

## Project 2007-06 System Protection Coordination Mapping Document

Mapping Document Showing Translation of PRC-001-2 – System Protection Coordination to PRC-027-1 – Protection System Coordination for Performance During Faults  
Updated 10-31 to reflect changes made to requirements

Standard: PRC-001-2 - System Protection Coordination		
Requirement in Approved Standard	Translation to New Standard or Other Action	Proposed Language or Comment in PRC-027-1
<b>R1.</b> Each Transmission Operator, Balancing Authority, and Generator Operator shall be familiar with the purpose and limitations of protection system schemes applied in its area.	Retained	NA
<p><b>R2.</b> A Generator Operator or Transmission Operator shall coordinate new protective systems and changes as follows.</p> <p><b>R2.1</b> Each Generator Operator shall coordinate all new protective systems and all protective system changes with its Transmission Operator and Host Balancing Authority.</p>	<p>PRC-027-1, R1, R3, &amp; R4</p> <p>Note: Applicability changed to GO, TO and DP</p>	<p><b>R1.</b> Each Transmission Owner, Generator Owner, and Distribution Provider shall:</p> <p><b>1.1.</b> Perform a Protection System Study (<u>PSCS</u>) for each <u>of its</u> Interconnected Element on its System as follows:</p> <p><b>1.1.3.</b> According to an agreed upon time frame to meet the schedule when proposing or being notified of a change, as described in Requirement R3, Part 3.1-<del>or</del>, <u>or within six calendar months of being notified of a change as described in</u> Part 3.3, or technically justify why</p>

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<p><b>R2.2</b> Each Transmission Operator shall coordinate all new protective systems and all protective system changes with neighboring Transmission Operators and Balancing Authorities.</p>		<p>such a study is not required.</p> <p><b>1.2.</b> Within 90 calendar days after the completion of each <del>Protection System Study</del><u>PSCS</u> provide to the <u>other</u> owner(s) of the Protection System(s) associated with the Interconnected Element(s) a summary of the results of each <del>Protection System Study</del><u>PSCS</u> performed pursuant to <del>this requirement</del><u>Requirement R1, Part 1.1</u>, (including, at a minimum, the <del>protective relay settings</del><u>Protection Systems</u> reviewed, <del>power system Elements to be isolated, contingencies evaluated,</del><u>the associated</u> Fault currents used, any issues identified, and any revisions <u>or actions</u> proposed).</p> <p><b>R3.</b> Each Transmission Owner, Generator Owner, and Distribution Provider shall provide to each Transmission Owner, Generator Owner, and Distribution Provider connected to the same Interconnected Element:</p> <p><b>3.1.</b> Details for any <u>proposed</u> change or <del>additions</del><u>addition</u> listed below; either at an existing or new Facility associated with the Interconnected Element; or at other <del>facilities</del><u>Facilities</u> when the proposed change modifies the conditions used in the coordination of Protection Systems associated with the Interconnected Element(s).</p> <ul style="list-style-type: none"> <li>• New installation, replacement with different types, or modification of: protective relays or protective function settings, communication systems, current transformer ratios and voltage</li> </ul>

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		<p>transformer ratios</p> <ul style="list-style-type: none"> <li>• Changes to a transmission system Element that <del>change</del><u>alter</u> any sequence or mutual coupling impedance</li> <li>• Changes to generator unit(s) that result in a change in impedance</li> <li>• Changes to the generator step-up transformer(s) that result in a change in impedance</li> </ul> <p><b>3.2.</b> Requested information related to the coordination of Protection Systems associated with an Interconnected Element within 30 calendar days of receiving a request or according to an agreed-upon schedule.</p> <p><b>3.3.</b> Within 30 calendar days, details of changes made to Protection Systems during Misoperation investigations, commissioning, maintenance activities, or emergency replacements made due to failures of Protection System components.</p> <p><b>R4.</b> Each Transmission Owner, Generator Owner, and Distribution Provider shall:</p> <p><b>4.2.</b> Prior to implementing any <del>planned</del><u>proposed</u> change(s) <u>or modifications</u> associated with Requirement R3, Part 3.1, <del>confirm the or Requirement 4, Part 4.1, affirm that the other</del> owner(s) of each Facility associated with the affected Interconnected Element <del>accept any</del></p>

