Market Rule Amendment Proposal Form

Part 1 - Market Rule Information

Identification No.:	MR-00446-R03
Subject:	Implementation of the Interim Storage Design
Title:	System Operations, Physical Markets and Settlements
Nature of Proposal:	☒ Alteration ☐ Deletion ☒ Addition
Chapter:	7, 9
Appendix:	Appendix 9.1
Sections:	Chapter 7: 2.1, 2.2, 2.3, 2.4, 3.3, 3.3A, 3.4, 3.7, 4.4, 5.2, 5.5, 6.3, 7.4, 7.5, 8.4A, 9.1, 9.2, 11.1, 11.2, 11.3, 12.1, 12.2, 19. Chapter 9: 2.1A, 2.2, 3.1, 3.3, 3.5, 3.8 Appendix 9.1; 1.5
Sub-sections proposed for amending:	Various

Part 2 - Proposal History

Version	Reason for Issuing	Version Date
1.0	Draft for Technical Panel Review and Comment	September 8, 2020
2.0	Publish for Stakeholder Review and Comment	September 16, 2020
3.0	Submitted for Technical Panel Vote	October 13, 2020
4.0	Recommended by Technical Panel; Submitted for IESO Board Consideration	October 20, 2020

Approved Amendment Publication Date:

Approved Amendment Effective Date:

Part 3 - Explanation for Proposed Amendment

Provide a brief description of the following:

- The reason for the proposed amendment and the impact on the *IESO-administered markets* if the amendment is not made.
- Alternative solutions considered.
- The proposed amendment, how the amendment addresses the above reason and impact of the proposed amendment on the *IESO-administered markets*.

Summary

The market rule changes in this proposal contain those needed in Chapter 7 - System Operations and Physical Markets and Chapter 9 - Settlements.

Chapter 7 outlines the process for registering facilities, and where applicable edits have been proposed to include electricity storage where comparable references are made to other resource types. The edits then move to outline the form of dispatch data that electricity storage facilities should submit in both the day ahead commitment process and the real time market. These requirements are replicated from those of generation facilities in the case of injections of energy and load facilities in the case of withdraws of energy. Edits are then made into the subsequent sections to include this dispatch data into the dispatch algorithm, the scheduling processes and dispatch instructions. These edits all replicate the requirements for generation or load for electricity storage. When these dispatch instructions require injections or withdraws during periods of administrative pricing, some compensation may be entitled to storage resources, similar to what is provided to generation and load, and some new clauses in section 8.4A outline how this will be determined for storage. Additions are proposed in section 9 to permit storage resources to participate in the IESO Procurement Markets. The remaining sections up to section 21 extend rules around synchronization and desynchronization procedures, reporting and notifications, and participation in the capacity auction to electricity storage resources. Section 21 is focused on the interim rules required for electricity storage participation and is included in proposal MR-00446-R04.

To extend the rights to storage that market participants have in Chapter 9 related to station service, some additional sections were required which begins the edits in Chapter 9. The remainder of Chapter 9 contains edits required to extend rules to storage related to data frequency, Congestion Management Settlement Credits, and adjustments for variations in Operating Reserve. An edit in Appendix 9.1 outlines how estimates to metering data would be developed if this data was unavailable.

Background

The IESO proposes to amend the market rules to address a specific set of barriers to the integration of energy storage resources in the IESO's markets. These barriers within the IESO's purview were identified in the December 2018 IESO report, "Removing Obstacles for Storage Resources in Ontario". Addressing these barriers required changes to both Market Rules and Market Manuals, consistent with one of the report's recommendations that the IESO "should

review and amend its market rules, where possible, to clarify the participation of storage resources in IESO-administered markets".

The IESO developed a design to integrate electricity storage resources for an interim and longer term period of time. An interim period was needed to facilitate the near term participation of electricity storage resources until the IESO's scheduling and optimization tool can recognize the unique characteristics of energy storage resources: they participate both as a load and a supply and are limited in each by its state of charge. The suite of changes in MR-00446 are designed to both clarify the participation of storage resources in the interim period and include rules that may not need to change to support the long term design.

Both the interim design for integrating electricity storage resources along with draft market rules were reviewed with stakeholders though the Energy Storage Advisory Group. Feedback has been largely supportive of the proposed amendments. Stakeholders had requested clarifications in a few sections and revisions have been made to reflect this feedback.

Discussion
Chapter 7

- 2.1; Sets out the minimum size threshold of 1 MW for electricity storage.
- 2.2; Sets out the requirements, including information requirements, for registration with the IESO, including the minimum facility size requirement for market participation. Section also sets out the requirements for registering as a self-scheduler and a commissioning facility. Note that the ability to register an electricity storage facility between 10 and 50MWs as a self-scheduler for the purposes of providing regulation is an interim provision that can be found in Chapter 7, section 21. The new section 2.2D Registration of Commissioning Electricity Storage Facilities mirrors section 2.2A for commissioning generation facilities. The other new section 2.2.9A is similar to section 2.2.9 for generation but contains some differences to refer to the interim conditions provided in Section 21.
- 2.3; Sets out the conditions that allow the IESO to refuse requests to aggregate facilities, and includes electricity storage in the types of facilities.
- 2.4; Includes electricity storage in the notification requirements of planned facility retirements through a new section 2.4.9 that is based on the existing section 2.4.8 for generation.
- 3.3; Includes section 21.6 as one of the exceptions to the rule that no market participant may make changes to dispatch data within 2 hours of dispatch.
- 3.3A; Sets out the requirements for the day ahead commitment process, the conditions for changing offers in real time, and the IESO approval of such submissions. Additions replicate what applies to dispatchable generation for electricity storage.
- 3.4; Relates to the offers to inject energy and the bids to withdraw energy, the requirements for a self-scheduler, and when an electricity storage will have either its injections or withdraws reduced to zero. Note: the interim requirement that an electricity storage participant provides bids and offers for the two units (load and

generator) that make up an electricity storage facility can be found in Chapter 7, section 21.

