Controls Guidance and Compliance Failure Points

MOD-025-2
June 2025

Verification and Data Reporting of Generator Real and Reactive Power Capability and Synchronous Condenser Reactive Power Capability

Modeling Data

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; and
- 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

Modeling Data: Simulation tools model individual components and their control systems, when applicable. The models form the building blocks of power system studies in the planning and operations horizons. Models that entities have verified as accurate are critical to a range of reliability studies, including transmission planning assessments and establishing SOLs and IROLs, as well as state estimation for Real-time Assessments (RTA) and Operation Planning Assessments (OPA). The validity of those assessments depends on modeling data, including, but not limited to, correct Facility Ratings, verified generator real and reactive capability, and knowing how control systems respond to dynamic system conditions. Failure to provide data in a timely manner and at intervals to ensure model accuracy during retirements and new construction may compromise BPS reliability and security.

Specifically, the purpose of MOD-025-2 is to ensure that accurate information on generator gross and net Real and Reactive Power capability and synchronous condenser Reactive Power capability is available for planning models used to assess Bulk Electric System (BES) reliability.

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 MOD-025-2. You may want to consider these two objectives:

Control Objective 1: Verify Real and Reactive Power capabilities.

Control Objective 2: Provide verification data to entities who need the data.

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 for 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: Verify Real and Reactive Power capabilities.

Control Activity A: Schedule testing activity sufficiently in advance to meet required timeline (per Attachment 1).

1. What technical controls does your entity use to ensure tests and related tasks are timely performed (e.g., calendars, workflows)?
2. How far in advance does your entity schedule testing to ensure:
   a. The ability to take the unit offline for testing during the required period?
   b. The availability of a third party to perform test, if used?

Control Activity B: Ascertain the required data for the verifications specified Attachment 1 (Sec. 3.1)

1. How does your entity acquire the value of the gross Real and Reactive Power generating capabilities at the end of the verification period?
2. How does your entity acquire the voltage schedule from the Transmission Operator, if applicable?
3. How does your entity acquire the voltage at the high and low side of the GSU and/or system interconnection transformer(s) at the end of the verification period?
   a. Is one or both of these values metered?
   b. Does the test plan provide a method to calculate voltage at the high or low side of the GSU and/or system interconnection transformer(s) at the end of the verification period?
   c. What criteria have you established to determine whether GSU transformer real and reactive losses may be estimated, based on the GSU impedance, if necessary?
4. How does your entity factor in the ambient conditions, if applicable, at the end of the verification period that the Generator Owner (GO) requires to perform corrections to Real Power for different ambient conditions such as:
   a. Ambient air temperature?
   b. Relative humidity?
   c. Cooling water temperature?
5. Does the GO require other data to perform corrections for ambient conditions?
   a. How is that communicated to you?
6. How does your entity ascertain the existing GSU and/or system interconnection transformer(s) voltage ratio and tap setting at the end of the verification period?

Control Activity C: Control Activity C: If your entity performs the testing in house, provide documented guidance on testing plan(s).

1. How has your entity outlined a testing strategy that reflects reasons for the entity's choice for testing where options are allowed by Standard?
   a. How do you decide whether Real Power testing will be performed at the same time as full load Reactive Power testing or separate testing?
   b. How do you decide whether to use a staged test or operational data?
2. How does the plan for synchronous condensers, where verified through test, ensure the test is scheduled at a time advantageous for the unit being verified to demonstrate its Reactive Power

capabilities while the Transmission Operator takes measures to maintain the plant's system bus voltage at the scheduled value or within acceptable tolerance of the scheduled value?
3. How does your entity identify that all auxiliary equipment needed for expected normal operation is in service for both the Real Power and Reactive Power capability verification?
   a. How do you ensure the automatic voltage regulator is in service for the verification?
4. How does the plan, for generating units of 20 MVA or less that are part of a plant greater than 75 MVA in aggregate, specify whether data is recorded either on an individual unit basis or as a group?
5. Does your entity provide guidance on handling scenarios where the Mvar verification required by the Standard does not reflect the manufacturer-supplied thermal capability curve (D-curve)?
   a. How does the plan document Facility limitations discovered from operational data or during testing?
   b. How does the plan outline methods to further analyze and resolve Facility limitations?
6. Does your entity perform engineering analyses to determine expected applicable Facility capabilities under less restrictive system voltages than those encountered during the verification?
7. How does your entity document a unit with no leading capability?
   a. Do you report the minimum lagging capability at which it can operate?

Control Activity D: If your entity hires a third party to perform testing, ensure the testing process meets regulatory and business objectives.

