

# Implementation Plan

## Project 2010-13.2 - Relay Loadability: Generator

### PRC-023-3 – Transmission Relay Loadability

#### Project 2010-13.2 Phase II Relay Loadability

#### Requested Approvals

- PRC-023-3 – Transmission Relay Loadability

#### Requested Retirements

- PRC-023-2 – Transmission Relay Loadability

#### Prerequisite Approvals

- PRC-025-1 – Generator Relay Loadability\*

\*A supplemental SAR was approved by the Standards Committee at their January 16-17, 2013 meeting to authorize the drafting team to make changes to PRC-023-2 to comport with the proposed draft PRC-025-1 – Generator Relay Loadability ~~and~~ in order to establish a bright line between the applicability of load-responsive protective relays in the current transmission and the proposed generator relay loadability standards.

#### Revisions to Defined Terms in the NERC Glossary

- None

#### Background

The generator relay loadability standard drafting team and industry stakeholders raised a concern that there is no bright line to clearly distinguish which load-responsive protective relays pertain to the~~about the potential for overlap between~~ existing PRC-023-2 – Transmission Relay Loadability standard, effective in the United States on July 1, 2012, and the proposed PRC-025-1 – Generator Relay Loadability ~~standards. The concern is that there was no bright line to clearly distinguish which load-responsive protective relays pertain to each~~ standard. To resolve this concern, the~~The~~ drafting team ~~researched the issue and~~ proposed to modify the applicability section of PRC-023-2. The standard drafting team clarified, for~~to clarify the~~ each functional entity, the~~entity's~~ applicability of PRC-023-2 by tying applicability to the~~with respect to which~~ terminal the load-responsive protective relay is connected to within the Transmission system.

Requirements R1 through R6 continue to apply to the Generator Owner to avoid a potential gap in situations where this entity owns load-responsive protective relays subject to transmission line relay loadability (PRC-

023). These situations could be the result of a current configuration or future changes or additions in transmission configurations.

The proposed PRC-023-3 standard also includes two new Requirements, R7 and R8 to address load-responsive protective relay loadability in cases where the Distribution Provider or Transmission Owner owns generator interconnection Facilities or generator step-up (GSU) transformers. The implementation time for Requirements R7 and R8 comports with the periods established in the proposed PRC-025-1 Implementation Plan.

**General Considerations**

~~It~~The Implementation Plan period reflects consideration that a specific period is not required because no new entity or facilities are subject to compliance. Also, it is expected that the implementation plan and period for PRC-023-2 will have been achieved, and that it will not need to be considered in part, by the time PRC-023-3 is adopted by the NERC Board of Trustees and by the time of other approvals by applicable governmental authorities. The proposed PRC-023-3 Implementation Plan now reflects specific milestone dates that are known, time periods consistent~~conjunction~~with PRC-023-2, and an implementation period for new Requirements R7 and R8. this revision.

**Applicable Entities**

- Distribution Provider
- Generator Owner
- Planning Coordinator
- Transmission Owner

**Effective Date**

**New Standard**

PRC-023-3 First day of the first calendar quarter beyond the date that this standard is approved by applicable regulatory authorities, or in those jurisdictions where regulatory approval is not required, the standard becomes effective on the first day of the first calendar quarter beyond the date this standard is approved by the NERC Board of Trustees, or as otherwise made effective pursuant to the laws applicable to such ERO governmental authorities.

**Standards for Retirement**

PRC-023-2 Midnight of the day immediately prior to the Effective Date of PRC-023-~~32~~ –

Transmission Relay Loadability in the particular jurisdiction in which the new standard is becoming effective.

**Implementation Plan for Definitions**

No definitions are proposed as a part of this standard.

