

# Violation Risk Factor and Violation Severity Level Justifications

## PRC-023-3 – Transmission Relay Loadability Project 2010-13.2 Phase II Relay Loadability

### Violation Risk Factor and Violation Severity Level Justifications

This document provides the drafting team's justification for assignment of violation risk factors (VRFs) and violation severity levels (VSLs) for each requirement in: PRC-023 – Transmission Relay Loadability.

Each primary requirement is assigned a VRF and a set of one or more VSLs. These elements support the determination of an initial value range for the Base Penalty Amount regarding violations of requirements in FERC-approved Reliability Standards, as defined in the ERO Sanction Guidelines.

The Reliability Coordination Standard Drafting Team (SDT) applied the following NERC criteria and FERC Guidelines when proposing VRFs and VSL for the requirements under this project.

#### NERC Criteria – Violation Risk Factors

##### ***High Risk Requirement***

A requirement that, if violated, could directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures; or, a requirement in a planning time frame that, if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures, or could hinder restoration to a normal condition.

##### ***Medium Risk Requirement***

A requirement that, if violated, could directly affect the electrical state or the capability of the bulk electric system, or the ability to effectively monitor and control the bulk electric system. However, violation of a medium risk requirement is unlikely to lead to bulk electric system instability, separation, or cascading failures; or, a requirement in a planning time frame that, if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly and adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system.

However, violation of a medium risk requirement is unlikely, under emergency, abnormal, or restoration conditions anticipated by the preparations, to lead to bulk electric system instability, separation, or cascading failures, nor to hinder restoration to a normal condition.

### ***Lower Risk Requirement***

A requirement that is administrative in nature and a requirement that, if violated, would not be expected to adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor and control the bulk electric system; or, a requirement that is administrative in nature and a requirement in a planning time frame that, if violated, would not, under the emergency, abnormal, or restorative conditions anticipated by the preparations, be expected to adversely affect the electrical state or capability of the bulk electric system, or the ability to effectively monitor, control, or restore the bulk electric system. A planning requirement that is administrative in nature.

### **FERC Violation Risk Factor Guidelines**

The SDT also considered consistency with the FERC Violation Risk Factor Guidelines for setting VRFs:<sup>1</sup>

#### ***Guideline 1 – Consistency with the Conclusions of the Final Blackout Report***

The Commission seeks to ensure that Violation Risk Factors assigned to Requirements of Reliability Standards in these identified areas appropriately reflect their historical critical impact on the reliability of the Bulk-Power System.

In the VSL Order, FERC listed critical areas (from the Final Blackout Report) where violations could severely affect the reliability of the Bulk-Power System:<sup>2</sup>

- Emergency operations
- Vegetation management
- Operator personnel training
- Protection systems and their coordination
- Operating tools and backup facilities
- Reactive power and voltage control
- System modeling and data exchange
- Communication protocol and facilities
- Requirements to determine equipment ratings

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<sup>1</sup> North American Electric Reliability Corp., 119 FERC ¶ 61,145, order on reh'g and compliance filing, 120 FERC ¶ 61,145 (2007) ("VRF Rehearing Order").

<sup>2</sup> Id. at footnote 15.

- Synchronized data recorders
- Clearer criteria for operationally critical facilities
- Appropriate use of transmission loading relief

***Guideline 2 – Consistency within a Reliability Standard***

The Commission expects a rational connection between the sub-Requirement Violation Risk Factor assignments and the main Requirement Violation Risk Factor assignment.

***Guideline 3 – Consistency among Reliability Standards***

The Commission expects the assignment of Violation Risk Factors corresponding to Requirements that address similar reliability goals in different Reliability Standards would be treated comparably.

***Guideline 4 – Consistency with NERC’s Definition of the Violation Risk Factor Level***

Guideline (4) was developed to evaluate whether the assignment of a particular Violation Risk Factor level conforms to NERC’s definition of that risk level.

***Guideline 5 – Treatment of Requirements that Co-mingle More Than One Obligation***

Where a single Requirement co-mingles a higher risk reliability objective and a lesser risk reliability objective, the VRF assignment for such Requirements must not be watered down to reflect the lower risk level associated with the less important objective of the Reliability Standard.

**NERC Criteria – Violation Severity Levels**

Violation Severity Levels (VSLs) define the degree to which compliance with a requirement was not achieved. Each requirement must have at least one VSL. While it is preferable to have four VSLs for each requirement, some requirements do not have multiple “degrees” of noncompliant performance, and may have only one, two, or three VSLs.

