

# Enforcement Explained

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## A Concerning Trend in VAR-002-4.1 R1 and R3

In Enforcement, beyond focusing on individual cases, we spend time zooming out on open and closed actions to assess whether we are seeing any broader trends across standards or registration functions. With that in mind, this column is focused on an uptick in VAR-002-4.1 issues among Generator Operators (GOPs).

VAR-002-4.1 is in the operations and planning space, and underlying compliance activities involve the performance of high-frequency conduct, especially VAR-002-4.1 R2 (maintaining voltage with a specified schedule). It is “high-frequency” in that it is a continual operational requirement, and the continual nature (or number of associated acts) elevates the probability of noncompliance occurring. Although it does not excuse noncompliance, this is a relevant consideration.

Enforcement’s concern relates to VAR-002-4.1 R1 (GOP operating interconnected generator in automatic voltage control mode) and R3 (GOP shall notify its associated TOP of a status change on the automatic voltage regulator, power system stabilizer,<sup>1</sup> alternative voltage controlling device within 30 minutes of the change).

### The Size and Nature of the Uptick

Since the start of 2020, RF has taken in 32 VAR-002-4.1 R1 or R3 noncompliances. Obviously, pure volume of noncompliances alone is not an indicator of heightened risk. However, we are seeing a high concentration of certain root causes or common failure types among a single registration type, which warrants further evaluation and discussion.

Additionally, VAR-002-4.1 R1 and R3 are fundamental building blocks for system stability. When units are not in automatic voltage control mode, operator interaction is necessary, and during a system event, the system operator may not know or react fast enough to provide the proper reactive support needed to maintain system voltage. Without proper reactive support, the Bulk Power System (BPS) could experience voltage depression, voltage exceedance, or loss of load due to reactive resources not responding as needed or required.

### Common Failure Types

When it comes to disarming automatic voltage control mode or the operation of Power System Stabilizers (PSS), the root causes and incidents of failure are remarkably similar. They are best understood in two buckets:

1. the initial act of an entity disabling or failing to enable automatic voltage control mode or PSS; and
2. an entity’s persistent failure to identify that it did not enable automatic voltage control mode or PSS.

We often see these common failure types occur when a generating asset is taken offline and then brought back online. Specifically, we’ve seen this when generators are taken out of operation for maintenance, operation verification, or for more material repairs. We less frequently see the failure occur when the asset is de-energized; rather, we see the failure most frequently when generators are re-energized.

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<sup>1</sup>Hereinafter, “PSS.”

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Generally, this is the result of haphazard generator restarts where either: (a) the entity's energizing process lacks adequate detail on how to confirm automatic voltage control mode or PSS status during a start-up; or (b) the execution of start-up is rushed, and the relevant procedure is ignored.

Beyond how the condition is most frequently initiated, we are also seeing automatic voltage control mode or PSS continue in a disabled state for sustained periods of time without proper notification because the entity does not have adequate alarming controls, or those alarming controls are not properly configured. We are seeing entities without audible alarms or pop-up alarms on their SCADA system for where PSS or automatic voltage control mode are not enabled, which can cause the condition to continue until a voltage issue arises if the items are missed at start-up. In fact, in multiple instances, entities identified that automatic voltage control mode was disabled while they were experiencing issues achieving their voltage schedule.

## What to do?

1. Entities should review site procedures for start-up/energizing steps and evaluate the quality of the procedural steps and the likelihood they will drive enabling PSS, automatic voltage control mode, or AVR where appropriate.
  - a. Consider adding multiple checkpoints or prompts in the process for enabling PSS or automatic voltage control mode and then confirming functionality.
2. Entities should review their identifying and alarming controls for automatic voltage control mode, and PSS operability. If the entity or a specific site does not have an alarm or notification likely to drive action when the tools are errantly disabled, consider implementing such an alarm.
3. Entities should review their applicable voltage schedules and compare their voltage alarm setpoints to ensure that deviations will be identified, as alarming controls are also relevant for VAR-002-4.1 R2.
  - a. Consider implementing a periodic comparison of the applicable voltage schedule and alarm setpoints.

## Enforcement Approach

At RF, VAR-002-4.1 R1 and R3 incidents are of increasing concern and represent "low-hanging fruit" in the effort to improve the probability of success in the struggle of maintaining voltage stability on the BPS. These items are simply too easy to get right or identify quickly (as well as too important as useful tools for voltage stability) for lapses to continue with such frequency and duration.

## Contact Entity Engagement

We encourage registered entities to [reach out to our Entity Engagement team](#) if they have questions regarding their approach to VAR-002-4.1.