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**UNITED STATES OF AMERICA  
BEFORE THE  
FEDERAL ENERGY REGULATORY COMMISSION**

**North American Electric Reliability )  
Corporation )**

**Docket No. \_\_\_\_\_**

**JOINT PETITION FOR APPROVAL OF  
PROPOSED REGIONAL RELIABILITY STANDARDS  
VAR-002-WECC-2 AND VAR-501-WECC-2**

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December 15, 2014

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PROPOSED REGIONAL RELIABILITY STANDARDS  
VAR-002-WECC-2 AND VAR-501-WECC-2**

The North American Electric Reliability Corporation (“NERC”)<sup>1</sup> hereby requests Federal Energy Regulatory Commission (“Commission”) approval, in accordance with Section 215(d)(1) of the Federal Power Act (“FPA”)<sup>2</sup> and Section 39.5 of the Commission’s regulations,<sup>3</sup> of proposed regional Reliability Standards VAR-002-WECC-2 (Automatic Voltage Regulators) and VAR-501-WECC-2 (Power System Stabilizer) developed by NERC and the Western Electricity Coordinating Council (“WECC”).<sup>4</sup> NERC requests that the Commission approve proposed regional Reliability Standards VAR-002-WECC-2 and VAR-501-WECC-2 (Exhibit A) and find that the proposed regional Reliability Standards are just, reasonable, not unduly discriminatory or preferential, and in the public interest.<sup>5</sup> NERC also requests approval of the associated Implementation Plan (Exhibit B). Proposed regional Reliability Standards VAR-002-WECC-2 and VAR-501-WECC-2 were adopted by the NERC Board of Trustees on November 13, 2014.

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<sup>1</sup> NERC has been certified by the Commission as the electric reliability organization (“ERO”) in accordance with Section 215 of the FPA. See *N. Am. Elec. Reliability Corp.*, 116 FERC ¶ 61,062 (2006).

<sup>2</sup> 16 U.S.C. § 824o (2012).

<sup>3</sup> 18 C.F.R. § 39.5 (2014).

<sup>4</sup> As the Regional Entity who developed proposed regional Reliability Standards VAR-002-WECC-2 and VAR-501-WECC-2, WECC joins and supports NERC’s petition, thereby making WECC a party in this proceeding.

<sup>5</sup> Unless otherwise designated, capitalized terms shall have the meaning set forth in the *Glossary of Terms Used in NERC Reliability Standards* (“NERC Glossary of Terms”), available at [http://www.nerc.com/files/Glossary\\_of\\_Terms.pdf](http://www.nerc.com/files/Glossary_of_Terms.pdf).

As required by Section 39.5(a)<sup>6</sup> of the Commission’s regulations, this petition presents the technical basis and purpose of the proposed Reliability Standards, a summary of the development proceedings conducted by NERC and WECC for proposed VAR-002-WECC-2 and VAR-501-WECC-2 (Exhibit D), and a demonstration that the proposed regional Reliability Standards meet the criteria identified by the Commission in Order No. 672<sup>7</sup> (Exhibit C).

## **I. Executive Summary**

Consistent with the Commission’s order<sup>8</sup> approving NERC’s Compliance Enforcement Initiative (“CEI”), including the Find, Fix, Track and Report (“FFT”) program, NERC is requesting retirement of two requirements within two regional Reliability Standards, VAR-002-WECC-1 Requirement R2 and VAR-501-WECC-1 Requirement R2, that are unnecessary, and where violation of the requirements pose a lesser risk to the reliability of the Bulk-Power System.

The proposed regional Reliability Standards continue to achieve the same reliability purpose of the prior versions. The purpose of proposed VAR-002-WECC-2 is to ensure that automatic voltage regulators on synchronous generators and condensers are kept in service and controlling voltage. The purpose of proposed VAR-501-WECC-2 is to ensure that power system stabilizers on synchronous generators are kept in service.

## **II. Notices and Communications**

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<sup>6</sup> 18 C.F.R. § 39.5(a) (2012).

<sup>7</sup> The Commission specified in Order No. 672 certain general factors it would consider when assessing whether a particular Reliability Standard is just and reasonable. *See Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards*, Order No. 672, FERC Stats. & Regs. ¶ 31,204, at P 262, 321-37, *order on reh’g*, Order No. 672-A, FERC Stats. & Regs. ¶ 31,212 (2006).

<sup>8</sup> *North American Electric Reliability Corporation*, 138 FERC ¶ 61,193 at P 81 (2012) (“FFT Order”).

Notices and communications with respect to this filing may be addressed to the following:<sup>9</sup>

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### **III. Background**

#### **A. Regulatory Framework**

By enacting the Energy Policy Act of 2005, which amended the Federal Power Act (“FPA”),<sup>10</sup> Congress entrusted the Commission with the duties of approving and enforcing rules to ensure the reliability of the Nation’s Bulk-Power System, and with the duties of certifying an ERO that would be charged with developing and enforcing mandatory Reliability Standards, subject to Commission approval. Section 215(b)(1)<sup>11</sup> of the FPA states that all users, owners, and operators of the Bulk-Power System in the United States will be subject to Commission-

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<sup>9</sup> Persons to be included on the Commission’s service list are identified by an asterisk. NERC respectfully requests a waiver of Rule 203 of the Commission’s regulations, 18 C.F.R. § 385.203 (2014), to allow the inclusion of more than two persons on the service list in this proceeding.

<sup>10</sup> 16 U.S.C. § 824o (2012).

<sup>11</sup> *Id.* § 824(b)(1).

approved Reliability Standards. Section 215(d)(5)<sup>12</sup> of the FPA authorizes the Commission to order the ERO to submit a new or modified Reliability Standard. Section 39.5(a)<sup>13</sup> of the Commission's regulations requires the ERO to file with the Commission for its approval each Reliability Standard that the ERO proposes should become mandatory and enforceable in the United States, and each modification to a Reliability Standard that the ERO proposes should be made effective.

The Commission has the regulatory responsibility to approve standards that protect the reliability of the Bulk-Power System and to ensure that such standards are just, reasonable, not unduly discriminatory or preferential, and in the public interest. A Reliability Standard proposed by a Regional Entity must meet the same standard that NERC's Reliability Standards must meet, *i.e.*, the regional Reliability Standard must be shown to be just, reasonable, not unduly discriminatory or preferential, and in the public interest.<sup>14</sup> If the regional Reliability Standard is proposed by a Regional Entity organized on an Interconnection-wide basis, to be applicable on an Interconnection-wide basis, then NERC must rebuttably presume that the standard is just, reasonable, not unduly discriminatory or preferential, and in the public interest.<sup>15</sup>

Pursuant to Section 215(d)(2) of the FPA<sup>16</sup> and Section 39.5(c)(1)-(2)<sup>17</sup> of the Commission's regulations, the Commission will give due weight to the technical expertise of the ERO with respect to the content of a Reliability Standard and to the technical expertise of a Regional Entity organized on an Interconnection-wide basis with respect to a Reliability

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<sup>12</sup> *Id.* § 824o(d)(5).

<sup>13</sup> 18 C.F.R. § 39.5(a) (2014).

<sup>14</sup> 16 U.S.C. § 824o(d)(2); 18 C.F.R. §39.5(a).

<sup>15</sup> 16 U.S.C. § 824o(d)(3); 18 C.F.R. §39.5(b).

<sup>16</sup> 16 U.S.C. § 824o(d)(2).

<sup>17</sup> 18 C.F.R. § 39.5(c)(1)(2).

Standard to be applicable within that Interconnection. In Order No. 672, the Commission noted that:

As a general matter, we will accept the following two types of regional differences, provided they are otherwise just, reasonable, not unduly discriminatory or preferential and in the public interest, as required under the statute: (1) a regional difference that is more stringent than the continent-wide Reliability Standard, including a regional difference that addresses matters that the continent-wide Reliability Standard does not; and (2) a regional Reliability Standard that is necessitated by a physical difference in the Bulk-Power System.<sup>18</sup>

A regional difference generally takes one of two forms: (1) a regional variance may be included in a continent-wide Reliability Standard, which achieves the reliability objective of the continent-wide standard's requirement(s) in an alternate way than specified in a given Requirement in the continent-wide standard or (2) a separate regional Reliability Standard may be developed, which adds one or more Requirements without altering any continent-wide Requirements that are applicable to entities in the region.<sup>19</sup> As discussed in the *Western Electricity Coordinating Council Reliability Standards Development Procedures*, the regional Reliability Standards for WECC are developed in a transparent, inclusive, open, and balanced process with reasonable notice and opportunity for public comment.<sup>20</sup>

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<sup>18</sup> Order No. 672 at P 291.

<sup>19</sup> See NERC, *Whitepaper to Provide Guidance on Regional Standards and Variances*, May 17, 2012, available at <http://www.nerc.com/docs/sac/rsg/Whitepaper%20on%20Regional%20Standards%20and%20Variances%20final.pdf>.

<sup>20</sup> The *Western Electricity Coordinating Council Reliability Standards Development Procedures* are available at [https://www.wecc.biz/\\_layouts/15/WopiFrame.aspx?sourcedoc=/Reliability/WECC%20Reliability%20Standards%20Development%20Procedures.pdf&action=default&DefaultItemOpen=1](https://www.wecc.biz/_layouts/15/WopiFrame.aspx?sourcedoc=/Reliability/WECC%20Reliability%20Standards%20Development%20Procedures.pdf&action=default&DefaultItemOpen=1)

## **B. History of VAR-002-WECC-2 and VAR-501-WECC-2**

On March 16, 2007, the Commission issued Order No. 693, approving Reliability Standard VAR-002-1.<sup>21</sup> Reliability Standard VAR-002-1 requires Generator Operators to operate in automatic voltage control mode, to maintain generator voltage or reactive power output as directed by the Transmission Operator, and to notify the Transmission Operator of a change in status or capability of any generator reactive power resource.

On June 8, 2007, the Commission approved eight WECC regional Reliability Standards that apply in the Western Interconnection, including WECC-VAR-STD-002a-1 (Automatic Voltage Regulators) and WECC-VAR-STD-002b-1 (Power System Stabilizer).<sup>22</sup> The Commission subsequently approved revisions to both WECC-VAR-STD-002a-1 and WECC-VAR-STD-002b-1, which were re-designated VAR-002-WECC-1 and VAR-501-WECC-1 respectively, in Order No. 751.<sup>23</sup>

## **C. Project 2013-02 Paragraph 81**

On March 15, 2012, the Commission issued an order<sup>24</sup> approving NERC's CEI, including the FFT program. Paragraph 81 ("P 81") of the FFT Order reads:

The Commission notes that NERC's FFT initiative is predicated on the view that many violations of requirements currently included in Reliability Standards pose lesser risk to the Bulk-Power System. If so, some current requirements likely provide little protection for Bulk-Power System reliability or may be redundant. The Commission is interested in obtaining views on whether such requirements could be removed from the Reliability Standards with little effect on reliability and an increase in efficiency of the ERO compliance program. *If NERC believes that specific Reliability Standards or specific requirements within certain Standards should be revised or removed, we invite NERC to make specific proposals*

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<sup>21</sup> *Id.* P 1884.

<sup>22</sup> *N. Am. Elec. Reliability Corp.*, 119 FERC ¶ 61,260 (2007).

<sup>23</sup> *Version One Regional Reliability Standards for Facilities Design, Connections, and Maintenance; Protection and Control; and Voltage and Reactive*, 135 FERC ¶ 61,061 (2011).

<sup>24</sup> FFT Order at P 81 (emphasis added).



*to the Commission identifying the Standards or requirements and setting forth in detail the technical basis for its belief.* In addition, or in the alternative, we invite NERC, the Regional Entities and other interested entities to propose appropriate mechanisms to *identify and remove from the Commission approved Reliability Standards unnecessary or redundant requirements.* We will not impose a deadline on when these comments should be submitted, but ask that to the extent such comments are submitted NERC, the Regional Entities, and interested entities coordinate to submit their respective comments concurrently.

In response, NERC initiated a review, referred to as the “P 81 project,” to identify requirements that could be removed from Reliability Standards without impacting the reliability of the Bulk-Power System. This project identified Requirement R2 in both regional Reliability Standards VAR-002-WECC-1 and VAR-005-WECC-1 as candidates for retirement. However, because these Reliability Standards are maintained by WECC, the retirements were deferred in that project for later consideration by WECC through its standard development process.<sup>25</sup>

#### **IV. Justification for Approval**

This section explains the proposed Requirement R2 retirement in each proposed regional Reliability Standard and how each continues to meet its respective reliability purpose. NERC and WECC request Commission approval of proposed regional Reliability Standards VAR-002-WECC-2 and VAR-501-WECC-2 (Exhibit A) and the Implementation Plan (Exhibit B). As discussed in Exhibit C, proposed regional Reliability Standards VAR-002-WECC-2 and VAR-501-WCC-2 satisfy the Commission’s criteria in Order No. 672 and are just, reasonable, not unduly discriminatory or preferential, and in the public interest. The complete development record for the proposed Regional Reliability Standard is provided in Exhibit D.

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<sup>25</sup> See “Complete Set of Standards with Proposed Retirements for Phase 1” available on the P 81 project page at [http://www.nerc.com/pa/Stand/Pages/Project2013-02\\_Paragraph\\_81.aspx](http://www.nerc.com/pa/Stand/Pages/Project2013-02_Paragraph_81.aspx).

**A. Basis and Purpose of Proposed VAR-002-WECC-2 and VAR-501-WECC-2**

Proposed VAR-002-WECC-2 and proposed VAR-501-WECC-2 revise currently-effective version 1 standards to remove an administrative Requirement R2 in each, which require documentation of R1. The documentation language has been added to the Measure in Requirement R1 in each. VAR-002-WECC-1, Requirement R2 states:

**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]*

VAR-501-WECC-2, 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]*

The proposed modifications in both VAR-002-WECC-1 and VAR-501-WECC-2 include:

- deletion of Requirement R2, which requires documentation of Requirement R1;
- the addition of Measure M1.4.3 requiring the date of the outage be provided with the currently required quarterly reports; and
- non-substantive formatting changes have been made throughout the document to conform to NERC drafting conventions.

The substantive Requirements in both regional Reliability Standards have not changed and remain more stringent than the continent-wide Reliability Standard VAR-002-1. Proposed VAR-002-WECC-2 continues to set only very limited circumstances for when a generator's automatic voltage regulator should be operated in a mode other than voltage control mode and continues to further limit the cumulative timeframe for doing so. Proposed VAR-501-WECC-2 continues to require that Generator Operators have a power system stabilizer in service.

**B. Enforceability of Proposed VAR-002-WECC-2 and VAR-501-WECC-2**

Proposed VAR-002-WECC-2 and VAR-501-WECC-2 contain Measures that support each Requirement by clearly identifying what is required and how the Requirement will be enforced. The Measures have not substantively changed from the prior Commission approved versions of the Standards except for the addition of reporting the date of an outage related to an exclusion for each Standard. The Measures continue to provide clarity regarding how the Requirements will be enforced, and ensure that the Requirements will be enforced in a clear, consistent, and non-preferential manner and without prejudice to any party.<sup>26</sup> The proposed regional Reliability Standards continue to contain both a VRF and VSL for the remaining Requirement R1.

**V. CONCLUSION**

For the reasons stated above, NERC and WECC respectfully request that the Commission approve the proposed VAR-002-WECC-2 and VAR-501-WECC-2 regional Reliability Standards and the Implementation Plan.

Respectfully submitted,

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<sup>26</sup> Order No. 672 at P 327 (“There should be a clear criterion or measure of whether an entity is in compliance with a proposed Reliability Standard. It should contain or be accompanied by an objective measure of compliance so that it can be enforced and so that enforcement can be applied in a consistent and non-preferential manner.”).