**Violation severity levels should be based on the guidelines shown in the table below:**

Lower	Moderate	High	Severe
Missing a minor element (or a small percentage) of the required performance. The performance or product measured has significant value as it almost meets the full intent of the requirement.	Missing at least one significant element (or a moderate percentage) of the required performance. The performance or product measured still has significant value in meeting the intent of the requirement.	Missing more than one significant element (or is missing a high percentage) of the required performance or is missing a single vital component. The performance or product has limited value in meeting the intent of the requirement.	Missing most or all of the significant elements (or a significant percentage) of the required performance. The performance measured does not meet the intent of the requirement or the product delivered cannot be used in meeting the intent of the requirement.

## **FERC Order of Violation Severity Levels**

FERC's VSL guidelines are presented below, followed by an analysis of whether the VSLs proposed for each requirement in the standard meet the FERC Guidelines for assessing VSLs:

### ***Guideline 1 – Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance***

Compare the VSLs to any prior levels of non-compliance and avoid significant changes that may encourage a lower level of compliance than was required when levels of non-compliance were used.

### ***Guideline 2 – Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties***

A violation of a "binary" type requirement must be a "Severe" VSL.

Do not use ambiguous terms such as "minor" and "significant" to describe noncompliant performance.

### ***Guideline 3 – Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement***

VSLs should not expand on what is required in the requirement.

### ***Guideline 4 – Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations***

... unless otherwise stated in the requirement, each instance of non-compliance with a requirement is a separate violation. Section 4 of the Sanction Guidelines states that assessing penalties on a per violation per day basis is the "default" for penalty calculations.

VRF and VSL Justifications

VRF Justifications – PRC-023-3, R7	
Proposed VRF	High
NERC VRF Discussion	<p>A Violation Risk Factor of High is consistent with the NERC VRF definition. Failure by an entity to apply load-responsive protective relay settings in accordance with the proposed standard PRC-025-1, Attachment 1; Relay Settings, if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures, or could hinder restoration to a normal condition.</p> <p>The unnecessary tripping of protective relays on generators has often been determined to have expanded the scope and/or extended the duration of disturbances of the past 25 years. This was also noted to be a serious issue in the August 2003 “blackout” in the northeastern North American continent.</p> <p>This requirement is analogous with the proposed PRC-025-1, Attachment 1, Table 1, Options 14 through 19 for generator interconnection Facility(ies). The loss of the connection between the generator and the Transmission system can directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures, or could hinder restoration to a normal condition.</p>
FERC VRF G1 Discussion	<p>Guideline 1- Consistency w/ Blackout Report:</p> <p>This requirement is directly related to observations from the NERC Recommendation 8a and US Canada Power System Outage Task Force Recommendation 21a, and is developed explicitly to address those recommendations. A High VRF is consistent with the role that relay loadability played in contributing to the August 14, 2003 Northeast Blackout. Further, this requirement addresses observations from the related reports that a number of generators tripped because of load-responsive protective relays, and establishes criteria recognizing the dynamic performance of generators during stressed system conditions for lines which connect those generators to the transmission system.</p>

<b>VRF Justifications – PRC-023-3, R7</b>	
<b>Proposed VRF</b>	<b>High</b>
FERC VRF G2 Discussion	Guideline 2- Consistency within a Reliability Standard: Requirements R1, R2, and R8 have similar reliability objectives and are assigned High VRFs.
FERC VRF G3 Discussion	Guideline 3- Consistency among Reliability Standards: No other approved Reliability Standards address similar reliability goals. Requirement R1 of Draft Reliability Standard PRC-025-1 has a similar reliability goal, and is currently assigned a High VRF.
FERC VRF G4 Discussion	Guideline 4- Consistency with NERC Definitions of VRFs The proposed VRF is consistent with the NERC definitions of VRFs because as described above the requirement ensures that load-responsive protective relays will not improperly operate during the loading conditions described within the R7 criteria. This requirement if violated, could directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures.
FERC VRF G5 Discussion	Guideline 5- Treatment of Requirements that Co-mingle More than One Obligation The proposed requirement does not co-mingle more than one obligation.

<b>Proposed VSLs for PRC-023-3, R7</b>				
<b>R7</b>	<b>Lower</b>	<b>Moderate</b>	<b>High</b>	<b>Severe</b>
<b>R7</b>	N/A	N/A	N/A	The responsible entity did not set one of its generator interconnection Facility relays in accordance with the criteria in Attachment C.

VSL Justifications – PRC-023-3, R7	
NERC VSL Guidelines	The NERC VSL guidelines are satisfied by identifying noncompliance based on “pass-fail” or a binary condition. The entity either “applied” or “did not apply” the setting(s) in accordance with PRC-023-3 Attachment C; therefore, the Violation Severity Level must be designated Severe.
FERC VSL G1 Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance	This is a new requirement. However, the proposed VSL for Requirement R7 is consistent with the approved VSL for the similar Requirements R1 and R2 within PRC-023-2.
FERC VSL G2 Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties  Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent  Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous Language	Guideline 2a: The proposed VSL is binary and assigns a “Severe” category for the violation of the requirement.  Guideline 2b: The proposed VSL for Requirement R7 does not contain ambiguous language.
FERC VSL G3 Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement	The proposed VSL is consistent with the corresponding Requirement, R7.
FERC VSL G4 Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations	The proposed VSL is based on a single violation and not a cumulative number of violations.

