

Controls Guidance and Compliance Failure Points

PRC-005-6
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Asset/System Identification

Asset/System Management and Maintenance

System Protection

WECC Intent

The *Controls Guidance and Compliance Failure Points* document is intended to provide a starting point for registered entities in assessing risks associated with their business activities and designing appropriate internal controls in response. It contains examples supporting registered entities' efforts to design controls specific to operational risk and compliance with the North American Electric Reliability Corporation (NERC) Reliability Standards. WECC does not intend for this document to establish a standard or baseline for entity risk assessment or control objectives.

Note: *Guidance questions help an entity understand and document controls. Any responses, including lack of affirmative feedback, will have no consequences on an entity's demonstration of compliance during a Compliance Monitoring and Enforcement Program (CMEP) engagement.*

** Please send feedback to internalcontrols@WECC.org with suggestions on controls guidance and potential failure points questions.*

Definitions

Control Objective: The aim or purpose of specified controls; control objectives address the risks related to achieving an entity's larger objectives.

Control Activities: The policies, procedures, techniques, and mechanisms that enforce management's directives to achieve the entity's objectives and address related risks.

Internal Control: The processes, practices, policies or procedures, system applications and technology tools, and skilled human capital that an entity employs to address risks associated with the reliable operation of its business. Internal control components include:

- Control Environment
- Risk Assessment
- Control Activities
- Information and Communication
- Monitoring

Quality Assurance / Quality Control (QA/QC): How an entity verifies whether it performed an activity or verifies an activity was performed correctly (examples include separation of duties, having a supervisor double-check someone's work, etc.).

Risk Category: Type of operational and inherent risks identified by the Electric Reliability Organization (ERO) Enterprise for use in the Compliance Oversight Plan (COP). Entities should use Risk Categories to understand, monitor, and mitigate known and future risks.

Risk Category

Asset/System Identification: Identifying and tracking assets and Bulk Electric System (BES) Facilities is critical to Bulk Power System (BPS) security and reliability. Failure to correctly identify, document, and track items may result in gaps and compromise the integrity, reliability, or security of the BPS.

Asset/System Management and Maintenance: BPS reliability depends on an entity's success in tracking, managing, and maintaining significant amounts of data, components, assets, and systems. The scope and complexity of this effort require programs to ensure that the entity effectively performs these activities. Failure to execute these programs can result in various types of lapses and may compromise the integrity and reliability of the BPS.

System Protection: BPS reliability and security requires adequate generation supplies to meet existing load during steady-state and expected dynamic conditions. When faults or failures occur, the system must isolate the problem but maintain BPS integrity as much as possible. Protection systems must identify the type and location of the problem and isolate the appropriate part of the BPS while minimizing the disturbance to the remainder of the system. This requires Protection Systems associated with the generation, transmission, and load to accurately detect system properties and respond appropriately to unsafe conditions. Protection System settings must allow control systems to provide a full range of control and allow the system to "ride-through" expected transients. Owners of interconnecting BPS devices and systems must coordinate their system settings with neighboring systems to ensure they achieve the desired outcome and prevent unnecessary disconnection of equipment. Protection Systems must also respond to Misoperations of primary protection. Entities must identify and correct the source of operational failures.

The objective of PRC-005-6 is to mitigate risks to the reliable operation of the BPS through proper maintenance of all Protection Systems, Automatic Reclosing, and Sudden Pressure Relaying so that they are kept in working order.

Control Objectives

Your entity should perform a risk assessment and identify entity-specific control objectives to mitigate those risks. To help entities get started, WECC has identified generic control objectives to mitigate the risks associated with the risk categories mentioned above and PRC-005-6. You may want to consider these objectives:

Control Objective 1: Identify all applicable Protection Systems, Automatic Reclosing, Sudden Pressure Relays, and associated Components. (Relates to Asset/System Identification)

Control Objective 2: Establish maintenance methods and intervals for each Protection System, Automatic Reclosing, and Sudden Pressure Relaying Component type. (Relates to Asset/System Management and Maintenance and System Protection)

Control Objective 3: Perform Maintenance and Testing according to the Protection System Maintenance Program (PSMP). (Relates to Asset/System Management and Maintenance)

Control Objective 4: Take corrective action as needed. (Relates to System Protection)

Reliability and Security Control Activities

Control activities are how your entity meets your control objectives. When designing and strengthening controls, they should be tailored to meet the applicable objectives.

