

Applicability

- 1 Section 502.14 applies to:
 - (a) the **operator** of a battery **energy storage facility** that is directly connected to the **transmission system** or to **transmission facilities** within the City of Medicine Hat, including a battery **energy storage facility** situated within an industrial complex or generating facility that is directly connected to the **transmission system**;
 - (b) the **legal owner** of a battery **energy storage facility** that is directly connected to the **transmission system** or to **transmission facilities** within the City of Medicine Hat, including a battery **energy storage facility** situated within an industrial complex or generating facility that is directly connected to the **transmission system**; and
 - (c) the **ISO**.

Requirements to Operate and Maintain a Battery Energy Storage Facility

2(1) The **legal owner** of a battery **energy storage facility** must operate and maintain the battery **energy storage facility** to comply with the technical design requirements of section 502.13 of the **ISO rules** for so long as the battery **energy storage facility** remains connected to the **transmission system**.

(2) The **operator** of a battery **energy storage facility** must, if it determines that any battery **energy storage facility** equipment required to meet the technical design requirements of an applicable **ISO rule** has become unavailable or is otherwise no longer meeting those requirements, notify the **ISO**, in writing, in accordance with subsection 2(3) no later than one (1) **business day** after making such a determination.

(3) A notification to the **ISO** under subsection 2(2) must include:

- (a) a description of the cause of the equipment unavailability or the reason that the equipment no longer meets the technical design requirements;
- (b) a plan to address the issue identified under subsection 2(2), including testing; and
- (c) the expected date and time at which the issue identified under subsection 2(2) will be resolved.

(4) The **operator** of a battery **energy storage facility** must, if the issue identified under subsection 2(2) is not resolved by the expected date and time provided in the notification described in subsection 2(3)(c), notify the **ISO**, in writing, no later than one (1) **business day** after the original expected date and time of the reason why the issue was not resolved by the expected date and time, and provide the **ISO** with a revised date and time under subsection 2(3)(c).

(5) The **operator** of a battery **energy storage facility** must notify the **ISO** no later than one (1) **business day** after the issue identified under subsection 2(2) has been resolved.

(6) The **operator** of any battery **energy storage facility** that is one of multiple battery **energy storage facilities** within a single complex must, as soon as practicable, verbally notify the **ISO** when it determines that the auxiliary systems of the battery **energy storage facility** are configured such that multiple battery **energy storage facilities** will trip or go off-line for a single **contingency** within the facility, such that it is being operated contrary to subsection 11(1)(b) of section 502.13 of the **ISO rules**, *Battery Energy Storage Facility Technical Requirements*.

- (7) If the **ISO** provides written notice to the **legal owner** of a battery **energy storage facility** detailing evidence that the observed performance of the battery **energy storage facility** is not consistent with any of the requirements set out in section 502.13 of the **ISO rules**, the **legal owner** must submit to the **ISO** a written report, in accordance with subsection 14, demonstrating that the battery **energy storage facility** is capable of meeting those requirements.
- (8) A **legal owner** must submit a report no later than sixty (60) **business days** after receipt of the written notice described in subsection 2(7).
- (9) Notwithstanding subsection 2(8), the **legal owner** of a battery **energy storage facility** is not required to provide the report if, between the date the **ISO** delivers the written notice and the deadline date for the submission of the report:
- (a) the **legal owner** demonstrates to the satisfaction of the **ISO** that the failure to perform in accordance with the requirements of section 502.13 of the **ISO rules** was caused by equipment issues with the battery **energy storage facility** that the legal owner corrected no later than sixty (60) **business days** after receipt of the written notice described in subsection 2(7); and
 - (b) the **ISO** provides written notice to the **legal owner** that the report is not required.

Operating Requirements for the Governor System

3 Subject to subsection 6, the **operator** of a battery **energy storage facility** must only operate the battery **energy storage facility** with the **governor system** in service, in droop mode and free to respond to frequency changes.

Operating Requirements for the Voltage Regulating System

4 Subject to subsection 2, the **operator** of a battery **energy storage facility** must only operate a battery **energy storage facility** when the **voltage regulating system** is in service and free to respond to voltage changes.

Battery Energy Storage Facility Disconnection and Interrupting Devices

5 The **operator** of the battery **energy storage facility** must not, once a connecting breaker of the battery **energy storage facility** has been opened or tripped, electrically reconnect to the **transmission facility** unless it has received approval from the **ISO**.

Operating Requirements related to Maximum Authorized Charging Power and Maximum Authorized Discharging Power

6(1) The **operator** of a battery **energy storage facility** must not operate the battery **energy storage facility** beyond its **maximum authorized charging power** or its **maximum authorized discharging power**.

