

## 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 (PSCS) for each of its 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, or within six calendar months of being notified of a change as described in 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 PSCS provide to the other owner(s) of the Protection System(s) associated with the Interconnected Element(s), a summary of the results of each PSCS performed pursuant to Requirement R1, Part 1.1, (including, at a minimum, the Protection Systems reviewed, the associated Fault currents used, any issues identified, and any revisions or actions 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 proposed change or addition listed below; either at an existing or new Facility associated with the Interconnected Element; or at other Facilities 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 transformer ratios</li> <li>• Changes to a transmission system Element that alter any sequence</li> </ul>

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		<p>or mutual coupling impedance</p> <ul style="list-style-type: none"> <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 proposed change(s) or modifications associated with Requirement R3, Part 3.1 or Requirement 4, Part 4.1, affirm that the other owner(s) of each Facility associated with the affected Interconnected Element have accepted the Protection System(s) changes including the resolution of any identified coordination issues.</p>
<b>R3.</b> Each Transmission Operator shall	PRC-027-1,	<b>R1.</b> Each Transmission Owner, Generator Owner, and Distribution Provider

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coordinate protection systems on major transmission lines and interconnections with neighboring Generator Operators, Transmission Operators, and Balancing Authorities.	R1, R2, R3, & R4  Note: Applicability changed to GO, TO and DP	<p>shall:</p> <ul style="list-style-type: none"> <li><b>1.1.</b> Perform a PSCS for each of its Interconnected Element on its System as follows:                             <ul style="list-style-type: none"> <li><b>1.1.1.</b> Within 60 calendar months after the effective date of this standard, if no PSCS for that Interconnected Element exists.</li> <li><b>1.1.2.</b> Within 12 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.</li> </ul> </li> <li><b>1.2.</b> Within 90 calendar days after the completion of each PSCS provide to the other owner(s) of the Protection System(s) associated with the Interconnected Element(s), a summary of the results of each PSCS performed pursuant to Requirement R1, Part 1.1, (including, at a minimum, the Protection Systems reviewed, the associated Fault currents used, any issues identified, and any revisions or actions proposed).</li> </ul> <p><b>R2.</b> For each Interconnected Element on its System, the Transmission Owner shall, once every 60 calendar months, technically justify why Fault current does not affect the Protection System coordination, or:</p> <ul style="list-style-type: none"> <li><b>2.1.</b> Perform a short circuit study to determine the present maximum available Fault current values (single line to ground and 3-phase) at the</li> </ul>

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		<p>interconnecting bus where a Protection System Coordination Study (PSCS) is available per Requirement R1.</p> <p><b>2.2.</b> Calculate the percent change between the Fault current values (single line to ground and 3-phase for the interconnecting bus(s) under consideration) used in the most recent PSCS and the Fault current values determined pursuant to Requirement R2, Part 2.1, 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            And: <math>I_{pSCS}</math> = Fault current value used in the most recent PSCS</p> <p><b>2.2.1</b> Within 30 calendar days after identification of a change of 10% or greater in either single line to ground or 3-phase Fault current, provide the updated Fault current values (<math>I_{scs}</math>) to each owner of the Protection System associated with the Interconnected Element.</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>3.2.</b> Requested information related to the coordination of Protection Systems associated with an Interconnected Element within 30 calendar</p>

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		<p>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 PSCS (per Requirement R1, Part 1.2) and respond to the other owner(s):</p> <ul style="list-style-type: none"> <li>• Accepting the results, or</li> <li>• Rejecting the results and suggesting modifications to resolve any identified coordination issues.</li> </ul>