UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Transmission Relay Loadability Reliability Standard	**)** **)** **)**	**Docket No. RM08-13-000**

COMMENTS OF THE EDISION ELECTRIC INSTITUTE

The Edison Electric Institute ("EEI"), on behalf of its member companies, hereby submits these Comments in response to the Federal Energy Regulatory Commission ("FERC" or "Commission") Notice of Proposed Rulemaking ("NOPR") on the Reliability Standard PRC-023-1 (Transmission Relay Loadability Reliability Standard) ("PRC-023-1") that the North American Electric Reliability Corporation ("NERC") developed in its capacity as the Electric Reliability Organization ("ERO").[1]

EEI requests that the Commission approve the proposed Reliability Standard PRC-023-1 as filed by NERC, pursuant to its authority under section 215 of the Federal Power Act ("FPA"). See 16 U.S.C. § 824o. The ERO developed the proposed Reliability Standard in response to recommendations by NERC and the U.S.-Canada Power System Outage Task Force regarding transmission relay loadability in connection with the August 14, 2003 blackout.[2] EEI believes that the proposed Reliability Standard PRC-023-1 is fully responsive to the Final Blackout Report recommendations with respect to transmission relay loadability issues and the Commission should approve this standard as soon as possible.

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[1] *Transmission Relay Loadability Reliability Standard*, Notice of Proposed Rulemaking, 127 FERC ¶ 61,175 (2009).

[2] See U.S.-Canada Power System Outage Task Force, Final Report on the August 14, 2003 Blackout in the United States and Canada: Causes and Recommendations (April 2004) ("Final Blackout Report").

In addition to proposing to approve Reliability Standard PRC-023-1, the Commission requests comment on whether the ERO should consider other issues raised in the NOPR toward the modification of Reliability Standard PRC-023 or whether these issues should be considered for possible implementation by the ERO as separate Reliability Standards in the ERO's Reliability Standards development process. EEI strongly urges the Commission to approve the Reliability Standard PRC-023-1 as filed by NERC, and to refer its concerns to the ERO for consideration towards implementation by standards development processes or by developing industry processes and guidelines. While the NOPR identifies other issues than transmission relay loadability that may raise concerns that are important to ensuring reliable operation of the Bulk Power System ("BPS"), these issues should be considered by the ERO separately from Reliability Standard PRC-023-1. Many of these proposals to modify the applicability of Reliability Standard PRC-023-1 do not appear to be directly related to the issues of transmission relay loadability that Reliability Standard PRC-023-1 is intended to address and instead these concerns appear to be directed at broader issues of system protection. Furthermore, many of the NOPR proposals for modifications to Reliability Standard PRC-023-1 are likely to result in undermining the reliability of the BPS. Additionally, in some cases, the concerns the NOPR identifies are the subject of current work by electric industry experts. Accordingly, proposed Reliability Standard PRC-023-1 should be approved as filed and its applicability or scope should not be expanded as the Commission proposes in the NOPR.

EEI is the trade association for shareholder-owned electric companies and serves international affiliates and industry associates worldwide. Our U.S. member companies serve 95 percent of the ultimate customers in the shareholder-owned segment of the industry and nearly 70 percent of all electric utility customers in the nation. EEI members own approximately 60

percent of the nation's circuit miles of transmission. EEI's members are owners, operators and users of the BPS and are subject to the Reliability Standards established by the ERO. Many EEI members will be required to comply with Reliability Standard PRC-023-1. EEI membership includes vertically integrated and stand-alone utility business models.

EXECUTIVE SUMMARY

EEI strongly supports the Commission recommendation to approve Reliability Standard PRC-023-1 as mandatory and enforceable. This standard is an important achievement by the electric industry in support of BPS reliability, reflects thousands of hours of subject matter experts' hard work in addressing the issues, and provides an assertive response to recommendations made in the U.S. – Canada Blackout Report. Relay loadability, and system protection broadly, is a highly complex matter that demands very careful analysis of layers of multi-variable problems, and their solutions. EEI uses these comments to express gratitude to the dedication and commitment of industry stakeholders in thoroughly addressing the loadability issues.

EEI further supports the full range of work being undertaken by NERC and industry stakeholders in the area of system protection. For example, later this year NERC will approve a landmark technical analysis on generator protection issues that will serve as the foundation for developing mandatory requirements in this critical area.

EEI does not support various Commission suggestions in the NOPR for expansion of the NERC standards. If Reliability Standard PRC-023-1 were approved with the modifications as suggested in the NOPR, EEI is concerned that BPS reliability could actually be harmed and not improved. Specifically, Commission suggestions on the reach of zone 2/zone 3 relays, if

approved as a mandatory requirement, could result in a reduction in BPS reliability caused by lower levels of protection provided by backup relays. In addition, EEI sees no benefit to BPS reliability in the Commission suggestion to direct NERC to change applicability of the standard to include all facilities rated at 100 kV and above.

In supporting its suggestions in the NOPR, EEI is also concerned that the Commission misstated various system protection related issues as presented in the Final Blackout Report. EEI disagrees with the Commission predicate that relays operated 'unnecessarily' on August 14, 2003, when in fact these relays performed exactly as designed and programmed, and protected vital generation and transmission equipment from severe or permanent damage and a potential outage event of much longer duration, and a much higher cost to the nation. EEI also disagrees with the NOPR suggestions that lower voltage facilities in general, and relays in particular, played a leading or significant role in the events of August 14, 2003. The NOPR takes these issues out of context of the many events of that day. While important, transmission relay loadability is only one of many issues that the electric industry has addressed and will address in the course of responding to the Final Blackout Report.

Finally, while raising these various BPS reliability issues, EEI is concerned that the NOPR strays from the issues proposed in the original NERC filing for approval of Reliability Standard PRC-023-1. NERC did not propose a comprehensive framework for system protection issues in its filing. NERC only proposed a transmission relay loadability reliability standard. Many of the issues raised in the NOPR apply to system protection broadly, and not directly to relay loadability. As an alternative to raising various technical issues formally in the context of a NOPR, EEI strongly encourages the Commission to direct its technical staff to participate in the various technical discussions of the issues within NERC.