- 3.7A; Includes electricity storage in the requirement that a Market Participant for a self-scheduling electricity storage facility shall submit dispatch data.
- 4.4; Includes electricity storage in the inputs to how price insensitive load is met.
- 5.2; Self-scheduling electricity storage is included as a resource whose output is used to determine pre-dispatch schedules.
- 5.5; Electricity storage participants are included in those market participants who the IESO shall release schedule information to.
- 6.3; Injections and withdraws from electricity storage facilities are used by the IESO to determine the real-time schedule.
- 7.4; Requires an electricity storage participant to maintain ability to provide operating reserve if they have offered this. Note that the interim design constraints for electricity storage in providing operating reserve can be found in section 21.
- 7.5; If a registered facility has not responded to dispatch instructions, and the IESO does not believe that it will in the future, then it will represent it as a self-scheduling facility, electricity storage is included in the specific resource types referred to in this section.
- 8.4A; This section sets out compensation provided for electricity storage participants during periods of time where there is administrative pricing in effect, and the conditions for this compensation.
- 9.1; Includes electricity storage as a resource that the IESO can enter into contracts with for ancillary services.
- 11.1; Includes electricity storage into the procedures related to synchronization.
- 11.2; Sets out the process for synchronization to the IESO controlled grid for storage facilities.
- 11.3; Sets out the notification required and conditions permitted for refusal of desynchronization requests by electricity storage participants.
- 12.1; IESO is to publish forecasts of hourly electricity storage capacity, similar to what is done for generation capacity, demand, etc. Major change advisory notices are also to be published where there is a major change to this capacity.
- 12.2; Includes electricity storage as a resource when there are over or under-generation advisory notices.
- 19.10; Sets out the requirements for satisfying capacity obligations with electricity storage resources.
- 19.11; Sets out how a capacity storage resource shall participate in the IESO energy market.

Chapter 9

- 2.1A; Sets out how station service will be applied to electricity storage, including how shared connection service costs and site specific losses will be apportioned, and what conditions need to exist to qualify for reimbursement of station service.

- 2.2; Specifies the frequency in which meters must record power from a self-scheduling electricity storage facility.
- 3.1; Includes self-scheduling electricity storage into list of market participants whose quantities are provided on an hourly basis.
- 3.3; Includes self-scheduling electricity storage into formula for net energy market settlement credit (NEMSC).
- 3.5; Includes electricity storage into the formulas for determining CMSC, sets out conditions where an electricity storage facility either withdrawing or injecting may not be entitled to CMSC and allows for the recovery of CMSC where needed, including when the no-overlap rule is violated in section 21 of Chapter 7.
- 3.8; Provides the formula used to charge electricity storage participants (either withdrawing or injecting) who have offered operating reserve, but have not been able to provide the full amount for what they offered.

Appendix 9.1

- 1.5; Provides how to estimate metering data when this is necessary.

Part 4 - Proposed Amendment

Chapter 7

2.   Registration for Physical Operations

2.1 Requirements for Operating on the Grid

2.1.3   Subject to sections 2.3 and 10.2.6, no person that intends to participate in the *IESO-administered markets* or to cause or permit *electricity* or any *physical service* to be conveyed into, through or out of the *integrated power system* shall be required to register the *facility* to or from which the *electricity* or *physical service* is to be so conveyed as a *registered facility* if such *facility* is embedded within a *distribution system*, a load *facility,* ~~or~~ a *generation facility* or an *electricity storage facility* and that:

2.1.3.1   in the case of a *generation facility*, has a maximum rated *generation capacity,* net of auxiliary requirements, of less than 1 MW; ~~or~~

2.1.3.2   in the case of a *load facility*, has a maximum load capacity of less than 1 MW; ~~or~~

2.1.3.3   in the case of a *distribution system*, has a maximum load capacity of less than 1 MW or; ~~-~~

2.1.3.4   in the case of an *electricity storage facility*, has a maximum capacity for *energy* for each of injections and withdrawals, net of auxiliary requirements, of less than 1 MW.

2.2   Registered Facilities

2.2.3   The *IESO* shall approve an application for registration of a *facility* or *boundary entity* as a *registered facility* if:

2.2.3.1   the applying *market participant* submits:

a. the registration information required by this section 2.2;

b. in the case of a *facility connected* to the *IESO-controlled grid*, a copy of the *connection agreement* pertaining to the *facility* and entered into with the applicable *transmitter*; and

c. in the case of a *generation facility*, an *electricity storage facility*, ~~-~~ or a *dispatchable load facility* embedded within a *distribution system*, a copy of the *connection agreement* pertaining to the *facility* and entered into with the applicable *distributor*;

2.2.6   Where the *facility* sought to be registered is within the *IESO control area*, the information required for registration as a *registered facility* shall, subject to any lesser requirements that may be *published* by the *IESO* in respect of the information required for registration of a given class or size of *facility*, include, but not be limited to:

2.2.6.8   for a *facility* that will be subject to the *IESO's dispatch instructions*, certification that the *facility* has a minimum rated *generation capacity*, net of auxiliary requirements, or a minimum *dispatchable load* capacity, of 1 MW, or for an *electricity storage facility* an ability to inject a minimum of 1 MW and withdraw a minimum of 1 MW. Individual *facilities* or units may be aggregated to meet this minimum capacity requirement if they meet the aggregation requirements of section 2.3; and

2.2.6D   The *IESO* may request, and the *registered market participant* for a *dispatchable generation facility* or a dispatchable *electricity storage facility* shall submit to the *IESO*, the following information for ~~the~~ that ~~generation~~ facility:

- *start-up time*; and
- *minimum shut-down time*.

2.2.9A   Except as the *IESO* may authorize under section 21.3.2, a *market participant* may apply to register a *facility* as a *self-scheduling electricity storage facility* only if it:

2.2.9A.1 has an *electricity storage facility size* of 1 MW or more but less than 10 MW and meets the condition of section 2.1.3.4; or

2.2.9A.2 is a *commissioning electricity storage facility* of any capacity and that is sought to be registered pursuant to section 2.2D.

2.2.11   The *IESO* shall approve an application for registration as a *self-scheduling generation facility* or a *self-scheduling electricity storage facility* if the information required by this section 2.2 is provided and the *IESO* determines that *self-scheduling* of the *facility* will not have a material adverse effect on power system *security*.

2.2.12   A self-scheduling generation facility or a *self-scheduling electricity storage facility* whose application for facility registration has been approved by the IESO is a registered facility.

2.2D   Registration of Commissioning Electricity Storage Facilities

2.2D.1   A *market participant* may apply to register a *commissioning electricity storage facility* as a *self-scheduling electricity storage facility*, in accordance with section 2.2, for the purpose of being permitted to convey electricity or a *physical service* into, through or out of the *integrated power system* or of participating in the *real-time markets* during the period in which the *commissioning electricity storage facility* is undergoing the commissioning tests referred to in section 2.2D.4.

2.2D.2   The *IESO* shall approve an application for *facility* registration of a *commissioning electricity storage facility* as a *self-scheduling facility* if it is satisfied that the requirements of section 2.2 have been met. Any such registration shall expire upon completion by the *commissioning electricity storage unit* of the final commissioning test submitted to and approved by the *IESO* pursuant to section 2.2D.4.

2.2D.3   Upon expiry of the registration referred to in section 2.2D.2, a *market participant* shall not participate in the *real-time markets* nor cause or permit electricity or any *physical service* to be conveyed into, through or out of the *integrated power system* in respect of a former *commissioning electricity storage facility* unless such former *commissioning electricity*

storage facility has been registered as an *electricity storage facility*, other than pursuant to this section 2.2D, in accordance with section 2.2.

