

ISO Rules

Part 500 Facilities

Division 503 Technical & Operating Requirements

Section 503.20 Baseline and Model Validation Testing



Applicability

- 1 Section 503.20 applies to:
 - (a) the **legal owner** of an **aggregated facility** that is directly connected to the **transmission system**, or to **transmission facilities** within the City of Medicine Hat, and has:
 - (i) **maximum authorized real power** greater than 9 MW; or
 - (ii) a range greater than 9 MW between the **maximum authorized charging power** and the **maximum authorized real power**;
including an **aggregated facility** situated within an industrial complex that is directly connected to the **transmission system**;
 - (b) the **legal owner** of a **generating unit** or **energy storage resource** that is directly connected to the **transmission system**, or to **transmission facilities** within the City of Medicine Hat, and has:
 - (i) **maximum authorized real power** equal to or greater than 9 MW; or
 - (ii) **maximum authorized real power** aggregate equal to or greater than 18 MW, where the **generating unit** or **energy storage resource** is part of a complex with other **generating units** or **energy storage resources**;and
 - (c) the **ISO**.
- 2 Section 503.20 does not apply to a **legal owner** if the **generating unit**, **aggregated facility**, or **energy storage resource** is connected to the in-plant distribution system of an industrial complex with 2 or more voltage transformations between the **generating unit**, **aggregated facility**, or **energy storage resource** and the **transmission system**.

Requirements

Baseline Testing for Aggregated Facilities

- 3(1) The **legal owner** of an **aggregated facility** must perform baseline testing, including model validation, in accordance with subsection 3(2), to validate the following models as applicable to the technology used in the **aggregated facility**:
 - (a) generator or converter;
 - (b) excitation system including the:
 - (i) **voltage regulating system** or **automatic voltage regulator** in voltage control mode;
and
 - (ii) **reactive power** resources;
 - (c) power system stabilizer, for an **aggregated facility** equipped with a power system stabilizer;
 - (d) turbine-governor system or real power controller; and
 - (e) other **aggregated facility** models as the **ISO** requests.
- (2) The **legal owner** of an **aggregated facility** must perform baseline testing when:
 - (a) the **aggregated facility** is connected to the **transmission system** for the first time;

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

- (i) the **voltage regulating system** or **automatic voltage regulator**; or
- (ii) the **governor system**;

or

(c) any modification is made that changes the modeled behaviour of the **aggregated facility** with respect to the **transmission facilities**.

(3) The **legal owner** of an **aggregated facility** is only required to perform testing on those portions of the models that are affected by the modifications described in subsection 3(2).

(4) The **legal owner** of an **aggregated facility** must perform **reactive power** verification, in accordance with Section 503.19 of the **ISO rules**, *Reactive Power Verification Testing* as part of the baseline testing.

(5) The **legal owner** of an **aggregated facility** must report the results of the baseline testing performed pursuant to subsection 3(2) to the **ISO** in accordance with subsection 7.

Baseline Testing for Generating Units and Synchronous Energy Storage Resources

4(1) The **legal owner** of a **generating unit** or synchronous **energy storage resource** must perform baseline testing, including model validation, in accordance with subsection 4(2), to validate the following **generating unit** or synchronous **energy storage resource** models:

(a) synchronous machine including:

- (i) open circuit saturation;
- (ii) inertia; and
- (iii) synchronous machine impedances and time constants;

(b) excitation system including:

- (i) the **automatic voltage regulator** in voltage control mode; and
- (ii) the open circuit saturation of the exciter for a **generating unit** or synchronous **energy storage resource** equipped with a rotary exciter;

(c) power system stabilizer for a **generating unit** or synchronous **energy storage resource** equipped with a power system stabilizer;

(d) turbine-**governor system**; and

(e) other **generating unit** or synchronous **energy storage resource** models as the **ISO** requires.

(2) The **legal owner** of a **generating unit** or synchronous **energy storage resource** must perform baseline testing when any of the following occurs:

(a) the **generating unit** or synchronous **energy storage resource** is synchronized to the **transmission system** for the first time;

(b) replacement or changes to control settings or software of:

- (i) the **automatic voltage regulator**;
- (ii) the power system stabilizer; or
- (iii) the **governor system**;

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- (c) a **generating unit** or synchronous **energy storage resource** stator rewind;
- (d) a **generating unit** or synchronous **energy storage resource** rotor rewind;
- (e) a rotary exciter rewind;
- (f) a turbine replacement; or
- (g) any other modification that changes the modeled behaviour of the **generating unit** or synchronous **energy storage resource** with respect to the **transmission system**.

(3) The **legal owner** of a **generating unit** or synchronous **energy storage resource** is, notwithstanding subsection 4(2), not required to perform baseline testing if any of the work described in subsections 4(2)(b) through (f) does not result in changes to the modeled behaviour of the **generating unit** or synchronous **energy storage resource** with respect to the **transmission system**.

(4) The **legal owner** of a **generating unit** or synchronous **energy storage resource** referred to in subsections 4(2)(b) through (g) is only required to perform testing on those portions of the models that are affected by the modifications.