DISCUSSION

I. FERC should approve the proposed Reliability Standard PRC-023-1

EEI commends the Commission for proposing to approve this standard. The area of relay loadability (and system protection more broadly) is a highly complex system that demands very careful analysis of layers of multi-variable problems and their solutions. This standard is an important achievement by the electric industry in support of BPS reliability, reflecting thousands of hours of hard work by subject matter experts to address transmission relay loadability issues and to provide an assertive response to the recommendations outlined in Recommendation 21A of the Final Blackout Report.[3] The NOPR is correct that the proposed Reliability Standard PRC-023-1 is a significant step towards improving BPS reliability because it requires that protective relay settings provide essential facility protection for faults, while allowing the BPS to be operated in accord with established Facility Ratings.[4] Accordingly, pursuant to FPA section 215(d)(2), the Commission should approve the proposed Reliability Standard PRC-023-1 as just and reasonable. See NOPR at PP 1 and 30.

The Energy Policy Act of 2005 ("EPAct 2005") entrusted NERC as the ERO with developing mandatory and enforceable Reliability Standards, which are subject to FERC review and approval. See 16. See U.S.C. § 824o. Section 215 (d)(2) of the FPA authorizes the Commission to approve, by rule or by order, a proposed Reliability Standard or modification to a

[3] See Final Blackout Report.

[4] See NOPR at P 30. The Commission is also correct that the proposed Reliability Standard PRC-023-1 ensures that all protective relays subject to it that protect and could therefore disconnect the facilities defined in it are set in accordance with its requirements, thereby avoiding a gap in protection that would undermine the goal of ensuring reliable operation. See NOPR at P 33.

Reliability Standard if it determines that the Reliability Standard is just and reasonable, not unduly discriminatory or preferential and in the public interest. See 16 U.S.C. § 824o (d)(2). When evaluating proposed Reliability Standards, the statute directs the Commission to give "due weight" to the technical expertise of the ERO.[5] If the Commission disapproves of the proposed Reliability Standard in whole or in part, it must remand the proposed Reliability Standard to the ERO for further consideration. See 16 U.S.C. § 824o (d)(4). However, Section 215 (d)(5) gives the Commission authority, upon its own motion or upon complaint, to order the ERO to submit to the Commission a proposed Reliability Standard or a modification to a Reliability Standard that addresses a specific matter if the Commission considers such a modified Reliability Standard appropriate to carry out FPA section 215. The Commission stated in Order No. 706 that "in some instances, while we provide specific details regarding the Commission's expectations, we intend by doing so to provide useful guidance to assist in the Reliability Standards development process, not to impede it…. [W]here a directive for modification appears to be determinative of the outcome, the Commission provides flexibility by directing the ERO to address the underlying issue through the Reliability Standards development process without mandating a specific change to the CIP Reliability Standard. " See Order No. 706, *Mandatory Reliability Standards for Critical Infrastructure Protection*, 122 FERC ¶61,040 at P 29 (2008) ("Order No. 706").

EEI requests that the Commission approve the proposed Reliability Standard PRC-023-1 because it has been developed and approved by subject matter experts participating in the ERO Reliability Standards development process. In this regard it is important to note that the NERC

[5] See 18 C.F.R. § 39.5(c) (1) and *Rules Concerning Certification of the Electric Reliability Organization: Procedures for the Establishment, Approval and Enforcement of Electric Reliability Standards*, Order No. 672, FERC Stats. & Regs. ¶ 31,204 (2006), *order on reh'g*, Order No. 672-A, FERC Stats. & Regs. ¶ 31,212 (2006).

System Protection and Control Subcommittee ("SPCS") provided very substantial input with respect to the development of this proposed Reliability Standard. The NERC SPCS is made of numerous experts in the field of transmission protection, who thoroughly understand the issues of operability, reliability and cost to the end user that are associated with ensuring that protective relays adequately serve their functions on the BPS. EEI believes that the proposed Reliability Standard PRC-023-1, as submitted, is best suited to meet the goal of ensuring BPS reliability and addresses all the concerns outlined in Recommendation 21A of the Final Blackout Report.[6] Furthermore, the proposed Reliability Standard's applicability was thoroughly vetted by industry experts in the ERO standards development process. As required by section 215 of the FPA, the Commission should give "due weight" to NERC's technical expertise, including the conclusion regarding the appropriate applicability of the proposed standard and approve the proposed standard as soon as possible,

Finally, the Commission's actions and proceedings to approve or modify Reliability Standards should reflect that, because of the industry's technical expertise, the statute gives the ERO the authority to develop Reliability Standards. While the Commission may properly remand Reliability Standards to the ERO to address specific concerns, the Commission cannot direct the ERO to modify the Reliability Standard in a specific manner. In Order No. 706, the Commission recognized this and it should continue to do so in that manner.[7] Therefore, the Commission should presently defer to the technical expertise of the NERC standards development process as to whether the additional issues raised in the NOPR should be addressed

[6] See Final Blackout Report.

[7] See Order No. 706, 122 FERC ¶61,040 at P 29.

in revisions to Reliability Standard PRC-023-1 or addressed in separate Reliability Standards or by means of industry processes or guidelines.

II. EEI does not support the NOPR's proposals to modify the applicability of the proposed Reliability Standard.

EEI does not support the NOPR's proposal for the Commission to direct the ERO to modify the proposed Reliability Standard to address the concerns presented in the NOPR. See NOPR at PP 1 and 34. While raising various BPS reliability issues, the NOPR strays from the issues proposed in the original NERC filing for approval of this Reliability Standard, namely transmission relay loadability issues and not broader issues of system protection. The Commission should articulate its material concerns with the proposed Reliability Standard PRC-023-1 but should not direct the ERO to consider other broader issues than those presented in the proposed Reliability Standard. Furthermore, rather than support BPS reliability, many of the NOPR's proposals to modify the proposed Reliability Standard's applicability could result in undermining the goal of ensuring reliable BPS operation. Significantly, applying the requirements below the 200 kV level will increase complexities in protection and control systems that, in turn, could make the electric system less reliable. The electric industry welcomes input from the Commission in the various areas addressed by the NOPR, but the best way for the Commission to do so would be for Commission technical staff to provide such input during the ERO Reliability Standards development process. This way FERC technical staff may make comments on proposed Reliability Standards as any other stakeholder may in an open and transparent manner ahead of the ERO filing before the Commission for approval.

