Final Alignment Supplementary: Incremental Amendments

Incremental Amendments from Provisionally Approved baseline	
Title:	Chapter 0.9 – Market Settlements, Market Billing and Funds Administration
Current Market Rules Baseline:	
This document shows only excerpts from sections that have been revised since the Technical Panel provisionally recommended/IESO Board provisionally approved version with tracked changes. For the full version of this and other chapters, refer to the market rule amendment proposal documents (MR-00481-R00-R12).	

Introduction

A.1 Chapter Scope and Operation

A.1.1 This Chapter is part of the *renewed market rules,* which pertain to:

A.1.1.1 the period prior to a *market transition* insofar as the provisions are relevant and applicable to the rights and obligations of the *IESO* and *market participants* relating to preparation for operation in the *IESO administered markets* following commencement of *market transition;* and

A.1.1.2 the period following commencement of *market transition* in respect of all the rights and obligations of the *IESO* and *market participants.*

A.1.2 All references herein to chapters or provisions of the *market rules* will be interpreted as, and deemed to be references to chapters and provisions of the *renewed market rules.*

A.1.3 Upon commencement of the *market transition*, the *legacy market rules* will be immediately revoked and only the *renewed market rules* will remain in force.

A.1.4 For certainty, the revocation of the *legacy market rules* upon commencement of *market transition* does not:

A.1.4.1 affect the previous operation of any *market rule* or *market manual* in effect before the *market transition*;

A.1.4.2 affect any right, privilege, obligation or liability that came into existence under the *market rules* or *market manuals* in effect prior to the *market transition*;

A.1.4.3 affect any breach, non-compliance, offense or violation committed under or relating to the *market rules* or *market manuals* in effect prior to the *market transition*, or any sanction or penalty incurred in connection with such breach, non-compliance, offense or violation

A.1.4.4 affect an investigation, proceeding or remedy in respect of,

(a) a right, privilege, obligation or liability described in subsection A.1.4.2, or

(b) a sanction or penalty described in subsection A.1.4.3.

A.1.5 An investigation, proceeding or remedy described in subsection A.1.4.3 may be commenced, continued or enforced, and any sanction or penalty may be imposed, as if the *legacy market rules* had not been revoked.

B.1 Exceptions

B.1.1 Following a *market transition*, if the registration status of *price responsive load* is unavailable for any reason, including software inadequacy, the *IESO* shall, notwithstanding anything to the contrary in this MR Ch.9, conduct the *settlement process* in a manner which treats *self-scheduling storage resources* that are registered to withdraw, which would otherwise be *settled* in the same manner as *price responsive loads*, as *non-dispatchable loads*.

B.1.2 Notwithstanding section 6.3.14, the applicable timeline to notify the *IESO* of any errors or omissions in a *preliminary settlement statement* shall be as follows:

(a) Upon commencement of *market transition*, the applicable timeline to notify the *IESO* of any such errors or ommissions in accordance with section 6.8 shall be ten *business days;* and

(b) Commencing 8 months after the first calendar day of the month in which the *market transition completion date* occurs, and for a period of 6 months, the applicable timeline to notify the *IESO* of any such errors or ommissions in accordance with section 6.8 shall be eight *business days.*

For greater certainty, this provision does not alter the timelines set out in section 6.3.3, and following the operation of section (b), the relevant timelines will return to as they are stated in section 6.3.14.

2 Settlement Data Collection and Management

2.1 Metering and Metering Responsibilities

2.1.5 The *IESO* shall be responsible for *metering data* and its allocation for all *intertie metering points*. The *IESO*, in accordance with ~~-~~*interconnection agreements* ~~with other *control areas*~~, shall:

2.1.5.1 to the extent required to fulfill its obligations under this Chapter, interpret and apply the protocols governing *interconnections* between the *IESO-controlled grid* and other *control areas*;

2.1.5.2 provide to the *settlement process* the *interchange schedule data* described in section 2.6; and

2.1.5.3 determine the allocated quantities called for by section 8 ~~3.1.9~~ of Appendix 9.2 based on scheduled *intertie* flows even when these differ from actual flows as determined by *metering data*.

2.2 Station Service

2.2.4.2 where the *energy* consumption associated with *connection station service* is not included in the *energy* consumption measured by a *registered wholesale meter*, the sum of the *energy* associated with that *connection station service* and with site specific losses shall be apportioned:

a. amongst those *market participants* whose ~~*facilities*~~*resources* are ~~connected to~~associated with the relevant *connection facility* in the proportions provided by the *metering service provider* for each *registered wholesale meter* measuring the flow of *energy* taken from the *connection facility*. The proportions provided by each *metering service provider* shall reflect agreement amongst all applicable *metering service providers* and shall only be accepted by the *IESO* if the proportions provided by all applicable *metering service providers* sum to one. The provision of such proportions shall constitute certification by each such *metering service provider* that it has reached agreement with all other applicable *metering service providers* in respect of such proportions; or

b. where one or more of the *metering service providers* referred to in section 2.2.4.2(a) has not provided the *IESO* with the proportions referred to in that section, amongst those *market participants* whose

~~facilities~~resources are ~~connected to~~associated with the relevant *connection facility* on the basis of the number of *load serving breakers* serving each such *market participant*.

2.2.9 Subject to section 2.2.12, where *metering data* from a *metering installation* does not reflect the amount of *energy* injected by a *generation* ~~unit~~*resource* 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:

2.2.9.1 amongst those *generation* ~~units~~*resources* consuming such *generation station service* in the proportions provided by the *metering service provider* for the relevant *metering installation*; or

2.2.9.2 where the *metering service provider* has not provided the proportions referred to in section 2.2.9.1, equally amongst all such *generation* ~~units~~*resources*,

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

2.2.10 Subject to section 2.2.13, where *metering data* from a *metering installation* does not reflect the amount of *energy* injected by an *electricity storage* ~~unit~~*resource* 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:

2.2.10.1 amongst those *electricity storage* ~~units~~*resources* consuming such *electricity storage station service* in the proportions provided by the *metering service provider* for the relevant *metering installation*; or

2.2.10.2 where the *metering service provider* has not provided the proportions referred to in section 2.2.10.1, equally amongst all such *electricity storage* ~~units~~*resources*,

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

2.2.11 A *metering service provider* who provides the *IESO* with proportions pursuant to section 2.2.9.1 may submit up to two requests in a calendar year to the *IESO* to have such proportions revised, provided that the giving of effect to such revisions shall be subject to the mutual agreement of the *metering service provider* and the *IESO*.

2.2.12 If the consumption of *generation station service* results in:

2.2.12.1 an allocated quantity of *energy* withdrawn or AQEW, as described in section 8 of Appendix 9.2, accruing at the ~~location~~*delivery point* of a *generation* ~~*unit* which is part of~~*resource* associated with an eligible *generation facility* within the meaning of section 2.2.15 in circumstances where the injection of *energy* by that *generation facility* as a whole exceeds the withdrawal of *energy* by that *generation facility* as a whole during a given *metering interval*; and

2.2.12.2 such accrual of AQEW results in *hourly uplift*, non-hourly uplift *settlement amounts*, or both, accruing at the ~~location~~*delivery point* referred to in section 2.2.12.1 during any *metering interval* within an *energy market billing period*,

the *metered market participant* for that *generation resource* associated with that *generation facility* shall, subject to section 2.2.14 and the application process described in the applicable *market manual*, be reimbursed the *hourly uplift* and non-hourly uplift *settlement amounts* referred to in section 2.2.12.2.

2.2.13 If the consumption of *electricity storage station service* results in:

2.2.13.1 an allocated quantity of *energy* withdrawn or AQEW, as described in section 8 of Appendix 9.2, accruing at the ~~location~~*delivery point* of an *electricity storage* ~~*unit* which is part of~~*resource* associated with an eligible *electricity storage facility* within the meaning of section 2.2.16 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

2.2.13.2 such accrual of AQEW results in *hourly uplift*, non-hourly uplift *settlement amounts*, or both, accruing at the ~~location~~*delivery point* referred to in section 2.2.13.1 during any *metering interval* within an *energy market billing period*,

the *metered market participant* for that *electricity storage resource* associated with that *electricity storage facility* shall, subject to section 2.2.14 and the application process described in the applicable *market manual*, be reimbursed the *hourly uplift* and non-hourly uplift *settlement amounts* referred to in section 2.2.13.2.

2.3 Metering Data Recording and Collection Frequency

2.3.1 All *metering data* must be recorded for each *metering interval* except as otherwise provided in section 2.3.2 or elsewhere in these *market rules*.

2.3.2 *Demand metering data* for *non-dispatchable loads*, *non-dispatchable generation resources*, or *self-scheduling electricity storage* ~~*facilities*~~*resources* shall be recorded

by ~~*registered wholesale meters*~~a *metering installation* at a given instant or averaged over such *metering intervals* as the *IESO* may specify in the applicable *market manual*.

2.4 Collection and Validation of Metering Data

2.4.4 Subject to section 2.4.5, all *metering data* in respect of a given ~~registered~~ *metering installation* for a given *trading day* used for determining *settlement amounts* pursuant to this Chapter shall be "*settlement* ready" *metering data* that has been validated and corrected by the *VEE process*. Such "*settlement* ready" *metering data* shall be accessible by electronic means by any person referred to in MR Ch.6 s.10.1.3 no later than five *business days* following such *trading day*, providing that the applicable *metering service provider* has resolved any trouble call pertaining to such *metering data*.

2.5 Delivery Points

2.5.1 The *delivery point* for ~~a~~ given *registered wholesale* ~~*meter*~~*meters* shall be determined by the *IESO* by:

2.5.1.1 adjusting the *metering data* from ~~that~~those *registered wholesale* ~~*meter*~~*meters* in accordance with MR Ch.6 s.4.2.3; and

2.5.1.2 summing the *metering data* from ~~that~~those *registered wholesale* ~~*meter*~~*meters* with *metering data* from all other applicable *registered wholesale meters* in accordance with the applicable totalization table comprised in the relevant *meter point* documentation submitted in respect of ~~that~~those *registered wholesale* ~~*meter*~~*meters* pursuant to MR Ch.6 App.6.5 s.1.3.

2.5.2 For the purposes of the determination of the *settlement amounts* referred to in sections 3, 4 and 5, all references to a *registered wholesale meter*, a *registered wholesale meter* 'm', 'c' or 's' or a *resource* 'k'/'m', 'k'/'c', or 'k'/'s' shall be deemed to be a reference to the *delivery point* associated with~~:~~ such *registered wholesale meter(s)*. All references to a *delivery point* shall be deemed to be references to the *resource* associated with such *delivery point.*

~~2.5.2.1 the *registered wholesale meter*; or~~

~~2.5.2.2 the *registered wholesale meter* or *registered wholesale meters* associated with the *facility*;~~

~~as the case may be.~~

2.11 Settlement Record Retention, Confidentiality, and Reliability

---

2.11.4 *Settlement* and supporting data for each *trading day* of a *billing period* shall be made available by direct electronic means to the relevant *market participant* as soon as practicable after the data become available to the *IESO*. The data shall remain available via electronic access until the earlier of 60 days from the end of the *billing period* and the date on which invoicing and payment activities for that *billing period* have been completed.

2.14 Market Remediation

2.14.2 Notwithstanding any other provisions in this MR Ch.9, if the *IESO* declares a *day-ahead market* failure in accordance with MR Ch.7 s.4.3 or the *IESO* declares a suspension of *market operations* that suspends the *day-ahead market* in accordance with MR Ch.7 s.13, the *IESO* shall:

a. not calculate *settlement amounts* related to the *day-ahead market*;

b. determine all of the *real-time market settlement amounts* only using *real-time market* data and variables; and

c. calculate the hourly *physical transaction settlement amount* for *non-dispatchable loads,* set out in section 3.2*,* using the hourly *real-time market Ontario zonal price* and a load forecast deviation ~~charge~~adjustment of 0.

Note: Existing Section 3 has been deleted in its entirety and replaced with new section 3 – Hourly Settlement Amounts.

3 Hourly Settlement Amounts (New)

3.1 Two-Settlement

3.1.1 The *IESO* shall operate a two-*settlement* system to support the *day-ahead market* and the *real-time market* in accordance with the following:

3.1.1.1 The hourly *physical transaction settlement amounts* shall be calculated for each *settlement hour* 'h' and disbursed to or collected from *market participant* 'k' in accordance with the following:

a. For amounts associated with *physical bilateral contracts*, the *day-ahead market settlement* hourly *physical transaction settlement amount* ("HPTSA{1}_$PBC_{k,h}$") and the real-time balancing *settlement* hourly *physical transaction settlement amount* ("HPTSA{2}_$PBC_{k,h}$") shall be determined by the equations set out in sections 3.1.2 and 3.1.5, respectively;

b. For *dispatchable loads*, *dispatchable generation resources*, *non-dispatchable generation resources, self-scheduling electricity storage resources* that are registered to inject, *dispatchable electricity storage resources*, and *energy traders* participating with *boundary entity resources*, the *day-ahead market settlement* hourly *physical transaction settlement amount* ("HPTSA{1}$_{k,h}$") and the real-time balancing *settlement* hourly *physical transaction settlement amount* ("HPTSA{2}$_{k,h}$") shall be determined by the equations set out in sections 3.1.3 and 3.1.6, respectively; and

c. For *price responsive loads* and *self-scheduling electricity storage resources* that are ~~withdrawing~~registered to withdraw, the *day-ahead market settlement* hourly *physical transaction settlement amount* ("HPTSA{1}_$PRL_{k,h}$") and the real-time balancing *settlement* hourly *physical transaction settlement amount* ("HPTSA{2}_$PRL_{k,h}$") shall be determined by the equations set out in sections 3.1.4 and 3.1.7, respectively;

3.1.1.3 The hourly *operating reserve settlement amounts* shall be calculated for each *settlement hour* 'h' and disbursed to or collected from *market participant* 'k' in accordance with the following:

a. For *energy traders* participating with *boundary entity resources*, *dispatchable loads*, *dispatchable electricity storage resources,* and *dispatchable generation resources*, the *day-ahead market settlement*

hourly *operating reserve settlement amount* ("HORSA$\{1\}_{k,h}$") and the real-time balancing *settlement* hourly *operating reserve settlement amount* ("HORSA$\{2\}_{k,h}$") shall be determined by the equations set out in sections 3.1.10 and 3.1.11, respectively; and

3.1.1.4 In calculating hourly *physical transaction settlement amounts* and hourly *operating reserve settlement amounts* in this section 3.1, the following subscripts and superscripts shall have the following meanings unless otherwise specified:

a. 'M' is the set of all *delivery points* 'm' and *intertie metering points* 'i';

b. 'M1' is the set of all *delivery points* 'm' for *price responsive loads* and *self-scheduling electricity storage resources* that are ~~withdrawing~~registered to withdraw; and

c. 'M2' is the set of all *delivery points* 'm' for *price responsive loads* associated with *load equipment* used as physical *hourly demand response resources* to fulfill *capacity obligations*.

Hourly Physical Transaction Settlement Amount – Day-Ahead Market Settlement

3.1.2 For all *delivery points* 'm' and *intertie metering points* 'i' associated with a *physical bilateral contract*:

$$HPTSA\_PBC\{1\}_{k,h} = \sum^{M} \left[DAM\_LMP_h^m \; x \left(\sum_S DAM\_BCQ_{s,k,h}^m - \sum_B DAM\_BCQ_{k,b,h}^m \right) + DAM\_LMP_h^i \; x \left(\sum_S DAM\_BCQ_{s,k,h}^i - \sum_B DAM\_BCQ_{k,b,h}^i \right) \right]$$

3.1.3 For all *delivery points* 'm' and *intertie metering points* 'i' associated with a *dispatchable load*, a *dispatchable generation resource,* a *non-dispatchable generation resources,* a *self-scheduling electricity storage resource* that is registered to inject, a *dispatchable electricity storage resource,* or an *energy trader* participating with a *boundary entity resource:*

3.1.4 For all *delivery points* 'm' associated with a *price responsive load* or a *self-scheduling electricity storage resource* that is ~~withdrawing~~registered to withdraw:

Hourly Physical Transaction Settlement Amount – Real-Time Balancing Settlement

3.1.5 For all *delivery points* 'm' and *intertie metering points* 'i' associated with a *physical bilateral contract*:

$$HPTSA\{2\}\_PBC_{k,h} = \sum^{M,T} RT\_LMP_h^{m,t} \; x \left(\sum_S BCQ_{s,k,h}^{m,t} - \sum_B BCQ_{k,b,h}^{m,t} \right) + \sum^{M,T} RT\_LMP_h^{i,t} \; x \left(\sum_S BCQ_{s,k,h}^{i,t} - \sum_B BCQ_{k,b,h}^{i,t} \right)$$

Where:

a. If the location specified pursuant to MR Ch.8 s.2.2.1 relates to a *non-dispatchable load*, the $RT\_LMP_h^{m,t}$ shall be replaced with the $DAM\_LMP_h^z$.

3.1.6 For all *delivery points* 'm' and *intertie metering points* 'i' associated with a *dispatchable load*, a *dispatchable generation resource,* a *non-dispatchable generation resources,* a *self-scheduling electricity storage resource* that is registered to inject, a *dispatchable electricity storage resource,* or an *energy trader* participating with a *boundary entity resource*:

$$HPTSA\{2\}_{k,h} = \sum^{M,T} RT\_LMP_h^{m,t} \; x \frac{\left(\left(AQEI_{k,h}^{m,t} - DAM\_QSI_{k,h}^{m} \right) - \left(AQEW_{k,h}^{m,t} - DAM\_QSW_{k,h}^{m} \right) \right)}{12} + RT\_LMP_h^{i,t} \; x \frac{\left(\left(SQEI_{k,h}^{i,t} - DAM\_QSI_{k,h}^{i} \right) - \left(SQEW_{k,h}^{i,t} - DAM\_QSW_{k,h}^{i} \right) \right)}{12}$$

3.1.7 For all *delivery points* 'm' associated with a *price responsive load* or a *self-scheduling electricity storage resource* that is ~~withdrawing~~registered to withdraw:

Hourly Operating Reserve Settlement Amount – Day-Ahead Market Settlement

3.1.10 For all *delivery points* 'm' and *intertie metering points* 'i' associated with an *energy trader* participating with a *boundary entity resource*, a *dispatchable load*, a *dispatchable electricity storage resource,* or a *dispatchable generation resource*:

$$HORSA\{1\}_{k,h} = \sum_R^M \left(DAM\_PROR_{r,h}^{m} \times DAM\_QSOR_{r,k,h}^{m} + DAM\_PROR_{r,h}^{i} \times DAM\_QSOR_{r,k,h}^{i} \right)$$

Hourly Operating Reserve Settlement Amount – Real-Time Balancing Settlement

3.1.11 For all *delivery points* 'm' and *intertie metering points* 'i' associated with an *energy trader* participating with a *boundary entity resource*, a *dispatchable load*, a *dispatchable electricity storage resource,* or a *dispatchable generation resource*:

$$HORSA\{2\}_{k,h} = \sum_{R}^{M,T} \{RT\_PROR_{r,h}^{m,t} \; x \; (RT\_QSOR_{r,k,h}^{m,t} - \; DAM\_QSOR_{r,k,h}^{m}) + \; RT\_PROR_{r,h}^{i,t} \; x \; (RT\_QSOR_{r,k,h}^{i,t} - \; DAM\_QSOR_{r,k,h}^{i})\}$$

3.2 Hourly Physical Transaction Settlement Amount – Non-Dispatchable ~~Resources~~Loads

3.2.1 Notwithstanding MR Ch.5 s.7.3A.1, the hourly *physical transaction settlement amount* for *non-dispatchable loads* shall be calculated for each *settlement hour* and collected from the *market participants* of *non-dispatchable loads* in accordance with sections 3.2.2 and 3.2.3. In calculating hourly *physical transaction settlement amounts* for *non-dispatchable loads* in this section 3.2, the following subscripts and superscripts shall have the following meanings unless otherwise specified:

i. ~~a.~~ 'K' is the set of all *market participants* 'k' with *non-dispatchable loads*;

ii. ~~b.~~ 'M' is the set of all *delivery points* 'm' relating to *non-dispatchable loads*; and

iii. ~~c.~~ 'M2' is the set of all *hourly demand response resources* 'd' that are not associated with *load equipment* registered as *price responsive loads*.

3.2.2 For all *non-dispatchable loads* for a *market participant*, the hourly *physical transaction settlement amount* for *non-dispatchable loads* applicable to *market participant* 'k' in *settlement hour* 'h' ("$HPTSA\_NDL_{k,h}$") is calculated as follows:

$$HPTSA\_NDL_{k,h} = \; -1 \text{ x } (DAM\_LMP_{h}^{z} + LFDC_{h}) \; x \; \sum^{T} (AQEW_{k,h}^{m,t} - AQEI_{k,h}^{m,t})$$

$$HPTSA\_NDL_{k,h} = \; -1 \text{ x } (DAM\_LMP_{h}^{z} + LFDA\cancel{C}_{h}) \; x \; \sum^{T} (AQEW_{k,h}^{m,t} - AQEI_{k,h}^{m,t})$$

Where:

a. '~~$LFDC_h$~~'$LFDA_h$' is the load forecast deviation ~~charge~~adjustment for *settlement hour* 'h' determined in accordance with section 3.2.3.

3.2.3 The *IESO* shall determine the load forecast deviation ~~charge~~adjustment for all *non-dispatchable loads* ("~~$LFDC_h$~~$LFDA_h$") for each *settlement hour* 'h' in accordance with the following:

$$LFDC_h = \frac{Real\_Time\ Purchase\ Cost\_Benefit_h + DAM\ Volume\ Factor\ Cost\_Benefit_h}{\sum_{K,h}^{M,T}(AQEW - AQEI)_{k,h}^{m,t}}$$

Where:

a. $Real\_Time\ Purchase\ Cost\_Benefit = \sum_{K,h}^{M,T}\left[RT\_LMP_h^{m,t}\ x\ (AQEW_{k,h}^{m,t} - AQEI_{k,h}^{m,t} - DAM\_QSW_{k,h}^{m})/12\right] - \sum_{K,h}^{M2,T}\left[RT\_LMP_h^{d,t}\ x\ DAM\_QSW_{k,h}^{d}/12\right]$;

b. $DAM\ Volume\ Factor\ Cost\_Benefit = DAM\_LMP_h^z\ x\ \left[\sum_{K,h}^{M,T}\left(DAM\_QSW_{k,h}^{m} - AQEW_{k,h}^{m,t} + AQEI_{k,h}^{m,t}\right)/12\right] + \sum_{K}^{M2}\left[DAM\_LMP_h^z\ x\ DAM\_QSW_{k,h}^{d}\right]$

$$LFDAC_h = \frac{Real\_Time\ Purchase\ Cost\_Benefit_h + DAM\ Volume\ Factor\ Cost\_Benefit_h}{\sum_{K,h}^{M,T}(AQEW - AQEI)_{k,h}^{m,t}}$$

Where:

1. $Real\_Time\ Purchase\ Cost\_Benefit = \sum_{K,h}^{M,T}\left[RT\_LMP_h^{m,t}\ x\ (AQEW_{k,h}^{m,t} - AQEI_{k,h}^{m,t} - DAM\_QSW_{k,h}^{m})/12\right] - \sum_{K,h}^{M2,T}\left[RT\_LMP_h^{d,t}\ x\ DAM\_QSW_{k,h}^{d}/12\right]$;

2. $DAM\ Volume\ Factor\ Cost\_Benefit = DAM\_LMP_h^z\ x\ \left[\sum_{K,h}^{M,T}\left(DAM\_QSW_{k,h}^{m} - AQEW_{k,h}^{m,t} + AQEI_{k,h}^{m,t}\right)/12\right] + \sum_{K}^{M2}\left[DAM\_LMP_h^z\ x\ DAM\_QSW_{k,h}^{d}\right]$

3.2.4 The hourly *physical transaction settlement amount* for *non-dispatchable generation resources* and *self-scheduling electricity storage resources* that are injecting shall be calculated for each *settlement hour* 'h' and disbursed to the *market participants* of such *resources* in accordance with section 3.2.4.1.

3.2.4.1 For all *delivery points* 'm' associated with a *non-dispatchable generation resource* and *self-scheduling electricity storage resources* that are injecting, the hourly *physical transaction settlement amount* for *non-dispatchable generation resources* applicable to *market participant* 'k' in *settlement hour* 'h' ("$HPTSA\_NDG_{k,h}$") is calculated as follows:

$$HPTSA\_NDG_{k,h} = RT\_LMP_h^{m,t}\ x\ \left(AQEI_{k,h}^{m,t} - AQEW_{k,h}^{m,t}\right)$$

3.3 Day-Ahead Market Balancing Credit

3.3.1 The *day-ahead market* balancing credit s*ettlement amount* for *market participant* 'k' in *settlement hour* 'h' ("DAM_$BC_{k,h}$") shall be calculated and disbursed to the *market participants* of *GOG-eligible resources* and *energy traders* participating with *boundary entity resources* in accordance with the eligibility and equations set out in this section 3.3 and the operating profit function described in section 10 of Appendix 9.2.

3.3.2 *GOG-eligible resources* and *energy traders* participating with *boundary entity resources* are eligible for the *day-ahead market* balancing credit *settlement amount* in each *metering interval* where:

3.3.2.1 for *energy traders* participating with *boundary entity resources*, such *resource* is activated for *operating reserve*; or

3.3.2.2 Where:

a. a *GOG-eligible resource* or an *energy trader* participating with a *boundary entity resource*, as the case may be, is *dispatched* to a quantity of *energy* less than its *day-ahead schedule* by the *IESO* in order to maintain the *reliability* of the *IESO-controlled grid* and does not receive a real-time make whole payment *settlement amount* pursuant to section 3.5 in relation to such *energy* for the same *metering intervals*; or

b. a *GOG-eligible resource's day-ahead operational commitment* for *energy* is cancelled by the *IESO* in order to maintain the *reliability* of the *IESO-controlled grid* and such *resource* does not receive a real-time make whole payment *settlement amount* pursuant to section 3.5 in relation to such *energy* for the same *metering intervals*.

3.3.3 Notwithstanding section 3.3.2, *energy traders* participating with a *boundary entity resources* shall be ineligible for the *day-ahead market* balancing credit *settlement amount* for the following transactions:

3.3.3.1 *Energy* transactions which form part of a *linked wheeling through transaction;*

3.3.3.2 *Energy* import transactions when:

a. ~~a. DAM_LMP$^{i,t}_{h}$~~ $DAM\_LMP^{i,t}_{h}$ is equal to or greater than ~~RT_LMP$^{i,t}_{h}$~~ $RT\_LMP^{i,t}_{h}$; or

b. ~~b. Min(RT_LOC_EOP$^{i,t}_{k,h}$, DAM_QSI$^{i}_{k,h}$)~~ $Min\,(RT\_LOC\_EOP^{i,t}_{k,h}, DAM\_QSI^{i}_{k,h})$ is equal to or less than ~~SQEI$^{i}_{k,h}$~~ $SQEI^{i}_{k,h}$; and

3.3.3.3 *Energy* export transactions when:

a. ~~a. DAM_LMP$^{i,t}_{h}$~~ $DAM\_LMP^{i,t}_{h}$ is equal to or less than ~~RT_LMP$^{i,t}_{h}$~~ $RT\_LMP^{i,t}_{h}$; or

b. ~~b. Min(RT_LOC_EOP$^{i,t}_{k,h}$, DAM_QSI$^{i}_{k,h}$)~~ $Min\,(RT\_LOC\_EOP^{i,t}_{k,h}, DAM\_QSW^{i}_{k,h})$ is equal to or less than ~~SQEW$^{i}_{k,h}$~~ $SQEW^{i}_{k,h}$.

3.3.3.4 *Operating reserve* transactions when:

a. $DAM\_PROR^{i,t}_{r,h}$ is equal to or greater than $RT\_PROR^{i,t}_{r,h}$; or

b. $Min\,(RT\_OR\_LOC\_EOP^{i,t}_{r,k,h}, DAM\_QSOR^{i}_{r,k,h})$ is equal to or less than $RT\_QSOR^{i,t}_{r,k,h}$

3.3.4 For *delivery point* 'm' associated with a *GOG-eligible resource*, the *day-ahead market* balancing credit s*ettlement amount* shall be calculated as follows:

$$DAM\_BC^{m}_{k,h} = BCE^{m}_{k,h} + BCOR^{m}_{k,h}$$

$$DAM\_BC^{m}_{k,h} = DAM\_BCE^{m}_{k,h} + DAM\_BCOR^{m}_{k,h}$$

Where:

a. ~~$BCE^{m}_{k,h}$~~ $DAM\_BCE^{m}_{k,h}$ is the *energy* component of the *day-ahead market* balancing credit *settlement amount* and is calculated as follows:

$$BCE^{m}_{k,h} = \sum^{T} MaxAX\left[0, \left(RT\_LMP^{m,t}_{h} - DAM\_LMP^{m}_{h}\right) \times MaxAX\left(0, \left(DAM\_QSI^{m}_{k,h} - AQEI^{m,t}_{k,h}\right)\right)\right]/12$$

$$DAM\_BCE^{m}_{k,h} = \sum^{T} Max\left[0, \left(RT\_LMP^{m,t}_{h} - DAM\_LMP^{m}_{h}\right) \times Max\left(0, \left(DAM\_QSI^{m}_{k,h} - AQEI^{m,t}_{k,h}\right)\right)\right]/12$$

~~$BCOR^{m}_{k,h}$~~

b. $DAM\_BCOR^{m}_{k,h}$ is the *operating reserve* component of the *day-ahead market* balancing credit s*ettlement amount* and is calculated as follows:

$$BCOR^{m}_{k,h} = \sum^{R,T} MaxAX\left(0, RT\_PROR^{m,t}_{r,h} - DAM\_PROR^{m}_{r,h}\right) \times MaxAX\left(0, DAM\_QSOR^{m}_{r,k,h} - RT\_QSOR^{m,t}_{r,k,h}\right)/12$$

$$DAM\_BCOR^{m}_{k,h} = \sum^{R,T} Max\left(0, RT\_PROR^{m,t}_{r,h} - DAM\_PROR^{m}_{r,h}\right) \times Max\left(0, DAM\_QSOR^{m}_{r,k,h} - RT\_QSOR^{m,t}_{r,k,h}\right)/12$$

3.3.5 Subject to section 3.3.5.1 and 3.3.5.2 and at an *intertie metering point* 'i' associated with an *energy trader* participating with a *boundary entity resource*, the *day-ahead market* balancing credit *settlement amount* shall be calculated as follows:

$$DAM\_BC^{i}_{k,h} = BCE^{i}_{k,h} + BCOR^{i}_{k,h}$$

$$DAM\_BC^{i}_{k,h} = DAM\_BCE^{i}_{k,h} + DAM\_BCOR^{i}_{k,h}$$

Where:

a. for an import transaction, ~~$BCE^{i}_{k,h}$~~ $DAM\_BCE^{i}_{k,h}$ is the *energy* component of the *day-ahead market* balancing credit s*ettlement amount* and calculated as follows:

$$DAM\_BCE^{i}_{k,h} = MAX\{0, \sum^{T} OP(RT\_LMP^{i,t}_{h}, Min(RT\_LOC\_EOP^{i,t}_{k,h}, DAM\_QSI^{i}_{k,h}), BE^{i,t}_{k,h}) - OP(RT\_LMP^{i,t}_{h}, SQEI^{i,t}_{k,h}, BE^{i,t}_{k,h})\} /12$$

$$BCE^{i}_{k,h} = Max\left[0, \sum^{T} \left(Min\left(RT\_LOC\_EOP^{i,t}_{k,h}, DAM\_QSI^{i}_{k,h}\right) - SQEI^{i}_{k,h}\right) \times \left(RT\_LMP^{i,t}_{h} - DAM\_LMP^{i,t}_{h}\right) + OP\left(DAM\_LMP^{i,t}_{h}, Min\left(RT\_LOC\_EOP^{i,t}_{k,h}, DAM\_QSI^{i}_{k,h}\right), BE^{i,t}_{k,h}\right)\right] /12$$

b. for an export transaction, $DAM\_BCE^{i}_{k,h}$ is the *energy* component of the *day-ahead market* balancing credit s*ettlement amount* and calculated as follows:

$$DAM\_BCE^{i}_{k,h} = -1 \times MIN\{0, \sum^{T} OP(RT\_LMP^{i,t}_{h}, Min(RT\_LOC\_EOP^{i,t}_{k,h}, DAM\_QSW^{i}_{k,h}), BL^{i,t}_{k,h}) - OP(RT\_LMP^{i,t}_{h}, SQEW^{i,t}_{k,h}, BL^{i,t}_{k,h})\}/12$$

$$BCE^{i}_{k,h} = Max\left[0, \sum^{T} \left(Min\left(RT\_LOC\_EOP^{i,t}_{k,h}, DAM\_QSW^{i}_{k,h}\right) - SQEW^{i}_{k,h}\right) \times \left(DAM\_LMP^{i,t}_{h} - RT\_LMP^{i,t}_{h}\right) - OP\left(DAM\_LMP^{i,t}_{h}, Min\left(RT\_LOC\_EOP^{i,t}_{k,h}, DAM\_QSW^{i}_{k,h}\right), BL^{i,t}_{k,h}\right)\right] /12$$

c. $DAM\_BCOR^{i}_{k,h}$ is the *operating reserve* component of the *day-ahead market* balancing credit s*ettlement amount* and calculated as follows:

$$DAM\_BCOR^{i}_{k,h} = \sum^{R} MAX\{0, \sum^{T} OP(RT\_PROR^{i,t}_{r,h,}, Min(RT\_OR\_LOC\_EOP^{i,t}_{r,k,h}, DAM\_QSOR^{i}_{r,k,h}), BOR^{i,t}_{r,k,h}) - OP(RT\_PROR^{i,t}_{r,h}, RT\_QSOR^{i,t}_{r,k,h}, BOR^{i,t}_{r,k,h})\}/12$$

$$BCOR^{i}_{k,h} = \sum^{R} Max\left[0, \sum^{T} \left(Min\left(RT\_OR\_LOC\_EOP^{i,t}_{r,k,h}, DAM\_QSOR^{i}_{r,k,h}\right) - RT\_QSOR^{i}_{r,k,h}\right) x \left(RT\_PROR^{i,t}_{r,h} - DAM\_PROR^{i,t}_{h}\right) + OP\left(DAM\_PROR^{i,t}_{r,h}, Min\left(RT\_OR\_LOC\_EOP^{i,t}_{r,k,h}, DAM\_QSOR^{i}_{r,k,h}\right), BOR^{i,t}_{r,k,h}\right)\right]/12$$

3.3.5.1 Where the *offer* price for *energy* or *operating reserve*, as the case may be, being used to determine the appropriate *day-ahead market* balancing credit s*ettlement amount* is less than the applicable *locational marginal price* for such *energy* or *operating reserve,* the *IESO* shall adjust, for the purposes of determining the *day-ahead market* balancing credit *settlement amount*, such *offer* price to be equal to the applicable *locational marginal price* for such *energy* or *operating reserve*.

3.3.5.2 Where the *bid* price for *energy* being used to determine the appropriate *day-ahead market* balancing credit s*ettlement amount* is greater than the applicable *locational marginal price* for such *energy*, the *IESO* shall adjust, for the purposes of determining the *day-ahead market* balancing credit *settlement amount*, such *bid* price to be equal to the applicable *locational marginal price* for such *energy*.

3.4 Day-Ahead Market Make-Whole Payment

3.4.1 Subject to section 3.4.2, 3.4.3 and the mitigation process described in section 5 and Appendix 9.4, the *day-ahead market* make-whole payment *settlement amount* for *market participant* 'k' in *settlement hour* 'h' ("DAM_MWP$_{k,h}$") shall be calculated for each *settlement hour* for the *market participants* of *dispatchable loads, price responsive loads, energy traders* participating with *boundary entity resources, dispatchable electricity storage resources, self-scheduling electricity storage resources* that are ~~withdrawing~~registered to withdraw, or *dispatchable generation resources:*

3.4.3 Notwithstanding anything in section 3.4 to the contrary and for the purpose of determining the *day-ahead market* make-whole payment *settlement amount* for a *market participant,* the *IESO* shall adjust any:

3.4.3.1 *Offer* price and their substitutions as per section 5.1.2.2, as applicable, associated with a *generation resource, dispatchable electricity storage resource* that is ~~injecting, or~~registered to inject, or an *energy trader* participating with a *boundary entity resource* that is injecting that is less than (i) 0.00 $/MWh; and (ii) the applicable *day-ahead market locational marginal price* for the applicable *metering interval,* to the lesser of 0.00 $/MWh and such *day-ahead market locational marginal price;* and

3.4.3.2 *Bid* price and their substitutions as per section 5.1.2.2, as applicable, associated with a *dispatchable load, price responsive load, dispatchable electricity storage resource* that is ~~withdrawing, or~~registered to withdraw, or an *energy trader* participating with a *boundary entity resource* that is withdrawing that is less than (i) the price determined in accordance with the applicable *market manual*; and (ii) the applicable *day-ahead market locational marginal price* for the applicable *metering interval,* to the lesser of the price determined in accordance with the applicable *market manual* and such *day-ahead market locational marginal price.*

Day-Ahead Market Make-Whole Payment - Ineligibilities

3.4.4 Notwithstanding this section 3.4 but subject to section 3.4.6, the following *resources* shall not be eligible to receive a *day-ahead market* make-whole payment *settlement amount* for:

3.4.4.3 an *energy trader* participating with a *boundary entity resource* during any *settlement hours* in which the *energy trader* participating with the *boundary entity resource* has a *day-ahead schedule* for any *linked wheeling through transactions*;

3.4.4.4 a hydroelectric *generation resource* for any *settlement hour* in respect of which the hydroelectric *generation resource* receives either a *minimum hourly output* or an *hourly must run* binding constraint;

3.4.4.5 *dispatchable loads* and *dispatchable electricity storage resources* that are ~~withdrawing~~registered to withdraw for any quantity of *energy* that they *bid* at the *maximum market clearing price* and which was scheduled in the *day-ahead market;* ~~and~~

3.4.4.6 combustion ~~turbines~~turbine *resources* or steam ~~turbines~~turbine *resources* that are not operating as a *pseudo-unit* for *settlement hours* in which they have a ~~binding~~minimum constraint applied for combined cycle ~~physical unit constraint~~operation consistent with combustion turbine commitment; and

3.4.4.7 *dispatchable electricity storage resources* for such *settlement hours* for which such *resource* is ineligible to receive a *day-ahead market* make-whole payment in accordance with MR Ch.7 s.21.4.3.

