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 and PER-005-2 — Operations Personnel Training.

Standard: PRC-001-2 - System Protection Coordination		
Requirement in Approved Standard	**Translation to New Standard or Other Action**	**Proposed Language or Comment in PER-005-2**
R1. Each Transmission Operator, Balancing Authority, and Generator Operator shall be familiar with the purpose and limitations of protection system schemes applied in its area.	PER-005-2	PER-005-2 — Operations Personnel Training (entire standard)

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**
~~**R1.** 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~~
R2. A Generator Operator or Transmission Operator shall coordinate new protective systems and changes as follows. **R2.1** Each Generator Operator shall coordinate all new protective systems and all protective system changes with its Transmission Operator and Host Balancing Authority. **R2.2** Each Transmission Operator shall coordinate all new protective systems and all protective system changes with neighboring Transmission Operators and Balancing Authorities.	PRC-027-1~~,~~: R1, R2, R3, ~~&~~ R4 & R5 Note: Applicability changed to GO, TO and DP	**R1.** Each Transmission Owner, Generator Owner, and Distribution Provider shall: **1.1.** Perform a Protection System Coordination Study (PSCS) for each of its ~~Interconnected Element on its System~~Interconnecting Elements as follows: **1.1.1.** Within 60 calendar months after the effective date of this standard, if no PSCS for that Interconnecting Element exists. **1.1.2.** 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. **1.1.3.** 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~~technically justify why such a study is not required. **1.1.4.** Within six calendar months of being notified of a change as described in Requirement R3, Part 3.3, or technically justify why such

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**
		a study is not required. **1.2.** Within 90 calendar days after the completion of each PSCS or the technical justification pursuant to Requirement R1, Part 1.1, provide to the other owner(s) of the Protection System(s) associated with the ~~Interconnected~~Interconnecting 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~~current(s) used, any issues identified, and any revisions or actions proposed~~).~~; or the technical justification. **R2.** For each Interconnecting Element on its System, the Transmission Owner shall, once every 60 calendar months: **2.1.** Perform a short circuit study to determine the present maximum available Fault current values (single line to ground and 3-phase) at its interconnecting bus where a PSCS is available pursuant to Requirement R1. **2.2.** Calculate the percent change between the Fault current values (single line to ground and 3-phase for its 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: $$\% \, Change = \left| \frac{Iscs - Ipscs}{Ipscs} \right| x \, 100$$

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**
		Where : I_{scs} = Fault current value from present short circuit study And: I_{pscs} = Fault current value used in the most recent PSCS **2.2.1** 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 (Iscs) to each owner of the Protection System(s) associated with the Interconnecting Element. **R3.** Each Transmission Owner, Generator Owner, and Distribution Provider shall provide to each Transmission Owner, Generator Owner, and Distribution Provider connected to the same ~~Interconnected~~Interconnecting Element: **3.1.** Details for any proposed change or addition listed below; either at an existing or new Facility associated with the ~~Interconnected~~Interconnecting Element; or at other Facilities when the proposed change modifies the conditions used in the coordination of Protection Systems associated with the ~~Interconnected~~Interconnecting Element(s). • New installation, replacement with different types, or modification of~~:~~ protective relays or protective function settings, communication systems, current transformer ratios and voltage transformer ratios • Changes to a transmission system Element that alter any sequence or mutual coupling impedance

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**
		• Changes to generator unit(s) that result in a change in impedance • Changes to the generator step-up transformer(s) that result in a change in impedance **3.2.** Requested information related to the coordination of Protection Systems associated with an ~~Interconnected~~Interconnecting Element, within 30 calendar days of receiving a request or according to an agreed-upon schedule. **3.3.** Within 30 calendar days of making the change, details of permanent changes made to Protection Systems associated with the Interconnecting Element during Misoperation investigations, commissioning, maintenance activities, or emergency replacements made due to failures of Protection System components. **R4.** Each Transmission Owner, Generator Owner, and Distribution Provider ~~shall~~that received a summary of the results of a PSCS or a technical justification explaining why a PSCS is not required (pursuant to Requirement R1, Part 1.2) shall, within 90 calendar days after receipt or according to an agreed upon schedule, review the summary of the results or the technical justification, and respond to the other owner(s) either: • ~~**4.2.** Prior~~Confirming that the summary of the results was reviewed and no coordination issue(s) were identified, or • Confirming that the summary of the results was reviewed and any identified coordination issue(s) were noted, or