VRF Justifications – PRC-023-3, R8	
Proposed VRF	High
NERC VRF Discussion	<p>A Violation Risk Factor of High is consistent with the NERC VRF definition. Failure by an entity to apply load-responsive protective relay settings in accordance with the proposed standard PRC-025-1, Attachment 1; Relay Settings, if violated, could, under emergency, abnormal, or restorative conditions anticipated by the preparations, directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures, or could hinder restoration to a normal condition.</p> <p>The unnecessary tripping of protective relays on generators has often been determined to have expanded the scope and/or extended the duration of disturbances of the past 25 years. This was also noted to be a serious issue in the August 2003 “blackout” in the northeastern North American continent.</p> <p>This requirement is analogous with the proposed PRC-025-1, Attachment 1, Table 1, Options 7 through 12 for generator interconnection Facility(ies). The loss of the connection between the generator and the Transmission system can directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures, or could hinder restoration to a normal condition.</p>
FERC VRF G1 Discussion	<p>Guideline 1- Consistency w/ Blackout Report:</p> <p>This requirement is directly related to observations from the NERC Recommendation 8a and US Canada Power System Outage Task Force Recommendation 21a, and is developed explicitly to address those recommendations. A High VRF is consistent with the role that relay loadability played in contributing to the August 14, 2003 Northeast Blackout. Further, this requirement addresses observations from the related reports that a number of generators tripped because of load-responsive protective relays, and establishes criteria recognizing the dynamic performance of generators during stressed system conditions for transformers which connect those generators to the transmission system.</p>



VRF Justifications – PRC-023-3, R8	
Proposed VRF	High
FERC VRF G2 Discussion	Guideline 2- Consistency within a Reliability Standard: Requirements R1, R2, and R7 have similar reliability objectives and are assigned High VRFs.
FERC VRF G3 Discussion	Guideline 3- Consistency among Reliability Standards: No other approved Reliability Standards address similar reliability goals. Requirement R1 of draft Reliability Standard PRC-025-1 has a similar reliability goal, and is currently assigned a High VRF.
FERC VRF G4 Discussion	Guideline 4- Consistency with NERC Definitions of VRFs The proposed VRF is consistent with the NERC definitions of VRFs because as described above the requirement ensures that load-responsive protective relays will not improperly operate during the loading conditions described within the R8 criteria. This requirement if violated, could directly cause or contribute to bulk electric system instability, separation, or a cascading sequence of failures, or could place the bulk electric system at an unacceptable risk of instability, separation, or cascading failures.
FERC VRF G5 Discussion	Guideline 5- Treatment of Requirements that Co-mingle More than One Obligation The proposed requirement does not co-mingle more than one obligation.

Proposed VSLs for PRC-023-3, R8				
R8	Lower	Moderate	High	Severe
R8	N/A	N/A	N/A	The responsible entity did not set one of its generator step-up transformer relays in accordance with the criteria in Attachment C.

VSL Justifications – PRC-023-3, R8	
NERC VSL Guidelines	The NERC VSL guidelines are satisfied by identifying noncompliance based on “pass-fail” or a binary condition. The entity either “applied” or “did not apply” the setting(s) in accordance with PRC-023-3 Attachment C; therefore, the Violation Severity Level must be designated Severe.
FERC VSL G1 Violation Severity Level Assignments Should Not Have the Unintended Consequence of Lowering the Current Level of Compliance	This is a new requirement. However, the proposed VSL for Requirement R8 is consistent with the approved VSL for the similar Requirements R1 and R2 within PRC-023-2.
FERC VSL G2 Violation Severity Level Assignments Should Ensure Uniformity and Consistency in the Determination of Penalties Guideline 2a: The Single Violation Severity Level Assignment Category for "Binary" Requirements Is Not Consistent Guideline 2b: Violation Severity Level Assignments that Contain Ambiguous Language	Guideline 2a: The proposed VSL is binary and assigns a “Severe” category for the violation of the requirement. Guideline 2b: The proposed VSL for Requirement R8 does not contain ambiguous language.
FERC VSL G3 Violation Severity Level Assignment Should Be Consistent with the Corresponding Requirement	The proposed VSL is consistent with the corresponding Requirement, R8.
FERC VSL G4 Violation Severity Level Assignment Should Be Based on A Single Violation, Not on A Cumulative Number of Violations	The proposed VSL is based on a single violation and not a cumulative number of violations.