3.4.5 Notwithstanding this section 3.4 but subject to section 3.4.6, the following *resources* shall not be eligible to receive the *energy* component of the *day-ahead market* make-whole payment *settlement amount* for a *trading day*:

3.4.5.1 hydroelectric *generation resources* that ~~do not share *forebays*~~are not registered on the same *forebay* as one or more other hydroelectric *generation resources*, if the sum of the quantity of *energy* scheduled in the *day-ahead market* for all *settlement hours* of the *trading day* for such *resource* is equal to its *minimum daily energy limit;* or

3.4.5.2 hydroelectric *generation resources* that ~~share a *forebay*~~are registered on the same *forebay* as one or more other hydroelectric *generation resources*, if the sum of the quantity of *energy* scheduled in the *day-ahead market* in such *trading day* for all *resources* that ~~share~~are registered to a *forebay* is equal to the *minimum daily energy limit* of ~~the shared~~such *forebay*.

Day-Ahead Market Make-Whole Payment for Dispatchable Generation Resources ~~Not Associated with a Pseudo-Unit~~That Are Not Pseudo-Units and Dispatchable Electricity Storage Resources That Are Registered to Inject

3.4.7 For a *delivery point* 'm' associated with a *dispatchable electricity storage resource* that is ~~injecting~~registered to inject or a *dispatchable generation resource* that is not ~~associated with~~ a *pseudo-unit* and that is not registered as a hydroelectric *generation resource*, the *day-ahead market* make-whole payment *settlement amount* is calculated as follows:

Day-Ahead Market Make-Whole Payment for Dispatchable Loads and Dispatchable Electricity Storage Resources That Are Registered to Withdraw

3.4.8 For a *delivery point* 'm' associated with a *dispatchable electricity storage resource* that is ~~withdrawing~~registered to withdraw or *dispatchable load*, the *day-ahead market* make-whole payment *settlement amount* is calculated as follows:

Day-Ahead Market Make-Whole Payment for Non-HDR Price Responsive Loads and Self-Scheduling Storage Resources That Are Registered to Withdraw

3.4.9 For a *delivery point* 'm' associated with a *self-scheduling electricity storage resource* that is ~~withdrawing~~registered to withdraw or a *price responsive load* that is not associated with *load equipment* registered as a physical *hourly demand response resource*, the *day-ahead market* make-whole payment *settlement amount* is calculated as follows:

Day-Ahead Market Make-Whole Payment for Physical Hourly Demand Response Price Responsive Loads

3.4.10 For a *price responsive load* associated with *load equipment* that is registered as a physical *hourly demand response resource*, the *day-ahead market* make-whole payment *settlement amount* is calculated as follows:

Day-Ahead Market Make-Whole Payment for Boundary Entity Resources - Imports

3.4.11 For an import transaction at an *intertie metering point* 'i' associated with an *energy trader* participating with a *boundary entity resource*, the *day-ahead market* make-whole payment *settlement amount* is calculated as follows:

Day-Ahead Market Make-Whole Payment for Boundary Entity Resources - Exports

3.4.12 For an export transaction at an *intertie metering point* 'i' associated with an *energy traders* participating with a *boundary entity resource*, the *day-ahead market* make-whole payment *settlement amount* is calculated as follows:

Day-Ahead Market Make-Whole Payment for Hydroelectric Generation Resources

3.4.13 For a *delivery point* 'm' associated with a hydroelectric *generation resource*, the *day-ahead market* make-whole payment *settlement amount* is calculated in accordance with the following:

3.4.13.2 where applicable, $FROP_{k,h}^{m}$ shall be determined as follows:

a. If $DAM\_QSI_{k,h}^{m}$ is not equal to $FR\_UL_{k}^{m,f}$, or the *resource* does not have a *forbidden region*,

$$FROP_{k,h}^{m} = 0$$

b. Otherwise,

$$FROP_{k,h}^{m} = OP\left(DAM\_LMP_{h}^{m}, FR\_UL_{k}^{m,f}, DAM\_BE_{k,h}^{m}\right) - OP\left(DAM\_LMP_{h}^{m}, Max(DAM\_EOP_{k,h}^{m}, FR\_LL_{k}^{m,f}), DAM\_BE_{k,h}^{m}\right)$$

Where:

i. '$FR\_UL_{k}^{m,f}$' is the *forbidden region* upper limit from *forbidden region* set 'f' where $DAM\_QSI_{k,h}^{m} = FR\_UL_{k}^{m,f}$, as submitted by *market participant* 'k' for *delivery point* 'm' as daily *dispatch data;*

ii. '$FR\_LL_{k}^{m,f}$' is the *forbidden region* lower limit from *forbidden region* set 'f' where $DAM\_QSI_{k,h}^{m} = FR\_UL_{k}^{m,f}$, as submitted by *market participant* 'k' for *delivery point* 'm' as daily *dispatch data;* and

iii. 'f' = (1…N) of the *forbidden region* set $\{FR\_UL_{k}^{m,f}, FR\_LL_{k}^{m,f}\}$ and N is the maximum number of *forbidden regions* submitted by *market participant* 'k' for *delivery point* 'm' as daily *dispatch data*.

3.4.13.3 if a hydroelectric *generation resource,* excluding those associated with *linked forebays,* has:

a. Not Attained Max Starts, then for all *settlement hours* of its *day-ahead schedule*;

b. Attained Max Starts, but has a *day-head schedule* with *settlement hours* with a ~~binding~~ *reliability* constraint, then for such *settlement hours* with a ~~binding~~ *reliability* constraint; or

---

3.4.13.4 if a hydroelectric *generation resource,* excluding those associated with *linked forebays,* has Attained Max Starts, the *day-ahead market* make-whole payment *settlement amount* is calculated as follows:

And where:

i. 'Hp' is the set of all *settlement hours* within start 's' where $OP(DAM\_LMP_h^m, DAM\_QSI_{k,h}^m, DAM\_BE_{k,h}^m)$ is positive, excluding those *settlement hours* in which the *resource* has a ~~binding~~ *reliability* constraint;

ii. 'Hn' is the set of all *settlement hours* within start 's' where $OP(DAM\_LMP_h^m, DAM\_QSI_{k,h}^m, DAM\_BE_{k,h}^m)$ is negative and $DAM\_QSI_{k,h}^m$ is greater than $DAM\_EOP_{k,h}^m$, excluding those *settlement hours* in which the *resource* has a ~~binding~~ *reliability* constraint or a binding constraint referred to in section 3.4.2.3; and

iii. $FROP_{k,h}^m$ is determined in accordance with the formulation outlined in section 3.4.13.2.

c. $DAM\_COMP2_{k,s}^m = (-1) \times \sum_H \sum_R \left[OP\left(DAM\_PROR_{r,h}^m, DAM\_QSOR_{r,k,h}^m, DAM\_BOR_{r,k,h}^m\right) - OP\left(DAM\_PROR_{r,h}^m, DAM\_\text{OR}\_EOP_{r,k,h}^m, DAM\_BOR_{r,k,h}^m\right)\right]$

And where:

a. 'H' is the set of all *settlement hours* within start 's'.

3.4.13.5 For hydroelectric *generation resources* associated with *linked forebays,* the *day-ahead market* make-whole payment *settlement amount* is calculated in accordance with the following:

3.4.13.5.1 For those hydroelectric *generation resources* associated with *linked forebays* that have Attained Max Starts, the *IESO* shall apply the formulation specified in section 3.4.13.4 for those *resources*;

3.4.13.5.2 Subject to Section 3.4.13.5.3, for those hydroelectric *generation resources* associated with *linked forebays* that has:

a. Not Attained Max Starts, then for all *settlement hours* of its *day-ahead schedule*;

b. Attained Max Starts but has a *day-~~head~~ahead schedule* with *settlement hours* with a ~~binding~~ *reliability* constraint, then for such *settlement hours* with a ~~binding~~ *reliability* constraint; or

---

Day-Ahead Market Make-Whole Payment for Dispatchable Generation Resources ~~Associated with a~~That Are Pseudo-~~unit~~Units

Combustion Turbine

3.4.14 For a *delivery point* 'c' for a combustion turbine ~~associated~~*resource* associated with a *pseudo-unit*, the *day-ahead market* make-whole payment *settlement amount* is calculated as follows:

$$DAM\_MWP^{c}_{k,h} = Max\left[0, DAM\_COMP1^{c}_{k,h} + DAM\_COMP2^{c}_{k,h}\right]$$

Where:

a. $DAM\_COMP1^{c}_{k,h} = -1 \times \left[OP\left(DAM\_LMP^{c}_{h}, DAM\_QSI^{c}_{k,h}, DAM\_DIPC^{c}_{k,h}\right) - OP\left(DAM\_LMP^{c}_{h}, DAM\_EOP^{c}_{k,h}, DAM\_DIPC^{c}_{k,h}\right)\right]$

b. $DAM\_COMP2^{c}_{k,h} = -1 \times \sum_{R}\left[OP\left(DAM\_PROR^{c}_{r,h}, DAM\_QSOR^{c}_{r,k,h}, DAM\_OR\_DIPC^{c}_{r,k,h}\right) - OP\left(DAM\_PROR^{c}_{r,h}, DAM\_\text{OR}\_EOP^{c}_{r,k,h}, DAM\_OR\_DIPC^{c}_{r,k,h}\right)\right]$

Steam Turbine

3.4.15 For a *delivery point* 's' for a steam turbine *resource* associated with a *pseudo-unit*, the *day-ahead market* make-whole payment *settlement amount* is calculated as follows:

$$DAM\_MWP^{s}_{k,h} = DAM\_COMP1^{s}_{k,h} + DAM\_COMP2^{s}_{k,h}$$

Where:

a. $DAM\_COMP1^{s}_{k,h} = -1 \times \left[OP\left(DAM\_LMP^{s}_{h}, DAM\_DIGQ^{s}_{k,h}, DAM\_DIPC^{s}_{k,h}\right) - OP\left(DAM\_LMP^{s}_{h}, DAM\_EOP\_DIGQ^{s}_{k,h}, DAM\_DIPC^{s}_{k,h}\right)\right]$

b. $DAM\_COMP2^{s}_{k,h} = -1 \times \sum_{R}\left[OP\left(DAM\_PROR^{s}_{r,h}, DAM\_QSOR^{s}_{r,k,h}, DAM\_OR\_DIPC^{s}_{r,k,h}\right) - OP\left(DAM\_PROR^{s}_{r,h}, DAM\_OR\_EOP^{s}_{r,k,h}, DAM\_OR\_DIPC^{s}_{r,k,h}\right)\right]$

3.5 Real-Time Make-Whole Payment

3.5.1 Subject to section 3.5.2, section 3.5.3, and the mitigation process described in section 5 and Appendix 9.4, the real-time make-whole payment *settlement amount* for *market participant* 'k' in *metering interval* 't' of *settlement hour* 'h' ("$RT\_MWP^{m,t}_{k,h}$") shall be calculated and disbursed to the *market participants* for *dispatchable loads*, *energy traders* participating with *boundary entity resources*,

dispatchable electricity storage resources, or *dispatchable generation resources* for each *settlement hour* where such *resource*:

Real-Time Make-Whole Payment - Ineligibilities

3.5.2 Notwithstanding this section 3.5 but subject to section 3.5.3, a real-time make-whole payment *settlement amount* shall not be paid for:

a. a *called capacity export*;

b. ~~a *boundary entity resource*~~an import or export transaction during any *settlement hours* in which the ~~*boundary entity resource*~~associated *energy trader* has a *real-time schedule* for any *linked wheeling through transactions*;

c. a *resource* for any *settlement hour* for which it was *dispatched*, on request from the *market participant*, to prevent endangering the safety of any person, equipment damage, or violation of any *applicable law;*

d. a *non-quick start resource* that is not ~~associated with~~ a *pseudo-unit*, for any *settlement hour* in which its *real-time schedule* is less than its *minimum loading point*;

e. a combustion turbine *resource* associated with a *pseudo-unit,* for any *settlement hour* in which its *real-time schedule* is less than its *minimum loading point;*

f. a steam turbine *resource* associated with a *pseudo-unit,* for any *settlement hour* where none of the combustion ~~turbines~~turbine *resource* associated with the steam turbine *resource* have a *real-time schedule* greater than its *minimum loading point*;

g. a *variable generation resource* for any *settlement hour* in which it is subject to a *release notification*; ~~or~~

h. an *energy trader* participating with a *boundary entity resource* for an export transaction *dispatched* with a reason code associated with a pre-dispatch pricing discrepancy, as set out in the applicable *market manual,* when the applicable *locational marginal price* in either the most recent run of the *pre-dispatch* ~~run~~*calculation engine* or the *real-time market* does not exceed the export transaction *bid* costs for the last scheduled *price-quantity pair bid* lamination~~.~~; or

i. *a dispatchable electricity storage resource* for such *settlement hours* for which such *resource* is ineligible to receive a real-time make-whole payment in accordance with MR Ch.7 s.21.4.3.

3.5.3 Notwithstanding sections 3.5.2, a real-time make-whole payment *settlement amount*, shall be determined for any *settlement hour* where a *resource* receives a *real-time schedule* resulting from a *reliability* constraint.

3.5.4 Notwithstanding this section 3.5, the following *resources* shall be ineligible for the following components of the real-time make-whole payment *settlement amount*:

3.5.4.1 The following *resources* shall be ineligible for ELC and ELOC:

a. *dispatchable loads* and *dispatchable electricity storage resources* that are ~~withdrawing~~registered to withdraw for any quantity of *energy* that they *bid* at the *maximum market clearing price* and which was scheduled in the *real-time market*;

b. combustion ~~turbines~~turbine *resources* or steam ~~turbines~~turbine *resources* that are registered as a *pseudo-unit* but not operating as a *pseudo-unit* for *metering intervals* in which they have a ~~binding~~minimum constraint applied for combined cycle ~~physical unit constraint~~operation consistent with combustion turbine commitment;

c. hydroelectric *generation resources:*

i. for any *settlement hour* for which the hydroelectric *generation resource* receives an *hourly must run* binding constraint;

ii. that ~~share a~~are registered to the same *forebay* as one or more other hydroelectric *generation resources*, for a *trading day,* except for any *metering intervals* for which it receives a ~~binding~~ *reliability* constraint, if the sum of the quantity of *energy* scheduled in the *real-time market* for all *settlement hours* of the *trading day* for all *resources* that ~~share a~~are registered to the same *forebay* is less than or equal to the *minimum daily energy limit* of ~~the shared~~such *forebay;* or

iii. that ~~do~~are not ~~share a~~registered to the same *forebay* as one or more other hydroelectric *generation resources*, for a *trading day,* except for any *metering intervals* for which it receives a ~~binding~~ *reliability* constraint, if the sum of the quantity of *energy* scheduled in the *real-time market* for all *settlement hours* of the *trading day* for such *resources* is less than or equal to its *minimum daily energy limit;*

3.5.4.2 *energy traders* participating with *boundary entity resources* shall be ineligible for ELC, ELOC, and OLOC for import transactions;

3.5.4.3 *energy traders* participating with *boundary entity resources* shall be ineligible for ELOC and OLOC for export transactions;

3.5.4.4 *dispatchable load resources* and *dispatchable electricity storage resources* that are ~~withdrawing~~registered to withdraw shall be ineligible for ELOC where the *price-quantity pairs* contained in its *energy bid* for a *settlement hour* are not the same as the *price-quantity pairs* contained in its *energy*

bid for the immediately preceding and next *settlement hour* and such change results in the ramping of the *resource* described in the applicable *market manual;*

3.5.4.5 *resources* shall be ineligible for ELC when it is injecting or withdrawing energy below it's RT_LC_EOP;

3.5.4.6 *resources* shall be ineligible for ELOC when it is injecting or withdrawing energy above RT_LOC_EOP;

3.5.4.7 *resources* shall be ineligible for OLC when its *real-time schedule* for *operating reserve* is less than its RT_OR_LC_EOP;

3.5.4.8 *resources* shall be ineligible for OLOC when its *real-time schedule* for *operating reserve* is less than its RT_OR_LOC_EOP; and

3.5.4.9 Subject to section 3.5.4.9.1, *dispatchable loads* and *dispatchable electricity storage resources* that are ~~withdrawing~~registered to withdraw shall be ineligible for ELOC when (i) its RT_LOC_EOP is greater than its *real-time schedule;* (ii) its RT_LOC_EOP is greater than its actual quantity of *energy* withdrawn; and (iii) any of the following conditions exists:

a. its *real-time schedule* exceeds its actual quantity of *energy* withdrawn in the previous *metering interval* plus 2.5 minutes of ramping unless it is ramping up or down as specified in the applicable *market manual*; or

b. the *resource* has desynchronized from the *IESO-controlled grid* or is unable to follow its *dispatch instruction.*

3.5.4.9.1 Notwithstanding section 3.5.4.9, *dispatchable loads* and *dispatchable electricity storage resources* that are ~~withdrawing~~registered to withdraw shall be eligible for ELOC in the circumstances described in section 3.5.4.9 in any of the following circumstances:

a. the applicable *real-time market locational marginal price* for the relevant *metering interval* is greater than or equal to the *resource's bid* price for the last scheduled *price-quantity pair* for the current, next or previous *metering interval*;

b. the *metering interval* is part of an activation for *operating reserves* as specified in the applicable *market manual*; or

c. the *resource* was *dispatched* by the *IESO* to maintain the *reliability* of the *IESO-controlled grid*.

3.5.5 Notwithstanding anything in section 3.5 to the contrary and for the purpose of determining the real-time make-whole payment *settlement amount* for a *market participant,* the *IESO* shall adjust any:

3.5.5.1 *Offer* price and their substitions as per section 5.1.2.2, as applicable, associated with a *generation resource, dispatchable electricity storage resource* that is ~~injecting, or~~registered to inject, or an *energy trader* participating with a *boundary entity resource* that is injecting that is less than, (i) 0.00 $/MWh; and (ii) the applicable *real-time market locational marginal price* for the applicable *metering interval,* to the lesser of 0.00 $/MWh and such *real-time market locational marginal price;* and

3.5.5.2 *Bid* price and their substitions as per section 5.1.2.2, as applicable, associated with a *dispatchable load, dispatchable electricity storage resource* that is ~~withdrawing, or~~registered to withdraw, or an *energy trader* participating with a *boundary entity resource* that is withdrawing that is less than, (i) the price determined in accordance with the applicable *market manual*; and (ii) the applicable *real-time market locational marginal price* for the applicable *metering interval,* to the lesser of price determined in accordance with the applicable *market manual* and such *real-time market locational marginal price.*

Real-Time Make-Whole Payment for Dispatchable Generation Resources ~~Not Associated with a Pseudo-Unit~~That Are Not Pseudo-Units and Dispatchable Electricity Storage Resources That Are Registered to Inject

3.5.6 For a *delivery point* 'm' associated with a *dispatchable electricity storage resource* that is ~~injecting~~registered to inject or a *dispatchable generation resource* that is not ~~associated with~~ a *pseudo-unit*, the real-time make-whole payment *settlement amount* is calculated as follows:

3.5.6.1 The *IESO* shall calculate $RT\_ELC_{k,h}^{m,t}$ as follows:

$$RT\_ELC_{k,h}^{m,t} = -1\ x\ [[[OP(RT\_LMP_{h}^{m,t}, Max(DAM\_QSI_{k,h}^{m}, Min(RT\_QSI_{k,h}^{m,t}, AQEI_{k,h}^{m,t})), BE_{k,h}^{m,t}) - OP(RT\_LMP_{h}^{m,t}, Max(RT\_LC\_EOP_{k,h}^{m,t}, DAM\_QSI_{k,h}^{m}), BE_{k,h}^{m,t})] - RT\_FROP\_LC_{k,h}^{m,t}]] /12$$

Where:

a. the *dispatchable generation resource* is registered as a hydroelectric *generation resource,* $RT\_QSI_{k,h}^{m,t}$ is greater than $FR\_LL_{k}^{m,f}$, and $RT\_QSI_{k,h}^{m,t}$ is less than or equal to $FR\_UL_{k}^{m,f}$, then:

$$RT\_FROP\_LC_{k,h}^{m,t} = OP\left(RT\_LMP_{h}^{m,t}, Max(DAM\_QSI_{k,h}^{m}, Min(RT\_QSI_{k,h}^{m,t}, AQEI_{k,h}^{m,t})), BE_{k,h}^{m,t}\right) - OP\left(RT\_LMP_{h}^{m,t}, Max(FR\_LL_{k,h}^{m,t,f}, DAM\_QSI_{k,h}^{m}, RT\_LC\_EOP_{k,h}^{m,t}), BE_{k,h}^{m,t}\right)$$

$$RT\_FROP\_LC_{k,h}^{m,t} = OP\left(RT\_LMP_{h}^{m,t}, Max(DAM\_QSI_{k,h}^{m}, Min(RT\_QSI_{k,h}^{m,t}, AQEI_{k,h}^{m,t}), BE_{k,h}^{m,t}\right) - OP\left(RT\_LMP_{h}^{m,t}, Max(FR\_LL_{k,h}^{m,t,f}, DAM\_QSI_{k,h}^{m}, RT\_LC\_EOP_{k,h}^{m,t}), BE_{k,h}^{m,t}\right)$$

Where:

i. '~~$FR\_UL_{k}^{m,f}$~~ $FR\_UL_{k}^{m,f}$' is the *forbidden region* upper limit from *forbidden region* set 'f' where ~~$RT\_QSI_{k,h}^{m,t}$~~ $RT\_QSI_{k,h}^{m,t}$ <= $FR\_UL_{k}^{m,f}$, as submitted by *market participant* 'k' for *delivery point* 'm' as daily *dispatch data*.

ii. '~~$FR\_LL_{k}^{m,f}$~~ $FR\_LL_{k}^{m,f}$' is the *forbidden region* lower limit from *forbidden region* set 'f' where ~~$RT\_QSI_{k,h}^{m,t}$~~ $RT\_QSI_{k,h}^{m,t}$ > $FR\_LL_{k}^{m,f}$, as submitted by *market participant* 'k' for *delivery point* 'm' as daily *dispatch data*.

iii. 'f' = (1…N) of the *forbidden region* set {~~$FR\_UL_{k}^{m,f}$, $FR\_LL_{k}^{m,f}$~~ $FR\_UL_{k}^{m,f}$, $FR\_LL_{k}^{m,f}$} and 'N' is the maximum number of *forbidden regions* submitted by *market participant* 'k' for *delivery point* 'm' as daily *dispatch data*.

b. Otherwise $RT\_FROP\_LC_{k,h}^{m,t}$ shall equal zero.

3.5.6.2 The *IESO* shall calculate $RT\_ELOC_{k,h}^{m,t}$ as follows:

$$RT\_ELOC_{k,h}^{m,t} = \{OP\left(RT\_LMP_{h}^{m,t}, RT\_LOC\_EOP_{k,h}^{m,t}, BE_{k,h}^{m,t}\right) - Max\left[0, OP\left(RT\_LMP_{h}^{m,t}, Max(RT\_QSI_{k,h}^{m,t}, AQEI_{k,h}^{m,t}), BE_{k,h}^{m,t}\right)\right] - RT\_FROP\_LOC_{k,h}^{m,t}\}/12$$

Where:

a. if the *offer* price of $BE_{k,h}^{m,t}$ is greater than $RT\_LMP_{h}^{m,t}$, the *IESO* shall revise the *offer* price of $BE_{k,h}^{m,t}$ to be equal to $RT\_LMP_{h}^{m,t}$

b. if the *dispatchable generation resource* is registered as a hydroelectric *generation resource,* $RT\_QSI_{k,h}^{m,t}$ is greater than or equal to ~~FR_LL~~ $FR\_LL_{k}^{m,f}$ and $RT\_QSI_{k,h}^{m,t}$ is less than ~~FR_UL,~~ $FR\_UL_{k}^{m,f}$, then:

$$RT\_FROP\_LOC_{k,h}^{m,t}$$
$$= OP\left(RT\_LMP_{h}^{m,t},\ Min(FR\_UL_{k,h}^{m,t,f}, RT\_LOC\_EOP_{k,h}^{m,t}), BE_{k,h}^{m,t}\right)$$
$$- Max\left[0, OP\left(RT\_LMP_{h}^{m,t}, Max(RT\_QSI_{k,h}^{m,t,f}, AQEI_{k,h}^{m,t}), BE_{k,h}^{m,t}\right)\right]$$

$$RT\_FROP\_LOC_{k,h}^{m,t}$$
$$= OP\left(RT\_LMP_{h}^{m,t},\ Min(FR\_UL_{k,h}^{m,\neq,f}, RT\_LOC\_EOP_{k,h}^{m,t}), BE_{k,h}^{m,t}\right)$$
$$- Max\left[0, OP\left(RT\_LMP_{h}^{m,t}, Max(RT\_QSI_{k,h}^{m,t,f}, AQEI_{k,h}^{m,t}), BE_{k,h}^{m,t}\right)\right]$$

Where:

i. '$FR\_UL_{k}^{m,f}$' is the *forbidden region* upper limit from *forbidden region* set 'f' where $RT\_QSI_{k,h}^{m,t} < FR\_UL_{k}^{m,f}$, as submitted by *market participant* 'k' for *delivery point* 'm' as daily *dispatch data*.

ii. '$FR\_LL_{k}^{m,f}$' is the *forbidden region* lower limit from *forbidden region* set 'f' where $RT\_QSI_{k,h}^{m,t} >= FR\_LL_{k}^{m,f}$, as submitted by *market participant* 'k' for *delivery point* 'm' as daily *dispatch data*.

iii. 'f' = (1…N) of the *forbidden region* set $\{FR\_UL_{k}^{m,f}, FR\_LL_{k}^{m,f}\}$ and 'N' is the maximum number of *forbidden regions* submitted by *market participant* 'k' for *delivery point* 'm' as daily *dispatch data*.

c. Otherwise $RT\_FROP\_LOC_{k,h}^{m,t}$ shall equal zero.

Real-Time Make-Whole Payment for Dispatchable Loads and Dispatchable Electricity Storage Resources That Are Registered to Withdraw

3.5.7 For a *delivery point* 'm' associated with a *dispatchable load* or *dispatchable electricity storage resource* that is registered to withdraw, the real-time make-whole payment *settlement amount* is calculated as follows:

$$RT\_MWP_{k,h}^{m} = \sum^{T} Max\left(0, RT\_ELC_{k,h}^{m,t} + RT\_OLC_{k,h}^{m,t}\right) + Max(0, RT\_ELOC_{k,h}^{m,t} + RT\_OLOC_{k,h}^{m,t})$$

Where:

a. $RT\_ELC_{k,h}^{m,t} = Max\{0, OP(RT\_LMP_{h}^{m,t}, Min(RT\_QSW_{k,h}^{m,t}, AQEW_{k,h}^{m,t}), BL_{k,h}^{m,t}) - OP(RT\_LMP_{h}^{m,t}, Max(RT\_LC\_EOP_{k,h}^{m,t}, DAM\_QSW_{k,h}^{m}), BL_{k,h}^{m,t})\}/12$

b. $RT\_OLC_{k,h}^{m,t} = \sum_{R}\{-1 \times [OP(RT\_PROR_{r,h}^{m,t}, Max(DAM\_QSOR_{r,k,h}^{m}, RT\_QSOR_{r,k,h}^{m,t}), BOR_{r,k,h}^{m,t}) - OP(RT\_PROR_{r,h}^{m,t}, Max(RT\_OR\_LC\_EOP_{r,k,h}^{m,t}, DAM\_QSOR_{r,k,h}^{m}), BOR_{r,k,h}^{m,t})]/12\}$

c. $RT\_ELOC_{k,h}^{m,t} = -1 \times \{OP(RT\_LMP_{h}^{m,t}, RT\_LOC\_EOP_{k,h}^{m,t}, BL_{k,h}^{m,t}) - Max[0, OP(RT\_LMP_{h}^{m,t}, Max(RT\_QSW_{k,h}^{m,t}, AQEW_{k,h}^{m,t}), BL_{k,h}^{m,t})]\}/12$

And where:

i. if the *bid* price of $BL^{m,t}_{k,h}$ is less than $RT\_LMP_{h}^{m,t}$, the *IESO* shall revise the *bid* price of $BL^{m,t}_{k,h}$ to be equal to $RT\_LMP_{h}^{m,t}$

d. $RT\_OLOC_{k,h}^{m,t} = \sum_{R}[\{OP(RT\_PROR_{r,h}^{m,t}, RT\_OR\_LOC\_EOP_{r,k,h}^{m,t}, BOR_{r,k,h}^{m,t}) - Max[0, OP(RT\_PROR_{r,h}^{m,t}, RT\_QSOR_{r,k,h}^{m,t}, BOR_{r,k,h}^{m,t})]\}/12]$

$$RT\_MWP_{k,h}^{m} = \sum^{T} Max\left(0, RT\_ELC_{k,h}^{m,t} + RT\_OLC_{k,h}^{m,t}\right) + Max(0, RT\_ELOC_{k,h}^{m,t} + RT\_OLOC_{k,h}^{m,t})$$

Where:

~~$RT\_ELC_{k,h}^{m,t} = Max\{0, OP(RT\_LMP_{h}^{m,t}, Min(RT\_QSW_{k,h}^{m,t}, AQEW_{k,h}^{m,t}), BL_{k,h}^{m,t}) - OP(RT\_LMP_{h}^{m,t}, Max(RT\_LC\_EOP_{k,h}^{m,t}, DAM\_QSW_{k,h}^{m}), BL_{k,h}^{m,t})\}/12$~~

a. $RT\_ELC_{k,h}^{m,t} = [OP(RT\_LMP_{h}^{m,t}, Max(DAM\_QSW_{k,h}^{m}, Min(RT\_QSW_{k,h}^{m,t}, AQEW_{k,h}^{m,t})), BL_{k,h}^{m,t}) - OP(RT\_LMP_{h}^{m,t}, Max(RT\_LC\_EOP_{k,h}^{m,t}, DAM\_QSW_{k,h}^{m}), BL_{k,h}^{m,t})]/12$

b. $RT\_OLC_{k,h}^{m,t} = \sum_{R}\{-1 \times [OP(RT\_PROR_{r,h}^{m,t}, Max(DAM\_QSOR_{r,k,h}^{m}, RT\_QSOR_{r,k,h}^{m,t}), BOR_{r,k,h}^{m,t}) - OP(RT\_PROR_{r,h}^{m,t}, Max(RT\_OR\_LC\_EOP_{r,k,h}^{m,t}, DAM\_QSOR_{r,k,h}^{m}), BOR_{r,k,h}^{m,t})]/12\}$

~~$RT\_ELOC_{k,h}^{m,t} = -1 \times \{OP(RT\_LMP_{h}^{m,t}, RT\_LOC\_EOP_{k,h}^{m,t}, BL_{k,h}^{m,t}) - Max[0, OP(RT\_LMP_{h}^{m,t}, Max(RT\_QSW_{k,h}^{m,t}, AQEW_{k,h}^{m,t}), BL_{k,h}^{m,t})]\}/12$~~

c. $RT\_ELOC_{k,h}^{m,t} = -1 \times \{OP(RT\_LMP_{h}^{m,t}, RT\_LOC\_EOP_{k,h}^{m,t}, BL_{k,h}^{m,t}) - OP(RT\_LMP_{h}^{m,t}, Max(RT\_QSW_{k,h}^{m,t}, AQEW_{k,h}^{m,t}), BL_{k,h}^{m,t})\}/12$

And where:

i. if the *bid* price of $BL^{m,t}_{k,h}$ is less than $RT\_LMP_{h}^{m,t}$, the *IESO* shall revise the *bid* price of $BL^{m,t}_{k,h}$ to be equal to $RT\_LMP_{h}^{m,t}$

d. $RT\_OLOC_{k,h}^{m,t} = \sum_{R}[\{OP(RT\_PROR_{r,h}^{m,t}, RT\_OR\_LOC\_EOP_{r,k,h}^{m,t}, BOR_{r,k,h}^{m,t}) - Max[0, OP(RT\_PROR_{r,h}^{m,t}, RT\_QSOR_{r,k,h}^{m,t}, BOR_{r,k,h}^{m,t})]\}/12]$

And where:

i. if the *offer* price of $BOR_{r,k,h}^{m,t}$, is greater than $RT\_PROR_{r,h}^{m,t}$, the *IESO* shall revise the *offer* price of $BOR_{r,k,h}^{m,t}$ to be equal to $RT\_PROR_{r,h}^{m,t}$.

$$RT\_MWP_{k,h}^{m} = \sum^{T} Max\left(0, RT\_ELC_{k,h}^{m,t} + RT\_OLC_{k,h}^{m,t}\right) + Max(0, RT\_ELOC_{k,h}^{m,t} + RT\_OLOC_{k,h}^{m,t}\right)$$

a. $RT\_ELC_{k,h}^{m,t} = \left[OP\left(RT\_LMP_{h}^{m,t}, Max(DAM\_QSW_{k,h}^{m}, Min(RT\_QSW_{k,h}^{m,t}, AQEW_{k,h}^{m,t})), BL_{k,h}^{m,t}\right) - OP\left(RT\_LMP_{h}^{m,t}, Max(RT\_LC\_EOP_{k,h}^{m,t}, DAM\_QSW_{k,h}^{m}), BL_{k,h}^{m,t}\right)\right]/12$

b. $RT\_OLC_{k,h}^{m,t} = \sum_{R}\{-1 \times \left[OP\left(RT\_PROR_{r,h}^{m,t}, Max(DAM\_QSOR_{r,k,h}^{m}, RT\_QSOR_{r,k,h}^{m,t}), BOR_{r,k,h}^{m,t}\right) - OP\left(RT\_PROR_{r,h}^{m,t}, Max(RT\_OR\_LC\_EOP_{r,k,h}^{m,t}, DAM\_QSOR_{r,k,h}^{m}), BOR_{r,k,h}^{m,t}\right)\right]/12\}$

c. $RT\_ELOC_{k,h}^{m,t} = -1 \times \{OP\left(RT\_LMP_{h}^{m,t}, RT\_LOC\_EOP_{k,h}^{m,t}, BL_{k,h}^{m,t}\right) - OP\left(RT\_LMP_{h}^{m,t}, Max(RT\_QSW_{k,h}^{m,t}, AQEW_{k,h}^{m,t}), BL_{k,h}^{m,t}\right)\}/12$

And where:

i. if the *bid* price of $BL^{m,t}_{k,h}$ is less than $RT\_LMP_{h}^{m,t}$, the *IESO* shall revise the *bid* price of $BL^{m,t}_{k,h}$ to be equal to $RT\_LMP_{h}^{m,t}$

d. $RT\_OLOC_{k,h}^{m,t} = \sum_{R}\left[\{OP\left(RT\_PROR_{r,h}^{m,t}, RT\_OR\_LOC\_EOP_{r,k,h}^{m,t}, BOR_{r,k,h}^{m,t}\right) - Max\left[0, OP\left(RT\_PROR_{r,h}^{m,t}, RT\_QSOR_{r,k,h}^{m,t}, BOR_{r,k,h}^{m,t}\right)\right]\}/12\right]$

And where:

i. if the *offer* price of $BOR^{m,t}_{r,k,h}$ is greater than $RT\_PROR_{r.h}^{m,t}$, the *IESO* shall revise the *offer* price of $BOR^{m,t}_{r,k,h}$ to be equal to $RT\_PROR_{r,h}^{m,t}$

Real-Time Make-Whole Payment for Boundary Entity Resources

3.5.8 For a transaction at an *intertie metering point* 'i' associated with an *energy trader* participating with a *boundary entity resource*, the real-time make-whole payment *settlement amount* is calculated in accordance with the following:

Real-Time Make-Whole Payment for Dispatchable Generation Resources ~~Associated with a~~That Are Pseudo-~~Unit~~Units

Combustion turbine

3.5.9 For a *delivery point* 'c' for a combustion turbine ~~of a *dispatchable generation resource*~~ associated with a *pseudo-unit*, the real-time make-whole payment *settlement amount* is calculated as follows:

Steam turbine

3.5.10 For a *delivery point* 's' for a steam turbine ~~of a *dispatchable generation* resource~~ associated with a *pseudo-unit* where at least one of the combustion ~~turbines~~turbine *resources* associated with the *pseudo-unit* has a *real-time schedule* greater than or equal to its *minimum loading point* during the applicable *settlement hour*, the real-time make-whole payment *settlement amount* is calculated as follows:

$$RT\_MWP^{s}_{k,h} = \sum^{T} Max\left(0, RT\_ELC^{s,t}_{k,h} + RT\_OLC^{s,t}_{k,h}\right) + Max\left(0, RT\_ELOC^{s,t}_{k,h} + RT\_OLOC^{s,t}_{k,h}\right)$$

Where:

a. $RT\_ELC^{s,t}_{k,h} = (-1) \times \left[OP\left(RT\_LMP^{s,t}_{h}, Max\left(DAM\_DIGQ^{s}_{k,h}, Min\left(RT\_QSI\_DIGQ^{s,t}_{k,h}, AQEI^{s,t}_{k,h}\right)\right), RT\_DIPC^{s,t}_{k,h}\right) - OP\left(RT\_LMP^{s,t}_{h}, Max\left(RT\_LC\_EOP\_DIGQ^{s,t}_{k,h}, DAM\_DIGQ^{s}_{k,h}\right), RT\_DIPC^{s,t}_{k,h}\right)\right]/12$

b. $RT\_OLC^{s,t}_{k,h} = \sum_{R}\left[(-1) \times \left\{OP\left(RT\_PROR^{s,t}_{r,h}, Max\left(DAM\_QSOR^{s}_{r,k,h}, RT\_QSOR^{s,t}_{r,k,h}\right), RT\_OR\_DIPC^{s,t}_{r,k,h}\right) - OP\left(RT\_PROR^{s,t}_{r,h}, Max\left(RT\_OR\_LC\_EOP^{s,t}_{r,k,h}, DAM\_QSOR^{s}_{r,k,h}\right), RT\_OR\_DIPC^{s,t}_{r,k,h}\right)\right\}/12\right]$

And where:

i. If the *offer* price in the $RT\_OR\_DIPC^{s,t}_{r,k,h}$ *offer* curve is greater than $RT\_PROR^{s,t}_{r,h}$ for the same *class r reserve*, the *IESO* shall revise the *offer* price of $RT\_OR\_DIPC^{s,t}_{r,k,h}$ to be equal to $RT\_PROR^{s,t}_{r,h}$.

c. $RT\_ELOC^{s,t}_{k,h} = \left\{OP\left(RT\_LMP^{s,t0}_{h}, RT\_LOC\_EOP\_DIGQ^{s,t0}_{k,h}, RT\_DIPC^{s,t0}_{k,h}\right) - Max\left[0, OP\left(RT\_LMP^{s,t0}_{h}, Max\left(RT\_QSI\_DIGQ^{s,t0}_{k,h}, AQEI^{s,t0}_{k,h}\right), RT\_DIPC^{s,t0}_{k,h}\right)\right]\right\}/12 + \left\{OP\left(RT\_LMP^{s,t1}_{h}, RT\_LOC\_EOP\_DIGQ^{s,t1}_{k,h}, RT\_DIPC^{s,t1}_{k,h}\right) - Max\left[0, OP\left(RT\_LMP^{s,t1}_{h}, RT\_QSI\_DIGQ^{s,t1}_{k,h}, RT\_DIPC^{s,t1}_{k,h}\right)\right]\right\}/12$

And where:

i. '~~T_0~~t_0' is ~~the set of all~~ *metering* ~~*intervals*~~*interval* 't' in *settlement hour* 'h' when none of the combustion ~~turbines~~turbine *resources* associated with the steam turbine *resource* have a *real-time schedule* that is less than its respective *minimum loading point*. For greater certainty, 't_1' and 't_0' *metering intervals* are mutually exclusive, and the calculation will be conducted using either the 't_1' or 't_0' variables, depending on whether the relevant *metering interval* meets the criteria of 't_1' or 't_0', respectively;

ii. '~~T_1~~t_1' is ~~the set of all~~ *metering* ~~*intervals*~~*interval* 't' in *settlement hour* 'h' when (1) at least one combustion turbine *resource* associated with the steam turbine *resource* has a *real-time schedule* greater than or equal to its *minimum loading point*; and (2) at least one of the combustion ~~turbines~~turbine *resources* associated with the steam turbine *resource* has a *real-time schedule* that is less than its respective *minimum loading point*. For greater certainty, 't_1' and 't_0' *metering intervals* are mutually exclusive, and the calculation will be conducted using either the 't_1' or 't_0' variables, depending on whether the relevant *metering interval* meets the criteria of 't_1' or 't_0', respectively; and

iii. If the *offer* price in the $RT\_DIPC_{k,h}^{s,t}$ *offer* curve is greater than $RT\_LMP_{h}^{s,t}$, the *IESO* shall revise the *offer* price of $RT\_DIPC_{k,h}^{s,t}$ to be equal to $RT\_LMP_{h}^{s,t}$.

d. $$RT\_OLOC_{k,h}^{s} = \sum_R\left[\left\{OP\left(RT\_PROR_{r,h}^{s,t}, RT\_OR\_LOC\_EOP_{r,k,h}^{s,t}, RT\_OR\_DIPC_{r,k,h}^{s,t}\right) - Max\left[0, OP\left(RT\_PROR_{r,h}^{s,t}, RT\_QSOR_{r,k,h}^{s,t}, RT\_OR\_DIPC_{r,k,h}^{s,t}\right)\right]\right\}/12\right]$$

And where:

i. If the *offer* price in the $RT\_OR\_DIPC_{r,k,h}^{s,t}$ *offer* curve is greater than $RT\_PROR_{r,h}^{s,t}$ for the same *class r reserve*, the *IESO* shall revise the *offer* price of $RT\_OR\_DIPC_{r,k,h}^{s,t}$ to be equal to $RT\_PROR_{r,h}^{s,t}$.

