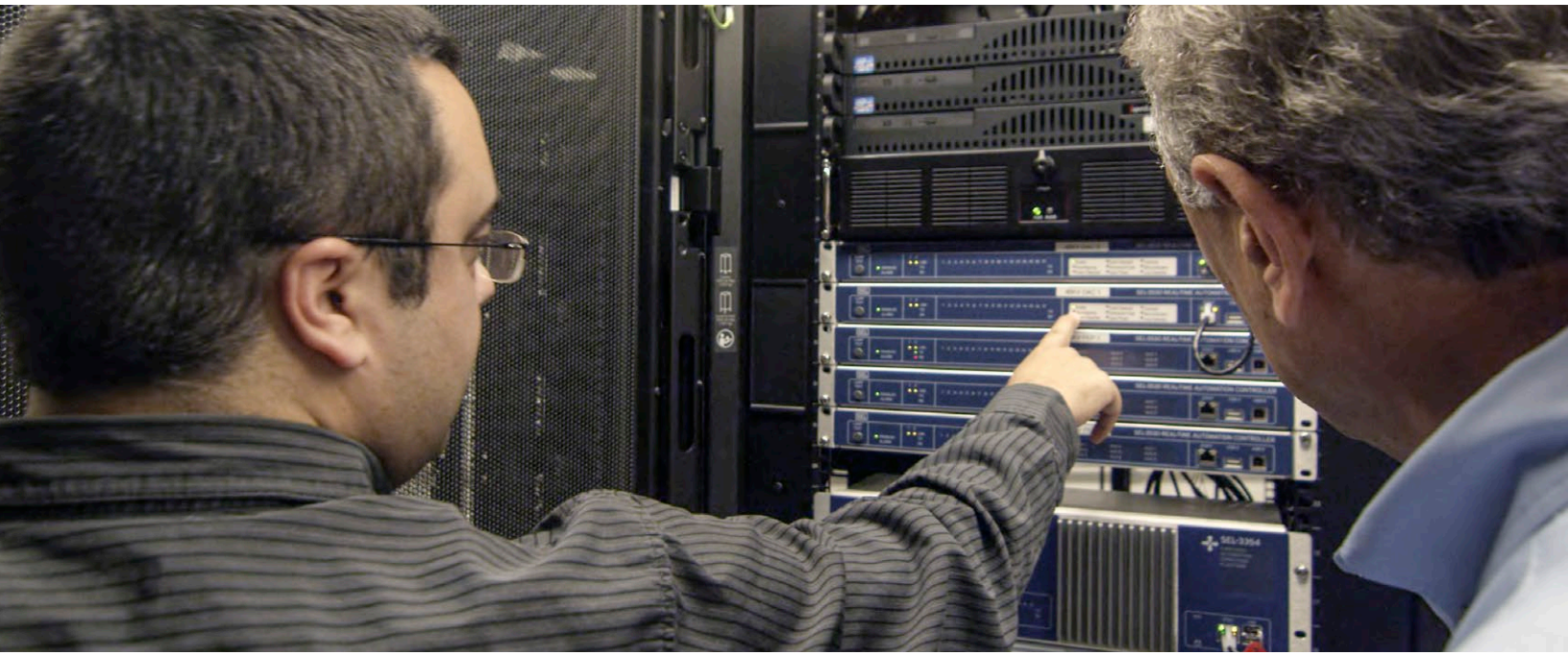
Automated NERC PRC-005 Maintenance and Testing



Automate and simplify protection system monitoring and verification

- Meet and exceed North American Electric Reliability Corporation (NERC) PRC-005 requirements for compliance.
- Streamline incident identification with automated report generation, preserving critical root cause analysis.
- Quickly detect and remediate security issues with real-time monitoring, verification, and reporting of system attacks or failures.
- Save time and money by employing existing system devices.

SEL

Meet and Exceed NERC PRC-005-6 Requirements

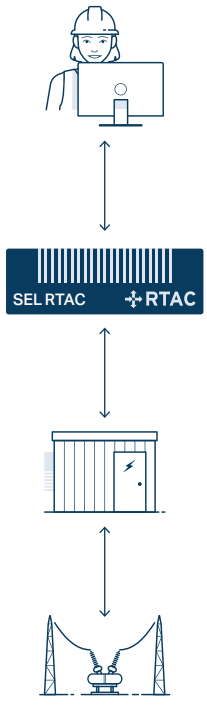
Under the direction of the Federal Energy Regulatory Commission (FERC), NERC is responsible for improving the reliability of the North American bulk electric system (BES). This responsibility includes creating a compliance program to improve the protection system reliability of generation and transmission facilities that can impact the BES. Under NERC PRC-005-6, the definition of protection systems includes protective relays, associated communications systems, voltage- and current-sensing devices (including their circuits), dc control circuitry, reclosers, sudden pressure relays, and station dc supplies associated with protection functions.

Generation and transmission owners need to ensure that their systems are continuously operating to provide the reliable delivery of power. These systems include a wide range of protection and control devices. Many of these IEDs have an inherent self-test functionality and communications. By using these existing features, an automated system can be created that performs real-time monitoring, verification, and reporting.

