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NERC requests that the Commission approve proposed Reliability Standard PRC-005-6 (**Exhibit A-1**) and find that it is just, reasonable, not unduly discriminatory or preferential, and in the public interest.<sup>5</sup> NERC also requests approval of the retirement of previous Reliability Standard PRC-005 standard versions as detailed in the 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. To allow for this orderly transition, NERC has filed, simultaneously with this petition, a Motion to Delay Implementation of the approved, but not yet effective versions of the PRC-005 Reliability Standards in Docket Nos. RM14-8-000 (PRC-005-3), RD15-3-000 (PRC-005-3(i)), and RM15-9-000 (PRC-005-4) until after the Commission issues an order or rule regarding proposed PRC-005-6 and the proposed implementation plan.

As 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, the Commission need not independently approve proposed PRC-005-5. Should the Commission decline to approve proposed PRC-005-6 or its associated implementation plan, however, NERC respectfully requests that the Commission approve PRC-005-5 (**Exhibit A-2**) and its associated implementation plan (**Exhibit B-2**). This approval will ensure that the PRC-005 standard continues to be applied appropriately to dispersed generation

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<sup>5</sup> Unless otherwise designated, capitalized terms shall have the meaning set forth in the *Glossary of Terms Used in NERC Reliability Standards* (“NERC Glossary of Terms”), available at [http://www.nerc.com/files/Glossary\\_of\\_Terms.pdf](http://www.nerc.com/files/Glossary_of_Terms.pdf).

resources while NERC addresses any of the Commission’s concerns regarding proposed PRC-005-6.

As required by Section 39.5(a)<sup>6</sup> of the Commission’s regulations, this petition presents the technical basis and purpose of the proposed Reliability Standard, a demonstration that the proposed Reliability Standard meets the criteria identified by the Commission in Order No. 672<sup>7</sup> (**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 approval in Order No. 693<sup>8</sup> to incorporate interpretations, clarify applicability, and respond to Commission directives. Following a restructuring of the standard in PRC-005-2, a number of versions have been developed, including currently-effective PRC-005-2(i), Commission-approved but 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 petition, NERC proposes additional modifications that improve upon the most recent Commission-approved version, PRC-005-4, in two respects.<sup>9</sup> First, proposed Reliability Standard PRC-005-6 revises the standard to include supervisory devices and functions associated

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<sup>6</sup> 18 C.F.R. § 39.5(a) (2012).

<sup>7</sup> The Commission specified in Order No. 672 certain general factors it would consider when assessing whether a particular Reliability Standard is just and reasonable. *See Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards*, Order No. 672, FERC Stats. & Regs. ¶ 31,204, at P 262, 321-37, *order on reh’g*, Order No. 672-A, FERC Stats. & Regs. ¶ 31,212 (2006).

<sup>8</sup> *Mandatory Reliability Standards for the Bulk-Power System*, Order No. 693, FERC Stats. & Regs. ¶ 31,242 (“Order No. 693”), *order on reh’g*, Order No. 693-A, 120 FERC ¶ 61,053 (2007).

<sup>9</sup> Reliability Standard PRC-005-4 was approved by the Commission in Docket No. RM15-9-000. *See Protection System, Automatic Reclosing, and Sudden Pressure Relaying Maintenance Reliability Standard*, Order No. 813, 152 FERC ¶ 61,199 (2015) (“Order No. 813”).

with applicable autoreclosing relay schemes. Reliability is improved by extending the protections of a strong Protection System Maintenance Program to these devices consistent with Order No. 803.<sup>10</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 Commission-approved revisions addressing the applicability of PRC-005 to owners of dispersed generation resources.<sup>11</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 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>12</sup>

Additionally, as there are now multiple versions of the PRC-005 Reliability Standard pending enforcement or Commission approval, the implementation plan for proposed PRC-005-6

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<sup>10</sup> Order No. 803 at P 31.

<sup>11</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.

<sup>12</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.