3.6 Real-Time Intertie Offer Guarantee

3.6.1 Subject to section 3.6.2, the real-time *intertie offer* guarantee *settlement amount* shall be calculated and disbursed to the ~~*market participants* of~~*energy trader* participating with a *boundary entity resource* in accordance with this section 3.6 for each *settlement hour* in which such *energy trader* participating with *boundary entity resource* has either an *energy* import transaction scheduled in the *real-time market* that is incremental to its *day-ahead schedule* for the same *settlement hour* or an *energy* import transaction scheduled in the *real-time market* for a *settlement hour* in

which the *energy trader* participating with a *boundary entity resource* does not have a *day-ahead schedule.*

3.6.5 The offset quantity of *energy* of an eligible *energy* import transaction scheduled in the *real-time market* ($OFFSET\_MW^{i}_{k,h}$) shall be:

3.6.5.1 determined for each eligible *energy* import transaction scheduled in the *real-time market* with a $IOG\_Rate^{i}_{k,h}$ that is greater than $0/MW. For greater certainty, those eligible *energy* import transaction scheduled in the *real-time market* with an $IOG\_Rate^{i}_{k,h}$ that is equal to $0/MW shall not receive any real-time *intertie offer* guarantee *settlement amount*;

3.6.5.2 equal to the total value of all *energy* quantities offset against such transaction which shall be determined in accordance with the following:

a. the offsetting process will produce an $OFFSET\_MW^{i}_{k,h}$ value for each eligible *energy* import transaction scheduled in the *real-time market* with a non-zero $IOG\_Rate^{i}_{k,h}$, and it shall not exceed the scheduled *energy* quantity of such import transaction;

---

f. the offsetting process shall be conducted in accordance with the process outlined in the applicable *market manual*, which will, in the following order:

i. offset export transaction quantities scheduled in the *real-time market* by the amount of *day-ahead market energy* export transaction quantities scheduled in the *day-ahead market* for the same *boundary entity resource* and *energy trader*;

3.7 Real-Time Intertie Failure Charges

3.7.1 The real-time import failure charge and the real-time export failure charge, referred to in MR Ch.7 s.7.5.8B, are *settlement amounts* calculated for each transaction meeting the eligibility criteria outlined in sections 3.7.3 and 3.7.5, respectively, and shall be collected from ~~*market participants* for~~ *energy traders* participating with *boundary entity resources* in accordance with sections 3.7.4 and 3.7.6, respectively.

3.7.2 The *IESO* shall determine, in accordance with the applicable *market manual*, any price bias adjustment factors to be used in the calculation of the real-time import failure charge or the real-time export failure charge, and shall *publish* all applicable

price bias adjustment factors in advance of the *settlement hours* to which such price bias adjustment factors apply.

Real-Time Import Failure Charge

3.7.4 For each import transaction scheduled in the *real-time schedule* that meets the criteria set out in section 3.7.3, the real-time import failure charge for *market participant* 'k' at *intertie metering point* 'i' in *settlement hour* 'h' ($RT\_IMFC^{i}_{k,h}$) shall be determined as follows:

$$RT\_IMFC^{i}_{k,h} = \sum^{T} (-1) \times MinIN\left(MaxAX\left(0, \left(RT\_IBP^{i,t}_{h} + PB\_IM^{t}_{h} - PD\_IBP^{i}_{h}\right) \times RT\_ISD^{i,t}_{k,h}\right), MaxAX\left(0, RT\_IBP^{i,t}_{h} \times RT\_ISD^{i,Dt}_{k,h}\right)\right)$$

Where:

a. $RT\_ISD^{i,t}_{k,h} = MaxAX\left(MaxAX\left(PD\_QSI^{i}_{k,h} - DAM\_QSI^{i}_{k,h}, 0\right) - MaxAX\left(SQEI^{i,t}_{k,h} - DAM\_QSI^{i}_{k,h}, 0\right), 0\right)$

$$RT\_IMFC^{i}_{k,h} = \sum^{T} \Big[(-1) \times Min\Big(Max\left(0, \left(RT\_IBP^{i,t}_{h} + PB\_IM^{t}_{h} - PD\_IBP^{i}_{h}\right) \times RT\_ISD^{i,t}_{k,h}\right), Max\left(0, RT\_IBP^{i,t}_{h} \times RT\_ISD^{i,t}_{k,h}\right)\Big) + Min\left(0, \left(RT\_PEC^{i,t}_{h} + RT\_PNISL^{i,t}_{h}\right) \times RT\_ISD^{i,t}_{k,h}\right)\Big] / 12$$

Where:

a. $RT\_ISD^{i,t}_{k,h}$ is the real-time import scheduling deviation quantity calculated for *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h', and calculated as follows:

$$RT\_ISD^{i,t}_{k,h} = Max\left(PD\_QSI^{i}_{k,h} - Max\left(DAM\_QSI^{i}_{k,h}, SQEI^{i,t}_{k,h}\right), 0\right)$$

Real-Time Export Failure Charge

3.7.6 For each export transaction scheduled in the *real-time schedule* that meets the criteria set out in section 3.7.5, the real-time export failure charge for *market*

participant 'k' at *intertie metering point* 'i' in *settlement hour* 'h' ($RT\_EXFC_{k,h}^{i}$) shall be determined as follows:

$$RT\_EXFC_{k,h}^{i} = \sum^{T} (-1) \times Min\left(Max\left(0, \left(PD\_IBP_{h}^{i} - PB\_EX_{h}^{t} - RT\_IBP_{h}^{i,t}\right) \times RT\_ESD_{k,h}^{i,t}\right), Max\left(0, PD\_IBP_{h}^{i} \times RT\_ESD_{k,h}^{i,t}\right)\right)/12$$

Where:

a. $RT\_ESD_{k,h}^{i,t} = Max\left(Max\left(PD\_QSW_{k,h}^{i} - DAM\_QSW_{k,h}^{i}, 0\right) - Max\left(SQEW_{k,h}^{i,t} - DAM\_QSW_{k,h}^{i}, 0\right), 0\right)$

$$RT\_EXFC_{k,h}^{i} = \sum^{T} \left[(-1) \times Min\left(Max\left(0, \left(PD\_IBP_{h}^{i} - PB\_EX_{h}^{t} - RT\_IBP_{h}^{i,t}\right) \times RT\_ESD_{k,h}^{i,t}\right), Max\left(0, PD\_IBP_{h}^{i} \times RT\_ESD_{k,h}^{i,t}\right)\right) - Max\left(0, \left(RT\_PEC_{h}^{i,t} + RT\_PNISL_{h}^{i,t}\right) \times RT\_ESD_{k,h}^{i,t}\right)\right]/12$$

Where:

a. $RT\_ESD_{k,h}^{i,t}$ is the real-time export scheduling deviation quantity calculated for *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h', and calculated as follows:

$$RT\_ESD_{k,h}^{i,t} = Max\left(PD\_QSW_{k,h}^{i} - Max\left(DAM\_QSW_{k,h}^{i}, SQEW_{k,h}^{i,t}\right), 0\right)$$

3.7A Day-Ahead Market Intertie Failure Charges

3.7A.1 The day-ahead import failure charge and the day-ahead export failure charge, referred to in MR Ch.7 s.7.5.8B, are *settlement amounts* calculated for all, or the portion, of each transaction for injection or withdrawal at an *intertie metering point* that is scheduled in the *day-ahead market* and subsequently scheduled in the *pre-dispatch process* but not scheduled in the *real-time market.* The day-ahead import failure charge and the day-ahead export failure charge shall be collected from *energy traders* participating with *boundary entity resources* in accordance with sections 3.7A.2 and 3.7A.3, respectively.

Day-Ahead Import Failure Charge

3.7A.2 For import transactions, the day-ahead import failure charge for *market participant* 'k' at *intertie metering point* 'i' in *settlement hour* 'h' ($DAM\_IMFC^{i}_{k,h}$) shall be determined as follows:

$$DAM\_IMFC^{i}_{k,h} = \sum^{T} Min\left(0, \left(RT\_PEC^{i,t}_{h} + RT\_PNISL^{i,t}_{h}\right) \times DAM\_ISD^{i,t}_{k,h}/12\right)$$

Where:

a. $DAM\_ISD^{i,t}_{k,h}$ is the *day-ahead market* import scheduling deviation quantity calculated for *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h', and calculated as follows:

$$DAM\_ISD^{i,t}_{k,h} = Max\left(Min\left(DAM\_QSI^{i}_{k,h}, PD\_QSI^{i}_{k,h}\right) - SQEI^{i,t}_{k,h}, 0\right)$$

Day-Ahead Market Export Failure Charge

3.7A.3 For export transactions, the day-ahead export failure charge for *market participant* 'k' at *intertie metering point* 'i' in *settlement hour* 'h' ($DAM\_EXFC^{i}_{k,h}$) shall be determined as follows:

$$DAM\_EXFC^{i}_{k,h} = \sum^{T} (-1) \times Max\left(0, \left(RT\_PEC^{i,t}_{h} + RT\_PNISL^{i,t}_{h}\right) \times DAM\_ESD^{i,t}_{k,h}/12\right)$$

Where:

a. $DAM\_ESD^{i,t}_{k,h}$ is the day-ahead export scheduling deviation quantity calculated for *market participant* 'k' at *intertie metering point* 'i' during *metering interval* 't' of *settlement hour* 'h', and calculated as follows:

$$DAM\_ESD^{i,t}_{k,h} = Max\left(Min\left(DAM\_QSW^{i}_{k,h}, PD\_QSW^{i}_{k,h}\right) - SQEW^{i,t}_{k,h}, 0\right)$$

3.8 Hourly Settlement Amounts for Transmission Rights

3.8.1 The ~~*TR*~~*transmission right* *settlement* credit *settlement amount* for *market participant* 'k' in *settlement hour* 'h' ("$TRSC_{k,h}$") shall, other than where MR Ch.8 s.3.4.2 or 3.4.3 applies, be determined by the following:

3.8.1.1 if the injection *TR zone* of the *transmission right* is in the *IESO control area*, determined by the following equation:

$$TRSC_{k,h} = Max\left[0, QTR_{k,h}^{i,j} \times DAM\_PEC_{h}^{i}\right]$$

3.8.1.2 if the withdrawal *TR zone* of the *transmission right* is in the *IESO control area*, determined by the following equation:

$$TRSC_{k,h} = Max\left[0, -1 \times QTR_{k,h}^{i,j} \times DAM\_PEC_{h}^{j}\right]$$

Where:

a. 'j' is the *registered wholesale meter* or *intertie metering points* associated with the withdrawal *TR zone*;

b. 'i' is the *registered wholesale meter* or *intertie metering points* associated with the injection *TR zone;*

c. $DAM\_PEC_{h}^{i}$ is the *day-ahead market* external congestion price for *energy* in injection *TR zone* 'i' in *settlement hour* 'h'; and

d. $DAM\_PEC_{h}^{j}$ is the *day-ahead market* external congestion price for *energy* in withdrawal *TR zone* 'j' in *settlement hour* 'h'.

3.8.1.1 if the injection *TR zone* of the *transmission right* is in the *IESO control area*, determined by the following equation:

$$TRSC_{k,h} = Max\left[0, QTR_{k,h}^{iz,jz} \times DAM\_PEC_{h}^{iz}\right]$$

3.8.1.2 if the withdrawal *TR zone* of the *transmission right* is in the *IESO control area*, determined by the following equation:

$$TRSC_{k,h} = Max\left[0, -1 \times QTR_{k,h}^{iz,jz} \times DAM\_PEC_{h}^{jz}\right]$$

Where:

~~a. 'j' is the *registered wholesale meter* or *intertie metering points* associated with the withdrawal *TR zone*;~~

~~b. 'i' is the *registered wholesale meter* or *intertie metering points* associated with the injection *TR zone;*~~

~~c.~~a. $DAM\_PEC_h^{iz}$ is the *day-ahead market* external congestion price for *energy* in injection *TR zone* 'iz' in *settlement hour* 'h'; and

~~d.~~b. $DAM\_PEC_h^{jz}$ is the *day-ahead market* external congestion price for *energy* in withdrawal *TR zone* 'jz' in *settlement hour* 'h'.

3.8.2 The amount of the *day-ahead market* net external congestion residual, which is the *day-ahead market external congestion rent* remaining following the disbursement of the ~~*TR*~~*transmission right* *settlement* credit *settlement amount,* in *settlement hour* 'h' ("DAM_NECR_h") shall be calculated as follows:

$$DAM\_NECR_h = \sum_K^I \left[\left(DAM\_QSW_{k,h}^i - DAM\_QSI_{k,h}^i\right) x\ DAM\_PEC_h^i\right] - \sum_K \left[TRSC_{k,h}\right]$$

3.8.3 Disbursements from the *TR clearing account* authorized by the *IESO Board* pursuant to MR Ch.8 s.3.18.2 shall be disbursed by the *IESO* in accordance with section 4.9.

3.8.4 Any net revenues received from the sale of a *transmission right* in a *TR auction,* along with the DAM_NECR_h and any other credits referred to in MR Ch.8 s.3.18.1*,* shall be credited to the *TR clearing account* and shall be used in accordance with the provisions of section 3.8.3 and the provisions of MR Ch.8.

3.9 Operating Deviations (ORSSD)

3.9.3 The *energy* shortfall fraction for *class r reserve* for *resource* 'k/m' in *metering interval* 't' of *settlement hour* 'h' ("$ORESF_{k,r,h}^{m,t}$") is determined in accordance with the following:

3.9.3.1 where *operating reserve* is provided from a *generation resource* or from an *electricity storage resource* ~~injecting~~registered to inject *energy*:

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

3.9.3.2 where *operating reserve* is provided from a *dispatchable load* or from an *electricity storage resource* ~~withdrawing~~registered to withdraw *energy*:

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

3.10 Operating Reserve Non-Accessibility Charge and Associated Reversal Charges

3.10.1 The *operating reserve* non-accessibility charge *settlement amount* for *market participant* 'k' for *delivery point* 'm' in *metering interval* 't' of *settlement hour* 'h' ("$ORSCB^{m,t}_{r,k,h}$") shall be calculated for each *metering interval* for the *market participants* of *dispatchable loads, dispatchable electricity storage resources,* or *dispatchable generation resources,* individually or as aggregated in accordance with MR Ch.7 s.2.3, as applicable, for each type of *class r reserve*. The *operating reserve* non-accessibility charge *settlement amount* shall be calculated and collected from such *market participants* for each instance in which they meet the eligibility criteria outlined in sections 3.10.7, 3.10.11 and 3.10.14, as applicable, and as calculated in accordance with sections 3.10.8, 3.10.9, 3.10.12, and 3.10.15, as applicable.

3.10.2 The real-time make whole payment reversal charge *settlement amount* for *market participant* 'k' for *delivery point* 'm' in *settlement hour* 'h' ($RT\_MWP\_RC^{m}_{k,h}$) shall be calculated for each *settlement hour* for the *market participants* of *dispatchable loads, dispatchable electricity storage resources,* or *dispatchable generation resources,* individually or as aggregated in accordance with MR Ch.7 s.2.3, as applicable. The real-time make whole payment reversal charge *settlement amount* shall be calculated and collected from such *market participants* for each *settlement hour* for which they received a real-time make whole payment *settlement amount* and meet the conditions set out in section 3.10.7, and as calculated in accordance with sections 3.10.17, 3.10.20, and 3.10.23, as applicable.

3.10.3 The real-time *generator offer* guarantee claw back *settlement amount* for *market participant* 'k' for *delivery point* 'm' in *settlement hour* 'h' ($RT\_GOG\_CB^{m}_{k,h}$) shall be calculated for each *settlement hour* for the *market participants* of *GOG-eligible resources,* individually or as aggregated in accordance with MR Ch.7 s.2.3, as applicable. The real-time *generator offer* guarantee claw back *settlement amount* shall be calculated and collected for each *settlement hour* for which they received a real-time *generator offer* guarantee *settlement amount* and meet the conditions set out in section 3.10.7, and as calculated in accordance with sections 3.10.26, 3.10.29, and 3.10.32, as applicable.

3.10.4 Notwithstanding anything in this section 3.10, if the relevant *resource* for the relevant *settlement hour* received a real-time make whole payment *settlement amount* or real-time *generator offer* guarantee *settlement amount* based on the EMFC *settlement amount,* as defined in section 5.1.2.2, then the calculation for real-time make whole payment reversal charge *settlement amount* and real-time *generator offer* guarantee claw back *settlement amount,* respectively, will utilize the same substitutions provided for in section 5.1.2.2.

3.10.5 Notwithstanding anything to the contrary in this section 3.10, a *resource* will not be subject to the real-time make whole payment reversal charge *settlement amount* or real-time *generator offer* guarantee claw back *settlement amount* if the relevant *resource* for the relevant *settlement hour* did not receive a real-time make whole payment *settlement amount* related to *operating reserve* or real-time *generator offer* guarantee *settlement amount* related to *operating reserve*, respectively.

3.10.6 For the purposes of this section 3.10, $TAOR_{k,h}^{m,t}$, $TAOR\_CT_{k,h}^{c,t}$, and $TAOR\_ST_{k,h}^{s,t}$ will be calculated as follows:

a. For a *dispatchable electricity storage resource* or a *dispatchable generation resource*, the total accessible *operating reserve* is calculated as follows:

$$TAOR_{k,h}^{m,t} = Max\left(0, MAX\_CAP_{k,h}^{m,t} - AQEI_{k,h}^{m,t}\right)$$

Where:

i. $MAX\_CAP_{k,h}^{m,t}$ is the maximum limit used in determining the *real-time schedule* in the *dispatch scheduling* and pricing process.

b. For a *dispatchable load*, the total accessible *operating reserve* is calculated as follows:

$$TAOR_{k,h}^{m,t} = Max\left(0, AQEW_{k,h}^{m,t} - MC_{k,h}^{m,t}\right)$$

Where:

i. $MC_{k,h}^{m,t}$ the minimum consumption level, equal to the quantity in the *price-quantity pair* where the *bid* price is the *maximum market clearing price.*

c. For a combustion turbine *resource* associated with a *pseudo unit*, the total accessible *operating reserve* is calculated as follows:

i. If the combustion turbine *resource* is injecting into the *IESO-controlled grid* an amount of *energy* that is equal to or greater than the *resource's minimum loading point* in *metering interval* 't', then:

$$TAOR\_CT_{k,h}^{c,t} = Max\left(0, MAX\_CAP_{k,h}^{c,t} - AQEI_{k,h}^{c,t}\right)$$

ii. If the combustion turbine *resource* is injecting into the *IESO-controlled grid* an amount *energy* that is less than the *resource's minimum loading point* in *metering interval* 't', then

$$TAOR\_CT_{k,h}^{c,t} = 0$$

d. For a steam turbine *resource* associated with a *pseudo unit*, the total accessible *operating reserve* is calculated as follows:

$$TAOR\_ST_{k,h}^{s,t} = Max\left[0, \left(\sum_{D}^{P1} RT\_ORRQ_{k,d}^{p}\right) - \left(\sum^{C1} MAX\_CAP_{k,h}^{c,t}\right) - AQEI_{k,h}^{s,t}\right]$$

Where:

i. 'P1' is the set of the *resource's pseudo-units* 'p' where the associated combustion turbine *resource* is injecting *energy* into the *IESO-controlled grid* in an amount equal to or greater than its *minimum loading point* and is not operating in *single cycle mode*;

ii. 'C1' is the set of the *resource's* combustion turbine *resources* 'c' associated with the steam turbine *resource* and where the combustion turbine *resources* are injecting *energy* into the *IESO-controlled grid* in an amount equal to or greater than its *minimum loading point* and is not operating in *single cycle mode*; and

iii. 'D' is the set of *pseudo-unit* operating regions 'd1', 'd2', and 'd3'.

3.10.7 The *operating reserve* non-accessibility charge *settlement amount*, real-time make whole payment reversal charge *settlement amount* and real-time *generator offer* guarantee claw back *settlement amount* shall be calculated and collected from the following *resources* in the following circumstances:

a. *dispatchable loads*, *electricity storage resources* and non-aggregated *generation resources* will be subject to the *operating reserve* non-accessibility charge *settlement amount* for any *metering interval* when the *market participant* was not activated by the *IESO* to provide *operating reserve* and the following is true:

i. $\sum_R RT\_QSOR_{r,k,h}^{m,t} > 0$; and

ii. $\sum_R RT\_QSOR_{r,k,h}^{m,t} > TAOR_{k,h}^{m,t}$

b. aggregated *generation resources* will be subject to the *operating reserve* non-accessibility charge *settlement amount* for any *metering interval* when, at one or more of the aggregated *delivery points*, the *market participant* was not activated by the *IESO* to provide *operating reserve* and the following is true:

i. $\sum_R RT\_QSOR_{r,k,h}^{m,t} > 0$; and

ii. $\sum_R RT\_QSOR_{r,k,h}^{m,t} > TAOR_{k,h}^{m,t}$

Operating Reserve Non-Accessibility Charge for Dispatchable Loads, Dispatchable Electricity Storage Resources, and Non-Aggregated Dispatchable Generation Resources

3.10.8 For a *delivery point* 'm' associated with a *dispatchable load*, *dispatchable electricity storage resource* or a non-aggregated *dispatchable generation resource*, the *operating reserve* non-accessibility charge *settlement amount* is calculated as follows for each type of *class r reserve*:

a. For synchronized *ten-minute operating reserve*:

$$ORSCB_{r1,k,h}^{m,t} = Min\left[0, \left(TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t}\right) \times RT\_PROR_{r1,h}^{m,t}\right]$$

b. For non-synchronized *ten-minute operating reserve*:

$$ORSCB_{r2,k,h}^{m,t} = Min\{0, [Max(0, TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t}) - RT\_QSOR_{r2,k,h}^{m,t} ~~AQOR_{r2,k,h}^{m,t}~~] \times RT\_PROR_{r2,h}^{m,t}\}$$

c. For *thirty-minute operating reserve*:

$$ORSCB_{r3,k,h}^{m,t} = Min\{0, [Max(0, TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t} - RT\_QSOR_{r2,k,h}^{m,t}) - RT\_QSOR_{r3,k,h}^{m,t}] \times RT\_PROR_{r3,h}^{m,t}\}$$

Operating Reserve Non-Accessibility Charge for Aggregated Dispatchable Generation Resources That Are Not Pseudo-Units

3.10.9 For each *delivery point* 'm' associated with an aggregated *dispatchable generation resources*, the *operating reserve* non-accessibility charge *settlement amount* is calculated as follows for each type of *class r reserve*:

a. For synchronized *ten-minute operating reserve*:

$$ORSCB_{r1,k,h}^{m,t} = ORSCB_{k,h}^{M,t} \times \frac{ORIA_{r1,k,h}^{m,t}}{\sum_{R}^{M} ORIA_{r,k,h}^{m,t}}$$

b. For non-synchronized *ten-minute operating reserve*:

$$ORSCB_{r2,k,h}^{m,t} = ORSCB_{k,h}^{M,t} \times \frac{ORIA_{r2,k,h}^{m,t}}{\sum_{R}^{M} ORIA_{r,k,h}^{m,t}}$$

c. For *thirty-minute operating reserve*:

$$ORSCB_{r3,k,h}^{m,t} = ORSCB_{k,h}^{M,t} \times \frac{ORIA_{r3,k,h}^{m,t}}{\sum_{R}^{M} ORIA_{r,k,h}^{m,t}}$$

Where:

i. 'M' is the set of all *delivery points* 'm' of the aggregated group of *dispatchable generation resources;*

ii. $ORIA_{r1,k,h}^{m,t}$ is the amount of inaccessible synchronized *ten-minute operating reserve*, and determined in accordance with the following:

$$ORIA_{r1,k,h}^{m,t} = Min(0, TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t})$$

iii. $ORIA_{r2,k,h}^{m,t}$ is the amount of inaccessible non-synchronized *ten-minute operating reserve*, and determined in accordance with the following:

$$ORIA_{r2,k,h}^{m,t} = Min\left[0, Max\left(0, TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t}\right) - RT\_QSOR_{r2,k,h}^{m,t}\right]$$

iv. $ORIA_{r3,k,h}^{m,t}$ is the amount of inaccessible *thirty-minute operating reserve*, and determined in accordance with the following:

$$ORIA_{r3,k,h}^{m,t} = Min\left[0, Max\left(0, TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t} - RT\_QSOR_{r2,k,h}^{m,t}\right) - RT\_QSOR_{r3,k,h}^{m,t}\right]$$

v. $ORSCB_{k,h}^{M,t}$ is the total amount of *operating reserve* non-accessibility charge calculated for all *delivery points* 'm' of the aggregated group of *dispatchable generation resources* 'M', as calculated in section 3.10.10;

3.10.10 For the purposes of calculating the *operating reserve* non-accessibility charge *settlement amount* set out in section 3.10.9, $ORSCB_{k,h}^{M,t}$ is calculated as follows:

$$ORSCB_{k,h}^{M,t} = Min\left[0, \sum_{R}^{M}\left(NORD_{r,k,h}^{m,t} \times RT\_PROR_{r,k,h}^{m,t}\right)\right]$$

Where:

a. 'M' is the set of all *delivery points* 'm' of the aggregated group of *dispatchable generation resources;*

b. $NORD_{r,k,h}^{m,t}$ is the net *operating reserve* deviation, and is calculated as follows for each type of *class r reserve*:

i. For synchronized *ten-minute operating reserve*:

$$NORD_{r1,k,h}^{m,t} = Min(RT\_QSOR_{r1,k,h}^{m,t}, TAOR_{~~r1,~~k,h}^{m,t}) + REAH_{r1,k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t}$$

ii. For non-synchronized *ten-minute operating reserve*:

$$NORD_{r2,k,h}^{m,t} = Min[RT\_QSOR_{r2,k,h}^{m,t}, Max(0, TAOR_{~~r1,~~k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t})] + REAH_{r2,k,h}^{m,t} - RT\_QSOR_{r2,k,h}^{m,t}$$

iii. For *thirty-minute operating reserve*:

$$NORD_{r3,k,h}^{m,t} = Min[RT\_QSOR_{r3,k,h}^{m,t}, MAX(0, TAOR_{~~r1,~~k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t} - RT\_QSOR_{r2,k,h}^{m,t})] + REAH_{r~~2~~3,k,h}^{m,t} - RT\_QSOR_{r3,k,h}^{m,t}$$

Where:

i. $REAH_{r,k,h}^{m,t}$ is the allocated excess available headroom for the relevant *dispatchable generation resources,* and is calculated as follows for each type of *class r reserve*:

$$REAH_{r,k,h}^{m,t} = TREAH_{r,k,h}^{M,t} \times \frac{EAH_{k,h}^{m,t}}{\sum^{M} EAH_{k,h}^{m,t}}$$

ii. $EAH_{k,h}^{m,t}$ is the total amount of excess available headroom for the relevant *delivery point* 'm', and is calculated as follows:

$$EAH_{k,h}^{m,t} = Max\left(0, TAOR_{k,h}^{m,t} - \sum\nolimits_{R} RT\_QSOR_{r,k,h}^{m,t}\right)$$

iii. $TREAH_{r,k,h}^{M,t}$ is the total reallocated excess available headroom for the aggregated *dispatchable generation resources*. When $\sum^{M} EAH_{k,h}^{m,t}$ is equal to zero, then $TREAH_{r,k,h}^{M,t}$ will also equal zero, and when $\sum^{M} EAH_{k,h}^{m,t}$ is greater than zero, then $TREAH_{r,k,h}^{M,t}$ is calculated as follows for each *class r reserve*:

a. $TREAH_{r1,k,h}^{M,t}$ is the total reallocated excess available headroom for synchronized *ten-minute operating reserve*, and determined in accordance with the following:

$$TREAH_{r1,k,h}^{M,t} = Min\left(\sum^{M} EAH_{k,h}^{m,t}, (-1) \times \sum^{M} ORIA_{r1,k,h}^{m,t}\right)$$

b. $TREAH_{r2,k,h}^{M,t}$ is the total reallocated excess available headroom for non-synchronized *ten-minute operating reserve*, and determined in accordance with the following:

$$TREAH_{r2,k,h}^{M,t} = Min\left[\left(\sum^{M} EAH_{k,h}^{m,t}\right) - TREAH_{r1,k,h}^{M,t}, (-1) \times \sum^{M} ORIA_{r2,k,h}^{m,t}\right]$$

c. $TREAH_{r3,k,h}^{M,t}$ is the total reallocated excess available headroom for *thirty-minute operating reserve*, and determined in accordance with the following:

$$TREAH_{r3,k,h}^{M,t} = Min\left[\left(\sum^{M} EAH_{k,h}^{m,t}\right) - TREAH_{r1,k,h}^{M,t} - TREAH_{r2,k,h}^{M,t}, (-1) \times \sum^{M} ORIA_{r3,k,h}^{m,t}\right]$$

Operating Reserve Non-Accessibility Charge for Dispatchable Generation Resources That Are Pseudo-Units

Combustion Turbine

3.10.11 The *operating reserve* non-accessibility charge *settlement amount* shall be calculated and collected from the combustion turbine *resource* of a non-aggregated

dispatchable generation resource that is a *pseudo unit* for any *metering interval* when the *market participant* was not activated by the *IESO* to provide *operating reserve* and the following is true:

a. $\sum_R RT\_QSOR_{r,k,h}^{c,t} > 0$; and

b. $\sum_R RT\_QSOR_{r,k,h}^{c,t} > TAOR\_CT_{k,h}^{c,t}$

3.10.12 For each combustion turbine *resource delivery point* 'c' associated with an aggregated *dispatchable generation resources,* the *operating reserve* non-accessibility charge *settlement amount* is calculated as follows for each type of *class r reserve*:

a. For synchronized *ten-minute operating reserve*:

$$ORSCB_{r1,k,h}^{c,t} = ORSCB_{k,h}^{M,t} \times \frac{\sum_R ORIA_{r1,k,h}^{c,t}}{\sum_R^M (ORIA_{r,k,h}^{c,t} + ORIA_{r,k,h}^{s,t})} ORIA_{r1,k,h}^{c,t}$$

b. For non-synchronized *ten-minute operating reserve*:

$$ORSCB_{r2,k,h}^{c,t} = ORSCB_{k,h}^{M,t} \times \frac{\sum_R ORIA_{r2,k,h}^{c,t}}{\sum_R^M (ORIA_{r,k,h}^{c,t} + ORIA_{r,k,h}^{s,t})} ORIA_{r2,k,h}^{c,t}$$

c. For *thirty-minute operating reserve*:

$$ORSCB_{r3,k,h}^{c,t} = ORSCB_{k,h}^{M,t} \times \frac{\sum_R ORIA_{r3,k,h}^{c,t}}{\sum_R^M (ORIA_{r,k,h}^{c,t} + ORIA_{r,k,h}^{s,t})} ORIA_{r3,k,h}^{c,t}$$

Where:

i. 'M' is the set of all *delivery points* 'c' and 's' of the aggregated group of *dispatchable generation resources;*

ii. $ORIA_{r1,k,h}^{c,t}$ is the amount of inaccessible synchronized *ten-minute operating reserve,* and determined in accordance with the following:

$$ORIA_{r1,k,h}^{c,t} = Min(0, TAOR\_CT_{k,h}^{c,t} - RT\_QSOR_{r1,k,h}^{c,t})$$

iii. $ORIA_{r2,k,h}^{c,t}$ is the amount of inaccessible non-synchronized *ten-minute operating reserve,* and determined in accordance with the following:

$$ORIA_{r2,k,h}^{c,t} = Min[0, Max(0, TAOR\_CT_{k,h}^{c,t} - RT\_QSOR_{r1,k,h}^{c,t}) - RT\_QSOR_{r2,k,h}^{c,t}]$$

iv. $ORIA^{c,t}_{r3,k,h}$ is the amount of inaccessible *thirty-minute operating reserve*, and determined in accordance with the following:

$$ORIA^{c,t}_{r3,k,h} = Min\left[0, Max\left(0, TAOR\_CT^{c,t}_{k,h} - RT\_QSOR^{c,t}_{r1,k,h} - RT\_QSOR^{c,t}_{r2,k,h}\right) - RT\_QSOR^{c,t}_{r3,k,h}\right]$$

v. $ORSCB^{M,t}_{k,h}$ is the total amount of *operating reserve* non-accessibility charge calculated for all *delivery points* 'm' of the aggregated group of *dispatchable generation resources* 'M', as calculated in section 3.10.15.