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December 15, 2014

**Exhibit A**

**VAR-002-WECC-2—Automatic Voltage Regulators**

**And**

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

**VAR-002-WECC-2—Automatic Voltage Regulators (Clean)**

## A. Introduction

1. **Title:** Automatic Voltage Regulators (AVR)
2. **Number:** VAR-002-WECC-2
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. **Functional Entities:**
    - 4.1.1 Generator Operators
    - 4.1.2 Transmission Operators that operate synchronous condensers
    - 4.1.3 This VAR-002-WECC-2 Standard 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 and Measures

- 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.
- 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,
    - M1.4.2** The adjusted AVR in-service percentage,
    - M1.4.3** The date of the outage.

## **C. 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 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 R1.9 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).

**E. Regional Differences**

None

**F. Interpretations**

None

**G. Associated Documents**

None

Table of Compliance Elements

R	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	Operational Assessment	Medium	There shall be a Lower Level of non-compliance if 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.	There shall be a Moderate Level of non-compliance if 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.	There shall be a High Level of non-compliance if 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.	There shall be a Severe Level of non-compliance if 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.

**VAR-002-WECC-2-Automatic Voltage Regulators (Redline)**

## A. Introduction

1. **Title:** Automatic Voltage Regulators (AVR)
2. **Number:** VAR-002-WECC-~~1~~2
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. Functional Entities:

~~4.1.1~~ ~~4.1.~~ Generator Operators

~~4.2.~~ ~~4.1.2~~ Transmission Operators that operate synchronous condensers

~~4.3.~~ ~~4.1.3~~ This VAR-002-WECC-~~1~~2 Standard ~~only~~ applies to synchronous generators and synchronous condensers that are connected to the Bulk Electric System.

### 5. Effective Date:

~~5.~~ ~~Effective Date:~~ On the first day of the first quarter, after applicable regulatory approval.

## B. Requirements and Measures

- 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.

~~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. ~~2~~
- ~~M2. If excluding hours for R1.1 through R1.10, provide the 1.4.3 The date of the outage, ~~the number of hours out of service, and supporting documentation for each requirement that applies.~~~~

### ~~D. C. Compliance~~

#### ~~1.1. Compliance Monitoring Process~~

##### ~~1.1.1 Compliance Monitoring Responsibility~~

Compliance Enforcement Authority

##### ~~1.2.1.2 Compliance Monitoring Period~~

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

~~2~~ 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~~ **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~~ **1.4 Additional Compliance Information**

~~1.4.1~~ **1.4.1** The sanctions shall be assessed on a calendar quarter basis.

~~1.4.2~~ **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~~ **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~~ **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~~

<del>Version</del>	<del>Date</del>	<del>Action</del>	<del>Change Tracking</del>
<del>1</del>	<del>April 16, 2008</del>	<del>Permanent Replacement Standard for VAR-STD-002a-1</del>	
<del>1</del>	<del>April 21, 2011</del>	<del>FERC Order issued approving VAR-002-WECC-1 (approval effective June 27, 2011)</del>	

~~\* FOR INFORMATIONAL PURPOSES ONLY \*~~

~~Enforcement Dates: Standard VAR-002-WECC-1 — Automatic Voltage Regulators (AVR) (WECC)~~

~~United States~~

<del>Standard</del>	<del>Requirement</del>	<del>Enforcement Date</del>	<del>Inactive Date</del>
<del>VAR-002-WECC-1</del>	<del>All</del>	<del>07/01/2011</del>	

~~None~~

~~E. Interpretations~~

~~None~~

~~G. Associated Documents~~

~~None~~

**Table of Compliance Elements**

<b><u>R</u></b>	<b><u>Time Horizon</u></b>	<b><u>VRP</u></b>	<b><u>Violation Severity Levels</u></b>			
			<b><u>Lower VSL</u></b>	<b><u>Moderate VSL</u></b>	<b><u>High VSL</u></b>	<b><u>Severe VSL</u></b>
<b><u>R1</u></b>	<b><u>Operational Assessment</u></b>	<b><u>Medium</u></b>	There shall be a <u>Lower Level of non-compliance if 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.</u>	There shall be a <u>Moderate Level of non-compliance if 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.</u>	There shall be a <u>High Level of non-compliance if 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.</u>	There shall be a <u>Severe Level of non-compliance if 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.</u>



**VAR-501-WECC-2—Power System Stabilizer (Clean)**

**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. **Functional Entities:**
    - 4.1.1 Generator Operators
5. **Effective Date:** On the first day of the first quarter after applicable regulatory approval.

**B. Requirements and Measures**

- 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.
- 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,
    - M1.4.2** The adjusted PSS in-service percentage,
    - M1.4.3** Date of the outage.

**C. 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.

**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).

**C. Regional Variances**

None.

**D. Interpretations**

None.

**E. Associated Documents**

None.

Table of Compliance Elements

R	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	Operational Assessment	Medium	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.	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.	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.	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.

**Version History**

<b>Version</b>	<b>Date</b>	<b>Action</b>	<b>Change Tracking</b>
1	April 16, 2008	Permanent Replacement Standard for VAR-STD-002b-1	
1	April 21, 2011	FERC Order issued approving VAR-501-WECC-1 (approval effective June 27, 2011)	
2		NERC Board of Trustees Approval	Removed documentation requirement from Requirement R2; placed the mandate into the Measures. Deleted Requirement R2.

**VAR-501-WECC-2—Power System Stabilizer (Redline)**

**A. Introduction**

1. **Title:** Power System Stabilizer (PSS)
2. **Number:** VAR-501-WECC-~~1~~2
3. **Purpose:** To ensure that Power System Stabilizers (PSS) on synchronous generators shall be kept in service.
4. **Applicability:**
  - 4.1. **Functional Entities:**
    - 4.1.1 ~~4.1.~~ Generator Operators
5. **Effective Date:** On the first day of the first quarter~~;~~ after applicable regulatory approval.

**B. Requirements and Measures**

- 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:

**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 \_\_\_\_\_ **M1.4.3** \_\_\_\_\_ Date of the outage.~~

~~**M2.2** — Supporting documentation for each requirement that applies~~

C.        ~~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.

**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.

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~~

### C. ~~E. Regional Differences~~ Variances

None.

### D. Interpretations

None.

### E. Associated Documents

None.

Table of Compliance Elements

<u>R</u>	<u>Time Horizon</u>	<u>VRF</u>	<u>Violation Severity Levels</u>			
			<u>Lower VSL</u>	<u>Moderate VSL</u>	<u>High VSL</u>	<u>Severe VSL</u>
<u>R1</u>	<u>Operational Assessment</u>	<u>Medium</u>	<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>

**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 (approval effective June 27, 2011)	
<u><a href="#">2</a></u>		<u><a href="#">NERC Board of Trustees Approval</a></u>	<u><a href="#">Removed documentation requirement from Requirement R2; placed the mandate into the Measures. Deleted Requirement R2.</a></u>

**\* FOR INFORMATIONAL PURPOSES ONLY \***

**Enforcement Dates: Standard VAR-501-WECC-1 — Power System Stabilizer (PSS) (WECC)**

[United States](#)

Standard	Requirement	Enforcement Date	Inactive Date
VAR-501-WECC-1	All	07/01/2011	

**Exhibit B**  
**Implementation Plan**

## Implementation Plan

WECC-0105 “P81” Changes

VAR-002-WECC-2 Automatic Voltage Regulator

VAR-501-WECC-2 Power System Stabilizer

### *Approvals Required*

VAR-002 WECC-2 – Automatic Voltage Regulator

VAR-501-WECC-2 – Power System Stabilizer

Project WECC-0105 implements “P81” changes. According to its Implementation Plan, the documentation requirements resident in Requirement R2 of both VAR-002-WECC-1 and VAR-501-WECC-1 have been removed from the Requirements section and made part of the Measures for Requirement R1 in the new documents. Other than various formatting changes, no other substantive changes were made.

### *Prerequisite Approvals*

None

### *Revisions to Glossary Terms*

None

### *Applicable Entities*

VAR-002 WECC-2 – Automatic Voltage Regulator

- Generator Operator
- Transmission Operator

VAR-501-WECC-2 – Power System Stabilizer

- Generator Operator

### *Conforming Changes to Other Standards*

None

### *Effective Dates*

On the first day of the first quarter, after applicable regulatory approval.

### *Retirements*

None

### *Justification of Phasing*

None

**Exhibit C**  
**Order No. 672 Criteria**



## EXHIBIT C

### Order No. 672 Criteria for Proposed VAR-002-WECC-2 and VAR-501-WECC-2

In Order No. 672,<sup>1</sup> the Commission identified a number of criteria it will use to analyze Reliability Standards proposed for approval to ensure they are just, reasonable, not unduly discriminatory or preferential, and in the public interest. The discussion below identifies these factors and explains how the proposed Reliability Standard has met or exceeded the criteria:

- 1. Proposed Reliability Standards must be designed to achieve a specified reliability goal and must contain a technically sound means to achieve that goal.<sup>2</sup>**

The purpose of VAR-002-WECC-2 is to ensure that automatic voltage regulators on synchronous generators and condensers shall be kept in service and controlling voltage. The proposed VAR-002-WECC-2 regional Reliability Standard continues to be technically sound as the proposed VAR-002-WECC-2 continues to meet the same

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<sup>1</sup> *Rules Concerning Certification of the Electric Reliability Organization; and Procedures for the Establishment, Approval, and Enforcement of Electric Reliability Standards*, Order No. 672, FERC Stats. & Regs. ¶ 31,204, *order on reh'g*, Order No. 672-A, FERC Stats. & Regs. ¶ 31,212 (2006).

<sup>2</sup> Order No. 672 at P 321. The proposed Reliability Standard must address a reliability concern that falls within the requirements of section 215 of the FPA. That is, it must provide for the reliable operation of Bulk-Power System facilities. It may not extend beyond reliable operation of such facilities or apply to other facilities. Such facilities include all those necessary for operating an interconnected electric energy transmission network, or any portion of that network, including control systems. The proposed Reliability Standard may apply to any design of planned additions or modifications of such facilities that is necessary to provide for reliable operation. It may also apply to Cybersecurity protection.

Order No. 672 at P 324. The proposed Reliability Standard must be designed to achieve a specified reliability goal and must contain a technically sound means to achieve this goal. Although any person may propose a topic for a Reliability Standard to the ERO, in the ERO's process, the specific proposed Reliability Standard should be developed initially by persons within the electric power industry and community with a high level of technical expertise and be based on sound technical and engineering criteria. It should be based on actual data and lessons learned from past operating incidents, where appropriate. The process for ERO approval of a proposed Reliability Standard should be fair and open to all interested persons.

performance of regional Reliability Standard VAR-002-WECC-1.<sup>3</sup> Proposed VAR-002-WECC-2 is more stringent than the continent-wide Reliability Standard VAR-002 because it sets only limited circumstances for when a generator's automatic voltage regulator should be operated in a mode other than the voltage control mode and further limits the cumulative timeframe for doing so.

The purpose of WECC-501-WECC-2 is to ensure that power system stabilizers on synchronous generators are kept in service. The proposed WECC-501-WECC-2 regional Reliability Standard continues to be technically sound as the proposed VAR-501-WECC-2 continues to meet the same performance as its Commission approved predecessor, VAR-501-WECC-1.<sup>4</sup> Proposed VAR-501-WECC-2 is more stringent than the continent-wide NERC Reliability Standards as there is no corresponding NERC Standard for power system stabilizers.

**2. Proposed Reliability Standards must be applicable only to users, owners and operators of the bulk power system, and must be clear and unambiguous as to what is required and who is required to comply.<sup>5</sup>**

Proposed VAR-002-WECC-2 is only applicable to Generator Operators and Transmission Operators that operate synchronous condensers within the WECC region. Proposed VAR-501-WECC-2 is only applicable to Generator Operators within the WECC region. As explained in greater detail in the petition, the proposed regional

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<sup>3</sup> VAR-002-WECC-1 was approved by the Commission on April 21, 2011. *See Version One Regional Reliability Standards for Facilities Design, Connections, and Maintenance; Protection and Control; and Voltage and Reactive*, 135 FERC ¶ 61,061 (2011).

<sup>4</sup> VAR-501-WECC-1 was approved by the Commission on April 21, 2011. *See Id.*

<sup>5</sup> Order No. 672 at P 322. The proposed Reliability Standard may impose a requirement on any user, owner, or operator of such facilities, but not on others.

Order No. 672 at P 325. The proposed Reliability Standard should be clear and unambiguous regarding what is required and who is required to comply. Users, owners, and operators of the Bulk-Power System must know what they are required to do to maintain reliability.

Reliability Standards each contain a single remaining Requirement, which continues to clearly state the entity that is expected to comply and identifies what is required.

**3. A proposed Reliability Standard must include clear and understandable consequences and a range of penalties (monetary and/or non-monetary) for a violation.<sup>6</sup>**

Proposed VAR-002-WECC-2 and VAR-501-WECC-2 do not have any substantive changes to the VRFs and VSLs approved in their predecessor Reliability Standards, with the exception of the deletion of the VRF and VSL related to the retirement of Requirement R2. The format of the VRF and VSL section has been updated from a textual representation to a tabular format without changing the substance of the content. The proposed regional Reliability Standards continue to comport with NERC and Commission guidelines related to their assignment. The assignment of the severity level for each VSL is consistent with the corresponding Requirement and the VSLs should ensure uniformity and consistency in the determination of penalties. The VSLs do not use any ambiguous terminology, thereby supporting uniformity and consistency in the determination of similar penalties for similar violations. For these reasons, the proposed regional Reliability Standards includes clear and understandable consequences in accordance with Order No. 672. Upon approval by the Commission, the ranges of penalties for violations will continue to be based on the applicable VRF and VSL in accordance with the sanctions table and the supporting penalty determination process described in the Commission-approved NERC Sanction Guidelines, Appendix 4B to the NERC Rules of Procedure.

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<sup>6</sup> Order No. 672 at P 326. The possible consequences, including range of possible penalties, for violating a proposed Reliability Standard should be clear and understandable by those who must comply.

**4. A proposed Reliability Standard must identify clear and objective criterion or measure for compliance, so that it can be enforced in a consistent and non-preferential manner.<sup>7</sup>**

Proposed VAR-002-WECC-2 and VAR-501-WECC-2 identify clear and objective criterion or Measures for compliance so that they can be enforced in a consistent and non-preferential manner. The regional Reliability Standards contain individual Measures that support the regional difference's Requirements by plainly identifying how the Requirements will be assessed and enforced. With the inclusion of a Measure requiring the reporting of the date of any outage for both proposed regional Reliability Standards, these Measures continue to ensure that the Requirements will be assessed and enforced in a clear, consistent, and non-preferential manner, without prejudice to any party.

**5. Proposed Reliability Standards should achieve a reliability goal effectively and efficiently — but do not necessarily have to reflect “best practices” without regard to implementation cost or historical regional infrastructure design.<sup>8</sup>**

Proposed VAR-002-WECC-2 and VAR-501-WECC-2 achieve their reliability goals effectively and efficiently. The proposed standards remove a documentation requirement and allow the Measures to address the documentation. By utilizing the existing documentation requirements and shifting the language to the Measures, the proposed regional Reliability Standards use the most efficient method available to

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<sup>7</sup> Order No. 672 at P 327. There should be a clear criterion or measure of whether an entity is in compliance with a proposed Reliability Standard. It should contain or be accompanied by an objective measure of compliance so that it can be enforced and so that enforcement can be applied in a consistent and non-preferential manner.