Below are examples of control activities based on good practices WECC has observed that are designed to meet the objectives listed above. WECC does not intend these activities or the associated questions to be prescriptive. Rather, they should help your entity consider how you might meet your objectives in your own unique environment. They also may help your entity identify controls you did not realize you had.

Control Objective 1: Identify all applicable Protection Systems, Automatic Reclosing, Sudden Pressure Relays, and associated Components.

Control Activity A: Inventory all applicable Protection Systems, Automatic Reclosing, Sudden Pressure Relays, and associated Components. (Relates to risk associated with R1.2)

1. How does your entity track its in-scope Components (e.g., database, multiple databases, spreadsheet, software)?
 - a. Is equipment categorized by Component type and attributes?
 - b. Are Component settings maintained in the same repository?
2. How does your entity ensure all relevant personnel provide input to identifying in-scope Components for the repository?
3. What QA/QC mechanism does your entity use to ensure it correctly identifies all in-scope Components?

Control Activity B: Fully review Protection Systems changes before implementation and address impacts when found.

1. How does your entity track changes in its Protection Systems that would affect its PSMP?
2. How does your entity determine whether a change to a Protection System affects coordination or settings required elsewhere in the standards?
 - a. Are both new systems and replacements in kind of Components addressed?
3. How does your entity ensure it coordinates proposed changes to a Protection System (internally and externally) prior to implementing the change?
4. How does your entity ensure the change—as implemented in the field—matches the design?
5. How does your entity ensure changes to Protection Systems are entered correctly in inventory systems along with corresponding maintenance activities?

6. What QA/QC does your entity perform to ensure the impacts of changes implemented in the field are properly addressed?
7. What QA/QC does your entity perform to confirm inventory data and categorization was entered correctly?

Control Objective 2: Establish maintenance methods and intervals for each Protection System, Automatic Reclosing, and Sudden Pressure Relaying Component type.

Control Activity A: Select a type of maintenance method for each Protection System, Automatic Reclosing, and Sudden Pressure Relaying Component type. (Relates to risk associated with R1.1)

1. How does your entity decide whether to use the performance-based or time-based method for in-scope Components?
 - a. What personnel or group is responsible for the decision?
 - b. What expertise or training do they have to support this analysis?
2. Does your entity extend maintenance time frames based on equipment monitoring?
3. Has your entity evaluated whether to switch from one PSMP method to the other?
4. What QA/QC does your entity perform to confirm the selection of maintenance methods is appropriate for its equipment.

Control Activity B: If your entity uses monitoring to extend the time between maintenance and testing, ensure the monitoring system is effective. (Relates to risk associated with R1.2)

1. How does your entity determine which Components are monitored?
 - a. What technical documentation do you maintain to confirm the Components qualify as monitored?
 - b. Do you consult with equipment vendors to confirm that every system Component is monitored?
2. How does your entity verify the alarm path for monitored devices conveys alarm signals to a location where you can initiate corrective action within 24 hours?
3. How does your entity verify the “health” of the monitoring system?
 - a. Is your alarm path monitored?
4. How does your entity determine the frequency of testing the monitoring system to ensure it is working properly?

Control Activity C: If your entity uses a performance-based PSMP, develop a list with a description of Components included in each designated Segment. (Relates to risk associated with R2)

1. How does your entity ensure it correctly developed a list with a description of Components included in each designated Segment, with a minimum Segment population of 60 Components?
 - a. How do you ensure consistent performance within the Segment?
2. Has your entity aggregated Segments with other entities in order to use the performance-based method?
 - a. If so, how do you coordinate with other entities?
3. How does your entity capture projects that may change the Segment population?

- a. What analysis is performed when the Segment population changes?
 - b. What person or department is responsible for that analysis?
4. What QA/QC does your entity perform to ensure it captures changes to the Segment population?

Control Activity D: If your entity uses a performance-based PSMP, track Countable Events. (Relates to risk associated with R2)

1. How does your entity ensure it tracks all Countable Events?
 - a. What person or department is responsible for tracking Countable Events?
 - b. What tools do you use to track Countable Events?
2. What QA/QC does your entity perform to ensure it tracks all Countable Events?

