

**Reliability Standard Audit Worksheet[[1]](#footnote-1)**

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

***This section to be completed by the Compliance Enforcement Authority.***

|  |  |
| --- | --- |
| **Registered Entity:**  | Registered name of entity being audited |
| **NCR Number:**  | NCRnnnnn |
|  **Compliance Enforcement Authority:** | Region or NERC performing audit |
| **Compliance Assessment Date(s)[[2]](#footnote-2):** | Month DD, YYYY, to Month DD, YYYY |
| **Compliance Monitoring Method:**  | [On-site Audit | Off-site Audit | Spot Check] |
| **Names of Auditors:**  | Supplied by CEA |

# **Applicability of Requirements**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **BA** | **DP** | **GO** | **GOP** | **IA** | **LSE** | **PA** | **PSE** | **RC** | **RP** | **RSG** | **TO** | **TOP** | **TP** | **TSP** |
| **R1** |  |  |  | X |  |  |  |  |  |  |  |  | X |  |  |

**Legend:**

|  |  |
| --- | --- |
| Text with blue background: | Fixed text – do not edit |
| Text entry area with Green background: | Entity-supplied information |
| Text entry area with white background: | Auditor-supplied information |

**Findings Table:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Req.** | **Finding** | **Summary & Documentation** | **Functions Monitored** |
| [**R****1.**](#R1_Summary) |  |  | TOP, GOP  |

|  |  |
| --- | --- |
| **Req.** | **Recommendations** |
|  |  |
|  |  |
|  |  |

|  |  |
| --- | --- |
| **Req.** | **Areas of Concern** |
|  |  |
|  |  |
|  |  |

|  |  |
| --- | --- |
| **Req.** | **Positive Observations** |
|  |  |
|  |  |
|  |  |

# **Subject Matter Experts**

Identify subject matter expert(s) responsible for this Reliability Standard. Insert additional lines if necessary.

**Registered Entity Response** (**Required**; Insert additional rows if needed)**:**

|  |  |  |  |
| --- | --- | --- | --- |
| **SME Name** | **Title** | **Organization** | **Requirement(s)** |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

# **R1 Supporting Evidence and Documentation**

**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.

**Registered Entity Response (Required):**

Describe, in narrative form, how you meet compliance with this requirement.

Registered Entity Evidence (Required; Insert additional rows if needed):

|  |
| --- |
| **The following information is requested for each document submitted as evidence. Also, evidence submitted should be highlighted and bookmarked, as appropriate, to identify the exact location where evidence of compliance may be found.** |
| **File Name** | **Document Title** | **Revision or Version** | **Document Date** | **Relevant Page(s) or Section(s)** | **Description of Applicability of Document** |
|  |  |  |  |  |  |
|  |  |  |  |  |  |
|  |  |  |  |  |  |

Audit Team Evidence Reviewed (This section to be completed by the Compliance Enforcement Authority):

|  |
| --- |
|  |
|  |
|  |

**Compliance Assessment Approach Specific to VAR-002-WECC-2 R1**

***This section must be completed by the Compliance Enforcement Authority.***

Review the evidence to verify the entity has the following:

|  |  |
| --- | --- |
|  | Identify the generating units that applicable under the standard for which the Entity is the GOP. |
|  | Determine if the TOP operates any synchronous condensers connected to the BES. If none, this standard does not apply to the TOP. |
|  | Determine if the GOP operated with the AVR in service and in the voltage control mode 98% of all operating hours during each calendar quarter of the compliance period. |
|  | If provided, review the quarterly AVR reports for the compliance period, noting the compliance percentage for each applicable generator or condenser. |
| If quarterly AVR reports are not provided; the entity must provide: |
|  | Total operating hours in each calendar quarter of each applicable generator or condenser. |
|  | Total hours excluded under R1.1 – R1.10, in each calendar quarter of each applicable generator or condenser --- see R2 for the excluded hours |
|  | Total hours each applicable generator or condenser did not have the AVR in service and in the voltage control mode. |
|  | Determine the percentage of hours the applicable generator or condenser operated with the AVR in service and in the voltage control mode by subtracting the excluded hours from the total operating hours --- use the result in determining the percent compliance. |

[**Compliance S****ummary:**](#R2_Finding)

(Finding Summary):

Primary Documents Supporting Finding:

**Auditor Notes:**

**Supplemental Information**

**Other ‑** The list of questions above is not all inclusive of evidence required to show compliance with the Reliability Standard. Provide additional information here**, as necessary that** demonstrates compliance with this Reliability Standard.