A. The Commission should not direct the ERO to modify the Reliability

Standard's applicability with respect to facilities operated between 100 kV and 200 kV.

EEI does not support the Commission's proposal directing NERC to consider modifications of the applicability of the proposed Reliability Standard with respect to entities with facilities operated at or above 100 kV. See NOPR at P 43. EEI also does not support the NOPR proposal for the Commission "to consider exceptions on a case-by-case basis for facilities operated between the 100 kV and 200 kV that demonstrably would not result in cascading outages, instability, uncontrolled separation, violation of facility ratings, or interruption of firm transmission service." Id.

The determination with respect to the scope of Reliability Standard PRC-023-1's applicability was based on substantive industry research and analysis, and is fully responsive to the Final Blackout Report recommendation 21A with respect to transmission relay loadability issues. Industry experts working on the development of PRC-023 chose the 200kv threshold, based on recommendations in both the Blackout Report and the NERC blackout recommendations. EEI agrees with NERC that the Final Blackout Report 21A added operationally significant 138 kV lines as a point of focus in post-August 2003 blackout analyses and as a result the Reliability Standard development team and NERC included those transmission lines operating between 100 kV and 200 kV that are designated by the Planning Authority as critical to BPS reliability within the scope of PRC-023-1. NERC is correct that this was done despite the fact that the U.S. – Canada Task force included 138 kV lines in its report primarily to demonstrate examples of monitored flowgates or interfaces between systems. See NERC Comments citing to Final Blackout Report at 158. EEI understands that NERC's comments make clear that industry expended great effort to develop relay review programs to address the loadability issues identified in the August 2003 blackout that were the basis for what

ultimately became the standards development of the proposed Reliability Standard PRC-023-1.[8] NERC has explained that the result of evaluating lines below 200 kV with operationally significant circuits and other phase relay functions were inconsistent because the regions defined "operationally significant" differently. Given that the purpose of a transmission relay loadability Reliability Standard is to minimize protective relaying from causing or sustaining cascading outages, Reliability Standard PRC-023-1 appropriately focuses on those lines that operate at 200 kV and above, and those between 100 kV and 200 kV that are critical to BPS via Requirement R3. EEI disagrees that focusing the Reliability Standard on every line operating between 100 kV and 200 kV is appropriate or a "conservative approach" to transmission relay loadability issues impacting BPS reliability.

The NOPR itself offers no persuasive reasoning for its proposal to shift the threshold to 100 kV. The NOPR rests exclusively on the Blackout Report and makes incorrect conclusions on the role of relays in the Final Blackout Report. The NOPR also invokes broad BPS definitional issues that make it inappropriate to be decided in the context of a single Reliability Standard. The NOPR also overlooks the "other side of the coin" -- that during the August 2003 blackout, relays protected generation and transmission equipment that, if damaged, could have caused an extended, more costly outage event. Industry experts working on the development of Reliability Standard PRC-023-1 chose the 200 kV threshold, based on recommendations in both the Final Blackout Report and NERC's own blackout recommendations. Based on this judgment, the "add-in" approach is appropriate to determine the criticality of facilities operated between 100 kV and 200 kV.

[8] Note that the full bibliography of the NERC reports since 2004 on transmission relay loadability is available at http://www.nerc.com/filez/spctf.html --- under "reports, procedures, and work products." This demonstrates the full range of NERC's thorough and rigorous reviews and analyses related to the Final Blackout Report's recommendation 21A.

1. The "add-in" approach is a sound means for the electric industry to identify circuits operated between 100 kV and 200 kV that are critical to BPS reliability.

EEI supports the use of the "add-in" approach to determine which facilities are operated between 100 kV and 200 kV should be subject to the proposed Reliability Standard. The "add-in" approach, when properly implemented, is a reasonable and adequate means to identify critical circuits operated between 100 kV and 200 kV. EEI does not agree with the Commission's concern that the "add-in" approach established in Requirement R3 will not meet the expectation that this process will be robust enough to identify all facilities operated between 100 kV and 200 kV that are critical to BPS reliability. See NOPR at P 39-40.

Requirement R3 calls for NERC Planning Coordinators to designate which transmission lines and transformers with low-voltage terminals operated or connected between 100 kV and 200 kV are critical to BPS reliability (because they prevent a cascading outage) and are therefore subject to Requirement R1. Sub-Requirements R3.1 and R3.1.1 specify that Planning Authorities must identify these facilities through a process that considers input from adjoining Planning Coordinators and affected Reliability Coordinators. This "add-in" approach works very well since it reflects the fact that most facilities operated between 100 kV and 200 kV are almost always not critical to maintaining reliable operation of the BPS during major disturbances in contrast to the need to assure the availability of higher voltage facilities to support BPS reliability during major disturbances. This is because the lower voltage facilities are normally operated in parallel with higher voltage facilities and the simple fact that most wide-area BPS power transfers flow on the higher voltage facilities. Since, generally, the higher voltage facilities will be prevented from experiencing load-related cascading outages by compliance with Reliability Standard PRC-023-1's requirements, most high power flows will not shift to

underlying facilities operated between 100 kV and 200 kV, thus these facilities will not be adversely affected. The power transfer capability between these voltage levels can be approximated by the voltage ratio squared; this implies that it takes 6.25 138 kV lines to replace each 345 kV line. In the 2003 August blackout, in terms of "cause" and "effect" terminology, the 138 kV lines that tipped were not the "cause" but rather the "effect" of tripping some of the overlaying 345 kV circuits.

The Commission should also understand that the "add-in" approach has been implemented by the electric industry on a voluntary basis as part of the "Beyond Zone 3" effort based on the work of the NERC SPCS [9] In this effort, several hundred 138 kV lines were determined to need review. Most of the 100 kV – 200 kV facilities identified as a result of this effort are located in areas with minimal EHV backbone facilities, i.e. where they are used as BPS facilities. Concentrating on those 100 kV – 200 kV facilities that will result in improved BPS power transfer capability is the goal and is best supported by available resources by the "add-in" approach established pursuant to Reliability Standard PRC-023-1.

