

Table of Issues and Directives

Project 2010-13.3 – Relay Loadability: Stable Power Swings

Table of Issues and Directives Associated with PRC-026-1

Source	Issue or Directive Language (including Para. #)	Section and/or Requirement(s)	Consideration of Issue or Directive
FERC Order 733	150. We will not direct the ERO to modify PRC-023-1 to address stable power swings. However, because both NERC and the Task Force have identified undesirable relay operation due to stable power swings as a reliability issue, we direct the ERO to develop a Reliability Standard that requires the use of protective relay systems that can differentiate between faults and stable power swings and, when necessary, phases out protective relay systems that cannot meet this	All requirements	<p>The PRC-026-1 standard is responsive to this directive because it applies a focused approach for the Planning Coordinator to identify BES Elements according to the Requirement R1, Criteria. The criterion used to identify a BES Element is based on the NERC System Protection and Control Subcommittee technical document, <i>Protection System Response to Power Swings</i> ("PSRPS Report").¹ Specific criterion is based on where power swings are most likely.</p> <p>These include (1) Generator(s) where an angular stability constraint exists which is addressed by an operating limit or a Remedial Action Scheme (RAS)</p>

¹ NERC System Protection and Control Subcommittee technical document, *Protection System Response to Power Swings*, August 2013: http://www.nerc.com/comm/PC/System%20Protection%20and%20Control%20Subcommittee%20SPCS%2020/SPCS%20Power%20Swing%20Report_Final_20131015.pdf

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	<p>requirement.</p> <p>We also direct the ERO to file a report no later than 120 days of this Final Rule addressing the issue of protective relay operation due to power swings. The report should include an action plan and timeline that explains how and when the ERO intends to address this issue through its Reliability Standards development process.</p> <p>AND</p> <p>153. While we recognize that addressing stable power swings is a complex issue, we note that more than six years have passed since the August 2003 blackout and there is still no Reliability Standard that addresses relays tripping due to stable power swings. Additionally, NERC has long identified undesirable relay operation due to stable power swings as a</p>		<p>and those Elements terminating at the transmission switching station associated with the generator(s); (2) An Element that is monitored as part of a System Operating Limit (SOL) that has been established based on angular stability constraints identified in system planning or operating studies; (3) An Element that forms the boundary of an island due to angular instability within the most recent underfrequency load shedding (UFLS) assessment; (4) An Element identified in the most recent Planning Assessment where relay tripping occurs due to a stable or unstable power swing during a simulated disturbance; and (5) An Element reported by the Generator Owner or Transmission Owner, until the Planning Coordinator determines the Element is no longer susceptible to power swings.</p> <p>Requirement R2 is responsive to the directive by requiring the Transmission Owner to identify any BES Elements that trip due to a stable or unstable power swing during an actual system Disturbance and any Element that forms the boundary of an island during an actual system Disturbance due to the</p>

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	<p>reliability issue. Consequently, pursuant to section 215(d)(5) of the FPA, we find that undesirable relay operation due to stable power swings is a specific matter that the ERO must address to carry out the goals of section 215, and we direct the ERO to develop a Reliability Standard addressing undesirable relay operation due to stable power swings.</p>		<p>operation of its load-responsive protective relays. This insures that any Elements that trip due to actual system Disturbances are identified, reported to the Planning Coordinator for awareness, and evaluated using PRC-026-1 – Attachment B, Criteria A and B.</p> <p>Requirement R3 is responsive to the directive by requiring the Generator Owner to identify any BES Elements that trip due to a stable or unstable power swing during an actual system Disturbance and due to the operation of its load-responsive protective relays. This insures that any Elements that trip due to actual system Disturbances are identified, reported to the Planning Coordinator for awareness, and evaluated using PRC-026-1 – Attachment B, Criteria A and B.</p> <p>Requirement R5 requires Generator Owners and Transmission Owners to evaluate its load-responsive protective relays that are applied at all of the terminals of each Element identified by Requirements R1, R2, and R3. The evaluation initially and periodically according to the Requirement, ensures that either the load-responsive protective</p>

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			<p>relay meets the PRC-026-1 – Attachment B, Criteria A and B, or that when it is found not to meet the criteria that the entity develop a Corrective Action Plan (CAP) in Requirement R5.</p> <p>Requirement R5 ensures a CAP is developed to modify the Protection System or apply power swing blocking so that the Protection System is not expected to trip in response to a stable power swing.</p> <p>Requirement R6 requires the entity to implement each developed CAP to modify its Protection System to achieve the PRC-026-1 – Attachment B, Criteria A and B.</p>
	<p>162. The PSEG Companies also assert that the Commission’s approach to stable power swings should be inclusive and include “islanding” strategies in conjunction with out-of-step blocking or tripping requirements. We agree with the PSEG Companies and direct the ERO to consider “islanding” strategies that achieve the fundamental</p>	<p>Requirement R1, Criterion 3 and Requirement R2, Criterion 2.</p>	<p>Islanding strategies were considered during the development of the proposed standard. It was determined that consideration of islanding strategies does not comport with the purpose and approach of the proposed standard. The proposed standard’s purpose is to ensure that load-responsive protective relays are expected to not trip in response to stable power swings during non-Fault conditions, not to determine where the transmission system Elements</p>

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	<p>performance for all islands in developing the new Reliability Standard addressing stable power swings.</p>		<p>should form island boundaries.</p> <p>With respect to considering the islanding concern, the proposed standard does require that an Element that was part of a boundary that formed an island since January 1, 2003 be identified as an that is within the scope of the proposed standard.</p> <p>Any identified Element(s) require the Generator Owner and Transmission Owner entities to determine whether its load-responsive protective relays applied at the terminal of such an Element, if any, are susceptible to tripping in response to a stable power swing. If so, the Generator Owner and Transmission Owner is required to take specific action according to the requirements to reduce the risk that its load-responsive protective relays would trip in response to stable power swings during non-Fault conditions.</p>