2.2D.4   Where a *commissioning electricity storage facility* has been registered by the *IESO* pursuant to section 2.2D.2, the *market participant* for that *commissioning electricity storage facility* shall, while such registration is in effect:

2.2D.4.1   ensure that the *commissioning electricity storage facility*:

    a.   complies with all of the provisions of these *market rules* applicable to *self-scheduling electricity storage facilities*; and

    b.   where it will seek to be registered, other than pursuant to this section 2.2D, in accordance with section 2.2 as other than a *self-scheduling electricity storage facility*, complies with all of the applicable requirements of section 7.3 of Chapter 4; and

2.2D.4.2   submit to the *IESO*, for approval and in accordance with section 2.2D.5, information detailing the commissioning test plans for the *commissioning electricity storage facility*.

2.2D.5   The detailed commissioning test plans, referred to in section 2.2D.4.2 shall be submitted to the *IESO* for approval and shall be scheduled in accordance with the procedures applicable to the *outage* coordination process described in section 6 of Chapter 5 and with any applicable *market manual* and shall include, but not be limited to:

2.2D.5.1   the time required for the *commissioning electricity storage facility* to synchronize to and de-synchronize from the *IESO-controlled grid*;

2.2D.5.2   *energy* and reactive output levels;

2.2D.5.3   the timing of and ramp rates associated with changes in *energy* and reactive output levels; and

2.2D.5.4   run-back or trip tests for the *commissioning electricity storage facility*.

2.2D.6   Except as otherwise provided in this section 2.2D, where a *commissioning electricity storage facility* has been registered by the *IESO* pursuant to section 2.2D.2, the *IESO* shall, while such registration is in effect, treat the *commissioning electricity storage facility* as a *self-scheduling electricity storage facility* for all purposes under these *market rules* including, but not limited to, the submission of *dispatch data* and *settlement*.

2.3 Aggregated Registered Facilities

2.3.2 The *IESO* shall approve an application for the aggregation of *facilities* into a single *registered facility* unless:

2.3.2.3 one or more of the facilities proposed to be aggregated is or includes a *generating* unit, an *electricity storage unit,* or a *load facility*:

a. whose *offer* or *bid* information or whose in service or out of service status affects the numerical value of operating *security limits* in any manner;

b. whose *offer* or *bid* information or whose in service or out of service status is information required by the *IESO* for conducting detailed *security* and resource adequacy assessment;

c. whose *offer* or *bid* information or whose in service or out of service status is information required to be submitted to the *market assessment unit* or the *market surveillance panel* in furtherance of their respective functions and obligations under the *Electricity Act, 1998,* the *Ontario Energy Board Act, 1998* and these *market rules*; or

d. whose *offer* or *bid* information, in service or out of service status or other information is required by *applicable law*, by *license*, by the *Ontario Energy Board* or by a *standards authority* to be submitted to or obtained by the *IESO*.

2.4 De-registration of Facilities

Planned Retirements of Generation and Electricity Storage Facilities

2.4.8 Each *generator* shall provide the *IESO* not less than six months advance notice of the commencement of the planned retirement of any one of its *generation facilities* that are *registered facilities*, including notification of any plans the *generator* may have to construct replacement *facilities* for those being retired.

2.4.9 Each *electricity storage participant* shall provide the *IESO* not less than six months advance notice of the commencement of the planned retirement of any one of its *electricity storage facilities* that are *registered facilities*, including notification of any plans the *electricity storage participant* may have to construct replacement *facilities* for those being retired.

3.3 Dispatch Data Submissions

3.3.5 Except as permitted by sections 3.3.4B, 3.3.8, 3.3.9.2, and 3.3.11, and 21.6 no *registered market participant* may, without the approval of the *IESO*,

submit revised *dispatch data* with respect to any *dispatch hour* within 2 hours of that *dispatch hour.*

3.3A   Dispatch Data Submissions for the Day-Ahead Commitment Process

3.3A.2   Subject to the standing *dispatch data* provisions of section 3.3.9, each *registered market participant* that intends its *dispatchable generation facility*, including a *generation facility* that intends to operate in *segregated mode of operation* in real-time, *dispatchable load facility*, dispatchable *electricity storage facility,* or *hourly demand response* resource to be eligible for *dispatch* by the *IESO* for a given *dispatch hour* of a *dispatch day* shall, after 06:00 EST but before 10:00 EST of the *pre-dispatch day,* submit *dispatch data* for those *dispatch hours* of the *dispatch* day including, where applicable, the daily *energy* limit for the *facility* for the *dispatch day.* The *registered market participant* may then only revise such initial *dispatch data* as permitted by this section 3.3A.

3.3A.3   If a *registered market participant* for a *dispatchable generation facility* or a dispatchable *electricity storage facility* does not provide *dispatch data* in accordance with section 3.3A.2 the *facility* shall not operate in real-time without the approval of the *IESO* under section 3.3A.12.

3.3A.9   Subject to sections 3.3A.10 and 3.3A.14, a *registered market participant* for a *dispatchable generation facility* or a dispatchable *electricity storage facility* who did submit *dispatch data* under section 3.3A.2 may revise its *offer* in real-time provided the revised *dispatch data* does not increase the number of hours offered or the offered quantity in any hour relative to the *dispatch data* submitted under section 3.3A.2. Revised *offers* which represent increases to the number of hours offered or increases to the offered quantity relative to the *dispatch data* submitted under section 3.3A.2 will require *IESO* approval. Changes to daily *energy* limits will not require *IESO* approval.

3.3A.12   The *IESO* shall approve increases to declared availability of a *dispatchable facility* if that *generation facility, electricity storage facility* or *dispatchable load facility* returns from outage earlier than planned, or if the *IESO* has solicited additional *offers* and *bids*, or if such increases will avoid an *emergency operating state* or *high-risk operating state*, or as permitted under section 3.3.6.3.

3.4 The Form of Dispatch Data

3.4.1   *Dispatch data* shall relate to a specified *dispatch hour* of the *dispatch day* and to a specified *registered facility*, shall comply with the applicable provisions of this section and sections 3.5 to 3.9 and shall take one of the following forms:

3.4.1.1   for a *dispatchable generation facility*, or a dispatchable *electricity storage facility* proposing to inject *energy* an *offer* to provide a *physical service* to the appropriate *real-time market*. *Offers* accepted result in sales in the *real-time market* only to the extent that, for the *registered market participant* submitting such *offers*, the total value of the *physical services* provided to the *real-time markets* is greater than the total value of the *physical bilateral contract quantities* notified to the *IESO* in respect of that *registered market participant* pursuant to Chapter 8;

3.4.1.2   for a *dispatchable load facility*, or a dispatchable *electricity storage facility* proposing to withdraw *energy* a *bid* to take *energy* from the *energy market*. *Bids* accepted result in purchases in the *real-time market* only to the extent that, for the *registered market participant* submitting such *bids*, the total value of the *physical services* taken from the *real-time markets* is greater than the total value of *physical bilateral contract quantities* notified to the *IESO* in respect of that *registered market participant* pursuant to Chapter 8;