Additionally, the NOPR has not demonstrated any reasonable basis on which to conclude that the "add-in" approach established by Requirement R3 will not result in a comprehensive study to identify applicable critical facilities and, at the outset, will effectively exempt a large percentage of facilities that should otherwise be subject to Reliability Standard PRC-023-1. See NOPR at P 40. While failure of a facility at these levels will affect local-area load served by it, such a lower voltage line is very unlikely to be the cause of a cascading outage.[10] When a line at

[9] See "Beyond Zone 3" NERC report at http://www.nerc.com/docs/pc/spctf/Beyond_Zone_3-EHV_Report.pdf.

[10] One of the criteria listed for the proposed exception process for 100 kV to 200 kV lines is "interruption of firm transmission service." See NOPR at P 43. Interruption of firm transmission service is not appropriate for inclusion with the other criteria such as resulting in cascading outages. Firm transmission service is form of service under the

this voltage level trips on load, it is almost always because of preceding faults at higher voltage lines.[11] These higher voltage lines are already covered under the proposed Reliability Standard PRC-023-1. Thus, EEI disagrees with the NOPR's conclusion regarding the sufficiency of the "add-in" approach to determine critical facilities at these voltage levels.

It is important for the Commission to note that many of these 100 kV – 200 kV facilities are designed to support local distribution service and their related protection systems are set to ensure separation, including load shedding, should disturbances or system events take place. These systems ensure "controlled separation" that, by definition, does not involve BPS. Therefore, the NOPR's concern that, pursuant to Reliability Standard PRC-023-1, the Planning Authority's process for determining the facilities operated between 100 kV and 200 kV that are critical to BPS reliability may not be robust enough to identify all such facilities because Requirement R3 uses an "add-in" approach to identify facilities operated between these voltage levels is not correct and has not been adequately supported. See NOPR at PP 39-41.

The NOPR is incorrect to conclude "a large percentage of the BPS not only falls into the 100 kV to 200 kV category, but also supports the reliability of the high voltage transmission system (200 kV and above)." See NOPR at P 43. Further there is also no basis for the Commission's conclusion that the identification process to determine which facilities are critical to BPS reliability must "necessarily identify nearly every facility operated at or above 100 kV." See NOPR at P 43. The NOPR fails to explain any connection between the fact that approximately 85 percent of circuit miles of electric transmission are operated at 253 kV and

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open access transmission tariff. It is not indicia of reliable operations, as are the other criteria listed. Moreover, as discussed above, loss of a line at the lower voltages will result in the loss of service to a particular local load but are not likely to have cascading impacts on the higher voltage parts of the system to which it is connected.

[11] For example, in an outage in MRO on September 18, 2007, a 138 kV line tripped only after three 345 kV lines had already tripped. The tripping of the 138kV line was not a root cause of the outage.

below and the NOPR's conclusion that a large percentage of these facilities are critical to BPS reliability. See NOPR at P 40. There is simply no basis in the NOPR to support the conclusion that all or even a significant percentage of these facilities are critical to BPS reliability. For example, during the 2006 update of NERC's mandated loadability reviews and modifications, the Reliability Coordinator only found less than one percent of this type of line terminals were operationally significant to the BPS.

Despite the fact that there are much larger numbers of facilities operated in the 100-200 kV category, the fact remains that the 200 kV and above facilities are much more often critical to the capability and reliability of the BPS. This is because higher voltage facilities are designed individually to have substantially higher capacity and because there are fewer of these types of facilities. The facilities operated between 100-200 kV most often provide connections that are primarily intended to serve local distribution loads rather than to allow significant load transfers through that part of the transmission system, especially in the unusual case where higher and lower voltage facilities are operated in parallel. Moreover, there is a substantial amount of variability in facilities operated between 100 and 200 kV, making an exceptions process extremely detailed, fact-specific and therefore time and resources intensive, diverting resources that could be more appropriately used to maintain reliability of the BPS at the higher voltages most implicated in cascading outages.

The NOPR's reliance on a statement by NERC in a letter concerning the appropriateness of the "add-in" approach with respect to CIP standards is not relevant to the sufficiency of this approach with respect to Reliability Standard PRC-023-1. NERC's statement of concern regarding the "in approach" in this letter was clearly limited to the CIP Reliability Standard, and it is important to note that this letter made recommendations for the first step of an internal

process to be conducted within the utility itself. See NOPR at P 40. The NOPR seeks to apply such an approach to an external process in which a utility would have to demonstrate to FERC, NERC or the Regional Authority that the vast majority of its 100 kV to 200 KV system needed to be "ruled out."

The NOPR also provides no support for its conclusion that the "add-in" approach established in Requirement R3 will not sufficiently identify facilities operated between 100 kV and 200 kV that are critical to BPS reliability by relying on the Final Blackout Report. See NOPR at P 41. The NOPR fails to explain that, during the August 2003 blackout, although load responsive phase protection relays without communications-based relaying operated, none of the 138 kV system overloading, real faults, uncontrolled separation, or cascading happened until several major events had already taken place, including the loss of three major 345 kV lines in the area that tripped due to line-to-tree faults, and various computer system problems. This forced abnormally high loads (i.e., actual overloads) onto the 138 kV transmission system that was ultimately protected from permanent damage by the protective relay tripping, which also prevented further spread of the blackout. Furthermore, EEI understanding of the events on August 14, 2003, is that at least five 345 kV lines and 15 138 kV lines tripped offline prior to 4:05 p.m., when additional lines tripped as a result of zone 3 relay actions. See Final Blackout Report graphic presentations, at pp. 46 and 81.

The NOPR incorrectly concludes that protective relays operated "unnecessarily" and disconnected "'healthy' transmission lines" due to stable power swings. See NOPR at PP 10-11, and 54- 56. EEI believes that this conclusion is ill founded. The inference that the Final Blackout Report shows the relays acted "unnecessarily" appears to suggest that if these relays had been set to react more slowly, then perhaps the system could have "naturally" taken care of

itself. However, what the Final Blackout Report does not say is --- the value of generation and transmission equipment that did not undergo severe or permanent damage because the relays did their jobs exactly as designed and avoided a blackout situation that could have lasted several days in some locations. The NOPR's logic extends from this speculation-based conclusion. Hence, if, the ERO adopts standards as suggested by the NOPR, this "flexibility" runs that risk. The same concern applies to the NOPR's conclusion regarding the issue of the reach of zone 2/zone 3 relays. If acted upon, EEI believes that the NOPR's recommendation may produce more harm than help.