**Standard:** [**VAR-002-WECC-1 – Automatic Voltage Regulators (WECC)**](https://www.wecc.org/Reliability/VAR-002-WECC-1.pdf)

**Excerpts from FERC Orders -- For Reference Purposes Only**

**Updated Through April 21, 2011**

**FERC-751**

**Version One Regional Reliability Standards for Facilities Design, Connections, and Maintenance; Protection and Control; and Voltage and Reactive**

7.On March 25, 2009, NERC submitted a petition (NERC Petition) to the Commission seeking approval of four WECC regional Reliability Standards. The four proposed WECC regional Reliability Standards are designated as FAC-501-WECC-1, PRC-004-WECC-1, VAR-002-WECC-1 and VAR-501-WECC-1. In its petition, NERC explains that the four proposed regional Reliability Standards are meant to replace certain currently-effective regional Reliability Standards:

* FAC-501-WECC-1 is intended to replace the current approved WECC PRC-STD-005-1;
* PRC-004-WECC-1 is intended to replace WECC PRC-STD-001-1 and WECC PRC-STD-003-1;
* VAR-002-WECC-1 is intended to replace WECC VAR-STD-002a-1; and
* VAR-501-WECC-1 is intended to replace WECC VAR-STD-002b-1.

53.Consistent with the Commission directives, the revised regional Reliability Standard replaces the former sanctions table with violation risk factors, violation severity levels, measures and time horizons. WECC also proposes a new glossary term, Commercial Operation, applicable only in the Western Interconnection.

66. In response to the comments filed by the Bureau of Reclamation, we agree that there is a difference between the automatic voltage regulator being “in service” and the automatic voltage regulator being “in automatic voltage control mode.” As the Bureau of Reclamation explained, modern excitation systems can include several control function modes, one of which is automatic voltage regulator mode. If the excitation controller is operating in automatic voltage regulator mode, then the generator is operating in automatic voltage control mode. If the excitation controller is operating in another mode, the generator is not operating in automatic voltage control mode. Accordingly, we believe that VAR-002-WECC-1 makes this distinction clear by requiring synchronous generators and synchronous condensers to have the automatic voltage regulator in service and in automatic voltage control mode.

**Revision History**

|  |  |  |
| --- | --- | --- |
| Date | Reviewers | Revision Description |
| July 2011 | Mike Wells | Initial RSAW for VAR-002-WECC-1 |
| January 2013 | Mindee Hawes | Updated Template for 2013 |
| January 2014 | Nickole B. Radabaugh | Reviewed for format consistency and content. |
| December 2014 | WECC Compliance Staff | Updated formatting for 2015 |
| February 2015 | WECC Compliance | Removed Audit Id line from cover page |
| July 2015 | WECC Compliance | Initial RSAW for VAR-002-WECC-2 (R2 retired) |

1. WECC developed this Reliability Standard Audit Worksheet (RSAW) language in order to facilitate WECC and the Regional Entities’ assessment of a registered entity’s compliance with this Reliability Standard. The WECC RSAW language is written to specific versions of each WECC Reliability Standard. Entities using this RSAW should choose the version of the RSAW applicable to the Reliability Standard being assessed. While the information included in this RSAW provides some of the methodology that WECC has elected to use to assess compliance with the requirements of the Reliability Standard, this document should not be treated as a substitute for the Reliability Standard or viewed as additional Reliability Standard requirements. In all cases, the Regional Entity should rely on the language contained in the Reliability Standard itself, and not on the language contained in this RSAW, to determine compliance with the Reliability Standard. WECC Reliability Standards are updated frequently, and this RSAW may not necessarily be updated with the same frequency. Therefore, it is imperative that entities treat this RSAW as a reference document only, and not as a substitute or replacement for the Reliability Standard. It is the responsibility of the registered entity to verify its compliance with the latest approved version of the Reliability Standards, by the applicable governmental authority, relevant to its registration status.

The WECC RSAW language contained within this document provides a non‑exclusive list, for informational purposes only, of examples of the types of evidence a registered entity may produce or may be asked to produce to demonstrate compliance with the Reliability Standard. A registered entity’s adherence to the examples contained within this RSAW does not necessarily constitute compliance with the applicable Reliability Standard, and WECC and the Regional Entity using this RSAW reserves the right to request additional evidence from the registered entity that is not included in this RSAW. Additionally, this RSAW includes excerpts from FERC Orders and other regulatory references. The FERC Order cites are provided for ease of reference only, and this document does not necessarily include all applicable Order provisions. In the event of a discrepancy between FERC Orders, and the language included in this document, FERC Orders shall prevail. [↑](#footnote-ref-1)
2. Compliance Assessment Date(s): The date(s) the actual compliance assessment (on-site audit, off-site spot check, etc.) occurs. [↑](#footnote-ref-2)