Alberta Reliability Standard
Voltage and Reactive Control
VAR-001-AB-4

1. Purpose

To ensure that voltage levels, reactive flows, and reactive resources are monitored, controlled, and maintained within limits in real-time to protect equipment and the reliable operation of the **Interconnection**.

2. Applicability

This **reliability standard** applies to:

(a) the **ISO**.

3. Requirements

R1 The **ISO** must specify a system voltage range with an associated tolerance band, as part of its plan to operate within **system operating limits** and **interconnection reliability operating limits**.

R1.1 The **ISO** must provide a copy of the system voltage range with an associated tolerance band to an **interconnected transmission operator** within thirty (30) **days** of a request.

R2 The **ISO** must operate with sufficient **reactive power** resources available within Alberta to protect the voltage levels of the **transmission system** under normal and **contingency** conditions.

R3 The **ISO** must be able to regulate transmission voltage and **reactive power** flow by issuing **directives** or instructions to operate the devices necessary to do so.

R4 The **ISO** must specify the criteria that will exempt a **generating unit** or an **aggregated generating facility** from:

a) following a voltage or **reactive power** instruction or **directive**;

b) having its **automatic voltage regulator** or **voltage regulating system** in service or being in voltage control mode; or

c) making any associated notifications.

R4.1 If the **ISO** determines that a **generating unit** or an **aggregated generating facility** has satisfied the exemption criteria, the **ISO** must notify the associated **operator** of a **generating unit** or **operator** of an **aggregated generating facility**.

R5 The **ISO**, when issuing **directives** or instructions for voltage level or **reactive power**, to the **operator** of a **generating unit** or the **operator** of an **aggregated generating facility**, must specify the following:

a) the voltage level at the **point of connection** between the **transmission system** and a **generating unit** or an **aggregated generating facility**, including those in a power plant or an industrial complex; or

b) the **reactive power** to be achieved by the **generating unit**, **aggregated generating facility**, power plant or industrial complex.

R6 The **ISO** must, after a review with the **legal owner** of a **generating unit** or the **legal owner** of an **aggregated generating facility** regarding necessary off-load tap changes for the step-up transformer that connects to the **transmission system**, provide documentation to the **legal owner** of a **generating**

unit or the **legal owner** of an **aggregated generating facility** specifying the required tap changes, a timeframe for making the changes, and technical justification for these changes.

4. Measures

The following measures correspond to the requirements identified in section 3 of this **reliability standard.** For example, MR1 is the measure for R1.

MR1. Evidence of specifying a system voltage range with an associated tolerance band as required in requirement R1 exists.

MR1.1 Evidence of providing a copy of the system voltage range with an associated tolerance band as required in requirement R1.1 exists. Evidence may include, but is not limited to, emails, website postings, or any other equivalent evidence.

MR2 Evidence of operating with sufficient **reactive power** resources as required in requirement R2 exists. Evidence may include, but is not limited to, data files or any other equivalent evidence.

MR3 Evidence of being able to regulate transmission voltage and **reactive power** flow as required in requirement R3 exists. Evidence may include, but is not limited to, relevant **ISO** authoritative documents.

MR4 Evidence of specifying the criteria that will exempt a **generating unit** or an **aggregated generating facility** as specified in requirement R4 exists.

> **MR4.1** Evidence of notifying the associated **operator** of a **generating uni**t or **operator** of an **aggregated generating facility** if the **ISO** determines that the exemption criteria were satisfied. Evidence may include, but is not limited to, emails, data files or other equivalent evidence.

MR5 Evidence of issuing **directives** or instructions to the **operator** of a **generating unit** or the **operator** of an **aggregated generating facility** as required in requirement R5 exists. Evidence may include, but is not limited to, voice recordings or other equivalent evidence.

MR6 Evidence of providing documentation as required in requirement R6 exists. Evidence may include, but is not limited to, dated study results or email to appropriate recipients that identifies contents submitted or other equivalent evidence.

5. Appendices

Appendix 1 - *Exemptions*

Revision History

Date	Description
2019-xx-xx	Unbolded “real time”
2016-04-01	Revised to align with NERC version 4.
2012-10-01	Initial release

Appendix 1 - Exemptions

1. Exemption Criteria

A **generating unit** or **aggregated generating facility** must, in order to meet the exemption criteria referred to in requirement R4 of this **reliability standard**:

(a) be a wind **aggregated generating facility**;

(b) not be equipped with a **voltage regulating system**; and

(c) be the subject of an executed *Construction Commitment Agreement* and have completed the **ISO**'s approval process for connection to the **transmission system** under the *Technical Requirements for connecting generators (1999)*.