

Alberta Reliability Standard

Automatic Voltage Regulators and Voltage Regulating Systems

VAR-002-WECC-AB-1



1. Purpose

The purpose of this **reliability standard** is to ensure that:

- (a) **automatic voltage regulators** on **generating units** and synchronous condensers are in service and controlling voltage; and
- (b) **voltage regulating systems** at **aggregated generating facilities** are in service and controlling voltage.

2. Applicability

This **reliability standard** applies to:

- (a) the **operator** of a **generating unit**, including those that operate as a synchronous condenser, that:
 - (i) is not part of an **aggregated generating facility**;
 - (ii) has a **maximum authorized real power** rating greater than four point five (4.5) MW; and
 - (iii) is directly connected to either the **transmission system** or to **transmission facilities** within the City of Medicine Hat;
- (b) the **operator** of an **aggregated generating facility** that:
 - (i) has a **maximum authorized real power** rating greater than four point five (4.5) MW; and
 - (ii) is directly connected to either the **transmission system** or to **transmission facilities** within the City of Medicine Hat; and
- (c) the **operator** of a **transmission facility** that operates a synchronous condenser.

3. Requirements

R1 Each **operator** of a **generating unit**, **operator** of an **aggregated generating facility** and **operator** of a **transmission facility** that operates a synchronous condenser, must have the **automatic voltage regulator** or **voltage regulating system** in service and in automatic voltage control mode for ninety-eight percent (98%) of all operating hours except that the operating hours determined in accordance with requirements R1.1 through R1.12 inclusive may be extended to achieve the ninety-eight percent (98%) requirement.

R1.1 The operating hours during which the **generating unit**, **aggregated generating facility** or synchronous condenser operates for less than five percent (5%) of all hours during any calendar quarter;

R1.2 The operating hours during which maintenance or testing on any of the foregoing was performed, up to a maximum of seven (7) calendar **days** per calendar quarter;

R1.3 The operating hours during which the **automatic voltage regulator** or **voltage regulating system** exhibits instability due to an abnormal system configuration;

R1.4 The operating hours, up to a maximum of sixty (60) consecutive **days** per incident, during which the **automatic voltage regulator** or **voltage regulating system** is out of service for repair due to component failure;

Alberta Reliability Standard

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VAR-002-WECC-AB-1



R1.5 The operating hours, up to a maximum of twelve (12) consecutive **months**, during which the **automatic voltage regulator** or **voltage regulating system** had a component failure, provided the **operator** of a **generating unit**, **operator** of an **aggregated generating facility** or **operator of a transmission facility** submitted documentation to the **ISO** identifying the need for time to obtain replacement parts and, if required, to schedule an **outage**;

R1.6 The operating hours, up to a maximum of twenty-four (24) consecutive **months** during which the **automatic voltage regulator** or **voltage regulating system** had a component failure, provided the **operator** of a **generating unit**, **operator** of an **aggregated generating facility** or **operator of a transmission facility** submitted documentation to the **ISO** identifying the need for time for replacement of the excitation system including replacing the **automatic voltage regulator** or **voltage regulating system**, limiters, and controls but not necessarily the power source and power bridge, and to schedule an **outage**;

R1.7 The operating hours during which the synchronous **generating unit**, **aggregated generating facility** or synchronous condenser is not in **commercial operation**;

R1.8 The operating hours for which the **ISO** has issued a **directive** to the **operator** of a **generating unit** to operate the **generating unit** when the **automatic voltage regulator** is unavailable for service;

R1.9 The operating hours for which the **ISO** has issued a **directive** to the **operator** of an **aggregated generating facility** to operate the **aggregated generating facility** when the **voltage regulating system** is unavailable for service;

R1.10 The operating hours for which the **ISO** has issued a **directive** to an **operator** of a **transmission facility** to operate a synchronous condenser when the **automatic voltage regulator** is unavailable for service;

R1.11 The operating hours during which an **automatic voltage regulator** exhibits instability due to operation of an on-load tap changer transformer in the area when the **ISO** has authorized the **operator** of a **generating unit** or **operator** of a **transmission facility** to operate the excitation system in modes other than automatic voltage control until the **transmission system** configuration changes; and

R1.12 The operating hours during which a **voltage regulating system** exhibits instability due to operation of an on-load tap changer transformer in the area when the **ISO** has authorized the **operator** of an **aggregated generating facility** to operate the **voltage regulating system** in modes other than automatic voltage control until the **transmission system** configuration changes.

R2 Each **operator** of a **generating unit**, **operator** of an **aggregated generating facility** and **operator** of a **transmission facility** must have documentation supporting the identification of the number of operating hours excluded for each requirement in requirements R1.1 through R1.12 inclusive.

4. Measures

MR1 Evidence of having the **automatic voltage regulator** or **voltage regulating system** in service and in automatic voltage control mode as required in requirement R1 exists. Evidence may include documentation that summarizes for each calendar quarter:

Alberta Reliability Standard Automatic Voltage Regulators and Voltage Regulating Systems VAR-002-WECC-AB-1



- (a) the number of hours the **automatic voltage regulator** or **voltage regulating system** was in service and in automatic voltage control mode while the **generating unit**, the **aggregated generating facility** or synchronous condenser was operating;
- (b) the number of hours the **automatic voltage regulator** or **voltage regulating system** was out of service while the **generating unit**, the **aggregated generating facility** or synchronous condenser was operating;
- (c) the number of operating hours excluded in accordance with requirements R1.1 through R1.12; and
- (d) the percentage of operating hours that the **automatic voltage regulator** or **voltage regulating system** was in service, excluding the number of operating hours determined in accordance with requirements R1.1 through R1.12.

MR2 Evidence of having documentation as required in requirement R2 exists. Evidence may include a document identifying the subject of each applicable exclusion, the date and the period of time that the exclusion refers to, reasons, the supporting data and the supporting logs.

Revision History

| Effective | Description |
|------------|-------------|
| 2013-10-01 | |
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