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 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:<sup>13</sup>

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## **III. BACKGROUND**

### **A. Regulatory Framework**

By enacting the Energy Policy Act of 2005,<sup>14</sup> Congress entrusted the Commission with the duties of approving and enforcing rules to ensure the reliability of the Bulk-Power System, and with the duties of certifying an ERO that would be charged with developing and enforcing mandatory Reliability Standards, subject to Commission approval. Section 215(b)(1)<sup>15</sup> of the FPA states that all users, owners, and operators of the Bulk-Power System in the United States will be subject to Commission-approved Reliability Standards. Section 215(d)(5)<sup>16</sup> of the FPA authorizes the Commission to order the ERO to submit a new or modified Reliability Standard.

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<sup>13</sup> Persons to be included on the Commission’s service list are identified by an asterisk. NERC respectfully requests a waiver of Rule 203 of the Commission’s regulations, 18 C.F.R. § 385.203 (2012), to allow the inclusion of more than two persons on the service list in this proceeding.

<sup>14</sup> 16 U.S.C. § 824o (2012).

<sup>15</sup> *Id.* § 824o(b)(1).

<sup>16</sup> *Id.* § 824o(d)(5).

Section 39.5(a)<sup>17</sup> of the Commission's regulations requires the ERO to file with the Commission for its approval each Reliability Standard that the ERO proposes should become mandatory and enforceable in the United States, and each modification to a Reliability Standard that the ERO proposes should be made effective.

The Commission is vested with the regulatory responsibility to approve Reliability Standards that protect the reliability of the Bulk-Power System and to ensure that Reliability Standards are just, reasonable, not unduly discriminatory or preferential, and in the public interest. Pursuant to Section 215(d)(2) of the FPA<sup>18</sup> and Section 39.5(c)<sup>19</sup> of the Commission's regulations, the Commission will give due weight to the technical expertise of the ERO with respect to the content of a Reliability Standard.

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

The proposed Reliability Standard was developed in an open and fair manner and in accordance with the Commission-approved Reliability Standard development process.<sup>20</sup> NERC develops Reliability Standards in accordance with Section 300 (Reliability Standards Development) of its Rules of Procedure and the NERC Standard Processes Manual.<sup>21</sup>

In its order certifying NERC as the Commission's ERO, the Commission found that 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

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<sup>17</sup> 18 C.F.R. § 39.5(a) (2015).

<sup>18</sup> 16 U.S.C. § 824o(d)(2).

<sup>19</sup> 18 C.F.R. § 39.5(c)(1).

<sup>20</sup> *Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards*, Order No. 672, FERC Stats. & Regs. ¶ 31,204, *order on reh'g*, Order No. 672-A, FERC Stats. & Regs. ¶ 31,212 (2006).

<sup>21</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).

the criteria for approving Reliability Standards.<sup>22</sup> The development process is open 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 Commission for approval.

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

The PRC-005 Reliability Standard has been revised several times since its initial approval in Order No. 693<sup>23</sup> to incorporate interpretations, clarify applicability, and respond to Commission directives. NERC provides a brief history of the PRC-005 standard below.

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

In Order No. 693, the Commission approved 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.<sup>24</sup> The Commission approved interpretations PRC-005-1a on September 26, 2011<sup>25</sup> and PRC-005-1b on February 3, 2012.<sup>26</sup> On September 19, 2013, the Commission approved PRC-005-1.1b, which clarified the standard's applicability to protection systems associated with generator interconnection facilities.<sup>27</sup>

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<sup>22</sup> 116 FERC ¶ 61,062 at P 250 (2006).

<sup>23</sup> *Mandatory Reliability Standards for the Bulk-Power System*, Order No. 693, FERC Stats. & Regs. ¶ 31,242 (“Order No. 693”), *order on reh'g*, Order No. 693-A, 120 FERC ¶ 61,053 (2007).

<sup>24</sup> Order No. 693 at P 1474, 1492, 1514, and 1546.

