NERC Releases 2016 State of Reliability Report

Protection system misoperations continue to be a significant risk factor

On May 17, 2016 NERC published its 2016 State of Reliability Report covering the performance of the Bulk Power System (BPS) in 2015. The report assesses the reliability performance of the BPS over the past year, identifies and quantifies power system reliability performance risks and identifies key areas for improvement, including protection system misoperations.

Key Findings

The Report found that the BPS in North America provided an Adequate Level of Reliability (ALR) for 2015. The objectives needed to meet ALR include stable BPS frequency and voltage within predefined ranges and no instability, uncontrolled separation of system elements, no cascading loss of system elements, or voltage collapse. NERC believes that targeting the top three causes of misoperations is an effective risk mitigation strategy. The causes for misoperations are presented in the figure below with the most significant being incorrect settings; relay malfunction and communications systems failures.

NERC 2016 State of Reliability Report Figure E.16: NERC Misoperations by Cause Code (2Q 2011–3Q 2015)
Over the past year, the industry focused on the instantaneous ground overcurrent function and improving relay system commissioning tests. The reported relay misoperation rate for 2015 was 9.4%. This is a performance level that NERC hopes to improve upon through its efforts to make the industry aware of its misoperation performance. The 2016 State of Reliability report recommends improving knowledge of this reliability risk by focusing education on the instantaneous ground overcurrent protection function settings and on improving relay system commissioning tests.

NERC’s report shows that utilities in the Southwest Power Pool (SPP), Midwest Reliability Organization (MRO) and the Reliability First Regions (RF) collectively have misoperation rates that are above the norm for NERC as a whole. Utilities in these regions should take note of this and consider whether they have a role to fulfil to improve the overall performance by reviewing their misoperations as reported and their protection programs in general.

NERC 2016 State of Reliability Report Figure 4.11: Three-Year Misoperation Rate by Region (Q4 2012–Q3 2015)
NERC is revising a number of Reliability Standards that involve protection systems and these have been reported in prior TRC Regulatory Updates. To increase awareness and transparency, NERC reports that it will continue to conduct industry webinars on protection systems and document success stories on how entities achieve higher levels of protection system performance. The quarterly protection system misoperation trends of NERC and the Regional Entities can be viewed on NERC’s website.

**Prepare for Success**

TRC has extensive experience in Protection & Control Design, System Protection (relay settings), Communications Engineering (including relay pilot protection communications) and Testing & Commissioning. Our experts can assist your staff to perform protection system analysis, revise or update protection schemes and/or test/commission protection schemes.

**Resources**

- TRC Protection and Controls Services
- TRC System Protection Services
- TRC Communications Engineering Services

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TRC’s engineers and planners provide full service generation and transmission, consulting and construction management for utilities, municipalities and industry. Comprised of over 1,000 personnel, many of whom are experienced utility engineers, our project teams know how to plan, design, and install facilities that meet a client’s financial, technical, and scheduling goals.

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