<sup>8</sup> Order No. 672 at P 328. The proposed Reliability Standard does not necessarily have to reflect the optimal method, or “best practice,” for achieving its reliability goal without regard to implementation cost or historical regional infrastructure design. It should however achieve its reliability goal effectively and efficiently.

achieve the reliability goal and reduce the time and cost for implementation of the proposed regional Reliability Standards.

**6. Proposed Reliability Standards cannot be “lowest common denominator,” *i.e.*, cannot reflect a compromise that does not adequately protect Bulk-Power System reliability. Proposed Reliability Standards can consider costs to implement for smaller entities, but not at consequences of less than excellence in operating system reliability.<sup>9</sup>**

Proposed VAR-002-WECC-2 and VAR-501-WECC-2 do not reflect a compromise that does not adequately protect Bulk-Power System reliability. The deletion of the documentation requirements and incorporation into the Measures of the Standards reflect the Commission stated goal of gaining efficiencies from the consolidation or retirement of requirements based on technical analysis of existing requirements.<sup>10</sup> NERC does not estimate any change in cost to small entities since Requirement R2 related only to documentation.

**7. Proposed Reliability Standards must be designed to apply throughout North America to the maximum extent achievable with a single Reliability Standard while not favoring one geographic area or regional model. It should take into account regional variations in the organization and corporate structures of transmission owners and operators, variations in generation fuel type and ownership patterns, and regional variations in market design if these affect the proposed Reliability**

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<sup>9</sup> Order No. 672 at P 329. The proposed Reliability Standard must not simply reflect a compromise in the ERO’s Reliability Standard development process based on the least effective North American practice — the so-called “lowest common denominator” — if such practice does not adequately protect Bulk-Power System reliability. Although FERC will give due weight to the technical expertise of the ERO, we will not hesitate to remand a proposed Reliability Standard if we are convinced it is not adequate to protect reliability.

Order No. 672 at P 330. A proposed Reliability Standard may take into account the size of the entity that must comply with the Reliability Standard and the cost to those entities of implementing the proposed Reliability Standard. However, the ERO should not propose a “lowest common denominator” Reliability Standard that would achieve less than excellence in operating system reliability solely to protect against reasonable expenses for supporting this vital national infrastructure. For example, a small owner or operator of the Bulk-Power System must bear the cost of complying with each Reliability Standard that applies to it.

<sup>10</sup> *Electric Reliability Organization Proposal to Retire Requirements in Reliability Standards*, 145 FERC ¶ 61,147 at P 20 (2013).

**Standard.<sup>11</sup>**

As regional Reliability Standards, proposed VAR-002-WECC-2 and VAR-501-WECC-2 meet the requirements for regional Reliability Standards as discussed in the petition and will be enforceable for registered entities within the WECC region.

**8. Proposed Reliability Standards should cause no undue negative effect on competition or restriction of the grid beyond any restriction necessary for reliability.<sup>12</sup>**

The proposed regional Reliability Standards do not make any substantive changes to the existing Commission-approved regional Reliability Standards other than the deletion of a documentation Requirement and incorporation into the Measures.

**9. The implementation time for the proposed Reliability Standard is reasonable.<sup>13</sup>**

The implementation time for the proposed regional Reliability Standards is reasonable. Since proposed VAR-002-WECC-2 and VAR-501-WECC-2 do not create additional burden on entities and save compliance time, an effective date of the first day of the first quarter after applicable regulatory approval is reasonable.

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<sup>11</sup> Order No. 672 at P 331. A proposed Reliability Standard should be designed to apply throughout the interconnected North American Bulk-Power System, to the maximum extent this is achievable with a single Reliability Standard. The proposed Reliability Standard should not be based on a single geographic or regional model but should take into account geographic variations in grid characteristics, terrain, weather, and other such factors; it should also take into account regional variations in the organizational and corporate structures of transmission owners and operators, variations in generation fuel type and ownership patterns, and regional variations in market design if these affect the proposed Reliability Standard.

<sup>12</sup> Order No. 672 at P 332. As directed by section 215 of the FPA, FERC itself will give special attention to the effect of a proposed Reliability Standard on competition. The ERO should attempt to develop a proposed Reliability Standard that has no undue negative effect on competition. Among other possible considerations, a proposed Reliability Standard should not unreasonably restrict available transmission capability on the Bulk-Power System beyond any restriction necessary for reliability and should not limit use of the Bulk-Power System in an unduly preferential manner. It should not create an undue advantage for one competitor over another.

<sup>13</sup> Order No. 672 at P 333. In considering whether a proposed Reliability Standard is just and reasonable, FERC will consider also the timetable for implementation of the new requirements, including how the proposal balances any urgency in the need to implement it against the reasonableness of the time allowed for those who must comply to develop the necessary procedures, software, facilities, staffing or other relevant capability.

**10. The Reliability Standard was developed in an open and fair manner and in accordance with the Commission-approved Reliability Standard development process.<sup>14</sup>**

The proposed Reliability Standards were developed in accordance with NERC's and WECC's Commission-approved processes for developing and approving Reliability Standards. WECC develops regional Reliability Standards in accordance with the WECC Reliability Standards Development Procedures, which is included as Exhibit C of WECC's Regional Delegation Agreement with NERC. The development process is open to any person or entity with a direct and material interest in the bulk power system. For a more thorough review, please see the complete development history included as Exhibit D. This process included, among other things, a comment period, a pre-ballot review period, and a balloting period.

**11. NERC must explain any balancing of vital public interests in the development of proposed Reliability Standards.<sup>15</sup>**

NERC and WECC have not identified competing vital public interests with respect to the request for approval of the regional Reliability Standards, and no comments were received during the development of the regional Reliability Standards indicating conflicts with other vital public interests.

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<sup>14</sup> Order No. 672 at P 334. Further, in considering whether a proposed Reliability Standard meets the legal standard of review, we will entertain comments about whether the ERO implemented its Commission-approved Reliability Standard development process for the development of the particular proposed Reliability Standard in a proper manner, especially whether the process was open and fair. However, we caution that we will not be sympathetic to arguments by interested parties that choose, for whatever reason, not to participate in the ERO's Reliability Standard development process if it is conducted in good faith in accordance with the procedures approved by FERC.

<sup>15</sup> Order No. 672 at P 335. Finally, we understand that at times development of a proposed Reliability Standard may require that a particular reliability goal must be balanced against other vital public interests, such as environmental, social and other goals. We expect the ERO to explain any such balancing in its application for approval of a proposed Reliability Standard.

**Exhibit D**

**Summary of Development History and Complete Development Record of Proposed VAR-002-WECC-2-Automatic Voltage Regulators and VAR-501-WECC-2- Power System Stabilizers**



**Exhibit D— Summary of Development History of Proposed VAR-002-WECC-2 and VAR-501-WECC-2**

The development record for proposed Regional Reliability Standards VAR-002-WECC-2 and VAR-501-WECC-2 are summarized below.

**I. Overview of the Standard Drafting Team**

When evaluating a proposed Reliability Standard, the Commission is expected to give “due weight” to the technical expertise of the ERO<sup>1</sup>. The technical expertise of the ERO is derived from the standard drafting team. For this project, the standard drafting team consisted of industry experts, all with a diverse set of experiences. A roster of the standard drafting team members is included in **Exhibit E**.

**II. WECC Standard Development History**

**A. Standard Authorization Request Development**

A Standard Authorization Request (“SAR”) was submitted on December 3, 2013 and approved by the WECC Standards Committee (“WSC”) on January 8, 2014.

**B. WECC Posting**

Proposed regional Reliability Standards VAR-002-WECC-2 and VAR-501-WECC-2 were posted for a 45-day public comment period from March 14, 2014 through April 28, 2014.

After consideration of each comment the SDT concluded that no further changes were necessary to the documents.

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<sup>1</sup> Section 215(d)(2) of the Federal Power Act; 16 U.S.C. §824(d) (2) (2012).

### **C. WECC Ballot**

Proposed regional Reliability Standards VAR-002-WECC-2 and VAR-501-WECC-2 were posted for ballot from June 25, 2014 through July 18, 2014. The proposed VAR-002-WECC-2 received a quorum of 83.1% and an approval rating of 100% and VAR-501-WECC-2 received a quorum of 83.5% and an approval rating of 100%.

### **D. WECC Board Approval**

Proposed regional Reliability Standards VAR-002-WECC-2 and VAR-501-WECC-2 were approved by the WECC Board on September 18, 2014.

### **E. NERC Posting**

By WECC's request, proposed Regional Reliability Standards VAR-002-WECC-2 and VAR-501-WECC-2 were posted for a 45-day public comment period from August 7, 2014 through September 22, 2014.

### **F. NERC Board of Trustee Approval**

Proposed regional Reliability Standards VAR-002-WECC-2 and VAR-501-WECC-2 were approved by the NERC Board of Trustees on November 13, 2014.

## Regional Reliability Standards Under Development

VAR-002-WECC-2	Automatic Voltage Regulators			
VAR-501-WECC-2	Power System Stabilizers (PSS)	Standards Under Development	08/07/2014 – 09/22/2014	<p>Info (1)</p> <p>Submit Comments</p> <p>Unofficial Comment Form (Word Version) (2)</p> <p>VAR-002-WECC-2 Clean (3)   Redline (4)</p> <p>VAR-501-WECC-2 Clean (5)   Redline (6)</p> <p>Comments Received (7)</p> <p>Consideration of Comments (8)</p>

## Regional Reliability Standards Announcement VAR-002-WECC-2 and VAR-501-WECC-2

Comment Period Now Open through September 22, 2014

### [Now Available](#)

#### **Proposed Standard for the Western Electricity Coordinating Council (WECC)**

WECC has requested NERC to post regional reliability standards **VAR-002-WECC-2 - Automatic Voltage Regulators** and **VAR-501-WECC-2 - Power System Stabilizers (PSS)** for a 45-day comment period.

#### **Instructions for Commenting**

Please use this [electronic form](#) to submit comments. If you experience any difficulties in using the electronic form, please contact [Arielle Cunningham](#). The electronic comment form must be completed by **8:00 p.m. Eastern on September 22, 2014**. An off-line, unofficial copy of the comment form is posted on the [Regional Reliability Standards Under Development](#) page.

#### **Regional Reliability Standards Development Process**

Section 300 of [NERC's Rules of Procedures of the Electric Reliability Organization](#) governs the regional reliability standards development process.

*For more information or assistance, please contact [Arielle Cunningham](#),  
Standards Development Administrator, or at 404-446-2560.*

North American Electric Reliability Corporation  
3353 Peachtree Rd, NE  
Suite 600, North Tower  
Atlanta, GA 30326  
404-446-2560 | [www.nerc.com](http://www.nerc.com)

# Unofficial Comment Form

## VAR-002-WECC-2 and VAR-501-WECC-2

Please **DO NOT** use this form. Please use the [electronic form](#) located at the link below to submit comments on the latest version of the Western Electric Coordinating Council (WECC) Regional Standards – **VAR-002-WECC-2 - Automatic Voltage Regulators** and **VAR-501-WECC-2 - Power System Stabilizers (PSS)**. Comments must be submitted by **8:00 p.m. ET on Monday, September 22, 2014**. If you have questions, please contact [Barb Nutter](#).

### [Regional Reliability Standards Under Development](#)

#### **Background Information**

Each NERC Regional Entity (RE) has a regional reliability standards development procedure to define the steps in that region's process for developing, revising, reaffirming, and withdrawing its regional reliability standards. Regional reliability standards must provide as much uniformity as possible with NERC's continent-wide reliability standards. When regional reliability standards are approved by FERC and applicable authorities in Mexico and Canada, these standards are added to the body of NERC reliability standards that are enforced upon all applicable bulk power system owners, operators, and users within the applicable area, regardless of membership in the region.

Before approving a RE's reliability standard(s), NERC must post the standard(s) for comment. Evaluation of the proposed standard(s) includes identifying whether the development of a proposed regional reliability standard(s) met the criteria listed below. The development of each regional reliability standard(s) must meet **all** of the following criteria:

**Open** — Regional reliability standards shall provide that any person or entity that is directly and materially affected by the reliability of the bulk power system within the regional entity shall be able to participate in the development and approval of reliability standards. There shall be no undue financial barriers to participation. Participation shall not be conditional upon membership in the regional entity, a regional entity or any organization, and shall not be unreasonably restricted on the basis of technical qualifications or other such requirements.

**Inclusive** — Regional reliability standards shall provide that any person with a direct and material interest has a right to participate by expressing an opinion and its basis, having that position considered, and appealing through an established appeals process, if adversely affected.

**Balanced** — Regional reliability standards shall have a balance of interests and shall not be dominated by any two-interest categories and no single-interest category shall be able to defeat a matter.

**Due Process** — Regional reliability standards shall provide for reasonable notice and opportunity for public comment. At a minimum, the standard shall include public notice of the intent to develop a standard, a public comment period on the proposed standard, due consideration of those public comments, and a ballot of interested stakeholders.

**Transparent** — All actions material to the development of regional reliability standards shall be transparent. All standards development meetings shall be open and publicly noticed on the regional entity's Web site.

Please review the revised *VAR-002-WECC-2* and *VAR-501-WECC-2* and answer the following questions.

**You do not have to answer all questions.**

*Insert a "check" mark in the appropriate boxes by double-clicking the gray areas.*

1. Do you agree the development of *VAR-002-WECC-2* and *VAR-501-WECC-2* met the "Open" criteria as outlined above? If "No", please explain in the comment area below.

Yes

No

Comments:

2. Do you agree the development of *VAR-002-WECC-2* and *VAR-501-WECC-2* met the "Inclusive" criteria as outlined above? If "No", please explain in the comment area below.

Yes

No

Comments:

3. Do you agree the development of *VAR-002-WECC-2 and VAR-501-WECC-2* met the “Balanced” criteria as outlined above? If “No”, please explain in the comment area below.

Yes

No

Comments:

4. Do you agree the development of *VAR-002-WECC-2 and VAR-501-WECC-2* met the “Due Process” criteria as outlined above? If “No”, please explain in the comment area below.

Yes

No

Comments:

5. Do you agree the development of *VAR-002-WECC-2 and VAR-501-WECC-2* met the “Transparent” criteria as outlined above? If “No”, please explain in the comment area below.

Yes

No

Comments:

**WECC Standard VAR-002-WECC-2 — Automatic Voltage Regulators**



<b>Document Title</b>	<b>Automatic Voltage Regulators VAR-002-WECC-2</b>
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	
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-002-WECC-1 with "P81" conforming changes.
Status	(X) Version 2 For NERC/FERC Approval ( ) 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-002a-1.	
1	October 28, 2008	Adopted by NERC Board of Trustees	
1	April 21, 2011	FERC Order issued approving VAR-002-WECC-1 (approval effective June 27, 2011; Effective Date: July 1, 2011)	
2	May 28, 2014	Approval by WECC Ballot Pool	Remove Requirement R2 and Measure M2 pursuant to FERC Paragraph 81.



## WECC Standard VAR-002-WECC-2 — Automatic Voltage Regulators

### 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. Documents 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. Board meets to approve	
24. Sent to NERC for NERC Board of Trustee and final disposition	

### 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 Standard, NERC is not empowered to directly change the document. In response, a regional team is required to draft the identified changes.

The following VAR-002-WECC-1, Automatic Voltage Regulator, Requirement R2 is identified as administrative in nature and should be addressed accordingly.

#### **VAR-002-WECC-1, Requirement R2 states:**

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]

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](#)

## **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.

## **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.

**A. Introduction**

- 1. Title:** Automatic Voltage Regulators (AVR)
- 2. Number:** VAR-002-WECC-2
- 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-2 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.