Steam Turbine

3.10.13 The *operating reserve* non-accessibility charge *settlement amount* shall be calculated and collected from the steam turbine *resource* of a non-aggregated *dispatchable generation resources* that is a *pseudo unit* for any *metering interval* when the *market participant* was not activated by the *IESO* to provide *operating reserve* and the following is true:

a. $\sum_R RT\_QSOR^{s,t}_{r,k,h} > 0$; and

b. $\sum_R RT\_QSOR^{s,t}_{r,k,h} > TAOR\_ST^{s,t}_{k,h}$

3.10.14 For each steam turbine *resource delivery point* 's' associated with an aggregated *dispatchable generation resources*, the *operating reserve* non-accessibility charge *settlement amount* is calculated as follows for each type of *class r reserve*:

a. For synchronized *ten-minute operating reserve*:

$$ORSCB^{s,t}_{r1,k,h} = ORSCB^{M,t}_{k,h} \times \frac{\sum_R ORIA^{s,t}_{r1,k,h}}{\sum^M_R \left(ORIA^{c,t}_{r,k,h} + ORIA^{s,t}_{r,k,h}\right)} ORIA^{s,t}_{r1,k,h}$$

b. For non-synchronized *ten-minute operating reserve*:

$$ORSCB^{s,t}_{r2,k,h} = ORSCB^{M,t}_{k,h} \times \frac{\sum_R ORIA^{s,t}_{r2,k,h}}{\sum^M_R \left(ORIA^{c,t}_{r,k,h} + ORIA^{s,t}_{r,k,h}\right)} ORIA^{s,t}_{r2,k,h}$$

c. For *thirty-minute operating reserve*:

$$ORSCB^{s,t}_{r3,k,h} = ORSCB^{M,t}_{k,h} \times \frac{\sum_R ORIA^{s,t}_{r3,k,h}}{\sum^M_R \left(ORIA^{c,t}_{r,k,h} + ORIA^{s,t}_{r,k,h}\right)} ORIA^{s,t}_{r3,k,h}$$

Where:

i. 'M' is the set of all *delivery points* 'c' and 's' of the aggregated group of *dispatchable generation resources;*

ii. $ORIA^{s,t}_{r1,k,h}$ is the amount of inaccessible synchronized *ten-minute operating reserve*, and determined in accordance with the following:

$$ORIA^{s,t}_{r1,k,h} = Min\left(0, TAOR\_ST^{s,t}_{k,h} - RT\_QSOR^{s,t}_{r1,k,h}\right)$$

iii. $ORIA^{s,t}_{r2,k,h}$ is the amount of inaccessible non-synchronized *ten-minute operating reserve*, and determined in accordance with the following:

$$ORIA^{s,t}_{r2,k,h} = Min\left[0, Max\left(0, TAOR\_ST^{s,t}_{k,h} - RT\_QSOR^{s,t}_{r1,k,h}\right) - RT\_QSOR^{s,t}_{r2,k,h}\right]$$

iv. $ORIA^{s,t}_{r3,k,h}$ is the amount of inaccessible *thirty-minute operating reserve*, and determined in accordance with the following:

$$ORIA^{s,t}_{r3,k,h} = Min\left[0, Max\left(0, TAOR\_ST^{s,t}_{k,h} - RT\_QSOR^{s,t}_{r1,k,h} - RT\_QSOR^{s,t}_{r2,k,h}\right) - RT\_QSOR^{s,t}_{r3,k,h}\right]$$

v. $ORSCB^{M,t}_{k,h}$ is the total amount of *operating reserve* non-accessibility charge calculated for all *delivery points* 'm' of the aggregated group of *dispatchable generation resources* 'M', as calculated in section 3.10.15;

Pseudo-Units

3.10.15 For the purposes of calculating the *operating reserve* non-accessibility charge *settlement amount* set out in sections 3.10.12 and 3.10.14, $ORSCB^{M,t}_{k,h}$ is calculated as follows:

$$ORSCB^{M,t}_{k,h} = Min\left[0, \sum\nolimits_{R}^{M}\left(\left(NORD^{c,t}_{r,k,h} \times RT\_PROR^{c,t}_{r,k,h}\right) + \left(NORD^{s,t}_{r,k,h} \times RT\_PROR^{s,t}_{r,k,h}\right)\right)\right]$$

Where:

a. 'M' is the set of all *delivery points* 'c' and 's' of the aggregated group of *dispatchable generation resources;*

b. $NORD^{c,t}_{r,k,h}$ is the net *operating reserve* deviation for a combustion turbine *resource*, and is calculated as follows for each type of *class r reserve*:

i. For synchronized *ten-minute operating reserve*:

$$NORD^{c,t}_{r1,k,h} = Min(RT\_QSOR^{c,t}_{r1,k,h}, TAOR\_CT^{c,t}_{r1,k,h}) + REAH^{c,t}_{r1,k,h} - RT\_QSOR^{c,t}_{r1,k,h}$$

ii. For non-synchronized *ten-minute operating reserve*:

$$NORD^{c,t}_{r2,k,h} = Min[RT\_QSOR^{c,t}_{r2,k,h}, MAX(0, TAOR\_CT^{c,t}_{r1,k,h} - RT\_QSOR^{c,t}_{r1,k,h})] + REAH^{c,t}_{r2,k,h} - RT\_QSOR^{c,t}_{r2,k,h}$$

iii. For *thirty-minute operating reserve*:

$$NORD^{c,t}_{r3,k,h} = Min[RT\_QSOR^{c,t}_{r3,k,h}, MAX(0, TAOR\_CT^{c,t}_{r1,k,h} - RT\_QSOR^{c,t}_{r1,k,h} - RT\_QSOR^{c,t}_{r2,k,h})] + REAH^{c,t}_{r3,k,h} - RT\_QSOR^{c,t}_{r3,k,h}$$

Where:

i. $REAH^{c,t}_{r,k,h}$ is the allocated excess available headroom for the relevant *dispatchable generation resources,* and is calculated as follows for each type of *class r reserve*:

$$REAH^{c,t}_{r,k,h} = TREAH^{M,t}_{r,k,h} \times \frac{EAH^{c,t}_{k,h}}{\sum^{M}(EAH^{c,t}_{k,h} + EAH^{s,t}_{k,h})}$$

ii. $EAH^{c,t}_{k,h}$ is the total amount of excess available headroom for the relevant combustion turbine *resourcedelivery point* 'c', and is calculated as follows:

$$EAH^{c,t}_{k,h} = Max\left(0, TAOR\_CT^{c,t}_{k,h} - \sum\nolimits_{R} RT\_QSOR^{c,t}_{r,k,h}\right)$$

c. $NORD^{s,t}_{r,k,h}$ is the net *operating reserve* deviation for a steam turbine *resource,* and is calculated as follows for each type of *class r reserve*:

i. For synchronized *ten-minute operating reserve*:

$$NORD^{s,t}_{r1,k,h} = Min(RT\_QSOR^{s,t}_{r1,k,h}, TAOR\_CT^{s,t}_{r1,k,h}) + REAH^{s,t}_{r1,k,h} - RT\_QSOR^{s,t}_{r1,k,h}$$

ii. For non-synchronized *ten-minute operating reserve*:

$$NORD^{s,t}_{r2,k,h} = Min[RT\_QSOR^{s,t}_{r2,k,h}, MAX(0, TAOR\_CT^{s,t}_{r1,k,h} - RT\_QSOR^{s,t}_{r1,k,h})] + REAH^{s,t}_{r2,k,h} - RT\_QSOR^{s,t}_{r2,k,h}$$

iii. For *thirty-minute operating reserve*:

$$NORD^{s,t}_{r3,k,h} = Min[RT\_QSOR^{s,t}_{r3,k,h}, MAX(0, TAOR\_CT^{s,t}_{r1,k,h} - RT\_QSOR^{s,t}_{r1,k,h} - RT\_QSOR^{s,t}_{r2,k,h})] + REAH^{s,t}_{r23,k,h} - RT\_QSOR^{s,t}_{r3,k,h}$$

Where:

i. $REAH_{r,k,h}^{s,t}$ is the allocated excess available headroom for the relevant *dispatchable generation resources,* and is calculated as follows for each type of *class r reserve*:

$$REAH_{r,k,h}^{s,t} = TREAH_{r,k,h}^{M,t} \times \frac{EAH_{k,h}^{s,t}}{\sum^{M}\left(EAH_{k,h}^{c,t} + EAH_{k,h}^{s,t}\right)}$$

ii. $EAH_{k,h}^{s,t}$ is the total amount of excess available headroom for the relevant steam turbine *resource delivery point* 's', and is calculated as follows:

$$EAH_{k,h}^{s,t} = Max\left(0, TAOR\_ST_{k,h}^{s,t} - \sum\nolimits_{R} RT\_QSOR_{r,k,h}^{s,t}\right)$$

d. $TREAH_{r,k,h}^{M,t}$ is the total reallocated excess available headroom for the aggregated *dispatchable generation resources*, as calculated in accordance with section 3.10.16.

3.10.16 For the purposes of calculating the *operating reserve* non-accessibility charge *settlement amount* set out in sections 3.10.12 and 3.10.14, $TREAH_{r,k,h}^{M,t}$ is the total reallocated excess available headroom for the aggregated *dispatchable generation resources*. When $\sum^{M}(EAH_{k,h}^{c,t} + EAH_{k,h}^{s,t})$ is equal to zero, then $TREAH_{r,k,h}^{M,t}$ will also equal zero, and when $\sum^{M}(EAH_{k,h}^{c,t} + EAH_{k,h}^{s,t})$ is greater than zero, then $TREAH_{r,k,h}^{M,t}$ is calculated as follows for each *class r reserve*:

a. $TREAH_{r1,k,h}^{M,t}$ is the total reallocated excess available headroom for synchronized *ten-minute operating reserve*, and determined in accordance with the following:

$$TREAH_{r1,k,h}^{M,t} = Min\left(\sum^{M}\left(EAH_{k,h}^{c,t} + EAH_{k,h}^{s,t}\right), (-1) \times \sum^{M}\left(ORIA_{r1,k,h}^{sc,t} + ORIA_{r1,k,h}^{s,t}\right)\right)$$

b. $TREAH_{r2,k,h}^{M,t}$ is the total reallocated excess available headroom for non-synchronized *ten-minute operating reserve*, and determined in accordance with the following:

$$TREAH_{r2,k,h}^{M,t} = Min\left[\left(\sum^{M}\left(EAH_{k,h}^{c,t} + EAH_{k,h}^{s,t}\right)\right) - TREAH_{r1,k,h}^{M,t}, (-1) \times \sum^{M}\left(ORIA_{r2,k,h}^{c,t} + ORIA_{r2,k,h}^{s,t}\right)\right]$$

c. $TREAH_{r3,k,h}^{M,t}$ is the total reallocated excess available headroom for *thirty-minute operating reserve*, and determined in accordance with the following:

$$TREAH_{r3,k,h}^{M,t} = Min\left[\left(\sum^{M}\left(EAH_{k,h}^{c,t} + EAH_{k,h}^{s,t}\right)\right) - TREAH_{r1,k,h}^{M,t} - TREAH_{r2,k,h}^{M,t}, (-1) \times \sum^{M}\left(ORIA_{r3,k,h}^{c,t} + ORIA_{r3,k,h}^{s,t}\right)\right]$$

Real-Time Make-Whole Payment Reversal Charge for Dispatchable Loads, Dispatchable Electricity Storage Resources, and Dispatchable Generation Resources That Are Not Pseudo-Units

3.10.17 For a *delivery point* 'm' associated with a *dispatchable electricity storage resource* or a *dispatchable generation resource* that is not a *pseudo-unit*, the real-time make-whole payment reversal charge *settlement amount* (RT_MWP_RC$^{m}_{k,h}$) is calculated as follows:

$$RT\_MWP\_RC_{k,h}^{m} = \sum^{T}\left(RT\_OLC\_RC_{k,h}^{m,t} + RT\_OLOC\_RC_{k,h}^{m,t}\right)$$

Where:

a. The *operating reserve* non-accessibility lost cost reversal, $RT\_OLC\_RC_{k,h}^{m,t}$, is calculated in accordance with section 3.10.18.

b. The *operating reserve* non-accessibility lost opportunity cost reversal, $RT\_OLOC\_RC_{k,h}^{m,t}$, is calculated in accordance with section 3.10.19.

3.10.18 The *operating reserve* lost cost component reversal charge, $RT\_OLC\_RC_{k,h}^{m,t}$, is calculated as follows:

$$RT\_OLC\_RC_{k,h}^{m,t} = Min\left[0, Max\left(-1 \times \left(RT\_ELC_{k,h}^{m,t} + RT\_OLC_{k,h}^{m,t}\right), \sum_{R} OLC\_CB_{r,k,h}^{m,t}\right)\right]$$

Where:

a. For synchronized *ten-minute operating reserve*:

i. if $TAOR_{k,h}^{m,t} < RT\_QSOR_{r1,k,h}^{m,t}$ and if $RT\_OR\_LC\_EOP_{r1,k,h}^{m,t} < RT\_QSOR_{r1,k,h}^{m,t}$ then:

$$OLC\_CB_{r1,k,h}^{m,t} = \{OP\left(RT\_PROR_{r1,h}^{m,t}, Max(DAM\_QSOR_{r1,k,h}^{m,t}, RT\_QSOR_{r1,k,h}^{m,t}), BOR_{r1,k,h}^{m,t}\right) - OP\left[RT\_PROR_{r1,h}^{m,t}, Max\left(TAOR_{k,h}^{m,t}, RT\_OR\_LC\_EOP_{r1,k,h}^{m,t}, DAM\_QSOR_{r1,k,h}^{m,t}\right), BOR_{r1,k,h}^{m,t}\right] /12$$

ii. Otherwise, $OLC\_CB_{r1,k,h}^{m,t} = 0$

b. For non-synchronized *ten-minute operating reserve*:

i. if $TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t} < RT\_QSOR_{r2,k,h}^{m,t}$ and if $RT\_OR\_LC\_EOP_{r2,k,h}^{m,t} < RT\_QSOR_{r2,k,h}^{m,t}$, then:

$$OLC\_CB_{r2,k,h}^{m,t} = \{OP\left(RT\_PROR_{r2,h}^{m,t}, Max(DAM\_QSOR_{r2,k,h}^{m,t}, RT\_QSOR_{r2,k,h}^{m,t}), BOR_{r2,k,h}^{m,t}\right) - OP\left[RT\_PROR_{r2,h}^{m,t}, Max\left(TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t}, RT\_OR\_LC\_EOP_{r2,k,h}^{m,t}, DAM\_QSOR_{r2,k,h}^{m,t}\right), BOR_{r2,k,h}^{m,t}\right]/12$$

ii. Otherwise, $OLC\_CB_{r2,k,h}^{m,t} = 0$

c. For *thirty-minute operating reserve*:

i. if $TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t} - RT\_QSOR_{r2,k,h}^{m,t} < RT\_QSOR_{r3,k,h}^{m,t}$ and if $RT\_OR\_LC\_EOP_{r3,k,h}^{m,t} < RT\_QSOR_{r3,k,h}^{m,t}$, then:

$$OLC\_CB_{r3,k,h}^{m,t} = \{OP\left(RT\_PROR_{r3,h}^{m,t}, Max(DAM\_QSOR_{r3,k,h}^{m,t}, RT\_QSOR_{r3,k,h}^{m,t}), BOR_{r3,k,h}^{m,t}\right) - OP\left[RT\_PROR_{r3,h}^{m,t}, Max\left(TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t} - RT\_QSOR_{r2,k,h}^{m,t}, RT\_OR\_LC\_EOP_{r3,k,h}^{m,t}, DAM\_QSOR_{r3,k,h}^{m,t}\right), BOR_{r3,k,h}^{m,t}\right]/12$$

ii. Otherwise, $OLC\_CB_{r3,k,h}^{m,t} = 0$

3.10.19 The *operating reserve* lost opportunity cost component reversal charge, $RT\_OLOC\_RC_{k,h}^{m}$, is calculated as follows:

$$RT\_OLOC\_RC_{k,h}^{m} = Min\left[0, Max\left(-1 \times \left(RT\_ELOC_{k,h}^{m,t} + RT\_OLOC_{k,h}^{m,t}\right), \sum_{R} OLOC\_CB_{r,k,h}^{m,t}\right)\right]$$

Where:

a. If the *offer* price of $BOR_{r,k,h}^{m,t}$ is greater than $RT\_PROR_{r,h}^{m,t}$, the *offer* price of $BOR_{r,k,h}^{m,t}$ shall be adjusted to be equal to $RT\_PROR_{r,h}^{m,t}$.

b. For synchronized *ten-minute operating reserve*:

i. (i) if $TAOR_{k.h}^{m,t} < RT\_OR\_LOC\_EOP_{r1.k.h}^{m,t}$ and if $RT\_QSOR_{r1.k.h}^{m,t} < RT\_OR\_LOC\_EOP_{r1,k,h}^{m,t}$ then:

$$OLOC\_CB_{r1,k,h}^{m,t} = (-1) \times \{OP(RT\_PROR_{r1,h}^{m,t}, RT\_OR\_LOC\_EOP_{r1,k,h}^{m,t}, BOR_{r1,k,h}^{m,t}) - OP[RT\_PROR_{r1,h}^{m,t}, Max(RT\_QSOR_{r1,k,h}^{m,t}, TAOR_{k,h}^{m,t}), BOR_{r1,k,h}^{m,t}]\}/12$$

ii. Otherwise, $OLOC\_CB_{r1,k,h}^{m,t} = 0$

c. For non-synchronized *ten-minute operating reserve*:

i. if $TAOR_{k.h}^{m,t} - RT\_QSOR_{r1.k.h}^{m,t} < RT\_OR\_LOC\_EOP_{r2.k.h}^{m,t}$ and if $RT\_QSOR_{r2,k,h}^{m,t} < RT\_OR\_LOC\_EOP_{r2,k,h}^{m,t}$, then:

$$OLOC\_CB_{r2,k,h}^{m,t} = (-1) \times \{OP(RT\_PROR_{r2,h}^{m,t}, RT\_OR\_LOC\_EOP_{r2,k,h}^{m,t}, BOR_{r2,k,h}^{m,t}) - OP[RT\_PROR_{r2,h}^{m,t}, Max(RT\_QSOR_{r2,k,h}^{m,t}, TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t}), BOR_{r2,k,h}^{m,t}]\}/12$$

ii. Otherwise, $OLOC\_CB_{r2,k,h}^{m,t} = 0$

d. For *thirty-minute operating reserve*:

i. if $TAOR_{k.h}^{m,t} - RT\_QSOR_{r1.k.h}^{m,t} - RT\_QSOR_{r2.k.h}^{m,t} < RT\_OR\_LOC\_EOP_{r3.k.h}^{m,t}$ and if $RT\_QSOR_{r3,k,h}^{m,t} < RT\_OR\_LOC\_EOP_{r3,k,h}^{m,t}$, then:

$$OLOC\_CB_{r3,k,h}^{m,t} = (-1) \times \{OP(RT\_PROR_{r3,h}^{m,t}, RT\_OR\_LOC\_EOP_{r3,k,h}^{m,t}, BOR_{r3,k,h}^{m,t}) - OP[RT\_PROR_{r3,h}^{m,t}, Max(RT\_QSOR_{r3,k,h}^{m,t}, TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t} - RT\_QSOR_{r2,k,h}^{m,t}), BOR_{r3,k,h}^{m,t}]\}/12$$

ii. Otherwise, $OLOC\_CB_{r3,k,h}^{m,t} = 0$

Real-Time Make-Whole Payment Reversal Charge for Dispatchable Generation Resources That Are Pseudo-Units

Combustion Turbine

3.10.20 For a *delivery point* 'c' for a combustion turbine *resource* associated with a *pseudo unit*, the real-time make-whole payment reversal charge *settlement amount* ($RT\_MWP\_RC^{c}_{k,h}$) is calculated as follows:

$$RT\_MWP\_RC^{c}_{k,h} = \sum^{T} \left(RT\_OLC\_RC^{c,t}_{k,h} + RT\_OLOC\_RC^{c,t}_{k,h}\right)$$

Where:

a. The *operating reserve* non-accessibility lost cost reversal, $RT\_OLC\_RC^{c}_{k,h}$, is calculated in accordance with section 3.10.21.

b. The *operating reserve* non-accessibility lost opportunity cost reversal, $RT\_OLOC\_RC^{c}_{k,h}$, is calculated in accordance with section 3.10.22.

3.10.21 The *operating reserve* lost cost component reversal charge, $RT\_OLC\_RC^{c}_{k,h}$, is calculated as follows:

$$RT\_OLC\_RC^{c,t}_{k,h} = Min\left[0, Max\left(-1 \times \left(RT\_ELC^{c,t}_{k,h} + RT\_OLC^{c,t}_{k,h}\right), \sum\nolimits_{R} OLC\_CB^{c,t}_{r,k,h}\right)\right]$$

Where:

a. For synchronized *ten-minute operating reserve*:

i. if $TAOR\_CT^{c,t}_{k,h} < RT\_QSOR^{c,t}_{r1,k,h}$ and if $RT\_OR\_LC\_EOP^{c,t}_{r1,k,h} < RT\_QSOR^{c,t}_{r1,k,h}$ then:

$$OLC_{CB}{}^{c,t}_{r1,k,h} = \{OP\left(RT\_PROR^{c,t}_{r1,h}, Max\left(DAM\_QSOR^{c}_{r1,k,h}, RT\_QSOR^{c}_{r1,k,h}\right), RT\_OR\_DIPC^{c,t}_{r1,k,h} \sout{BOR^{c,t}_{r1,k,h}}\right) - OP\left[RT\_PROR^{c,t}_{r1,h}, Max\left(TAOR\_CT^{c,t}_{k,h}, RT\_OR\_LC\_EOP^{c,t}_{r1,k,h}, DAM\_QSOR^{c}_{r1,k,h}\right), RT\_OR\_DIPC^{c,t}_{r1,k,h} \sout{BOR^{c,t}_{r1,k,h}}\right]\}/12$$

ii. Otherwise, $OLC\_CB^{c,t}_{r1,k,h} = 0$

b. For non-synchronized *ten-minute operating reserve*:

i. if $TAOR\_CT^{c,t}_{k,h} - RT\_QSOR^{c,t}_{r1,k,h} < RT\_QSOR^{c,t}_{r2,k,h}$ and if $RT\_OR\_LC\_EOP^{c,t}_{r2,k,h} < RT\_QSOR^{c,t}_{r2,k,h}$, then:

$$OLC\_CB^{c,t}_{r2,k,h} = \{OP\left(RT\_PROR^{c,t}_{r2,h}, Max\left(DAM\_QSOR^{c}_{r2,k,h}, RT\_QSOR^{c,t}_{r2,k,h}\right), RT\_OR\_DIPC^{c,t}_{r2,k,h} \sout{BOR^{c,t}_{r2,k,h}}\right) - OP\left[RT\_PROR^{c,t}_{r2,h}, Max\left(TAOR\_CT^{c,t}_{k,h} - RT\_QSOR^{c,t}_{r1,k,h}, RT\_OR\_LC\_EOP^{c,t}_{r2,k,h}, DAM\_QSOR^{c}_{r2,k,h}\right), RT\_OR\_DIPC^{c,t}_{r2,k,h} \sout{BOR^{c,t}_{r2,k,h}}\right]\}/12$$

ii. Otherwise, $OLC\_CB^{c,t}_{r2,k,h} = 0$

c. For *thirty-minute operating reserve*:

i. if $TAOR\_CT^{c,t}_{k,h} - RT\_QSOR^{c,t}_{r1,k,h} - RT\_QSOR^{c,t}_{r2,k,h} < RT\_QSOR^{c,t}_{r3,k,h}$ and if $RT\_OR\_LC\_EOP^{c,t}_{r3,k,h} < RT\_QSOR^{c,t}_{r3,k,h}$, then:

$$OLC\_CB^{c,t}_{r3,k,h} = \{OP(RT\_PROR^{c,t}_{r3,h}, Max(DAM\_QSOR^{c}_{r3,k,h}, RT\_QSOR^{c,t}_{r3,k,h}), RT\_OR\_DIPC^{c,t}_{r3,k,h} \sout{BOR^{c,t}_{r3,k,h}}) - OP[RT\_PROR^{c,t}_{r3,h}, Max(TAOR\_CT^{c,t}_{k,h} - RT\_QSOR^{c,t}_{r1,k,h} - RT\_QSOR^{c,t}_{r2,k,h}, RT\_OR\_LC\_EOP^{c,t}_{r3,k,h}, DAM\_QSOR^{c}_{r3,k,h}), RT\_OR\_DIPC^{c,t}_{r3,k,h} \sout{BOR^{c,t}_{r3,k,h}}]\}/12$$

ii. Otherwise, $OLC\_CB^{c,t}_{r3,k,h} = 0$

3.10.22 The *operating reserve* lost opportunity cost component reversal charge, $RT\_OLOC\_RC^{c}_{k,h}$, is calculated as follows:

$$RT\_OLOC\_RC^{c,t}_{k,h} = Min\,[0, Max\,(-1 \times (RT\_ELOC^{c,t}_{k,h} + RT\_OLOC^{c,t}_{k,h}), \sum_{R} OLOC\_CB^{c,t}_{r,k,h})]$$

Where:

a. If the *offer* price of $RT\_OR\_DIPC^{c,t}_{r,k,h}$ is greater than $RT\_PROR^{c,t}_{r,h}$, the *offer* price of $RT\_OR\_DIPC^{c,t}_{r,k,h}$ shall be adjusted to be equal to $RT\_PROR^{c,t}_{r,h}$.

b. For synchronized *ten-minute operating reserve*:

i. if $TAOR\_CT^{c,t}_{k,h} < RT\_OR\_LOC\_EOP^{c,t}_{r1,k,h}$ and if $RT\_QSOR^{c,t}_{r1,k,h} < RT\_OR\_LOC\_EOP^{c,t}_{r1,k,h}$

$$OLOC\_CB^{c,t}_{r1,k,h} = \{(-1) \times \{OP(RT\_PROR^{c,t}_{r1,h}, RT\_OR\_LOC\_EOP^{c,t}_{r1,k,h}, RT\_OR\_DIPC^{c,t}_{r1,k,h} \sout{BOR^{c,t}_{r1,k,h}}) - OP[RT\_PROR^{c,t}_{r1,h}, Max(RT\_QSOR^{c,t}_{r1,k,h}, TAOR\_CT^{c,t}_{k,h}), RT\_OR\_DIPC^{c,t}_{r1,k,h} \sout{BOR^{c,t}_{r1,k,h}}]$$

ii. Otherwise, $OLOC\_CB^{c,t}_{r1,k,h} = 0$

c. For non-synchronized *ten-minute operating reserve*:

i. if $TAOR\_CT_{k,h}^{c,t} - RT\_QSOR_{r1,k,h}^{c,t} < RT\_OR\_LOC\_EOP_{r2,k,h}^{c,t}$ and if $RT\_QSOR_{r2,k,h}^{c,t} < RT\_OR\_LOC\_EOP_{r2,k,h}^{c,t}$, then:

$$OLOC\_CB_{r2,k,h}^{c,t} = \Big\{(-1) \times \{OP\big(RT\_PROR_{r2,h}^{c,t}, RT\_OR\_LOC\_EOP_{r2,k,h}^{c,t}, RT\_OR\_DIPC_{r2,k,h}^{c,t} \sout{BOR_{r2,k,h}^{c,t}}\big) - OP\big[RT\_PROR_{r2,h}^{c,t}, Max\big(RT\_QSOR_{r2,k,h}^{c,t}, TAOR\_CT_{k,h}^{c,t} - RT\_QSOR_{r1,k,h}^{c,t}\big), RT\_OR\_DIPC_{r2,k,h}^{c,t} \sout{BOR_{r2,k,h}^{c,t}}\big]\}\Big\}/12$$

ii. Otherwise, $OLOC\_CB_{r2,k,h}^{c,t} = 0$

d. For *thirty-minute operating reserve*:

i. if $TAOR\_CT_{k,h}^{c,t} - RT\_QSOR_{r1,k,h}^{c,t} - RT\_QSOR_{r2,k,h}^{c,t} < RT\_OR\_LOC\_EOP_{r3,k,h}^{c,t}$ and if $RT\_QSOR_{r3,k,h}^{c,t} < RT\_OR\_LOC\_EOP_{r3,k,h}^{c,t}$, then:

$$OLOC\_CB_{r3,k,h}^{c,t} = \Big\{(-1) \times \{OP\big(RT\_PROR_{r3,h}^{c,t}, RT\_OR\_LOC\_EOP_{r3,k,h}^{c,t}, RT\_OR\_DIPC_{r3,k,h}^{c,t} \sout{BOR_{r3,k,h}^{c,t}}\big) - OP\big[RT\_PROR_{r3,h}^{c,t}, Max\big(RT\_QSOR_{r3,k,h}^{c,t}, TAOR\_CT_{k,h}^{c,t} - RT\_QSOR_{r1,k,h}^{c,t} - RT\_QSOR_{r2,k,h}^{c,t}\big), RT\_OR\_DIPC_{r3,k,h}^{c,t} \sout{BOR_{r3,k,h}^{c,t}}\big]\}\Big\}/12$$

ii. Otherwise, $OLOC\_CB_{r3,k,h}^{c,t} = 0$

Steam Turbine

3.10.23 For a *delivery point* 's' for a steam turbine *resource* associated with a *pseudo unit*, the real-time make-whole payment reversal charge *settlement amount* ($RT\_MWP\_RC_{k,h}^{s}$) is calculated as follows:

$$RT\_MWP\_RC_{k,h}^{s} = \sum^{T} \left(RT\_OLC\_RC_{k,h}^{s,t} + RT\_OLOC\_RC_{k,h}^{s,t}\right)$$

Where:

a. The *operating reserve* non-accessibility lost cost reversal, $RT\_OLC\_RC_{k,h}^{s}$, is calculated in accordance with section 3.10.24.

b. The *operating reserve* non-accessibility lost opportunity cost reversal, $RT\_OLOC\_RC_{k,h}^{s}$, is calculated in accordance with section 3.10.25.

3.10.24 The *operating reserve* lost cost component reversal charge, $RT\_OLC\_RC^{s}_{k,h}$, is calculated as follows:

$$RT\_OLC\_RC^{s,t}_{k,h} = Min\,[0, Max(-1 \times (RT\_ELC^{s,t}_{k,h} + RT\_OLC^{s,t}_{k,h}), \sum_{R} OLC\_CB^{s,t}_{r,k,h})]$$

Where:

a. For synchronized *ten-minute operating reserve*:

i. if $TAOR\_ST^{s,t}_{k,h} < RT\_QSOR^{s,t}_{r1,k,h}$ and if $RT\_OR\_LC\_EOP^{s,t}_{r1,k,h} < RT\_QSOR^{s,t}_{r1,k,h}$ then:

$$OLC\_CB^{s,t}_{r1,k,h} = \{OP(RT\_PROR^{s,t}_{r1,h}, Max(DAM\_QSOR^{s}_{r1,k,h}, RT\_QSOR^{s,t}_{r1,k,h}), RT\_OR\_DIPC^{s,t}_{r1,k,h} \sout{BOR^{c,t}_{r1,k,h}}) - OP[RT\_PROR^{s,t}_{r1,h}, Max(TAOR\_ST^{s,t}_{k,h}, RT\_OR\_LC\_EOP^{s,t}_{r1,k,h}, DAM\_QSOR^{s}_{r1,k,h}), RT\_OR\_DIPC^{s,t}_{r1,k,h} \sout{BOR^{c,t}_{r1,k}}$$
$$12$$

ii. Otherwise, $OLC\_CB^{s,t}_{r1,k,h} = 0$

b. For non-synchronized *ten-minute operating reserve*:

i. if $TAOR\_ST^{s,t}_{k,h} - RT\_QSOR^{s,t}_{r1,k,h} < RT\_QSOR^{s,t}_{r2,k,h}$ and if $RT\_OR\_LC\_EOP^{s,t}_{r2,k,h} < RT\_QSOR^{s,t}_{r2,k,h}$, then:

$$OLC\_CB^{s,t}_{r2,k,h} = \{OP(RT\_PROR^{s,t}_{r2,h}, Max(DAM\_QSOR^{s}_{r2,k,h}, RT\_QSOR^{s,t}_{r2,k,h}), RT\_OR\_DIPC^{s,t}_{r2,k,h} \sout{BOR^{c,t}_{r2,k,h}}) - OP[RT\_PROR^{s,t}_{r2,h}, Max(TAOR\_ST^{s,t}_{k,h} - RT\_QSOR^{s,t}_{r1,k,h}, RT\_OR\_LC\_EOP^{s,t}_{r2,k,h}, DAM\_QSOR^{s}_{r2,k,h}), RT\_OR\_DIPC^{s,t}_{r2,k,h} \sout{BOR^{c,t}_{r2,k,h}}]\}/12$$

ii. Otherwise, $OLC\_CB^{s,t}_{r2,k,h} = 0$

c. For *thirty-minute operating reserve*:

i. if $TAOR\_ST^{s,t}_{k,h} - RT\_QSOR^{s,t}_{r1,k,h} - RT\_QSOR^{s,t}_{r2,k,h} < RT\_QSOR^{s,t}_{r3,k,h}$ and if $RT\_OR\_LC\_EOP^{s,t}_{r3,k,h} < RT\_QSOR^{s,t}_{r3,k,h}$, then:

$$OLC\_CB^{s,t}_{r3,k,h} = \{OP(RT\_PROR^{s,t}_{r3,h}, Max(DAM\_QSOR^{s}_{r3,k,h}, RT\_QSOR^{s,t}_{r3,k,h}), RT\_OR\_DIPC^{s,t}_{r3,k,h} \sout{BOR^{c,t}_{r3,k,h}}) - OP[RT\_PROR^{s,t}_{r3,h}, Max(TAOR\_ST^{s,t}_{k,h} - RT\_QSOR^{s,t}_{r1,k,h} - RT\_QSOR^{s,t}_{r2,k,h}, RT\_OR\_LC\_EOP^{s,t}_{r3,k,h}, DAM\_QSOR^{s}_{r3,k,h}), RT\_OR\_DIPC^{s,t}_{r3,k,h} \sout{BOR^{c,t}_{r3,k,h}}]\}/12$$

ii. Otherwise, $OLC\_CB^{s,t}_{r3,k,h} = 0$

3.10.25 The *operating reserve* lost opportunity cost component reversal charge, $RT\_OLOC\_RC^{s}_{k,h}$, is calculated as follows:

$$RT\_OLOC\_RC^{s}_{k,h} = Min\,[0, Max\,(-1 \times (RT\_ELOC^{s,t}_{k,h} + RT\_OLOC^{c,t}_{k,h}), \sum_{R} OLOC\_CB^{s,t}_{r,k,h})]$$

Where:

a. If the *offer* price of $RT\_OR\_DIPC^{s,t}_{r,k,h}$ is greater than $RT\_PROR^{s,t}_{r,h}$, the *offer* price of $RT\_OR\_DIPC^{s,t}_{r,k,h}$ shall be adjusted to be equal to $RT\_PROR^{s,t}_{r,h}$.

b. For synchronized *ten-minute operating reserve*:

i. if $TAOR\_ST^{s,t}_{k,h} < RT\_OR\_LOC\_EOP^{s,t}_{r1,k,h}$ and if $RT\_QSOR^{s,t}_{r1,k,h} < RT\_OR\_LOC\_EOP^{s,t}_{r1,k,h}$ then:

$$OLOC\_CB^{s,t}_{r1,k,h} = \Big\{(-1) \times \big\{OP\big(RT\_PROR^{s,t}_{r1,h}, RT\_OR\_LOC\_EOP^{s,t}_{r1,k,h}, RT\_OR\_DIPC^{s,t}_{r1,k,h} \sout{BOR^{s,t}_{r1,k,h}}\big) - OP\big[RT\_PROR^{s,t}_{r1,h}, Max\big(RT\_QSOR^{s,t}_{r1,k,h}, TAOR\_ST^{s,t}_{k,h}\big), RT\_OR\_DIPC^{s,t}_{r1,k,h} \sout{BOR^{s,t}_{r1,k,h}}\big]\big\}\Big\}/12$$

ii. Otherwise, $OLOC\_CB^{s,t}_{r1,k,h} = 0$

c. For non-synchronized *ten-minute operating reserve*:

i. if $TAOR\_ST^{s,t}_{k,h} - RT\_QSOR^{s,t}_{r1,k,h} < RT\_OR\_LOC\_EOP^{s,t}_{r2,k,h}$ and if $RT\_QSOR^{s,t}_{r2,k,h} < RT\_OR\_LOC\_EOP^{s,t}_{r2,k,h}$, then:

$$OLOC\_CB^{s,t}_{r2,k,h} = \Big\{(-1) \times \big\{OP\big(RT\_PROR^{s,t}_{r2,h}, RT\_OR\_LOC\_EOP^{s,t}_{r2,k,h}, RT\_OR\_DIPC^{s,t}_{r2,k,h} \sout{BOR^{s,t}_{r2,k,h}}\big) - OP\big[RT\_PROR^{s,t}_{r2,h}, Max\big(RT\_QSOR^{s,t}_{r2,k,h}, TAOR\_ST^{s,t}_{k,h} - RT\_QSOR^{s,t}_{r1,k,h}\big), RT\_OR\_DIPC^{s,t}_{r2,k,h} \sout{BOR^{s,t}_{r2,k,h}}\big]\big\}\Big\}/12$$

ii. Otherwise, $OLOC\_CB^{s,t}_{r2,k,h} = 0$

d. For *thirty-minute operating reserve*:

i. if $TAOR\_ST^{s,t}_{k,h} - RT\_QSOR^{s,t}_{r1,k,h} - RT\_QSOR^{s,t}_{r2,k,h} < RT\_OR\_LOC\_EOP^{s,t}_{r3,k,h}$ and if $RT\_QSOR^{s,t}_{r3,k,h} < RT\_OR\_LOC\_EOP^{s,t}_{r3,k,h}$, then:

$$OLOC\_CB^{s,t}_{r3,k,h} = \Big\{(-1) \times \big\{OP\big(RT\_PROR^{s,t}_{r3,h}, RT\_OR\_LOC\_EOP^{s,t}_{r3,k,h}, RT\_OR\_DIPC^{s,t}_{r3,k,h} \sout{BOR^{s,t}_{r32,k,h}}\big) - OP\big[RT\_PROR^{s,t}_{r3,h}, Max\big(RT\_QSOR^{s,t}_{r3,k,h}, TAOR\_ST^{s,t}_{k,h} - RT\_QSOR^{s,t}_{r1,k,h} - RT\_QSOR^{s,t}_{r2,k,h}\big), RT\_OR\_DIPC^{s,t}_{r3,k,h} \sout{BOR^{s,t}_{r3,k,h}}\big]\big\}\Big\}/12$$

ii. Otherwise, $OLOC\_CB^{s,t}_{r3,k,h} = 0$

Real-Time Generator Offer Guarantee Clawback for GOG-Eligible Resources That Are Not Pseudo-Units

3.10.26 For a *delivery point* 'm' associated with a *GOG-eligible resource* that is not a *pseudo-unit*, the real-time *generator offer* guarantee *clawback settlement amount* ($RT\_GOG\_CB^{m}_{k,h}$) is calculated as follows:

$$RT\_GOG\_CB_k^m = Max\{(-1) \times RT\_GOG_k^m, Min[0, \sum_R^{T1} [ORSCB\_REV_{r,k,h}^{m,t} + COMP2\_CB_{r,k,h}^{m,t} - ORIA\_AMT_{r,k,h}^{m,t}] - \sum^{T1} RT\_MWP\_RC_{k,h}^{m,t}]\}$$

Where:

a. 'T1' is the set of all *metering intervals* 't' beginning from the first *metering interval* that the *generation unit* is at *minimum loading point* within a *real-time commitment period* or a *real-time reliability commitment period* until the last *metering interval* that the *generation unit* is at *minimum loading point* within such *real-time commitment period* or a *real-time reliability commitment period,* as applicable.

b. $ORSCB\_REV_{r,k,h}^{m,t}$ = (-1) x $ORSCB_{r,k,h}^{m,t}$

c. $COMP2\_CB_{r,k,h}^{m,t}$ is calculated in accordance with section 3.10.27.

d. $ORIA\_AMT_{r,k,h}^{m,t}$ is calculated in accordance with section 3.10.28.

