

ISO Rules

Part 200 Markets

Division 205 Ancillary Services

Section 205.4 Regulating Reserve Technical Requirements and Performance Standards



Applicability

- 1 Section 205.4 applies to:
 - (a) a **pool participant**; and
 - (b) the **ISO**.

Requirements

Application for Qualification to Provide Regulating Reserve

- 2(1) A **pool asset** must be qualified by the **ISO** in order to provide **regulating reserve**.
- 2(2) A **pool participant** seeking to have a **pool asset** qualified by the **ISO** to provide **regulating reserve** must provide the **ISO** with:
 - (a) a completed application form, available on the AESO website; and
 - (b) the data and records that the **ISO** specifies in the application form.

Eligibility to Provide Regulating Reserve

- 3(1) A **pool participant** seeking to have its **pool asset** qualified by the **ISO** to provide **regulating reserve** must ensure that its **pool asset** has at least one (1) **regulating reserve resource** that is:
 - (a) at a minimum, capable of providing:
 - (i) 15 MW of **regulating reserve**;
 - (ii) the amount of **real power** applied for, at either the high limit or the low limit of the **regulating reserve** range, for a period of up to sixty (60) minutes;
 - (iii) without manual intervention, **real power** movement in the direction of the latest **automatic generation control** signal within no more than:
 - A. twenty-eight (28) seconds of receiving an **automatic generation control** signal; and
 - B. forty (40) seconds of receiving an **automatic generation control** signal reversal;
 - (b) equipped with a **governor** or **governor system** that:
 - (i) is responsive to both over frequency and under frequency events;
 - (ii) has a total deadband of equal to or less than 0.036 Hz;
 - (iii) has a droop setting equal to or greater than 3% but less than or equal to 5% based on the maximum operating range of the **regulating reserve resource**, as specified by the **ISO**;
 - (iv) has no time delays, ramp characteristics or other control settings that prevent the **regulating reserve resource** from providing an immediate, automatic and sustained response to frequency deviations;
 - (v) has a sample rate of at least 20 samples per second;
 - (vi) has a resolution of at least 0.004 Hz;

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- (vii) is not acting as a **governor** or **governor system** for more than one (1) **regulating reserve resource**; and
- (viii) continues to be responsive to **automatic generation control** signals during frequency deviations between 58.9 Hz and 61 Hz.

(2) The requirements set out in subsections 3(1)(b)(v) and (vi) do not apply to a **pool asset** that provides **regulating reserve** from a **generating unit** that is equipped with an analog **governor**, as of December 23, 2014, until such time as the **governor** is replaced.

Qualification of a Pool Asset to Provide Regulating Reserve

4(1) The **ISO** may qualify a **pool asset** to provide **regulating reserve** if one (1) or more **regulating reserve resources** of the **pool asset** meet the eligibility criteria set out in subsection 3.

(2) The **ISO** must, after qualifying a **pool asset** under subsection 4(1), determine the **real power** quantity in MW that each **regulating reserve resource** of the **pool asset** is capable of providing, with consideration given to the following:

- (a) whether the **regulating reserve resource** is capable of a minimum **ramp rate** in MW per minute equal to 10% of the **real power** applied for under subsection 2(2);
- (b) whether the **regulating reserve resource** participates in a **remedial action scheme**;
- (c) the total **operating reserve** that could be lost during a single **contingency**;
- (d) the maximum **real power** capability and minimum **real power** capability of each **regulating reserve resource** of the **pool asset**; and
- (e) any other factors that the **ISO** considers relevant.

(3) The **ISO** must advise a **pool participant** whether its **pool asset** is qualified to provide **regulating reserve** within sixty (60) **days** of the **ISO** receiving a completed application under subsection 2(2).

Performance Requirements when under Dispatch to Provide Regulating Reserve

5(1) A **pool participant** must ensure that, following the receipt of a **dispatch** to provide **regulating reserve**, one (1) or more **regulating reserve resources** of the **pool asset** are positioned for the **regulating reserve** range indicated in the **dispatch**.