**Implementation Plan for PRC-023-3, Requirements R1 through R6~~All requirements~~**

Each Distribution Provider, Generator Owner, Planning Coordinator, and Transmission Owner applicable to this standard shall be 100% compliant on the following dates:~~effective date of the standard according to the jurisdiction.~~

<u>Requirement</u>	<u>Applicability</u>	<u>Implementation Date</u>	
		<u>Jurisdictions where Regulatory Approval is Required</u>	<u>Jurisdictions where No Regulatory Approval is Required</u>
<u>R1</u>	<u>Each Transmission Owner, Generator Owner, and Distribution Provider with transmission lines operating at 200 kV and above and transformers with low voltage terminals connected at 200 kV and above, except as noted below.</u>	<u>First day of the first calendar quarter, after applicable regulatory approvals</u>	<u>First calendar quarter after Board of Trustees adoption, or as otherwise made effective pursuant to the laws applicable to such ERO governmental authorities</u>
	<ul style="list-style-type: none"> <li><u>For supervisory elements as described in PRC-023-3 - Attachment A, Section 1.6</u></li> </ul>	<u>The later of July 1, 2014 or first day of the first calendar quarter after applicable regulatory approvals</u>	<u>First day of the first calendar quarter after Board of Trustees adoption, or as otherwise made effective pursuant to the laws applicable to such ERO governmental authorities</u>

Requirement	Applicability	Implementation Date	
		Jurisdictions where Regulatory Approval is Required	Jurisdictions where No Regulatory Approval is Required
	<ul style="list-style-type: none"> <li>For switch-on-to-fault schemes as described in PRC-023-3 - Attachment A, Section 1.3</li> </ul>	First day of the first calendar quarter after applicable regulatory approvals	First day of the first calendar quarter after Board of Trustees adoption, or as otherwise made effective pursuant to the laws applicable to such ERO governmental authorities
<b>R1</b> (continued)	Each Transmission Owner, Generator Owner, and Distribution Provider with circuits identified by the Planning Coordinator pursuant to Requirement R6	Later of the first day of the first calendar quarter 39 months following notification by the Planning Coordinator of a circuit's inclusion on a list of circuits per application of Attachment B, or the first day of the first calendar year in which any criterion in Attachment B applies, unless the Planning Coordinator removes the circuit from the list before the applicable effective date	Later of the first day of the first calendar quarter 39 months following notification by the Planning Coordinator of a circuit's inclusion on a list of circuits per application of Attachment B, or the first day of the first calendar year in which any criterion in Attachment B applies, unless the Planning Coordinator removes the circuit from the list before the applicable effective date

<u>Requirement</u>	<u>Applicability</u>	<u>Implementation Date</u>	
		<u>Jurisdictions where Regulatory Approval is Required</u>	<u>Jurisdictions where No Regulatory Approval is Required</u>
<b><u>R2 and R3</u></b>	<u>Each Transmission Owner, Generator Owner, and Distribution Provider with transmission lines operating at 200 kV and above and transformers with low voltage terminals connected at 200 kV and above</u>	<u>First day of the first calendar quarter after applicable regulatory approvals</u>	<u>First day of the first calendar quarter after Board of Trustees adoption, or as otherwise made effective pursuant to the laws applicable to such ERO governmental authorities</u>
<b><u>R2 and R3 continued</u></b>	<u>Each Transmission Owner, Generator Owner, and Distribution Provider with circuits identified by the Planning Coordinator pursuant to Requirement R6</u>	<u>Later of the first day of the first calendar quarter 39 months following notification by the Planning Coordinator of a circuit's inclusion on a list of circuits per application of Attachment B, or the first day of the first calendar year in which any criterion in Attachment B applies, unless the Planning Coordinator removes the circuit from the list before the applicable effective date</u>	<u>Later of the first day of the first calendar quarter 39 months following notification by the Planning Coordinator of a circuit's inclusion on a list of circuits per application of Attachment B, or the first day of the first calendar year in which any criterion in Attachment B applies, unless the Planning Coordinator removes the circuit from the list before the applicable effective date</u>

Requirement	Applicability	Implementation Date	
		Jurisdictions where Regulatory Approval is Required	Jurisdictions where No Regulatory Approval is Required
<b>R4</b>	<u>Each Transmission Owner, Generator Owner, and Distribution Provider that chooses to use Requirement R1 criterion 2 as the basis for verifying transmission line relay loadability</u>	<u>First day of the first calendar quarter six months after applicable regulatory approvals</u>	<u>First day of the first calendar quarter six months after Board of Trustees adoption, or as otherwise made effective pursuant to the laws applicable to such ERO governmental authorities</u>
<b>R5</b>	<u>Each Transmission Owner, Generator Owner, and Distribution Provider that sets transmission line relays according to Requirement R1 criterion 12</u>	<u>First day of the first calendar quarter after applicable regulatory approvals</u>	<u>First day of the first calendar quarter after Board of Trustees adoption, or as otherwise made effective pursuant to the laws applicable to such ERO governmental authorities</u>
<b>R6</b>	<u>Each Planning Coordinator shall conduct an assessment by applying the criteria in Attachment B to determine the circuits in its Planning Coordinator area for which Transmission Owners, Generator Owner, and Distribution Providers must comply with Requirements R1 through R5</u>	<u>Later of January 1, 2014 or the first day of the first calendar quarter after applicable regulatory approvals</u>	<u>First day of the first calendar quarter after Board of Trustees adoption, or as otherwise made effective pursuant to the laws applicable to such ERO governmental authorities</u>

