

WECC Standard VAR-501-WECC-1 – Power System Stabilizer

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:

Completed Actions	Completion Date
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-002b-1. VAR-501-WECC-1 is designed to implement the directives of FERC and recommendations of NERC when VAR-STD-002b-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 Power System Stabilizers are in service to enhance system damping. The requirements in VAR-501-WECC-1 are to ensure that the generator provides the proper damping to maintain system stability when generation and transmission outages occur.

The WECC Operating Committee approved the VAR-501-WECC-1 standard as a permanent replacement standard for VAR-STD-002b-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-501-WECC-1 as a permanent replacement standard for VAR-STD-002b-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:

Anticipated Actions	Anticipated Date
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

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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.

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A. Introduction

- 1. Title:** Power System Stabilizer (PSS)
- 2. Number:** VAR-501-WECC-1
- 3. Purpose:** To ensure that Power System Stabilizers (PSS) on synchronous generators shall be kept in service.
- 4. Applicability**
 - 4.1. Generator Operators
- 5. Effective Date:** On the first day of the first quarter, after applicable regulatory approval.

B. Requirements

- R1.** Generator Operators shall have PSS in service 98% of all operating hours for synchronous generators equipped with PSS. Generator Operators may exclude hours for R1.1 through R1.12 to achieve the 98% requirement. *[Violation Risk Factor: Medium] [Time Horizon: Operations Assessment]*
- R1.1.** The synchronous generator 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.** PSS exhibits instability due to abnormal system configuration.
 - R1.4.** Unit is operating in the synchronous condenser mode (very near zero real power level).
 - R1.5.** Unit is generating less power than its design limit for effective PSS operation.
 - R1.6.** Unit is passing through a range of output that is a known “rough zone” (range in which a hydro unit is experiencing excessive vibration).
 - R1.7.** The generator AVR is not in service.
 - R1.8.** Due to component failure, the PSS may be out of service up to 60 consecutive days for repair per incident.
 - R1.9.** Due to a component failure, the PSS may be out of service up to one year provided the Generator Operator submits documentation identifying the need for time to obtain replacement parts and if required to schedule an outage.
 - R1.10.** Due to a component failure, the PSS may be out of service up to 24 months provided the Generator Operator submits documentation identifying the need for time for PSS replacement and to schedule an outage.
 - R1.11.** The synchronous generator has not achieved Commercial Operation.
 - R1.12.** The Transmission Operator directs the Generator Operator to operate the synchronous generator, and the PSS is unavailable for service.
- R2.** Generator Operators shall have documentation identifying the number of hours excluded for each requirement in R1.1 through R1.12. *[Violation Risk Factor: Low] [Time Horizon: Operations Assessment]*

C. Measures

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

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- M1.1** The number of hours the synchronous generator was on line.
- M1.2** The number of hours the PSS was out of service with generator on line.
- M1.3** The PSS in service percentage
- M1.4** If excluding PSS out of service hours as allowed in R1.1 through R1.12, provide:
 - M1.4.1** The number of hours excluded, and
 - M1.4.2** The adjusted PSS in-service percentage.

M2. If excluding hours for R1.1 through R1.12, provide:

- M2.1** The date of the outage
- M2.2** 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 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

- 1.4.1** The sanctions shall be assessed on a calendar quarter basis.
- 1.4.2** If any of R1.2 through R1.12 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 R1.8 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.

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- 1.4.3** When calculating the adjusted in-service percentage, the PSS out of service hours do not include the time associated with R1.1 through R1.12.
- 1.4.4** The standard shall be applied on a generating unit by generating unit basis (a Generator Operator can be subject to a separate sanction for each non-compliant synchronous generating unit or to a single sanction for multiple machines that operate as one unit).

2. Violation Severity Levels

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

- 2.1.1.** PSS is in service less than 98% but at least 90% or more of all hours during which the synchronous generating unit 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.** PSS is in service less than 90% but at least 80% or more of all hours during which the synchronous generating unit 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.** PSS is in service less than 80% but at least 70% or more of all hours during which the synchronous generating unit 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.** PSS is in service less than 70% of all hours during which the synchronous generating unit 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 R1.12.

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 R1.12.

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

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