

Preliminary PRC-023-1 NOPR Thoughts & Notes – Not for Submission

Thoughts and notes by paragraph number:

P8. Zone 2 relays provide backup protection and are typically set to reach 125 percent of the protected transmission line, i.e., 100 percent of the protected transmission line and 25 percent of the adjacent transmission line (i.e., they have a 25 percent margin). Because zone 2 relays can operate for faults on both the protected transmission line and on parts of adjacent transmission lines connected to the remote terminal, they are set with a time delay to allow for coordination of protection with the zone 1 relay on the faulted line. This time delay is determined or verified through system planning analysis.

P8. [Proposed] We propose the following corrections to this paragraph. The statement “25 percent of adjacent line” is incorrect. The Zone 2 setting is 125 percent of the protected line impedance that provides 25 percent margin. The time delay of zone 2 relays are not determined or verified by transmission planning reliability assessment analysis. The time delay is determined by System Planning coordination studies

[Xcel Energy] The statement “25 percent of adjacent line” is incorrect. The Zone 2 setting is 125 percent of the protected line impedance that provides 25 percent margin.

[ATC] The time delay of zone 2 relays are not determined or verified by transmission planning reliability assessment analysis. The time delay is determined by System Planning coordination studies.

P31. Consequently, in implementing PRC-023, registered entities must comply with the requirements of other Reliability Standards. For example, protective relay settings determined and applied in accordance with the requirements of PRC-023-1 must be included in determining system performance, System Operating Limits, and Interconnection Reliability Operating Limits, and must be coordinated with other protective relay settings as required by the applicable Reliability Coordination (IRO), Transmission Operations (TOP) and TPL Reliability Standards. Only in this way can the entity satisfy its obligations under other Reliability Standards and comply with the requirements in PRC-023-1 to set protective relays while “maintaining reliability protection of the bulk electric system for all fault conditions.”

P31. [Proposed] Protective relay settings will not be, or are very unlikely be, SOLs, IROs, or need to be simulated in TPL analysis for most Planning Coordinator areas.

[ATC] FERC does not appear to properly understand the relationship between the FAC, TPL and PRC standards.

[ATC] FAC standards: Address the rules around determining facility ratings. (Establishing the SOL / IROL limits) (Only in the rare case when the relay is the limiting device is the relay setting also the facility rating. Zone 2 and / or 3 protection settings are typically set some percentage over facility rating. (Range 115% to 150%)

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[ATC] TPL standards: Addresses the rules around determining expected future system performance. (One of the major inputs is facility ratings.) System planners look for situations where a transmission facility may be operated near or over its ratings. Those situations are determined by the TPL standards and/or more stringent corporate/regional standards. The important thing to remember is that the system planner is not modeling the Zone 2 or 3 relay settings, but is using the facility ratings determined from the FAC standards.

[ATC] IRO and TOP standards: Address communication of SOLs/IROLs in real-time. The Commission supposes that the standard also applies to lower facilities (Below 200 kV and not determined as critical) if their protection takes into account above 200 kV facilities. (If their zone 2 or 3 looks at the 200 kV system then those systems are also included in the standard)

P32. Similarly, Reliability Standards TPL-001-0 through TPL-004-0 require annual system assessments to determine if the system meets performance requirements, and if not, to determine what corrective action plans must be implemented. Commission's view, protective relay settings of both primary and backup systems implemented in accordance with PRC-023-1 are subject to these requirements and must be considered as part of performing a valid assessment.

P32. [Proposed]

[ATC] If protective relay settings are the basis for any line or transformer circuit ratings, then they will be used to determine whether the system is expected to meet future system performance requirements of the TPL-001 through TPL-004 standards. In addition, if a line or transformer is loaded above the protective relay setting for any line or transformer circuit due to a TPL contingency event, then the subsequent tripping of the line or transformer circuit should be simulated as part of the required TPL analyses.