**Implementation Plan for PRC-023-3, Requirements R7 and R8**

**Load-responsive protective relays subject to the standard**

Each Transmission Owner and Distribution Provider that owns load-responsive protective relays applicable to this standard shall be 100% compliant on the following dates:

<u>Requirement</u>	<u>Applicability</u>	<u>Implementation Date</u>	
		<u>Jurisdictions where Regulatory Approval is Required</u>	<u>Jurisdictions where No Regulatory Approval is Required</u>
<b><u>R7</u></b>	<u>Each Transmission Owner and Distribution Provider shall set their load responsive relays in accordance with PRC-023-3, Attachment C at the terminals of the generator interconnection Facility.</u>	<u>Where determined by the Transmission Owner and Distribution Provider that replacement or removal is not necessary, the first day 48 months after applicable regulatory approvals</u>	<u>Where determined by the Transmission Owner and Distribution Provider that replacement or removal is not necessary, the first day 48 months after Board of Trustees adoption, or as otherwise made effective pursuant to the laws applicable to such ERO governmental authorities</u>
		<u>Where determined by the Transmission Owner and Distribution Provider that replacement or removal is necessary, the first day 72 months after applicable regulatory approvals</u>	<u>Where determined by the Transmission Owner and Distribution Provider that replacement or removal is necessary, the first day 72 months after Board of Trustees adoption, or as otherwise made effective pursuant to the laws applicable to such ERO governmental authorities</u>

Requirement	Applicability	Implementation Date	
		Jurisdictions where Regulatory Approval is Required	Jurisdictions where No Regulatory Approval is Required
R8	Transmission Owner and Distribution Provider shall set their load responsive relays in accordance with PRC-023-3, Attachment C at the terminals of the generator step-up transformer.	Where determined by the Transmission Owner and Distribution Provider that replacement or removal is not necessary, the first day 48 months after applicable regulatory approvals	Where determined by the Transmission Owner and Distribution Provider that replacement or removal is not necessary, the first day 48 months after Board of Trustees adoption, or as otherwise made effective pursuant to the laws applicable to such ERO governmental authorities
		Where determined by the Transmission Owner and Distribution Provider that replacement or removal is necessary, the first day 72 months after applicable regulatory approvals	Where determined by the Transmission Owner and Distribution Provider that replacement or removal is necessary, the first day 72 months after Board of Trustees adoption, or as otherwise made effective pursuant to the laws applicable to such ERO governmental authorities



**Load-responsive protective relays which become applicable to the standard**

Each Transmission Owner and Distribution Provider that owns load-responsive protective relays that become applicable to this standard, not because of the actions of the Transmission Owner and Distribution Provider including, but not limited to changes in NERC Registration Criteria, Bulk Electric System (BES) definition, or any other non-Generator Owner action, shall be 100% compliant on the following dates:

<u>Requirement</u>	<u>Applicability</u>	<u>Implementation Date</u>	
		<u>Jurisdictions where Regulatory Approval is Required</u>	<u>Jurisdictions where No Regulatory Approval is Required</u>
<b>R7</b>	<u>Each Transmission Owner and Distribution Provider shall set their load responsive relays in accordance with PRC-023-3, Attachment C at the terminals of the generator interconnection Facility.</u>	<u>Where determined by the Transmission Owner and Distribution Provider that replacement or removal is not necessary, the first day 48 months beyond the date the load-responsive protective relays become applicable to the standard</u>	<u>Where determined by the Transmission Owner and Distribution Provider that replacement or removal is not necessary, the first day 48 months beyond the date the load-responsive protective relays become applicable to the standard</u>
		<u>Where determined by the Transmission Owner and Distribution Provider that replacement or removal is necessary, the first day 72 months beyond the date the load-responsive protective relays become applicable to the standard</u>	<u>Where determined by the Transmission Owner and Distribution Provider that replacement or removal is necessary, the first day 72 months beyond the date the load-responsive protective relays become applicable to the standard</u>