**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,
- M1.4.2** The adjusted AVR in-service percentage,
- M1.4.3** The date of the outage.

## **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 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 R1.9 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).

**E. Regional Differences**

None

Table of Compliance Elements

R	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>R1</b>	Operational Assessment	Medium	There shall be a Lower Level of non-compliance if 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.	There shall be a Moderate Level of non-compliance if 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.	There shall be a High Level of non-compliance if 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.	There shall be a Severe Level of non-compliance if 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.



## WECC Standard VAR-002-WECC-2 — Automatic Voltage Regulators

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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-002a-1	
1	April 21, 2011	FERC Order issued approving VAR-002-WECC-1 (FERC approval effective June 27, 2011; Effective Date July 1, 2011)	
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**WECC Standard VAR-002-WECC-2 — Automatic Voltage Regulators**



<b>Document Title</b>	<b>Automatic Voltage Regulators VAR-002-WECC-2</b>
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	<del>WECC Board of Directors</del>
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-002-WECC-1 with "P81" conforming changes.
Status	(X) Version <del>1</del> <u>Effective Date July 1, 2014</u> <u>For NERC/FERC Approval</u> . ( ) usable, minor formatting/editing required ( ) modification needed ( ) superseded by ( ) other _____ ( ) obsolete/archived)

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## WECC Standard VAR-002-WECC-2 — Automatic Voltage Regulators

Automatic Voltage Regulators  
WECC Regional Reliability Standard  
VAR-002-WECC-2

### Project Roadmap

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## WECC Standard VAR-002-WECC-2 — Automatic Voltage Regulators

Automatic Voltage Regulators  
WECC Regional Reliability Standard  
VAR-002-WECC-2

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### Background

#### WECC-0105 P81 Project VAR Redraft

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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](#)

## WECC Standard VAR-002-WECC-2 — Automatic Voltage Regulators

Automatic Voltage Regulators  
WECC Regional Reliability Standard  
VAR-002-WECC-2

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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.

### **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.

**WECC Standard VAR-002-WECC-2 — Automatic Voltage Regulators**

Automatic Voltage Regulators  
WECC Regional Reliability Standard  
VAR-002-WECC-2

**WECC Standard VAR-002-WECC-1 ~~2~~ — Automatic Voltage Regulators**

**A. Introduction**

- 1. Title:** Automatic Voltage Regulators (AVR)
- 2. Number:** VAR-002-WECC-~~1~~2
- 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~~2 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.

**WECC Standard VAR-002-WECC-2 — Automatic Voltage Regulators**

Automatic Voltage Regulators  
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**R1.4.** Due to component failure, the AVR may be out of service up to 60 consecutive days for repair per incident.

## WECC Standard VAR-002-WECC-2 — Automatic Voltage Regulators

Automatic Voltage Regulators  
WECC Regional Reliability Standard  
VAR-002-WECC-2

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- 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.

~~**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.



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**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:

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VAR-002-WECC-2

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

**M1.4.2** The adjusted AVR in-service percentage, ~~and~~

**M1.4.3** The date of the outage, ~~and~~

~~**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

## WECC Standard VAR-002-WECC-2 — Automatic Voltage Regulators

Automatic Voltage Regulators  
WECC Regional Reliability Standard  
VAR-002-WECC-2

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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.

## WECC Standard VAR-002-WECC-2 — Automatic Voltage Regulators

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- 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).

### **SECTION MOVED TO THE BELOW COMPLIANCE TABLE**

#### **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.~~

## WECC Standard VAR-002-WECC-2 — Automatic Voltage Regulators

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~~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.

### **SECTION DELTED AS R2 NO LONGER EXISTS.**

#### **~~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**

None

**WECC Standard VAR-002-WECC-2 — Automatic Voltage Regulators**

Automatic Voltage Regulators  
 WECC Regional Reliability Standard  
 VAR-002-WECC-2

**Table of Compliance Elements**

R	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
<u>R1</u>	<u>Operational Assessment</u>	<u>Medium</u>	<u>There shall be a Lower Level of non-compliance if 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.</u>	<u>There shall be a Moderate Level of non-compliance if 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.</u>	<u>There shall be a High Level of non-compliance if 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.</u>	<u>There shall be a Severe Level of non-compliance if 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.</u>

## WECC Standard VAR-002-WECC-2 — Automatic Voltage Regulators

Automatic Voltage Regulators  
WECC Regional Reliability Standard  
VAR-002-WECC-2

**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	April 16, 2008	Permanent Replacement Standard for VAR-STD-002a-1	
1	April 21, 2011	FERC Order issued approving VAR-002-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>

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



<b>Document Title</b>	<b>Power System Stabilizer VAR-501-WECC-2</b>
File Name	
Category	<input checked="" type="checkbox"/> Regional Reliability Standard <input type="checkbox"/> Regional Criterion <input type="checkbox"/> Policy <input type="checkbox"/> Guideline <input type="checkbox"/> Report or other <input type="checkbox"/> Charter
Document date	
Adopted/approved by	
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	<input checked="" type="checkbox"/> Version 2 For NERC/FERC Approval <input type="checkbox"/> usable, minor formatting/editing required <input type="checkbox"/> modification needed <input type="checkbox"/> superseded by <input type="checkbox"/> other _____ <input type="checkbox"/> 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)	
2	May 28, 2014	Approval by WECC Ballot Pool	Remove Requirement R2 and Measure M2 pursuant to FERC Paragraph 81.

Adopted by NERC Board of Trustees:  
Effective Date:



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

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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. Documents 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. Board meets to approve	
24. Sent to NERC for NERC Board of Trustee and final disposition	

## **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 Standard, 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](#)

**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.

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

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### 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.

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

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- 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.

### **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,
    - M1.4.2** The adjusted PSS in-service percentage,
    - M1.4.3** Date of the outage.

**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 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.

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

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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).

### **E. Regional Differences**

**None**

**Table of Compliance Elements**

<b>R</b>	<b>Time Horizon</b>	<b>VRF</b>	<b>Violation Severity Levels</b>			
			<b>Lower VSL</b>	<b>Moderate VSL</b>	<b>High VSL</b>	<b>Severe VSL</b>
<b>R1</b>	Operational Assessment	Medium	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.	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.	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.	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.



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

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**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	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)	
2	May 28, 2014	Approval by WECC Ballot Pool	Remove Requirement R2 and Measure M2 pursuant to FERC Paragraph 81.

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



<b>Document Title</b>	<b>Power System Stabilizer VAR-501-WECC-2</b>
File Name	
Category	(X) Regional Reliability Standard ( ) Regional Criterion ( ) Policy ( ) Guideline ( ) Report or other ( ) Charter
Document date	
Adopted/approved by	<del>WECC Board of Directors</del>
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 <del>1</del> <u>2</u> <del>Effective Date July 1, 2014</del> <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>

Adopted by NERC Board of Trustees:

Effective Date:

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

~~Power System Stabilizer  
WECC Regional Reliability Standard  
VAR-501-WECC-2~~

### 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
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7. Posting 1 WECC open 45-day	3-14-2014
8. Posting 1 WECC closed	4-28-2014
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16. Ballot closed	7-18-2014
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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	

~~Developed as WECC-0105~~ Adopted by NERC Board of Trustees: \_\_\_\_\_ 2

Effective Date: \_\_\_\_\_ Page 3

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

~~Power System Stabilizer  
WECC Regional Reliability Standard  
VAR-501-WECC-2~~

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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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~~Developed as WECC-0105~~ Adopted by NERC Board of Trustees: \_\_\_\_\_ 3

Effective Date: \_\_\_\_\_ Page 3

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

~~Power System Stabilizer  
WECC Regional Reliability Standard  
VAR-501-WECC-2~~

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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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~~Developed as WECC-0105~~ Adopted by NERC Board of Trustees: \_\_\_\_\_ 4

Effective Date: \_\_\_\_\_ **Page 3**

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

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

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#### 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

Adopted by NERC Board of Trustees:

Effective Date:

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

~~Power System Stabilizer  
WECC Regional Reliability Standard  
VAR-501-WECC-2~~

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,

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

~~Power System Stabilizer  
WECC Regional Reliability Standard  
VAR-501-WECC-2~~

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

~~Power System Stabilizer  
WECC Regional Reliability Standard  
VAR-501-WECC-2~~

- 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.

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

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

- 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.~~

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

~~Power System Stabilizer  
WECC Regional Reliability Standard  
VAR-501-WECC-2~~

### ~~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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**WECC Standard VAR-501-WECC-2 Power System Stabilizer**

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

**Table of Compliance Elements**

R	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>R1</b>	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>

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

~~Power System Stabilizer  
WECC Regional Reliability Standard  
VAR-501-WECC-2~~

**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	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>

**Individual or group. (4 Responses)**  
**Name (1 Responses)**  
**Organization (1 Responses)**  
**Registered Ballot body segment (check all industry segments in which your company is registered) (1 Responses)**  
**Group Name (3 Responses)**  
**Lead Contact (3 Responses)**  
**Question 1 (4 Responses)**  
**Question 1 Comments (4 Responses)**  
**Question 2 (4 Responses)**  
**Question 2 Comments (4 Responses)**  
**Question 3 (4 Responses)**  
**Question 3 Comments (4 Responses)**  
**Question 4 (4 Responses)**  
**Question 4 Comments (4 Responses)**  
**Question 5 (4 Responses)**  
**Question 5 Comments (4 Responses)**

Group
Arizona Public Service Co.
Janet Smith
Yes
Yes
Yes
Yes
Yes
Individual
Tim Trimmell
Idaho Power Company
1 - Transmission Owners
Yes
Yes
Yes
Yes
Yes
Group
Southern Company: Southern Company Services, INC.; Alabama Power Company; Georgia Power Company; Gulf Power Company; Mississippi Power Company; Southern Company Generation; Southern Company Generation and Energy Marketing
Marcus Pelt

Yes
Yes
Yes
Yes
Yes
Group
Bonneville Power Administration
Andrea Jessup
Yes
Yes
Yes
Yes
Yes

# Consideration of Comments

## Regional Reliability Standards Under Development - WECC

The WECC Drafting Team thanks all commenters who submitted comments on the latest version of the Western Electric Coordinating Council (WECC) Regional Standards – VAR-002-WECC-2 Automatic Voltage Regulators and VAR-501-WECC-2 Power System Stabilizers (PSS). This was posted for a 45-day public comment period from August 7, 2014 through September 22, 2014. Stakeholders were asked to provide feedback to specific questions as to if they believed that WECC followed their standards development process during the development of the associated standards through a special electronic comment form. There were 4 sets of comments, including comments from approximately 5 different people from approximately 11 companies representing 4 of the 10 Industry Segments as shown in the table on the following pages.

All comments submitted may be reviewed in their original format on the standard's [project page](#).

After consideration of all comments, no changes were made as all respondents agreed development of the project was open, inclusive, balanced, transparent, and due process was provided.

If you feel that your comment has been overlooked, please let us know immediately. Our goal is to give every comment serious consideration in this process. If you feel there has been an error or omission, you can contact the Director of Standards, Valerie Agnew, at 404-446-2566 or at [valerie.agnew@nerc.net](mailto:valerie.agnew@nerc.net). In addition, there is a NERC Reliability Standards Appeals Process.<sup>1</sup>

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<sup>1</sup> The appeals process is in the Standard Processes Manual: [http://www.nerc.com/comm/SC/Documents/Appendix\\_3A\\_StandardsProcessesManual.pdf](http://www.nerc.com/comm/SC/Documents/Appendix_3A_StandardsProcessesManual.pdf)



1. Do you agree the development of VAR-002-WECC-2 and VAR-501-2 met the “Open” criteria as outlined above? If “No”, please explain in the comment area below..... 6

2. Do you agree the development of VAR-002-WECC-2 and VAR-501-2 met the “Inclusive” criteria as outlined above? If “No”, please explain in the comment area below..... 7

3. Do you agree the development of VAR-002-WECC-2 and VAR-501-2 met the “Balanced” criteria as outlined above? If “No”, please explain in the comment area below..... 8

4. Do you agree the development of VAR-002-WECC-2 and VAR-501-2 met the “Due Process” criteria as outlined above? If “No”, please explain in the comment area below..... 9

5. Do you agree the development of VAR-002-WECC-2 and VAR-501-2 met the “Transparent” criteria as outlined above? If “No”, please explain in the comment area below.....10

**The Industry Segments are:**

- 1 — Transmission Owners
- 2 — RTOs, ISOs
- 3 — Load-serving Entities
- 4 — Transmission-dependent Utilities
- 5 — Electric Generators
- 6 — Electricity Brokers, Aggregators, and Marketers
- 7 — Large Electricity End Users
- 8 — Small Electricity End Users
- 9 — Federal, State, Provincial Regulatory or other Government Entities
- 10 — Regional Reliability Organizations, Regional Entities

Group/Individual		Commenter	Organization	Registered Ballot Body Segment									
				1	2	3	4	5	6	7	8	9	10
1.	Group	Janet Smith	Arizona Public Service Co.	X		X		X	X				
N/A													
2.	Group	Marcus Pelt	Southern Company: Southern Company Services, INC.; Alabama Power Company; Georgia Power Company; Gulf Power Company; Mississippi Power Company; Southern Company Generation; Southern Company Generation and Energy Marketing	X		X		X	X				
N/A													
3.	Group	Andrea Jessup	Bonneville Power Administration	X		X		X	X				
<b>Additional Member Additional Organization Region Segment Selection</b>													

Group/Individual	Commenter	Organization	Registered Ballot Body Segment											
			1	2	3	4	5	6	7	8	9	10		
1. Steven Hitchens	Technical Operations	WECC 1												
4. Individual	Tim Trimmell	Idaho Power Company	X											

If you support the comments submitted by another entity and would like to indicate you agree with their comments, please select "agree" below and enter the entity's name in the comment section (please provide the name of the organization, trade association, group, or committee, rather than the name of the individual submitter).

**Summary Consideration:** No changes were made as all respondents agreed development of the project was open, inclusive, balanced, transparent, and due process was provided.

Organization	Agree	Supporting Comments of "Entity Name"
N/A	N/A	N/A

1. Do you agree the development of VAR-002-WECC-2 and VAR-501-2 met the “Open” criteria as outlined above? If “No”, please explain in the comment area below.

**Summary Consideration: No changes were made as all respondents agreed development of the project was open, inclusive, balanced, transparent, and due process was provided.**

Organization	Yes or No	Question 1 Comment
Arizona Public Service Co.	Yes	
Southern Company: Southern Company Services, INC.; Alabama Power Company; Georgia Power Company; Gulf Power Company; Mississippi Power Company; Southern Company Generation; Southern Company Generation and Energy Marketing	Yes	
Bonneville Power Administration	Yes	
Idaho Power Company	Yes	

2. Do you agree the development of VAR-002-WECC-2 and VAR-501-2 met the “Inclusive” criteria as outlined above? If “No”, please explain in the comment area below.

**Summary Consideration: No changes were made as all respondents agreed development of the project was open, inclusive, balanced, transparent, and due process was provided.**

Organization	Yes or No	Question 2 Comment
Arizona Public Service Co.	Yes	
Southern Company: Southern Company Services, INC.; Alabama Power Company; Georgia Power Company; Gulf Power Company; Mississippi Power Company; Southern Company Generation; Southern Company Generation and Energy Marketing	Yes	
Bonneville Power Administration	Yes	
Idaho Power Company	Yes	

3. Do you agree the development of VAR-002-WECC-2 and VAR-501-2 met the “Balanced” criteria as outlined above? If “No”, please explain in the comment area below.