[Xcel Energy] We feel this paragraph needs further clarification, due to the statements "Similarly, Reliability Standards TPL-001-0 through TPL-004-0 require annual system assessments to determine if the system meets performance requirements,..." and "In the Commission's view, protective relay settings of both primary and backup systems implemented in accordance with PRC-023-1 are subject to these requirements and must be considered as part of performing a valid assessment." It is unclear if the intent is to have Transmission Planning Departments evaluate protective relay systems set per PRC-023-1, to see how they respond when performing their annual TPL assessments, or if the intent is for the Protective Relay groups to verify that relays set per PRC-023-1 will accommodate the load levels expected from Transmission Planning's annual TPL assessments.

P33. The Commission also emphasizes that the requirements of PRC-023-1 apply to all protection systems as described in Attachment A that provide protection to the facilities defined in section 4.1.1 through 4.1.4 of PRC-023-1, regardless of whether the protection systems provide primary or backup

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protection and regardless of whether the protection systems provide primary or backup protection and regardless of their physical location. This is because protective relays are always applied to protect specific system elements, such that when PRC-023-1 states that it governs certain protection systems “applied to” certain facilities, it means that the specified protection systems must be set according to its requirements if they are applied to protect the specified facilities. Consequently, transmission owners, generator owners, and distribution providers with protective relays applied to protect the facilities defined in section 4.1.1 through 4.1.4 of PRC-023-1 must set the relays according to PRC-023-1’s requirements. For example, a protective relay physically installed on the low-voltage side of a generator step-up transformer with the purpose of providing backup protection to a transmission line operated above 200 kV must be set in accordance with the requirements of PRC-023-1 because it is applied to protect a facility defined in the PRC-023-1.

P33. [Proposed]

Does the standard support this interpretation or is the commission grabbing at straws? If the Commission believes this to be the case then it would also be applied if this standard is lowered to 100 kV. (Therefore, the 69 kV system would be brought into the picture.)

P35. The Commission seeks comment on PRC-023-1’s applicability with respect to: (1) TOs, GOs and DPs with facilities operated between 100 kV and 200 kV and facilities operated below 100 kV that are designated as critical to the reliability of the bulk electric system, and (2) generator step-up and auxiliary transformers.

P35. [Proposed] We consider the present Applicability in the PRC023-1 is reasonable.

P37 “. . . NERC position on low benefit and high cost for less than 100 kV . . .”

P37. [Proposed] We agree with NERC’s position that minimal benefit of including less than 100 kV is not worth the cost. This request would require the industry to perform a large amount of additional analysis and record keeping to provide with very little or no additional reliability to the BES.

40. The Commission believes that the approach in Requirement 3 may not result in a comprehensive study to identify applicable facilities and, at the outset, will effectively exempt a large percentage of bulk system facilities that should otherwise be subject to the Reliability Standard.

43. The Commission expects that a comprehensive process to determine which facilities are critical to the reliability of the BES should necessarily identify nearly every facility operated at or above 100 kV.

P40, P43. [Proposed] The Blackout Report recommended that all TOs evaluate the zone 3 relay settings “operating at 230 kV and above.” In addition the Task Force recommended that NERC go further than it had proposed and “broaden the review to include

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operationally significant 115 kV and 138 kV lines, e.g., lines that are part of monitored flowgates or interfaces.”

Although NERC provided some justification on why this should be limited to 200 kV and above the Commission does not believe that NERC provided a technical analysis to support their position.

P44. In order to meet this goal, it is the Commission’s view that the process for determining the facilities operated between 100 kV and 200 kV that are critical to the reliability of the BES must include the same system simulations and assessments that are required by TPL Reliability Standards for reliable operation for all Category of Contingencies used in transmission planning.

P44. [Proposed] The Commission supposes that the standard also applies to lower facilities (Below 200 kV and not determined as critical) if their protection takes into account above 200 kV facilities. (If their zone 2 or 3 looks at the 200 kV system then those system are also included in the standard)

P45. “. . .expand scope to include facilities operated at less than 100 kV that the Regional Entities consider critical . . .”

P45. [Proposed] FERC is asking for input on lowering the criteria for the applicable facilities for the standard to 100 kV. This request would require the industry to perform a large amount of additional analysis and record keeping to provide with very little or no additional reliability to the BES.

