

## **WECC Standard VAR-002-WECC-1 – Automatic Voltage Regulators**

### **Standard Development Roadmap**

*This section is maintained by the drafting team during the development of the standard and will be removed when the standard becomes effective.*

#### **Development Steps Completed:**

<b>Completed Actions</b>	<b>Completion Date</b>
1. Post Draft Standard for initial industry comments	September 26, 2007
2. Drafting Team to review and respond to initial industry comments	November 30, 2007
3. Post second Draft Standard for industry comments	November 30, 2007
4. Drafting Team to review and respond to industry comments	January 25, 2008
5. Post Draft Standard for Operating Committee approval	January 25, 2008
6. Operating Committee ballots proposed standard	March 6, 2008
7. Post Draft Standard for WECC Board approval	March 12, 2008

#### **Description of Current Draft:**

The purpose of this standard is to create a permanent replacement standard for VAR-STD-002a-1. VAR-002-WECC-1 is designed to implement the directives of FERC and recommendations of NERC when VAR-STD-002a-1 was approved as a NERC reliability standard.

In the Western Interconnection, System Operating Limits for transmission paths in the Bulk Electric System assume that Automatic Voltage Regulators are in service to control voltage to support the transfer capability. The requirements in VAR-002-WECC-1 are to ensure that the generator provides the proper voltage support when generation and transmission outages occur.

The WECC Operating Committee approved the VAR-002-WECC-1 standard as a permanent replacement standard for VAR-STD-002a-1 on March 6, 2008. This posting of the standard is for ballot by the WECC Board of Directors. The Operating Committee recommends that the WECC Board of Directors approve VAR-002-WECC-1 as a permanent replacement standard for VAR-STD-002a-1. In addition, the Operating Committee recommends that the WECC Board of Directors submit the standard to the NERC and FERC for approval.

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### **Future Development Plan:**

<b>Anticipated Actions</b>	<b>Anticipated Date</b>
1. Post Draft Standard for NERC comment period	March 28, 2008
2. WECC Board ballots proposed standard	April 16-18, 2008
3. Drafting Team to review and respond to industry comments	May 2008
4. NERC Board approval request	May 2008
5. Request FERC approval	June 2008

## **WECC Standard VAR-002-WECC-1 – Automatic Voltage Regulators**

### **Definitions of Terms Used in Standard**

*This section includes all newly defined or revised terms used in the proposed standard. Terms already defined in the Reliability Standards Glossary of Terms are not repeated here. New or revised definitions listed below become approved when the proposed standard is approved. When the standard becomes effective, these definitions will be removed from the standard and added to the Glossary.*

**Commercial Operation** - Achievement of this designation indicates that the Generator Operator or Transmission Operator of the synchronous generator or synchronous condenser has received all approvals necessary for operation after completion of initial start-up testing.

## **WECC Standard VAR-002-WECC-1 – Automatic Voltage Regulators**

### **A. Introduction**

- 1. Title:** Automatic Voltage Regulators (AVR)
- 2. Number:** VAR-002-WECC-1
- 3. Purpose:** To ensure that Automatic Voltage Regulators on synchronous generators and condensers shall be kept in service and controlling voltage.
- 4. Applicability**
  - 4.1. Generator Operators
  - 4.2. Transmission Operators that operate synchronous condensers
  - 4.3. This VAR-002-WECC-1 Standard only applies to synchronous generators and synchronous condensers that are connected to the Bulk Electric System.
- 5. Effective Date:** On the first day of the first quarter, after applicable regulatory approval.

### **B. Requirements**

- R1.** Generator Operators and Transmission Operators shall have AVR in service and in automatic voltage control mode 98% of all operating hours for synchronous generators or synchronous condensers. Generator Operators and Transmission Operators may exclude hours for R1.1 through R1.10 to achieve the 98% requirement. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*
  - R1.1.** The synchronous generator or synchronous condenser operates for less than five percent of all hours during any calendar quarter.
  - R1.2.** Performing maintenance and testing up to a maximum of seven calendar days per calendar quarter.
  - R1.3.** AVR exhibits instability due to abnormal system configuration.
  - R1.4.** Due to component failure, the AVR may be out of service up to 60 consecutive days for repair per incident.
  - R1.5.** Due to a component failure, the AVR may be out of service up to one year provided the Generator Operator or Transmission Operator submits documentation identifying the need for time to obtain replacement parts and if required to schedule an outage.
  - R1.6.** Due to a component failure, the AVR may be out of service up to 24 months provided the Generator Operator or Transmission Operator submits documentation identifying the need for time for excitation system replacement (replace the AVR, limiters, and controls but not necessarily the power source and power bridge) and to schedule an outage.
  - R1.7.** The synchronous generator or synchronous condenser has not achieved Commercial Operation.
  - R1.8.** The Transmission Operator directs the Generator Operator to operate the synchronous generator, and the AVR is unavailable for service.
  - R1.9.** The Reliability Coordinator directs Transmission Operator to operate the synchronous condenser, and the AVR is unavailable for service.
  - R1.10.** If AVR exhibits instability due to operation of a Load Tap Changer (LTC) transformer in the area, the Transmission Operator may authorize the Generator Operator to operate the excitation system in modes other than automatic voltage control until the system configuration changes.