3.4.1.3   for a self-scheduling generation facility or a *self-scheduling electricity storage facility*, a self-schedule for the provision of energy to the energy market. Energy actually provided by a ~~self-scheduling generation facility~~ *self-scheduling facility* results in sales in the real-time market only to the extent that, for the registered market participant designated for that ~~self-scheduling generation~~ *self-scheduling* facility, the total value of energy provided to the real-time market is greater than the total value of physical bilateral contract quantities notified to the IESO in respect of that registered market participant pursuant to Chapter 8;

3.4.4B   The *market price* of *energy*, in $/MWh, at and below which the *IESO* may instruct an *electricity storage facility* to reduce its injections of *energy* to zero shall be:

3.4.4B.1   in the case of an *electricity storage facility* other than a *self-scheduling electricity storage facility* the lowest price in any *price-quantity pair* submitted with respect to such *facility*.

Such price may be zero or negative but may not be less than negative *MMCP*.

3.4.4C   Every submission of *dispatch data* with respect to a *self-scheduling electricity storage facility* shall specify a price, in $/MWh, at and below

which the applicable *registered market participant* reasonably expects to reduce the injections of *energy* from *self-scheduling electricity storage facility* to zero. Such price may be zero or negative but may not be less than negative *MMCP*.

3.4.5   Every submission of *dispatch data* with respect to a *dispatchable load facility* or a dispatchable *electricity storage facility* proposing to withdraw *energy* shall specify a *market price* of *energy*, in $/MWh, at and above which the *IESO* may instruct the *facility* to reduce its *energy* withdrawals to zero. Such price shall not be greater than *MMCP*.

3.7A   Self-Scheduling Electricity Storage

3.7A.1   A *registered market participant* for a *self-scheduling electricity storage facility* shall submit *dispatch data* indicating the amount of *energy* that the *registered market participant* reasonably expects to be injected by that *self-scheduling electricity storage facility* in each *dispatch hour*. Such *dispatch data* shall:

3.7A.1.1 be submitted to the *IESO* in such form as may be specified by the *IESO*, including provision of the applicable information specified in Appendix 7.1; and

3.7A.1.2 comply with section 3.4.4C

3.7A.2   Subject to section 1.7 defining when the day-ahead commitment process shall function, a *registered market participant* for a *registered facility* that is a *self-scheduling electricity storage facility* shall submit *dispatch data* after 6:00 EST but before 10:00 EST of the *pre-dispatch day* in accordance with section 3.7A.1.

4.4   Inputs to the Dispatch Algorithm

4.4.2   The cost to suppliers of *energy* and *operating reserves* and the value to *dispatchable loads* of delivered electricity shall be based on the most recent valid *offers* and *bids* (including standing *dispatch data*) submitted by *registered market participants* with respect to *dispatchable generation facilities*, dispatchable *electricity storage facilities* and *dispatchable load facilities*.

4.4.3   Subject to section 4.4.3A, the price-insensitive load to be met shall be the sum of:

4.4.3.1 the net energy injections (injections minus withdrawals) by all non-dispatchable load facilities, self-scheduling generation facilities, *self-scheduling electricity storage facilities* and intermittent generators and transitional scheduling generators; and

4.4.3.2 any net amount by which the actual net injections (injections minus withdrawals) by all *dispatchable generation facilities*, dispatchable *electricity storage facilities* and *dispatchable load facilities* is less than the net amount implied by the *IESO's dispatch instructions* to such *facilities*.

5.2 Information Used to Determine Pre-dispatch Schedules

5.2.1.2 the IESO's own forecasts of non-dispatchable load, and of generation by intermittent generators, transitional scheduling generators and self-scheduling generation facilities with name-plate ratings of less than 10 MW and *self-scheduling electricity storage facilities* with an *electricity storage facility size* of less than 10 MW;

5.5 Release of Pre-dispatch Schedule Information

5.5.2 For each registered facility that is a boundary entity, a dispatchable load facility, a dispatchable generation facility, a dispatchable *electricity storage facility,* or an hourly demand response resource in respect of which a valid bid or offer for at least one dispatch hour of the applicable dispatch day has been submitted, the IESO shall release the following information only to the registered market participant for that registered facility:

5.5.2.1 the pre-dispatch schedule for that registered facility;

5.5.2.2 the projected market schedule for that *registered facility*; and

5.5.2.3 [Intentionally left blank]

5.5.2.4 any requirement of that *registered facility* to submit an *offer* or *bid* under a *reliability must-run contract* and the expected scheduled use of that *registered facility* under *contracted ancillary service* contracts.

6.3 Determining the Real-Time Schedule

6.3.1 The *IESO* shall use the information described in section 6.2 and the *dispatch algorithm* to determine a *real-time schedule* for each *dispatch interval* as follows:

6.3.1.4 the output level of each generator, and each *electricity storage facility,* and the withdrawal levels of each *dispatchable load,* and of *non-dispatchable*

Public

loads, and *electricity storage facility* at the beginning of the *dispatch interval* shall be set at the *IESO's* best estimate of their actual values, as determined from real-time system data or the *real-time schedule* for the preceding *dispatch interval*; and

7.4 IESO Dispatch of Operating Reserve

7.4.2   Each *registered facility* to which section 7.4.1 applies shall maintain unused *generation* (or load reduction) *capacity, electricity storage capacity,* or load reduction capacity during that *dispatch interval*, consistent with the *dispatch instructions* issued to it under these *market rules*, so as to be able to increase *energy* production (or decrease *energy* withdrawal) as soon as possible upon being instructed to do so by the *IESO* pursuant to section 7.4.3.

7.5 Compliance with Dispatch Instructions

7.5.6   If the *IESO* declares a *registered facility* other than a *boundary entity* to be non-conforming under section 7.5.4:

7.5.6.3   if the *IESO* is not satisfied that the *registered facility* will respond to future *dispatch instructions*, the *IESO* may direct the *registered facility* to follow, as closely as practicable, an output or withdrawal profile specified by the *IESO*, and shall thereafter represent the *registered facility* as a *self-scheduling generation facility, self- scheduling electricity storage facility* or *non-dispatchable load* having the specified profile until the non-conforming *registered facility* satisfies the *IESO* that it has remedied the conditions causing the non-conformance.