P48. “. . . Commission proposes to expand scope to include GSU and AUX transformer circuit protection . . . Commission proposes to extend the time frame for revising the standard to expand the scope to include GSU and AUX transformer circuit protection . . .”

P48. [Proposed] We disagree with adding applicability to GSU and AUX transformer circuit protection because the GSU and AUX transformer circuit protection schemes do not or are unlikely to monitor transmission system line or transformer circuit loading and subsequently trip a transmission system line or transformer.

Although we appose adding GSU and AUX transformer circuit protection, we would support extending the timeframe for revising the standard, if the Commission does not follow our advice.

P51. The Task Force identified fourteen 345 kV and 138 kV transmission lines that disconnected during the 2003 blackout because of zone 3/zone 2 relays applied as remote circuit breaker failure and backup protection.⁸¹ Among the relays that operated unnecessarily were several zone 2 relays in Michigan that overreached their protected lines by more than 200 percent and operated without a time delay.⁸² The Task Force stated that although these and the other relays operated according to their settings, they operated so quickly that they

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impeded the natural ability of the electric system to hold together and did not allow time for operators to try to stop the cascade.

P51. [Proposed]

[Xcel Energy] line 3: The statement "...and operated without a time delay" is missing the reason for tripping without a delay. This may be due to communication failures in blocking schemes instead of over reaching adjacent zones without time coordination. This point should be clarified.

P52. The Commission is concerned that zone 3/zone 2 relays will operate because of line load or overload in extreme contingency conditions even in the absence of a fault. The large setting of zone 3/zone 2 relays makes them susceptible to operating in the absence of a fault under abnormal system conditions. This is because under abnormal system conditions, such as very high loading and large, but stable power swings, the current and voltage as measured by the impedance relay may fall within the very large magnitude and phase setting of the relay. When this occurs, the relay is susceptible to operation.

P52. [Proposed]

[Xcel Energy] In regard to FERC's concerns over Z3 relays to cover breaker failures, no exemption from Requirement 1 is given to relays which are set to cover adjacent lines in the event of breaker failure. In our opinion, the standard does not need to identify any maximum reach allowable outside of the impact on loadability. Distance elements which over reach adjacent lines and trip with insufficient delay have coordination issues, not loadability issues. Additionally, we feel the maximum reach of Z2/Z3 relays is already adequately addressed in R1 of PRC-023-1 standard (MAXIMUM reach set to 150% current and 0.85 p.u. voltage at a 30 degree load angle). No specific maximum reach needs to be defined. If remote back-up Z2/Z3 relays cannot provide adequate breaker failure coverage and still comply with PRC-023-1, then local breaker failure relaying must be applied.

P53. "... it is the Commission's view that the ERO should develop a maximum allowable relay reach for zone 3/zone 2 relays applied as remote circuit breaker failure and backup protection."

53. [Proposed] We oppose directing the ERO to develop a maximum allowable relay reach. A maximum allowable relay reach limit would prevent setting a wider zone of protection even though a valid protection coordination study may call for a longer reach. This limitation may not be appropriate for some conditions and topologies particularly in the West and less dense areas. There will be situations where following this maximum allowable relay reach limit would cause less protection. In addition, the less dense and remote areas that need protection systems with long reach will tend to be less critical to the BES and rare in application. When FERC referenced an incorrect zone 3 setting of a

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relay as a cause or contributing factor to the 2003 Blackout, this incorrect setting was an isolated event and not a common practice so referencing to it does not seem practical.

[Xcel Energy] FERC wants to direct NERC to set a maximum Zone2/Zone 3 reach. The proposal would set an artificial maximum limit which would prevent setting a wider zone regardless of the results of a protection coordination study

58. While zone 3/zone 2 relays operated during the 2003 blackout according to their settings and specifications, the inability of these relays to distinguish between a dynamic, but stable power swing and an actual fault contributed to the cascade. Because PRC-023-1 addresses only the unnecessary operation of protective relays caused by high loading conditions, and does not address unnecessary operation caused by stable power swings, the Commission is concerned that relays set according to PRC-023-1 could still operate unnecessarily because of stable power swings.

