Success Story
NERC compliance

Helping a utility to become NERC compliant

Problem:
NERC continues to evolve with additional standards being introduced and requiring compliance within a short period of time

Solution:
Eaton's power system studies and compliance solutions

Results:
Completion of system studies to meet NERC compliance requirements and helping the customer develop an understanding and knowledge for NERC PRC standards

"The utility had a firm compliance requirement date from NERC. Eaton took a proactive approach to discuss data requirements and confirm all assumptions for modeling and calculations required for the NERC compliance report"

Joel Liu, engineering manager, advanced power systems, Eaton

Background

The key objective of North American Electric Reliability Corporation (NERC) standards is to protect and maintain the reliability of the North American Bulk Electrical System. Since the power system blackout in 2003, NERC has continued to issue new reliability standards to ensure generation assets are appropriately modeled, adequately protected and systems designed to prevent such an event from reoccurring. Each standard requires system study to prove compliance to the standard requirements. Each utility or generator owner (GO) must demonstrate this compliance by prescribed dates.

The utility, a non-profit wholesaler of electrical power and service provider, approached Eaton to perform the NERC compliance studies within on of their service territories, specific to the following Protection and Control (PRC) standards – PRC –019, PRC – 024, PRC – 025, and PRC – 027. There were 12 units at five generating facilities requiring system study and compliance reports to be completed by the firm NERC implementation dates.

Eaton's power system studies and compliance solutions enabled the utility to meet their NERC compliance requirements with data compilation, NERC compliance report and a detailed system review and recommendations.

Challenge

The NERC Standards continue to evolve with additional standards being introduced and requiring compliance within a short period of time. This ever-changing regulatory world can be complex for utilities and result in insufficient time to understand the standard requirements or ensure proper data collection to support the new compliance needs.

Solution

NERC has detailed requirements to ensure compliance to each of the standards summarized in **Table 1** as well as a firm deadline by which the utility needed to demonstrate compliance. Eaton's power systems engineers have experience in completing the modeling and assessments required to meet NERC standards. The project included compliance for four different NERC PRC standards across multiple sites with multiple generation sources, including gas and hydro turbine generation facilities.

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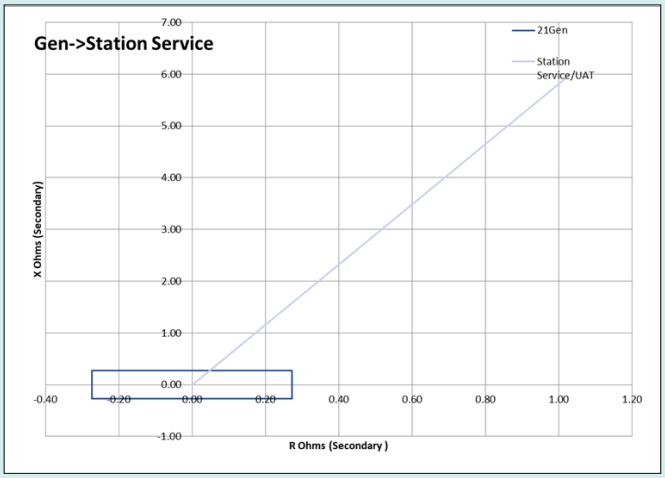
Eaton engineers began each site evaluation with an assessment of the previous site PRC study reports, the existing power system equipment documentation, and the protective relay setting information. Eaton evaluated the available data, confirmed assumptions for unknown data per standard requirements, and completed all necessary calculations and system modeling to ensure compliance per the stated standard. A compliance report was issued per site in compliance NERC standard requirements. In the cases where compliance was not demonstrated, Eaton provided the utility with a detailed explanation as well as recommendations to achieve compliance. The final reports also included all calculation and modeling results, as well as further recommendations for system and protection optimization.

NERC PRC standard	Standard intent
PRC-019-2	Coordinate generator units with its associated voltage regulating controls, limit functions, equipment capabilities, and protective settings.
PRC-024	Ensure generator owners set their generator protective relays such that generating units remain connected during defined frequency and voltage excursions.
PRC-025-2	To set load-responsive protective relays associated with generation facilities at a level to prevent unnecessary tripping of generators during a system disturbance for conditions that do not pose a risk of damage to the associated equipment.
PRC-027-1	To coordinate generator unit protection systems with the Bulk Electric System (BES) elements, such that all protection systems operate in the intended sequence during faults.

Table 1



Impedance plot of the generator relay backup distance element with the station service transformer

Results

Standards Knowledge

PRC-027-01 is the most recent standard released included in this project scope. In addition to the completion of NERC Compliance Reports, Eaton helped the utility develop an understanding and knowledge about the new industry standard. This knowledge sharing supported the customer in developing a plan to ensure ongoing data collection for the compliance process. Eaton's system knowledge and standards expertise enabled Eaton to act as a single source provider for NERC PRC Compliance.

Meticulous Recommendations

Eaton provided a comprehensive list of recommendations for each PRC standard for each location that had been studied. These recommendations outline data, additional modeling, or equipment recommendations to optimize protection or system functionality.

Delivery Timelines

The utility had a firm compliance requirement date from NERC. Eaton took a proactive approach to discuss data requirements and confirm all assumptions for modeling and calculations required for the NERC compliance report. In some cases, additional data collection resulted in abbreviated schedules to complete the modeling and report. With good communication and strong relationships, Eaton was able to meet the delivery requirements for the compliance reports.

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