

I. INTRODUCTION

Pursuant to Rules 212 and 713¹ of the Federal Energy Regulatory Commission's ("FERC" or the "Commission") Rules of Practice and Procedure, 18 C.F.R. §§ 385.212 and 385.713, the North American Electric Reliability Corporation ("NERC")² seeks clarification and, in the alternative, requests rehearing of the Commission's Order No. 733 ("Order No. 733") issued on March 18, 2010.³ Order No. 733 approved NERC's proposed Transmission Relay Loadability Reliability Standard (PRC-023-1) and directed NERC to develop and file modifications to the Reliability Standard to address FERC's specific concerns in Order No. 733, no later than one year from the date of the Order.

The Transmission Relay Loadability Reliability Standard represents a significant step toward improving the reliability of the bulk power system in North America because it requires load-responsive phase protection relay settings to provide essential facility protection for faults, while allowing the bulk power system to be operated in accordance with established facility ratings. Relay loadability was a significant factor in the spread of the August 2003 blackout, and approval of the standard marks the culmination of years of work by industry experts.

II. STATEMENT OF ISSUES FOR CLARIFICATION AND, IN THE ALTERNATIVE, REQUEST FOR REHEARING

Pursuant to 18 C.F.R. §§ 385.212 and 385.713, NERC seeks clarification of the following issues and, in the alternative, requests that the Commission address specifications of errors on rehearing of Paragraphs 47, 112-114, 150, 168, and 173 of Order No. 733:

¹ 18 C.F.R. §§ 385.212 and 385.713 (2010).

² The Commission certified NERC as the electric reliability organization ("ERO") in its order issued on July 20, 2006 in Docket No. RR06-1-000. *North American Electric Reliability Corporation*, "Order Certifying North American Electric Reliability Corporation as the Electric Reliability Organization and Ordering Compliance Filing," 116 FERC ¶ 61,062 (July 20, 2006).

³ *Transmission Relay Loadability Reliability Standard*, 130 FERC ¶ 61,221 (March 18, 2010) ("Order No. 733").

- A. **Issue 1:** The Commission should clarify that if NERC is unable to utilize already existing study regimes, then the time for NERC to address the Order No. 733 modifications to Requirement R3 of PRC-023-1 to include a test that planning coordinators must use to identify sub-200 kV facilities that are critical to the reliability of the bulk power system may be extended to 24 months from the date of the Order on Clarification or Rehearing. *See, e.g.*, 16 U.S.C. § 824o(d)(2)(2005); *Chevron, U.S.A., Inc. v. Natural Res. Def. Council, Inc.*, 467 U.S. 837, 843 (1984) (courts and agencies are to “give effect to the unambiguously expressed intent of Congress.”).
- B. **Issue 2:** The Commission should clarify or grant rehearing that it is authorizing the Reliability Standards Development Process to deal with the applicability of generator step-up transformer relay loadability in a separate Reliability Standard from PRC-023-1. *See, e.g.*, 16 U.S.C. § 824o(d)(2)(2005); *Chevron*, 467 U.S. 837, 843; *Motor Vehicle Mfrs. Ass’n. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983) (quoting *Burlington Truck Lines, Inc. v. U.S.*, 371 U.S. 156, 168 (1962)) (“Nevertheless, the agency must examine the relevant data and articulate a satisfactory explanation for its action including a ‘rational connection between the facts found and the choice made.’”); *see also*, 5 U.S.C. § 706(2)(A).
- C. **Issue 3:** The Commission should reconcile and clarify or grant rehearing of its statement in Order No. 733 that a Reliability Standard requiring dependable protection system operation for faults and secure operation for stable swings, for a defined set of contingencies and base cases, is consistent with the Order regarding protective relays operating unnecessarily due to stable power swings. *See, e.g.*, 16 U.S.C. § 824o(d)(2)(2005); *Chevron*, 467 U.S. 837, 843; *Motor Vehicles Mfrs. Ass’n*, 463 U.S. 29, 43; *Greater Boston Television Corp. v. FCC*, 444 F.2d 841, 852 (D.C. Cir. 1970).