<sup>25</sup> *North American Electric Reliability Corp.*, 136 FERC ¶ 61,208 (2011).

<sup>26</sup> *Interpretation of Protection System Reliability Standard*, Order No. 758, 138 FERC ¶ 61,094 (2012) (“Order No. 758”).

<sup>27</sup> *Generator Requirements at the Transmission Interface*, Order No. 785, 144 FERC ¶ 61,221 (2013).

2. PRC-005-2

The Commission approved PRC-005-2 on December 19, 2013.<sup>28</sup> 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 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

The Commission approved PRC-005-3 on January 22, 2015 in Order No. 803.<sup>29</sup> 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>30</sup> In Order No. 803, the Commission also directed further revisions to the PRC-005 Reliability Standard which are, in part, the subject of this petition.

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<sup>28</sup> *Protection System Maintenance Reliability Standard*, Order No. 793, 145 FERC ¶ 61,253 (2013) (“Order No. 793”).

<sup>29</sup> Order No. 803 at P 17.

<sup>30</sup> In Order No. 758, the Commission 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.

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 May 29, 2015, the Commission approved 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.<sup>31</sup> 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 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 3, 2015, NERC submitted a petition seeking approval of 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

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<sup>31</sup> Letter Order, *N. Am. Elec. Reliability Corp.*, 151 FERC ¶ 61,186 (2015).

term “Special Protection System” with “Remedial Action Scheme” where it appears in PRC-005.<sup>32</sup> This petition is pending.

The implementation of these proposed versions is addressed in the proposed Remedial Action Scheme implementation plan. Under this plan, the proposed versions would become effective the first day of the first calendar quarter that is 12 months after regulatory approval, if not already retired by an implementation plan for a successor version.

6. PRC-005-4

The Commission approved PRC-005-4 in Order No. 813 issued September 17, 2015.<sup>33</sup> 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.<sup>34</sup>

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>35</sup> Both PRC-005-4 and PRC-005-2(i)/-3(i) were adopted by the NERC Board of Trustees on November 13, 2014 and filed with Commission for approval soon after. Development then began on PRC-005-5,

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<sup>32</sup> *Petition of the North American Electric Reliability Corporation for Approval of Revisions to the Definition of “Remedial Action Scheme” and Proposed Reliability Standards*, Docket No. RM15-13-000 (Feb. 3, 2015).

<sup>33</sup> *See supra* n. 9.

<sup>34</sup> PRC-005-4 addressed certain concerns set out by the Commission in Order No. 758 regarding a lack of maintenance requirements for non-electrical sensing relays (such as sudden pressure relays) that could affect the reliable operation of the Bulk-Power System. *See id.* at PP 5 and 22.

<sup>35</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.

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 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. The Commission approved PRC-005-2(i) and PRC-005-3(i), which revised the applicability of PRC-005-2 and PRC-005-3 respectively, in Docket No. RD15-3-000.<sup>36</sup> 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 Docket No. RD15-3-000 and the DGR White Paper,<sup>37</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 generation resources interconnected to the transmission system typically have a control system that controls

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<sup>36</sup> See *supra* n. 11 and Section III.C.4.

<sup>37</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**.



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>38</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>39</sup>

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

As noted above, in Order No. 803, the Commission 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 device as desired after it has opened under abnormal conditions. In the PRC-005-3

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<sup>38</sup> For this discussion, *see id.* at Section 3.2.

<sup>39</sup> *Id.* at Sections 3.2.1, 3.2.3 and 4.10.7.

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, the Commission 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>40</sup> Project 2007-17.4 PRC-005 FERC Order No. 803 Directive was initiated in response to this directive.

As explained by the Commission 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>41</sup> The Commission 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>42</sup> Therefore, the Commission 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 the Commission 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

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<sup>40</sup> Order No. 803 at P 31.