(2) A **pool participant** must ensure that each **regulating reserve resource** being used to provide **regulating reserve** meets the requirements set out in subsection 5(1) beginning at:

- (a) the time stated in the **dispatch**, for a **dispatch** with a time more than fifteen (15) minutes from the time the **pool participant** receives the **dispatch**; or
- (b) the time stated in the **dispatch** or as soon as possible thereafter, but in any event, not more than fifteen (15) minutes after receiving the **dispatch**, for a **dispatch** with a time fifteen (15) minutes or less from the time the **pool participant** receives the **dispatch**.

(3) A **pool participant** must ensure that, after positioning each **regulating reserve resource** being used to provide **regulating reserve** in accordance with subsection 5(1), the **regulating reserve** control status is sent to the **ISO**:

- (a) indicating that the **regulating reserve resource** is enabled to provide **regulating reserve**; and
- (b) identifying the high and low limits of the **regulating reserve** range.

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- (4) The **ISO** may issue an **automatic generation control** signal to a **pool asset** or a **regulating reserve resource** any time after the **regulating reserve resource** being used to provide **regulating reserve** has met the requirements set out in subsection 5(3).
- (5) A **pool participant** must ensure that the **automatic generation control** signal issued by the **ISO** in accordance with subsection 5(4) can move each **regulating reserve resource** being used to provide **regulating reserve** within the **regulating reserve** range.
- (6) A **pool participant** must ensure that each **regulating reserve resource** being used to provide **regulating reserve** responds to an **automatic generation control** signal change:
- (a) with a minimum **ramp rate** in MW per minute of 10% of the **real power** quantity qualified for under subsection 4(2); and
 - (b) in accordance with time delays set out in subsection 3(1)(a)(iii).
- (7) A **pool participant** must ensure that the **regulating reserve resources** being used to provide **regulating reserve** maintain a output level equal to the latest **automatic generation control** signal within a total tolerance of plus or minus:
- (a) 1 MW of the **regulating reserve** range for a **regulating reserve** range less than or equal to 20 MW; or
 - (b) 5% of the **regulating reserve** range for a **regulating reserve** range greater than 20 MW.
- (8) A **pool participant** will not be paid for **regulating reserve** unless the **pool participant** ensures that the **regulating reserve resources** being used to provide **regulating reserve** meet the requirements set out in subsections 5(1), 5(2), 5(3), 5(5), 5(6) and 5(7) for as long as the **dispatch** is in effect.

Frequency Response Requirements when under Dispatch to Provide Regulating Reserve

- 6(1) A **pool participant** must ensure that, while its **pool asset** is under **dispatch** to provide **regulating reserve**, the **governor** or **governor system** of each **regulating reserve resource** providing **regulating reserve** is operating such that it is:
- (a) in service at all times;
 - (b) operating without load limiters or other control systems including outer control loops that would prevent the **governor** or **governor system** from achieving the maximum frequency response; and
 - (c) the response of the **governor** or **governor system** and the **automatic generation control** signal of the **regulating reserve resource** is coordinated to provide both primary frequency control and response to the **automatic generation control** signal.
- (2) A **pool participant** must ensure that, while its **pool asset** is under **dispatch** to provide **regulating reserve**, the change in **real power** output of each **regulating reserve resource** being used to provide **regulating reserve** is:
- (a) continuously proportional to the measured frequency;
 - (b) in accordance with the droop setting set out in subsection 3(1)(b)(iii); and
 - (c) limited to the maximum **real power** capability of the **regulating reserve resource** that is available at the time of the frequency event

for any change in frequency where the frequency goes outside the deadband set out in subsection 3(1)(b)(ii).