59. [Proposed] Because PRC-023-1 address only the unnecessary operation of protective relays caused by high loading conditions, and does not address unnecessary operation caused by stable power swings, the Commission is concerned that relays set according to PRC-023-1 could sill operate unnecessarily because of stable power swings.

60. In the Commission's view, a protective relay system that cannot refrain from operating under non-fault conditions because of a technological impediment is unable to achieve the performance required for reliable operation. Consequently, the Commission seeks comment on whether it should 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.

P58-60. [Proposed] We oppose including power swing relays in this standard and therefore, oppose directing the ERO to require the use of protection relay systems that differentiate between faults and stable power swing. Relay performance during power swings is a very complex subject and should be considered outside of a relay loadability standard. Additional, the MRO is not aware of any technical basis to support reliability gain from the additional complexity of adding protective element that differentiate between stable and non-stable power swings. The MRO is not aware of evidences showing that such systems would have prevented to blackout.

[ATC] If the standard was changed to include power swing relays, then it will be very difficult for the Planning Coordinator to identify which 100 kV to 200 kV circuits might be susceptible to tripping due to stable power swings and then subsequently determine whether the resultant tripping would cause any critical cascading.

[Xcel Energy] We feel that the proposed PRC-023 standard will go a very long way in preventing operation during stable swings. With that said, we feel that relay performance

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during power swings is a very complex subject, and should be considered outside of a relay loadability standard. While out of step tripping and blocking relays need to be set to comply with PRC-023-1 to prevent tripping or blocking on heavy loading, we feel the entire subject of relay performance during power swings (stability-related) does not belong in the scope of a standard on loadability.

[Xcel Energy] The protection schemes mentioned as not susceptible to power swings, created a major disturbance in MRO region on 9/18/07 due to problems with communication circuits. This seems to suggest these schemes are superior, but they are prone to misoperations due to loss of communication or timing difference in transmit and receive communication path.

P66. Requirement R1.10 establishes criteria for applicable entities to set transformer fault protective relays and transmission line relays on transmission lines that terminate in a transformer. For this system configuration, protective relays would be set such that the transformer fault protective relays and transmission line relays do not operate at or below the greater of 150 percent of the applicable maximum transformer name-plate rating (expressed in amperes), including the forced cooled ratings corresponding to all installed supplemental cooling equipment, or 115 percent of the highest owner-established emergency transformer rating.

P64. The Commission is concerned that Requirement R1.2 might conflict with Requirement R4 of existing Reliability Standard TOP-004-1(Transmission Operations), which states that if a transmission operator enters an unknown operating state, it will be considered to be in an emergency and shall restore operations to respect proven reliability power system limits within 30 minutes. The Commission is concerned that the transmission operator (or any other reliability entity affected by the facility) might conclude that it has 30 minutes to restore the system to normal when in fact it has only 15 minutes because the relay settings for certain transmission facilities have been set to operate at the 15-minute rating in accordance with Requirement R1.2. This may have an adverse impact on system reliability, since the operator might not take Requirement R1.2 into consideration.

(LES) There are two major problems with this.

The first is that R1.2 says: Set transmission line relays so they do not operate at or below 115% of the highest seasonal 15 minute facility rating of a circuit (expressed in amperes).

That's 115% of the 15 minute rating, not at the 15 minute rating.

The second problem is that the 15 minute rating does not mean that the relays are going to wait 15 minutes to trip. Fifteen minutes is the time that your facility ratings methodology has determined that the line can safely be loaded at that level. If you are in compliance with R1.2 and the relays are set to trip just above 115% and the line is loaded at or below 115%, the relays will never trip. If the line is loaded above 115%, the relays

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could be set to trip immediately and still be in compliance with R1.2. There would probably be some short time delay, but I don't know a relay engineer in his right mind who would set a fifteen minute time delay on something like this. If the abnormal condition for which the transmission operator has 30 minutes to respond, involves this line being suddenly loaded to 200% of the 15 minute rating, you certainly don't want your relays waiting around for 15 minutes before they trip.