Control Activity E: If your entity uses a performance-based PSMP, analyze maintenance program activities and results for each Segment to determine the overall Segment performance and develop maintenance intervals. (Relates to risk associated with R2)

1. How does your entity analyze maintenance program activities and results for each Segment to determine the overall Segment performance and develop maintenance intervals?
 - a. What person or department is responsible for analyzing maintenance program activities and results?
2. How frequently does your entity reevaluate maintenance program activities and results for each Segment to determine the overall Segment performance to revise maintenance intervals?
3. How does your entity determine the maximum allowable maintenance interval for each Segment?
 - a. What person or department is responsible for analyzing results?
 - b. What expertise do they have, or what training do you provide?
4. How frequently does your entity reevaluate the maximum allowable maintenance interval for each Segment?
5. What tools does your entity use to track performance-based maintenance requirements?
 - a. Is it the same system as is used for time-based maintenance?
6. What QA/QC does your entity have in place to ensure that it:
 - a. Accurately captures all performance-based maintenance requirements in the tracking tool?
 - b. Reevaluates the maintenance program activities and maintenance interval as appropriate?

Control Activity F: If your entity uses a performance-based PSMP and the Components in a Segment maintained through a performance-based PSMP experience 4% or more Countable Events, develop, document, and implement an action plan to reduce the Countable Events to less than 4% of the Segment population within three years. (Relates to risk associated with R2)

1. How does your entity develop action plans to reduce the Countable Events to less than 4% of the Segment population within three years?
 - a. What methods for correcting segment performance do you consider? (e.g., decreasing the maximum allowable interval, redefining the Segment, updating or replacing Components)?
 - b. How is the action plan documented?
2. How does your entity track the implementation of an action plan?

- a. Do you track the completion of milestones?
 - b. Do you monitor the effectiveness of the plan?
3. What QA/QC does your entity perform to verify that an effective plan has been documented and implemented?

Control Objective 3: Perform Maintenance and Testing according to PSMP.

Control Activity A: Ensure Protection System field personnel are knowledgeable in maintenance/testing of Protection System Components.

1. What experience or expertise do field personnel have?
 - a. Are they required to maintain any certifications?
2. If your entity uses contractors to perform maintenance and testing, how do you confirm they are both technically knowledgeable and understand the application of PRC-005-6 requirements?
3. What training does your entity provide to Protection System field personnel regarding how to perform maintenance and testing of Components?
4. How does your entity determine the frequency of refresher training to Protection System field personnel regarding maintenance and testing procedures for Components?
5. How does your entity update training for new equipment or testing technologies?
6. What QA/QC does your entity perform to confirm training is effective?

Control Activity B: Ensure Protection System field personnel follow procedures for performing maintenance and testing of Protection System Components. (Relates to risk associated with R3 and R4)

1. How does your entity ensure Protection System field personnel understand the importance of following maintenance and testing procedures?
2. What tools does your entity have in place to support Protection System field personnel regarding maintenance and testing procedures for Components?
 - a. Do you include detailed information in a work order system?
 - b. Do you use checklists or testing forms?
3. If your entity uses performance-based maintenance for Components, how do you ensure it performs maintenance on the greater of 5% of Components in each Segment or three individual Components in the Segment each year?
4. What QA/QC does your entity perform to ensure Protection System field personnel (including contractors if applicable) correctly complete all applicable maintenance and testing activities for each Component?

Control Activity C: Timely perform Protection System, Automatic Reclosing, and Sudden Pressure Relaying maintenance and testing. (Relates to risk associated with R3 and R4)

1. How does your entity track Protection System, Automatic Reclosing, and Sudden Pressure Relaying maintenance and testing activity status? (e.g., Maximo, database, spreadsheet, etc.)
 - a. Does it include automated alerting or a maintenance dashboard?
 - b. Does one system track all phases? (e.g., scheduling, testing, maintenance, corrective action)
2. How does your entity ensure work is scheduled according to your process?

3. Does your entity schedule maintenance early to allow for a “grace period” in case of issues beyond your control?
 - a. Do you do a risk analysis to determine when to schedule maintenance?
 - b. What risks do you consider (e.g., extreme weather, fire risk, supplier risk, contractor availability)?
4. What QA/QC does your entity perform to ensure it timely performs Protection System, Automatic Reclosing, and Sudden Pressure Relaying maintenance and testing?

Control Objective 4: Take corrective action as needed.

Control Activity A: Correct deficiencies discovered during maintenance and testing.