<sup>41</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>42</sup> *Id.* at P 30 (citing Order No. 758 at P 24). In Order No. 758, the Commission 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, the Commission 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.

generating unit or plant instability. NERC stated that it would support the addition of voltage supervision, supervisory inputs associated with selective autoreclosing (where used), and synchronism check supervision in the PRC-005 Reliability Standard.<sup>43</sup>

In Order No. 803, the Commission 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>44</sup> The Commission 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>45</sup>

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

#### **IV. JUSTIFICATION FOR APPROVAL**

As discussed in **Exhibit C** and below, proposed Reliability Standard PRC-005-6 satisfies the Commission’s criteria in Order No. 672, 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

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<sup>43</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>44</sup> Order No. 803 at P 31.

<sup>45</sup> *Id.*

“BES”) so that they are kept in working order. The proposed Reliability Standard enhances 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 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 Commission-approved 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 the Commission’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 the Commission’s Order No. 803 directive:

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

**Automatic Reclosing** – Includes the following Components<sup>[46]</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

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<sup>46</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.”

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 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>47</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 the Commission'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>48</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:

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<sup>47</sup> See SAMS/SPCS Report (Exhibit H) at 5-7.

<sup>48</sup> See Ex. E (Supplementary Reference and FAQ – October 2015) at 8.

- Table 4-1, Maintenance Activities and Intervals for Automatic Reclosing Components Component Type – Reclosing and Supervisory Relay;
- 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 approved by the Commission in PRC-005-2(i) and PRC-005-3(i) and 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>[49]</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.

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<sup>49</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.



**4.2.5.2** 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).~~

~~**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 Docket No. RD15-3-000 and the DGR White Paper,<sup>50</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 Commission-approved revised Bulk Electric System definition and prior revisions made to the PRC-005 standard as reflected in currently-effective PRC-005-2(i) and approved PRC-005-3(i).

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<sup>50</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 Commission 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>51</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>51</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>52</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>53</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>52</sup> In Order No. 803 approving PRC-005-3, the Commission 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 respectfully requests that, if the Commission approves the proposed PRC-005-6 implementation plan, the Commission also clarify that NERC's Order No. 803 data collection obligations would begin one year following the effective date of PRC-005-6.

<sup>53</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), Commission-approved but 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 petition. The implementation plan continues to reflect that the retirement of the legacy Reliability Standards PRC-005-1.1b,<sup>54</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>54</sup> PRC-005-1.1b, which was approved on September 19, 2013 and became mandatory and enforceable on November 25, 2013, retired the prior-approved 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 currently-effective PRC-005-2(i) and approved 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 the Commission decline to approve proposed PRC-005-6 for reasons specific to that version of the standard, such as the inclusion of supervisory devices or the proposed implementation plan, NERC respectfully requests that the Commission approve PRC-005-5 (**Exhibit A-2**) and the PRC-005-5 implementation plan (**Exhibit B-2**). The PRC-005-5 implementation plan provides that PRC-005-5 shall become effective the later of: (i) the first day following the effective date of PRC-005-4; or (ii) the first day following approval by an applicable governmental authority. 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 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.<sup>55</sup>

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 Commission 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. NERC, therefore, requests that the Commission approve the VRFs as applied to the supervisory devices now included in the proposed Reliability Standard as Automatic Reclosing Components.

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.

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<sup>55</sup> Order No. 672 at P 327 (“There should be a clear criterion or measure of whether an entity is in compliance with a proposed Reliability Standard. It should contain or be accompanied by an objective measure of compliance so that it can be enforced and so that enforcement can be applied in a consistent and non-preferential manner.”).

## VI. CONCLUSION

For the reasons set forth above, NERC respectfully requests that the Commission:

- approve proposed Reliability Standard PRC-005-6 and associated elements included in Exhibit A-1;
- approve the implementation plan included in Exhibit B-1a; and
- approve the retirement of previous versions of the PRC-005 Reliability Standard as set forth in the PRC-005-6 implementation plan.

Respectfully submitted,

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