Requirement	Applicability	Implementation Date	
		Jurisdictions where Regulatory Approval is Required	Jurisdictions where No Regulatory Approval is Required
R8	Transmission Owner and Distribution Provider shall set their load responsive relays in accordance with PRC-023-3, Attachment C at the terminals of the generator step-up transformer.	Where determined by the Transmission Owner and Distribution Provider that replacement or removal is not necessary, the first day 48 months beyond the date the load-responsive protective relays become applicable to the standard	Where determined by the Transmission Owner and Distribution Provider that replacement or removal is not necessary, the first day 48 months beyond the date the load-responsive protective relays become applicable to the standard
		Where determined by the Transmission Owner and Distribution Provider that replacement or removal is necessary, the first day 72 months beyond the date the load-responsive protective relays become applicable to the standard	Where determined by the Transmission Owner and Distribution Provider that replacement or removal is necessary, the first day 72 months beyond the date the load-responsive protective relays become applicable to the standard

### Revisions or Retirements to Already Approved Standards

The following table identifies the sections of the approved standard that shall be added, retired, or revised when this standard is implemented. If the drafting team is recommending revisions, those changes are identified in bold~~the retirement or revision of a requirement, that text is blue~~ with underlining for additions and for deletions in bold red with a strikeout.

Already Approved Standard	Proposed Replacement <del>Requirement(s)</del>
<p><b>PRC-023-2</b></p> <p>4.1. Functional Entity</p> <p>4.1.1 Transmission Owners with load-responsive phase protection systems as described in PRC-023-2 - Attachment A, applied to circuits defined in 4.2.1 (<i>Circuits Subject to Requirements R1 – R5</i>).</p> <p>4.1.2 Generator Owners with load-responsive phase protection systems as described in PRC-023-2 - Attachment A, applied to circuits defined in 4.2.1 (<i>Circuits Subject to Requirements R1 – R5</i>).</p> <p>4.1.3 Distribution Providers with load-responsive phase protection systems as described in PRC-023-2 - Attachment A, applied to circuits defined in 4.2.1(<i>Circuits Subject to Requirements R1 – R5</i>), provided those circuits have bi-directional flow capabilities.</p> <p>4.1.4 Planning Coordinators</p>	<p><b>PRC-023-3</b></p> <p>4.1.Functional Entity</p> <p>4.1.1 Transmission Owners with load-responsive phase protection systems as described in PRC-023-2 3 - Attachment A, applied <b>at the terminals of the <del>to</del></b> circuits defined in 4.2.1, <b><u>4.2.3, or 4.2.4</u></b> (<i>Circuits Subject to Requirements R1 – R5, <u>R7, and R8</u></i>).</p> <p>4.1.2 Generator Owners with load-responsive phase protection systems as described in PRC-023-<del>32</del> - Attachment A, applied <b>at the terminals of the <del>to</del></b> circuits defined in 4.2.1 (<i>Circuits Subject to Requirements R1 – R5</i>).</p> <p>4.1.3 Distribution Providers with load-responsive phase protection systems as described in PRC-023-2 3 - Attachment A, applied <b>at the terminals of the <del>to</del></b> circuits defined in 4.2.1, <b><u>4.2.3, or 4.2.4</u></b> (<i>Circuits Subject to Requirements R1 – R5, <u>R7, and R8</u></i>), provided those circuits have bi-directional flow capabilities.</p> <p>4.1.4 Planning Coordinators</p>
<p><b>Notes:</b> The change in <u>the proposed PRC-023-3 Applicability</u><del>applicability</del> creates a bright line between those load-responsive protective relays that are applicable to PRC-023-3 – Transmission Relay Loadability and the proposed PRC-025-1 – Generator Relay Loadability. This is evident by the minor changes to the <u>A</u>applicability text to distinguish the applicability of the relays by which “terminal” the load-responsive protective relay is connected to within the Transmission system.</p>	