**Summary Consideration: No changes were made as all respondents agreed development of the project was open, inclusive, balanced, transparent, and due process was provided.**

Organization	Yes or No	Question 3 Comment
Arizona Public Service Co.	Yes	
Southern Company: Southern Company Services, INC.; Alabama Power Company; Georgia Power Company; Gulf Power Company; Mississippi Power Company; Southern Company Generation; Southern Company Generation and Energy Marketing	Yes	
Bonneville Power Administration	Yes	
Idaho Power Company	Yes	

4. Do you agree the development of VAR-002-WECC-2 and VAR-501-2 met the “Due Process” criteria as outlined above? If “No”, please explain in the comment area below.

**Summary Consideration: No changes were made as all respondents agreed development of the project was open, inclusive, balanced, transparent, and due process was provided.**

Organization	Yes or No	Question 4 Comment
Arizona Public Service Co.	Yes	
Southern Company: Southern Company Services, INC.; Alabama Power Company; Georgia Power Company; Gulf Power Company; Mississippi Power Company; Southern Company Generation; Southern Company Generation and Energy Marketing	Yes	
Bonneville Power Administration	Yes	
Idaho Power Company	Yes	













5. Do you agree the development of VAR-002-WECC-2 and VAR-501-2 met the “Transparent” criteria as outlined above? If “No”, please explain in the comment area below.





**Summary Consideration: No changes were made as all respondents agreed development of the project was open, inclusive, balanced, transparent, and due process was provided.**

Organization	Yes or No	Question 4 Comment
Arizona Public Service Co.	Yes	
Southern Company: Southern Company Services, INC.; Alabama Power Company; Georgia Power Company; Gulf Power Company; Mississippi Power Company; Southern Company Generation; Southern Company Generation and Energy Marketing	Yes	
Bonneville Power Administration	Yes	
Idaho Power Company	Yes	

**Checklist for NERC Board and FERC Submittal**

<b>Standard Name:</b> Automatic Voltage Regulators (AVR) Power System Stabilizers			
<b>Standard No:</b> VAR-002-WECC-2 VAR-501-WECC-2			
		<b>BOT</b>	<b>FERC</b>
<b>SAR – Standard Authorization Request</b>		X	X
 WECC-0105 P81 Standards Authorizat			
<b>Implementation Plan</b> <i>(redlined if different from previous posting).</i>		X	X
 WECC-0105 P81 Implementation Plan.			
<b>Technical Justification</b>		X	X
Technical justification was not included as the proposed changes are administrative in nature and do not affect reliability.			
<b>VRF &amp; VSL Justification</b>		X	X
VRF and VSL justification was not included as no changes were made. The textual representation of these components was updated using the standardized table format.			
<b>Mapping Document – Optional</b>		X	X
NA			
<b>Issues Table – Optional</b>		X	X
This project removes administrative duties from the Requirements section of the documents and places them in the associated Measures section in accordance with the P81 Project.			
<b>Project Roadmap</b>		X	X

 WECC-0105 P81 Project Roadmap.doc				
<b>Order 672 Criteria</b>			X	X
 WECC-0105 P81 Order 672 Criteria.do				
<b>Drafting Team Roster with Biographies</b>			X	X
 WECC-0105 P81 Drafting Team Biograp				
<b>Ballot Pool Members</b>			X	X
  WECC-0105 P81 WECC-0105 P81 Ballot Pool Members \ Ballot Pool Members \				
<b>Final Ballot Results</b>			X	X
 WECC-0105 P81 Final Ballot Results.dc				
<b>Comments &amp; Responses</b>			X	X
  WECC-0105 P81 WECC-0105 P81 Response to Commer Response to Commer				
<b>Clean Versions of Version 1</b>				
  WECC-0105 P81 WECC-0105 P81 VAR-002-WECC-1 Au VAR-501-WECC-1 Po				
<b>Clean Versions of Version 2</b>				

 WECC-0105 P81  WECC-0105 P81 VAR-002-WECC-2 Au VAR-501-WECC-2 Po			
<b>Redline Versions comparing Version 1 to Version 2</b>		<b>X</b>	<b>X</b>
 WECC-0105 P81  WECC-0105 P81 VAR-002-WECC-1 Au VAR-501-WECC-1 Po			
<b>Petition Filing (<i>Federal Energy Regulatory Commission</i>)</b>			<b>X</b>

Title	WECC-0105 P81 Project for Regional Standards - VAR
First Name	W. Shannon
Last Name	Black
Email	sblack@wecc.biz
Phone Number	(503) 307-5782
Organization	WECC
Alternate Contact	Steven Rueckert
Request Type	Standard
Issue	This SAR calls for the deletion of VAR-002-WECC-1, Automatic Voltage Regulators, Requirement R2, and VAR-501-WECC-1, Power System Stabilizer, Requirement R2, and incorporation of that information into the Measures of the associated Requirements, specifically R1 of each document. This SAR suggests calling for a single drafting team to remedy both requests. This project is in response to Paragraph 81-P81-of FERC's March 15, 2012 Order issued on NERC's Find, Fix and Track process.
Purpose	The purpose of the P81 Project is to retire or modify FERC-approved Reliability Standard Requirements and/or Measures that provide little protection to BES, are redundant or unnecessary, or to retire or modify a FERC-approved Reliability Standard requirement to increase the efficiency of the associated compliance program.
Responsible Entities	Generator Operator, Transmission Operator
Notes	
Detailed Description	<p>In Phase 1 of the P81 Project, a NERC team identified the following WECC-specific Requirements for modification; however, since the underlying documents are WECC Regional Reliability Standards, NERC is not empowered to directly change the documents. In response, a regional team is requested to facilitate the needed changes.</p> <p><b>VAR-002-WECC-1, Requirement R2 states:</b> 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]</p> <p><b>VAR-501-WECC-1, Requirement 2 states:</b> 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]</p> <p>Each of these Requirements are a call to "have documentation." 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, each of these Requirements is better suited for inclusion in the Measures of R1 of each respective Standard.</p>
Preliminary Technical Assessment and Reference Documents	
Does the proposed request comply with all of the following Market Interface Principles?	1. The planning and operation of bulk electric systems shall recognize that reliability is an essential requirement of a robust North American economy, 2. Standard or Criterion shall not give any market participant an unfair competitive advantage, 3. Standard or Criterion shall neither mandate nor prohibit any specific market structure, 4. Standard or Criterion shall not preclude market solutions to achieving compliance with that Standard, 5. Standard or Criterion shall not require the public disclosure of commercially sensitive information.
Reliability Principles	1. Interconnected bulk electric systems shall be planned and operated in a coordinated manner to perform reliably under normal and abnormal conditions

# WECC-0105 P81 Modifications

## Standards Authorization Request

### Related

Standards/Criterion VAR-002-WECC-1, Automatic Voltage Regulators  
<http://www.wecc.biz/library/Documentation%20Categorization%20Files/Regional%20Standards/VAR-002-WECC-1.pdf>

VAR-501-WECC-1 Power System Stabilizers  
<http://www.wecc.biz/library/Documentation%20Categorization%20Files/Regional%20Standards/VAR-501-WECC-1.pdf>

Is this Request in response to a NERC "Fill-in-the-Blank" Standard? No

### Attachments

Created at 12/3/2013 8:55 AM by [cfuka@wecc.biz](mailto:cfuka@wecc.biz)

Last modified at 8/12/2014 12:41 PM by [sblack@wecc.biz](mailto:sblack@wecc.biz)

## Implementation Plan

### WECC-0105 “P81” Changes VAR-002-WECC-2 Automatic Voltage Regulator VAR-501-WECC-2 Power System Stabilizer

#### *Approvals Required*

VAR-002 WECC-2 – Automatic Voltage Regulator

VAR-501-WECC-2 – Power System Stabilizer

Project WECC-0105 implements “P81” changes. According to its Implementation Plan, the documentation requirements resident in Requirement R2 of both VAR-002-WECC-1 and VAR-501-WECC-1 have been removed from the Requirements section and made part of the Measures for Requirement R1 in the new documents. Other than various formatting changes, no other substantive changes were made.

#### *Prerequisite Approvals*

None

#### *Revisions to Glossary Terms*

None

#### *Applicable Entities*

VAR-002 WECC-2 – Automatic Voltage Regulator

- Generator Operator
- Transmission Operator

VAR-501-WECC-2 – Power System Stabilizer

- Generator Operator

#### *Conforming Changes to Other Standards*

None

#### *Effective Dates*

On the first day of the first quarter, after applicable regulatory approval.

#### *Retirements*

None

#### *Justification of Phasing*

None

**Project Roadmap**  
**WECC-0105 P81 Changes**  
**VAR-002-WECC-2 Automatic Voltage Regulators**  
**VAR-501-WECC-2 Power System Stabilizers**

Completed Actions	Completed Actions
1. Standard Authorization Request (SAR) received	12-3-2013
2. SAR deemed Complete/Valid/Team Site created	12-3-2013
3. WECC Standards Committee (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 opens 45-day comment period	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. Ballot Pool open	5-28-2014
12. Ballot Pool closed	6-19-2014
13. Joint Session	6-12-2014
14. Ballot open	6-25-2014
15. Ballot closed	7-18-2014
16. WSC approves forwarding to the WECC Board of Directors	7-24-2014
17. Posting 1 NERC Open	8-7-2014
18. WECC Board of Directors Approval	9-18-2014
19. Posting 1 NERC Closed	9-22-2014
20. Posting 1 NERC Response to Comments	9-30-2014
21. Sent to NERC	10-9-2014



**Order 672 Criteria**  
**VAR-002-WECC-2 Automatic Voltage Regulators**  
**VAR-501-WECC-2 Power System Stabilizers**

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NERC is responsible for ensuring that the Reliability Standards, Violation Risk Factors (VRF), Violation Severity Levels (VSL), definitions, Variances, and Interpretations developed by drafting teams are developed in accordance with NERC processes. They must also meet NERC's benchmarks for Reliability Standards, as well as criteria for governmental approval.

In FERC Order No. 672,<sup>1</sup> the Federal Energy Regulatory Commission (FERC) identified a number of criteria that it will use to analyze Reliability Standards proposed for approval to ensure they are just, reasonable, not unduly discriminatory or preferential, and in the public interest. The discussion below identifies these factors, and explains how the proposed Regional Reliability Standard meets or exceeds the criteria:

**1. Proposed Reliability Standards must be designed to achieve a specified, reliability goal.**

The proposed Reliability Standard must address a reliability concern that falls within the requirements of section 215 of the Federal Power Act. That is, it must provide for the reliable operation of bulk power system facilities. It may not extend beyond reliable operation of such facilities or apply to other facilities. Such facilities include all those necessary for operating an interconnected electric energy transmission network, or any portion of that network, including control systems. The proposed Reliability Standard may apply to any design of planned additions or modifications of such facilities that is necessary to provide for reliable operation. It may also apply to Cybersecurity protection. Order No. 672 at P321.

NERC Reliability Standards are based on certain reliability principles that define the foundation of reliability for North American bulk power systems. Each Reliability Standard shall enable or support one or more of NERC's reliability principles, thereby ensuring that each standard serves a purpose in support of reliability of the North American bulk power systems.

NERC Reliability Principle 1 states: "Interconnected bulk power systems shall be planned and operated in a coordinated manner to perform *reliably under normal and abnormal conditions* as defined in the NERC Standards."<sup>2</sup> [Emphasis added]

The stated Purpose for VAR-002-WECC-2, Automatic Voltage Regulators is "To ensure that Automatic Voltage Regulators on synchronous generators and condensers shall be kept in service and controlling voltage."

The stated Purpose of VAR-501-WECC-2, Power System Stabilizers is "To ensure that Power System Stabilizers (PSS) on synchronous generators shall be kept in service."

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<sup>1</sup> [http://www.nerc.com/files/final\\_rule\\_reliability\\_Order\\_672.pdf](http://www.nerc.com/files/final_rule_reliability_Order_672.pdf)

<sup>2</sup> [http://www.nerc.com/files/Reliability\\_Principles.pdf](http://www.nerc.com/files/Reliability_Principles.pdf)

These Purpose statements have not changed since approved by the Federal Energy Regulatory Commission (FERC).

## **2. Proposed Reliability Standards must contain a technically sound method to achieve the goal.**

The proposed Reliability Standard must be designed to achieve a specified reliability goal and must contain a technically sound means to achieve this goal. Although any person may propose a topic for a Reliability Standard to the Electric Reliability Organization (ERO), in the ERO's process, the specific proposed Reliability Standard should be developed by persons within the electric power industry and community who have a high level of technical expertise and it should be based on sound technical and engineering criteria. It should be based on actual data and lessons learned from past operating incidents, where appropriate. The process for ERO approval of a proposed Reliability Standard should be fair and open to all interested persons. Order No. 672 at Paragraph 324.

### Standard Development

This "P81" filing of VAR-002-WECC-2 and VAR-501-WECC-2 was developed using the NERC and WECC Standards development processes approved by FERC. Among other things, these processes include drafting of the standard by a drafting team composed of subject matter experts (SME). Biographies of those SMEs are provided with this filing. These processes also include provision for public comment/response cycles, consideration by SMEs, redrafting of the standard based upon those comments, public notice and transparent balloting.

### Technically Sound

The original technical foundation of these standards has not changed; therefore, no additional technical justification has been provided.

The only substantive change in the documents is the deletion of a documentation requirement from the Requirement R2 section of each document. The mandate for documentation is now covered in the associated Measures.

## **3. Proposed Reliability Standards must be applicable to users, owners, and operators of the bulk power system, and not others.**

The proposed Reliability Standard may impose a requirement on any user, owner, or operator of such facilities, but not on others. Order No. 672 at P322.

The Applicability section of VAR-002-WECC-2 is as follows:

**4. Applicability**

- 4.1. Generator Operators
- 4.2. Transmission Operators that operate synchronous condensers
- 4.3. This VAR-002-WECC-2 Standard only applies to synchronous generators and synchronous condensers that are connected to the Bulk Electric System.

The Applicability section of VAR-501-WECC-2 is as follows:

**5. Proposed Reliability Standards must be clear and unambiguous as to what is required and who is required to comply.**

The proposed Reliability Standard should be clear and unambiguous regarding what is required and who is required to comply. Users, owners, and operators of the Bulk Power System must know what they are required to do to maintain reliability. Order No. 672 at P325.

In addition to the posting, comment, and review of comments provided for each of the proposed standards, the NERC “P81” review team reviewed the proposed standards and made recommendations to change the documents accordingly.

The purpose of this filing is to complete the P81 recommendation to remove administrative Requirements from the Requirements section, and where applicable, place those mandates in the associated Measures section. As a result the two standards should better articulate the reliability-related Requirements.

**6. Proposed Reliability Standards must include clear and understandable consequences and a range of penalties (monetary and/or non-monetary) for a violation.**

The possible consequences, including range of possible penalties, for violating a proposed Reliability Standard should be clear and understandable by those who must comply. Order No. 672 at P 326.

No changes have been made to the substance of the Violation Risk Factors (VRF) or the Violation Severity Levels (VSL) of either document since their approval by FERC. The format of the VRF/VSL section has been updated from a textual representation to the currently accepted table format.

**7. Proposed Reliability Standards must identify clear and objective criteria or measures for compliance, so that it can be enforced in a consistent and non-preferential manner.**

There should be a clear criterion or measure of whether an entity is in compliance with a proposed Reliability Standard. It should contain or be accompanied by an objective measure of compliance so that it can be enforced and so that enforcement can be applied in a consistent and non-preferential manner. Order No. 672 at P327.

For each Requirement specified in each of the documents, there is a corresponding objective measurement by which the assigned task can be measured. These objective measurements include, but are not limited to, submittal of quarterly reports containing specific information.