8.4A   Administrative Pricing and Corresponding Schedules – Revised

Additional Compensation for Complying with Dispatch Instructions

8.4A.9   Where the *IESO* has established an *administrative price* pursuant to sections 8.4A.6 and 8.4A.8.2 and subject to any materiality limits published in the applicable *market manual*,

8.4A.9.1 a *market participant* with a *generation facility* that has complied with *dispatch instructions* issued by the *IESO* shall be entitled to additional compensation determined under section 8.4A.10~~.~~; ~~and~~

8.4A.9.2 a *market participant* with a *dispatchable load facility* shall be entitled to additional compensation on those consumption amounts where their *bid* price is less than the *administrative price,* equal to the difference between its applicable *bid* price and the *administrative price* multiplied by those consumption amounts if:

- the *market participant's bid* price, for the level of consumption to which it was dispatched, is less than the *administrative price;*

- the *market participant* has complied with *dispatch instructions* issued by the *IESO*; and

- the *market participant* issues to the *IESO* a *notice of disagreement* in accordance with section 6.6 of Chapter 9; ~~, and~~

8.4A.9.3 a *market participant* with an *electricity storage facility* that injected *energy* into the *electricity system* shall be entitled to additional compensation on those injection amounts where its *offer* price is greater than the *administrative price*, equal to the difference between its applicable *offer* price and the *administrative price* multiplied by those injection amounts if;

- the *market participant's offer* price, for the level of injection to which it was dispatched, is greater than the *administrative price;*

- for the *dispatch hour,* where both *energy offers* and *bids* are submitted for the same *electricity storage facility*, these *energy offers* and *bids* were submitted in accordance with section 21.4.2 of this Chapter;

- the *market participant* has complied with the *dispatch instruction* for the *dispatch interval* to which the *administrative price* applies; and

- the *market participant* issues to the *IESO* a *notice of disagreement* in accordance with section 6.6 of Chapter 9; and

8.4A.9.4 a *market participant* with an *electricity storage facility* that withdrew *energy* from the *electricity system* shall be entitled to additional compensation on those withdrawal amounts where its *bid* price is less than the *administrative price*, equal to the difference between its applicable *bid* price and the *administrative price* multiplied by those consumption amounts if:

- the *market participant's bid* price, for the level of withdraws to which it was dispatched, is less than the *administrative price;*

- for the *dispatch hour,* where both *energy offers* and *bids* are submitted for the same *electricity storage facility,* these *energy offers* and *bids* were submitted in accordance with section 21.4.2 of this Chapter;

- the *market participant* has complied with the *dispatch instruction* for the *dispatch interval* to which the *administrative price* applies; and

- the *market participant* issues to the *IESO* a *notice of disagreement* in accordance with section 6.6 of Chapter 9;

and the *IESO* shall recover any such compensation amounts in accordance with section 4.8 of Chapter 9.

8.4A.9B If the *energy market* is suspended and no *offer* prices are available to make the determination in section 8.4A.9.3 that an *offer* price is greater than the *administrative price,* a *market participant* with an *electricity storage facility* shall provide to the *IESO* evidence that its average historical *offer* price is greater than the *administrative price.* Average historical *offer* prices shall be determined for each interval from the corresponding interval from each of the four most recent *business days* or non-*business days,* as the case may be, prior to the event that gave rise to the *administrative price.*

8.4A.9C If the *energy market* is suspended and no *bid* prices are available to make the determination in section 8.4A.9.4 that a *bid* price is less than the *administrative price,* a *market participant* with an *electricity storage facility* shall provide to the *IESO* evidence that its average historical *bid* price is less than the *administrative price.* Average historical *bid* prices shall be determined for each interval from the corresponding interval from each of the four most recent *business days* or non-*business days,* as the case may be, prior to the event that gave rise to the *administrative price.*

Dispatchable Generator, Electricity Storage Facility while Injecting, and Import:

Compensation = (-1) * OP(EMPh m,t*, AQEI k,h m,t* , BE)

Where:

t* = *metering interval* of administrative price period

$EMP_h{}^{m,t*}$ is the administrative price in the metering interval t* of settlement hour h

OP is the profit function as described in Chapter 9, Section 3.5.2

Dispatchable Load, Electricity Storage Facility while Withdrawing and Export:

Compensation $= OP(EMP_h{}^{m,t*}, AQEW_{k,h}{}^{m,t*}, BL)$

Where:

t* = *metering interval* of administrative price period

$EMP_h{}^{m,t*}$ is the administrative price in the metering interval t* of settlement hour h

OP is the profit function as described in Chapter 9, Section 3.5.2

9. IESO Procurement Markets

9.1 Introduction

9.1.1   The *IESO* shall procure, primarily through contracts, certain *physical services* that are needed to maintain *reliable* system operations but that are not offered in the *real-time markets*. The *IESO* may also enter into contracts allowing it to direct the operations of specific *generation facilities, electricity storage facilities* or *load facilities* that are critical to system *reliability* under certain conditions. This section 9 describes such *physical services* and the manner in which the *IESO* shall procure them.

9.2 Definition of Contracted Ancillary Services

9.2.2   The principal *contracted ancillary services* that the *IESO* will procure pursuant to section 9.2.1 are:

9.2.2.1   *regulation*: this *ancillary service* allows total system generation to match total system load (plus losses) minute-by-minute or even second-by-second as required on an electricity grid;

9.2.2.2   *voltage control* and *reactive support*: this *ancillary service* involves the control and maintenance of prescribed voltages at specific locations, using

defined reactive capacity, *energy* and manoeuvrability to support system operations. *Reactive support* is provided by *generation units, electricity storage units* as well as by synchronous condensers, capacitors and other electrostatic equipment that is often owned and operated by *transmitters*; and

9.2.2.3 *black start capability*: this *ancillary service* involves *generation facilities* that are tested and/or assessed for their ability to be a *certified black start facility*, and from which the *IESO* may direct the delivery of power without assistance from the electrical system.

11. Generator and Electricity Storage Participant Synchronization Procedures

11.1 Introduction

11.1.1 No *generator* or *electricity storage participant*:

11.1.1.1 may physically *connect* and synchronize to the *IESO-controlled grid* or de-synchronize and *disconnect* from the *IESO-controlled grid*; or

11.1.1.2 if an *embedded generator* or *embedded electricity storage participant* may physically *connect* and synchronize to the embedding *facility* or de-synchronize and *disconnect* from the embedding *facility*,

11.1.4 All *electricity storage facilities* located within *the IESO control area* are subject to the provisions of this section 11 except for *self-scheduling electricity storage facilities* with an *electricity storage facility size* of less than 10 MW, any *electricity storage facilities* classified as *minor electricity storage facilities* or as *small electricity storage facilities*, *electricity storage facilities* that, for the purposes of the application of the provisions of this section 11, have been designated by the *IESO* as not impairing the ability of the IESO to maintain the security or adequacy of the *electricity system.*

11.2 Process for Synchronization

11.2.1 A *generator* or *electricity storage participant* that intends to synchronize a *generation unit* or *electricity storage unit* to the *IESO-controlled grid* or embedding *facility*, as the case may be, must notify the *IESO* at least two hours in advance of the intended synchronization time unless an under-

generation system advisory notice is in force, in which case the *IESO* may reduce the required notification time to that specified in the system advisory notice.