III. DISCUSSION OF ISSUES ADDRESSED BY THE REQUEST FOR CLARIFICATION AND, IN THE ALTERNATIVE, REHEARING

Issue 1: The Commission should clarify that if NERC is unable to utilize already existing study regimes, then the time for NERC to address the Order No. 733 modifications to Requirement R3 of PRC-023-1 to include a test that planning coordinators must use to identify sub-200 kV facilities that are critical to the reliability of the bulk power system may be extended to 24 months from the date of the Order on Clarification or Rehearing.

NERC seeks clarification or in the alternative rehearing with respect to Paragraph 47 of Order No. 733, in which FERC directed NERC to modify Requirement R3 of PRC-023-1 to include the test that planning coordinators must use to identify sub-200 kV facilities that are critical to the reliability of the bulk power system and file the test and the results of applying the

test to a representative sample of utilities from each of the three Interconnections for FERC approval:

As discussed more fully below, we decline to direct the ERO to adopt the ‘rule out’ approach for 100 kV-200 kV facilities. However, we adopt the NOPR proposal and direct the ERO to modify PRC-023-1 to apply an “add in” approach to certain sub-100 kV facilities that Regional Entities have already identified or will identify in the future as critical facilities for the purposes [of] the Compliance Registry. Finally, we direct the ERO to modify Requirement R3 of the Reliability Standard to include the test that planning coordinators must use to identify sub-200 kV facilities that are critical to the reliability of the bulk electric system.⁴

The Commission directed NERC, “to file its test, and the results of applying the test to a representative sample of utilities from each of the three Interconnections, for Commission approval no later than one year from the date of this Final Rule.”⁵ However, the Commission noted that “[c]onsistent with [S]ection 215 of the FPA, our regulations, and Order No. 693, any modification to a Reliability Standard, including a modification that addresses a Commission directive, must be developed and fully vetted through NERC’s Reliability Standards development process.”⁶

As FERC noted in Order No. 733, the NERC System Protection and Control Task Force (“SPCTF”) provided guidance to the Regional Entities for identifying operationally significant 100 kV-200 kV facilities during the voluntary Beyond Zone 3 relay review and mitigation program. This guidance advised Regional Entities to identify:

All circuits that are elements of flowgates in the Eastern Interconnection, Commercially Significant Constraints in the Texas Interconnection, or Rated Paths in the Western Interconnection. This includes both the monitored and outage element for OTDF sets.

All circuits that are elements of system operating limits (SOLs) and interconnection reliability operating limits (IROLs), including both monitored and outage elements.

⁴ *Id.* at P 74.

⁵ *Id.* at P 69.

⁶ *Id.* at P 19.

All circuits that are directly related to off-site power supply to nuclear plants. Any circuit whose outage causes unacceptable voltages on the off-site power bus at a nuclear plant must be included, regardless of its proximity to the plant.

All circuits of the first 5 limiting elements (monitored and outaged elements) for transfer interfaces determined by regional and interregional transmission reliability studies. If fewer than 5 limiting elements are found before reaching studied transfers, all should be listed.

Other circuits determined and agreed to by the reliability authority/coordinator and the Regional Reliability Organizations.⁷

The formalization and extension of those guidelines into a mandatory test for Planning Coordinators and operational planners to determine the criticality of facilities below 200 kV could meet the performance characteristics consistent with the tenets of the TPL and TOP standards, and meet the reliability objectives of PRC-023-1. The studies that determine the system elements that make up flowgates (Eastern Interconnection), Commercially Significant Constraints (ERCOT), or Rated Paths (Western Interconnection) are already consistent with the TPL and TOP standards. Furthermore, the base cases used in those studies are consistent with the range of study conditions of concern to FERC in the Order. The original NERC SPCTF guidelines could be expanded to include additional screening during contingency analysis studies by Planning Coordinators and operational planners for their internal sub-200 kV circuits that exhibit overload characteristics that are of concern to relay loadability in PRC-023. Such internal contingency analyses should already conform to the TPL and TOP standards with the base cases covering the appropriate range of expected operations.