Already Approved Standard	Proposed Replacement Requirement(s)
<p><b><u>PRC-023-2</u></b> <b><u>None.</u></b></p>	<p><b><u>PRC-023-3</u></b> <b><u>New applicability</u></b></p> <p><b><u>4.2 Circuits</u></b></p> <p><b><u>4.2.3 Circuits Subject to Requirement R7</u></b> <b><u>4.2.3.1 Transmission lines that are used solely to export energy directly from a BES generating unit or generating plant to the network.</u></b></p> <p><b><u>4.2.4 Circuits Subject to Requirement R8</u></b> <b><u>4.2.2.2 Transformers with low voltage terminals connected below 200 kV, including generator step-up transformers, that are used solely to export energy directly from a BES generating unit or generating plant to the network.</u></b></p>
<p><b><u>Notes:</u></b> The above two new applicability items for circuits subject to the standard were added to address to situations where the Distribution Provider or Transmission Owner own either generator interconnection Facilities or generator step-up (GSU) transformers, respectively.</p>	
<p><b><u>PRC-023-2</u></b> <b><u>R1, Criterion 6. – Set transmission line relays applied on transmission lines connected to generation stations remote to load so they do not operate at or below 230% of the aggregated generation nameplate capability.</u></b></p>	<p><b><u>PRC-023-3</u></b> <b><u>New Requirement</u></b></p> <p><b><u>R7. Each Transmission Owner and Distribution Provider shall set their load responsive relays in accordance with PRC-023-3, Attachment C at the terminals of the generator interconnection Facility. [Violation Risk Factor: High] [Time Horizon: Long Term Planning].</u></b></p>
<p><b><u>Notes:</u></b> This new requirement is included to address a gap concerning generator step-up (GSU) transformers where the Transmission Owner or Distribution Provider has applied load-responsive protective relays. Referencing the proposed Applicability section 4.2.4, Circuits Subject to Requirement R8, this requirement closes the gap for those transformers that have low voltage terminals connected below 200 kV. Currently, only those Transmission system transformers with low voltage terminals connected at 200 kV and above are applicable to the Transmission Owner or</p>	

Already Approved Standard	Proposed Replacement Requirement(s)
<p><u>Distribution Provider or transformers with low voltage terminals under 200 kV if the Planning Coordinator determines (in accordance with requirement R6) that they should be subject to PRC-023-3. This is identified by in the proposed Applicability 4.2.1.4. This requirement eliminates the gap between the proposed PRC-023-3 and PRC-025-1 so that generator step-up (GSU) transformers (i.e., where the Transmission system transformer is the transmission line termination – Criterion 10) apply to the Transmission Owner or Distribution Provider in the proposed PRC-023-3 in the same manner as the Generator Owner in the proposed PRC-025-1.</u></p> <p><u>Circuits subject to R8 are primarily GSU transformers and also include “aggregated generator transformers” – those connecting wind farms, and photovoltaic sites.</u></p>	
<p><b><u>PRC-023-2</u></b></p> <p><u>None.</u></p>	<p><b><u>PRC-023-3</u></b></p> <p><b><u>New Requirement</u></b></p> <p><u>R8. Transmission Owner and Distribution Provider shall set their load responsive relays in accordance with PRC-023-3, Attachment C at the terminals of the generator step-up transformer. [Violation Risk Factor: High] [Time Horizon: Long Term Planning].</u></p>
<p><b><u>Notes:</u></b> <u>The above new Requirement R7 addresses a gap between the proposed PRC-023-3 and PRC-025-1 standards. This requirement applies to the condition where the Transmission Owner or Distribution Provider apply load-responsive protective relays on a generator interconnection Facility(ies). Rather than add Transmission Owner and Distribution Provider to the proposed PRC-025-1, it was equally and efficient to include the same loadability criteria as the proposed PRC-025-1 in the proposed PRC-023-3 standard. Requirement R7 proposes to replace the current PRC-023-2, Requirement R1, Criterion 6 with a new requirement. Criterion 6 for setting the load-responsive protective relays so they do not operate at or below 230% now has additional flexibility in setting such relays according to Attachment C which is referenced in this new Requirement, R7. The 230% criterion comports with the loadability criteria found in the proposed PRC-023-3 Attachment C. The Transmission Owner and Distribution Provider in the proposed PRC-023-3 will have the same options for setting its load-responsive protective relays when applied on generator interconnection Facility(ies) as the Generator Owner in the proposed PRC-025-1.</u></p>	