11.2.2   If a *generator* or *electricity storage participant* does not advise the *IESO* at least two hours in advance of synchronization, or any shorter interval allowed by an under-generation system advisory notice, the *IESO* may approve synchronization only if, in the *IESO*'s judgement, synchronization will not impair the ability of the *IESO* to maintain the *security* or *adequacy* of the *electricity system.*

11.2.3   The *IESO* shall notify the *generator* or *electricity storage participant* of the *IESO*'s acceptance or rejection of the *generation unit's* or *electricity storage unit's* synchronization plans within 5 minutes of receiving such plans. In the event that the *IESO* does not approve synchronization, the *registered market participant* responsible for the *registered facility,* of which the *generation unit* or *electricity storage unit* is a part, must revise its *dispatch data* in accordance with section 3.

11.2.4   Receipt by the *generator* or *electricity storage participant* of notification of acceptance by the *IESO* under section 11.2.3 gives the *generator* or *electricity storage participant* the right to synchronize the *generation unit* or *electricity storage unit* to the *IESO-controlled grid* or the embedding *facility*, as the case may be. This right does not preclude the *IESO* from requiring de-synchronization of a *generation unit* or *electricity storage unit* in the event of over-generation in accordance with any applicable provisions of these *market rules* relating to over-generation.

11.2.5   The exact time of synchronization shall be subject to directions from the *IESO* and to the terms and conditions specified in the *generator's* or *electricity storage participant's* connection agreement or, in the case of an *embedded generation unit* or *embedded electricity storage unit* its connection agreement, in such form as may be prescribed by the *OEB*, with the *distributor* with whom it is *connected.*

11.2.6   Each *generator* or *electricity storage participant* shall notify the *IESO* of any revisions to its synchronization plans without delay. Upon receipt of such notice, the *IESO* shall re-assess any prior acceptance of a synchronization plan and shall notify the *generator* or *electricity storage participant* accordingly.

11.3   Process for De-synchronization

11.3.1   A *generator* or *electricity storage participant* intending to de-synchronize a *generation unit* or *electricity storage unit* from the *IESO-controlled grid* or embedding *facility*, as the case may be shall notify the *IESO* 1 hour in

advance of the intended de-synchronization time, unless a system advisory notice for over-generation is in effect, in which event the *generation unit or electricity storage unit* may de-synchronize at will subject to the conditions of the system advisory notice.

11.3.2 If a *generator or electricity storage participant* does not advise the *IESO* at least 1 hour prior to its planned de-synchronization, or any shorter interval allowed by an over-generation system advisory notice, the *IESO* may approve de-synchronization only if, in the *IESO*'s judgement, the unit's de-synchronization will not impair the ability of the *IESO* to maintain the *security* or *adequacy* of the *electricity system*.

11.3.3 The *IESO* shall approve any request to de-synchronize unless:

11.3.3.1 the *generation unit or electricity storage unit* is operating under the provisions of a *reliability must-run contract* and the *IESO* has directed it to operate;

11.3.3.2 the *IESO* requires the *generation unit or electricity storage unit* to remain synchronized to maintain the *security* or *adequacy* of the *electricity system*; or

11.3.3.3 an under-generation system advisory notice is in force.

11.3.4 The *IESO* shall notify the *generator or electricity storage participant* of the *IESO*'s acceptance or rejection of the *generation unit's or electricity storage unit's* de-synchronization plans within 5 minutes of receiving such plans.

11.3.5 The exact time of de-synchronization shall be subject to directions from the *IESO* and to the terms and conditions specified in the *generator's or electricity storage participant's connection agreement* or, in the case of an *embedded generation unit, or embedded electricity storage unit* its connection agreement, in such form as may be prescribed by the *OEB*, with the *distributor* with whom it is *connected*.

11.3.6 Receipt by the *generator or electricity storage participant* of notification of acceptance by the *IESO* under section 11.3.4 gives the *generator or electricity storage participant* the right to commence shut-down of the *generation unit electricity storage unit*.

11.3.7 Each *generator or electricity storage participant* shall notify the *IESO* of any revisions to its de-synchronization plans without delay. Upon receipt of such notice, the *IESO* shall re-assess any prior acceptance of a de-synchronization plan and shall notify the *generator or electricity storage participant* accordingly.

12. Status Reports, Advisories, and Protocols

12.1 IESO System Status Reports and Advisory Notices

12.1.1 The *IESO* shall *publish*, in addition to the daily assessments specified in section 7.3.1.4 of Chapter 5, system status reports to:

12.1.1.6 provide forecasts, with respect to each *dispatch day*, as projected for future *dispatch hours* and as estimated for the current *dispatch hour*, where appropriate, of expected hourly *demand*, *generation capacity*, *electricity storage capacity*, *energy* capability of *generation facilities*, exports and imports of *energy*, and *operating reserve* requirements, *published* at the following times:

12.1.3 If required, the *IESO* shall *publish*, in accordance with the applicable *market manual*, advisory notices as follows:

12.1.3.1 a major change advisory if a major change in expected *generation capacity, electricity storage capacity* or *transmission capacity* has occurred since the last system status report was issued;

12.2 Over-Generation and Under-Generation Advisories

12.2.2 If the *IESO* issues an under-generation system advisory notice pursuant to section 12.1.3, the *IESO* shall, unless the *IESO* determines that it is not able to do so for operational or system security reasons, and notwithstanding any notification requirements or other conditions specified elsewhere in these *market rules*:

12.2.2.1 solicit and accept additional or revised *bids* from *dispatchable loads and electricity storage facilities* that will reduce load in response to higher prices;

12.2.2.2 allow *generators or electricity storage facilities* to synchronize to the *IESO-controlled grid* or the embedding *facility*, as the case may be, without penalty, some or all of the *generation units or electricity storage units* within any *registered facility* in locations designated by the *IESO*; and/or

12.2.2.3 solicit and accept additional or revised *offers* from *generators, electricity storage participants* or *wholesale sellers* that will increase generation resources *or injections of energy* in response to higher prices, in locations designated by the *IESO*.

19. Capacity Market Participants with Capacity Obligations

19.10 Eligibility Requirements for Capacity Storage Resources

19.10.1 A *capacity market participant* is eligible to satisfy its *capacity obligation* with a *capacity storage resource* provided that the *capacity market participant*:

19.10.1.2 is a registered *market participant* authorized as an ~~electricity storage participant~~ *electricity storage participant* in accordance with the applicable *market manual;*

19.10.1.3 registers its *facilities* in accordance with the registration requirements applicable to ~~generation~~ *electricity storage facilities*. The *capacity market participant* shall not modify, vary or amend in any material respect any of the features or specifications of any *facility* without first requesting *IESO* authorization and approval in accordance with the applicable *market manual;*

19.11 Energy Market Participation for Capacity Storage Resources

Dispatch of Capacity Storage Resources

19.11.2 The *IESO* shall schedule a *capacity storage resource* as it would a~~n~~ *electricity storage* ~~generation~~ *facility* in the *energy market,* and issue *dispatch instructions* in accordance with Chapter 7.