Similarly, those internal studies should normally identify any sub-100 kV circuits whose performance is operationally significant to the bulk power system and whose overload characteristics are of concern to relay loadability in PRC-023. By relying on already existing

⁷ *Id.* at P 74.

study regimes by the Planning Coordinators and Reliability Coordinators, any additional analyses of the applicability test for PRC-023-1 would be minimized and be kept consistent with the desired system performance characteristics of the TPL and TOP standards. NERC believes that formalizing and extending the original SPCTF guidelines, vetting them through the Reliability Standard Development process, and performing sample tests could be accomplished in the one-year timeframe prescribed in the Order.

However, if the industry believes that the SPCTF screening test is insufficient and a different, more technical analysis is warranted, that time may be insufficient. NERC maintains that developing a more comprehensive separate testing regime to determine the criticality of sub-200 kV facilities that would require additional specific system studies beyond those already conducted by Planning Coordinators and Transmission Owners would require significant time and commitment of a wide array of industry experts, and the participation and support of NERC's technical committees to design (and for the industry to agree to) the testing procedures. The testing procedure would then have to be vetted through the Reliability Standards Development process, including field testing of representative sample utilities, prior to filing. NERC does not believe that it is possible to perform all of these tasks within the one-year timeframe mandated in the order.

Therefore, NERC requests that the Commission clarify or reverse its determination that the deadline for the test is one year from the date of Order No. 733. Instead, the Commission should grant NERC flexibility to extend that deadline to twenty-four (24) months from the date FERC issues an Order on Clarification or Rehearing of this request. Such extension will allow

sufficient time to complete the necessary work to develop the more comprehensive testing regime and move that testing regime through the Reliability Standard Development process.⁸

Issue 2: The Commission should clarify or grant rehearing that it is authorizing the Reliability Standards Development Process to deal with the applicability of generator step-up transformer relay loadability in a separate Reliability Standard from PRC-023-1.

NERC seeks clarification or in the alternative rehearing with respect to Paragraphs 112-114 of Order No. 733, in which FERC stated:

We reiterate that the requirements of PRC-023-1 apply to all protection systems as described in Attachment A that are intended to provide protection to the facilities defined in section 4.1.1 through 4.1.4 of the Reliability Standard, regardless of whether the protection systems provide primary or backup protection and regardless of their physical location. Our interpretation is based on the fact that protective relays are applied to protect specific system elements and, it is consistent with approved Reliability Standards, the zones of protection principle on which relaying schemes are designed, and NERC's voluntary Beyond Zone 3 Review, which examined all primary and backup protection systems.

We also clarify that protective relays can be applied as back-up protection in two different ways: they can be physically located at the generator terminal on the low-voltage side of a generator step-up transformer and provide backup protection for a Bulk-Power System element (i.e., for a transmission line outside of the generator zone of protection), as discussed in the NOPR, or provide back-up protection for the generator and the step-up transformer (i.e., within the generator zone of protection), as the commenters discuss. In this Reliability Standard, the Commission is referring to the first type of relays; i.e. relays that are applied to provide back-up protection to Bulk-Power System elements and that would sense increased current flow due to a fault on a Bulk-Power System transmission circuit. In the NOPR, the Commission explained that distance relays physically located at the generator terminal that are applied to protect Bulk-Power System facilities must be coordinated with primary protection systems for a transmission line and be set to see through the step-up transformer, providing backup protection for un-cleared faults on the Bulk-Power System. Consequently, these relays will sense increased current flow and may trip on high load and therefore must also be set pursuant to PRC-023-1. If the primary protection system of the transmission line fails to operate, or does not operate within a certain time, the backup protection operates and trips Bulk-Power System elements that it is applied to protect.

⁸ See, e.g., 16 U.S.C. § 824o(d)(2)(2005); *Chevron*, 467 U.S. 837, 843 (courts and agencies are to “give effect to the unambiguously expressed intent of Congress.”).