Somehow FERC seems to think that 15 minute seasonal rating implies a 15 minute delay before tripping.

P66. [Proposed]

[Xcel Energy] We do not agree that FERC's concerns with R1.10 merit any modifications. 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; we feel that operator intervention is the best approach.

P69. Consequently, the Commission proposes 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 the fault from the facility owner. If the facility owner can not verify that ability, the facility owner should apply either different protection systems or change the topology to avoid this configuration to be in compliance with PRC-023-1. The Commission seeks comments on this proposal.

P69. [Proposed] We appose directing the ERO to modify R1.10 to verify that limiting equipment is capable of sustaining the overload current for the longest relay clearing time because it is unnecessary. 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 zone 2 time-delayed operation is typically, if not always, set to less than 1 second, the proposed requirement is inherently met

[Xcel Energy] We feel that 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 the fault from the facility owner" is not necessary. 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 zone 2 time-delayed operation is typically, if not always, set to less than 1 second, the proposed requirement is inherently met.

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70. Requirement R1.12 establishes relay loadability criteria when the desired transmission line capability is limited by the requirement to adequately protect the transmission line. In these cases, the line distance relays are still required to provide adequate protection, but the implemented relay settings will limit the desired loading capability of the circuit. NERC states that in the event an essential fault protection imposes a more constraining limit on the system, the limit imposed by the fault protection is reflected within the facility rating.⁹⁶

71. NERC claims that PRC-023-1 should cause no undue negative effect on competition or restrict the grid beyond what is necessary for reliability.⁹⁷ It explains that, with the exception of those relays that legitimately define and restrict the facility rating, PRC-023-1 removes arbitrary limits related to relay loadability that cause transmission capability limitations. NERC further points out that no market-based entity is required to comply with PRC-023-1.

72. The Commission is concerned that Requirement R1.12 allows entities to technically comply with PRC-023-1 but not achieve its stated purpose. Since protective relay settings are allowed to limit the load carrying capability of a transmission line, that line is not being utilized to its full potential in response to sudden increases in line loadings or power swings, i.e., the natural response of the Bulk-Power System will be less robust in response to system disturbances.

73. Entities subject to PRC-023-1 must employ a protection system that meets their reliability obligations, but a protection system that requires the application of Requirement R1.12 may not satisfy this requirement. Consequently, the Commission seeks comment on whether use of such a protection system is consistent with the reliability objectives of PRC-023-1, and whether the Commission should direct a modification that would require that entities that employ such a system use a different protection relay system that would meet the reliability objective of the Reliability Standard.

P70-73. [Proposed]

[Xcel Energy] We do not feel that FERC's proposal on R1.12 would have much impact. It seems to be directed toward piloted schemes on three terminal lines. If those schemes are permissive in nature, there should be no concern. If not, they can be modified.

74. Requirement R3 requires 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 the reliability of the bulk electric system and therefore subject to Requirement R1. Sub-Requirements R3.1 and R3.1.1 specify that planning coordinators must determine these facilities through a process that considers input from adjoining planning coordinators and affected reliability coordinators. Sub-Requirements R3.2 and R3.3 require planning coordinators to maintain a list of designated facilities and provide it to reliability coordinators, transmission owners, generator owners, and distribution providers within 30 days of its initial establishment, and within 30 days of any subsequent change.

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75. *In light of the Commission’s proposal to direct the ERO to modify PRC-023-1 to make it applicable to all facilities operated at or above 100 kV, with the possibility of case-by-case exceptions, and to all facilities operated below 100 kV that are designated by the Regional Entity as critical to the reliability of the bulk electric system, the Commission proposes to direct the ERO to revise Requirement R3 and Sub-Requirement R3.2 to require that the planning coordinator maintain a list that reflects the Commission’s proposal. Moreover, it is Commission’s view that the Regional Entity should know which facilities in its area are subject to the Reliability Standard. Accordingly, the Commission proposes to direct the ERO to modify Requirement R3.3 to add the Regional Entity to the list of entities that receive the list as required by Requirement R3.2*

P74. [Proposed]