Compliance with NERC PRC-005-6 entails the creation of a comprehensive protection system maintenance program and the execution of maintenance activities on a time- or performance-based interval or a combination of both. Leveraging the inherent self-test functionality and communications capabilities of modern IEDs, engineers can implement an automated system to perform real-time monitoring, verification, and reporting for power system components. This provides the following benefits:

- Improves protection system awareness and identifies potential failed components that may otherwise go unnoticed.
- Supports maintenance and validation testing documentation requirements for each of the monitored critical protection system components.
- Documents the behavior of power system components during fault events and steady-state operations.

Beyond compliance, monitoring critical assets via predictive alarming gives engineers the necessary data to keep power system components online and avoid expensive downtime.



Data flow from power system assets through automated report generation for the enterprise.

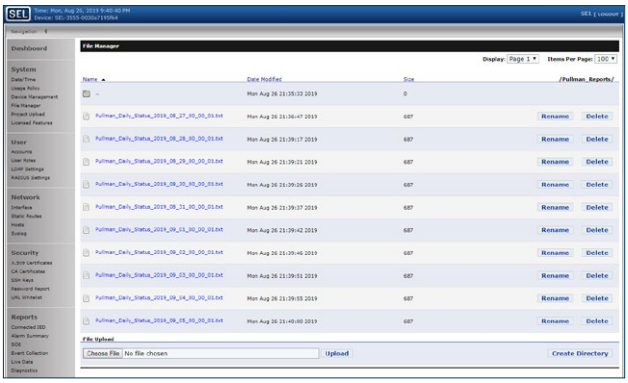
Develop Compliance Programs and Improve Operations

Whether you need to meet NERC reliability requirements or want to improve your protection system reliability through automated verification, SEL has products and services that can help you implement a system to achieve this. Using the SEL Real-Time Automation Controller (RTAC), you can build an automated system that will:

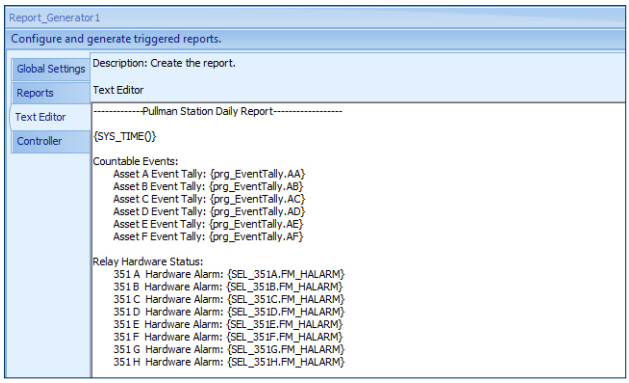
- Verify commissioned IED settings and firmware configurations.
- Generate automated reports for both local and remote access.
- Assess the health of breakers and trip coil assemblies.
- Verify CTs and PTs with continuous IED measurements.
- Verify the communications-assisted protection channel integrity.
- Monitor IED diagnostics.
- Identify and log maintenance conditions.

Automated Compliance Reporting

Save time and money with a fully automated compliance system. Traditionally, maintenance technicians modify settings and create documentation for testing purposes. Sometimes these changes are not properly restored once testing is complete, which can result in a misoperation or unintended operation. Because the SEL RTAC offers automated IED settings verification, it reduces the risk of human error-induced failures. The Report Generator extension lets you format custom reports through a simple workspace. Within the report, you can add references to IED measurements and status indicator tags. Report generation can be automated based on a time interval or event conditions, and the FTP Sync extension lets you automatically push reports to an FTP server. SEL automated solutions are scalable in size and function to meet future system needs.



The automated report functionality of the SEL RTAC.



User-formatted report generated by the RTAC.

The SEL RTAC family.

Get the Most Out of Your Existing System

A full-featured, comprehensive solution that can automate and connect data collection, policy enforcement, tracking, and reporting activities is essential to both cybersecurity programs and regulatory compliance. Enterprise maturity and intelligence will grow from systematized processes and data-driven planning, providing benefits well beyond compliance and risk management.

Generator and transmission protection relays demonstrate their designed function when a protection event occurs. Typically, there is an extended period of time between events. This can increase the possibility of a false operation or a failure to operate on a protection event due to an undetected critical protection system component failure, noncommissioned setting, or other potential issue. The RTAC helps mitigate these possibilities by continuously monitoring many critical protection system components, recording their statuses through daily reports, and increasing protection system engineering awareness through data aggregation and logging tools.

SEL Engineering Services can audit an existing NERC PRC-005 compliance program to uncover possible additional efficiencies. Whether or not you need to comply with regulatory standards, you can also use SEL Engineering Services to audit existing maintenance programs to determine improvement areas. Our team of experienced engineers will demonstrate how to leverage the benefits of IEDs already installed in the system to perform real-time validation and status reporting. You will benefit from being audited by engineers familiar with industry best practices.

Our verification portion of the solution comprises nondisruptive, repeated functional checks that are embedded in the normal operating cycles of monitored devices, such as protective relays. These checks provide immediate problem identification. This proactive approach results in enhanced protection reliability while reducing maintenance activities, particularly the traditional time-based maintenance that is expensive and repetitive. The task of keeping paper records of the last maintenance test is also eliminated.

For more information about automating performance-based protection system maintenance, the following SEL white papers are available at **selinc.com**:

- *Leveraging Security—Using the SEL RTAC's Built-In Security Features*
- *Automating Protection System Monitoring and Verification With the SEL RTAC*

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