The NOPR incorrectly seeks to justify its proposal to expand the application of PRC-023-1 by stating that in the Final Blackout Report, the Task Force recommended to NERC to broaden its review to include operationally significant 115 kV and 138 kV lines, that during the 2003 blackout, load responsive phase protection relays for facilities operated above and below 200 kV without communications-based relaying operated unnecessarily, which contributed to cascading outages. The Commission incorrectly reasons that since facilities operated between 100 kV and 200 kV generally do not have communications-based relays, they remain subject to the same problems that contributed to cascading during the 2003 blackout. The Commission is incorrect to assume that because facilities operated at lower voltages generally do not have communications-based relaying that consequently facilities operated below 200 kV remain vulnerable to the same problems that contributed to cascading during the 2003 blackout. See NOPR at P 41. While there is no doubt that there are cases where 100-200 kV facilities are critical to the transfer capability of the system due to limited higher voltage parallel paths or other system configurations, these tend to be uncommon or geographically limited cases.

B. The Commission should not direct the ERO to modify Reliability Standard PRC-023-1 to make it applicable to all facilities operated below 100 kV that are included on the NERC Compliance Registry.

As an initial matter, the NOPR appears to ignore that the regions and electric utilities already perform annual reviews to determine critical facilities at these voltage levels. Consequently, while the NOPR is correct to point out that there are facilities operating below 100 kV that are critical to BPS reliability, EEI believes that there are few facilities of this type. See NOPR at P 27. For example, because several 69 kV lines are generally required to replace one 138 kV line, it is highly unlikely that facilities operated below 100 kV could become the root cause of a major cascading blackout. It is much more likely that facilities rated below 100 kV will trip to end a cascading blackout, which was the case for the 138 kV lines in the August 2003 blackout event. Furthermore to apply Reliability Standard PRC-023-1 to these facilities will cost the functional entities millions of dollars in capital investment and operating costs, which could be better allocated for the facilities operated at 200 kV and above in order to ensure BPS reliability.

The NOPR proposal that the proposed Reliability Standard PRC-023-1 should include facilities operated below 100 kV listed in the NERC Compliance Registry is inappropriate. The Commission should approve Reliability Standard PRC-023-1 as proposed. The Commission should not extend applicability of this standard to those entities that are included on the NERC Compliance Registry as a result of owning facilities that are considered material to BPS reliability. However, EEI agrees that the Commission's proposal to include circuits critical to BPS reliability operated below 100 kV as determined by the Regional Entity or the Reliability Coordinator may have merit and should be studied. In particular, EEI contemplates that the ERO

would consider developing criteria for determining what facilities at these voltage levels are critical to BPS reliability. Again, any expansion of the scope of Reliability Standard PRC-023-1 must be done through the ERO's Reliability Standards development process.

C. The generator step-up and auxiliary transformer loadability issues are being addressed in separate standard development processes.

EEI recognizes that the issue of generator step-up relay loadability merits attention but, based on the conclusion of industry experts, believes that these issues should continue to be considered in separate standards development processes currently under way. EEI understands the drafting team recognized the issue and made the decision to move forward with transmission relays, recognizing that generation protection would involve complex discussion and decisionmaking. The generation protection issue is in the NERC standards work plan.

Generation and transmission protection are two basically different issues technically and separate discussion and decisions are needed. Moreover, other Reliability Standards already require that generation and transmission protection be coordinated (e.g. Reliability Standard PRC-001-1). EEI therefore does not support the NOPR's proposal for the Commission to direct the ERO to include it in Reliability Standard PRC-023-1, and recommends that generator step-up and auxiliary transformer loadability should be addressed in a separate Reliability Standard as the ERO intends. See NOPR at 53. The plan adopted for developing this standard should not be disrupted.

NERC is correct that without the consideration of the overall generator protective system in place, it would have been inappropriate to include a generator step-up and auxiliary transformer loadability in a transmission relay loadability standard. See NOPR at P 46. Generator protection settings must be coordinated with other generation protection functions as

well as the local transmission system protection and to develop such a standard would require technical experts from the generator industry, who were not a part of the Standards Drafting Team. In addition, EEI understands that development of such a standard involves complex issues, there are far fewer subject matter experts on generator relays, and many companies do not have in-house expertise. Rather than attempt to develop such a standard without the requisite technical expertise, which would be unreasonable, NERC has been clear that generator protection standards for relay loadability will be addressed in future Reliability Standards and developed in a process that includes the appropriate industry technical experts. The SPCS technical paper now being completed will provide both a means for coordination between the Generator and Transmission Owners as well as providing guidance on loadability requirements for the Generator Owner for those generator protection elements that respond to load. This is also reflected in the NERC standards development work plan.

III. Other reliability issues raised in the NOPR should be considered through the NERC standards development process where complex technical issues raised by the NOPR can be best addressed by subject matter experts.

A. FERC should not direct the ERO to consider developing a maximum allowable reach for zone 3/zone 2 relays applied as remote circuit breaker failure and backup protection.

Pursuant to proposed Reliability Standard PRC-023-1, an entity will first develop protective relay settings that ensure adequate protection of the facility or facilities and then will apply the transmission relay loadability Reliability Standard. If the entity cannot meet Reliability Standard PRC-023-1, it will then be necessary to change the relay scheme to accommodate both the need for protection and to comply with Reliability Standard PRC-023-1. Thus EEI believes that the Commission's concern that these relays' operation under certain conditions is well addressed by Requirement 1 since no exemption is given to relays that are set

to cover adjacent lines in the event of breaker failure. See NOPR at PP 54-57. Hence, the Reliability Standard does not need to identify any maximum reach allowable outside of the impact on loadability. Furthermore, issues of protective relay settings that over reach adjacent lines and trip with insufficient delay are coordination issues and not transmission relay loadability issues. Accordingly, no specific maximum reach needs to be defined in Reliability Standard PRC-023-1 or in a new Reliability Standard. If remote back-up relays cannot provide adequate breaker failure coverage and still comply with Reliability Standard PRC-023-1, then local breaker failure relaying must be applied. The NOPR proposal is too prescriptive since establishing such an absolute maximum reach could harm BPS reliability.