1. How does your entity communicate testing requirements or specifications to the third party?
   a. Are any of the considerations in Control Activity C included in this specification?
2. Does your entity have a process to review testing plans to ensure they are conducted according to Attachment 1?
3. Does your entity have a process to review test reports prior to submitting them to the Transmission Planner (TP) to ensure they include all the information required in Attachment 2?

Control Activity E: Develop a process to track changes to Facilities.

1. How has your entity developed a process to conduct the first verification for each applicable Facility?
2. How has your entity developed a process to monitor Real Power or Reactive Power capability to discover it has changed by more than 10% of the last reported verified capability?
3. How has your entity developed a process to understand whether change is expected to last more than six months?

Control Objective 2: Provide verification data to entities who need the data.

Control Activity A: Implement a process to provide verification data to the TP

1. Has your entity identified your TP?
   a. If you have more than one TP in your area, to whom do you provide your data?
2. Has your entity defined roles and responsibilities for providing data?
3. How does your entity ensure data supplied is complete?

Control Activity B: Develop a process to manage adjustment requests by TP(s)

1. How does your entity ensure TP requests are timely responded to?
   a. Does your process include tracking tools (e.g., workflows, alerts)?
   b. Does your process include periodic reviews of outstanding requests?
2. How does your entity ensure requests are fulfilled within 90 days of the request or the date the data was recorded/selected whichever is later?
   a. How do you define or communicate start/end dates used for TP request?
3. Does your entity provide written guidance on how to incorporate adjustments requested by the TP?
   a. Do you develop the relationships between test conditions and generator output so that the amount of Real Power that can be expected to be delivered from a generator can be determined at different conditions, such as peak summer conditions?
   b. Does it include direction on adjusting of MW values tested to the ambient conditions specified by the TP?

Control Activity C: Coordinate with other entities with need for validated generator data.

1. Does your entity participate with any other BES study groups that also require validated generator data?
2. Does your entity participate with the WECC Model and Validation Subcommittee?

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, R2, R3): Failure to develop to process to perform unit capability verification in accordance with Attachment 1.

Potential Failure Point (Attachment 1): Failure to clearly define or communicate start/end dates used to establish time frame(s) to perform verifications.

1. How does your entity establish start and end dates used to ensure verification occurs within the periodicity specified in Attachment 1?
2. Does your entity have any technical controls to ensure verification occurs within the periodicity specified in Attachment 1?
   a. For each new applicable Facility, how do you ensure verification occurs within 12 calendar months of its commercial operation date?
   b. For existing units that have been in long-term shutdown and have not been tested for more than five years, how do you ensure verification occurs within 12 calendar months?

Potential Failure Point (Attachment 1): Failure to clearly define or communicate start and end dates and times of the verification period.

1. How does your entity capture the date and time of the verification period, including start and end time in hours and minutes?

Potential Failure Point (Attachment 1): Failure to develop guidance for verification data recording.

1. If using operational data, how does your entity determine that operational data is acceptable?
   a. Time stamping of operational data used (within two years prior to the verification date)?
   b. How it meets criteria 2.1 through 2.4?
   c. That it demonstrates at least 90% of a previously staged test?
   d. Check of the previously staged test for verification whether it was unduly restricted (so that it did not demonstrate at least 50% of the associated thermal capability curve) by unusual generation or equipment limitations (e.g., capacitor or reactor banks out of service).
2. Does your entity's guidance include:
   a. If data for different points is recorded on different days, the earliest recorded dates serve as the verification date on Attachment 2; and
   b. Verification of Real Power capability and Reactive Power capability over-excited (lagging) of all applicable Facilities at the applicable Facilities' normal (not emergency) expected maximum Real Power output at the time of the verifications?

Potential Failure Point (Attachment 1): Failure to verify automatic voltage regulator in-service status.

1. How does your entity ensure the automatic voltage regulator is in service for the Reactive Power capability verification?

Potential Failure Point (Attachment 2): Failure to develop a complete and accurate simplified key one-line diagram.

1. How does your entity ensure the following are accurately and clearly shown on the simplified key one-line diagram?
   a. Sources of auxiliary Real and Reactive Power.
   b. Associated system connections for each unit verified.
   c. GSU and/or system interconnection and auxiliary transformers.
   d. Reactive Power flows, with directional arrows.
2. How does your entity indicate engineering estimates and associated calculations (if applicable) on the diagram for:
   a. Reactive auxiliary (load) where metering does not exist?
   b. Transformer Real and Reactive Power losses?

Potential Failure Point (Attachment 2): Failure to develop a process to document all required information as identified in Attachment 2.

1. How does your entity ensure all of the criteria in Attachment 2 have been submitted?
2. If your entity uses an equivalent report, does your entity have any controls in place to ensure that the equivalent report includes all the information requested in Attachment 2?