(2) Notwithstanding subsection 6(1), the **ISO** may, where additional **real power** is required to ensure the reliability of the **interconnected electric system**, request that the **operator** of a battery **energy storage facility** operate beyond the **maximum authorized charging power** or the **maximum authorized discharging power** of the battery **energy storage facility**.

(3) The **ISO** must, when the additional **real power** referred to in subsection 6(2) is no longer required, notify the **operator** of the battery **energy storage facility** to return the battery **energy storage facility** within the range of its **maximum authorized charging power** or its **maximum authorized discharging power**.

Operating Requirements for the Synchrophasor Measurement and Sequence of Event Devices

7 The **legal owner** of a battery **energy storage facility** must collect synchrophasor measurements and sequence of event records for the battery **energy storage facility**, and must retain those records for a minimum period of one (1) calendar year.

Operating Data Requests from the ISO

8(1) The **ISO** may request, by way of written notice, operating data from the **legal owner** of a battery **energy storage facility**, including the records described in subsection 7.

(2) The **legal owner** of a battery **energy storage facility** must:

- (a) submit the operating data requested by the **ISO**, if available, no later than five (5) **business days** after receipt of the notice under subsection 8(1); or
- (b) if the operating data requested by the **ISO** is not available, advise the **ISO** in writing no later than five (5) **business days** after receipt of the notice under subsection 8(1).

Reactive Current Compensation Setting

9(1) The **ISO** must, where a battery **energy storage facility** is equipped with reactive current compensation, provide the **legal owner** of a battery **energy storage facility** with one hundred and eighty (180) **days'** notice in writing that a change to the reactive current compensation settings of the battery **energy storage facility** is required.

(2) The **legal owner** of a battery **energy storage facility** must, upon receiving notice in writing from the **ISO** referenced in subsection 9(1), make a change to the reactive current compensation settings of the battery **energy storage facility** on or before the date specified by the **ISO**, and must provide written confirmation to the **ISO** as soon as practicable upon implementing such a change.

Testing Applicability

10 The following subsections 11 and 12 are only applicable to the **legal owner** of a battery **energy storage facility** that meets the following criteria:

- (a) the battery **energy storage facility** has:
 - (i) a range that is greater than 9 MW between the **maximum authorized charging power** and the **maximum authorized discharging power**; or
 - (ii) an aggregate range greater than 18 MW between the **maximum authorized charging power** and the **maximum authorized discharging power**, where the battery **energy storage facility** is one of multiple battery **energy storage facilities** within a single complex and each battery **energy storage facility** has its own **voltage regulating system** or **governor system**; and
- (b) the battery **energy storage facility** is not connected to the in-plant distribution system of an industrial complex with two (2) or more voltage transformations between the converter terminals and the **transmission system**.

Baseline Testing

11(1) The **legal owner** of a battery **energy storage facility** must perform baseline testing, including model validation, in accordance with subsection 11(2), to validate the following battery **energy storage facility** models:

- (a) the **voltage regulating system**; and

(b) the **governor system**.

(2) The **legal owner** of a battery **energy storage facility** must perform baseline testing when any of the following occurs:

(a) the battery **energy storage facility** is connected to the **transmission system** for the first time;

(b) changes are made to control settings, software or hardware of:

(i) the **voltage regulating system**; or

(ii) the **governor system**; or

(c) any other modification is made that changes the modeled behaviour of the battery **energy storage facility** with respect to the **transmission system**.

(3) For the purposes of subsections 11(2)(b) and (c), the **legal owner** of a battery **energy storage facility** is only required to perform testing and model validation on those portions of the models that are affected by the modifications.

(4) The results of the testing performed pursuant to subsection 11(2) must be reported to the **ISO** in accordance with subsection 14.

Model Revalidation Testing

12(1) The **legal owner** of a battery **energy storage facility** must, for each model referenced in subsection 12(2), perform regular model revalidation testing no later than five (5) years from the date of the most recently completed baseline testing or model revalidation testing.

(2) Model revalidation testing must consist of the following battery **energy storage facility** models:

(a) the **voltage regulating system**; and

(b) the **governor system**.

(3) Where the **ISO** provides written notice to the **legal owner** of a battery **energy storage facility** stating that the modeled response of the battery **energy storage facility** is not consistent with the observed response, the **legal owner** must perform model revalidation testing of the battery **energy storage facility** in accordance with subsection 12(2).

(4) The **legal owner** of a battery **energy storage facility** must provide to the **ISO** the written results of any model revalidation testing no later than sixty (60) **business days** after receipt of the notice described in subsection 12(3).

(5) Notwithstanding subsection 12(4), the **legal owner** of a battery **energy storage facility** is not required to provide the revalidation testing results if, between the date the **ISO** delivers the written notice and the deadline date for the submission of model revalidation testing results:

(a) the legal owner demonstrates to the satisfaction of the **ISO** that the lack of consistency described in subsection 12(3) was caused by equipment problems for the battery **energy storage facility** that the legal owner corrected prior to the revalidation testing date; and

(b) the **ISO** provides written notice to the **legal owner** that the revalidation testing results are not required.