3.10.27 $COMP2\_CB_{r,k,h}^{m,t}$ is calculated as follows:

a. For synchronized *ten-minute operating reserve*:

i. If $TAOR_{k,h}^{m,t} < RT\_QSOR_{r1,k,h}^{m,t}$, then:

$$COMP2\_CB_{r1,k,h}^{m,t} = \{OP[RT\_PROR_{r1,h}^{m,t}, RT\_QSOR_{r1,k,h}^{m,t}, BOR_{r1,k,h}^{m,t}] - OP(RT\_PROR_{r1,h}^{m,t}, TAOR_{k,h}^{m,t}, BOR_{r1,k,h}^{m,t})\}$$ ~~/12~~

ii. Otherwise, $COMP2\_CB_{r1,k,h}^{m,t} = 0$

b. For non-synchronized *ten-minute operating reserve*:

i. If $TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t} < RT\_QSOR_{r2,k,h}^{m,t}$, then:

$$COMP2\_CB_{r2,k,h}^{m,t} = \{OP[RT\_PROR_{r2,h}^{m,t}, RT\_QSOR_{r2,k,h}^{m,t}, BOR_{r2,k,h}^{m,t}] - OP(RT\_PROR_{r2,h}^{m,t}, TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t}, BOR_{r2,k,h}^{m,t})\}$$ ~~/12~~

ii. Otherwise, $COMP2\_CB_{r2,k,h}^{m,t} = 0$

c. For *thirty-minute operating reserve*:

i. If $TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t} - RT\_QSOR_{r2,k,h}^{m,t} < RT\_QSOR_{r3,k,h}^{m,t}$, then:

$$COMP2\_CB_{r3,k,h}^{m,t} = \{OP\left[RT\_PROR_{r3,h}^{m,t}, RT\_QSOR_{r3,k,h}^{m,t}, BOR_{r3,k,h}^{m,t}\right] - OP\left(RT\_PROR_{r3,h}^{m,t}, TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t} - RT\_QSOR_{r2,k,h}^{m,t}, BOR_{r3,k,h}^{m,t}\right)\} /12$$

ii. Otherwise, $COMP2\_CB_{r3,k,h}^{m,t} = 0$

3.10.28 The revenue earned for non-accessible *operating reserve*, $ORIA\_AMT_{r,k,h}^{m,t}$, is calculated as follows:

a. For synchronized *ten-minute operating reserve*:

i. If $TAOR_{k,h}^{m,t} < RT\_QSOR_{r1,k,h}^{m,t}$, then:

$$ORIA\_AMT_{r1,k,h}^{m,t} = \left[RT\_PROR_{r1,h}^{m,t} \times \left(RT\_QSOR_{r1,k,h}^{m,t} - TAOR_{k,h}^{m,t}\right)\right] /12$$

ii. Otherwise, $ORIA\_AMT_{r1,k,h}^{m,t} = 0$

b. For non-synchronized *ten-minute operating reserve*:

ii. If $TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t} < RT\_QSOR_{r2,k,h}^{m,t}$, then:

$$ORIA\_AMT_{r2,k,h}^{m,t} = \left[RT\_PROR_{r2,h}^{m,t} \times \left(RT\_QSOR_{r2,k,h}^{m,t} - Max(0, TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t})\right)\right] /12$$

ii. Otherwise, $ORIA\_AMT_{r2,k,h}^{m,t} = 0$

c. For *thirty-minute operating reserve*:

iii. If $TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t} - RT\_QSOR_{r2,k,h}^{m,t} < RT\_QSOR_{r3,k,h}^{m,t}$, then:

$$ORIA\_AMT_{r3,k,h}^{m,t} = \left[RT\_PROR_{r3,h}^{m,t} \times \left(RT\_QSOR_{r3,k,h}^{m,t} - Max\left(0, TAOR_{k,h}^{m,t} - RT\_QSOR_{r1,k,h}^{m,t} - RT\_QSOR_{r2,k,h}^{m,t}\right)\right)\right] /12$$

ii. Otherwise, $ORIA\_AMT_{r3,k,h}^{m,t} = 0$

Real-Time Generator Offer Guarantee Clawback for GOG-Eligible Resources That Are Pseudo-Units

Steam Turbine

3.10.29 For a *delivery point* 's' associated with a steam turbine *resource* of a *GOG-eligible resource* that is a *pseudo-unit*, the real-time *generator offer* guarantee *clawback settlement amount* (RT_GOG_CB$^{s}_{k,h}$) is calculated as follows:

$$RT\_GOG\_CB^{m}_{k} = Max\{(-1) \times RT\_GOG^{s}_{k}, Min[0, \sum_{R}^{T1}[ORSCB\_REV^{s,t}_{r,k,h} + COMP2\_CB^{s,t}_{r,k,h} - ORIA\_AMT^{s,t}_{r,k,h}] - \sum^{T1} RT\_MWP\_RC^{s,t}_{k,h}]\}$$

Where:

a. 'T1' is the set of all *metering intervals* 't' beginning from the first *metering interval* that the steam turbine *resource* is at *minimum loading point* within a *real-time commitment period* or a *real-time reliability commitment period* until the last *metering interval* that the steam turbine *resource* is at *minimum loading point* within such *real-time commitment period* or a *real-time reliability commitment period*, as applicable.

b. $$ORSCB\_REV^{s,t}_{k,h} = -1\ x\ ORSCB^{s,t}_{k,h} \times \frac{\sum_R RT\_OR\_CMT\_DIGQ^{s,t}_{r,k,h}}{\sum_R RT\_QSOR^{s,t}_{r,k,h}}$$

c. $COMP2\_CB^{s,t}_{r,k,h}$ is calculated in accordance with section 3.10.30

d. $ORIA\_AMT^{s,t}_{r,k,h}$ is calculated in accordance with section 3.10.31

e. for the purposes of section 3.10.30 and section 3.10.31, $RT\_GOG\_TAOR\_ST^{s,t}_{k,h}$ is calculated as follows:

$$RT\_GOG\_TAOR\_ST^{s,t}_{k,h} = TAOR\_ST^{s,t}_{k,h} \times \frac{\sum_R RT\_OR\_CMT\_DIGQ^{s,t}_{r,k,h}}{\sum_R RT\_QSOR^{s,t}_{r,k,h}}$$

3.10.30 $COMP2\_CB^{s,t}_{r,k,h}$ is calculated as follows:

a. For synchronized *ten-minute operating reserve*:

i. If $TAOR\_ST^{s,t}_{k,h} < RT\_OR\_CMT\_DIGQ^{s,t}_{r1,k,h}$, then:

$$COMP2\_CB^{s,t}_{r1,k,h} = \{OP(RT\_PROR^{s,t}_{r1,h}, RT\_OR\_CMT\_DIGQ^{s,t}_{r1,k,h}\ ~~RT\_QSOR^{s,t}_{r1,k,h}~~, RT\_OR\_CMT\_DIPC^{s,t}_{r1,k,h}\ ~~BOR^{s,t}_{r1,k,h}~~ OP(RT\_PROR^{s,t}_{r1,h}, RT\_GOG\_TAOR\_ST^{s,t}_{k,h}, RT\_OR\_CMT\_DIPC^{s,t}_{r1,k,h}\ ~~BOR^{s,t}_{r1,k,h}~~)\}~~/12~~$$

ii. Otherwise, $COMP2\_CB^{s,t}_{r1,k,h} = 0$

b. For non-synchronized *ten-minute operating reserve*:

i. If $RT\_GOG\_TAOR\_ST_{k,h}^{s,t} - RT\_OR\_CMT\_DIGQ_{r1,k,h}^{s,t}$ ~~$RT\_QSOR_{r1,k,h}^{s,t}$~~ < $RT\_OR\_CMT\_DIGQ_{r2,k,h}^{s,t}$ ~~$RT\_QSOR_{r2,k,h}^{s,t}$~~, then:

$$COMP2\_CB_{r2,k,h}^{s,t} = \{OP(RT\_PROR_{r2,h}^{s,t}, RT\_OR\_CMT\_DIGQ_{r2,k,h}^{s,t}\ RT\_QSOR_{r2,k,h}^{s,t}, RT\_OR\_CMT\_DIPC_{r2,k,h}^{s,t} BOR_{r2,k,h}^{s,t}$$
$$OP(RT\_PROR_{r2,h}^{s,t}, RT\_GOG\_TAOR\_ST_{k,h}^{s,t} - RT\_OR\_CMT\_DIGQ_{r1,k,h}^{s,t} RT\_QSOR_{r1,k,h}^{s,t}, RT\_OR\_CMT\_DIPC_{r2,k,h}^{s,t} BOR_{r2,k,h}^{s,t}))\}/12$$

ii. Otherwise, $COMP2\_CB_{r2,k,h}^{s,t} = 0$

c. For *thirty-minute operating reserve*:

i. If $RT\_GOG\_TAOR\_ST_{k,h}^{s,t} - RT\_OR\_CMT\_DIGQ_{r1,k,h}^{s,t}$ ~~$RT\_QSOR_{r1,k,h}^{s,t}$~~ − $RT\_OR\_CMT\_DIGQ_{r2,k,h}^{s,t}$ ~~$RT\_QSOR_{r2,k,h}^{s,t}$~~ < $RT\_OR\_CMT\_DIGQ_{r3,k,h}^{s,t}$ ~~$RT\_QSOR_{r3,k,h}^{s,t}$~~, then:

$$COMP2\_CB_{r3,k,h}^{s,t} = \{OP(RT\_PROR_{r3,h}^{s,t}, RT\_OR\_CMT\_DIGQ_{r3,k,h}^{s,t}\ RT\_QSOR_{r3,k,h}^{s,t}, RT\_OR\_CMT\_DIPC_{r3,k,h}^{s,t} BOR_{r3,k,h}^{s,t})$$
$$- OP(RT\_PROR_{r3,h}^{s,t}, RT\_GOG\_TAOR\_ST_{k,h}^{s,t} - RT\_OR\_CMT\_DIGQ_{r1,k,h}^{s,t} RT\_QSOR_{r1,k,h}^{s,t}$$
$$- RT\_OR\_CMT\_DIGQ_{r2,k,h}^{s,t} RT\_QSOR_{r2,k,h}^{s,t}, RT\_OR\_CMT\_DIPC_{r3,k,h}^{s,t} BOR_{r3,k,h}^{s,t}))\}/12$$

ii. Otherwise, $COMP2\_CB_{r3,k,h}^{s,t} = 0$

3.10.31 The revenue earned for non-accessible *operating reserve*, $ORIA\_AMT_{r,k,h}^{s,t}$, is calculated as follows:

a. For synchronized *ten-minute operating reserve*:

i. If $RT\_GOG\_TAOR\_ST_{k,h}^{s,t} < RT\_OR\_CMT\_DIGQ_{r1,k,h}^{s,t}$ ~~$RT\_QSOR_{r1,k,h}^{s,t}$~~, then:

$$ORIA\_AMT_{r1,k,h}^{s,t} = [RT\_PROR_{r1,h}^{s,t} \times (RT\_OR\_CMT\_DIGQ_{r1,k,h}^{s,t}\ RT\_QSOR_{r1,k,h}^{s,t} - RT\_GOG\_TAOR\_ST_{k,h}^{s,t})]/12$$

ii. Otherwise, $ORIA\_AMT_{r1,k,h}^{s,t} = 0$

b. For non-synchronized *ten-minute operating reserve*:

ii. If $RT\_GOG\_TAOR\_ST_{k,h}^{s,t} - RT\_OR\_CMT\_DIGQ_{r1,k,h}^{s,t}$ ~~$RT\_QSOR_{r1,k,h}^{s,t}$~~ $< RT\_OR\_CMT\_DIGQ_{r2,k,h}^{s,t}$ ~~$RT\_QSOR_{r2,k,h}^{s,t}$~~, then:

$$ORIA\_AMT_{r2,k,h}^{s,t} = \left[RT\_PROR_{r2,h}^{s,t} \times \left(RT\_OR\_CMT\_DIGQ_{r2,k,h}^{s,t}\ \text{~~}RT\_QSOR_{r2,k,h}^{s,t}\text{~~} - Max\left(0, RT\_GOG\_TAOR\_ST_{k,h}^{s,t} - RT\_OR\_CMT\_DIGQ_{r1,k,h}^{s,t}\ \text{~~}RT\_QSOR_{r1,k,h}^{s,t}\text{~~}\right)\right)\right] \text{~~/12~~}$$

ii. Otherwise, $ORIA\_AMT_{r2,k,h}^{s,t} = 0$

c. For *thirty-minute operating reserve*:

iii. If $RT\_GOG\_TAOR\_ST_{k,h}^{s,t} - RT\_OR\_CMT\_DIGQ_{r1,k,h}^{s,t}$ ~~$RT\_QSOR_{r1,k,h}^{s,t}$~~ $- RT\_OR\_CMT\_DIGQ_{r2,k,h}^{s,t}$ ~~$RT\_QSOR_{r2,k,h}^{s,t}$~~ $< RT\_OR\_CMT\_DIGQ_{r3,k,h}^{s,t}$ ~~$RT\_QSOR_{r3,k,h}^{s,t}$~~, then:

$$ORIA\_AMT_{r3,k,h}^{s,t} = \left[RT\_PROR_{r3,h}^{s,t} \times \left(RT\_OR\_CMT\_DIGQ_{r3,k,h}^{s,t}\ \text{~~}RT\_QSOR_{r3,k,h}^{s,t}\text{~~} - Max\left(0, RT\_GOG\_TAOR\_ST_{k,h}^{s,t} - RT\_OR\_CMT\_DIGQ_{r1,k,h}^{s,t}\ \text{~~}RT\_QSOR_{r1,k,h}^{s,t}\text{~~} - RT\_OR\_CMT\_DIGQ_{r2,k,h}^{s,t}\ \text{~~}RT\_QSOR_{r2,k,h}^{s,t}\text{~~}\right)\right)\right] \text{~~/12~~}$$

ii. Otherwise, $ORIA\_AMT_{r3,k,h}^{s,t} = 0$

Combustion Turbine

3.10.32 For a *delivery point* 'c' associated with a combustion turbine *resource* of a *GOG-eligible resource* that is a *pseudo-unit,* the real-time *generator offer* guarantee *operating reserve* non-accessibility reversal *settlement amount* ($RT\_GOG\_CB^{c}_{k,h}$) is calculated as follows:

$$RT\_GOG\_CB_{k}^{c} = Max\{(-1) \times RT\_GOG_{k}^{c}, Min[0, \sum_{R}^{T1}\left[ORSCB\_REV_{r,k,h}^{c,t} + COMP2\_CB_{r,k,h}^{c,t} - ORIA\_AMT_{r,k,h}^{c,t}\right] - \sum^{T1} RT\_MWP\_RC_{k,h}^{c,t}]\}$$

Where:

a. 'T1' is the set of all *metering intervals* 't' beginning from the first *metering interval* that the combustion turbine *resource* is at *minimum*

loading point within a *real-time commitment period* or a *real-time reliability commitment period* until the last *metering interval* that the combustion turbine *resource* is at *minimum loading point* within such *real-time commitment period* or a *real-time reliability commitment period,* as applicable.

b. $ORSCB\_REV^{c,t}_{r,k,h}$ = (-1) x $ORSCB^{c,t}_{r,k,h}$

c. $COMP2\_CB^{c,t}_{r,k,h}$ is calculated in accordance with section 3.10.33.

d. $ORIA\_AMT^{c,t}_{r,k,h}$ is calculated in accordance with section 3.10.34.

3.10.33 $COMP2\_CB^{c,t}_{r,k,h}$ is calculated as follows:

a. For synchronized *ten-minute operating reserve*:

i. If $TAOR\_CT^{c,t}_{k,h} < RT\_QSOR^{c,t}_{r1,k,h}$, then:

$$COMP2\_CB^{c,t}_{r1,k,h} = \{OP\left(RT\_PROR^{c,t}_{r1,h}, RT\_QSOR^{c,t}_{r1,k,h}, RT\_OR\_DIPC^{c,t}_{r1,k,h} BOR^{c,t}_{r1,k,h}\right) - OP\left(RT\_PROR^{c,t}_{r1,h}, TAOR\_CT^{c,t}_{k,h}, RT\_OR\_DIPC^{c,t}_{r1,k,h} BOR^{c,t}_{r1,k,h}\right)\}/12$$

ii. Otherwise, $COMP2\_CB^{c,t}_{r1,k,h} = 0$

b. For non-synchronized *ten-minute operating reserve*:

i. If $TAOR\_CT^{c,t}_{k,h} - RT\_QSOR^{c,t}_{r1,k,h} < RT\_QSOR^{c,t}_{r2,k,h}$, then:

$$COMP2\_CB^{c,t}_{r2,k,h} = \{OP\left(RT\_PROR^{c,t}_{r2,h}, RT\_QSOR^{c,t}_{r2,k,h}, RT\_OR\_DIPC^{c,t}_{r2,k,h} BOR^{c,t}_{r2,k,h}\right) - OP\left(RT\_PROR^{c,t}_{r2,h}, TAOR\_CT^{c,t}_{k,h} - RT\_QSOR^{c,t}_{r1,k,h}, RT\_OR\_DIPC^{c,t}_{r2,k,h} BOR^{c,t}_{r2,k,h}\right)\}/12$$

ii. Otherwise, $COMP2\_CB^{c,t}_{r2,k,h} = 0$

c. For *thirty-minute operating reserve*:

i. If $TAOR\_CT^{c,t}_{k,h} - RT\_QSOR^{c,t}_{r1,k,h} - RT\_QSOR^{c,t}_{r2,k,h} < RT\_QSOR^{c,t}_{r3,k,h}$, then:

$$COMP2_{CB}{}^{c,t}_{r3,k,h} = \{OP\left(RT\_PROR^{c,t}_{r3,h}, RT\_QSOR^{c,t}_{r3,k,h}, RT\_OR\_DIPC^{c,t}_{r3,k,h} BOR^{c,t}_{r3,k,h}\right) - OP\left(RT\_PROR^{c,t}_{r3,h}, TAOR\_CT^{c,t}_{k,h} - RT\_QSOR^{c,t}_{r1,k,h} - RT\_QSOR^{c,t}_{r2,k,h}, RT\_OR\_DIPC^{c,t}_{r3,k,h} BOR^{c,t}_{r3,k,h}\right)\}/12$$

ii. Otherwise, $COMP2\_CB^{c,t}_{r3,k,h} = 0$

3.10.34 The revenue earned for non-accessible *operating reserve*, $ORIA\_AMT_{r,k,h}^{c,t}$, is calculated as follows:

a. For synchronized *ten-minute operating reserve*:

i. If $TAOR\_CT_{k,h}^{c,t} < RT\_QSOR_{r1,k,h}^{c,t}$, then:

$$ORIA\_AMT_{r1,k,h}^{c,t} = \left[RT\_PROR_{r1,h}^{c,t} \times \left(RT\_QSOR_{r1,k,h}^{c,t} - TAOR\_CT_{k,h}^{c,t}\right)\right] /12$$

ii. Otherwise, $ORIA\_AMT_{r1,k,h}^{c,t} = 0$

b. For non-synchronized *ten-minute operating reserve*:

i. If $TAOR\_CT_{k,h}^{c,t} - RT\_QSOR_{r1,k,h}^{c,t} < RT\_QSOR_{r2,k,h}^{c,t}$, then:

$$ORIA\_AMT_{r2,k,h}^{c,t} = \left[RT\_PROR_{r2,h}^{c,t} \times \left(RT\_QSOR_{r2,k,h}^{c,t} - Max\left(0, TAOR\_CT_{k,h}^{c,t} - RT\_QSOR_{r1,k,h}^{c,t}\right)\right)\right] /12$$

c. For *thirty-minute operating reserve*:

i. If $TAOR\_CT_{k,h}^{c,t} - RT\_QSOR_{r1,k,h}^{c,t} - RT\_QSOR_{r2,k,h}^{c,t} < RT\_QSOR_{r3,k,h}^{c,t}$, then:

$$ORIA\_AMT_{r3,k,h}^{c,t} = \left[RT\_PROR_{r3,h}^{c,t} \times \left(RT\_QSOR_{r3,k,h}^{c,t} - Max\left(0, TAOR\_CT_{k,h}^{c,t} - RT\_QSOR_{r1,k,h}^{c,t} - RT\_QSOR_{r2,k,h}^{c,t}\right)\right)\right] /12$$

ii. Otherwise, $ORIA\_AMT_{r3,k,h}^{c,t} = 0$

3.11 ~~3.10~~ Hourly Uplifts

Hourly Uplift Settlement Amount

3.11.1 ~~3.10.1~~ The total *hourly uplift* for *settlement hour* 'h' ("$HUSA_h$") to be recovered from *market participants* shall be determined according to the following equation:

$$HUSA_h = \sum_K \left(HORSA\{1\}_{k,h} + HORSA\{2\}_{k,h} + DAM\_BC_{k,h} + RT\_MWP_{k,h} + RT\_IOG_{k,h} + RT\_NISLR_h\right) - \sum_K \left(\sum_R ORSSD_{r,k,h} + RT\_IMFC_{k,h} + RT\_EXFC_{k,h} + GFC\_MPC_{k,h} + RT\_RLSC_{k,h} + DAM\_RLSC_{k,h}\right)$$

$$HUSA_h = \sum_K \left(HORSA\{1\}_{k,h} + HORSA\{2\}_{k,h} + DAM\_BC_{k,h} + RT\_MWP_{k,h} + RT\_IOG_{k,h} + RT\_NISLR_h\right) - \sum_K \left(\sum_R ORSSD_{r,k,h} + \sum_R ORSCB_{r,k,h} + RT\_IMFC_{k,h} + RT\_EXFC_{k,h} + GFC\_MPC_{k,h} + RT\_RLSC_{k,h} + DAM\_RLSC_{k,h}\right)$$

Where:

a. $HORSA\{1\}_{k,h}$ is the hourly *operating reserve settlement amount* calculated in accordance with section 3.1.10 for *market participant* 'k' in *settlement hour* 'h';

b. $HORSA\{2\}_{k,h}$ is the hourly *operating reserve settlement amount* calculated in accordance with section 3.1.11 for *market participant* 'k' in *settlement hour* 'h';

c. $DAM\_BC_{k,h}$ is the *day-ahead market* balancing credit calculated in accordance with section 3.3 for *market participant* 'k' in *settlement hour* 'h';

d. $RT\_MWP_{k,h}$ is the real-time make-whole payment *settlement amount* calculated in accordance with section 3.5 for *market participant* 'k' in *settlement hour* 'h', as reduced by any RT_MWP_RC$^m_{k,h}$ calculated in accordance with sections 3.10.2 for such *market participant, delivery point,* and *settlement hour*;

e. $RT\_IOG_{k,h}$ is the net real-time *intertie offer* guarantee *settlement amount* calculated in accordance with section 3.6 for *market participant* 'k' in *settlement hour* 'h';

f. $RT\_IMFC_{k,h}$ is the real-time *intertie* failure charge *settlement amount* for import transactions calculated in accordance with section 3.7.4 for *market participant* 'k' in *settlement hour* 'h';

g. $RT\_EXFC_{k,h}$ is the real-time *intertie* failure charge *settlement amount* for export transactions calculated in accordance with section 3.7.6 for *market participant* 'k' in *settlement hour* 'h';

h. RT_NISLR_h is the *real-time market* net interchange scheduling limit (NISL) residual calculated in accordance with section 4.8.8 for *settlement hour* 'h';

i. $GFC\_MPC_{k,h}$ is the *market price* component of the *generator failure* charge *settlement amount* calculated in accordance with sections 4.10.5 and 4.10.8 for *market participant* 'k' in *settlement hour* 'h';

j. $RT\_RLSC_{k,h}$ is the *real-time market reference level settlement* charge *settlement amount* calculated in accordance with section 5.3 for *market participant* 'k' in *settlement hour* 'h';

k. $DAM\_RLSC_{k,h}$ is the *day-ahead market reference level settlement* charge *settlement amount* calculated in accordance with section 5.2 for *market participant* 'k' in *settlement hour* 'h'; ~~and~~

l. $ORSSD_{r,k,h}$ is the *operating reserve* shortfall *settlement* debit *settlement amount* calculated in accordance with section 3.9.2 for *market participant* 'k' for *class r reserve* for *settlement hour* 'h'~~.~~; and

m. $ORSCB_{r,k,h}$ is the *operating reserve* non-accessibility charge *settlement amount* calculated in accordance with section 3.10.1 for *market participant* 'k' for *class r reserve* for *settlement hour* 'h'.

3.11.2 ~~3.10.2~~ The *IESO* shall allocate the *hourly uplift* to all *market participants* on a pro-rata basis across all allocated quantities of *energy* withdrawn at all *delivery points* and across all scheduled quantities of *energy* withdrawn at all *intertie metering points* during all *metering intervals* within each *settlement hour* in which an *hourly uplift* accrues. The *hourly uplift settlement amount* to be collected or disbursed to *market participant* 'k' in *settlement hour* 'h' ("$HUSA_{k,h}$") shall be determined as follows:

$$HUSA_{k,h} = \mathrm{HUSA_h}\ x \left[\sum^{M,T} \left(AQEW_{k,h}^{m,t} + SQEW_{k,h}^{i,t} + RQ_{k,h}^{m,i,t}\right) \Big/ \sum_{K}^{M,T} \left(AQEW_{k,h}^{m,t} + SQEW_{k,h}^{i,t}\right)\right]$$

Where:

a. 'M' is all *delivery points* 'm' and *intertie metering points* 'i'.

3.11.3 ~~3.10.3~~ The *hourly uplift settlement amount* may be disaggregated by the *IESO* on *settlement statements* in such manner as the *IESO* determines appropriate.

4 Non-Hourly Settlement Amounts

4.4 Day-Ahead Market Generator Offer Guarantee

General

4.4.1 Subject to section 4.4.2 and the mitigation process described in section 5 and Appendix 9.4, the *day-ahead market generator offer* guarantee *settlement amount* for *market participant* 'k' ("DAM_GOG_k") shall be calculated for each *settlement hour* within a *day-ahead commitment period* for each *GOG-eligible resource* and disbursed to the *market participant* for such *resource* in accordance with the operating profit function described in section 10 of Appendix 9.2, and this section 4.4.

4.4.1.1 In determining the *day-ahead market generator offer* guarantee *settlement amount* in this section 4.4, the following expressions shall have the following meanings:

a. "Day ~~-1~~0" refers to the day the *day-ahead market calculation engine* runs to set the *day-ahead schedule* for Day ~~0~~1;

b. "Day ~~0~~1" refers to the *dispatch day* for which the *day-ahead market generator offer* guarantee *settlement amount* is being calculated; and

4.4.1.2 The *day-ahead market generator offer* guarantee *settlement amount* will be determined utilizing one of three possible variants each of which consists of the following components, where applicable:

---

c. Component 3 is the amount calculated by Component 1 up to the *minimum loading point* for the *settlement hours* of *minimum generation block run-time* scheduled over midnight into Day ~~0~~1, and is calculated in accordance with sections 4.4.8, 4.4.17, or 4.4.24, as applicable;

4.4.2 Notwithstanding section 4.4.1, a *market participant* shall be ineligible to receive a *day-ahead market generator offer* guarantee *settlement amount* for a *settlement hour* where:

4.4.2.2 when all of the following circumstances are true:

a. the *GOG-eligible resource* has a *day-ahead operational commitment* or *pre-dispatch operational commitment* in the last *settlement hour* of Day ~~-1~~0 at the time the *day-ahead market calculation engine* determines the *day-ahead schedule* for Day ~~0~~1;

b. the *GOG-eligible resource* has completed its scheduled *minimum generation block run-time* in Day ~~-1~~0 and has a *day-ahead operational schedule* in the first *settlement hour* of Day ~~0~~1 in order to ramp down the *GOG-eligible resource* to an offline status; and

c. the *GOG-eligible resource* did not receive an *extended pre-dispatch operational commitment* for the first *settlement hour* of Day ~~0~~1.

Day-Ahead Market Generator Offer Guarantee for Non-Pseudo Units

Formulations

Variant #1

4.4.3 If a *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit* meets any of the following conditions:

Variant #2

4.4.4 If a *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit* (1) has a *pre-dispatch operational commitment* or a *day-ahead operational commitment* in the last *settlement hour* of Day ~~-1~~0 at the time the *day-ahead market calculation engine* determined the *day-ahead schedule* for Day ~~0~~1; and (2) is scheduled to complete its *minimum generation block run-time* in Day ~~0~~1, the *day-ahead market generator offer* guarantee *settlement amount* is calculated as follows for a *delivery point* 'm':

Variant #3

4.4.5 If a *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit* meets any of the following conditions*:*

4.4.5.1 such *resource* (1) has a *day-ahead schedule* in the first *settlement hour* of Day ~~0~~1; (2) has either a *day-ahead operational commitment* or *pre-dispatch operational commitment* in the last *settlement hour* of Day ~~-1~~0 at the time the *day-ahead market calculation engine* determines the *day-ahead schedule* for Day ~~0~~1; and (3) completed its *minimum generation block run-time* in the last *settlement hour* of Day ~~-1~~0;

Components

Component #1 – applicable to Variant # 1, 2 and 3

4.4.6 In determining the *day-ahead market generator offer* guarantee *settlement amount* for the *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit,* the *IESO* shall calculate $DAM\_GOG\_COMP1_k^m$ as follows:

$$DAM\_GOG\_COMP1_k^m = \sum^{H}\left[-1\ x\ \left(OP(DAM\_LMP_h^m, DAM\_QSI_{k,h}^m, DAM\_BE_{k,h}^m)\right) + \left(DAM\_BE\_SNL_{k,h}^m\ x\ N_{k,h}^m/12\right)\right] - \sum^{RH}\left[DAM\_LMP_h^m\ x\ DAM\_QSI_{k,h}^m\right]$$

Where:

a. 'H' is the set of *settlement hours* within the relevant *day-ahead commitment period*;

b. 'RH' is the set of contiguous *settlement hours* with *day-ahead schedules* for the ramp-up period;

c. '$N_{k,h}^m$' is the number of *metering intervals* in *settlement hour* 'h' during which *delivery point* 'm' for *market participant* 'k' was synchronized and injecting *energy* into the *IESO-controlled grid;* and

d. If the combustion turbine *resource* or steam turbine *resource* is registered as a *pseudo-unit* but is not operating as a *pseudo-unit* and has a ~~binding~~minimum constraint applied for combined cycle ~~physical unit constraint~~operation consistent with combustion turbine commitment, then $DAM\_QSI_{k,h}^m$ will be replaced with $DAM\_EOP_{k,h}^m$ for those *settlement hours* in which they have such constraint.

Component #2 – applicable to Variant # 1, 2 and 3

4.4.7 In determining the *day-ahead market generator offer* guarantee *settlement amount* for the *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit,* the *IESO* shall calculate $DAM\_GOG\_COMP2_k^m$ as follows:

$$DAM\_GOG\_COMP2_k^m = -1\ x\ \sum_R^H\left[OP\left(DAM\_PROR_{r,h}^m, DAM\_QSOR_{r,k,h}^m, DAM\_BOR_{r,k,h}^m\right)\right]$$

Where:

a. 'H' is the set of *settlement hours* within the relevant *day-ahead commitment period*.

Component #3 – applicable to Variant # 2

4.4.8 In determining the *day-ahead market generator offer* guarantee *settlement amount* for the *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit,* the *IESO* shall calculate $DAM\_GOG\_COMP3_k^m$ as follows:

$$DAM\_GOG\_COMP3_k^m = \sum^H [(-1)\, x\, (OP(DAM\_LMP_h^m, MLP_k^m, DAM\_BE_{k,h}^m)) + DAM\_BE\_SNL_{k,h}^m \times \frac{N_{k,h}^m}{12}]$$

Where:

a. 'H' is the set of *settlement hours* within the *day-ahead commitment period* that are required to complete the *resource's minimum generation block run-time* that began in Day ~~-1~~0;

b. 'MLP_k^m' is the *minimum loading point* of the *GOG-eligible resource* for Day ~~-1~~0 for *market participant* 'k' for *delivery point* 'm'; and

c. '$N_{k,h}^m$' is the number of *metering intervals* in *settlement hour* 'h' during which *delivery point* 'm' for *market participant* 'k' was synchronized and injecting *energy* into the *IESO-controlled grid*.

Component #4 – applicable to Variant # 1

4.4.9 In determining the *day-ahead market generator offer* guarantee *settlement amount* for the *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit,* the *IESO* shall calculate $DAM\_GOG\_COMP4_{k,h}^m$ in accordance with the following:

4.4.10 If the sole reason that a *GOG-eligible resource* did not complete its *minimum generation block run-time* is because the *IESO* ~~required, in order to maintain the reliability of the IESO-controlled grid,~~directed such *GOG-eligible resource* to de-synchronize from the *IESO-controlled grid* after the commencement of its *day-ahead operational commitment*, then the *GOG-eligible resource* is not required to complete its *minimum generation block run-time* in order for section 4.4.9.1 to apply.

Component #5 – applicable to Variant # 1, 2 and 3

4.4.11 In determining the *day-ahead market generator offer* guarantee *settlement amount* for the *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit,* the *IESO* shall calculate $DAM\_GOG\_COMP5_k^m$ as follows:

$$DAM\_GOG\_COMP5_k^m = \sum^H DAM\_MWP_{k,h}^m$$

Where:

a. 'H' is the set of *settlement hours* within the relevant *day-ahead commitment period*.

Day-Ahead Market Generator Offer Guarantee – Combustion Turbine Associated with a Pseudo-Unit

Formulations

Variant #1

4.4.12 If the combustion turbine ~~of~~*resource* of a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit* meets any of the following conditions:

4.4.12.1 The combustion turbine *resource* has:

a. A *day-ahead operational schedule* to start in Day ~~0~~1 to meet a *day-ahead operational commitment* without any preceding *day-ahead operational commitment, pre-dispatch operation commitment,* or *reliability* commitment; or

b. a *day-ahead operational schedule* with a preceding *advanced pre-dispatch operational commitment* or *reliability* commitment that extends less than the *resource's minimum generation block run-time* plus its *minimum generation block down-time,*

the *day-ahead market generator offer* guarantee *settlement amount* is calculated as follows for combustion turbine ~~*delivery*~~*resource delivery point* 'c':

$$DAM\_GOG_k^c = Max\left[0, DAM\_GOG\_COMP1_k^c + DAM\_GOG\_COMP2_k^c + DAM\_GOG\_COMP4_{k,h}^c - DAM\_GOG\_COMP5_k^c\right]$$

Where:

a. $DAM\_GOG\_COMP1_k^c$, $DAM\_GOG\_COMP2_k^c$, $DAM\_GOG\_COMP4_{k,h}^c$ and $DAM\_GOG\_COMP5_k^c$ are calculated in accordance with sections 4.4.15, 4.4.16, 4.4.18 and 4.4.20, respectively.

Variant #2

4.4.13 If the combustion turbine *resource* of a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit* has either a *day-ahead operational commitment* or *pre-dispatch operational commitment* for the last *settlement hour* of Day ~~-1~~0 and is scheduled to complete its *minimum generation block run-time* in the first *settlement hour* of Day ~~0~~1, the *day-ahead market generator offer* guarantee *settlement amount* is calculated as follows for combustion turbine *resource delivery point* 'c':

Variant #3

4.4.14 If the combustion turbine *resource* of a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit* meets any of the following conditions:

4.4.14.1 such *resource* (1) has a *day-ahead schedule* in the first *settlement hour* of Day ~~0~~1; (2) has either a *day-ahead operational commitment* or a *pre-dispatch operational commitment* for the last *settlement hour* of Day ~~-1~~0 at the time the *day-ahead market calculation engine* determines the *day-ahead schedule* for Day ~~0~~1; and (3) has completed its *minimum generation block run-time* when the *day-ahead operational commitment* in the first *settlement hour* of Day ~~0~~1 was scheduled;

4.4.14.2 has a *day-ahead operational schedule* that is not eligible under section 4.4.13 and which immediately follows a *day-ahead operational commitment* that is eligible under section 4.4.13*;* or

4.4.14.3 has a *day-ahead operational commitment* in Day ~~0~~1 that immediately follows a *pre-dispatch operational commitment* that:

Components

Component #1 - applicable to Variant # 1, 2 and 3

4.4.15 In determining the *day-ahead market generator offer* guarantee *settlement amount* for the combustion turbine *resource* of a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit,* the *IESO* shall calculate $DAM\_GOG\_COMP1_k^c$ as follows:

$$DAM\_GOG\_COMP1_k^c = \sum^{H} \left[(-1)\ x\ OP(DAM\_LMP_h^c, DAM\_QSI_{k,h}^c, DAM\_DIPC_{k,h}^c) + DAM\_BE\_SNL_{k,h}^p \times \frac{N_{k,h}^c}{12} \times \left(1 - ST\_Portion_{k,d1}^p\right) \right] - \sum^{RH} \left[DAM\_LMP_h^c \times DAM\_QSI_{k,h}^c \right]$$

Where:

a. 'H' is the set of *settlement hours* within the combustion ~~turbine's~~turbine *resource*'s relevant *day-ahead commitment period*;

b. 'RH' is the set of contiguous *settlement hours* that the combustion turbine *resource* has a *day-ahead schedule* for the ramp-up period, scheduled greater than zero but less than the combustion ~~turbine's~~turbine *resource*'s *minimum loading point;*

c. 'p' is the *pseudo-unit* associated with combustion turbine *resource delivery point* 'c'; and

d. '$N^{c}_{k,h}$' is the number of *metering intervals* in the *settlement hour* 'h' during which combustion turbine *resource delivery point* 'c' for *market participant* 'k' was synchronized and injecting *energy* into the *IESO-controlled grid*.