EEI agrees with NERC that Reliability Standard PRC-023-1 should be silent on the application of zone 3/zone 2 relays as remote circuit breaker failure and backup protection because the standard establishes requirements for any load-responsive relay regardless of its protective function. See NERC Petition at 39. NERC's approach is to allow for setting these types of relays based on the specific operational circumstances. This issue may be addressed in a separate standards development proceeding.

To arbitrarily limit settings by determining a maximum reach without understanding or even considering the specific application will result in less reliability from failure to clear faults. EEI's understanding is that relays must be set to ensure fault detection under contingency conditions to protect the integrity of the whole system. The Commission should recognize that failure of these relays to trip is significantly more disruptive to the reliability of the BPS than an "over-trip" and leads to load and generator instability. The proposal presents the risk of these relays not tripping when needed, which could lead to a larger scale problem concerning BPS reliability. It is not technically possible to do what the NOPR proposes and to have fault

detection satisfied. The electric industry's technically preferred approach is to set specific fault conditions. Thus, EEI supports the existing Reliability Standard PRC-023-1 that already establishes a maximum reach limit in Requirement R1 and settings based on specifics.

B. FERC should not direct the ERO to consider developing a new Reliability Standard or a modification that requires applicable entities to use protective relay systems that can differentiate between faults and stable power swings and phase out protective relay systems that cannot meet this requirement.

EEI believes that the proposed Reliability Standard PRC-023-1 is well suited to prevent operation during stable power swings and the Commission should not direct the ERO to develop a Reliability Standard or a modification that requires applicable entities to use protective relay systems that can differentiate between faults and stable power swings and phase out protective relay systems that cannot meet this requirement. See NOPR at P 60. It should be noted that as relay loadability is increased through any of the available means, the proper response to stable power swings is enhanced. The proposed Reliability Standard is a transmission relay loadability standard, not a stability standard. While out of step tripping and blocking relays set to comply with Reliability Standard PRC-023-1 prevent tripping or blocking under heavy loading conditions, the entire subject of relay performance during power swings (stability-related) does not belong in the scope of a standard on loadability.

EEI also disagrees with this proposal because subject matter experts in the electric industry have found that many of these schemes are significantly more difficult to install and maintain compared to step distance and directional comparison schemes using distance relays. Application of line differential relays has been reliable when applied over fiber communications systems, but the schemes are still expensive to install. The Commission should also be aware that on September 18, 2007, the protection schemes the NOPR mentions as not susceptible to

power swings actually created a major disturbance in MRO region due to problems with communication circuits. See NOPR at 59. This suggests these schemes may not in fact be superior since they are prone to misoperation due to loss of communication or timing differences in a transmit-and-receive communication path.[12]

EEI also does not support this proposal because it would be likely to unreasonably require removal of a large number of electromechanical relays, perhaps even an entire class of relays, all of which function effectively today. The potential result of the NOPR proposal to use only protective functions that do not respond to power swings would be to leave the grid with less than adequate protection when an unstable power swing occurs. Proper handling of power swings requires development of all the issues for both stable and unstable power swings. The focus must be on both types of power swings with the desired result for each assured. Furthermore, replacing electromechanical relays with microprocessor relays is onerous work and the electric industry does not see any corresponding reliability benefits. EEI believes that electric utilities should only replace electromechanical relays for specific reasons and there is no need to do so at this time.

Finally, the Commission should understand that Relay Out-of-Step ("OOS") blocking is set based on specific system contingencies and results of stability simulations. Relays cannot be set reliably for OOS blocking under extreme multi-contingency conditions, where the trajectory of power swing are unpredictable. Also, the application of OOS blocking may decrease reliable fault detection for developing fault conditions. See IEEE-PRC Working Group whitepaper on Out-of-Step and Power Swing Blocking Considerations at http://www.pes-psrc.org.

[12] See "September 18, 2007 System Event Analysis Report," at http://www.midwestreliability.org/00_events/EA918_Final_Report_Public.pdf. EEI understands that additional non-public information may be available upon request related to this issue.

D. FERC should not direct the ERO to either revise Requirement R1.2, or develop a new requirement or take any other action.

EEI does not support the NOPR proposal to direct the ERO to either revise Requirement R1.2 to apply it to Reliability Standard TOP-004-1 or develop a new requirement that Transmission Owners, Generation Owners, and Distribution Providers give their Transmission Operators a list of transmission facilities that implement Requirement R1.2, or propose an equally effective and efficient approach to avoid the potential conflict. See NOPR at 65.

The Commission's concern is not correct that Requirement R1.2 might conflict with Requirement R4 of existing Reliability Standard TOP-004-1(Transmission Operations), which allows a 30-minute response time for Transmission Operators to restore the system within proven limits. See NOPR at P 64. The Commission's assertion is not correct that transmission line relays set according to R1.2 would constrain a Transmission Operator's response to an overloading situation. R1.2 does not define the time to trip but determines the current level used to develop the relay pickup setting. If the relays are set according to R1.2 they will not trip until reaching at least 115% of that rating, which will always be higher than the 30-minute rating. Using 115 % of the highest seasonal 15-minute Facility Rating gives more conservative relay load limits, and it does not limit the time of the operator action to 15 minutes.

The Commission should also understand that the line or transformer phase over current relays are designed and applied for fault protection and not for overload protection. These are fundamentally different protection devices. Thus, EEI disagrees with the Commission's assertion that these relays should be relied upon for transformer overload protection. The Commission should recognize that R1.11 is the requirement addressing overload protection.

E. FERC should not direct the ERO consider developing a modification to Requirement R1.10.

EEI does not support the Commission's proposal to direct the ERO to submit a modification that requires any entity that implements Requirement R1.10 to verify that the limiting piece of equipment is capable of sustaining the anticipated overload current for the longest clearing time associated with fault from the facility owner.