1. How does your entity document deficiencies that are discovered?
2. How does your entity ensure deficiencies are timely corrected?
3. What QA/QC does your entity perform to ensure it timely addressed all deficiencies within the maintenance interval or documented them as Unresolved Maintenance Issues (UMI)?

Control Activity B: Identify and timely address Unresolved Maintenance Issues. (Relates to risk associated with R5)

1. How does your entity determine that a deficiency is a UMI?
 - a. How are UMIs documented?
 - b. How is corrective action for a UMI determined?
2. How does your entity track corrective action for UMIs (database, Maximo (or similar), spreadsheet, etc.)?
3. What QA/QC does your entity perform to ensure it timely addresses all Unresolved Maintenance Issues?

Compliance Potential Failure Points

The control activities listed above are specifically targeted at mitigating risk to the reliability and security of the BPS, but also promote compliance with the referenced standard. Your entity should also develop controls specifically to mitigate compliance risk. The following compliance potential failure points relate directly to compliance risk and warrant consideration.

Potential Failure Point (R1): Failure to document a comprehensive Protection System Maintenance Program (PSMP).

1. Does your entity’s PSMP include Protection Systems, Automatic Reclosing, and Sudden Pressure Relaying?
2. Are Protection System settings included in the maintenance activities?
3. Has your entity identified which maintenance method is used to address each Component type?
4. If monitoring is used to extend the maintenance intervals, has your entity included the applicable monitored Component attributes?
5. How frequently does your entity review your PSMP?



- a. Are the maintenance and testing procedures reviewed to ensure they encompass all current Protection System, Automatic Reclosing, and Sudden Pressure Relaying Components and their configuration?
- b. Do you maintain a descriptive revision history of your PSMP?

Potential Failure Point (R2): Failure to establish and maintain technical justification for performance-based intervals as prescribed in PRC-005-6 Attachment A.

1. How does your entity ensure it correctly developed a list with a description of Components included in each designated Segment, with a minimum Segment population of 60 Components?
2. How does your entity, at least annually, review and update the list of Components and Segments and description if any changes occurred in the Segment?
3. How does your entity analyze maintenance program activities and results for each Segment to determine the overall Segment performance and develop maintenance intervals?
4. How does your entity determine the maximum allowable maintenance interval for each Segment, so the Segment experiences Countable Events on no more than 4% of its Components, for the greater of either the last 30 Components maintained, or all Components maintained, in the previous year?
5. How does your entity develop action plans to reduce the Countable Events to less than 4% of the Segment population within three years?

Potential Failure Point (R3 and R4): Failure to meet prescribed maintenance intervals.

1. How does your entity ensure prescribed maintenance timelines are met?
 - a. How does your system address the concept of “calendar” year or “calendar” month?
 - b. How do you take scheduled outages into account when scheduling maintenance?
2. How does your entity establish the initial date in the maintenance cycle for new components? (e.g., commission testing, in-service date)
3. What QA/QC does your entity perform to confirm all deadlines are met?

Potential Failure Point (R3 and R4): Failure to document maintenance.

1. How does your entity document it performed required maintenance?
 - a. Does your documentation include prompts for each required maintenance activity by Component?
 - b. How do you document commission testing of new Components to demonstrate all required maintenance activities were completed?
 - c. How do you document efforts to correct Unresolved Maintenance Issues?
2. How does your entity ensure documentation is retained for the required period?
 - a. Do you differentiate retention periods or retention methods based on Component type?
3. What QA/QC does your entity perform to ensure it fully documented required maintenance?
 - a. Do you review for both human error and completeness of records?
 - b. How do you address situations where records are found to be inaccurate or incomplete?

Potential Failure Point (R3 and R4): Failure to meet implementation plan milestones.

1. How does your entity prioritize and plan to meet prescribed implementation milestones?



- a. What technology do you use to assist in this process?
 - b. Are dashboards or alerts used?
2. How does your entity track which Components are maintained under which version of the standard?
 - a. How is this documented?
 - b. Where is evidence retained?
3. How does your entity consider Components that are procured or retired when calculating percent compliant?
4. What QA/QC does your entity perform to confirm all implementation plan milestones are met?

Potential Failure Point (R5): Failure to have evidence efforts have been made to correct UMI.

1. How does your entity track corrective action for UMIs (database, Maximo (or similar), spreadsheet, etc.)?
2. What QA/QC does your entity perform to ensure it timely addresses all Unresolved Maintenance Issues?