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- R2.** Generator Operators and Transmission Operators shall have documentation identifying the number of hours excluded for each requirement in R1.1 through R1.10. *[Violation Risk Factor: Low] [Time Horizon: Operations Assessment]*

### **C. Measures**

- M1.** Generator Operators and Transmission Operators shall provide quarterly reports to the compliance monitor and have evidence for each synchronous generator and synchronous condenser of the following:

**M1.1** The actual number of hours the synchronous generator or synchronous condenser was on line.

**M1.2** The actual number of hours the AVR was out of service.

**M1.3** The AVR in service percentage.

**M1.4** If excluding AVR out of service hours as allowed in R1.1 through R1.10, provide:

**M1.4.1** The number of hours excluded, and

**M1.4.2** The adjusted AVR in-service percentage.

- M2.** If excluding hours for R1.1 through R1.10, provide the date of the outage, the number of hours out of service, and supporting documentation for each requirement that applies.

### **D. Compliance**

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

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

Compliance Enforcement Authority

##### **1.2 Compliance Monitoring Period**

Compliance Enforcement Authority may use one or more of the following methods to assess compliance:

- Reports submitted quarterly
- Spot check audits conducted anytime with 30 days notice
- Periodic audit as scheduled by the Compliance Enforcement Authority
- Investigations
- Other methods as provided for in the Compliance Monitoring Enforcement Program

The Reset Time Frame shall be a calendar quarter.

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

The Generator Operators and Transmission Operators shall keep evidence for Measures M1 and M2 for three years plus current year, or since the last audit, whichever is longer.

##### **1.4 Additional Compliance Information**

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- 1.4.1** The sanctions shall be assessed on a calendar quarter basis.
- 1.4.2** If any of R1.2 through R1.9 continues from one quarter to another, the number of days accumulated will be the contiguous calendar days from the beginning of the incident to the end of the incident. For example, in R1.4 if the 60 day repair period goes beyond the end of a quarter, the repair period does not reset at the beginning of the next quarter.
- 1.4.3** When calculating the in-service percentages, do not include the time the AVR is out of service due to R1.1 through R1.10.
- 1.4.4** The standard shall be applied on a machine-by-machine basis (a Generator Operator or Transmission Operator can be subject to a separate sanction for each non-compliant synchronous generator and synchronous condenser).

### **2. Violation Severity Levels for R1**

**2.1. Lower:** There shall be a Lower Level of non-compliance if the following condition exists:

- 2.1.1.** AVR is in service less than 98% but at least 90% or more of all hours during which the synchronous generating unit or synchronous condenser is on line for each calendar quarter.

**2.2. Moderate:** There shall be a Moderate Level of non-compliance if the following condition exists:

- 2.2.1.** AVR is in service less than 90% but at least 80% or more of all hours during which the synchronous generating unit or synchronous condenser is on line for each calendar quarter.

**2.3. High:** There shall be a High Level of non-compliance if the following condition exists:

- 2.3.1.** AVR is in service less than 80% but at least 70% or more of all hours during which the synchronous generating unit or synchronous condenser is on line for each calendar quarter.

**2.4. Severe:** There shall be a Severe Level of non-compliance if the following condition exists:

- 2.4.1.** AVR is in service less than 70% of all hours during which the synchronous generating unit or synchronous condenser is on line for each calendar quarter.

### **3. Violation Severity Levels for R2**

**3.1. Lower:** There shall be a Lower Level of non-compliance if documentation is incomplete with any requirement R1.1 through R1.10.

**3.2. Moderate:** There shall be a Moderate Level of non-compliance if the Generator Operator does not have documentation to demonstrate compliance with any requirement R1.1 through R1.10.

**3.3. High:** Not Applicable

**3.4. Severe:** Not Applicable

### **E. Regional Differences**

**Version History** – Shows Approval History and Summary of Changes in the Action Field

<b>Version</b>	<b>Date</b>	<b>Action</b>	<b>Change Tracking</b>
1	January 1, 2008	Permanent Replacement Standard for VAR-STD-002a-1	

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