Our statement that such relays are subject to the Reliability Standard is not in conflict with the use of a protection system to protect the generator/step-up transformer in the context of other industry standards, such as IEEE Standard C37.102, or with the exclusion in section 3.4 of Attachment A to PRC-023-1 of generator relays that are susceptible to load. The relays that we referred to in the NOPR, while they may be physically located at the generator terminal or on the low-voltage side of the generator step-up transformer, are applied to provide backup protection for Bulk-Power System elements. This application is different from “generator relays,” which are also physically located at the generator, but are applied to protect the generator.⁹

The general organizing principle for the NERC Reliability Standard regarding relays is that relays that protect a transmission element should be subject to PRC-023-1. Relays that protect the generator should be subject to a new Reliability Standard addressing generator relay loadability. If that is not the Commission’s intent, then NERC seeks rehearing of this aspect of Order No. 733.¹⁰ It would be a mistake to have relays whose primary purpose is to protect the generator subject to PRC-023-1 or the new Reliability Standard to be developed for generator relay loadability, depend on whether the relay is set to operate for faults on the transmission system to which the generating unit is connected. This situation could lead to confusion over applicability and the possibility of conflicting requirements. Either situation could impair the reliability of the bulk power system.

Generator relay loadability is a complex issue that presents different challenges than transmission relay loadability. These differences relate to the generator capability which may present a higher loading angle (lower power factor) than loading on a transmission line and the dynamic response of the generator to local disturbances, related to both the time varying

⁹ *Id.* at 112 – 114.

¹⁰ *See, e.g.*, 16 U.S.C. § 824o(d)(2)(2005); *Chevron*, 467 U.S. 837, 843; *Motor Vehicle Mfrs. Ass’n.*, 463 U.S. 29, 43 (1983) (quoting *Burlington Truck Lines, Inc. v. U.S.*, 371 U.S. 156, 168 (1962)) (“Nevertheless, the agency must examine the relevant data and articulate a satisfactory explanation for its action including a ‘rational connection between the facts found and the choice made.’”); *see also*, 5 U.S.C. § 706(2)(A).

generator impedance in the sub-transient, transient, and synchronous time frame and the action of the excitation system and associated limiters, none of which have been addressed in development of PRC-023-1. When load responsive relays are applied at the terminals of a generator, the maximum load and the resultant apparent impedance to which the relay will respond is independent of whether it is set with a shorter reach to protect the generator and the generator step-up transformer or with a longer reach to additionally provide backup protection for transmission system faults.

The work completed to date by NERC in developing a technical reference document on the subject of generator relay loadability indicates that applying the requirements in PRC-023-1 are insufficient to provide for secure operation of generator back-up protection during severe system conditions. The requirements in PRC-023-1 would allow a longer relay reach prone to undesired operation for conditions of depressed system voltage during which the generator excitation system is in field-forcing. The requirements in PRC-023-1 also would allow assessing the relay setting based on a stressed line loading angle of 30 degrees, whereas the generator loading angle during field-forcing may be on the order of 45 degrees making the relay more susceptible to undesired operation.

Note that the defining characteristic is not the purpose served by the relay, or whether the relay would sense increased current flow due to a fault on a bulk power system transmission circuit. The determination of whether the relay should be subject to PRC-023-1 or the new generator relay loadability standard should turn on the location at which the relay is applied. NERC believes there is a need for clarification because in Paragraph 104 of the Order the Commission states that generator step-up transformer loadability may be addressed in a separate reliability standard, yet in Paragraph 113 the Commission states that relays on the low side of a

generator step-up transformer that are applied to provide back-up protection to bulk power system elements and that would sense increased current flow due to a fault on a bulk power system transmission circuit are to be covered by PRC-023-1. The determination should turn on the location at which the relay is applied because a relay applied at the terminals of the generator will see increased current flow due to a fault on a bulk power system transmission circuit regardless of the purpose served by the relay. The primary purpose of back-up distance protection applied at the terminals of a generator is to provide thermal protection for the generator and back-up protection for the Generator Step-Up (“GSU”) transformer, not the connected transmission lines. The relay may be set to operate for faults on the transmission system to which the generating unit is connected; however, in such cases the primary purpose of this function is protection of the generator and GSU transformer. Assigning applicability of PRC-023-1 to generator relays applied to provide system back-up protection would permit protection owners to use less stringent setting criteria when setting the relay for an application that requires a longer reach. NERC believes this is an unintended consequence that would negatively impact reliability of the bulk power system.