All transformers have an overload capability that has been covered by system dispatcher action regardless of its connection method. Reliability Standard PRC-023 now requires transformer relays that are load responsive to be set to carry at least 150% of the transformer nameplate rating. System dispatcher response time is based on the degree of overload, not the connection method. R1.10 allows the line protection to be set more conservative (usually to the rating of the transformer) thus improving the setting at which relays can be set to sense fault conditions.

EEI does not agree that FERC's concerns with R1.10 merit any modifications since these concerns do not appear to be related to transmission relay loading but with fault protection. Any transformer requiring overload protection should have it specifically applied regardless of transmission line protection, or system configuration. Overload protection of a transformer should be done independently and cautiously. Providing adequate transformer protection is in the best interest of the asset owner. If adequate transformer protection can be provided by a remote breaker and still meet the loadability standard, then there is no loadability issue. Fundamental to this standard is the fact that transmission protection systems have generally been applied as fault protection and not equipment thermal protection. Other methods are typically

employed for thermal protection such as temperature monitors. Accordingly, Transmission Operator intervention is the best approach.

Furthermore, the proposed modifications to the Reliability Standard are not necessary because IEEE Standard C57.109-1993 (R2008) titled "IEEE Guide for Liquid-Immersed Transformer Through-Fault-Current Duration" establishes the thermal damage curve for transformers above 30 MVA and allows 25 times rated transformer current for two seconds. Since typically zone 2 time-delayed operation is set to less than one second, the proposed modification is inherently met. EEI notes that IEEE standards are a valued electric industry reference providing a framework for system protection and good utility practice. For example, EEI understands it is common industry practice to reject equipment from manufacturers that does not comply with IEEE standards.

F. FERC should not direct the ERO to consider developing a modification to Requirement R1.12.

EEI believes that the use of R1.12 is consistent with the objectives of Reliability Standard PRC-023-1, and the Commission should not direct a modification to Requirement R1.12. See NOPR at PP 72-73. EEI does not believe that this proposal would provide any significant benefits because it seems directed toward communications assisted schemes on three terminal lines.

The requirement imposes a moderate maximum over reach for distance relay elements which is consistent with the ability to dependably detect faults on the protected line. It may even be reasonably interpreted as the first implementation of the Commission's proposal to limit zone 3/zone 2 reach. See NOPR at PP 50-53. This setting, 125% of the apparent length of the protected line, is identical to the most commonly used industry practices for setting zone 2 relays

to date. The most common application of requirement R1.12 seems to be for lines with three or more terminals. Such lines usually require larger zone 2 settings than for two-terminal lines. When R1.12 is applied, in some cases the effect may be to prevent using a delayed, over reaching zone 3 as remote backup protection, unless other load limiting relay features are used (see above comments in response to NOPR PP 50-53). Even with this single possible limitation, this loadability method is consistent with the reliability objectives of Reliability Standard PRC-023-1.

G. FERC should not direct the ERO to consider modification to Requirement R3 and its Sub-Requirements.

While the Commission's point that the Regional Entity should be able to obtain a list of facilities in its area that are subject to the Reliability Standard has merit, the Commission should not direct the ERO to modify Requirement R.3.3 to do this. See NOPR at PP 75. The Commission should understand that the Regional Entity can already request that data from Planning Authorities and Reliability Coordinators at any time. It is not necessary for this to be formalized in a Reliability Standard as the NOPR proposes.

H. Attachment A.

1. The Commission should not direct the ERO to modify the Reliability Standard with respect to evaluation of out-of-step blocking schemes by adding the statement in section 2 of Attachment A as an additional requirement with the appropriate violation risk factor and violation severity level assignments.

EEI disagrees that the language in Section (2) of Attachment A, "[S]tandard includes out-of-step blocking schemes which shall be evaluated to ensure that they do not block trip for fault during loading condition defined within the requirements," should be in the requirements section of the Reliability Standard. See NOPR at P 77. Section (2) of Attachment A, which assures that

out-of-step relays or functions do not prevent relays from tripping for faults within their intended zone, is already appropriately placed within Attachment A. Attachment A is a compilation of the types of transmission line relays or relay schemes that are impacted by this standard. Out-of-step blocking relays are "transmission line relays" that are addressed in Requirement R1. Accordingly, EEI does not support the NOPR proposal for the Commission to direct the ERO to modify the Reliability Standard by adding the statement in section 2 of Attachment A as an additional requirement with the appropriate Risk Violation Factor and Violation Severity Level assignments. See NOPR at P 77.

2. The Commission should not direct the ERO to modify the Reliability Standard by deleting specific subsections in section 3.

As an initial matter, EEI does not believe the NOPR is clear whether the concerns of the Commission are limited to the three cases cited or whether its concerns includes all of those cases. The intent of the R3.1 requirements seems to be to apply exceptions (1) and (2) to certain relay system failures that, for normal utility practice, would result either in emergency call outs and repairs or, at the latest, the next business day. These are rare enough to have a limited BPS reliability impact in both numbers and duration. If this issue needs to be addressed at all by a Reliability Standard, EEI does not believe that Reliability Standard PRC-023 appears to be the appropriate location to address these issues. For example, Reliability Standard PRC-004-WECC-1, now pending FERC-approval, at least partially addresses these issues.

EEI nevertheless believes that the exclusions in section 3 of Attachment A are technically justifiable and the Commission should not direct the ERO to modify Reliability Standard PRC-023-1 by deleting specific subsections in this section. See NOPR at P 80. The intent of excluding elements that are enabled during a loss of potential or loss of communication

conditions is to allow lines to continue to be in-service while providing a level of fault protection during repair of the loss of potential or loss of communication condition. The alternative would be to take the line(s) or buses out of service, which would put the system in a less reliable N-1 state. Many long lines that are proposed to support the creation of the national grid will require backup protection for either or both of these types of failures. For very long lines the fault currents can be below rated continuous capability without the 150% margin. Simple schemes are what are required for the small periods of time that the backup protection will be in-service for either failure case. These exceptions only impact one facility at a time and do not present more risk than removing the facility.