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		<del>resulting</del> have accepted the Protection System(s) changes <u>including the resolution of any identified coordination issues.</u>
<p><b>R3.</b> Each Transmission Operator shall coordinate protection systems on major transmission lines and interconnections with neighboring Generator Operators, Transmission Operators, and Balancing Authorities.</p>	<p>PRC-027-1, R1, R2, R3, &amp; R4</p> <p>Note: Applicability changed to GO, TO and DP</p>	<p><b>R1.</b> Each Transmission Owner, Generator Owner, and Distribution Provider shall:</p> <p><b>1.1.</b> Perform a <del>Protection System Study</del><u>PSCS</u> for each <u>of its</u> Interconnected Element on its System as follows:</p> <p><b>1.1.1.</b> Within <del>48</del><u>60</u> calendar months after the effective date of this standard, if no <del>Protection System Study</del><u>PSCS</u> for that Interconnected Element exists.</p> <p><b>1.1.2.</b> Within <del>six</del><u>12</u> calendar months after determining or being notified of a 10% or greater change in Fault current at an interconnecting bus, as described in Requirement R2, or technically justify why such a study is not required.</p> <p><b>1.2.</b> Within 90 calendar days after the completion of each <del>Protection System Study</del><u>PSCS</u> provide to the <u>other</u> owner(s) of the Protection System(s) associated with the Interconnected Element(s) <del>a</del> a summary of the results of each <del>Protection System Study</del><u>PSCS</u> performed pursuant to <del>this requirement</del><u>Requirement R1, Part 1.1</u>, (including, at a minimum, the <del>protective relay settings</del><u>Protection Systems</u> reviewed, <del>power system Elements to be isolated, contingencies evaluated, the associated</del> Fault currents used, any issues identified, and any revisions <u>or actions</u></p>

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		<p>proposed).</p> <p><b>R2.</b> For each <del>Facility associated with an</del> Interconnected Element on its System, the Transmission Owner shall:</p> <p><del>2.1. At least,</del> once every <del>2460</del> calendar months, <u>technically justify why Fault current does not affect the Protection System coordination, or:</u></p> <p><b>2.1.1</b> Perform a short circuit study to determine the present maximum available Fault current values (single line to ground and 3-phase) at the interconnecting bus where a Protection System <u>Coordination Study (PSCS)</u> is available per Requirement R1.</p> <p><b>2.1.2.</b> Calculate the percent <u>deviationchange</u> between the Fault current values (single line to ground and 3-phase for the interconnecting bus(s) under consideration) used in the most recent <u>Protection System StudyPSCS</u> and the Fault current values determined pursuant to Requirement R2, Part <del>2.1.1</del>, using the following equation:</p> $\frac{I_{scs} - I_{PSCS}}{I_{PSCS}} \times 100$ <p>Where: <math>I_{scs}</math> = Fault current value from present short-circuit study</p> <p>And: <math>I_{PSCS}</math> = Fault current value used in the most recent <u>Protection System StudyPSCS</u></p>

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		<p><b>2.2.1</b> <del>2.2.</del> Within 30 calendar days after identification <del>where the calculation performed, pursuant to Requirement R2, Part 2.1.2, indicates of a deviation in Fault current change</del> of 10% or greater <u>in either single line to ground or 3-phase Fault current</u>, provide <del>each the updated Fault current values (I<sub>SCS</sub>) to each</del> owner of the Protection System associated with the Interconnected Element <del>the updated Fault current values (I<sub>scs</sub>).</del></p> <p><b>R3.</b> Each Transmission Owner, Generator Owner, and Distribution Provider shall provide to each <del>Responsible Entity</del> <u>Transmission Owner, Generator Owner, and Distribution Provider</u> connected to the same Interconnected Element:</p> <p><b>3.2.</b> Requested information related to the coordination of Protection Systems associated with an Interconnected Element within 30 calendar days of receiving a request or according to an agreed-upon schedule.</p> <p><b>R4.</b> Each Transmission Owner, Generator Owner, and Distribution Provider shall:</p> <p><b>4.1.</b> Within 90 calendar days after receipt, or according to an agreed upon schedule, review the summary results of a <del>Protection System Study, as described in PSCS (per</del> Requirement R1, Part 1.2;) and respond <del>as to whether further action is required</del> <u>the other owner(s):</u></p>

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		<ul style="list-style-type: none"><li>• <u>Accepting the results, or</u></li><li>• <u>Rejecting the results and suggesting modifications to resolve any identified coordination issues.</u></li></ul>