Section 215(d)(2) of the FPA mandates that the Commission pay attention to the ERO’s technical expertise:

The Commission shall give due weight to the technical expertise of the Electric Reliability Organization with respect to the content of a proposed standard or modification to a reliability standard

That requirement in Section 215 must mean something more than simply giving NERC an opportunity to comment. To afford that language significance, it must mean that the Commission cannot substitute its judgment for that of the ERO. As stated by Senator Thomas on proposing the language that eventually became Section 215:

[t]he amendment, instead, establishes a participant-run, FERC-overseen electric reliability organization. This is key to this whole amendment and this whole direction. It is a blend of Federal oversight along with industry expertise.¹¹

If the Commission's intent regarding the scope of PRC-023-1 is not as NERC has requested above, then NERC seeks rehearing of that aspect of Order No. 733. A directive that would subject the same type of relay to the requirements of two different reliability standards, developed to serve two different purposes, would not be technically sound.

Issue 3: The Commission should reconcile and clarify or grant rehearing its statements in the order that a Reliability Standard requiring dependable protection system operation for faults and secure operation for stable swings, for a defined set of contingencies and base cases, is consistent with the Order regarding protective relays operating unnecessarily due to stable power swings.

NERC seeks clarification or in the alternative rehearing with respect to language in Paragraphs 150, 168, and 173 of Order No. 733. In Paragraph 150, the Commission states:

We will not direct the ERO to modify PRC-023-1 to address stable power swings. However, because both NERC and the Task Force have identified undesirable relay operation due to stable power swings as a reliability issue, we direct the ERO to develop a Reliability Standard that requires the use of protective relay systems that can differentiate between faults and stable power swings and, when necessary, phases out protective relay systems that cannot meet this requirement. We also direct the ERO to file a report no later than 120 days of this Order addressing the issue of protective relay operation due to power swings. The report should include an action plan and timeline that explains how and when the ERO intends to address this issue through its Reliability Standards development process.¹²

In summarizing its determination in Paragraph 173, the Commission states:

In sum, we adopt the NOPR proposal and direct the ERO to develop a new Reliability Standard that prevents protective relays from operating unnecessarily due to stable power swings by requiring the use of protective relay systems that can differentiate between faults and stable power swings and, when necessary, phases-out relays that cannot meet this requirement.¹³

¹¹ 148 Cong. Rec., S1873 (March 14, 2002).

¹² Order No. 733 at P 150.

¹³ *Id.* at P 173.

However, the Commission states in Paragraph 168:

We recognize that, because of the operating characteristic of the impedance relay, regardless of whether a power swing is stable or unstable, the relay may potentially operate under Category D contingencies. Thus, the NOPR proposed alternative protection applications and relays that are less susceptible to transient or dynamic power swings. This is consistent with Order No. 693, where the Commission stated that it is not realistic to expect the ERO to develop Reliability Standards that anticipate every conceivable critical operating condition applicable to unknown future configurations for regions with various configurations and operating characteristics.¹⁴

NERC requests that the Commission clarify an apparent conflict between on the one hand Paragraph 168 (which recognizes the need for “relays that are less susceptible to transient or dynamic power swings” and further recognizes “it is not realistic to expect the ERO to develop Reliability Standards that anticipate every conceivable operating condition,”) and on the other hand Paragraphs 150 and 173 (which appear to direct NERC to develop a reliability standard containing an absolute obligation to prevent “protective relays from operating unnecessarily by requiring the use of protective relay systems that can differentiate between faults and stable power swings” and “phasing out those systems that cannot meet the requirement”).

