

**A. Introduction**

- 1. Title:** Generator Operation for Maintaining Network Voltage Schedules
- 2. Number:** VAR-002-1
- 3. Purpose:** To ensure generators provide reactive and voltage control necessary to ensure voltage levels, reactive flows, and reactive resources are maintained within applicable Facility Ratings to protect equipment and the reliable operation of the Interconnection.
- 4. Applicability**
  - 4.1.** Generator Operator.
  - 4.2.** Generator Owner.
- 5. Effective Date:** Six months after effective date of VAR-001-1.

**B. Requirements**

- R1.** The Generator Operator shall operate each generator connected to the interconnected transmission system in the automatic voltage control mode (automatic voltage regulator in service and controlling voltage) unless the Generator Operator has notified the Transmission Operator.
- R2.** Unless exempted by the Transmission Operator, each Generator Operator shall maintain the generator voltage or Reactive Power output (within applicable Facility Ratings<sup>1</sup>) as directed by the Transmission Operator.
  - R2.1.** When a generator's automatic voltage regulator is out of service, the Generator Operator shall use an alternative method to control the generator voltage and reactive output to meet the voltage or Reactive Power schedule directed by the Transmission Operator.
  - R2.2.** When directed to modify voltage, the Generator Operator shall comply or provide an explanation of why the schedule cannot be met.
- R3.** Each Generator Operator shall notify its associated Transmission Operator as soon as practical, but within 30 minutes of any of the following:
  - R3.1.** A status or capability change on any generator Reactive Power resource, including the status of each automatic voltage regulator and power system stabilizer and the expected duration of the change in status or capability.
  - R3.2.** A status or capability change on any other Reactive Power resources under the Generator Operator's control and the expected duration of the change in status or capability.
- R4.** The Generator Owner shall provide the following to its associated Transmission Operator and Transmission Planner within 30 calendar days of a request.
  - R4.1.** For generator step-up transformers and auxiliary transformers with primary voltages equal to or greater than the generator terminal voltage:
    - R4.1.1.** Tap settings.
    - R4.1.2.** Available fixed tap ranges.

---

<sup>1</sup> When a Generator is operating in manual control, reactive power capability may change based on stability considerations and this will lead to a change in the associated Facility Ratings.

**R4.1.3.** Impedance data.

**R4.1.4.** The +/- voltage range with step-change in % for load-tap changing transformers.

**R5.** After consultation with the Transmission Operator regarding necessary step-up transformer tap changes, the Generator Owner shall ensure that transformer tap positions are changed according to the specifications provided by the Transmission Operator, unless such action would violate safety, an equipment rating, a regulatory requirement, or a statutory requirement.

**R5.1.** If the Generator Operator can't comply with the Transmission Operator's specifications, the Generator Operator shall notify the Transmission Operator and shall provide the technical justification.

### **C. Measures**

**M1.** The Generator Operator shall have evidence to show that it notified its associated Transmission Operator any time it failed to operate a generator in the automatic voltage control mode as specified in Requirement 1.

**M2.** The Generator Operator shall have evidence to show that it controlled its generator voltage and reactive output to meet the voltage or Reactive Power schedule provided by its associated Transmission Operator as specified in Requirement 2.

**M3.** The Generator Operator shall have evidence to show that it responded to the Transmission Operator's directives as identified in Requirement 2.1 and Requirement 2.2.

**M4.** The Generator Operator shall have evidence it notified its associated Transmission Operator within 30 minutes of any of the changes identified in Requirement 3.

**M5.** The Generator Owner shall have evidence it provided its associated Transmission Operator and Transmission Planner with information on its step-up transformers and auxiliary transformers as required in Requirements 4.1.1 through 4.1.4

**M6.** The Generator Owner shall have evidence that its step-up transformer taps were modified per the Transmission Operator's documentation as identified in Requirement 5.

**M7.** The Generator Operator shall have evidence that it notified its associated Transmission Operator when it couldn't comply with the Transmission Operator's step-up transformer tap specifications as identified in Requirement 5.1.

### **D. Compliance**

#### **1. Compliance Monitoring Process**

##### **1.1. Compliance Monitoring Responsibility**

Regional Reliability Organization.

##### **1.2. Compliance Monitoring Period and Reset Time Frame**

One calendar year.

##### **1.3. Data Retention**

The Generator Operator shall maintain evidence needed for Measure 1 through Measure 5 and Measure 7 for the current and previous calendar years.

The Generator Owner shall keep its latest version of documentation on its step-up and auxiliary transformers. (Measure 6)

The Compliance Monitor shall retain any audit data for three years.

**1.4. Additional Compliance Information**

The Generator Owner and Generator Operator shall each demonstrate compliance through self-certification or audit (periodic, as part of targeted monitoring or initiated by complaint or event), as determined by the Compliance Monitor.

**2. Levels of Non-Compliance for Generator Operator**

**2.1. Level 1:** There shall be a Level 1 non-compliance if any of the following conditions exist:

**2.1.1** One incident of failing to notify the Transmission Operator as identified in , R3.1, R3.2 or R5.1.

**2.1.2** One incident of failing to maintain a voltage or reactive power schedule (R2).

**2.2. Level 2:** There shall be a Level 2 non-compliance if any of the following conditions exist:

**2.2.1** More than one but less than five incidents of failing to notify the Transmission as identified in R1, R3.1,R3.2 or R5.1.

**2.2.2** More than one but less than five incidents of failing to maintain a voltage or reactive power schedule (R2).

**2.3. Level 3:** There shall be a Level 3 non-compliance if any of the following conditions exist:

**2.3.1** More than five but less than ten incidents of failing to notify the Transmission Operator as identified in R1, R3.1, R3.2 or R5.1.

**2.3.2** More than five but less than ten incidents of failing to maintain a voltage or reactive power schedule (R2).

**2.4. Level 4:** There shall be a Level 4 non-compliance if any of the following conditions exist:

**2.4.1** Failed to comply with the Transmission Operator's directives as identified in R2.

**2.4.2** Ten or more incidents of failing to notify the Transmission Operator as identified in R1, R3.1, R3.2 or R5.1.

**2.4.3** Ten or more incidents of failing to maintain a voltage or reactive power schedule (R2).

**3. Levels of Non-Compliance for Generator Owner:**

**3.1.1 Level One:** Not applicable.

**3.1.2 Level Two:** Documentation of generator step-up transformers and auxiliary transformers with primary voltages equal to or greater than the generator terminal voltage was missing two of the data types identified in R4.1.1 through R4.1.4.

**3.1.3 Level Three:** No documentation of generator step-up transformers and auxiliary transformers with primary voltages equal to or greater than the generator terminal voltage

**3.1.4 Level Four:** Did not ensure generating unit step-up transformer settings were changed in compliance with the specifications provided by the Transmission Operator as identified in R5.

**Standard VAR-002-1 — Generator Operation for Maintaining Network Voltage Schedules**

---

**E. Regional Differences**

None identified.

**Version History**

<b>Version</b>	<b>Date</b>	<b>Action</b>	<b>Change Tracking</b>
1	May 15, 2006	Added “(R2)” to the end of levels on non-compliance 2.1.2, 2.2.2, 2.3.2, and 2.4.3.	July 5, 2006