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**
		• Confirming that a technical justification was reviewed and no issue(s) were identified, or • Confirming that a technical justification was reviewed and any identified issue(s) were noted **R5.** Each Transmission Owner, Generator Owner, and Distribution Provider that received a response pursuant to Requirement R4 shall address any identified coordination issues 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~~addition(s) to the Protection System(s) ~~changes including the resolution of any identified coordination issues~~associated with the Interconnecting Element.
R3. Each Transmission Operator shall coordinate protection systems on major transmission lines and interconnections with neighboring Generator Operators, Transmission Operators, and Balancing Authorities.	PRC-027-1~~,~~: R1, R2, R3, ~~&~~ R4 & R5 Note: Applicability changed to GO, TO and DP	**R1.** Each Transmission Owner, Generator Owner, and Distribution Provider shall: **1.1.** Perform a Protection System Coordination Study (PSCS) for each of its ~~Interconnected Element on its System~~ Interconnecting Elements as follows: **1.1.1.** Within 60 calendar months after the effective date of this standard, if no PSCS for that ~~Interconnected~~Interconnecting Element exists. **1.1.2.** Within 12 calendar months after determining or being notified of a 10% or greater change in Fault current at an interconnecting bus,

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**
		as described in Requirement R2, or technically justify why such a study is not required. **1.~~2.~~** ~~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).~~**1.3.** 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 technically justify why such a study is not required. **1.1.4.** Within six calendar months of being notified of a change as described in Requirement R3, Part 3.3, or technically justify why such a study is not required. **1.2.** Within 90 calendar days after the completion of each PSCS or the technical justification pursuant to Requirement R1, Part 1.1, provide to the other owner(s) of the Protection System(s) associated with the Interconnecting Element(s): a summary of the results of each PSCS performed, including, at a minimum, the Protection Systems reviewed, the associated Fault current(s) used, any issues identified, and any revisions or actions proposed; or the technical justification. **R2.** For each ~~Interconnected~~Interconnecting Element on its System, the

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**
		Transmission Owner shall, once every 60 calendar months~~, technically justify why Fault current does not affect the Protection System coordination, or~~: **2.1.** Perform a short circuit study to determine the present maximum available Fault current values (single line to ground and 3-phase) at ~~the~~its interconnecting bus(s) where a ~~Protection System Coordination Study (~~PSCS~~)~~ is available ~~per~~pursuant to Requirement R1. **2.2.** Calculate the percent change between the Fault current values (single line to ground and 3-phase for ~~the~~its 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: $$\% \, Change = \left| \frac{Iscs - Ipscs}{Ipscs} \right| x \, 100$$ Where : I_{scs} = Fault current value from present short circuit study And: I_{pscs} = Fault current value used in the most recent PSCS **2.2.1** 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 (Iscs) to each owner of the Protection System(s) associated with the ~~Interconnected~~Interconnecting Element. **R3.** Each Transmission Owner, Generator Owner, and Distribution Provider shall provide to each Transmission Owner, Generator Owner, and Distribution Provider connected to the same ~~Interconnected~~Interconnecting Element:

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**
		3.1. Details for any proposed change or addition listed below; either at an existing or new Facility associated with the Interconnecting Element; or at other Facilities when the proposed change modifies the conditions used in the coordination of Protection Systems associated with the Interconnecting Element(s). • New installation, replacement with different types, or modification of protective relays or protective function settings, communication systems, current transformer ratios and voltage transformer ratios • Changes to a transmission system Element that alter any sequence or mutual coupling impedance • Changes to generator unit(s) that result in a change in impedance • Changes to the generator step-up transformer(s) that result in a change in impedance **3.2.** Requested information related to the coordination of Protection Systems associated with an ~~Interconnected~~Interconnecting Element within 30 calendar days of receiving a request or according to an agreed-upon schedule. **3.3.** Within 30 calendar days of making the change, details of permanent changes made to Protection Systems associated with the Interconnecting Element during Misoperation investigations, commissioning, maintenance activities, or emergency replacements made due to failures of Protection

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**
		System components. **R4.** Each Transmission Owner, Generator Owner, and Distribution Provider that received a summary of the results of a PSCS or a technical justification explaining why a PSCS is not required (pursuant to Requirement R1, Part 1.2) shall: **4.1.** Within, within 90 calendar days after receipt, or according to an agreed upon schedule, review the summary of the results of a PSCS (per Requirement R1, Part 1.2)or the technical justification, and respond to the other owner(s).) either: • AcceptingConfirming that the results, or • • Rejectingsummary of the results was reviewed and suggesting modifications to resolveno coordination issue(s) were identified, or • Confirming that the summary of the results was reviewed and any identified coordination issue(s) were noted, or • Confirming that a technical justification was reviewed and no issue(s) were identified, or • Confirming that a technical justification was reviewed and any identified issue(s) were noted **R5.** Each Transmission Owner, Generator Owner, and Distribution Provider that received a response pursuant to Requirement R4 shall address any identified coordination issues prior to implementing any proposed change(s)

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**
		or addition(s) to the Protection System(s) associated with the Interconnecting Element.