



Protection System Maintenance Program following NERC PRC-005-6

What is NERC PRC-005-6?

The North American Electric Reliability Corporation's (NERC) PRC-005-6 mandates the development and implementation of maintenance programs for protection systems, automatic reclosing, and sudden pressure relaying components, critical for the reliability of the Bulk Electric System (BES). These programs aim to ensure optimal working conditions for these critical systems, minimizing disruptions and enhancing grid resilience. The standard applies to generation owners, transmission owners, and distribution providers, emphasizing their collective responsibility in BES operation.

Generation owners, transmission owners, and distribution providers are required to establish, implement, and maintain a documented maintenance program for their protection systems. These programs should include procedures for maintaining protective relay systems, communication networks, and associated equipment. Additionally, entities must establish a documented Protection System Maintenance Program (PSMP) that identifies maintenance methods, including performance-based and time-based approaches, for each component type. The PSMP should also include monitored component attributes used to extend maintenance intervals and ensure reliability.



Performance-based

The performance-based maintenance program outlined in NERC PRC-005-6 represents an innovative approach to maintenance management within the BES. Unlike traditional time-based maintenance strategies, which rely on predetermined intervals, the performance-based program enables entities to customize maintenance schedules based on actual component condition and

performance. By leveraging data-driven insights and analytics, entities can optimize maintenance intervals, reduce downtime, and allocate resources more efficiently. This program involves segmenting components, analyzing maintenance data, and establishing maximum allowable maintenance intervals that ensure the reliability and resilience of critical systems. Through continuous monitoring and evaluation, entities can dynamically adapt their maintenance strategies, enhancing system reliability and mitigating the risk of potential failures.

Time-based

In contrast, the time-based maintenance program specified in NERC PRC-005-6 provides a structured and systematic approach to maintenance scheduling within the BES. Unlike performance-based maintenance, which relies on real-time data and condition monitoring, time-based maintenance adheres to predetermined maintenance intervals for protection systems, automatic reclosing, and sudden pressure relaying components. Entities utilizing time-based maintenance programs must adhere to set minimum maintenance activities and maximum maintenance intervals outlined in the standard. While lacking the adaptability and flexibility of performance-based approaches, time-based maintenance provides a straightforward and reliable method for maintaining critical system components. Adherence to time-based maintenance schedules also facilitates compliance with regulatory requirements, minimizing the risk of non-compliance penalties.

Overall, NERC PRC-005-6 aims to ensure the reliable operation of protection systems within the Bulk Electric System through effective maintenance practices and performance monitoring. Compliance with these requirements is essential for maintaining grid reliability and minimizing the risk of system failures.

How can SynchroGrid help?

SynchroGrid has developed a step-by-step procedure designed to assess the entirety of a client's generator set as compared to a generic system test that may only cover small portions of the equipment and may not take the client's specific requirements into consideration. The three core components to SynchroGrid's maintenance procedures include relay procedures, functional procedures, and equipment procedures. By establishing a detailed set of standard procedures, we ensure consistency in testing across different contractors, with full compliance and documentation for PRC-005.

For one of our generation clients, SynchroGrid has documented and implemented maintenance programs for all protection systems, automatic reclosing, and sudden pressure relaying to enhance the reliability of the Bulk Electric System. SynchroGrid developed standard relay maintenance procedures and documentation to implement organization and efficiency in all necessary tested items and records. Furthermore, we have reviewed and updated the PRC-005 spreadsheets for another generation clients to ensure accuracy and compliance.

In the realm of our transmission, SynchroGrid has conducted thorough reviews and updates of PRC-005 spreadsheets specifically for one client, ensuring the adequacy of their current maintenance records. This review highlighted the significance of battery maintenance, a critical aspect that warranted greater attention. Our recommendations encompass testing procedures

and comprehensive documentation practices. Additionally, we provided similar services for another transmission client, reviewing and refining their PRC-005 spreadsheets, which detail all applicable relays requiring testing.

NERC PRC-005-6 serves as a cornerstone in the maintenance and upkeep of protection systems, automatic reclosing, and sudden pressure relaying components within the Bulk Electric System. Its requirements and guidelines are instrumental in preserving grid reliability, promoting operational efficiency, and ensuring the uninterrupted supply of electricity to consumers. Through proactive compliance and robust maintenance practices, entities can uphold the integrity of the electrical grid, thereby fulfilling their commitment to grid reliability and resilience.

Reference:

<https://www.nerc.com/pa/Stand/Reliability%20Standards/PRC-005-6.pdf>