(7) The results of any model revalidation testing performed pursuant to subsections 12(1) and 12(3) must be reported to the **ISO** in accordance with the requirements of subsection 14.

Reactive Power Verification Testing

13(1) The **legal owner** of a battery **energy storage facility** must, subject to subsection 13(3), verify the **reactive power** capability of the battery **energy storage facility** at the **maximum authorized charging power** and **maximum authorized discharging power** for the battery **energy storage facility** at regular intervals no later than five (5) years from the date the prior **reactive power** verification or re-verification testing was completed.

(2) The **reactive power** testing for the battery **energy storage facility** for both the **maximum authorized charging power** and the **maximum authorized discharging power** must achieve:

- (a) the gross **reactive power** at zero point nine zero (0.90) over-excited **power factor**; and
- (b) the gross **reactive power** at zero point nine five (0.95) under-excited **power factor**.

(3) The **legal owner** of a battery **energy storage facility** may test the battery **energy storage facility** at values other than the **maximum authorized charging power** and **maximum authorized discharging power**, but only if ambient conditions or **transmission system** limits do not allow the battery **energy storage facility** to achieve the **maximum authorized charging power** and **maximum authorized discharging power** or the **reactive power** requirements.

(4) Where a battery **energy storage facility** has a common **point of connection** with a generating asset and the **reactive power** resources are shared, the testing described in this subsection 13 must verify that the **reactive power** capability is in accordance with the applicable requirements of section 502.13 of the **ISO rules**, *Battery Energy Storage Facility Technical Requirements*.

(5) Where the **ISO** provides written notice to the **legal owner** of a battery **energy storage facility** that the observed response of the battery **energy storage facility** is not consistent with the **reactive power** requirements for that battery **energy storage facility**, the **legal owner** must perform **reactive power** re-verification testing in accordance with subsection 13(2).

(6) The **legal owner** of a battery **energy storage facility** must provide the **reactive power** re-verification testing results to the **ISO** no later than sixty (60) **business days** after receipt of the notice described in subsection 13(4).

(7) Notwithstanding subsection 13(5), the **legal owner** of a battery **energy storage facility** is not required to provide the **reactive power** re-verification testing results if, between the date the **ISO** delivers the written notice and the deadline date for the submission of the testing results:

- (a) the legal owner demonstrates to the satisfaction of the **ISO** that the lack of consistency described in subsection 13(4) was caused by equipment issues with the battery **energy storage facility** that the legal owner corrected prior to the testing date; and
- (b) the **ISO** provides written notice to the legal owner that the re-verification testing results are not required.

(8) The results of any **reactive power** re-verification testing performed pursuant to subsections 13(1) or 13(3) must be reported to the **ISO** in accordance with subsection 14, and must contain sufficient data to confirm the **reactive power** capability of the battery **energy storage facility**.

Model Validation and Reactive Power Verification Reporting

14(1) The **legal owner** of a battery **energy storage facility** must submit all test results referred to in this rule to the **ISO** in the form of reports that meet the requirements specified by the **ISO**.

ISO Rules
Part 500 Facilities
Division 502 Technical Requirements
Section 502.14 Battery Energy Storage Facility Operating Requirements



(2) In addition to any other reporting requirements specified in this rule, the **legal owner** of a battery **energy storage facility** must submit a separate report in accordance with subsection 14(1) to the **ISO** no later than one hundred and eighty (180) **days** after the date of completion of each of:

- (a) the first connection of a battery **energy storage facility** to the **transmission system**;
- (b) the first connection of a battery **energy storage facility** to the **transmission system** upon completion of any modification described in subsections 11(2);
- (c) the in-service date of any increased **maximum authorized charging power** or **maximum authorized discharging power** of a battery **energy storage facility** that the **ISO** approves under section 502.13 of the **ISO rules**;
- (d) the completion of any model revalidation testing other than that required in subsection 12; and
- (e) the completion of any **reactive power** verification or re-verification testing other than that required in subsection 13.

Power Quality

15(1) The **ISO** must, where voltage unbalance is identified on the **transmission system**, address the unbalance in accordance with the specifications set out in the version of the *International Electrotechnical Commission 61000-3-13, Electromagnetic compatibility (EMC) – Part 3-13: Limits - Assessment of emission limits for the connection of unbalanced installations to MV, HV and EHV power system* at the **point(s) of connection** of the battery **energy storage facility** to the **transmission system**.

(2) The **legal owner** and **operator** of a battery **energy storage facility** must assist the **ISO** in a power quality investigation, including but not limited to an investigation relating to voltage unbalance, harmonics, resonance and flicker.

Revision History

Date	Description
2016-04-25	Initial release.