(5) The **legal owner** of a **generating unit** or synchronous **energy storage resource** must perform **reactive power** verification, in accordance with Section 503.19 of the **ISO rules**, *Reactive Power Verification Testing*, as part of the baseline testing.

(6) The **legal owner** of a **generating unit** or synchronous **energy storage resource** must report the results of the baseline testing performed pursuant to subsection 4(2) to the **ISO** in accordance with subsection 7.

Model Revalidation Testing for Aggregated Facilities

5(1) The **legal owner** of an **aggregated facility** must, for each model referenced in subsection 5(2) and as applicable to the technology used in the **aggregated facility**, perform model revalidation testing no later than 5 calendar years from the date of the most recently completed baseline testing or model revalidation testing.

(2) Model revalidation testing must consist of the following **aggregated facility** models:

- (a) **voltage regulating system** or **automatic voltage regulator** in voltage control mode;
- (b) power system stabilizer for an **aggregated facility** equipped with a power system stabilizer; and
- (c) **governor system** or **real power** controller.

(3) The **legal owner** of an **aggregated facility** must, when the **ISO** provides written notice to the **legal owner** that the modeled response of the **aggregated facility** is not consistent with the observed response, perform model revalidation testing of the **aggregated facility** in accordance with subsection 5(2).

(4) The **legal owner** of an **aggregated facility** must provide to the **ISO** the written results of any model revalidation testing no later than 60 **business days** after receipt of the notice described in subsection 5(3).

(5) The **legal owner** of an **aggregated facility** is not required, notwithstanding subsection 5(4), to perform the revalidation testing 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 5(3) was caused by equipment problems for the **aggregated facility** that the **legal owner** corrected prior to the revalidation testing date; and

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- (b) the **ISO** provides written notice to the **legal owner** that the revalidation testing results are not required.
- (6) Notwithstanding subsection 5(1):
 - (a) the **legal owner** may make a request in writing to the **ISO** for a deferral of model validation testing for no more than one year if there is a planned change to equipment within that year; and
 - (b) the **ISO** must reply in writing within 60 **business days** of receiving such a request.
- (7) The results of any model revalidation testing performed pursuant to subsections 5(1) and 5(3) must be reported to the **ISO** in accordance with the requirements of subsection 7.

Model Revalidation Testing for Generating Units and Synchronous Energy Storage Resources

- 6(1)** The **legal owner** of a **generating unit** or **energy storage resource** must, for each model referenced in subsection 6(2), perform model revalidation testing no later than 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 **generating unit** or **energy storage resource** models:
 - (a) **excitation system**, including the **automatic voltage regulator** in voltage control mode;
 - (b) power system stabilizer for **generating units** or **energy storage resources** equipped with a power system stabilizer; and
 - (c) **turbine-governor system**.
- (3)** Where the **ISO** provides written notice to the **legal owner** of a **generating unit** or **energy storage resource** that the modeled response of the **generating unit** or **energy storage resource** is not consistent with the observed response, the **legal owner** must perform model revalidation testing of the **generating unit** or **energy storage resource** in accordance with subsection 6(2).
- (4)** The **legal owner** of a **generating unit** or **energy storage resource** must provide to the **ISO** the written results of any model revalidation testing no later than 60 **business days** after receipt of the notice described in subsection 6(3).
- (5)** The **legal owner** of a **generating unit** or **energy storage resource** is not required, notwithstanding subsection 6(4), to perform the revalidation testing 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 6(3) was caused by equipment problems for the **generating unit** or **energy storage resource** 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.
- (6)** Notwithstanding subsection 6(1):
 - (a) the **legal owner** may make a request to the **ISO**, in writing, for a deferral of model revalidation testing for no more than one year if there is a planned change to equipment within that year; and
 - (b) the **ISO** must reply to the **legal owner**, in writing, within 60 **business days** of receiving a

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request under section 6(1)(a).

(7) The results of any model revalidation testing performed pursuant to subsections 6(1) and 6(3) must be reported to the **ISO** in accordance with the requirements of subsection 7.

Reporting

7(1) The **legal owner** must report all test results referred to in this Section 503.20 to the **ISO**.

(2) The **legal owner** must submit an additional testing report to the **ISO**, in the form specified by the **ISO**, no later than **180 days** after the date of completion of each of:

- (a) the first connection of a **generating unit, aggregated facility, or energy storage resource** to the **transmission system** or a **transmission facility** within the **service area** of the City of Medicine Hat;
- (b) the first connection of a **generating unit, aggregated facility, or energy storage resource** to the **transmission system** or a **transmission facility** within the **service area** of the City of Medicine Hat upon completion of any modification described in subsection 3(2) or 4(2) as applicable;
- (c) any increase or decrease to the **maximum authorized real power** or **maximum authorized charging power** of a **generating unit, aggregated facility, or energy storage resource** that the **ISO** approves; and
- (d) any model revalidation testing other than that required in subsections 5 or 6.

Revision History

Date	Description
2024-08-08	Administrative amendment to correct formatting and cross reference to subsection 7.
2024-04-01	Initial release.