**8. Proposed Reliability Standards should achieve a reliability goal effectively and efficiently - but does not necessarily have to reflect “best practices” without regard to implementation cost.**

The proposed Reliability Standard does not necessarily have to reflect the optimal method, or “best practice,” for achieving its reliability goal without regard to implementation cost or historical regional infrastructure design. However, it should achieve its reliability goal effectively and efficiently. Order No. 672 at P328.

Both of the proposed standards reach their goals effectively and efficiently by using existing business practices. Currently, a documentation requirement is resident in Requirement R2 of each of the documents. This filing deletes those documentation requirements from the Requirements section and allows the documentation mandate to be addressed in the associated Measures.

Since entities should already be complying with the documentation requirement there should be no undue burden or surprise by shifting the mandate to the Measures.

**9. Proposed Reliability Standards cannot be “lowest common denominator,” meaning that they cannot reflect a compromise that does not adequately protect Bulk-Power System reliability.**

The proposed Reliability Standard must not simply reflect a compromise in the ERO’s Reliability Standard development process based on the least effective North American practice — the so-called “lowest common denominator” — if such practice does not adequately protect Bulk Power System reliability. Although the Commission will give due weight to the technical expertise of the ERO, it will not hesitate to remand a proposed Reliability Standard if it is convinced the proposed Reliability Standard is not adequate to protect reliability. Order No. 672 at Paragraph 329.

The technical substance of the two proposed standards has not changed since they were approved by FERC. Only the documentation mandate has been affected.

**10. Proposed Reliability Standards may consider costs to implement for smaller entities but not at consequence of less than excellence in operating system reliability.**

A proposed Reliability Standard may take into account the size of the entity that must comply with the Reliability Standard and the cost to those entities of implementing the proposed Reliability Standard. However, the ERO should not propose a “lowest common denominator” Reliability Standard that would achieve less than excellence in operating system reliability solely to protect against reasonable expenses for supporting this vital national infrastructure. For example, a small owner or operator of the Bulk Power System must bear the cost of complying with each Reliability Standard that applies to it. Order No. 672 at P330.

Since the documentation mandate already exists in these two standards there should be no new burden or costs associated with implementing the standards as proposed.

**11. Proposed Reliability Standards must be designed to apply throughout North America to the maximum extent achievable with a single reliability standard while not favoring one area or approach.**

A proposed Reliability Standard should be designed to apply throughout the interconnected North American Bulk Power System, to the maximum extent this is achievable with a single Reliability Standard. The proposed Reliability Standard should not be based on a single geographic or regional model, but should take into account geographic variations in grid characteristics, terrain, weather, and other such factors. It should also take into account regional variations in the organizational and corporate structures of transmission owners and operators, variations in generation fuel type and ownership patterns, and regional variations in market design - if these affect the proposed Reliability Standard. Order No. 672 at P331.

These are regional Reliability Standards developed by and applicable to the assigned applicable entities operating within the Western Interconnection. The needs for the more stringent approach, based upon the specific attributes of the Western Interconnection has been previously noted by FERC – but is not at issue in this filing.

**12. Proposed Reliability Standards should cause no undue negative effect on competition or restriction of the grid.**

As directed by section 215 of the FPA, the Commission itself will give special attention to the effect of a proposed Reliability Standard on competition. The ERO should attempt to develop a proposed Reliability Standard that has no undue negative effect on competition. Among other possible considerations, a proposed Reliability Standard should not unreasonably restrict available transmission capability on the Bulk Power System beyond any restriction necessary for reliability and should not limit use of the Bulk Power System in an unduly preferential manner. It should not create an undue advantage for one competitor over another. Order No. 672 at Paragraph 332

The implementation of the proposed standards should impose no undue burden or surprise on the applicable entities as under the existing standards the assigned requirements are already being met. The only substantive change in this filing has been to move the documentation requirement out of the Requirements section and into the Measures section.

**13. The implementation time for the proposed Reliability Standards must be reasonable.**

In considering whether a proposed Reliability Standard is just and reasonable, the Commission also will consider the timetable for implementation of the new requirements, including how the proposal balances any urgency in the need to implement it against the reasonableness of the time allowed for those who must comply to develop the necessary procedures, software, facilities, staffing or other relevant capability. Order No. 672 at P333.

Since the applicable entities are already mandated to perform the assigned tasks, these standards could go into effect immediately without undue surprise or burden on the applicable entities. As drafted, the requested Effective Dates are “On the first day of the first quarter, after applicable regulatory approval.”

#### **14. The Reliability Standard development process must be open and fair.**

Further, in considering whether a proposed Reliability Standard meets the legal standard of review, we will entertain comments about whether the ERO implemented its Commission-approved Reliability Standard development process for the development of the particular proposed Reliability Standard in a proper manner, especially whether the process was open and fair. However, we caution that we will not be sympathetic to arguments by interested parties that choose, for whatever reason, not to participate in the ERO’s Reliability Standard development process if it is conducted in good faith in accordance with the procedures approved by the Commission. Order No. 672 at P334.

WECC followed its standard development process as approved by FERC in effect at the time of each step in the process.

In accordance with the Procedures, effective March 1, 2012, all drafting team meetings were open to the public. Between February 25, 2014 and May 1, 2014, the drafting team met twice – once to draft the changes and once to draft the response to comments. Notice of the meetings was provided to NERC and the WECC Standards Email List, posted on WECC’s website, and embedded in the minutes of each meeting. Meeting minutes are posted on WECC’s website and are accessible by the public.

All meetings were supported by a telephone conference bridge associated with an on-line Internet visual capability, allowing all participants to see the document(s) as they were being developed.

The proposed standards were posted for public comment by WECC on one occasion and by NERC on one additional occasion. Comments were solicited, received, considered, and answered. Comments and their responses are posted on WECC’s website on the DT’s Team Site and included with this filing. Supporting documents are located in the Development Table located on the home page of the DT’s Team Site.

#### **15. Proposed Reliability Standards must balance with other vital public interests.**

Finally, we understand that at times, the development of a proposed Reliability Standard may require that a particular reliability goal must be balanced against other vital public interests, such as environmental, social and other considerations. We expect the ERO to explain any such balancing in its application for approval of a proposed Reliability Standard. Order No. 672 at P335.

WECC is not aware of any other vital public interests impacted by this standard. No such balancing concerns were raised or noted.

**16. Proposed Reliability Standards must consider any other relevant factors.**

In considering whether a proposed Reliability Standard is just and reasonable, we will consider the following general factors, as well as other factors that are appropriate for the particular Reliability Standard proposed. Order No. 672 at P 323.

Due to the elementary level of the proposed changes no additional issues were raised or addressed.

**WECC-0105 “P81” Team Member Biographies**

**VAR-002-WECC-2 Automatic Voltage Regulators**

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

<p>Merrill Brimhall</p>	<p>Mr. Brimhall received his Electrical Engineering and Master of Business Administration degrees from the University of Utah. His career has included transmission planning, line design, management of Standards Services and Generation Project Management at PacifiCorp from 1978 to 2009. He has worked at Codale Electric designing lines, substations, and relay packages. Mr. Brimhall joined the Western Electricity Coordinating Council (WECC) in 2011 and is working as a Standards Engineer.</p>
<p>Steve Ashbaker</p>	<p>Mr. Ashbaker is the Director of Operations at WECC. He has been with WECC since December 1998. Prior to coming to WECC, Mr. Ashbaker worked for PacifiCorp/Utah Power &amp; Light for 27 years in various positions in Thermal and Hydro Plant Operations, Thermal Plan Shift Supervisor, Power Plant Training Instructor, Power System Dispatcher, Outage Coordinator, and Manager Bulk Power Control Center.</p> <p>Mr. Ashbaker manages the personnel that support the Operating Committee, eight subcommittees and 17 work groups within WECC as well as the WECC System Operator Training Program. Mr. Ashbaker, along with the Operations staff, provide support to the Operating Committee and associated member groups in advising and making recommendations to the WECC Board on all WECC-related matters that apply to maintaining reliability through the operation and security of the interconnected Bulk Electric System in the Western Interconnection. Mr. Ashbaker and staff manage the Event Analysis Program, Balancing Authority and Transmission Operator Certification Program, the WECC Interchange Tool, webSAS congestion management tool, and the Remedial Action Scheme review, and support the development of Regional Criteria and Regional Standards. He completed a three-year Electronics Technology Program at Idaho State University in 1971.</p>
<p>Steve Rueckert</p>	<p>Mr. Rueckert received his Bachelor of Science degree in Electrical Engineering at the University of Utah. He has worked in the electric utility industry since 1984. He currently serves as the Director of Standards at WECC and is responsible for coordinating WECC’s efforts in development and revision of WECC and NERC Standards. He is a member of the NERC Standards Committee. Prior to his current position, Mr. Rueckert was responsible for development and analysis of Power flow and Stability studies, Regional base cases, and Data Conversion. Mr. Rueckert also worked at PacifiCorp where he was responsible for conducting future transmission studies and preparation of budget items for transmission-related capital additions.</p>



<p>W. Shannon Black</p>	<p>Mr. Black received his Juris Doctor degree from the University of the Pacific, McGeorge School of Law. He has 15 years of experience in the electric utility industry. His expertise spans regulatory affairs and filings, market design, power purchase and transmission agreements, and standards development. He has conducted over 400 drafting team meetings and managed over 40 Standard Authorization Requests from kick-off through roll-out.</p>
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**Ballot Results - Adjusted for Affiliates**

[\(Click Here to View Web Site Summary of Votes\)](#)

**Ballot Name:** WECC-0105 VAR-002-WECC-2  
**Ballot Period:** 6/25/2014 - 7/18/2014  
**Total # Votes:** 108  
**Total Ballot** 130  
**Pool:**  
**Quorum:** 83.10%  
**Weighted Sector** 100.00%  
**Vote:**  
**Ballot Results:** The Document has Passed

**Summary of Ballot Results - Adjusted for Affiliates**

Sectors	Ballot Pool	Sector Weight	Affirmative		Negative	Abstain	Did Not
			# Votes	Fractional	# Votes	# Votes	Cast a Vote
Distribution	23	1	17	1	0	1	5
End User Representative	2	0.2	2	0.2	0	0	0
Generation	25	1	20	1	0	1	4
Marketers and Brokers	25	1	21	1	0	0	4
Other Non-Registered Entities	1	0	0	0	0	0	1
State and Provincial Representatives	1	0.1	1	0.1	0	0	0
System Coordination	25	1	21	1	0	0	4
Transmission	28	1	24	1	0	0	4
<b>Totals</b>	<b>130</b>	<b>5.3</b>	<b>106</b>	<b>5.3</b>	<b>0</b>	<b>2</b>	<b>22</b>

**Individual Ballot Pool Results**

Sector	Organization	Member	Ballot	Comments
Distribution	Seattle City Light	Dana Wheelock	Affirmative	
Distribution	Southern California Edison	Steven Mavis	No Vote	
Distribution	Public Utility District No. 1 of Okanogan County	Dale Dunckel	Abstain	
Distribution	Bonneville Power Administration	Rebecca Berdahl	Affirmative	
Distribution	BC Hydro and Power Authority	Pat Harrington	Affirmative	
Distribution	California Department of Water Resources	Glenn Solberg	Affirmative	
Distribution	Public Service Company of Colorado (Xcel Energy)	Kelly Bloch	Affirmative	
Distribution	Sacramento Municipal Utility District	Joe Tarantino	Affirmative	

Distribution	Platte River Power Authority	Deborah Schaneman	No Vote
Distribution	Colorado Springs Utilities	Warren Rust	Affirmative
Distribution	City of Redding Electric Utility	Mary Downey	Affirmative
Distribution	Western Area Power Administration - CRSP	Ken Otto	Affirmative
Distribution	Western Area Power Administration - LAP	Jeff Ackerman	No Vote
Distribution	Arizona Public Service Company	Jacob Tetlow	Affirmative
Distribution	Farmington Electric Utility System	Glen Hoisington	Affirmative
Distribution	Portland General Electric Company	Tom Ward	Affirmative
Distribution	Salt River Project	John Underhill	Affirmative
Distribution	Puget Sound Energy, Inc.	Denise Lietz	Affirmative
Distribution	Public Utility District No. 1 of Snohomish County	Kenn Backholm	Affirmative
Distribution	Southern California Edison	Hayk Zargaryan	Affirmative
Distribution	Modesto Irrigation District	Renee Knarreborg	Affirmative
Distribution	PacifiCorp	Sandra Shaffer	No Vote
Distribution	Salt River Project	Sara McCoy	No Vote
End User Representative	Utah Association of Energy Users	Caitlin Liotiris	Affirmative
End User Representative	NRDC	Carl Zichella	Affirmative
Generation	BC Hydro and Power Authority	Clement Ma	Affirmative
Generation	California Department of Water Resources	Glenn Solberg	Affirmative
Generation	Iberdrola Renewables	Joe Polen	No Vote
Generation	PPL Montana	Leland McMillan	Affirmative
Generation	Public Service Company of Colorado (Xcel Energy)	Dan Lusk	Affirmative
Generation	Sacramento Municipal Utility District	Joe Tarantino	Affirmative
Generation	Seattle City Light	Mike Haynes	Affirmative
Generation	Black Hills Corporation	Sheila Suurmeier	Affirmative
Generation	NaturEner USA, LLC	Andrew Ace	Abstain
Generation	South Feather Water and Power Agency	Kathryn Zancanella	Affirmative
Generation	Tri-State Generation and Transmission Association, Inc.	Mark Stein	Affirmative
Generation	City of Redding Electric Utility	Mary Downey	Affirmative
Generation	CER Generation II, LLC	Mary Lynch	No Vote
Generation	Farmington Electric Utility System	Glen Hoisington	Affirmative
Generation	Salt River Project	William Alkema	Affirmative
Generation	Tacoma Power	Karen Hedlund	Affirmative
Generation	Puget Sound Energy, Inc.	Lynda Kupfer	Affirmative
Generation	Arizona Public Service Company	Scott Takinen	Affirmative
Generation	US Bureau of Reclamation	Erika Doot	Affirmative
Generation	Public Utility District No. 1 of Snohomish County	Kenn Backholm	Affirmative
Generation	Southern California Edison	Joseph Marone	Affirmative

Generation	Modesto Irrigation District	Renee Knarreborg	Affirmative
Generation	Platte River Power Authority	Christopher Wood	Affirmative
Generation	PacifiCorp	Sandra Shaffer	No Vote
Generation	Salt River Project	Sara McCoy	No Vote
Marketers and Brokers	Bonneville Power Administration	Brenda Anderson	Affirmative
Marketers and Brokers	Shell Energy North America (US), L.P.	Paul Kerr	Affirmative
Marketers and Brokers	Gila River Power, LP	Lisa Wildes	Affirmative
Marketers and Brokers	PPL EnergyPlus, LLC	Jon Williamson	Affirmative
Marketers and Brokers	Sacramento Municipal Utility District	Joe Tarantino	Affirmative
Marketers and Brokers	Seattle City Light	Dennis Sismaet	Affirmative
Marketers and Brokers	Platte River Power Authority	Carol Ballantine	Affirmative
Marketers and Brokers	Arizona Public Service Company	Gordon Scheinost	Affirmative
Marketers and Brokers	City of Redding Electric Utility	Mary Downey	Affirmative
Marketers and Brokers	Western Area Power Administration - CRSP	Ken Otto	Affirmative
Marketers and Brokers	Western Area Power Administration - LAP	Jeff Ackerman	No Vote
Marketers and Brokers	Constellation Energy Commodities Group, Inc.	Mary Lynch	Affirmative
Marketers and Brokers	Farmington Electric Utility System	Glen Hoisington	Affirmative
Marketers and Brokers	Salt River Project	Sara McCoy	No Vote
Marketers and Brokers	Avista Corp	Scott Kinney	Affirmative
Marketers and Brokers	Portland General Electric Company	Shawn Davis	Affirmative
Marketers and Brokers	Public Utility District No. 1 of Snohomish County	Kenn Backholm	Affirmative
Marketers and Brokers	Southern California Edison	Joseph Marone	Affirmative
Marketers and Brokers	Puget Sound Energy, Inc.	Mariah Kennedy	Affirmative
Marketers and Brokers	Powerex	Raj Hundal	Affirmative
Marketers and Brokers	Public Service Company of Colorado (Xcel Energy)	Peter Colussy	Affirmative
Marketers and Brokers	Modesto Irrigation District	Renee Knarreborg	Affirmative
Marketers and Brokers	PPL Montana	Leland McMillan	Affirmative
Marketers and Brokers	Salt River Project	Bill Abraham	Affirmative
Marketers and Brokers	PacifiCorp	Sandra Shaffer	No Vote