[Xcel Energy] We feel that expanding the applicability of PRC-023 to all circuits above 100kV will include many lines which are not operationally significant. In effect, we feel it would divert limited resources inappropriately, quite probably to the detriment of reliability. The current requirements of R3 require Planning Coordinators to determine which lines below 200kV are to be covered by PRC-023. We feel this is the best approach for reliability. We are not convinced that there would be an increase in reliability by including all lines/terminals between 100kV and 200kV. If there were an overall resulting increase in reliability, we do not feel it would be enough to merit the resource and financial impact on our ratepayers. Additionally, we feel that the proposal to shorten the implementation time frame from 39 months after applicable regulatory approval, to 18 months for all circuits below 200 kV is not practical in application. Even if resource constraints were of no issue, we feel that 18 months is still too aggressive and 24-36 months would be necessary.

P77. *Section (2) of Attachment A states that the “[S]tandard includes out-of-step blocking schemes which shall be evaluated to ensure that they do not block trip for fault during the loading conditions defined within the requirements.” This obligation, however, is not included as a requirement in the proposed Reliability Standard. Instead, it is included in Attachment A. Requirements should be in the requirements section of a Reliability Standard to ensure compliance. Since the ERO intends to require the evaluation of out-of-step blocking applications, language to this effect should be included as a requirement and not as a statement in an Attachment. Consequently, the Commission proposes to direct the ERO to modify PRC-023-1 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*

P77. [Proposed]

[Xcel Energy] We feel that section 2 of Attachment A, assuring that Out of Step relays or functions do not prevent relays from tripping for faults within their intended zone, is appropriate 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”, which are addressed in requirement R1.

P80. The Commission seeks comment on whether the exclusions in section 3 are technically justifiable and whether the Commission should direct the ERO to modify PRC-023-1 by deleting specific subsections in section 3. The Commission also seeks comment on whether it should direct the ERO to modify subsection 3.1 to clarify that it does not exclude from the requirements of PRC-023-1 such protection systems as described above.

P80. [Proposed]

[Xcel Energy] We feel that the exceptions referenced in section 3 of Attachment A, with the exception of the second bullet under 3.1, are appropriate and technically justifiable.

General Comments:

Resource Estimates:

[Exel] We have 876 100 kV- 200 kV line terminals. Based on our analysis, we estimate the following resource requirements:

Engineering

3,500 to 7,000 O&M man-hours to complete a review of all 876 terminals,
2,000 to 4,000 O&M man-hours to issue relay settings for terminals requiring mitigation (assumes 30% of terminals require mitigation).

System Protection

2,000 to 4,000 O&M man-hours to implement relay settings for terminals requiring mitigation.

Capital Mitigation

We have not included any resource estimates for capital mitigation solutions. It is likely that there will be some, though we have no way to estimate yet.

Out-of Step Relays:

[Xcel Energy] There should not be any reference to stability regarding Out-Of-Step relays in this standard. Out-Of-Step relays only need to be applied to “stability critical” lines. All references to stability in PRC-023-1 should be put in a new System Stability standard.

Communication Relays

Are more common on 200 kV and above system

Less than 200 kV Facilities

- Bus configurations at 200 kV and above substation do not need remote clearing and therefore, less likely to have relay setting level issues,
- Blackout Task Force reported that only a small set of 100 kV to 200 kv facilities are critical to BES reliability.

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General Information

Key (for Table Below)

Highlight - Has notes/thoughts were provided.

“*” - Level of importance.

FERC Requested Comments:

P35: Applicability (okay) *

P45: Extend to 100 kV and below (disapprove) *****

P48: Extend to GSU and AUX transformers (disapprove) ***

P48: Timeframe to expand standard for GSU (disapprove) ***

P53: Zone3/Zone 2 maximum reach (disapprove) **

P60: require new relays that differentiate (disapprove) ***

P65: modify R1.2

P69: modify R1.10

P73: modify R1.12

P80: App A, Section 3 exclusion

P85: effective date for extend to 100 kV **

P92: R1 VRF

P101: R1 VSL

P103: R2 VSL

P110: new reporting burden

P113: cost of new reporting