EEI also opposes the Commission's proposal to direct the ERO to modify Reliability Standard PRC-023-1 by removing the footnote. See NOPR at P 86. This is entirely too prescriptive given the roles established under EPAct 2005 for the Commission and the ERO with respect to the development and approval of Reliability Standards. Here, the Commission has gone much farther than identifying its concern since this proposal does not allow for equally effective alternatives to be considered by the ERO to meet the Commission's concern.

IV. EEI does not support the Commission's proposal on Violation Risk Factors and Violation Severity Levels

A. FERC should not assign the ERO to assign a high violation risk factor to each of the Sub-Requirements R1.1 – R1.13 and to assign violation risk factor to Requirement R3 and its sub-requirements.

The Commission should not direct the ERO to consider whether to assign a high Violation Risk Factor ("VRF") to each of the "sub-Requirements R1.1 through R1.13." See NOPR at P 92. The Commission is incorrect to characterize the sub-requirements in Requirement R1 as setting forth "criteria for compliance with Requirement R1, and therefore

wrong to conclude "the reliability risk of a violation of any one of the sub-requirements is the same as a violation of Requirement R1." Id. Since the Commission should not adopt its proposal to direct the ERO to modify Requirement R3 and its sub-requirements, it should also not direct the ERO to consider assigning a new Violation Risk Factor to Requirement R3 and its sub-requirements. See NOPR at P 94. Additionally, the Commission should not direct the ERO to assign a single Violation Severity Level to Requirement R1 and a single Violation Severity Level to each of the sub-Requirements R1.1 through R1.13 consistent with its Guideline 2a compliance filing in Docket No. RR08-4-004. See NOPR at P 101.

The Commission should recognize that Reliability Standard PRC-023-1 allows for many acceptable solutions to transmission relay loadability issues. The nature of the R1 requirements is that each of R1.1 through R1.13 is an alternate method to all other compliance methods enumerated therein. This allows an entity to use any or all of these methods to meet the specific operational circumstances. Indeed, the Reliability Standard specifically states that each transmission owner, generator owners and distribution provider subject to the proposed Reliability Standard PRC-023-1 shall use one of the criteria prescribe in the sub-Requirements R1.1 through R.1.13 for any specific circuit terminal to prevent its phase protective relay settings from limiting transmission system loadability while maintaining reliable protection of the bulk electric system for all fault conditions. See NOPR at PP 19. For example, the standard allows the owner to violate R.1.1 for a particular line terminal with no penalty if that line terminal complies with R1.3.2. The real risk factor is a failure to comply with Requirement R1, but not the individual sub-requirements.

Since the sub-requirements in Requirement R1 are really various methods that can be taken to comply with Requirement R1, and a particular application only need be compliant with

one of the sub-requirements, it is not necessary for the ERO to assign Violation Risk Factors and Violation Severity Levels to each sub-requirement. See NOPR at PP 92 and 94. Assigning separate Violation Risk Factors for each R1.X is inappropriate because it would strongly imply that all entities must comply with all sub-requirements.

V. The NOPR seriously underestimates the burden of its proposed modifications to Reliability Standard PRC-023-1.

A. The NOPR proposal to establish an effective date of eighteen months following regulatory approvals for facilities operated below 200 kV is infeasible.

While the Commission should approve the implementation plan as it relates to facilities operated at 200 kV and above, EEI does not support the proposal to establish an effective date of eighteen months following applicable regulatory approvals for facilities operated below 200 kV. See NOPR at P 85. The Commission must understand that, in most cases, mitigation of a specific relay load limit by replacement within 18 months is impracticable and may be impossible resulting in the need for wholesale replacement of relays, which would be even more burdensome. For systems with substantial amounts of long lines or for those utilities with a significant amount of electromechanical relays above 100 kV, which would need to be replaced with microprocessor relays, this deadline will very likely be infeasible comply with. In many cases, a minimum of 24 months is required to account for engineering, budgeting, drafting, scheduling, equipment lead times and delivery, installation, and commissioning. Moreover, lead times for new relay panels alone may take more than 12 months for delivery. Accordingly, this proposal should be rejected.

B. The Commission's burden estimate is substantially understated

The Commission's estimate of hours for reporting and recordkeeping substantially underestimates the actual cost, in both time and money that would be involved in complying with

the Reliability Standard if the modifications proposed by the Commission are adopted. For example, one smaller investor-owned utility has estimated that it would take 4-8 man-hours of engineering time, per relay terminal, to complete a review of all line terminals on its system between 100 kV to 200 kV in excess of 850 line terminals. It believes that about one third of those line terminals would require mitigation under the Commission's proposed modifications, requiring another 6-12 man-hours of engineering time per terminal to issue relay settings, and another 6-12 man-hours of operations and maintenance staff to implement relay settings for terminals requiring mitigation. This utility is concerned that its current engineering staff cannot take on this work load in addition to its regular duties required to maintain the reliability of its system, and the availability of trained professional staff in the U.S. capable of performing these tasks is highly limited.

Multiplied by all of the systems potentially subject to the Reliability Standard as proposed to be modified by the Commission, the Commission's burden estimate is dramatically understated. EEI understands that an estimate of $40,000 to replace each terminal is not unreasonable. By a conservative estimate, there are more than 100,000 line terminals in the U.S. on facilities between 100 kV and 200 kV that would have to be checked, if NERC revised PRC-023 as proposed by Commission. Undertaking the required review of these terminals could take 1.5 million man-hours. If one-half need replacement under that standard, it could require an additional 750,000 man-hours. The Commission must consider, whether given the current scarcity of qualified engineers, there are sufficient engineering resources available to undertake these activities within the Commission's proposed timetable. Moreover, the aggregate cost to replace these terminals could exceed $2.4 billion.

CONCLUSION

For the reasons stated in these comments, EEI urges the Commission to approved proposed Reliability Standard PRC-023-1, as filed with the Commission by NERC. EEI also believes that it is inappropriate to expand the application of this standard to facilities at lower voltages, except for those facilities determined to be critical to the reliability of the BPS through an "add-in" process, rather than an exceptions process. In addition, while the other issues discussed in the NOPR may need to be addressed to ensure the reliability of the bulk power system, they should be addressed separately through the NERC standards development process.

Respectfully submitted

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