19.11.3 A *capacity storage resource* ~~that is participating as a *generation facility*~~ shall comply with *IESO dispatch instructions* in accordance with Chapter 7.

Outage Notification Requirements for Capacity Storage Resources

19.11.5 Each *capacity storage resource* shall comply with ~~the~~ its *outage* notification requirements ~~of a *generation facility*~~ as outlined in Chapter 5.

Chapter 9

2.1A   Station Service

2.1A.6   For greater certainty, nothing in section 2.1A.4 shall be construed as permitting the apportionment of *connection service* and site specific losses to a *market participant* in respect of a *facility* that is an *embedded load facility* or an *embedded generation facility*, or an *embedded electricity storage facility*.

2.1A.7   Subject to section 2.1A.9, where *metering data* from a *metering installation* does not reflect the amount of *energy* injected by a *generation unit* passing through the *metering installation* net of all applicable *generation station service*, the costs associated with *generation station service* shall, for *settlement* purposes, be apportioned:

2.1A.7.1   amongst those *generation units* consuming such *generation station service* in the proportions provided by the *metering service provider* for the relevant *metering installation*; or

2.1A.7.2   where the *metering service provider* has not provided the proportions referred to in section 2.1A.7.1, equally amongst all such *generation units*,

provided that, in either case such apportionment results in a totalization of the applicable *RWMs* that is identical to the totalization of the *meters* required to meet the monitoring requirements of section 7.3, 7.3A, 7.4, 7.5 or 7.6, as the case may be, of Chapter 4.

2.1A.7A   Subject to section 2.1A.9A, where *metering data* from a *metering installation* does not reflect the amount of *energy* injected by an *electricity storage unit* passing through the *metering installation* net of all applicable *electricity storage station service*, the costs associated with *electricity storage station service* shall, for *settlement* purposes, be apportioned:

2.1A.7A.1   amongst those *electricity storage units* consuming such *electricity storage station service* in the proportions provided by the *metering service provider* for the relevant *metering installation*; or

2.1A.7A.2   where the *metering service provider* has not provided the proportions referred to in section 2.1A.7A.1, equally amongst all such *electricity storage units*,

provided that, in either case such apportionment results in a totalization of the applicable *RWMs* that is identical to the totalization of the *meters* required to meet the

monitoring requirements of section 7.3, 7.3A, 7.4, 7.5 or 7.6, as the case may be, of Chapter 4.

2.1A.9A If the consumption of *electricity storage station service* results in:

2.1A.9A.1   an allocated quantity of *energy* withdrawn or AQEW, as described in section 3.1.9, accruing at the location of an *electricity storage unit* which is part of an eligible *electricity storage facility* within the meaning of section 2.1A.13A in circumstances where the injection of *energy* by that *electricity storage facility* as a whole exceeds the withdrawal of *energy* by that *electricity storage facility* as a whole during a given *metering interval*; and

2.1A.9A.2   such accrual of AQEW results in *hourly uplift,* non-hourly *settlement amounts,* or both, accruing at the location referred to in section 2.1A.9.1 during any *metering interval* within an *energy market billing period,*

the *metered market participant* for that *electricity storage facility* shall, subject to section 2.1A.10, be reimbursed the *hourly uplift* and non-hourly *settlement amounts* referred to in section 2.1A.9A.2.

2.1A.10   No reimbursement will be provided to a *metered market participant* pursuant to section 2.1A.9 or 2.1A.9A in respect of amounts attributable to the following:

2.1A.13A For the purposes of section 2.1A.9A.1, an *electricity storage facility* may be designated by the *IESO* as an eligible *electricity storage facility* where the *electricity storage facility*:

2.1A.13A.1   is comprised of two or more *registered facilities* that have the same metered market participant;

2.1A.13A.2   is located within the *IESO control area*; and

2.1A.13A.3   has associated with it *electricity storage station service* that serves more than one *registered facility* included within that *electricity storage facility.*

2.1A.14   The *IESO* shall recover any amount reimbursed pursuant to section 2.1A.9 or 2.1A.9A described in section 4.8.1.6.

2.2 Metering Data Recording and Collection Frequency

2.2.2   A RWM that serves only *non-dispatchable load*, *self-scheduled generation facilities*, *self-scheduling electricity storage facilities*, *transitional scheduling generators* or *intermittent generators* need not record any *metering data* regarding *energy* (in MWh) or reactive energy (in MVARh) for *metering intervals* but must record such *metering data* for each *settlement hour*. *Metering data* regarding demand or power (in MW) shall be recorded by such *RWMs* for such intervals as the IESO may specify in the applicable *market manual*.

3.   Determination of Hourly Settlement Amounts

3.1   Hourly Settlement Variables and Data

3.1.9   The *IESO* shall determine the following allocated physical quantities for each *market participant* for each *primary RWM* and each *intertie metering point* using *metering data*, *operating results* and *interchange schedule data*. If physical quantities are provided only for each *settlement hour* (as they may be for *interchange schedules*, *non-dispatchable loads*, *self-scheduled generation facilities*, *self-scheduling electricity storage facilities*, *transitional scheduling generators* and *intermittent generators*), the *IESO* shall, if necessary for *settlement* purposes, determine the interval amounts defined below by dividing the hourly amounts into twelve equal interval amounts:

3.3   Hourly Settlement Amounts in the Real-Time Energy Market

3.3.2.2   in respect of a *non-dispatchable load facility*, a *self-scheduling generation facility*, a *self-scheduling electricity storage facility*, a *transitional scheduling generator* or *intermittent generator*.

$$NEMSC_{k,h} = HOEP_h \times \Sigma_{t,m} (AQEI_{k,h}^{m,t} - AQEW_{k,h}^{m,t} + \Sigma_s BCQ_{s,k,h}^{m,t})$$
$$- \Sigma_{n,b,t} (EMP_h^{n,t} \times BCQ_{k,b,h}^{n,t})$$

where:

m = all *RWMs* relating to a *non-dispatchable load facility,* a *self-scheduling generation facility,* a *self-scheduling electricity storage facility,* -a *transitional scheduling generator* or *intermittent generator*

n = all *RWMs* and *intertie metering point*s

s = all *selling market participant*s

b= all *buying market participants*

t = all *metering interval*s in *settlement hour* 'h'

3.5 Hourly Settlement Amounts for Congestion Management

3.5.1A   A *registered market participant* for a *registered facility* that is a *dispatchable load* or an *electricity storage facility* withdrawing *energy* is not entitled to a congestion management *settlement* credit determined in accordance with section 3.5.2 where that *registered facility's* DQSW is less than the corresponding MQSW at that location for the same *metering interval* as the result of that *registered facility's* own equipment or operational limitations, if:

3.5.1A.1   that *registered facility* does not fully or accurately respond to its *dispatch instructions*; or

3.5.1A.2   the ramping capability of that *registered facility*, as represented by the ramp rate set out in the *offers* or *bids,* is below the threshold for the *IESO* to modify *dispatch instructions* and thereby prevents changes to the *dispatch*;

and then the *IESO* may withhold or recover such congestion management *settlement* credits and shall redistribute any recovered payments in accordance with section 4.8.2 of Chapter 9.