Other Non-Registered Entities	Cogentrix Energy, LLC	Mike Hirst	No Vote
State and Provincial Representatives	Idaho Public Utilities Commission	Marsha Smith	Affirmative
System Coordination	Bonneville Power Administration	Fran Halpin	Affirmative
System Coordination	BC Hydro and Power Authority	Patricia Robertson	Affirmative
System Coordination	California Department of Water Resources	Glenn Solberg	Affirmative
System Coordination	California Independent System Operator	Richard Vine	Affirmative
System Coordination	NV Energy	Richard Salgo	No Vote
System Coordination	Public Service Company of Colorado (Xcel Energy)	Robert Staton	Affirmative
System Coordination	Sacramento Municipal Utility District	Joe Tarantino	Affirmative
System Coordination	Seattle City Light	Pawel Krupa	Affirmative
System Coordination	Balancing Authority of Northern California	Joseph Tarantino	Affirmative
System Coordination	Black Hills Corporation	Alvin Pinkston	Affirmative
System Coordination	Tri-State Generation and Transmission Association, Inc.	Mary Ann Zehr	Affirmative
System Coordination	Platte River Power Authority	John Collins	No Vote
System Coordination	City of Redding Electric Utility	Mary Downey	Affirmative
System Coordination	Western Area Power Administration - Rocky Mountain Region	Orlando Reyes	Affirmative
System Coordination	Western Area Power Administration - Upper Great Plains Region	Lloyd Linke	Affirmative
System Coordination	Rocky Mountain Reserve Group	Robert Johnson	Affirmative
System Coordination	Salt River Project	Sara McCoy	No Vote
System Coordination	Puget Sound Energy, Inc.	Denise Lietz	Affirmative
System Coordination	Southern California Edison	Joseph Marone	Affirmative
System Coordination	Colorado Springs Utilities	Shawna Speer	Affirmative
System Coordination	Arizona Public Service Company	Brian Cole	Affirmative
System Coordination	Farmington Electric Utility System	Glen Hoisington	Affirmative
System Coordination	Modesto Irrigation District	Renee Knarreborg	Affirmative

System Coordination	Salt River Project	Rob Kondziolka	Affirmative
System Coordination	PacifiCorp	Sandra Shaffer	No Vote
Transmission	Public Service Company of Colorado (Xcel Energy)	Robert Staton	Affirmative
Transmission	Sacramento Municipal Utility District	Joe Tarantino	Affirmative
Transmission	Seattle City Light	Hao Li	Affirmative
Transmission	Southern California Edison	Steven Mavis	No Vote
Transmission	Southwest Transmission Cooperative, Inc. (SWTC)	John Shaver	No Vote
Transmission	Bonneville Power Administration	Don Watkins	Affirmative
Transmission	California Department of Water Resources	Glenn Solberg	Affirmative
Transmission	California Independent System Operator	Richard Vine	Affirmative
Transmission	Farmington Electric Utility System	Linda Jacobson-Quinn	Affirmative
Transmission	NV Energy	Richard Salgo	No Vote
Transmission	Clark Public Utilities	Jack Stamper	Affirmative
Transmission	Tacoma Power	Joseph Wilson	Affirmative
Transmission	Platte River Power Authority	Terry Baker	Affirmative
Transmission	Puget Sound Energy, Inc.	Denise Lietz	Affirmative
Transmission	Colorado Springs Utilities	Warren Rust	Affirmative
Transmission	Tri-State Generation and Transmission Association, Inc.	Tracy Sliman	Affirmative
Transmission	Western Area Power Administration - Rocky Mountain Region	Bob Easton	Affirmative
Transmission	Western Area Power Administration - Upper Great Plains Region	Steve Sanders	Affirmative
Transmission	Salt River Project	Sara McCoy	No Vote
Transmission	Portland General Electric Company	John Walker	Affirmative
Transmission	BC Hydro and Power Authority	Patricia Robertson	Affirmative
Transmission	US Bureau of Reclamation	Erika Doot	Affirmative
Transmission	Public Utility District No. 1 of Snohomish County	Kenn Backholm	Affirmative
Transmission	Southern California Edison	Hayk Zargaryan	Affirmative
Transmission	Arizona Public Service Company	Sarah Kist	Affirmative
Transmission	Modesto Irrigation District	Renee Knarreborg	Affirmative
Transmission	Salt River Project	Rob Kondziolka	Affirmative
Transmission	PacifiCorp	Sandra Shaffer	Affirmative

**Ballot Results - Adjusted for Affiliates**

[\(Click Here to View Web Site Summary of Votes\)](#)

**Ballot Name:** WECC-0105 VAR-501-WECC-2  
**Ballot Period:** 6/25/2014 - 7/18/2014  
**Total # Votes:** 106  
**Total Ballot:** 127  
**Pool:**  
**Quorum:** 83.50%  
**Weighted Sector:** 100.00%  
**Vote:**  
**Ballot Results:** The Document has Passed

**Summary of Ballot Results - Adjusted for Affiliates**

Sectors	Ballot Pool	Sector Weight	Affirmative		Negative	Abstain	Did Not
			# Votes	Fractional	# Votes	# Votes	Cast a Vote
Distribution	23	1	17	1	0	1	5
End User Representative	2	0.2	2	0.2	0	0	0
Generation	24	1	20	1	0	1	3
Marketers and Brokers	25	1	21	1	0	0	4
Other Non-Registered Entities	1	0	0	0	0	0	1
State and Provincial Representatives	1	0.1	1	0.1	0	0	0
System Coordination	24	1	20	1	0	0	4
Transmission	27	1	23	1	0	0	4
<b>Totals</b>	<b>127</b>	<b>5.3</b>	<b>104</b>	<b>5.3</b>	<b>0</b>	<b>2</b>	<b>21</b>

**Individual Ballot Pool Results**

Sector	Organization	Member	Ballot	Comments
Distribution	Seattle City Light	Dana Wheelock	Affirmative	
Distribution	Southern California Edison	Steven Mavis	No Vote	
Distribution	Public Utility District No. 1 of Okanogan County	Dale Dunckel	Abstain	
Distribution	Bonneville Power Administration	Rebecca Berdahl	Affirmative	
Distribution	BC Hydro and Power Authority	Pat Harrington	Affirmative	
Distribution	California Department of Water Resources	Glenn Solberg	Affirmative	
Distribution	Public Service Company of Colorado (Xcel Energy)	Kelly Bloch	Affirmative	
Distribution	Sacramento Municipal Utility District	Joe Tarantino	Affirmative	

Distribution	Platte River Power Authority	Deborah Schaneman	No Vote
Distribution	Colorado Springs Utilities	Warren Rust	Affirmative
Distribution	City of Redding Electric Utility	Mary Downey	Affirmative
Distribution	Western Area Power Administration - CRSP	Ken Otto	Affirmative
Distribution	Western Area Power Administration - LAP	Jeff Ackerman	No Vote
Distribution	Arizona Public Service Company	Jacob Tetlow	Affirmative
Distribution	Farmington Electric Utility System	Glen Hoisington	Affirmative
Distribution	Portland General Electric Company	Tom Ward	Affirmative
Distribution	Salt River Project	John Underhill	Affirmative
Distribution	Puget Sound Energy, Inc.	Denise Lietz	Affirmative
Distribution	Public Utility District No. 1 of Snohomish County	Kenn Backholm	Affirmative
Distribution	Southern California Edison	Hayk Zargaryan	Affirmative
Distribution	Modesto Irrigation District	Renee Knarreborg	Affirmative
Distribution	PacifiCorp	Sandra Shaffer	No Vote
Distribution	Salt River Project	Sara McCoy	No Vote
End User Representative	Utah Association of Energy Users	Caitlin Liotiris	Affirmative
End User Representative	NRDC	Carl Zichella	Affirmative
Generation	BC Hydro and Power Authority	Clement Ma	Affirmative
Generation	California Department of Water Resources	Glenn Solberg	Affirmative
Generation	PPL Montana	Leland McMillan	Affirmative
Generation	Public Service Company of Colorado (Xcel Energy)	Dan Lusk	Affirmative
Generation	Sacramento Municipal Utility District	Joe Tarantino	Affirmative
Generation	Seattle City Light	Mike Haynes	Affirmative
Generation	Black Hills Corporation	Sheila Suurmeier	Affirmative
Generation	NaturEner USA, LLC	Andrew Ace	Abstain
Generation	South Feather Water and Power Agency	Kathryn Zancanella	Affirmative
Generation	Tri-State Generation and Transmission Association, Inc.	Mark Stein	Affirmative
Generation	City of Redding Electric Utility	Mary Downey	Affirmative
Generation	CER Generation II, LLC	Mary Lynch	No Vote
Generation	Farmington Electric Utility System	Glen Hoisington	Affirmative
Generation	Salt River Project	William Alkema	Affirmative
Generation	Tacoma Power	Karen Hedlund	Affirmative
Generation	Puget Sound Energy, Inc.	Lynda Kupfer	Affirmative
Generation	Arizona Public Service Company	Scott Takinen	Affirmative
Generation	US Bureau of Reclamation	Erika Doot	Affirmative
Generation	Public Utility District No. 1 of Snohomish County	Kenn Backholm	Affirmative



Generation	Southern California Edison	Joseph Marone	Affirmative
Generation	Modesto Irrigation District	Renee Knarreborg	Affirmative
Generation	Platte River Power Authority	Christopher Wood	Affirmative
Generation	PacifiCorp	Sandra Shaffer	No Vote
Generation	Salt River Project	Sara McCoy	No Vote
Marketers and Brokers	Bonneville Power Administration	Brenda Anderson	Affirmative
Marketers and Brokers	Shell Energy North America (US), L.P.	Paul Kerr	Affirmative
Marketers and Brokers	Gila River Power, LP	Lisa Wildes	Affirmative
Marketers and Brokers	PPL EnergyPlus, LLC	Jon Williamson	Affirmative
Marketers and Brokers	Sacramento Municipal Utility District	Joe Tarantino	Affirmative
Marketers and Brokers	Seattle City Light	Dennis Sismaet	Affirmative
Marketers and Brokers	Platte River Power Authority	Carol Ballantine	Affirmative
Marketers and Brokers	Arizona Public Service Company	Gordon Scheinost	Affirmative
Marketers and Brokers	City of Redding Electric Utility	Mary Downey	Affirmative
Marketers and Brokers	Western Area Power Administration - CRSP	Ken Otto	Affirmative
Marketers and Brokers	Western Area Power Administration - LAP	Jeff Ackerman	No Vote
Marketers and Brokers	Constellation Energy Commodities Group, Inc.	Mary Lynch	Affirmative
Marketers and Brokers	Farmington Electric Utility System	Glen Hoisington	Affirmative
Marketers and Brokers	Salt River Project	Sara McCoy	No Vote
Marketers and Brokers	Avista Corp	Scott Kinney	Affirmative
Marketers and Brokers	Portland General Electric Company	Shawn Davis	Affirmative
Marketers and Brokers	Public Utility District No. 1 of Snohomish County	Kenn Backholm	Affirmative
Marketers and Brokers	Southern California Edison	Joseph Marone	Affirmative
Marketers and Brokers	Puget Sound Energy, Inc.	Mariah Kennedy	Affirmative
Marketers and Brokers	Powerex	Raj Hundal	Affirmative
Marketers and Brokers	Public Service Company of Colorado (Xcel Energy)	Peter Colussy	Affirmative
Marketers and Brokers	Modesto Irrigation District	Renee Knarreborg	Affirmative
Marketers and Brokers	PPL Montana	Leland McMillan	Affirmative
Marketers and Brokers	Salt River Project	Bill Abraham	Affirmative

Marketers and Brokers	PacifiCorp	Sandra Shaffer	No Vote
Other Non-Registered Entities	Cogentrix Energy, LLC	Mike Hirst	No Vote
State and Provincial Representatives	Idaho Public Utilities Commission	Marsha Smith	Affirmative
System Coordination	Bonneville Power Administration	Fran Halpin	Affirmative
System Coordination	BC Hydro and Power Authority	Patricia Robertson	Affirmative
System Coordination	California Department of Water Resources	Glenn Solberg	Affirmative
System Coordination	NV Energy	Richard Salgo	No Vote
System Coordination	Public Service Company of Colorado (Xcel Energy)	Robert Staton	Affirmative
System Coordination	Sacramento Municipal Utility District	Joe Tarantino	Affirmative
System Coordination	Seattle City Light	Pawel Krupa	Affirmative
System Coordination	Balancing Authority of Northern California	Joseph Tarantino	Affirmative
System Coordination	Black Hills Corporation	Alvin Pinkston	Affirmative
System Coordination	Tri-State Generation and Transmission Association, Inc.	Mary Ann Zehr	Affirmative
System Coordination	Platte River Power Authority	John Collins	No Vote
System Coordination	City of Redding Electric Utility	Mary Downey	Affirmative
System Coordination	Western Area Power Administration - Rocky Mountain Region	Orlando Reyes	Affirmative
System Coordination	Western Area Power Administration - Upper Great Plains Region	Lloyd Linke	Affirmative
System Coordination	Rocky Mountain Reserve Group	Robert Johnson	Affirmative
System Coordination	Salt River Project	Sara McCoy	No Vote
System Coordination	Puget Sound Energy, Inc.	Denise Lietz	Affirmative
System Coordination	Southern California Edison	Joseph Marone	Affirmative
System Coordination	Colorado Springs Utilities	Shawna Speer	Affirmative
System Coordination	Arizona Public Service Company	Brian Cole	Affirmative
System Coordination	Farmington Electric Utility System	Glen Hoisington	Affirmative
System Coordination	Modesto Irrigation District	Renee Knarreborg	Affirmative

System Coordination	Salt River Project	Rob Kondziolka	Affirmative
System Coordination	PacifiCorp	Sandra Shaffer	No Vote
Transmission	Public Service Company of Colorado (Xcel Energy)	Robert Staton	Affirmative
Transmission	Sacramento Municipal Utility District	Joe Tarantino	Affirmative
Transmission	Seattle City Light	Hao Li	Affirmative
Transmission	Southern California Edison	Steven Mavis	No Vote
Transmission	Southwest Transmission Cooperative, Inc. (SWTC)	John Shaver	No Vote
Transmission	Bonneville Power Administration	Don Watkins	Affirmative
Transmission	California Department of Water Resources	Glenn Solberg	Affirmative
Transmission	Farmington Electric Utility System	Linda Jacobson-Quinn	Affirmative
Transmission	NV Energy	Richard Salgo	No Vote
Transmission	Clark Public Utilities	Jack Stamper	Affirmative
Transmission	Tacoma Power	Joseph Wilson	Affirmative
Transmission	Platte River Power Authority	Terry Baker	Affirmative
Transmission	Puget Sound Energy, Inc.	Denise Lietz	Affirmative
Transmission	Colorado Springs Utilities	Warren Rust	Affirmative
Transmission	Tri-State Generation and Transmission Association, Inc.	Tracy Sliman	Affirmative
Transmission	Western Area Power Administration - Rocky Mountain Region	Bob Easton	Affirmative
Transmission	Western Area Power Administration - Upper Great Plains Region	Steve Sanders	Affirmative
Transmission	Salt River Project	Sara McCoy	No Vote
Transmission	Portland General Electric Company	John Walker	Affirmative
Transmission	BC Hydro and Power Authority	Patricia Robertson	Affirmative
Transmission	US Bureau of Reclamation	Erika Doot	Affirmative
Transmission	Public Utility District No. 1 of Snohomish County	Kenn Backholm	Affirmative
Transmission	Southern California Edison	Hayk Zargaryan	Affirmative
Transmission	Arizona Public Service Company	Sarah Kist	Affirmative
Transmission	Modesto Irrigation District	Renee Knarreborg	Affirmative
Transmission	Salt River Project	Rob Kondziolka	Affirmative
Transmission	PacifiCorp	Sandra Shaffer	Affirmative

**Ballot Results for WECC-0105 “P81”**

**Ballot Name:** WECC-105 VAR-002-WECC-2  
**Ballot Period:** 6-25-2014 through 7-18-2014  
**Total # Votes:** 108  
**Total Ballot Pool:** 130  
**Quorum:** 83.1%  
**Weighted Sector Vote:** 100.0 %  
**Ballot Results:** This document passed.