Component #2 - applicable to Variant # 1, 2 and 3

4.4.16 In determining the *day-ahead market generator offer* guarantee *settlement amount* for the combustion turbine *resource* of a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit,* the *IESO* shall calculate $DAM\_GOG\_COMP2^{c}_{k}$ as follows:

$$DAM\_GOG\_COMP2^{c}_{k} = \sum^{R} \sum^{H} [(-1) \times OP(DAM\_PROR^{c}_{r,h}, DAM\_QSOR^{c}_{r,k,h}, DAM\_OR\_DIPC^{c}_{r,k,h})]$$

Where:

a. 'H' is the set of *settlement hours* within the combustion ~~turbine's~~turbine *resource*'s relevant *day-ahead commitment period.*

Component #3 - applicable to Variant # 2

4.4.17 In determining the *day-ahead market generator offer* guarantee *settlement amount* for the combustion turbine *resource* of a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit,* the *IESO* shall calculate $DAM\_GOG\_COMP3^{c}_{k}$ as follows:

$$DAM\_GOG\_COMP3^{c}_{k} = \sum^{H} \left[(-1)x\ OP(DAM\_LMP^{c}_{h}, MLP^{c}_{k}, DAM\_DIPC^{c}_{k,h}) + DAM\_BE\_SNL^{p}_{k,h} \times \frac{N^{c}_{k,h}}{12} \times (1 - ST\_Portion^{p}_{k,d1}) \right]$$

Where:

a. 'H' is the set of *settlement hours* within the *day-ahead commitment period* that are required to complete the associated *pseudo-unit's minimum generation block run-time* that began in Day ~~-1~~0;

b. 'p' is the *pseudo-unit* associated with combustion turbine *resource delivery point* 'c';

c. 'MLP^{c}_{k}' is the *minimum loading point* of the combustion turbine *resource* associated with combustion turbine *resource delivery point* 'c'; and

d. '$N^{c}_{k,h}$' is the number of *metering intervals* in the *settlement hour* 'h' during which combustion turbine ~~*delivery*~~*resource delivery point* 'c' for *market participant* 'k' was synchronized and injecting *energy* into the *IESO-controlled grid*.

Component #4 - applicable to Variant # 1

4.4.18 In determining the *day-ahead market generator offer* guarantee *settlement amount* for the combustion turbine *resource* of a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit,* the *IESO* shall calculate $DAM\_GOG\_COMP4^{c}_{k,h}$ in accordance with the following:

4.4.18.1 Subject to section 4.4.19, if the combustion turbine *resource* synchronizes and injects *energy* into the *IESO-controlled grid* to complete its *day-ahead operational commitment*, its *day-ahead operational commitment* does not immediately follow another *day-ahead operational commitment*, it completes its *minimum generation block run-time*, and:

a. the combustion turbine *resource* achieved its *minimum loading point* within the first six *metering intervals* of the first *settlement hour* of its *day-ahead operational commitment*, then:

$$DAM\_GOG\_COMP4^{c}_{k,h} = DAM\_BE\_SU^{p}_{k,h} \times \left(1 - ST\_Portion^{p}_{k,d1}\right); \text{ or}$$

b. the combustion turbine *resource* achieved its *minimum loading point* after the first six *metering intervals* of the start of its *day-ahead operational commitment* but before the 19th *metering interval* following the start of its *day-ahead operational commitment*, then:

$$DAM\_GOG\_COMP4^{c}_{k,h} = DAM\_BE\_SU^{p}_{k,h} \times \left(1 - \frac{N\_INT}{12}\right) \times \left(1 - ST\_Portion^{p}_{k,d1}\right)$$

Where:

i. 'N_INT' is the number of *metering intervals* after the first six *metering intervals* that the combustion turbine *resource* took to achieve *minimum loading point.*

4.4.18.2 Otherwise,

$$DAM\_GOG\_COMP4^{c}_{k,h} = 0$$

4.4.19 If the sole reason that the combustion turbine *resource* did not complete its *minimum generation block run-time* is because the *IESO dispatched*, in order to maintain the *reliability* of the *IESO-controlled grid*, such combustion turbine *resource* after the commencement of its *day-ahead operational commitment*, then the combustion turbine *resource* is not required to complete its *minimum generation block run-time* in order for section 4.4.18.1 to apply.

Component #5 - applicable to Variant # 1, 2 and 3

4.4.20 In determining the *day-ahead market generator offer* guarantee *settlement amount* for the combustion turbine *resource* of a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit,* the *IESO* shall calculate $DAM\_GOG\_COMP5^{c}_{k}$ as follows:

$$DAM\_GOG\_COMP5_k^c = \sum^H DAM\_MWP_{k,h}^c$$

Where:

i. 'H' is the set of *settlement hours* within the combustion ~~turbine's~~turbine *resource*'s relevant *day-ahead commitment period.*

Day-Ahead Market Generator Offer Guarantee – Steam Turbine Associated with a Pseudo-Unit

Formulation

4.4.21 For a *delivery point* 's' for a steam turbine *resource* associated with a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit*, the *day-ahead market generator offer* guarantee *settlement amount* is calculated as follows:

Components

Component #1

4.4.22 In determining the *day-ahead market generator offer* guarantee *settlement amount* for the steam turbine *resource* of a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit,* the *IESO* shall calculate $DAM\_GOG\_COMP1_k^s$ as follows:

$$DAM\_GOG\_COMP1_k^s = \sum^H \left[(-1) \times OP\left(DAM\_LMP_h^s, DAM\_DIGQ_{k,h}^s, DAM\_DIPC_{k,h}^s\right) + \sum_{p=1}^{M} \left(DAM\_BE\_SNL_{k,h}^p \times \frac{N_{k,h}^p}{12} \times ST\_Portion_{k,d1}^p \right) \right] - \sum^{RH} \left[DAM\_LMP_h^s \times DAM\_QSI_{k,h}^s \right]$$

Where:

i. 'H' is the set of all *settlement hours* within the steam ~~turbine's~~turbine *resource*'s *day-ahead commitment period* when at least one of the *pseudo-units* associated with the steam turbine *resource* has a *day-ahead schedule* greater than or equal to its respective *pseudo-unit's minimum loading point;*

ii. 'M' is the set of all *pseudo-units* 'p' associated with steam turbine *resource delivery point* 's' that have a *day-ahead schedule* greater than or equal to their respective *minimum loading point* in *settlement hour* 'h';

iii. 'RH' is the set of all *settlement hours* in the steam ~~turbine's~~turbine *resource*'s *day-ahead operational commitment* when all of the *pseudo-units* associated

with the steam turbine *resource* are scheduled less than their *minimum loading point*; and

iv. '$N^{p}_{k,h}$' is the number of *metering intervals* in the *settlement hour* 'h' during which the combustion turbine *resource* associated with *pseudo-unit* 'p' for *market participant* 'k' was synchronized and injecting *energy* into the *IESO-controlled grid*.

Component #2

4.4.23 In determining the *day-ahead market generator offer* guarantee *settlement amount* for the steam turbine *resource* of a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit,* the *IESO* shall calculate $DAM\_GOG\_COMP2^{s}_{k}$ as follows:

$$DAM\_GOG\_COMP2^{s}_{k} = \sum^{R}\sum^{H}\left[(-1) \times OP\left(DAM\_PROR^{s}_{r,h}, DAM\_QSOR^{s}_{r,k,h}, DAM\_OR\_DIPC^{s}_{r,k,h}\right)\right]$$

Where:

a. 'H' is the set of all *settlement hours* within the steam ~~turbine's~~turbine *resource*'s *day-ahead commitment period* when at least one of the *pseudo-units* associated with the steam turbine *resource* has a *day-ahead schedule* greater than or equal to its respective *pseudo-unit's minimum loading point.*

Component #3

4.4.24 In determining the *day-ahead market generator offer* guarantee *settlement amount* for the steam turbine *resource* of a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit,* the *IESO* shall calculate $DAM\_GOG\_COMP3^{s}_{k}$ as follows:

$$DAM\_GOG\_COMP3^{s}_{k} = \sum^{V}\sum^{MHR_p}\left[(-1) \times OP\left(DAM\_LMP^{s}_{h}, MLP^{s}_{k}, DAM\_DIPC^{s}_{k,h}\right) + DAM\_BE\_SNL^{p}_{k,h} \times \frac{N^{p}_{k,h}}{12} \times ST\_Portion^{p}_{k,d1}\right]$$

Where:

a. 'V' is the set of all *pseudo-units* 'p' associated with steam turbine *resource delivery point* 's' whose associated combustion turbine *resource* has a variant #2 (section 4.4.13) *day-ahead operational commitment* that overlaps with the steam turbine *resource day-ahead operational commitment;*

b. 'MHR_p' is the set of *settlement hours* within the *day-ahead commitment period* that are required to complete *minimum generation block run-time* that began in Day ~~-1~~0 for *pseudo-unit* 'p' associated with the steam turbine *resource*;

c. 'MLP_k^s' is the *minimum loading point* of steam turbine *resource*, associated with *pseudo-unit* 'p', for *market participant* 'k'; and

d. '$N_{k,h}^p$' is the number of *metering intervals* in the *settlement hour* 'h' during which the combustion turbine *resource* associated with *pseudo-unit* 'p' for *market participant* 'k' was synchronized and injecting *energy* into the *IESO-controlled grid.*

Component #4

4.4.25 In determining the *day-ahead market generator offer* guarantee *settlement amount* for the steam turbine *resource* of a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit,* the *IESO* shall calculate $DAM\_GOG\_COMP4_{k,h}^s$ as follows:

$$DAM\_GOG\_COMP4_{k,h}^s = \sum_{c=1}^{C} \sum_{x=1}^{X_c} \left[DAM\_GOG\_COMP4_{k,x}^c \times \frac{ST\_Portion_{k,d1}^p}{\left(1 - ST\_Portion_{k,d1}^p\right)} \right]$$

Where:

a. 'C' is the set of all combustion turbine ~~*delivery*~~*resourcedelivery points* 'c' associated with steam turbine *resource delivery point* 's'; ~~and~~

b. $DAM\_GOG\_COMP4_{k,x}^c$ is determined in accordance with section 4.4.18 for combustion turbine *resource delivery point* 'c' for *market participant* 'k' for *day-ahead commitment period 'x';* and

~~b.~~c. 'X_c' is the set of all *day-ahead commitment periods* 'x' for combustion turbine *resource delivery point* 'c' that are entitled to a *day-ahead market generator offer* guarantee *settlement amount* pursuant to section 4.4.12 (variant #1) that overlap with the steam ~~turbine's~~turbine *resource*'s *day-ahead commitment period.*

Component #5

4.4.26 In determining the *day-ahead market generator offer* guarantee *settlement amount* for the steam turbine *resource* of a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit,* the *IESO* shall calculate $DAM\_GOG\_COMP5_k^s$ as follows:

$$DAM\_GOG\_COMP5_k^s = \sum^{H} DAM\_MWP_{k,h}^s$$

Where:

a. 'H' is the set of all *settlement hours* within the steam ~~turbine's~~turbine *resource*'s *day-ahead commitment period* when at least one of the *pseudo-units* associated with steam turbine ~~*delivery*~~*resourcedelivery point* 's' has a *day-ahead schedule* greater than or equal to its respective *minimum loading point.*

4.5 Real-Time Generator Offer Guarantee

General

4.5.1 Subject to section 4.5.2 and the mitigation process described in section 5 and Appendix 9.4, the real-time *generator offer* guarantee *settlement amount* for *market participant* 'k' ("RT_GOG_k") shall be calculated for each *settlement hour* within a *real-time commitment period* or a *real-time reliability commitment period* for each *GOG-eligible resource* and disbursed to the *market participant* for such *resource* in accordance with the operating profit function described in section 10 of Appendix 9.2, and this section 4.5.

4.5.1.1 In determining the real-time *generator offer* guarantee *settlement amount* in this section 4.5, the following expressions shall have the following meanings:

a. "Day ~~-1~~0" refers to the day before Day ~~0~~1;

b. "Day ~~0~~1" refers to the *dispatch day* for which the real-time *generator offer* guarantee *settlement amount* is being calculated;

c. *Real-time commitment period* is the set of contiguous *settlement hours* of a *resource* with *real-time schedules* in Day ~~0~~1:

---

d. *Real-time reliability commitment period* is the set of contiguous *settlement hours* of a *resource* with *real-time schedules* in Day ~~0~~1:

4.5.1.2 The real-time *generator offer* guarantee *settlement amount* will be determined utilizing one of three possible variants each of which consists of the following components, where applicable:

a. Component 1 is any shortfall in payment over the *real-time commitment period* or *real-time reliability commitment period* for *energy* based upon the *resource's* operating profit for *energy* and its *speed no-load offers,* and is calculated in accordance with sections 4.5.6, 4.5.15, or 4.5.22, as applicable;

b. Component 2 is any shortfall in payment over the *real-time commitment period* or *real-time reliability commitment period* for *operating reserve* based upon the *resource's* operating profit for *operating reserve,* and is calculated in accordance with sections 4.5.7, 4.5.16, or 4.5.23, as applicable;

c. Component 3 is the amount calculated by Component 1 up to the *minimum loading point* for the *settlement hours* of *minimum generation block run-time* scheduled over midnight into Day ~~0~~1 and is calculated in accordance with sections 4.5.8, 4.5.17, or 4.5.24, as applicable;

4.5.2 Notwithstanding section 4.5.1, a *market participant* shall be ineligible to receive a real-time *generator offer* guarantee *settlement amount* in respect of a *GOG-eligible resource* for:

---

iv. the steam turbine *resource* where the *pseudo-unit* received a *pre-dispatch operational commitment* while operating in combined cycle-mode but, due to a failure or *outage* at the steam turbine *resource*, operates in *single cycle mode*.

Real-Time Generator Offer Guarantee for Non-Pseudo Units

Formulations

Variant #1

4.5.3 If a *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit*:

a. injects into the *IESO-controlled grid* in Day ~~0~~1 to meet a *pre-dispatch operational commitment*; and

b. such *pre-dispatch operational commitment* does not immediately follow a *day-ahead operational commitment* or *reliability* commitment,

---

Variant #2

4.5.4 If a *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit* has a *pre-dispatch operational commitment* in the first *settlement hour* of Day ~~0~~1 where such *pre-dispatch operational commitment* requires the *resource* to complete its *minimum generation block run-time* that began in Day ~~-1~~0, the real-time *generator offer* guarantee *settlement amount* is calculated as follows for a *delivery point* 'm' for the *settlement hours* of the *pre-dispatch operational commitment* required to complete its *minimum generation block run-time*:

Variant #3

4.5.5 If a *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit*:

a. has a *pre-dispatch operational commitment* in the first *settlement hour* of Day ~~0~~1 where such *pre-dispatch operational commitment* requires the *resource* to operate continuously from Day ~~-1~~0 after completing its *minimum generation block-run time* in Day ~~-1~~0;

Components

Component #1 – applicable to Variant # 1, 2 and 3

4.5.6 In determining the real-time *generator offer* guarantee *settlement amount* for the *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit,* the *IESO* shall calculate $RT\_GOG\_COMP1_{k,h}^{m}$ as follows:

$$RT\_GOG\_COMP1_{k}^{m} = \sum^{T1}\left[(-1) \times Max\left(OP\left(RT\_LMP_{h}^{m,t}, RT\_QSI_{k,h}^{m,t}, BE_{k,h}^{m,t}\right), OP\left(RT\_LMP_{h}^{m,t}, AQEI_{k,h}^{m,t}, BE_{k,h}^{m,t}\right)\right) + \frac{PD\_BE\_SNL_{k,h}^{m}}{12}\right] - \sum^{T0}\left[RT\_LMP_{h}^{m,t} \times AQEI_{k,h}^{m,t}\right] + \sum^{RH}\left[DAM\_LMP_{h}^{m} \; x \; DAM\_QSI_{k,h}^{m}/12\right]$$

Where:

a. 'T1' is the set of contiguous *metering intervals* 't' within the *real-time commitment period* or the *real-time reliability commitment period*, as the case may be.

b. 'T0' is the set of all *metering intervals* between the time when the *resource* is synchronized and injecting *energy* into the *IESO-controlled grid* and the time when the *resource* achieves its *minimum loading point*.

c. 'RH' is the set of contiguous *settlement hours* 'h' with *day-ahead schedules* for the ramp-up period in the *day-ahead market* that do not overlap with a *pre-dispatch operational commitment*.

d. If the combustion turbine *resource* or steam turbine *resource* is registered as a *pseudo-unit* but is not operating as a *pseudo-unit* and has a ~~binding~~minimum constraint applied for combined cycle ~~physical unit constraint~~operation consistent with combustion turbine commitment, then $RT\_QSI_{k,h}^{m,t}$ will be replaced with $RT\_LC\_EOP^{m,t}{}_{k,h}$ for those *metering intervals* in which they have such constraint.

Component #2 - applicable to Variant # 1, 2 and 3

4.5.7 In determining the real-time *generator offer* guarantee *settlement amount* for the *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit,* the *IESO* shall calculate $RT\_GOG\_COMP2_{k,h}^{m}$ as follows:

$$RT\_GOG\_COMP2_{k}^{m} = (-1) \times \sum_{R}^{T1} OP\left(RT\_PROR_{r,h}^{m,t}, RT\_\mathrm{QSOR}_{r,k,h}^{m,t}, BOR_{r,k,h}^{m,t}\right)$$

Where:

a. 'T1' is the set of contiguous *metering intervals* 't' within the *real-time commitment period* or the *real-time reliability commitment period*, as the case may be.

Component #3 - applicable to Variant # 2

4.5.8 In determining the real-time *generator offer* guarantee *settlement amount* for the *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit,* the *IESO* shall calculate $RT\_GOG\_COMP3^{m}_{k,h}$ as follows:

$$RT\_GOG\_COMP3^{m}_{k} = \sum^{T2} [(-1)\ x\ \left(OP(RT\_LMP^{m,t}_{h}, MLP^{m}_{k}, BE^{m,t}_{k,h})\right) + \frac{PD\_BE\_SNL^{m}_{k,h}}{12}]$$

Where:

a. 'T2' is the set of contiguous *metering intervals* 't' beginning with the first *metering interval* of Day ~~0~~1 and ending with the *metering interval* in Day ~~0~~1 in which the *resource* completes its *minimum generation block run-time* that began in Day ~~-1~~0; and

b. 'MLP_k^m' is the *minimum loading point* of the *resource* for Day ~~0~~1 for *market participant* 'k' for *delivery point* 'm'.

Component #4 - applicable to Variant # 1

4.5.9 In determining the real-time *generator offer* guarantee *settlement amount* for the *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit,* the *IESO* shall calculate $RT\_GOG\_COMP4^{m}_{k,h}$ in accordance with the following:

Component #5 – applicable to Variant # 1, 2 and 3

4.5.11 In determining the real-time *generator offer* guarantee *settlement amount* for the *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit,* the *IESO* shall calculate $RT\_GOG\_COMP5^{m}_{k,h}$ as follows:

$$RT\_GOG\_COMP5^{m}_{k} = \sum^{T1} RT\_MWP^{m}_{k,h}$$

Where:

a. 'T1' is the set of contiguous *metering intervals* 't' within the *real-time commitment period* or the *real-time reliability commitment period*, as the case may be.

Real-Time Generator Offer Guarantee – Combustion Turbine Associated with a Pseudo-Unit

Formulations

Variant #1

4.5.12 If the combustion turbine *resource* of a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit:*

a. injects into the *IESO-controlled grid* in Day ~~0~~1 to meet a *pre-dispatch operational commitment*; and

b. such *pre-dispatch operational commitment* does not immediately follow a *day-ahead operational commitment* or *reliability* commitment,

the real-time *generator offer* guarantee *settlement amount* is calculated as follows for combustion turbine *resource delivery point* 'c':

$$RT\_GOG_k^c = Max[0, RT\_GOG\_COMP1_k^c + RT\_GOG\_COMP2_k^c + RT\_GOG\_COMP4_k^c - RT\_GOG\_COMP5_k^c]$$

Where:

i. $RT\_GOG\_COMP1_k^c$, $RT\_GOG\_COMP2_k^c$, $RT\_GOG\_COMP4_k^c$ and $RT\_GOG\_COMP5_k^c$ are calculated in accordance with sections 4.5.15, 4.5.16, 4.5.18, and 4.5.20, respectively.

Variant #2

4.5.13 If the combustion turbine *resource* of a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit* has a *pre-dispatch operational commitment* in the first *settlement hour* of Day ~~0~~1 where such *pre-dispatch operational commitment* requires the *resource* to complete its *minimum generation block run-time* that began in Day ~~-1~~0, the real-time *generator offer* guarantee *settlement amount* is calculated as follows for combustion turbine *resource delivery point* 'c' for the *settlement hours* of the *pre-dispatch operational commitment* required to complete its *minimum generation block run-time:*

Variant #3

4.5.14 If the combustion turbine *resource* of a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit:*

a. has a *pre-dispatch operational commitment* in the first *settlement hour* of Day ~~0~~1 where such *pre-dispatch operational commitment* requires the *resource* to operate continuously from Day ~~-1~~0 after completing its *minimum generation block-run time* in Day ~~-1~~0; or

b. such *pre-dispatch operational commitment* immediately follows a *day-ahead operational schedule* or *reliability* commitment,

the real-time *generator offer* guarantee *settlement amount* is calculated as follows for combustion turbine *resource delivery point* 'c' for the *settlement hours* of the *pre-dispatch operational commitment* following the completion of its *minimum generation block run-time*:

Components

Component #1 - applicable to Variant # 1, 2 and 3

4.5.15 In determining the real-time *generator offer* guarantee *settlement amount* for a combustion turbine *resource*, the *IESO* shall calculate $RT\_GOG\_COMP1_k^c$ as follows:

$$RT\_GOG\_COMP1_k^c = \sum^{T1} \left[(-1) \times \text{Max}\left(OP\left(RT\_LMP_h^{c,t}, RT\_QSI_{k,h}^{c,t}, RT\_DIPC_{k,h}^{c,t}\right), OP\left(RT\_LMP_h^{c,t}, AQEI_{k,h}^{c,t}, RT\_DIPC_{k,h}^{c,t}\right)\right) + \frac{PD\_BE\_SNL_{k,h}^{p}}{12} \times \left(1 - ST\_Portion_{k,d1}^{p}\right) \right] - \sum^{T0} \left(RT\_LMP_h^{c,t} \times AQEI_{k,h}^{c,t}\right) + \sum^{RH} \left[DAM\_LMP_h^c \times DAM\_QSI_{k,h}^c / 12\right]$$

Where:

a. 'T1' is the set of contiguous *metering intervals* 't' within the *real-time commitment period* or the *real-time reliability commitment period*, as the case may be, for the combustion turbine *resource*;

b. 'p' is the *pseudo-unit* associated with combustion turbine ~~*delivery*~~*resourcedelivery point* 'c';

c. 'T0' is the set of all *metering intervals* 't' between the time when the combustion turbine *resource* is synchronized and injecting *energy* into the *IESO-controlled grid* and the time when the combustion turbine *resource* achieves its *minimum loading point*;

d. 'RH' is the set of contiguous *settlement hours* 'h' with *day-ahead schedules* for the ramp-up period in the *day-ahead market* that do not overlap with a *pre-dispatch operational commitment*; and

e. Where the *pseudo-unit* associated with the combustion turbine *resource* received a *pre-dispatch operational commitment* while operating in combined

cycle mode but, due to a failure or *outage* at the associated steam turbine *resource*, operates in *single cycle mode*, then the applicable ~~$RT\_CMT\_DIPC_{k,h}^{c,t}$~~$RT\_DIPC_{k,h}^{c,t}$ shall be the one determined just prior to the failure or *outage*.

Component #2 - applicable to Variant # 1, 2 and 3

4.5.16 In determining the real-time *generator offer* guarantee *settlement amount* for a combustion turbine *resource*, the *IESO* shall calculate $RT\_GOG\_COMP2_k^c$ as follows:

$$RT\_GOG\_COMP2_k^c = \sum_R^{T1}\left[(-1) \times OP\left(RT\_PROR_{r,h}^{c,t}, RT\_QSOR_{r,k,h}^{c,t}, RT\_\mathrm{OR}\_DIPC_{r,k,h}^{c,t}\right)\right]$$

Where:

a. 'T1' is the set of contiguous *metering intervals* '*t*' within the *real-time commitment period* or the *real-time reliability commitment period*, as the case may be, for the combustion turbine *resource*.

Component #3 - applicable to for Variant # 2

4.5.17 In determining the real-time *generator offer* guarantee *settlement amount* for a combustion turbine *resource*, the *IESO* shall calculate $RT\_GOG\_COMP3_k^c$ as follows:

$$RT\_GOG\_COMP3_k^c = \sum^{T2}\left[(-1) \times \left(OP\left(RT\_LMP_h^{c,t}, MLP_k^c, RT\_DIPC_{k,h}^{c,t}\right)\right) + \frac{PD\_BE\_SNL_{k,h}^p}{12} \times (1 - ST\_Portion_{k,d1}^p)\right]$$

Where:

a. 'T2' is the set of contiguous *metering intervals* 't' beginning with the first *metering interval* of Day ~~0~~1 and ending with the *metering interval* in Day ~~0~~1 in which the *resource* completes its *minimum generation block run-time* that began in Day ~~-~~1~~0~~;

b. '$\mathrm{MLP_k^c}$' is the *minimum loading point* of the combustion turbine *resource* associated with combustion turbine ~~*delivery*~~*resourcedelivery point* 'c'; and

c. 'p' is the *pseudo-unit* associated with combustion turbine ~~*delivery*~~*resourcedelivery point* 'c'.

Component #4 - applicable to Variant # 1

4.5.18 Subject to section 4.5.19, in determining the real-time *generator offer* guarantee *settlement amount* for a combustion turbine *resource*, the *IESO* shall calculate $RT\_GOG\_COMP4_k^c$ in accordance with the following:

a. For a *pre-dispatch operational commitment* where the associated *pseudo-unit* has a *stand-alone pre-dispatch operational commitment* or where the associated *pseudo-unit* receives a *pre-dispatch operational commitment* in advance of an existing *day-ahead market operational commitment* by a period that is greater than or equal to the *resource's minimum generation block run-time* plus its *minimum generation block down-time* for the hot *thermal state*:

i. If the combustion turbine *resource* achieved its *minimum loading point* within the first six *metering intervals* of the start of the *pre-dispatch operational commitment*, then:

$$RT\_GOG\_COMP4_k^c = PD\_BE\_SU_{k,h}^p \times \left(1 - ST\_Portion_{k,d1}^p\right)$$

ii. If the combustion turbine *resource* achieved its *minimum loading point* after the first six *metering intervals* of the start of its *pre-dispatch operational commitment* but before the 19th *metering interval* following the start of its *pre-dispatch operational commitment*, then:

$$RT\_GOG\_COMP4_k^c = PD\_BE\_SU_{k,h}^p \times \left(1 - ST\_Portion_{k,d1}^p\right) \times \left(1 - \frac{N\_INT_k^c}{12}\right)$$

Where:

a. '$N\_INT_k^c$' is the number of *metering intervals* after the first six *metering intervals* that the combustion turbine *resource* took to achieve its *minimum loading point.*

iii. Otherwise,

$$RT\_GOG\_COMP4_k^c = 0$$

b. For a *pre-dispatch operational commitment* where the associated *pseudo-unit* has a *pre-dispatch operational commitment* in advance of an existing *day-ahead market operational commitment* by a period that is less than the *resource's minimum generation block run-time* plus its *minimum generation block down-time* for the hot *thermal state*, then:

i. If the combustion turbine *resource* achieved its *minimum loading point* within the first six *metering intervals* of the start of the *pre-dispatch operational commitment*, then:

$$RT\_GOG\_COMP4_k^c = Max\left(0, PD\_BE\_SU_{k,h}^p - DAM\_BE\_SU_{k,h}^p\right) \times \left(1 - ST\_Portion_{k,d1}^p\right)$$

Where:

a. notwithstanding section 5, $DAM\_BE\_SU^p_{k,h}$ shall be equal to the $EMFC\_DAM\_BE\_SU^p_{k,h}$ exclusively when the EMFC *settlement amount*, as defined in section 5.1.2.2, is the applicable *settlement amount* for the *day-ahead market generator offer* guarantee *settlement amount* for such *resource.*

i. If the combustion turbine *resource* achieved its *minimum loading point* after the first six *metering intervals* of the start of its *pre-dispatch operational commitment* but before the 19th *metering interval* following the start of its *pre-dispatch operational commitment*, then:

$$RT\_GOG\_COMP4_k^c = Max\left(0, PD\_BE\_SU_{k,h}^p - DAM\_BE\_SU_{k,h}^p\right) \times \left(1 - ST\_Portion_{k,d1}^p\right) \times \left(1 - \frac{N\_INT_k^c}{12}\right)$$

Where:

a. '$N\_INT^c_k$' is the number of *metering intervals* after the first six *metering intervals* that the combustion turbine *resource* took to achieve its *minimum loading point;* and

b. notwithstanding section 5, $DAM\_BE\_SU^p_{k,h}$ shall be equal to the $EMFC\_DAM\_BE\_SU^p_{k,h}$ exclusively when the EMFC *settlement amount*, as defined in section 5.1.2.2, is the applicable *settlement amount* for the *day-ahead market generator offer* guarantee *settlement amount* for such *resource.*

ii. Otherwise,

$$RT\_GOG\_COMP4_k^c = 0$$

4.5.19 If the sole reason that the combustion turbine *resource* did not complete its *minimum generation block run-time* is because the *IESO* required, in order to maintain the *reliability* of the *IESO-controlled grid*, such combustion turbine *resource* to de-synchronize from the *IESO-controlled grid* after the commencement of its *pre-dispatch operational commitment*, then the combustion turbine *resource* is not required to complete its *minimum generation block run-time* in order for section 4.5.18(a) to apply.

Component #5 - applicable to Variant # 1, 2 and 3

4.5.20 In determining the real-time *generator offer* guarantee *settlement amount* for a combustion turbine *resource*, the *IESO* shall calculate $RT\_GOG\_COMP5_k^c$ as follows:

$$RT\_GOG\_COMP5_k^c = \sum^{T1} RT\_MWP_{k,h}^c$$

Where:

a. 'T1' is the set of contiguous *metering intervals 't'* within the *real-time commitment period* or the *real-time reliability commitment period*, as the case may be, for the combustion turbine *resource*.

Real-Time Generator Offer Guarantee – Steam Turbine Associated with a Pseudo-Unit

Formulation

4.5.21 For a *delivery point* 's' for a steam turbine *resource* associated with a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit*, the real-time *generator offer* guarantee *settlement amount* is calculated as follows:

$$RT\_GOG_k^s = Max[0, RT\_GOG\_COMP1_k^s + RT\_GOG\_COMP2_k^s - RT\_GOG\_COMP3_k^s + RT\_GOG\_COMP4_k^s - RT\_GOG\_COMP5_k^s]$$

Where:

a. $RT\_GOG\_COMP1_k^s$, $RT\_GOG\_COMP2_k^s$, $RT\_GOG\_COMP3_k^s$, $RT\_GOG\_COMP4_k^s$, and $RT\_GOG\_COMP5_k^s$ are calculated in accordance with sections 4.5.22, 4.5.23, 4.5.24, 4.5.25, and 4.5.26, respectively.

Components

Component #1

4.5.22 In determining the real-time *generator offer* guarantee *settlement amount* for a steam turbine *resource*, the *IESO* shall calculate $RT\_GOG\_COMP1_k^s$ as follows:

$$RT\_GOG\_COMP1_k^s = \sum^{T1}\left[(-1) \times OP\left(RT\_LMP_h^{s,t}, RT\_CMT\_DIGQ_{k,h}^{s,t}, RT\_CMT\_DIPC_{k,h}^{s,t}\right) + \sum_{p=1}^{N}\left(\frac{PD\_BE\_SNL_{k,h}^p}{12} \times ST\_Portion_{k,d1}^p\right) + \sum_{p=1}^{D}\left(DAM\_LMP_h^s \times \frac{[DAM\_QSI_{k,h}^p \times (ST\_Portion_{k,d1}^p)]}{12}\right)\right] - \sum^{T0}\left(RT\_LMP_h^{s,t} \times AQEI_{k,h}^{s,t}\right)$$

Where:

a. 'T1' is the set of all *metering intervals* 't' in the steam ~~turbine's~~turbine *resource*'s *real-time commitment period* where at least one of the associated *pseudo-units' real-time schedule* is greater than or equal to its *minimum loading point* in accordance with a *pre-dispatch operational commitment;*

b. 'N' is the set of all *pseudo-units* 'p' associated with steam turbine *resource delivery point* 's' that are eligible for a real-time *generator offer* guarantee *settlement amount* in *metering interval* 't' of *settlement hour* 'h';

c. 'D' is the set of all *pseudo-units* 'p' associated with steam turbine *resource delivery point* 's' that have: (i) a *pre-dispatch operational commitment* greater than its *minimum loading point* in *metering interval* 't'; (ii) an associated combustion turbine *resource* that is injecting *energy* into the *IESO-controlled grid* in an amount greater than or equal to its *minimum loading point* in *metering interval* 't'; and (iii) a *day-ahead schedule* less than its *minimum loading point* in *metering interval* 't'; and

d. 'T0' is the set of all *metering intervals* 't' in the steam ~~turbine's~~turbine *resource*'s *real-time commitment period* when: (i) the steam turbine *resource* is injecting *energy* into the *IESO-controlled grid* in an amount that is less than its 1-on-1 *minimum loading point*; and (ii) none of the associated *pseudo-units* have a *day-ahead schedule.*

Component #2

4.5.23 In determining the real-time *generator offer* guarantee *settlement amount* for a steam turbine *resource*, the *IESO* shall calculate $RT\_GOG\_COMP2_k^s$ as follows:

$$RT\_GOG\_COMP2_k^s = \sum_R^{T1} \left[(-1) \times OP\left(RT\_PROR_{r,h}^{s,t}, RT\_OR\_CMT\_DIGQ_{r,k,h}^{s,t}, RT\_OR\_CMT\_DIPC_{r,k,h}^{s,t}\right)\right]$$

Where:

a. 'T1' is the set of all *metering intervals* 't' in the steam ~~turbine's~~turbine *resource*'s *real-time commitment period* where at least one of the associated *pseudo-units* is greater than or equal to its *minimum loading point* in accordance with a *pre-dispatch operational commitment.*

Component #3

4.5.24 In determining the real-time *generator offer* guarantee *settlement amount* for a steam turbine *resource*, the *IESO* shall calculate $RT\_GOG\_COMP3_k^s$ as follows:

$$RT\_GOG\_COMP3_k^s = \sum^{U} \sum^{T_p} \left[(-1) \times \left(OP\left(RT\_LMP_h^{s,t}, \left(MLP_k^p \times ST\_Portion_{k,d1}^p \right), BE_{k,h}^{p,t} \right) \right) + \frac{PD\_BE\_SNL_{k,h}^p}{12} \times ST\_Portion_{k,d1}^p \right]$$

Where:

a. 'U' is the set of all *pseudo-units* 'p' associated with steam turbine *resource delivery point* 's' that have a *real-time schedule* in the first *settlement hour* of Day ~~0~~1 to complete its *minimum generation block run-time* as part of a *pre-dispatch operational commitment* that began in Day ~~-1~~0 and forms part of the steam ~~turbine's~~turbine *resource's real-time commitment period;*

b. 'T_p' is the set of *metering intervals* 't' where: (i) the associated *pseudo-unit* had a *real-time schedule* in the first *settlement hour* of Day ~~0~~1 to complete its *minimum generation block run-time;* and (ii) the combustion turbine *resource* associated with *pseudo-unit* 'p' actually injected *energy* into the *IESO-controlled grid* in an amount equal to or greater than its *minimum loading point;* and

c. '$\mathrm{MLP_k^p}$' is the *minimum loading point* of *pseudo-unit* 'p' for *market participant* 'k' for Day ~~0~~1.

Component #4

4.5.25 In determining the real-time *generator offer* guarantee *settlement amount* for a steam turbine *resource*, the *IESO* shall calculate $RT\_GOG\_COMP4_k^s$ in accordance with the following:

$$RT\_GOG\_COMP4_k^s = \sum_{c=1}^{C} \sum^{X_c} \left[RT\_GOG\_COMP4_{k,x}^c \times \frac{ST\_Portion_{k,d1}^p}{\left(1 - ST\_Portion_{k,d1}^p\right)} \right]$$

Where:

a. 'C' is the set of all combustion turbine *resource delivery points* 'c' associated with steam turbine *resource delivery point* 's';

b. $RT\_GOG\_COMP4_{k,x}^c$ is determined in accordance with section 4.5.18 for combustion turbine *resource delivery point* 'c' for *market participant* 'k' for *pre-dispatch operational commitment 'x';* and

c. 'X_c' is the set of all *pre-dispatch operational commitments* 'x' that are classified as variant 1 and were incurred by combustion turbine *resource* 'c' during the steam ~~turbine's~~turbine *resource's real-time commitment period*.