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(3) A **pool participant** must ensure that, while its **pool asset** is under **dispatch** to provide **regulating reserve**, each **regulating reserve resource** being used to provide **regulating reserve** sustains the change in **real power** set out in subsection 6(2) for any change in frequency where the frequency is outside of the deadband set out in subsection 3(1)(b)(ii).

(4) A **pool participant** must ensure that, while its **pool asset** is under **dispatch** to provide **regulating reserve**, for any change in frequency where the frequency is outside the deadband set out in subsection 3(1)(b)(ii), other resources within the **pool asset** do not change their **real power** load level as a result of the change in **real power** of the **regulating reserve resource**, unless such a change does not negatively impact frequency response of the **pool asset**.

(5) A **pool participant** must ensure that, for the applicable minimum time period set out in Appendix 1, each **regulating reserve resource** being used to provide **regulating reserve** will not trip as a result of under frequency or over frequency deviations while the **pool asset** is under **dispatch** to provide **regulating reserve**.

Maintaining Connection when under Dispatch to Provide Regulating Reserve

7 A **pool participant** must ensure that, while its **pool asset** is under **dispatch** to provide **regulating reserve**, the **regulating reserve resource** remains connected to the **interconnected electric system** and remains frequency responsive in accordance with the requirements set out in subsection 6.

Measuring Frequency Response when under Dispatch to Provide Regulating Reserve

8 For the purpose of subsection 6, frequency response performance is measured at:

- (a) the stator winding terminals of a **generating unit**;
- (b) the circuit breaker or disconnection device that is electrically closest to each load;
- (c) the alternating current terminal closest to each inverter based technology;
- (d) the **collector bus** for **aggregated generating facilities**; or
- (e) a point designated by the **ISO**.

Other Facility Arrangements

9 The **ISO** may, for the purposes of evaluating frequency response performance, consider other facility arrangements if the combined change in **real power** demonstrates in aggregate that they meet the performance requirements set out in subsection 6 for a single **regulating reserve resource**.

Test Requirements

10 The **ISO** may request a **pool participant** to test a **regulating reserve resource**:

- (a) prior to allowing the **regulating reserve resource** to provide **regulating reserve**;
- (b) if the **ISO** provides evidence that the **regulating reserve resource** exhibits behaviour that is inconsistent with the requirements of this Section 205.4; or
- (c) if the **ISO** otherwise determines that such testing is necessary.

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Maintaining Eligibility to Provide Regulating Reserve

11(1) The **ISO** may issue a notice suspending the ability of a **pool participant** to provide **regulating reserve** if the **pool participant** does not comply with:

- (a) a testing request pursuant to subsection 10;
- (b) any other provision of this Section 205.4; or
- (c) other **ISO rules** that affect the provision of **regulating reserve**.

(2) A **pool participant** that has received a suspension notice issued pursuant to subsection 11(1) may not submit an **offer** for **regulating reserve** until the **ISO** confirms that the **pool participant** is compliant with this Section 205.4 and all other **ISO rules** that affect the provision of **regulating reserve**.

Appendices

Appendix 1 – *Frequency Ranges*

Revision History

| Date | Description |
|------------|--|
| 2018-02-01 | Revised requirements to be technology agnostic, added new requirements to define clarify proper frequency response, removed prohibition against assets located outside the ISO's balancing authority providing regulating reserve. |
| 2014-12-23 | Initial Release |

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Appendix 1 Frequency Ranges

| High Frequency Duration | | Low Frequency Duration | |
|-------------------------|----------------------|------------------------|----------------------|
| Frequency (Hz) | Time (seconds) | Frequency (Hz) | Time (seconds) |
| ≥ 61.7 | Instantaneous trip | ≤ 57.0 | Instantaneous trip |
| ≥ 61.6 | 30 | ≤ 57.3 | 0.75 |
| ≥ 60.6 | 180 | ≤ 57.8 | 7.5 |
| < 60.6 | Continuous operation | ≤ 58.4 | 30 |
| | | ≤ 59.4 | 180 |
| | | > 59.4 | Continuous operation |

