intervals, the responsible entity(s) shall have evidence for each Protection System, Automatic Reclosing, and Sudden Pressure Relaying Component Type (such as manufacturer’s specifications or engineering drawings) of the appropriate monitored Component attributes as specified in Tables 1-1 through 1-5, Table 2, Table 3, Table 4-1 through 4-3, and Table 5. (Part 1.2)

**M2.** Each Transmission Owner, Generator Owner, and Distribution Provider that uses performance-based maintenance intervals shall have evidence that its current performance-based maintenance program(s) is in accordance with Requirement R2, which may include, but is not limited to, Component lists, dated maintenance records, and dated analysis records and results.

**M3.** Each Transmission Owner, Generator Owner, and Distribution Provider that utilizes time-based maintenance program(s) shall have evidence that it has maintained its Protection System, Automatic Reclosing, and Sudden Pressure Relaying Components included within its time-based program in accordance with Requirement R3. The evidence may include, but is not limited to, dated maintenance records, dated maintenance summaries, dated check-off lists, dated inspection records, or dated work orders.

**M4.** Each Transmission Owner, Generator Owner, and Distribution Provider that utilizes performance-based maintenance intervals in accordance with Requirement R2 shall have evidence that it has

implemented the PSMP for the Protection System, Automatic Reclosing, and Sudden Pressure Relaying Components included in its performance-based program in accordance with Requirement R4. The evidence may include, but is not limited to, dated maintenance records, dated maintenance summaries, dated check-off lists, dated inspection records, or dated work orders.

**M5.** Each Transmission Owner, Generator Owner, and Distribution Provider shall have evidence that it has undertaken efforts to correct identified Unresolved Maintenance Issues in accordance with Requirement R5. The evidence may include, but is not limited to, work orders, replacement Component orders, invoices, project schedules with completed milestones, return material authorizations (RMAs) or purchase orders.

These Measures help provide clarity regarding how the Requirements will be enforced, and help ensure that the Requirements will be enforced in a clear, consistent, and non-preferential manner and without prejudice to any party.

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

The proposed Reliability Standard achieves its reliability goals effectively and efficiently. Proposed Reliability Standard PRC-005-5 improves reliability by ensuring the equipment utilized to aggregate individual dispersed generation resources to a common point of interconnection with the Bulk-Power System is maintained as required by the PRC-005 standard. Proposed Reliability Standard PRC-005-6 improves reliability by extending the protections of a strong Protection System Maintenance Program to supervisory devices associated with applicable autoreclosing relay schemes in accordance with Order No. 803.

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

The proposed Reliability Standards do not reflect a “lowest common denominator” approach. The changes reflected in proposed Reliability Standard PRC-005-5 are supported by

the DGR White Paper in Exhibit D and determinations from the Project 2014-01 standard drafting team, are targeted to a specific issue, and balance the applicability of the coverage of proposed PRC-005-5 with the reliability needs specific to dispersed generation resources. The changes reflected in proposed Reliability Standard PRC-005-6, in addition to satisfying a FERC reliability concern, require expanded application of maintenance plans and processes, helping to preserve reliability by addressing potential issues before they can have a negative impact. In identifying the appropriate supervisory devices to include within the PRC-005 standard, NERC reviewed the SAMS/SPCS report in Exhibit H and consulted with its internal subject matter experts. This resulted in an efficient and effective determination regarding the supervisory devices to be included as Automatic Reclosing Components in proposed PRC-005-6.

- 7. Proposed Reliability Standards must be designed to apply throughout North America to the maximum extent achievable with a single Reliability Standard while not favoring one geographic area or regional model. It should take into account regional variations in the organization and corporate structures of transmission owners and operators, variations in generation fuel type and ownership patterns, and regional variations in market design if these affect the proposed Reliability Standard.**

The proposed Reliability Standards apply throughout North America and do not favor one geographic area or regional model.

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

Proposed Reliability Standards PRC-005-5 and PRC-005-6 have no undue negative effect on competition. The proposed Reliability Standards requires the same performance by each of the applicable Functional Entities—Generator Owners, Transmission Owners, and Distribution Providers—in requiring the development of maintenance plans to address Automatic Reclosing including applicable supervisory devices.

The proposed Reliability Standards do not unreasonably restrict the available generation or transmission capability or limit use of the Bulk-Power System in a preferential manner.

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

The proposed effective dates for the proposed Reliability Standards are just and reasonable and appropriately balance the urgency in the need to implement the proposed Reliability Standards against the reasonableness of the time allowed for those who must comply to develop necessary procedures, software, facilities, staffing or other relevant capability. This will allow applicable entities adequate time to ensure compliance with the Requirements. The proposed effective dates are explained in the proposed implementation plans, attached as **Exhibit B (B-1a, B-2)**.

The proposed PRC-005-6 Implementation Plan is intended to facilitate an orderly and efficient transition from currently-effective PRC-005-2(i) to proposed PRC-005-6 and represents a significant improvement over the previous implementation approach for these standards, which would require multiple successive revisions to the Protection System Maintenance Programs, required by the PRC-005 standard to address newly applicable devices.

In the proposed implementation plan for PRC-005-6, NERC proposes to continue the phased implementation approach of the previous PRC-005 implementation plans. Depending on the type of device and specific requirement, implementation is divided into phases, requiring registered entities to gradually ensure compliance of a percentage of their devices until they reach 100% compliance. However, as multiple versions of the PRC-005 standard have now been submitted by NERC and are pending enforcement, NERC proposes to align the dates by which entities must be compliant for all new applicable systems. Although this approach would require a slight delay in implementing requirements for new applicable systems introduced by previous PRC-005 versions, it would provide several important benefits. First, this approach would

advance reliability by allowing entities sufficient time to address all new devices, thereby decreasing the number of opportunities for misidentified and missed devices across successive program revisions and across multiple compliance schedules. Second, this approach would promote the efficient use of entity and ERO Enterprise resources by eliminating the need to create and audit multiple, successive revisions to entity Protection System Maintenance Programs. Third, this approach would allow NERC additional time to provide additional education and outreach to industry regarding the implementation of this important Reliability Standard, further promoting reliability.

**10. The Reliability Standard was developed in an open and fair manner and in accordance with the Reliability Standard development process.**

The proposed Reliability Standards were developed in accordance with NERC's ANSI-accredited processes for developing and approving Reliability Standards. **Exhibit I** includes a summary of the Reliability Standards development proceedings, and details the processes followed to develop the proposed Reliability Standards.

These processes included, among other things, comment periods, pre-ballot review periods, and balloting periods. Additionally, all meetings of the standard drafting team were properly noticed and open to the public. The initial ballots, non-binding poll,<sup>32</sup> and final ballots achieved a quorum and exceeded the required ballot pool approval levels.

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

NERC has identified no competing public interests regarding the request for approval of the proposed Reliability Standards. No comments were received indicating the proposed Reliability Standards are in conflict with other vital public interests.

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<sup>32</sup> For proposed Reliability Standard PRC-005-6. No non-binding poll was required for proposed Reliability Standard PRC-005-5.

**12. Proposed Reliability Standards must consider any other appropriate factors.**

No other factors relevant to whether the proposed Reliability Standards are just, reasonable, not unduly discriminatory or preferential were identified.