

Industry Advisory Protection System Single Point of Failure

Initial Distribution: March 30, 2009

This issue has caused three significant disturbances since 2004.

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Distribution: **Initial Distribution: Primary Compliance Contacts**
Transmission Owners, Generation Owners, Distribution Providers owning protection systems installed on the Bulk Electric System

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Primary Interest Groups: Protection System Engineers

Advisory: Transmission Owners, Generation Owners, and Distribution Providers owning protection systems installed on the Bulk Electric System are advised to address single-points-of-failure on their protection systems when identified in routine system evaluations to prevent N-1 transmission system contingencies from evolving into more severe or even extreme events.

These entities are additionally advised to begin preparing an estimate of the resource commitment required to review, re-engineer, and develop a workable outage and construction schedule to address single points of failure on their protection systems.

**Advisory:
(continued)**

NERC will be conducting a survey of the industry through the Regional Entities to collect information to assist in developing an implementation plan for the proposed redundancy standard presently under development in through Standards Project 2009-7 — Reliability of Protection Systems. NERC expects the survey to be issued on or about April 15, 2009.

Based on the potential impacts to system reliability, one potential priority order to consider as estimates are prepared is:

1. Switching stations \geq 200-kV with 4 or more circuits
2. Generating stations with aggregate generation \geq 2,000 MW
3. Generating stations with units \geq 1,000 MW
4. Switching stations with 6 or more operationally significant circuits 100-kV to 200-kV
5. All other generating stations \geq 20 MVA or generation groupings \geq 75 MVA
6. All other switching stations

Background:

Protection system component failures may render a protective scheme inoperative, which could result in N-1 transmission system contingencies evolving into more severe or even extreme events.

Three system disturbances were caused by failure of a single component (lockout or auxiliary relay) of a protection system in the past 5 years:

Westwing Outage — June 14, 2004 (Category 3 outage)

Single auxiliary relay on 230-kV line failed, resulting in the loss of approximately 5,000 MW of generation and the potential for collapse of the Western Interconnection.

Broad River Disturbance — Aug. 25, 2007 (Category 2 outage)

Single lockout relay used to trip and initiate breaker failure timers on GSU failed, resulting in the loss of seven generating units at three plants (totaling 871 MW) and the loss of five 230-kV transmission lines.

PacifiCorp East Disturbance — Feb. 14, 2008 (Category 3 outage)

Single lockout relay used to trip and initiate breaker failure timers on GSU failed, resulting in the loss of eight generating units at three plants (totaling 2,803 MW), four 345-kV transmission lines, and the shedding of 247 MW of interruptible and 200 MW of firm load.

NERC

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