

WECC Standard VAR-501-WECC-2 Power System Stabilizer



Document Title	Power System Stabilizer VAR-501-WECC-2
File Name	
Category	(X) Regional Reliability Standard () Regional Criterion () Policy () Guideline () Report or other () Charter
Document date	
Adopted/approved by	WECC Board of Directors
Date adopted/approved	
Custodian (entity responsible for maintenance and upkeep)	Standards
Stored/filed	Physical location: Web URL:
Previous name/number	This document is designed to update VAR-501-WECC-1 with "P81" conforming changes.
Status	(X) Version 1 <u>2</u> Effective Date July 1, 2014 <u>For NERC/FERC Approval.</u> () usable, minor formatting/editing required () modification needed () superseded by () other _____ () obsolete/archived)

Version	Date	Action	Change Highlights
1	April 16, 2008	Permanent replacement standard for VAR-STD-002b-1.	
1	October 28, 2008	Adopted by NERC Board of Trustees	
1	April 21, 2011	FERC Order issued approving VAR-501-WECC-1 (approval effective June 27, 2011; Effective Date: July 1, 2011)	
<u>2</u>	<u>May 28, 2014</u>	<u>Approval by WECC Ballot Pool</u>	<u>Remove Requirement R2 and Measure M2 pursuant to FERC Paragraph 81.</u>

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Project Roadmap

Completed Actions	Completed Actions
1. SAR received	12-3-2013
2. SAR deemed Complete/Valid/Team Site created	12-3-2013
3. WSC approved the SAR	1-8-2014
4. WSC solicits / assigns a drafting team (DT)	1-8-2014
5. First DT meeting	2-25-2014
6. WSC approves posting	3-12-2014
7. Posting 1 WECC open 45-day	3-14-2014
8. Posting 1 WECC closed	4-28-2014
9. DT meets to respond to comments	5-1-2014
10. WSC approves for ballot	5-20-2014
11. Joint Session Noticed	5-22-2014
12. Ballot Pool Open	5-28-2014
13. Joint Session	6-12-2014
14. Ballot Pool Closed	6-19-2014
15. Ballot open	6-25-2014
16. Ballot closed	7-18-2014
17. WSC meets to approve forwarding to the WECC Board of Directors	7-24-2014
18. Sent to NERC with a request for 45-day posting	7-25-2014
19. Posting 1 NERC Open	
20. Document posted for 30 days prior to WECC Board meeting/ Placed on Board agenda	
21. Posting 1 NERC Closes	
22. Posting 1 NERC Responses Posted	
23. WECC Board meets to approve	
24. Sent to NERC for NERC Board of Trustee and final disposition	

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Background

WECC-0105 P81 Project VAR Redraft

In Phase 1 of the “P81” Project, a NERC team identified the following WECC-specific Requirement for modification; however, since the underlying document is a WECC Regional Reliability Standards, NERC is not empowered to directly change the document. In response, a regional team is required to draft the identified changes.

The following VAR-501-WECC-1, Power System Stabilizer, Requirement R2 is identified as administrative in nature and should be addressed accordingly.

VAR-501-WECC-1, Requirement R2 states:

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]

This Requirement is a call to “have documentation.” In this Standard, requiring documentation does not add to or detract from the reliability of the grid; rather, having documentation is an element of verifying that a reliability-related task has been completed. As such, this Requirement is better suited for inclusion in the associated Measure.

Because the changes are administrative in nature, on January 8, 2014, the WECC Standards Committee assigned drafting of the proposed change to WECC staff. Proposed changes are to be processed under the WECC Reliability Standards Development Procedures. The motion was as follows:

A motion was made by Ms. Angela Small that was seconded by Ms. Crystal Musselman to assign the redraft of VAR-002-WECC-1, Requirement R2, and VAR-501-WECC-1, Requirement R2, to staff for further development in accordance with the Procedures. The motion carried by consensus.” [WSC Minutes 1-8-2014](#)

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Description of Current Document

The proposed redline below:

- 1) Moves the administrative substance of Requirement R2 into the Measure of R1, deleting Requirement R2.
- 2) Because there is no longer a Requirement R2, Measure M2 and the associated Compliance values are deleted.
- 3) To update the style of the document, the Compliance values are moved into a Compliance Table. Fonts and other NERC styles will be adopted upon completion.

Implementation Plan

Definitions of Terms Used

This section includes all newly defined or revised terms used in the proposed document. 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 document is approved. When the document becomes effective, these definitions will be removed from the document and added to the appropriate NERC or WECC Glossary.

None proposed.

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WECC Standard VAR-501-WECC-2—Power System Stabilizer

A. Introduction

1. **Title:** Power System Stabilizer (PSS)
2. **Number:** VAR-501-WECC-2
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

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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:

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,

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~~M1.4.3 Date of the outage.~~

~~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

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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 R1.12 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.~~

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~~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

None

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Table of Compliance Elements

R	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	Operational Assessment	Medium	<u>There shall be a Lower Level of non-compliance if 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.</u>	<u>There shall be a Moderate Level of non-compliance if 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.</u>	<u>There shall be a High Level of non-compliance if 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.</u>	<u>There shall be a Severe Level of non-compliance if PSS is in service less than 70% of all hours during which the synchronous generating unit is on line for each calendar quarter.</u>

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

Version	Date	Action	Change Tracking
1	April 16, 2008	Permanent Replacement Standard for VAR-STD-002b-1	
1	April 21, 2011	FERC Order issued approving VAR-501-WECC-1 (FERC approval effective June 27, 2011; Effective Date July 1, 2011)	
<u>2</u>	<u>May 28, 2014</u>	<u>Approval by WECC Ballot Pool</u>	<u>Remove Requirement R2 and Measure M2 pursuant to FERC Paragraph 81.</u>