3.5.1D   A *registered market participant* for a *registered facility* that is a *dispatchable load* or an *electricity storage facility* withdrawing energy, shall not be entitled to a congestion management *settlement* credit determined in accordance with section 3.5.2 for *settlement hour* 'h' where:

3.5.1G   A *registered market participant* for a *registered facility* that is a *dispatchable generation facility* or an *electricity storage facility* injecting *energy,* shall not be entitled to a congestion management *settlement* credit determined in accordance with section 3.5.2 for any *dispatch interval 't'* within *settlement hour* 'h' where:

3.5.2   Subject to sections 3.5.1A, 3.5.1D, 3.5.1E, 3.5.1F, 3.5.1G, 3.5.6, 3.5.6A, 3.5.6B, 3.5.6C, 3.5.6D, 3.5.6F, 3.5.9, 3.5.10 and 3.5.11 and subject to Appendix 7.6 of Chapter 7, the hourly congestion management *settlement* credit for *market participant* 'k' for *settlement hour* 'h' ("$CMSC_{k,h}$") shall be determined by the following equation:

Let 'BE' be a matrix of n *price-quantity pairs* offered by *market participant* 'k' to supply *energy* during *settlement hour* 'h'

Let 'BR_r' be a matrix of n *price-quantity pairs* offered by *market participant* 'k' to supply class r *operating reserve* during *settlement hour* 'h'

Let 'BL' be a matrix of n *price-quantity pairs* bid by *market participant* 'k' to withdraw *energy* by a *dispatchable load* or an *electricity storage facility* during *settlement hour* 'h'

$OPL_{k,h}$ represents that component of the congestion management *settlement* credit for *market participant* 'k' during *settlement hour* 'h' attributable to a constraint on the withdrawal of *energy* by a *dispatchable load* or an *electricity storage facility* subject to section 3.5.1. $OPL_{k,h}$ utilizes the negative of each output from each component Operating Profit (OP) function so as to correct for negative revenue streams (owing to withdrawals of *energy*).

3.5.6   The *IESO* shall adjust, in the matrices specified in section 3.5.2 and for the purposes of determining the applicable congestion management *settlement* credit payments, any *offer price* that:

3.5.6.1   is associated with a *generation facility*, an injecting *electricity storage facility,* or is associated with an injecting *boundary entity*; and

3.5.6.2   is less than a specified lower limit where such limit is the lesser of 0.00 $/MWh and the *energy market price* for the applicable *dispatch interval*;

to that lower limit.

3.5.6A   The *IESO* may adjust, in the matrices specified in section 3.5.2 and for the purposes of determining the applicable congestion management *settlement* credit payments, any *bid* price that:

3.5.6A.1   is associated with a *dispatchable load facility* or is associated with a withdrawing *boundary entity* or a withdrawing *electricity storage facility*;

3.5.6C   A *registered market participant* for a *registered facility* that is a *dispatchable generation facility* *or a dispatchable electricity storage facility that can inject* who, for *settlement hour* 'h':

- is unable to comply with a *dispatch instruction* under section 7.5.3 of Chapter 7, to prevent endangering the safety of any person, equipment damage, or violation of any *applicable law*; and/or

- requests that the *IESO* apply a constraint to the *dispatchable generation facility* *or the dispatchable electricity storage facility that can inject* to prevent endangering the safety of any person, equipment damage, or violation of any *applicable law*, excluding constraints applied under Chapter 7 sections 6.3A.2 or 6.3A.4;

3.5.6E   The IESO may recover congestion management settlement credits or ramp-down settlement amounts in accordance with sections 3.5.6B, 3.5.6C and 3.5.6D *and Section 21.5 of Chapter 7*. In this situation, the IESO shall:

- notify the market participant of its intent to recover that congestion management settlement credit or ramp-down settlement amount; and

- notify the market participant of the time, which shall not be less than five business days from the date of receipt of the notice, within which the market participant may make written representations in response to the IESO's intent.

3.8   Hourly Settlement Amounts for Operating Deviations

3.8.2   An *operating reserve* shortfall *settlement* debit may be assessed on any *market participant* 'k' responsible for a *registered facility* at *RWM* m, which will be *registered facility* "k/m" for the purpose of this section 3.8.2 and of section 3.8.4, that is scheduled by the *IESO* to provide *class r reserve* of class 1 or 2 (i.e., *ten-minute reserve* or *thirty-minute reserve*) and then fails to provide *energy* from that class of *operating reserve* when instructed to do so by the *IESO* according to these *market rules*. The amount of *market participant* 'k's *operating reserve* shortfall *settlement* debit for *class r reserve* for *settlement hour* 'h' ("$ORSSD_{k,r,h}$") is determined as follows:

3.8.2.1   the *energy* shortfall fraction for *class r reserve* for *registered facility* k/m in *metering interval* 't' of *settlement hour* 'h' ("$ORESF_{k,r,h}^{m,t}$") is defined as follows:

where *operating reserve* is provided from a *generator*, *or from an electricity storage participant* injecting *energy*:

$$ORESF_{k,r,h}{}^{m,t} \quad = \quad MAX\ [(SE_{k,h}{}^{m,t} - AQEI_{k,h}{}^{m,t})/SE_{k,h}{}^{m,t},\ 0]$$

where *operating reserve* is provided from a *dispatchable load* or from an *electricity storage participant* withdrawing *energy*:

$$ORESF_{k,r,h}{}^{m,t} \quad = \quad MAX\ [(AQEW_{k,h}{}^{m,t} - SE_{k,h}{}^{m,t})\ /\ AQEW_{k,h}{}^{m,t},\ 0]$$

Appendix 9.1

1.5 Validation, Estimation and Editing: Main/Alternate Metering Installation

1.5.8 For the purposes of section 1.5.7.2, where the *metering data*:

1.5.8.1 relates to a *generation facility*, the *metering data* for the interval recording the lowest quantity shall be used for estimation; ~~and~~

1.5.8.2 relates to a *load facility*, the *metering data* for the interval recording the highest quantity shall be used for estimation;

1.5.8.3 relates to the injections for an *electricity storage facility*; the *metering data* for the interval recording the lowest quantity shall be used for estimation; and

1.5.8.4 relates to the withdrawals for an *electricity storage facility*, the *metering data* for the interval recording the highest quantity shall be used for estimation.