**Ballot Name:** WECC-105 VAR-501-WECC-2  
**Ballot Period:** 6-25-2014 through 7-18-2014  
**Total # Votes:** 106  
**Total Ballot Pool:** 127  
**Quorum:** 83.5%  
**Weighted Sector Vote:** 100.0 %  
**Ballot Results:** This document passed.



**Consideration of Comments  
Comment Report Form for WECC-0105  
P81 Modification Posting 1**

**VAR-002-WECC-2 / Automatic Voltage Regulators  
VAR-501-WECC-2 / Power System Stabilizers**

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The WECC-0105 P81 Modification Drafting Team (DT) thanks everyone who submitted comments on the proposed project.

**Posting**

This document was last posted for a 45-day public comment period from March 14, 2014 through April 28, 2014.

WECC distributed the notice for the posting on March 13, 2014. The Drafting Team asked stakeholders to provide feedback on the proposed document through a standardized electronic template. WECC received comments from one company representing four of the eight Industry Segments, as shown in the table on the following page.

**Location of Comments**

All comments received on the document can be viewed in their original format [here](#).

**Changes in Response to Comment**

After consideration of each comment the DT concluded that no further changes were necessary to the documents.

**Minority Comments Summary**

There are no minority positions.

**Action Plan**

The DT concluded by majority vote to forward the two documents to the WECC Standards Committee (WSC) for disposition under the Reliability Standards Development Procedures.

## Comment Report Form for WECC-0106

### Contacts and Appeals

If you feel your comment has been omitted or overlooked, please contact the Manager, WECC Standards Processes, W. Shannon Black, at [sblack@wecc.biz](mailto:sblack@wecc.biz). In addition, there is a WECC Reliability Standards Appeals Process.<sup>1</sup>

The WECC Standards Voting Sectors are:

- 1 — Transmission Sector
- 2 — Generation Sector
- 3 — Marketers and Brokers Sector
- 4 — Distribution Sector
- 5 — System Coordination Sector
- 6 — End Use Representative Sector
- 7 — State and Provincial Representatives Sector
- 8 — Other Non-Registered WECC Members and Participating Stakeholders Sector

Commenter		Organization	WECC Standards Voting Sectors								
			1	2	3	4	5	6	7	8	
1	Andria Jessup	Bonneville Power Administration	X		X	X	X				

## Index to Questions, Comments, and Responses

### Questions

The drafting team welcomes comments on each of the documents posted for comment. The goal of this project is to eliminate unnecessary Requirements. In the case of each of these documents, a Requirement to create documentation has been changed to a Measurement. Please specify the document to which your comments apply.

1. If WECC-0105 VAR-002-WECC-2 Automatic Voltage Regulators with adjusted Requirement and Measure were balloted today, would you vote to approve the document as posted?
2. If WECC-0105 VAR-501-WECC-2 Power System Stabilizer with adjusted Requirement and Measure were balloted today, would you vote to approve the document as posted?

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<sup>1</sup> The appeals process is described in the Reliability Standards Development Procedures: <http://www.wecc.biz/Standards/Documents/WECC%20Reliability%20Standards%20Development%20Procedures.aspx>

1. The drafting team welcomes comments on all aspects of the proposed criterion

<b>Summary Consideration:</b>	No changes were made to the document.		
<b>Commenter</b>	<b>Yes</b>	<b>No</b>	<b>Comment</b>
Bonneville Power Administration			
Approve VAR-002-WECC-2?	X		
Approve VAR-501-WECC-2?			No response.
Other Comments			No response.
The drafting team thanks Bonneville for its continued participation in the Reliability Standards Development Process.			

### 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.
- 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**

- 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	April 16, 2008	Permanent Replacement Standard for VAR-STD-002a-1	
1	April 21, 2011	FERC Order issued approving VAR-002-WECC-1 (approval effective June 27, 2011)	

**\* FOR INFORMATIONAL PURPOSES ONLY \***

**Enforcement Dates: Standard VAR-002-WECC-1 — Automatic Voltage Regulators (AVR) (WECC)**

**United States**

<b>Standard</b>	<b>Requirement</b>	<b>Enforcement Date</b>	<b>Inactive Date</b>
VAR-002-WECC-1	All	07/01/2011	

**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:

- 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.
- 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	April 16, 2008	Permanent Replacement Standard for VAR-STD-002b-1	
1	April 21, 2011	FERC Order issued approving VAR-501-WECC-1 (approval effective June 27, 2011)	

**\* FOR INFORMATIONAL PURPOSES ONLY \***

**Enforcement Dates: Standard VAR-501-WECC-1 — Power System Stabilizer (PSS) (WECC)**

**United States**

<b>Standard</b>	<b>Requirement</b>	<b>Enforcement Date</b>	<b>Inactive Date</b>
VAR-501-WECC-1	All	07/01/2011	

## A. Introduction

1. **Title:** Automatic Voltage Regulators (AVR)
2. **Number:** VAR-002-WECC-2
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. **Functional Entities:**
    - 4.1.1 Generator Operators
    - 4.1.2 Transmission Operators that operate synchronous condensers
    - 4.1.3 This VAR-002-WECC-2 Standard 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 and Measures

- 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.
- 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,
    - M1.4.2** The adjusted AVR in-service percentage,
    - M1.4.3** The date of the outage.

## **C. 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 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 R1.9 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).

**E. Regional Differences**

None

**F. Interpretations**

None

**G. Associated Documents**

None

**Table of Compliance Elements**

R	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
<b>R1</b>	Operational Assessment	Medium	There shall be a Lower Level of non-compliance if 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.	There shall be a Moderate Level of non-compliance if 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.	There shall be a High Level of non-compliance if 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.	There shall be a Severe Level of non-compliance if 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.

**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. **Functional Entities:**
    - 4.1.1 Generator Operators
5. **Effective Date:** On the first day of the first quarter after applicable regulatory approval.

**B. Requirements and Measures**

- 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.
- 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,
    - M1.4.2** The adjusted PSS in-service percentage,
    - M1.4.3** Date of the outage.

## **C. 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.

**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).

**C. Regional Variances**

None.

**D. Interpretations**

None.

**E. Associated Documents**

None.

Table of Compliance Elements

R	Time Horizon	VRF	Violation Severity Levels			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
R1	Operational Assessment	Medium	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.	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.	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.	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.

**Version History**

<b>Version</b>	<b>Date</b>	<b>Action</b>	<b>Change Tracking</b>
1	April 16, 2008	Permanent Replacement Standard for VAR-STD-002b-1	
1	April 21, 2011	FERC Order issued approving VAR-501-WECC-1 (approval effective June 27, 2011)	
2		NERC Board of Trustees Approval	Removed documentation requirement from Requirement R2; placed the mandate into the Measures. Deleted Requirement R2.



**A. Introduction**

1. **Title:** Automatic Voltage Regulators (AVR)
2. **Number:** VAR-002-WECC-12
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. Functional Entities:**

~~4.1.4.1.1~~ **4.1.1** Generator Operators

~~4.2.~~ **4.1.2** Transmission Operators that operate synchronous condensers

~~4.3.~~ **4.1.3** This VAR-002-WECC-12 Standard ~~only~~ applies to synchronous generators and synchronous condensers that are connected to the Bulk Electric System.

**5. Effective Date:**

- ~~5.~~ On the first day of the first quarter, after applicable regulatory approval.

**B. Requirements and Measures**

**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.

## **WECC Standard VAR-002-WECC-1 — Automatic Voltage**

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- 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.

~~**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.~~

**M1.4.3** \_\_\_\_\_ The date of the outage.

### ~~D.~~ **C. Compliance**

~~1.~~ **1. Compliance Monitoring Process**

~~1.1~~ **1.1 Compliance Monitoring Responsibility**

\_\_\_\_\_ Compliance Enforcement Authority

~~1.2~~ **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~~ **1.3 Data Retention**

\_\_\_\_\_ The Generator Operators and Transmission Operators shall keep

## **WECC Standard VAR-002-WECC-1 — Automatic Voltage**

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\_\_\_\_\_ evidence for Measures M1 ~~and M2~~ for three years plus current year, or since the \_\_\_\_\_ last audit, whichever is longer.

### **1.4 \_\_\_\_\_ 1.4 Additional Compliance Information**

**1.4.1 \_\_\_\_\_ 1.4.1** The sanctions shall be assessed on a calendar quarter basis.

**1.4.2 \_\_\_\_\_ 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~~ 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~~ 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

None

**F. Interpretations**

None

**G. Associated Documents**

None

**Table of Compliance Elements**

Version	Time Horizon	Action/Reference	Violation Severity Levels/Change-Tracking			
			Lower VSL	Moderate VSL	High VSL	Severe VSL
4	April 16, 2008	Permanent Replacement Standard for VAR-STD-002a-4				
<u>R1</u>	April 21, 2011 <u>Operational Assessment</u>	FERC Order issued approving VAR-002-WECC-4 (approved effective June 27, 2011) <u>Medium</u>	<u>There shall be a Lower Level of non-compliance if 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.</u>	<u>There shall be a Moderate Level of non-compliance if 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.</u>	<u>There shall be a High Level of non-compliance if 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.</u>	<u>There shall be a Severe Level of non-compliance if 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.</u>

**WECC Standard VAR-002-WECC-2 — Automatic Voltage Regulators**

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**~~\* FOR INFORMATIONAL PURPOSES ONLY \*~~**

**~~Enforcement Dates: Standard VAR-002-WECC-1 — Automatic Voltage Regulators (AVR) (WECC)~~**

**United States**

<b>Standard</b>	<b>Requirement</b>	<b>Enforcement Date</b>	<b>Inactive Date</b>
<del>VAR-002-WECC-1</del>	<del>All</del>	<del>07/01/2011</del>	



Printed On: October 07, 2014, 05:55 PM

**A. Introduction**

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

**B. Requirements and Measures**

- 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

## WECC Standard VAR-501-WECC-1 — Power System

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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<sub>2</sub>.

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

~~**M2.1** — The date  
           **M1.4.3**            Date of the outage.~~

~~**M2.2** — Supporting documentation for each requirement that applies~~

~~**D.**~~ **C. 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

## **WECC Standard VAR-501-WECC-1 — Power System**

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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.

- 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.~~

## C. Regional Differences/Variations

None.

## D. Interpretations

None.

**E. Associated Documents**

None.

Table of Compliance Elements

<u>R</u>	<u>Time Horizon</u>	<u>VRE</u>	<u>Violation Severity Levels</u>			
			<u>Lower VSL</u>	<u>Moderate VSL</u>	<u>High VSL</u>	<u>Severe VSL</u>
<u>R1</u>	<u>Operational Assessment</u>	<u>Medium</u>	<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>



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 (approval effective June 27, 2011)	
<u>2</u>		<u>NERC Board of Trustees Approval</u>	<u>Removed documentation requirement from Requirement R2; placed the mandate into the Measures. Deleted Requirement R2.</u>

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

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**~~\* FOR INFORMATIONAL PURPOSES ONLY \*~~**

**~~Enforcement Dates: Standard VAR-501-WECC-1 — Power System Stabilizer (PSS) (WECC)~~**

**United States**

<b>Standard</b>	<b>Requirement</b>	<b>Enforcement Date</b>	<b>Inactive Date</b>
VAR-501-WECC-1	All	07/01/2011	

Printed On: October 07, 2014, 06:53 PM

**Exhibit E**

**Standard Drafting Team Roster**

**WECC-0105 “P81” Team Member Biographies**

**VAR-002-WECC-2 Automatic Voltage Regulators**

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

Merrill Brimhall	<p>Mr. Brimhall received his Electrical Engineering and Master of Business Administration degrees from the University of Utah. His career has included transmission planning, line design, management of Standards Services and Generation Project Management at PacifiCorp from 1978 to 2009. He has worked at Codale Electric designing lines, substations, and relay packages. Mr. Brimhall joined the Western Electricity Coordinating Council (WECC) in 2011 and is working as a Standards Engineer.</p>
Steve Ashbaker	<p>Mr. Ashbaker is the Director of Operations at WECC. He has been with WECC since December 1998. Prior to coming to WECC, Mr. Ashbaker worked for PacifiCorp/Utah Power &amp; Light for 27 years in various positions in Thermal and Hydro Plant Operations, Thermal Plan Shift Supervisor, Power Plant Training Instructor, Power System Dispatcher, Outage Coordinator, and Manager Bulk Power Control Center.</p> <p>Mr. Ashbaker manages the personnel that support the Operating Committee, eight subcommittees and 17 work groups within WECC as well as the WECC System Operator Training Program. Mr. Ashbaker, along with the Operations staff, provide support to the Operating Committee and associated member groups in advising and making recommendations to the WECC Board on all WECC-related matters that apply to maintaining reliability through the operation and security of the interconnected Bulk Electric System in the Western Interconnection. Mr. Ashbaker and staff manage the Event Analysis Program, Balancing Authority and Transmission Operator Certification Program, the WECC Interchange Tool, webSAS congestion management tool, and the Remedial Action Scheme review, and support the development of Regional Criteria and Regional Standards. He completed a three-year Electronics Technology Program at Idaho State University in 1971.</p>
Steve Rueckert	<p>Mr. Rueckert received his Bachelor of Science degree in Electrical Engineering at the University of Utah. He has worked in the electric utility industry since 1984. He currently serves as the Director of Standards at WECC and is responsible for coordinating WECC’s efforts in development and revision of WECC and NERC Standards. He is a member of the NERC Standards Committee. Prior to his current position, Mr. Rueckert was responsible for development and analysis of Power flow and Stability studies, Regional base cases, and Data Conversion. Mr. Rueckert also worked at PacifiCorp where he was responsible for conducting future transmission studies and preparation of budget items for transmission-related capital additions.</p>

<p>W. Shannon Black</p>	<p>Mr. Black received his Juris Doctor degree from the University of the Pacific, McGeorge School of Law. He has 15 years of experience in the electric utility industry. His expertise spans regulatory affairs and filings, market design, power purchase and transmission agreements, and standards development. He has conducted over 400 drafting team meetings and managed over 40 Standard Authorization Requests from kick-off through roll-out.</p>
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