Component #5

4.5.26 In determining the real-time *generator offer* guarantee *settlement amount* for a steam turbine *resource*, the *IESO* shall calculate $RT\_GOG\_COMP5_k^s$ as follows:

$$RT\_GOG\_COMP5_k^s = \sum^{T1} RT\_MWP_{k,h}^s$$

Where:

a. 'T1' is the set of all *metering intervals* 't' in the steam ~~turbine's~~turbine *resource's* *real-time commitment period* where at least one of the associated *pseudo-units* is greater than or equal to its *minimum loading point* in accordance with a *pre-dispatch operational commitment.*

4.6 Real-Time Ramp-Down Settlement Amount

Real-Time Ramp-Down Settlement Amount

4.6.1 Subject to section 4.6.3 and to the mitigation process described in section 5 and Appendix 9.4, the real-time ramp-down *settlement amount* for *market participant* 'k' at *delivery point* 'm' ("$RT\_RDSA_k^m$") shall be calculated and disbursed to the *market participant* for a *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit* for each instance where such *resource* injects *energy* into the *IESO-controlled grid,* receives a *real-time schedule* less than its *minimum loading point,* and desynchronizes from the *IESO-controlled grid*. The real-time ramp-down *settlement amount* shall be disbursed to such *GOG-eligible resources* in accordance with the eligibility and equations set out in this section 4.6, and the operating profit function described in section 10 of Appendix 9.2.

4.6.3 Notwithstanding section 4.6.1, a *market participant* shall be ineligible to receive a real-time ramp-down *settlement amount*:

4.6.3.1 for a *settlement hour* where the *GOG-eligible resource* that is not a *pseudo-unit* received a *real-time schedule* for the duration of its *minimum generation block run-time,* on request from the *market participant,* to prevent endangering the safety of any person, equipment damage, or violation of any *applicable law*; or

4.6.3.2 where the *GOG-eligible resource* that is not a *pseudo-unit* fails to achieve its *minimum loading point* in accordance with its *real-time schedule* prior to de-synchronizing from the *IESO-controlled grid.*

4.6.4 For a *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit* that receives a *real-time schedule* less than its *minimum loading point* during a period when the *GOG-eligible resource* has a *day-ahead schedule,* the real-time ramp-down *settlement amount* is calculated as follows:

$$RT\_RDSA_k^m = Max\left(0, \sum^T \left[(-1) \times OP\left(DAM\_LMP_h^m, AQEI_{k,h}^{m,t}, BE_{k,h}^{m,t}\right) - Max\left(0, (-1) \times OP\left(DAM\_LMP_h^m, AQEI_{k,h}^{m,t}, DAM\_BE_{k,h}^m\right)\right)\right]\right)$$

4.6.5 For a *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit* that receives a *real-time schedule* less than its *minimum loading point* during a period when the *GOG-eligible resource* does not have a *day-ahead schedule,* the real-time ramp-down *settlement amount* is calculated as follows:

$$RT\_RDSA_k^m = Max\left(0, \sum^T \left[(-1) \times OP\left(RT\_LMP_h^{m,t}, AQEI_{k,h}^{m,t}, BE_{k,h}^{m,t}\right)\right]\right)$$

Pseudo-Units – Combustion Turbine

4.6.6 Subject to section 4.6.8 and to the mitigation process described in section 5 and Appendix 9.4, the real-time ramp-down *settlement amount* for *market participant* 'k' at combustion turbine *resource delivery point* 'c' ("$RT\_RDSA_k^c$") shall be calculated and disbursed to the *market participant* for a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit* for each instance where such *resource* injects *energy* into the *IESO-controlled grid,* receives a *real-time schedule* less than its *minimum loading point,* and desynchronizes from the *IESO-controlled grid.* The real-time ramp-down *settlement amount* shall be disbursed to such *GOG-eligible resources* in accordance with the eligibility and equations set out in this section 4.6, and the operating profit function described in section 10 of Appendix 9.2.

4.6.8 Notwithstanding section 4.6.6, a *market participant* shall be ineligible to receive a real-time ramp-down *settlement amount:*

4.6.8.1 for a *settlement hour* where the *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit*, or an associated physical unit *resource,* received a *real-time schedule* for the duration of its *minimum generation block run-time*, on request from the *market participant*, to prevent endangering the safety of any person, equipment damage, or violation of any *applicable law*; or

4.6.8.2 where the *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit* fails to achieve its *minimum loading point* in accordance with its *real-time schedule* prior to de-synchronizing from the *IESO-controlled grid.*

4.6.9 For a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit* that receives a *real-time schedule* less than its *minimum loading point* during a period when the *GOG-eligible resource* has a *day-ahead schedule,* the real-time ramp-down *settlement amount* is calculated as follows:

$$RT\_RDSA_k^c = Max\left(0, \sum^T \left[(-1) \times OP\left(DAM\_LMP_h^c, AQEI_{k,h}^{c,t}, RT\_DIPC_{k,h}^{c,t}\right) - Max\left(0, (-1) \times OP\left(DAM\_LMP_h^c, AQEI_{k,h}^{c,t}, DAM\_DIPC_{k,h}^{c}\right)\right)\right]\right)$$

4.6.10 For a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit* that receives a *real-time schedule* less than its *minimum loading point* during a period when the *GOG-eligible resource* does not have a *day-ahead schedule,* the real-time ramp-down *settlement amount* is calculated as follows:

$$RT\_RDSA_k^c = Max\left(0, \sum^T \left[(-1) \times OP\left(RT\_LMP_h^{c,t}, AQEI_{k,h}^{c,t}, RT\_DIPC_{k,h}^{c,t}\right)\right]\right)$$

Pseudo-Units – Steam Turbine

4.6.11 Subject to section 4.6.13 and to the mitigation process described in section 5 and Appendix 9.4, the real-time ramp-down *settlement amount* for *market participant* 'k' at steam turbine *resource delivery point* 's' ("$RT\_RDSA_k^s$") shall be calculated and disbursed to the *market participant* for a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit* for each instance where such *resource* injects *energy* into the *IESO-controlled grid,* receives a *real-time schedule* less than its 1-on-1 *minimum loading point,* and desynchronizes from the *IESO-controlled grid*. The real-time ramp-down *settlement amount* shall be disbursed to such *GOG-eligible resources* in accordance with the eligibility and equations set out in this section 4.6, and the operating profit function described in section 10 of Appendix 9.2.

4.6.13 Notwithstanding section 4.6.11, a *market participant* shall be ineligible to receive a real-time ramp-down *settlement amount:*

4.6.13.1 for a *settlement hour* where the *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit*, or an associated physical unit *resource,* received a *real-time schedule* for the duration of its *minimum generation block-run time*, on request from the *market participant*, to prevent endangering the safety of any person, equipment damage, or violation of any *applicable law*; or

4.6.13.2 where the *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit* fails to achieve its *minimum loading point* in accordance with its *real-time schedule* prior to de-synchronizing from the *IESO-controlled grid.*

4.6.14 For a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit* that receives a *real-time schedule* less than its 1-on-1 *minimum loading point* during a period when the *GOG-eligible resource* has a *day-ahead schedule,* the real-time ramp-down *settlement amount* is calculated as follows:

$$RT\_RDSA_k^s = Max\left(0, \sum^T \left[(-1) \times OP\left(DAM\_LMP_h^s, AQEI_{k,h}^{s,t}, RT\_DIPC_{k,h}^{s,t}\right) - Max\left(0, (-1) \times OP\left(DAM\_LMP_h^s, AQEI_{k,h}^{s,t}, DAM\_DIPC_{k,h}^s\right)\right)\right]\right)$$

4.6.15 For a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit* that receives a *real-time schedule* less than its 1-on-1 *minimum loading point* during a period when the *GOG-eligible resource* does not have a *day-ahead schedule,* the real-time ramp-down *settlement amount* is calculated as follows:

$$RT\_RDSA_k^s = Max\left(0, \sum^T \left[(-1) \times OP\left(RT\_LMP_h^{s,t}, AQEI_{k,h}^{s,t}, RT\_DIPC_{k,h}^{s,t}\right)\right]\right)$$

4.7 Internal Congestion and Loss Residuals

4.8 Real-Time External Congestion, Real-Time NISL Residual, and Day-Ahead Market NISL Residuals

Real-Time External Congestion Residual

4.8.1 The real-time external congestion residual *settlement amount* shall be calculated for each *energy market billing period* and disbursed to or collected from the *market participants* for *non-dispatchable loads*, *dispatchable loads*, *price responsive loads*, and *energy traders* participating with *boundary entity resources* engaging in export transactions in accordance with sections 4.8.3 and 4.8.4. In calculating the real-time external congestion residual *settlement amount*, the following subscripts and superscripts shall have the following meanings unless otherwise specified:

4.8.3 In respect of *non-dispatchable loads*, *dispatchable loads* and *price responsive loads,* the real-time external congestion residual uplift *settlement amount* to be disbursed to or collected from *market participant* 'k' ("RT_ECRU_k") in the current *energy market billing period* shall be calculated as follows:

4.8.4 In respect of export transactions for *energy traders* participating with *boundary entity resources,* the real-time external congestion residual uplift *settlement amount* to be disbursed to or collected from *market participant* 'k' ("RT_ECRU_k") in the current *energy market billing period* shall be calculated as follows:

Day-Ahead Market NISL Residual

4.8.5 The *day-ahead market* net interchange scheduling limit residual *settlement amount* shall be calculated for each *trading day* and disbursed to or collected from the

market participants for ~~*non-dispatchable loads, dispatchable loads, price responsive loads,* and~~*load resources, electricity storage resources* that are registered to withdraw, and *energy traders* participating with *boundary entity resources* engaging in export transactions in accordance with section 4.8.7. In calculating the *day-ahead market* net interchange scheduling limit residual uplift *settlement amount*, the following subscripts and superscripts shall have the following meanings unless otherwise specified:

4.8.7 The *day-ahead market* net interchange scheduling limit residual uplift *settlement amount* to be disbursed to or collected from *market participant* 'k' ("DAM_NISLU_k") for the applicable *trading day* shall be calculated as follows:

$$DAM\_NISLU_k = DAM\_NISLR \; x \left[\sum_H^{M,T} \left(AQEW_{k,h}^{m,t} + SQEW_{k,h}^{i,t} \right) / \sum_{K,H}^{M,T} \left(AQEW_{k,h}^{m,t} + SQEW_{k,h}^{i,t} \right) \right]$$

4.9 Transmission Rights Clearing Account Disbursements

4.9.2 The portion of any disbursement from the *TR clearing account* payable to *market participant* 'k' in the current *energy market billing period* shall be calculated as follows:

4.9.2.2 For *market participants* that have paid export *transmission services charges* in the *energy market billing periods* immediately preceding the current *energy market billing period*, as determined by the *IESO Board*:

$$TRCAC_k = TRCAD_E \times \sum_H{}^{I,T} [(SQEW_{k,h}{}^{i,t}) / \sum_{K,H}{}^{I,T} (SQEW_{k,h}{}^{i,t})]$$

Where:

a. $TRCAD_L = (\sum_K TD_C / \sum_K TD_{C,C1}) \times TRCAD$

b. $TRCAD_E = (\sum_K TD_{C1} / \sum_K TD_{C,C1}) \times TRCAD$

c. $TRCAC_k$ = the *TR clearing account* credit payable to *market participant* 'k' in the current *energy market billing period;*

d. TRCAD = the total dollar value (in $ and up to 2 decimal places) of all disbursements from the *TR clearing account* authorized by the *IESO Board* in the current *energy market billing period;*

e. $TRCAD_L$ = the portion of the total dollar value (in $ and up to 2 decimal places) of all disbursements from the *TR clearing account*

authorized by the *IESO Board* in the current *energy market billing period* allocated to *market participants* that have paid provincial *transmission services charges* "C" in the *energy market billing periods* immediately preceding the current *energy market billing period*, as determined by the *IESO Board;*

f. $TRCAD_E$ = the portion of the total dollar value (in $ and up to 2 decimal places) of all disbursements from the *TR clearing account* authorized by the *IESO Board* in the *current energy market billing period* allocated to *market participants* that have paid export *transmission services charges* "C1" in the *energy market billing periods* immediately preceding the current *energy market billing period*, as determined by the *IESO Board;*

g. M = the set of all *registered wholesale meters* 'm' excluding *intertie metering points* during *energy market billing periods* immediately preceding the current *energy market billing period*, as determined by the *IESO Board;*

h. I = the set of all *intertie metering points* 'i' during *energy market billing periods* immediately preceding the current *energy market billing period*, as determined by the *IESO Board;*

4.10 Generator Failure Charge

4.10.1 The *generator failure* charge – *market price* component *settlement amount* and the *generator failure* charge – guarantee cost component *settlement amount* shall be calculated for each *settlement hour* of a *generator failure*, and collected from the *market participant* for the *GOG-eligible resource* which experienced the *generator failure* in accordance with this section 4.10. In calculating each component of the *generator failure* charge in this section 4.10, the following subscripts and superscripts shall have the following meanings unless otherwise specified:

a. 'T'T1' is the set of all contiguous *metering intervals* at *delivery point* 'm' in *settlement hour* 'h', combustion turbine *resource delivery point* 'c', or steam turbine *resource delivery point* 's', as applicable, of the relevant *generator failure,* determined in accordance with the applicable *market manual*; and

b. 'T1' 'T' is the set of all contiguous *metering intervals* at *delivery point* 'm' of the relevantwithin *settlement hour* 'h' during which a *generator failure*, is determined, in accordance with the applicable *market manual*, to have occurred at *delivery point* 'm', combustion turbine *resource delivery point* 'c', or steam turbine *resource delivery point* 's', as applicable.

Non-Pseudo-Unit – Failure Events

4.10.4 Subject to section 4.10.3 and for a *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit,* a *generator failure* will have occurred when the *GOG-eligible resource* fails to:

a. achieve its *minimum loading point* by the start of the *pre-dispatch operational commitment*; or

b. inject *energy* into the *IESO-controlled grid* greater than or equal to its *minimum loading point* for the duration of the *pre-dispatch operational commitment*, including any *extended pre-dispatch operational commitments* that immediately follow.

Non-Pseudo-Unit – Market Price Component

4.10.5 For a *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit* where a *generator failure* is determined to have occurred, the *IESO* shall calculate the *generator failure* charge – *market price* component *settlement amount* for *market participant* 'k' at *delivery point* 'm' for each *settlement hour* 'h' within the *generator failure* ($GFC\_MPC^{m}_{k,h}$) in accordance with the following:

Non-Pseudo-Unit – Guarantee Cost Component

4.10.6 For a *GOG-eligible resource* that is not ~~associated with~~ a *pseudo-unit* where a *generator failure* is determined to have occurred, the *IESO* shall calculate the *generator failure* charge – guarantee cost component *settlement amount* for *market participant* 'k' at *delivery point* 'm' for each *generator failure* 'f' ($GFC\_GCC^{m}_{k,f}$) in accordance with the following and the operating profit function described in section 10 of Appendix 9.2:

---

e. $PD\_SU\_Ratio^{m}_{k,f}$ is a prorating factor for *market participant* 'k' at *delivery point* 'm' for *generator failure* 'f', and calculated as follows:

i. if the *pre-dispatch operational commitment* violated by the *generator failure* 'f' is an *extended pre-dispatch operational commitment*, then:

$$PD\_SU\_RATIO^{m}_{k,f} = 0$$

ii. Otherwise:

$$PD\_SU\_Ratio^{m}_{k,f} = \text{Min}\left(1, \frac{MLP\_INJ^{m}_{k,f}}{PD\_MGBRT^{m}_{k,f}}\right)$$

Pseudo-Unit – Failure Events

4.10.7 Subject to section 4.10.3 and for a *GOG-eligible resource* ~~associated with~~that is a *pseudo-unit,* a *generator failure* will have occurred in the following circumstances:

4.10.7.1 for a combustion turbine *resource* associated with a *pseudo-unit*, if at any time during a *settlement hour* where:

a. the combustion turbine *resource* fails to achieve its *minimum loading point* by the start of the *pre-dispatch operational commitment* of its associated *pseudo-unit*;

b. the combustion turbine *resource* fails to inject *energy* into the *IESO-controlled grid* greater than or equal to its *minimum loading point* for the duration of the *pre-dispatch operational commitment* of its associated *pseudo-unit,* including any *extended pre-dispatch operational commitments* that immediately follow; or

c. the associated *pseudo-unit* activates a single cycle flag during its *pre-dispatch operational commitment,* including any *extended pre-dispatch operational commitments* that immediately follow, and increases its *offer* price*;*

4.10.7.2 for a steam turbine *resource* associated with a *pseudo-unit*, if:

a. one or more of the combustion ~~turbines~~turbine *resource* associated with the steam turbine *resource*:

i fails to achieve its *minimum loading point* by the start of the *pre-dispatch operational commitment* of its associated *pseudo-unit*; or

ii fails to inject *energy* into the *IESO-controlled grid* greater than or equal to its *minimum loading point* for the duration of the *pre-dispatch operational commitment* of its associated *pseudo-unit*, including any *extended pre-dispatch operational commitments* that immediately follow; or

b. one or more of the *pseudo-units* associated with the steam turbine *resource* activates a single cycle flag during its *pre-dispatch operational commitment,* including any *extended pre-dispatch operational commitments* that immediately follow*.*

Pseudo-Unit – Market Price Component

4.10.8 For a combustion turbine *resource* associated with a *pseudo-unit* where a *generator failure* has occurred, the *IESO* shall calculate the *generator failure* charge – *market price* component *settlement amount* for *market participant* 'k' at combustion turbine ~~*delivery*~~*resource delivery point* 'c' for each *settlement hour* 'h' within the *generator failure* ($GFC\_MPC^{c}_{k,h}$) in accordance with the following:

4.10.9 For a steam turbine *resource* associated with a *pseudo-unit* where a *generator failure* has occurred, the *IESO* shall calculate the *generator failure* charge – *market price* component *settlement amount* for *market participant* 'k' steam turbine *resource* *delivery point* 's' for each *settlement hour* 'h' within the *generator failure* ($GFC\_MPC^{s}_{k,h}$) in accordance with the following:

$$GFC\_MPC^{s}_{k,h} = \sum^{T} GFC\_MPC^{s,t}_{k,h}$$

Where:

~~a. 'T' is the set of all *metering intervals* at steam turbine *delivery point* 's' in *settlement hour* 'h' of the relevant *generator failure,* determined in accordance with the applicable *market manual;*~~

~~b.~~a. If the *market participant* provides less than four hours of advance notice of the *generator failure* or fails to provide such notice, $GFC\_MPC^{s,t}_{k,h}$ shall be determined as follows:

$$GFC\_MPC^{s,t}_{k,h} = (-1) \times Max\left(RT\_LMP^{s,t}_{h} - Min\left\{c \in CT_F \middle| PD\_LMP^{s,pdm}_{h}\right\}, 0\right) \times Max\left(\sum^{M_t}\left[RT\_STP\_QSI^{p,t}_{k,h}\right] + \sum^{N_t}\left[PD\_STP\_QSI^{p,pdm}_{k,h}\right] - AQEI^{s,t}_{k,h}, 0\right)/12$$

~~c.~~b. If the *market participant* provides four hours or greater advance notice of the *generator failure*, $GFC\_MPC^{s,t}_{k,h}$ shall be determined as follows:

$$GFC\_MPC^{s,t}_{k,h} = (-1) \times Max\left(Min\left(RT\_LMP^{s,t}_{h}, PD\_LMP^{s,pd1}_{h}\right) - Min\left\{c \in CT_F \middle| PD\_LMP^{s,pdm}_{h}\right\}, 0\right) \times Max\left(\sum^{M_t}\left[RT\_STP\_QSI^{p,t}_{k,h}\right] + \sum^{N_t}\left[PD\_STP\_QSI^{p,pdm}_{k,h}\right] - AQEI^{s,t}_{k,h}, 0\right)/12$$

Where:

i. 'CT_F' is the set of all combination ~~turbines~~turbine *resources* associated with steam turbine *resource* *delivery point* 's' having a combustion turbine *resource* failure interval or are operating in *single cycle mode* during *metering interval* 't';

ii. 'M_t' is the set of all *pseudo-units* associated with the steam turbine *resource delivery point* 's' whose associated combustion turbine *resource* does not have a combustion turbine *resource* failure interval and are not operating in *single cycle mode* during *metering interval* 't'; and

iii. 'N_t' is the set of all *pseudo-units* associated with the steam turbine *resource delivery point* 's' whose associated combustion turbine *resource* has a combustion turbine ~~failure~~*resource* failure interval or are operating in *single cycle mode* during *metering interval* 't'.

Pseudo-Unit – Guarantee Cost Component

4.10.10 For a combustion turbine *resource* associated with a *pseudo-unit* where a *generator failure* has occurred, the *IESO* shall calculate the *generator failure* charge – guarantee cost component *settlement amount* for *market participant* 'k' at combustion turbine *resource* *delivery point* 'c' for each *generator failure* 'f' that occurs ($GFC\_GCC^{c}_{k,f}$) in accordance with the following and the operating profit function described in section 10 of Appendix 9.2:

$$GFC\_GCC^{c}_{k,f} = (-1) \times Max\left[0, PD\_SU\_Ratio^{c}_{k,f} \times SU\_INCR^{p,pdm}_{k,f} \times \left(1 - ST\_Portion^{p}_{k,d1}\right) + \sum^{T1}\left(\frac{PD\_BE\_SNL^{p,pdm}_{k,h}}{12} \times \left(1 - ST\_Portion^{p}_{k,d1}\right) - \frac{OP\left(PD\_LMP^{c,pdm}_{h}, PD\_QSI^{c,pdm}_{k,h}, PD\_DIPC^{c,t}_{k,h}\right)}{12}\right)\right] \times M1$$

Where:

a. 'M1' is the prorating factor based on the quantity of *energy* that the *resource* failed to deliver and calculated as follows:

$$M1 = \left[1 - \frac{\sum^{T1} Min\left(PD\_QSI^{c,pdm}_{k,h}, Max\left(AQEI^{c,t}_{k,h}, DAM\_QSI^{c}_{k,h}\right)\right)}{\left(\sum^{T1} PD\_QSI^{c,pdm}_{k,h}\right)}\right]$$

b. If the *pre-dispatch operational commitment* violated by failure 'f' bridges with a *day-ahead operational commitment* and the number of advancement hours of the *advanced pre-dispatch operational commitment* is less than its *minimum generation block run-time* plus its *minimum generation block down-time*, then:

$$SU\_INCR^{p,pdm}_{k,f} = Max\left(0, PD\_BE\_SU^{p,pdm}_{k,f} - DAM\_BE\_SU^{p}_{k,f}\right)$$

c. if the *pre-dispatch operational commitment* violated by the *generator failure* 'f' is an *extended pre-dispatch operational commitment*, then:

$$SU\_INCR_{k,f}^{p,pdm} = 0$$

d. Otherwise:

$$SU\_INCR_{k,f}^{p,pdm} = PD\_BE\_SU_{k,f}^{p,pdm}$$

e. $PD\_SU\_Ratio_{k,f}^{c}$ is a ~~prorated factor~~prorating factor for *market participant* 'k' at combustion turbine *resource delivery point* 'c' for *generator failure* 'f', and calculated as follows:

i. if the *pre-dispatch operational commitment* violated by the *generator failure* 'f' is an *extended pre-dispatch operational commitment*, then:

$$PD\_SU\_Ratio_{k,f}^{c} = 0$$

ii. Otherwise:

$$PD\_SU\_Ratio_{k,f}^{c} = Min\left(1, \frac{MLP\_INJ_{k,f}^{c}}{PD\_MGBRT_{k,f}^{c}}\right)$$

Where:

a. $MLP\_INJ_{k,f}^{c}$ is the number of *metering intervals* where the *GOG-eligible resource* for *market participant* 'k' injects *energy* into the *IESO-controlled grid* at combustion turbine *resource delivery point* 'c' in an amount less than its *minimum loading point* during the *minimum generation block-run time* associated with the *pre-dispatch operational commitment* associated with *generator failure* 'f'; and

b. $PD\_MGBRT_{k,f}^{c}$ is, for *market participant* 'k' at combustion turbine *resource delivery point* 'c', the number of *metering intervals* of the *minimum generation block run-time* associated with the *pre-dispatch operational commitment* associated with *generator failure* 'f'.

4.10.11 For a steam turbine *resource* associated with a *pseudo-unit* where a *generator failure* has occurred, the *IESO* shall calculate the *generator failure* charge – guarantee cost component *settlement amount* for *market participant* 'k' at steam turbine *resource delivery point* 's' ($GFC\_GCC_{k}^{s}$) in accordance with the following and the operating profit function described in section 10 of Appendix 9.2:

$$GFC\_GCC_k^s = (-1) \times Max\left[0, \sum^{F}\left(PD\_SU\_Ratio_{k,f}^{c} \times SU\_INCR_{k,f}^{p,pdm} \times ST\_Portion_{k,d1}^{p}\right) + \sum^{T1}\sum^{CT_f}\left(\frac{PD\_BE\_SNL_{k,h}^{p,pdm}}{12} \times ST\_Portion_{k,d1}^{p}\right) - \sum^{T1}\left(OP\left[Min\left\{c \in CT_F \middle| PD\_LMP_h^{s,pdm}\right\}, PD\_DIGQ_{k,h}^{s,t}, PD\_DIPC_{k,h}^{s,t}\right]/12\right)\right] \times M1$$

---

b. If the combustion ~~turbine's~~turbine *resource's* *pre-dispatch operational commitment* violated by failure 'f' bridges with a *day-ahead operational commitment* and the number of pre-dispatch advancement hours is less than its *minimum generation block run-time* plus its *minimum generation block down-time*, then:

$$SU\_INCR_{k,f}^{p,pdm} = Max\left(0, PD\_BE\_SU_{k,f}^{p,pdm} - DAM\_BE\_SU_{k,f}^{p}\right)$$

c. If the *pre-dispatch operational commitment* violated by the *generator failure* 'f' is an *extended pre-dispatch operational commitment*, then:

$$SU\_INCR_{k,f}^{p,pdm} = 0$$

d. Otherwise,

$$SU\_INCR_{k,f}^{p,pdm} = PD\_BE\_SU_{k,f}^{p,pdm}$$

e. $PD\_SU\_Ratio_{k,f}^{c}$ is a ~~prorated *start up offer*~~prorating factor for *market participant* 'k' at combustion turbine *resource delivery point* 'c' for *generator* failure 'f', and calculated as follows:

i. if the *pre-dispatch operational commitment* violated by the *generator failure* 'f' is an *extended pre-dispatch operational commitment*, then:

$$PD\_SU\_Ratio_{k,f}^{c} = 0$$

ii. Otherwise:

$$PD\_SU\_Ratio_{k,f}^{c} = Min\left(1, \frac{MLP\_INJ_{k,f}^{c}}{PD\_MGBRT_{k,f}^{c}}\right)$$

Where:

a. 'CT_f' is the set of all combustion ~~turbines~~turbine *resources* associated with steam turbine *resource delivery point* 's' having a combustion turbine ~~failure~~*resource*failure interval during *metering interval* 't';

b. 'M_t' is the set of all *pseudo-units* associated with steam turbine ~~*delivery*~~*resourcedelivery point* 's' whose associated combustion turbine

resource does not have a combustion turbine *resource* failure interval and are not operating in *single cycle mode* during *metering interval* 't';

c. 'N_t' is the set of all *pseudo-units* associated with steam turbine *resource* *delivery point* 's' whose associated combustion turbine *resource* has a combustion turbine *resource* failure interval or are operating in *single cycle mode* during *metering interval* 't';

d. 'F' is the set of all combustion turbine *resource* or steam turbine *resource* failures 'f' occurring during the period 'T1';

e. $MLP\_INJ^{c}_{k,f}$ has the same meaning as section 4.10.10(e)(ii)(a); and

f. $PD\_MGBRT^{c}_{k,f}$ has the same meaning as section 4.10.10(e)(ii)(b).

4.11.2 In determining whether claims, or part thereof, made pursuant to sections 4.11.1 are valid, the *IESO* shall apply the following principles:

4.11.2.1 Financial losses related to the procurement of fuel required for the *GOG-eligible resource* to achieve and maintain its *minimum loading point* ~~in accordance with~~for the duration of its *day-ahead operational commitment* or *pre-dispatch operational commitment* that were impacted by the *IESO's* actions as described in section 4.11.1.2 are eligible for

---

4.13 Capacity Obligations

Capacity Obligation Availability Payment

4.13.1 The *capacity obligation* availability payment *settlement amount* for *capacity market participant* 'k' at *delivery point* or *intertie metering point* 'm' for the relevant *energy market billing period* ("$CAAP^{m}_{k}$") shall be calculated for each *energy market billing period* and disbursed to *capacity market participants* who have a *capacity obligation* during the relevant *obligation period* and which shall be calculated as follows:

$$CAAP^{m}_{k} = \Sigma^{H} CCO^{m}_{k,h} \times CACP^{z}_{h}$$

Where:

a. 'H' is the set of all *settlement hours* 'h' within the *availability window* of all *business days* in the relevant *energy market billing period.*

Capacity Obligation Availability Charge

4.13.2 The *capacity obligation* availability charge *settlement amount* for *capacity market participant* 'k' at *delivery point* or *intertie metering point* 'm' for the relevant *trading*

day ("$CAAC^{m}_{k}$") shall be collected from such *capacity market participants* in accordance with the following:

4.13.2.1 In regards to a *capacity market participant* participating with an *hourly demand response resource* or a *capacity dispatchable load resource*, the *capacity obligation* availability charge *settlement amount* shall be calculated for each *trading day* for which it receives a standby notice and it fails for any *settlement hour* of the *availability window* during such *trading day* to submit a *demand response energy bid* in an amount that is greater than or equal to its *capacity obligation* in the *day-ahead market* and maintain such *energy bid* through the *real-time market.* The *capacity obligation* availability charge *settlement amount* is calculated as follows:

$$CAAC^{m}_{k} = \Sigma^{H} (-1) \times Max(0, CCO^{m}_{k,h} - DREBQ^{m}_{k,h}) \times CACP^{z}_{h} \times CNPF_{tm}$$

Where:

a. 'H' is the set of all *settlement hours* 'h' within the *availability window* during the relevant *trading day*;

b. If the *capacity market participant* did not submit a *demand response energy bid* for its *hourly demand response resource* or *capacity dispatchable load resource*, as the case may be, for *settlement hour* 'h' in the *day-ahead market* or failed to maintain such *energy bid* through the *real-time market*, $DREBQ^{m}_{k,h} = 0$;

c. In regards to *hourly demand response resource*, if the *demand response energy bids* submitted for *settlement hour* 'h' in either the *day-ahead market* or the *real-time market* does not form part of *energy bids* spanning at least four consecutive *settlement hours* during the relevant *availability window*, $DREBQ^{m}_{k,h} = 0$;

d. If the *demand response energy bid* submitted in the *day-ahead market* for *settlement hour* 'h' is not equal to the *demand response energy bid* submitted in the *real-time market* for the same *settlement hour*, $DREBQ^{m}_{k,h}$ shall be equal to the lesser of the two *demand response energy bids*; and

e. Notwithstanding any of the foregoing, $DREBQ^{m}_{k,h}$ shall not exceed the $CARC^{m}_{k}$ for the *hourly demand response resource* or *capacity dispatchable load resource*, as the case may be.

4.13.2.2 For a *capacity market participant* participating with a *capacity generation resource*, *system-backed capacity import resource*, *generator-backed capacity import resource*, or *capacity storage resource*, the *capacity obligation* availability charge *settlement amount* shall be calculated for each *trading day* it fails for any *settlement hour* of an *availability window* during such *trading day* to submit *energy offer* in an amount that is greater than or equal to its *capacity obligation* in the *day-ahead market* and maintain such *energy offer* in accordance with the applicable *market*

manual. The *capacity obligation* availability charge *settlement amount* is calculated as follows:

$CAAC^{m}_{k} = \Sigma^{H} (-1) \times Max(0, CCO^{m}_{k,h} - CAEO^{m}_{k,h}) \times CACP^{z}_{h} \times CNPF_{tm}$

Where:

a. 'H' is the set of all *settlement hours* 'h' within the *availability window* during the relevant *trading day*;

b. If the *capacity market participant* did not submit an *energy offer* in the *day-ahead market* or failed to maintain such *energy offer* in accordance with the applicable *market manual* for *settlement hour* 'h', $CAEO^{m}_{k,h} = 0$;

c. If the *energy offer* submitted in the *day-ahead market* for *settlement hour* 'h' is not equal to the *energy offer* submitted in the *pre-dispatch process* for the same *settlement hour*, $CAEO^{m}_{k,h}$ shall be equal to the lesser of the two *energy offers*; and

d. If a *capacity storage resource* receives a non-zero *energy dispatch instruction* within the relevant *availability window,* the $CAEO^{m}_{k,h}$ for the remaining *settlement hours* of the *availability window* after receiving such non-zero *energy dispatch instruction* shall be equal to the *energy offer* applicable to the *settlement hour* in which they receive such non-zero energy dispatch instruction.

Capacity Obligation Dispatch Charge

4.13.3 Subject to MR Ch.7 ss.19.4.5 and 7.5.3, the *capacity obligation* dispatch charge *settlement amount* for *capacity market participant* 'k' at *delivery point* 'm' in *settlement hour* 'h' ("$CADC^{m}_{k,h}$") shall be calculated and collected from such *capacity market participant* participating with a commercial and industrial *hourly demand response resource* for each *settlement hour* of an *availability window* in which the *hourly demand response resource* fails to comply with an activation notice, as determined in accordance with section 4.13.3.1, and which shall be calculated in accordance with the following:

$CADC^{m}_{k,h} = (-1) \times DRSQty^{m}_{k,h} \times CACP^{z}_{h} \times CNPF_{tm}$

Where:

a. 'h' is a *settlement hour* in which the *hourly demand response resource* failed to comply with its activation notice, as determined in accordance with the applicable *market manual.*

4.13.3.1 A commercial and industrial *hourly demand response resource* is determined to have failed to comply with an activation notice if the following condition is true:

$$C\&I\_HDR\_BL^{m,t}_{k,h} - HDR\_AC^{m,t}_{k,h} < 85\% \times (TBQ^{m,t}_{k,h} - DQSW_{k,h}{}^{m,t})$$

Where:

a. "$C\&I\_HDR\_BL^{m,t}_{k,h}$" is the amount calculated pursuant to the applicable *market manual*.

b. "$HDR\_AC^{m,t}_{k,h}$" is the total measured quantity of *energy* consumed (in MWh) for *capacity market participant* 'k' at *delivery point* 'm' for the *hourly demand response resource* in *metering interval* 't' of *settlement hour* "h", as determined in accordance with the submitted measurement data and its allocated quantity of *energy* withdrawn, as the case may be.

c. "$TBQ^{m,t}_{k,h}$" has the same meaning as ascribed to the same variable within the definition of $HDRDC^{m}_{k,h}$ in section 11 of Appendix 9.2.

Capacity Obligation Administration Charge

4.13.4 The *capacity obligation* administration charge *settlement amount* for *capacity market participant* 'k' at *delivery point* 'm' in the relevant *energy market billing period* ("$CAADM^{m}_{k}$") shall be calculated and collected from each *capacity market participant* participating with a virtual *hourly demand response resource* or a *generator-backed capacity import resource* for each *energy market billing period* in which such *capacity market participant* fails to provide timely, accurate and complete data, including measurement data to the *IESO* in accordance with the applicable *market manual*, and which shall be calculated as follows:

$$CAADM^{m}_{k} = (-1) \times CAAP^{m}_{k}$$

Where:

a. '$CAAP^{m}_{k}$' is the *capacity obligation* availability payment *settlement amount*, calculated in accordance with section 4.13.1, for *capacity market participant* 'k' at *delivery point* or *intertie metering point* 'm' for the relevant *energy market billing period*.

Capacity Obligation Capacity Charge

4.13.5 The *capacity obligation* capacity charge *settlement amount* for *capacity market participant* 'k' at *delivery point* or *intertie metering point* 'm' in the relevant *energy market billing period* ("$CACC^{m}_{k}$") shall be calculated and collected from each *capacity market participant* for each *energy market billing period* in which such *capacity market participant* fails to deliver its *cleared ICAP* within the applicable threshold, as set out in the applicable *market manual*, in response to a *capacity obligation capacity test*, and which shall be calculated as follows:

$$CACC^{m}_{k} = (-1) \times CAAP^{m}_{k}$$

Where:

a. 'CAAP$^{m}_{k}$' is the *capacity obligation* availability payment *settlement amount*, calculated in accordance with section 4.13.1, for *capacity market participant* 'k' at *delivery point* or *intertie metering point* 'm' for the relevant *energy market billing period*.

Capacity Obligation Capacity Import Call Failure Charge

4.13.6 Subject to MR Ch.7 s.7.5.8A, the *capacity obligation* capacity import failure *settlement amount* for *capacity market participant* 'k' participating with a *generator-backed capacity import resource* at *delivery point* or *intertie metering point* 'm' for the relevant *energy market billing period* ("CACIF$^{m}_{k}$") shall be calculated and collected from such *capacity market participant* for each *energy market billing period* in which such *capacity market participant* fails to satisfy its *capacity obligation* in response to a *capacity import call*, as determined in accordance with the applicable *market manual*, and which shall be calculated as follows:

$$CACIF^{m}_{k} = (-1) \times CAAP^{m}_{k}$$

Where:

a. 'CAAP$^{m}_{k}$' is the *capacity obligation* availability payment *settlement amount*, calculated in accordance with section 4.13.1, for *capacity market participant* 'k' at *delivery point* or *intertie metering point* 'm' for the relevant *energy market billing period*.

Capacity Obligation Capacity Deficiency Charge

4.13.7 The *capacity obligation* capacity deficiency *settlement amount* for *capacity market participant* 'k' at *intertie metering point* 'i' for the relevant *energy market billing period* ("CACD$^{i}_{k}$") shall be calculated and collected from such *capacity market participant* for each *energy market billing period* in which the *IESO* has determined that all or a portion of the *capacity market participant's capacity obligation* is *over committed capacity*, and which shall be calculated and collected for the entire *obligation period* in accordance with the following:

$$CACD^{i}_{k} = \sum^{H} (-1.5) \times OCMW^{i}_{k} \times CACP^{z}_{h}$$

Where:

a. 'H' is the set of all *settlement hours* 'h' within the *availability window* of all *trading days* within the relevant *energy market billing period*.