The Commission should clarify that NERC, working with industry technical experts through the NERC standards development process, may apply expert judgment and develop a standard that addresses the issue appropriately for the various circumstances that exist across the bulk power system.¹⁵ NERC is concerned that requiring the use of protective relay systems that can differentiate between faults and stable power swings could be in some cases unnecessary (such as in a tightly-connected network of coherent generation) and in other cases insufficient to maintain reliability of the bulk power system (by impeding detection and isolation of unstable (out of synchronism) systems during unstable power swings).

¹⁴ *Id.* at P 168.

¹⁵ *See, e.g.*, 16 U.S.C. § 824o(d)(2)(2005); *Chevron*, 467 U.S. 837, 843; *Motor Vehicles Mfrs. Ass’n*, 463 U.S. 29, 43; *Greater Boston Television Corp. v. FCC*, 444 F.2d 841, 852 (D.C. Cir. 1970).

The susceptibility of protection systems to operate during stable swings is a function of the location on the system at which the relays are applied. For example, protection systems applied on long transmission lines between weakly-connected coherent generation groups are more likely to operate during a stable swing than protection systems applied on short transmission lines within a tightly-connected network of coherent generation. In cases where apparent swings do not approach near the relay operating characteristic, or cases where modifications to the relay operating characteristic are sufficient to provide secure operation during stable swings, the reliability objective may be met without requiring protection systems to be able to differentiate between faults and stable power swings.

In addition, some protection systems that are able to differentiate between faults and stable swings are incapable of responding to any swing, stable or unstable (*e.g.*, current differential or phase comparison). The undesirable effects of failing to physically separate portions of the power system that are operating out-of-synchronism were observed in southeast Michigan on August 14, 2003, when slip frequency between portions of the system reached 37 Hz. It is important for the reliability of the bulk power system that a Reliability Standard addressing protective relays operating unnecessarily due to stable power swings does not result in the unintended consequence of decreasing ability to identify unstable swings and isolate unstable portions of the power system.

NERC seeks clarification that the Commission's directive regarding the development of a Reliability Standard that requires the use of protective relay systems that can differentiate between faults and stable power swings and, when necessary, phases out protective relay systems that cannot meet this requirement was in the nature of a description of the specific matter the Commission wants NERC to address rather than an absolute requirement to establish such a

requirement. NERC seeks clarification that other approaches to addressing the specific matter (such as a standard that requires demonstration of dependable protection system operation for faults and secure operation for stable swings for a defined set of contingencies and steady-state and dynamic base cases (*i.e.*, to include various generation dispatches, topologies, maintenance outages)) might, if properly supported, satisfy the Commission's intent in Order No. 733.

If the Commission did intend to direct NERC to develop a Reliability Standard that requires the use of protective relay systems that can differentiate between faults and stable power swings and, when necessary, phases out protective relay systems that cannot meet this requirement, then NERC seeks rehearing of that directive.

The Commission's role under Section 215 is to approve or remand reliability standards developed by the ERO, not to write the standard itself. Moreover, Section 215(d)(2) states the Commission shall give due weight to the technical expertise of the Electric Reliability Organization with respect to the content of a proposed standard or modification to a reliability standard. When the Commission dictates the requirement of a Reliability Standard, it is not giving any acknowledgment whatsoever to the technical expertise of the ERO.

IV. CONCLUSION

For the reasons set forth in this filing, NERC requests that the Commission clarify or, in the alternative, grant rehearing of Order No. 733, as discussed above.

Respectfully submitted,

Gerald W. Cauley
President and Chief Executive Officer
David N. Cook
Vice President and General Counsel
North American Electric Reliability Corporation
116-390 Village Boulevard
Princeton, NJ 08540-5721
(609) 452-8060
(609) 452-9550 – facsimile
david.cook@nerc.net

/s/ Willie L. Phillips
Rebecca J. Michael
Assistant General Counsel
Willie L. Phillips
Attorney
North American Electric Reliability
Corporation
1120 G Street, N.W.
Suite 990
Washington, D.C. 20005-3801
(202) 393-3998
(202) 393-3955 – facsimile
rebecca.michael@nerc.net
willie.phillips@nerc.net

CERTIFICATE OF SERVICE

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

Dated at Washington, D.C. this 19th day of April, 2010.

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