4.13.7.1 If the *IESO* determines that all or a portion of the *capacity market participant's capacity obligation* is *over committed capacity*, the *capacity market participant's capacity obligation* shall be reduced by the amount of *over committed capacity* effective as of the first *trading day* of the subsequent *energy market billing period*. If such reduction in the *capacity market participant's capacity obligation* for such resource results in such *capacity obligation* being less than one MW, the remainder of the *capacity*

market participant's capacity obligation for such resource is forfeited effective as of the first *trading day* of the subsequent *energy market billing period*.

Capacity Obligation In-Period Cleared UCAP Adjustment Charge

4.13.8 The *capacity obligation* in-period *cleared UCAP* adjustment charge *settlement amount* for *capacity market participant* 'k' at *delivery point* 'm' in the relevant *energy market billing period* ("$CAIPA^{m}_{k}$") shall be calculated and collected from such *capacity market participant* for i) the *energy market billing period* in which the *IESO* provided notice to the *capacity market participant* that the *hourly demand response resource's* average hourly capacity delivered over the four hour testing period was less than 90% of its *cleared UCAP*; ii) each prior *energy market billing period* of the relevant *obligation period* included as an adjustment to the next scheduled *recalculated settlement statement* for such *energy market billing period*; and iii) if the *capacity market participant* has filed a *notice of disagreement* in regards to the outcome of a *capacity auction capacity test,* each subsequent *energy market billing period* of the relevant *obligation period*. The *capacity obligation* in-period UCAP adjustment charge *settlement amount* is calculated as follows:

$$CAIPA^{m}_{k} = (-1 \times \text{Max}\ (0, (CAAP^{m}_{k} \times (\text{UCAP Adjustment}) + \Sigma^{H}\ CAAC^{m}_{k,h}))$$

Where:

a. $CAAP^{m}_{k}$ is the *capacity obligation* availability payment *settlement amount* for *capacity market participant* 'k' at *delivery point* 'm' for the relevant *energy market billing period*, as calculated pursuant to section 4.13.1;

b. $CAAC^{m}_{k,h}$ is the *capacity obligation* availability charge *settlement amount* for *capacity market participant* 'k' at *delivery point* 'm' for *settlement hour* 'h', as calculated pursuant to section 4.13.2;

c. 'H' is the set of all *settlement hours* 'h' within the *availability window* of the relevant *energy market billing period;* and

d. 'UCAP Adjustment' is a de-rate (in %) based on the *hourly demand response resource's* delivered performance during a *capacity auction capacity test*, as determined in accordance with the applicable *market manual*. If the *capacity market participant* has filed a *notice of disagreement* in regards to the outcomes of the *capacity auction capacity test* in accordance with section 6.8, and but for filing such *notice of disagreement* the *capacity market participant* would have forfeited any of its *capacity obligation* pursuant to MR Ch.7 s. 19.4.18, then the UCAP Adjustment shall equal 100%.

Capacity Obligation Buy-Out Charge

4.13.9 A *capacity market participant* or a *capacity auction participant* may elect to be subject to a *capacity obligation* buy-out charge *settlement amount* for all, or a portion of, their *capacity obligation* in accordance with the applicable *market manual*. Upon the *IESO's* acceptance of a buy-out request, the *capacity market*

participant's capacity obligation shall be reduced to reflect the approved buy-out and the *IESO* shall calculate the *capacity obligation* buy-out charge *settlement amount* for such *capacity market participant* 'k' at *delivery point* or *intertie metering point* 'm' ("$CABOC^{m}_{k}$") which shall be calculated as follows:

$$CABOC^{m}_{k} = 50\% \times \Sigma^{H} CBOC^{m}_{k} \times CACP^{z}_{h} \times (1 - CNPF_{tm})$$

Where:

a. 'H' is the set of all *settlement hours* 'h' within the *availability window* of all *trading days* from the buy-out effective date to the end of the *capacity auction commitment period*.

Measurement Data Audit

4.13.10 At any time, the *IESO* may audit any submitted measurement data and supporting information and a *capacity market participant* shall provide such information in the time and manner specified by the *IESO*. If, as a result of such an audit, the *IESO* determines that actual measurement data and supporting information differed from the submitted measurement data and supporting information, the *IESO* shall recover from or distribute to a *capacity market participant* any resulting over or under payment, as applicable.

Capacity Obligation Test Activation and Emergency Activation Payment

4.13.11 Subject to section 4.13.11.3, the *IESO* shall calculate and disburse a *capacity obligation dispatch test* payment *settlement amount* or *capacity obligation* emergency activation payment *settlement amount* for a valid *capacity auction dispatch test* or emergency activation, respectively, of an *hourly demand response resource* to the applicable *capacity market participant*, in accordance with the following:

4.13.11.1 in regards to *capacity auction dispatch tests*, the c*apacity obligation dispatch test* payment *settlement amount* for *capacity market participant* 'k' participating with an *hourly demand response resource* at *delivery point* 'm' in *settlement hour* 'h' ("$CATAP^{m}_{k,h}$") shall be determined for each applicable *settlement hour* within the activation window as follows:

$$CATAP^{m}_{k,h} = HDRTAPR \times HDRDC^{m}_{k,h}$$

4.13.11.2 in regards to *emergency operating state* activation, the *capacity obligation emergency operating state* activation payment *settlement amount* for *capacity market participant* 'k' participating with an *hourly demand response resource* that is not associated with *load equipment* registered as a *price responsive load* at *delivery point* 'm' in *settlement hour* 'h' ("$CAEOP^{m}_{k,h}$") shall be determined for each applicable *settlement hour* within the activation window as follows:

$$CAEOP^{m}_{k,h} = Max(0, HDRBP^{m}_{k,h} – Max(0, DAM\_LMP^{z}_{h} + LFDA_{h})) X HDRDC^{m}_{k,h}$$

Where:

a. '$LFDA_{h}$' is the load forecast deviation adjustment for *settlement hour* 'h' determined in accordance with section 3.2.3.

4.13.11.3 in regards to *emergency operating state* activation, the *capacity obligation emergency operating state* activation payment *settlement amount* for *capacity market participant* 'k' participating with an *hourly demand response resource* that is associated with *load equipment* registered as a *price responsive load* at *delivery point* 'm' in *settlement hour* 'h' ("$CAEOP^{m}_{k,h}$") shall be determined for each applicable *settlement hour* within the activation window as follows:

$$CAEOP^{m}_{k,h} = Max(0, HDRBP^{m}_{k,h} – Max(0,RT\_LMP^{z}_{h})) X HDRDC^{m}_{k,h}$$

4.13.11.4 If measurement data for any *metering interval* within a *settlement hour* was not submitted to the *IESO* in accordance with the applicable *market manual,* the *capacity market participant* shall not be eligible to receive a *capacity obligation* test activation payment *settlement amount* or a *capacity obligation emergency operating state* activation payment *settlement amount* for such *settlement hour.*

Capacity Obligation Availability Charge True-Up Payment

4.13.12 The *capacity obligation* availability charge true-up *settlement amount* for *capacity market participant* 'k' at *delivery point* 'm' in the relevant *obligation period* ("$CAACT^{m}_{k}$") shall be calculated and disbursed to such *capacity market participant* for each *obligation period* in which (i) the *capacity market participant* was subject to an availability charge pursuant to section 4.13.2.1 or 4.13.2.2; and (ii) the lowest quantity of capacity *offered* in the *day-ahead market, pre-dispatch process,* and *real-time market* by the *capacity market participant* is in excess of the *capacity obligation* of the relevant *capacity auction resource* for at least one *settlement hour* within the *availability window* of the applicable *obligation period*. The *capacity obligation* availability charge true-up *settlement amount* shall be calculated as follows*:*

$$CAACT^{m}_{k} = (Min ((-1) x \Sigma^{TM} ((\Sigma^{D} CAAC^{m}_{k}) + UCAP\ Adjustment\ x\ CAAP^{m}_{k} + CAIPA^{m}_{k}), \Sigma^{H} Max (0,(RAC_{k} – CCO_{k,h}) x CACP_{h} x CNPF_{tm}))$$

Where:

a. $CAAC^{m}_{k}$ is the *capacity obligation* availability charge *settlement amount* for *capacity market participant* 'k' at *delivery point* or *intertie metering point* 'm' for the relevant *trading day,* as calculated as the sum of the *capacity obligation* availability charge *settlement amount* of each *settlement hour* within the relevant *availability window* determined pursuant to section 4.13.2.1;

b. 'UCAP Adjustment' is a de-rate (in %) determined in accordance with section 4.13.8;

c. $CAAP^{m}_{k}$ is the *capacity obligation* availability payment *settlement amount* for *capacity market participant* 'k' at *delivery point* 'm' for the relevant *energy market billing period*, as calculated pursuant to section 4.13;

d. $CAIPA^{m}_{k}$ is the *capacity obligation* in-period *cleared UCAP* adjustment charge *settlement amount* for *capacity market participant* 'k' at *delivery point* 'm' for the relevant *energy market billing period*, as calculated pursuant to section 4.13.8;

e. 'D' is the set of all *trading days* within the relevant *energy market billing period*;

f. 'TM' is the set of all *energy market billing periods* within the relevant *obligation period;* and

g. 'H' is the set of all *settlement hours* 'h' within the *availability window* of the relevant *obligation period.*

Capacity Obligation Capacity Auction Charges True-up Payment

4.13.13 The *capacity obligation* charge true-up *settlement amount* for *capacity market participant* 'k' at *delivery point* 'm' in the relevant *obligation period* ("$CACT^{m}_{k}$") shall be calculated and disbursed to such *capacity market participant* for each *obligation period* in which the *capacity market participant* has a *capacity obligation*. The *capacity obligation* charge true-up *settlement amount* shall be calculated as follows:

$$CACT^{m}_{k} = -1 \times \text{Min}\ (0, (\sum_{H} TD_{C,k,h}{}^{m} + \sum_{H} TD_{P,k,h}{}^{m}))$$

Where:

a. $TD_{C,k,h}{}^{m}$ is the total dollar value of all *settlement amounts* 'C' for *capacity market participant* 'k' at *delivery point* 'm' in *settlement hour* 'h' in the relevant *obligation period*, where:

'C' is the set of the *settlement amounts* applied in accordance with MR Ch.9 ss. 4.13.2, 4.13.2.1, 4.13.4, 4.13.5, 4.13.6, 4.13.7, and 4.13.8.

b. $TD_{P\ k,h}{}^{m}$ is the total dollar value of all *settlement amounts* 'P' for *capacity market participant* 'k' at *delivery point* 'm' in *settlement hour* 'h' in the relevant *obligation period*, where:

'P' is the set of the *settlement amounts* applied in accordance with MR Ch.9 ss. 4. 13.1 and 4.13.12.

c. 'H' is the set of all *settlement hours* 'h' within the *availability window* of the relevant *obligation period*.

Capacity Auction Uplift

4.13.14 The *capacity obligation* uplift *settlement amount* for *market participant* 'k' at *delivery point* 'm' in the *energy market billing period* ("CAU^{m}_{k}") will be calculated and collected from or disbursed to *market participants* for load facilities, as defined in *Ontario Regulation 429/04,* for each *energy market billing period*. The *capacity obligation* uplift *settlement amount* shall be determined in accordance with sections 4.13.14.1 and 4.13.14.2. In calculating the *capacity obligation* uplift *settlement amount* in this section 4.13.14, the following subscripts and superscripts shall have the following meanings unless otherwise specified:

(a) 'H' is the set of all *settlement hours* 'h' in the relevant *energy market billing period;*

(b) 'M' is the set of all *delivery points* 'm' of *market participant* 'k';

(c) 'Class B Load' as defined in the applicable *market manual;*

(d) '$EGEI_{k}$' as defined in the applicable *market manual.*

4.13.14.1 for *market participants* that are classified as a 'Class A Market Participants' in respect of the relevant load facility, as defined in *Ontario Regulation 429/04,* in accordance with *applicable law,* the *capacity obligation* uplift *settlement amount* for such load facility shall be calculated as follows:

$$CAU^{m}_{k} = \Sigma_{H,M} (TD_{C,k,h}{}^{m} \times PDF_{k})$$

Where:

a. '$TD_{C,k,h}{}^{m}$' is total dollar value of all *settlement amounts* 'C' for *capacity market participant* 'k' at *delivery point* 'm' in *settlement hour* 'h' in the relevant *energy market billing period,* where:

i. 'C' is the set of the *settlement amounts* applied in accordance with MR Ch. 9 ss. 4.13.1, 4.13.2, 4.13.9, 4.13.11, 4.13.12, and 4.13.13.

b. 'PDF_{k}' is the Peak Demand Factor for 'Class A Market Participant' or Distributor 'k' for the relevant *energy market billing period,* as determined in accordance with *applicable law,* where if the 'Class A Market Participant' or Distributor 'k' ceases to be a 'Class A Market Participant' in respect of the relevant load facility during the relevant *energy market billing period,* the PDF_{k} shall be pro-rated accordingly.

4.13.14.2 for *market participants* that are classified as 'Class B Market Participants' in respect of the relevant load facility, as defined in *Ontario Regulation 429/04,* in accordance with *applicable law,* the *capacity obligation* uplift *settlement amount* shall for such load facility shall be calculated in accordance with the following:

a. for Fort Frances Power Corporation Distribution Inc.:

$$CAU^{m}_{k} = (\Sigma_{H,M}\, TD_{C,k,h}{}^{m} - TD_{C1350,k,h}{}^{m}) \times Max((\Sigma_{H}{}^{M,T}\, AQEW_{k,h}{}^{m,t} + EGEI_{k} - EEQ),0) / \text{Class B Load}$$

Where:

i. '$TD_{C,k,h}{}^{m}$' is total dollar value of all *settlement amounts* 'C' for *capacity market participant* 'k' at *delivery point* 'm' in *settlement hour* 'h' in the relevant *energy market billing period*, where 'C' is the set of the *settlement amounts* applied in accordance with MR Ch. 9 ss. 4.13.1, 4.13.2, 4.13.9, 4.13.11, 4.13.12, and 4.13.13.

ii. '$TD_{C1350,k,h}{}^{m}$' is total dollar value of *settlement amounts* applied pursuant to section 4.13.14.1 for *capacity market participant* 'k' at *delivery point* 'm' in *settlement hour* 'h' in the relevant *energy market billing period;*

iii. 'EEQ' as defined in the applicable *market manual;*

b. For other *market participants* that are classified as 'Class B Market Participants' in respect of the relevant *load facility* in accordance with *applicable law*:

$$CAU^{m}_{k} = (\Sigma_{H,M}\, TD_{C,k,h}{}^{m} - TD_{C1350,k,h}{}^{m}) \times Max((\Sigma_{H}{}^{M,T}\, AQEW_{k,h}{}^{m,t} + EGEI_{k} - GA\_AQEW_{g,k,h,M}{}^{m,t} - PGS_{h,M}),0) / \text{Class B Load}$$

Where:

i. '$TD_{C,k,h}{}^{m}$' is total dollar value of all *settlement amounts* 'C' for *capacity market participant* 'k' at *delivery point* 'm' in *settlement hour* 'h' in the relevant *energy market billing period*, where 'C' is the set of the *settlement amounts* applied in accordance with MR Ch.9 ss. 4.13.1, 4.13.2, 4.13.9, 4.13.11, 4.13.12, and 4.13.13.

ii. '$TD_{C1350,k,h}{}^{m}$' is total dollar value of *settlement amounts* applied pursuant to section 4.13.14.1 for *capacity market participant* 'k' at *delivery point* 'm' in *settlement hour* 'h' in the relevant *energy market billing period;*

iii. '$GA\_AQEW_{g,k,h,M}{}^{m,t}$' as defined in the applicable *market manual*.

iv. '$PGS_{h,M}$' as defined in the applicable *market manual*.

4.14 Non-Hourly Uplifts

Generator Failure Charge – Guarantee Cost Component Uplift

4.14.1 The *generator failure* charge – guarantee cost component uplift *settlement amount* will be calculated and disbursed to the *market participants* for *load resources* ~~and~~, *electricity storage resources* that are registered to withdraw, and *energy traders*

participating with *boundary entity resources* engaged in export transactions for each *trading day* in which the *IESO* applies the *generator failure* charge – guarantee cost component in accordance with section 4.10.6 or 4.10.10. The *generator failure* charge – guarantee cost component uplift *settlement amount* for *market participant* 'k' for the relevant *trading day* ("GFC_GCCU_k") shall be determined as follows:

$$GFC\_GCCU_k = -1\ x \sum_{K,F}^{M} GFC\_GCC_{k,f}^{m} \times \left[\sum_{H}^{M,T} (AQEW_{k,h}^{m,t} + SQEW_{k,h}^{i,t}) / \sum_{K,H}^{M,T} (AQEW_{k,h}^{m,t} + SQEW_{k,h}^{i,t})\right]$$

Real-Time Generator Offer Guarantee Uplift

4.14.2 The real-time *generator offer* guarantee uplift *settlement amount* will be calculated and collected from the *market participants* for *load resources*, *electricity storage resources* that are registered to withdraw, and *energy traders* participating with *boundary entity resources* engaged in export transactions for each *trading day* in which the *IESO* applies the real-time *generator offer* guarantee in accordance with section 4.5. The real-time *generator offer* guarantee uplift *settlement amount* for *market participant* 'k' for the relevant *trading day* ("$RT\_GOG_{k,h}^{m}$") shall be determined as follows:

$$RT\_GOGU_k = -1\ x \sum_{K,H}^{M,T} (RT\_GOG_{k,h}^{m} + RT\_GOG\_CB_{k,h}^{m}) \times \left[\sum_{H}^{M,T} (AQEW_{k,h}^{m,t} + SQEW_{k,h}^{i,t}) / \sum_{K,H}^{M,T} (AQEW_{k,h}^{m,t} + SQEW_{k,h}^{i,t})\right]$$

Where:

a. $RT\_GOG_{k,h}^{m}$ is the real-time *generator offer* guarantee *settlement amount* calculated in accordance with sections 4.5 for *market participant* 'k' at *delivery point 'm'* for *settlement hour 'h';* ~~and~~

b. 'M' is the set of all *delivery points* 'm' and *intertie metering points* 'i'~~.~~; and

c. $RT\_GOG\_CB^{m}_{k,h}$ is the real-time *generator offer* guarantee clawback *settlement amount* calculated in accordance with sections 3.10.3 for *market participant* 'k' at *delivery point* 'm' for *settlement hour 'h'.*

Day-Ahead Market Uplift

4.14.3 The *day-ahead market* uplift *settlement amount* will be calculated and collected from the *market participants* for *load resources*, *electricity storage resources* that are registered to withdraw, and *energy traders* participating with *boundary entity resources* engaged in export transactions for each *trading day* in which the *IESO* applies the *day-ahead market* make whole payment or the *day-ahead market generator offer* guarantee in accordance with section 3.4 or 4.4, respectively. The

day-ahead market uplift *settlement amount* for *market participant* 'k' for the relevant *trading day* ("DAM_UPL_k") shall be determined as follows:

$$DAM\_UPL_k = -1\ x \left(\sum_H^M \left(DAM\_MWP_{k,h}^m + DAM\_GOG_k^m\right) - DAM\_P2\_PMT\right) \times \sum_H^{M,T} \left(AQEW_{k,h}^{m,t} + SQEW_{k,h}^{i,t}\right) / \sum_{K,H}^{M,T} \left(AQEW_{k,h}^{m,t} + SQEW_{k,h}^{i,t}\right)$$

Day-Ahead Market Reliability Scheduling Uplift

4.14.4 The *day-ahead market reliability* scheduling uplift *settlement amount* will be calculated and collected from the *market participants* for *virtual zonal resources* with *day-ahead schedules* to inject *energy*, *load resources* ~~and~~, *electricity storage resources* that are registered to withdraw, and *energy traders* participating with *boundary entity resources* engaged in export transactions for each applicable *trading day*. The *day-ahead market reliability* scheduling uplift *settlement amount* for *market participant* 'k' for the relevant *trading day* ("$DRSU_k$") shall be determined in accordance with the following:

4.14.4.1 First, the *IESO* shall determine the *day-ahead market reliability* scheduling uplift *settlement amount* for *market participants* for *virtual zonal resources* with *day-ahead schedules* to inject *energy* as follows:

$$V\_DRSU_k = DAM\_P2\_PMT \times \sum_H^V DAM\_QVSI_{k,h}^v \Big/ \left(\sum_{K,H}^V DAM\_QVSI_{k,h}^v + DAM\_NDL\_OF\right)$$

Where:

i. 'DAM_P2_PMT' is as calculated in accordance with section 4.14.5; and

~~a. 'V' is the set of all *delivery points* 'v' for *virtual zonal resources*; and~~

ii. 'DAM_NDL_OF' is the total quantity of *energy* that was over-forecasted in the *day-ahead market* for *non-dispatchable loads* in Pass 2: Reliability Scheduling and Commitment of the *day-ahead market calculation engine*, as determined by the *IESO* as follows:

$$DAM\_NDL\_OF = \sum_{H,K}^M Max(DAM\_QSW_{k,h}^m + DAM\_HDR\_QSW_{k,h}^{m1} - AQEW_{k,h}^{m,t}, 0)$$

$$DAM_{NDL_{OF}} = Max[\sum_{H,K}^M \sout{Max}(DAM\_QSW_{k,h}^{m,p2} + DAM\_HDR\_QSW_{k,h}^{m1,p2} - AQEW_{k,h}^{m,t}), 0]$$

Where:

a. 'M' is the set of all *delivery points* 'm' for non-dispatchable loads and physical *hourly demand response resources* that are not associated with *load equipment* registered as *price responsive loads*; and

b. 'm1' is the set of all *delivery points* 'm' for physical *hourly demand response resources*.

c. 'p2' is Pass 2: Reliability Scheduling and Commitment of the *day-ahead market calculation engine.*

4.14.4.2 Second, the *IESO* shall determine the *day-ahead market reliability* scheduling uplift *settlement amount*, if any, for *market participants* for *load resources* ~~and~~, *electricity storage resources* that are registered to withdraw, and *energy traders* participating with *boundary entity resources* engaged in export transactions as follows:

$$EL\_DRSU_k = \left(DAM\_P2\_PMT - \sum_K V\_DRSU_k\right) \times \sum_H^{M,T} (AQEW_{k,h}^{m,t} + SQEW_{k,h}^{i,t}) / \sum_{K,H}^{M,T} (AQEW_{k,h}^{m,t} + SQEW_{k,h}^{i,t})$$

Where:

a. 'M' is the set of all *delivery points* 'm' and *intertie metering points* 'i'.

4.14.5 The *IESO* shall calculate the total amount of *day-ahead market* make-whole payment disbursed to *energy traders* participating with *boundary entity resources* engaged in import transactions and *day-ahead market generator offer* guarantee disbursed to *GOG-eligible resources*, in each instance for those *resources* that were scheduled in Pass 2: Reliability Scheduling and Commitment but were not scheduled in Pass 1: Market Commitment and Market Power Mitigation Pass of the *day-ahead market calculation engine* (DAM_P2_PMT) as follows:

4.14.6 The *IESO* shall calculate the *day-ahead market* ~~make~~make-whole payment disbursed to *energy traders* participating with *boundary entity resources* with import transactions that were scheduled in Pass 2: Reliability Scheduling and Commitment ($Imp\_DAM\_MWP_{k,h}^{i,p2}$) as follows:

4.14.7 The *IESO* shall calculate the *day-ahead market* make-whole payment disbursed to *energy traders* participating with *boundary entity resources* with import transactions

that were scheduled in Pass 1: Market Commitment and Market Power Mitigation Pass ($Imp\_DAM\_MWP_{k,h}^{i,p1}$) as follows:

$$Imp\_DAM\_MWP_{k,h}^{i,p1} = Max\left[0, DAM\_COMP1_{k,h}^{i} + DAM\_COMP2_{k,h}^{i}\right]$$

Where:

a. $DAM\_COMP1_{k,h}^{i} = -1 \times \left[OP\left(DAM\_LMP_{h}^{i}, DAM\_QSI_{k,h}^{i,p1}, DAM\_BE_{kh}^{i}\right) - OP\left(DAM\_LMP_{h}^{i}, DAM\_EOP_{k,h}^{i}, DAM\_BE_{kh}^{i}\right)\right]$

b. $DAM\_COMP2_{k,h}^{i} = -1 \times \sum_{R}\left[OP\left(DAM\_PROR_{r,h}^{i}, DAM\_QSOR_{r,k,h}^{i,p1}, DAM\_BOR_{r,k,h}^{i}\right) - OP\left(DAM\_PROR_{r,h}^{i}, DAM\_OR\_EOP_{r,k,h}^{i}, DAM\_BOR_{r,k,h}^{i}\right)\right]$

Fuel Cost Compensation Uplift

4.14.8 The fuel cost compensation uplift *settlement amount* will be calculated and collected from the *market participants* for *load resources*, *electricity storage resources* that are registered to withdraw, and *energy traders* participating with *boundary entity resources* engaged in export transactions for each *energy market billing period* in which the *IESO* applies the fuel cost compensation *settlement amount* in accordance with section 4.11. The fuel cost compensation uplift *settlement amount* for *market participant* 'k' for the relevant *energy market billing period* ("$FCCU_k$") shall be determined as follows:

Mitigation Amount for Physical Withholding Uplift

4.14.9 The ex-post mitigation for *physical withholding settlement* charge uplift *settlement amount* will be calculated and disbursed to the *market participants* for *load resources* ~~and~~, *electricity storage resources* that are registered to withdraw, and *energy traders* participating with *boundary entity resources* engaged in export transactions for each *trading day* in which the *IESO* applies the mitigation for *physical withholding settlement amount,* in accordance with section 5.5. The ex-post mitigation *physical withholding settlement* charge uplift *settlement amount* for *market participant* 'k' for the relevant *trading day* ("EXP_PWSU_k") shall be determined as follows:

Mitigation Amount for Intertie Economic Withholding Uplift

4.14.10 The ex-post mitigation amount for *intertie economic withholding* ~~*settlement* charge~~ uplift *settlement amount* will be calculated and collected from the *market participants* for *load resources*, *electricity storage resources* that are registered to withdraw, and *energy traders* participating with *boundary entity resources* engaged in export transactions for each *trading day* ~~*energy market billing period*~~ in which the *IESO* applies the mitigation for *intertie economic withholding* ~~on uncompetitive~~

~~interties~~ *settlement amount,* in accordance with section 5.~~9~~5. The ex-post mitigation amount for *intertie economic withholding* ~~*settlement* charge~~ uplift *settlement amount* for *market participant* 'k' for the relevant *trading day* ~~*energy market billing period*~~ ("$\mathrm{EXP\_EWSCU}_k$") shall be determined as follows:

$$EXP\_EWSCU_k = \sum_K^M (EXP\_EWSC_k^i) \text{ x } \sum_H^{M,T} (AQEW_{k,h}^{m,t} + SQEW_{k,h}^{i,t}) / \sum_{K,H}^{M,T} (AQEW_{k,h}^{m,t} + SQEW_{k,h}^{i,t})$$

Where:

a. $EXP\_EWSC_k^i$ is the mitigation for *intertie economic withholding* ~~on uncompetitive interties~~ *settlement amount* calculated in accordance with sections 5.5 for *market participant* 'k' at *intertie metering point* 'i';

b. 'M' is the set of all *delivery points* 'm' and *intertie metering points* 'i'; and

c. 'H' is the set of all *settlement hours* 'h' in the relevant *trading day.*

Real-Time Ramp-Down Settlement Amount Uplift

4.14.11 The real-time ramp-down uplift *settlement amount* will be calculated and collected from the *market participants* for *load resources*, *electricity storage resources* that are registered to withdraw, and *energy traders* participating with *boundary entity resources* engaged in export transactions for each *trading day* in which the *IESO* applies the ramp-down *settlement amount* in accordance with section 4.6. The real-time ramp-down uplift *settlement amount* for *market participant* 'k' for the relevant *trading day* ("RT_RDSAU_k") shall be determined as follows:

Additional Non-Hourly Uplifts

4.14.12 The *IESO* shall, at the end of each *energy market billing period*, ~~recover from *market participants*~~calculate and collect from *market participants* for *load resources*, *electricity storage resources* that are registered to withdraw, and *energy traders* participating with *boundary entity resources* engaged in export transactions, on a pro-rata basis across all allocated quantities of *energy* withdrawn at all *registered wholesale meters* and across all scheduled quantities of *energy* withdrawn at all *intertie metering points* during all *metering intervals* and *settlement hours* within that *energy market billing period*, any compensation, out-of-pocket expenses, costs, or reimbursements, as the case may be, paid or incurred in that *energy market billing period* by the *IESO* pursuant to:

a. MR Ch.4 s.5.3.4;

b. MR Ch.5 s.2.3.3A;

c. MR Ch.5 s.5.3.4;

d. MR Ch.5 s.6.7.4;

e. MR Ch.5 s.8.2.6;

f. MR Ch.7 s.8.4A.9;

g. Section 2.2.17;

h. Section 2.13.1; ~~and~~

i. Section 4.12.1~~.~~; and

j. MR.Ch.7 s.22.8.11.2

Note: Existing section 5 – Market Power Mitigation: section 5.1 is being deleted in its entirety and replaced by new section 5 under the same title.

5 Market Power Mitigation

5.1 Mitigation of Settlement Amounts

5.1.2 Subject to section 5.1.4 and 5.1.5, where a *resource* which is otherwise eligible to receive a *settlement amount* referred to in section 5.1.1 fails a conduct test specified in section 2.4 or 3.4 of Appendix 9.4, as the case may be, for a *settlement hour* included within a period for which they were otherwise eligible to receive such *settlement amount*, the *IESO* shall calculate the applicable *settlement amount* in accordance with the following process:

5.1.2.1 First, the *IESO* shall calculate the *settlement amount* in accordance with the equations set out in sections 3.4, 3.5, 4.4, 4.5 and 4.6, as the case may be (the "initial *settlement amount*").

5.1.2.2 Second, the *IESO* shall calculate the *settlement amount* in accordance with the equations set out in sections 3.4, 3.5, 4.4, 4.5 and 4.6, as the

case may be, except with the following substitutions for such *settlement hours* that failed the applicable conduct test, as applicable:

a. $EMFC\_DAM\_BE^{m}_{k,h}$ shall replace $DAM\_BE^{m}_{k,h}$;

b. $EMFC\_DAM\_BOR^{m}_{r,k,h}$ shall replace $DAM\_BOR^{m}_{r,k,h}$;

c. $EMFC\_DAM\_BE\_SU^{m}_{k,h}$ shall replace $DAM\_BE\_SU^{m}_{k,h}$;

d. $EMFC\_DAM\_SNL^{m}_{k,h}$ shall replace $DAM\_SNL^{m}_{k,h}$;

e. $EMFC\_RT\_BE^{m}_{k,h}$ shall replace $RT\_BE^{m}_{k,h}$;

f. $EMFC\_RT\_BOR^{m}_{r,k,h}$ shall replace $RT\_BOR^{m}_{r,k,h}$;

g. $EMFC\_RT\_SU^{m}_{k,h}$ shall replace $RT\_SU^{m}_{k,h}$; and

h. $EMFC\_RT\_SNL^{m}_{k,h}$ shall replace $RT\_SNL^{m}_{k,h}$;

i. for greater certainty, the aforementioned substitutions shall also apply to the calculation of the following, including the intermediate variables necessary to derive the following:

   i. $DAM\_MWP\_DIPC^{c}_{k,h}$;
   ii. $DAM\_MWP\_DIPC^{c}_{r,k,h}$;
   iii. $DAM\_MWP\_DIPC^{s}_{k,h}$;
   iv. $DAM\_MWP\_DIPC^{s}_{r,k,h}$; and
   v. the assessment of the condition set out in section 3.4.13.5.3.

(the "EMFC *settlement amount*")

a. $EMFC\_DAM\_BE^{m}_{k,h}$ shall replace $DAM\_BE^{m}_{k,h}$;

b. $EMFC\_DAM\_BOR^{m}_{r,k,h}$ shall replace $DAM\_BOR^{m}_{r,k,h}$;

c. $EMFC\_DAM\_BE\_SU^{m}_{k,h}$ shall replace $DAM\_BE\_SU^{m}_{k,h}$;

d. $EMFC\_DAM\_SNL^{m}_{k,h}$ shall replace $DAM\_BE\_SNL^{m}_{k,h}$;

e. $EMFC\_RT\_BE^{m}_{k,h}$ shall replace ~~$RT\_BE^{m}_{k,h}$~~;

f. $EMFC\_RT\_BOR^{m}_{r,k,h}$ shall replace ~~$RT\_BOR^{m}_{r,k,h}$~~;

g. $EMFC\_RT\_SU^{m}_{k,h}$ shall replace $RT\_GOG\_SU^{m}_{k,h}$; and

h. $EMFC\_RT\_SNL^{m}_{k,h}$ shall replace ~~$RT\_PD\_BE\_SNL^{m}_{k,h}$~~;

i. all of the above substitutions shall apply to their respective counterparts for steam turbine *delivery points* 's', and combustion turbine *delivery points* 'c';

j. for greater certainty, the aforementioned substitutions shall also apply to the calculation of the following, including the intermediate variables necessary to derive the following:

i. $DAM\_MWP\_DIPC^{c}_{k,h}$;
ii. $DAM\_MWP\_DIPC^{c}_{r,k,h}$;
iii. $DAM\_MWP\_DIPC^{s}_{k,h}$;
iv. $DAM\_MWP\_DIPC^{s}_{r,k,h}$; and
v. the assessment of the condition set out in section 3.4.13.5.3.

(the "EMFC *settlement amount*")

5.1.4 Notwithstanding section 5.1.2, no substitutions shall be made pursuant to section 5.1.2 for:

a. *energy traders* participating with *boundary entity resources* in regards to any *settlement amount*;

b. *dispatchable loads* and *dispatchable electricity storage resource* that is ~~withdrawing~~registered to withdraw in determining the real-time make-whole payment *settlement amount* and the *day-ahead market* make-whole payment *settlement amount* each as they relate to *energy*. For greater certainty, these substitutions will be made as they pertain to the *operating reserve* elements of such *settlement amounts;* and

c. hydroelectric *generation resources* in determining the *day-ahead market* make-whole payment in accordance with section 3.4.13.4 for *settlement hours* that fall within period 'Hp'.

5.2 Day-Ahead Market Reference Level Settlement Charge

5.2.1 The *day-ahead market reference level settlement* charge *settlement amount* for *market participant* 'k' at *delivery point* 'm' in *settlement hour* 'h' ("$DAM\_RLSC^{m}_{k,h}$") shall be calculated in each instance a *dispatchable generation resource* or *dispatchable electricity storage resource* that is ~~injecting~~registered to inject meets the conditions set out in section 5.2.1.1 and collected from the *market participant* for such *resources* as follows:

$$DAM\_RLSC^{m}_{k,h} = -1 \times DAM\_QSI^{m}_{k,h} \times (DAM\_LMP^{m}_{h} - DAM\_PLCP^{m}_{k,h}) \times PM\_RLSC_{mcepw}$$

~~$DAM\_RLSC^{m}_{k,h} = -1 \times DAM\_QSI^{m}_{k,h} \times (DAM\_LMP^{m}_{h} - DAM\_PLCP^{m}_{k,h}) \times$~~

~~Where PM_RLSC_{mcepw}~~

Where for the purposes of this section 5.2.1:

b. $DAM\_PLCP^{m}_{k,h}$ is the price component P_n of N-by-2 matrix $(DAM\_RLL^{m}_{k,h})$ of *price quantity pairs* where 'n' is the highest indexed row of the matrix such that $DAM\_QSI^{m}_{k,h} \leq Q_n$~~; and~~.

~~c. PM_RLSC_{mcepw} is the persistence multiplier for *market control entity for physical withholding* 'mcepw' of the relevant *resource* for the relevant *settlement hour,* determined as the number of *trading days* in which any *resource* associated with the *market control entity for physical withholding* is subject to a *day-ahead market reference level settlement* charge *settlement amount* or a *real-time market reference level settlement* charge *settlement amount* within the last 18 months, up to a maximum of 3.~~

Conditions

5.2.1.1 The *IESO* shall apply the *day-ahead market reference level settlement* charge for each *settlement hour* for which a *resource* meets all of the following conditions:

5.2.1.1.1 $DAM\_PHCP^{m}_{k,h} >= DAM\_LMP^{m}_{h}$;

a. Where:

$DAM\_PHCP_{k,h^{m}}$ is the price component P_n of N-by-2 matrix $(DAM\_RLH^{m}_{k,h})$ of *price quantity pairs* where 'n' is the highest indexed row of the matrix such that $DAM\_QSI^{m}_{k,h} \leq Q_n$.

5.2.1.1.2 $DAM\_LMP^{m}_{h} > DAM\_PLCP^{m}_{k,h}$; and

5.2.1.1.3 where either of the following conditions is true:

a. where the *registered market participant* for such *resource* requested a change to its fuel cost component for the *day-ahead market* in accordance with MR Ch.7 ss.22.5.5 and 22.5.7.1, the *IESO* is not satisfied that the fuel cost component will not reflect the *resource's short-run marginal costs* for fuel in one or more hours of a *dispatch day*; ~~and~~or

~~5.2.1.1.4~~b. where the *registered market participant* for such *resource* requested to use its higher cost profile *reference levels* for the *day-ahead market* in accordance with MR Ch.7 ss.22.5.6 and 22.5.7.1, the *registered market participant* for such *resource* failed to provide the documentation required pursuant to MR Ch.7 s.22.5.11 within two *business days* of the *trading day* for which the request was made or the *IESO* is not satisfied that the *resource* needed to use the set of *reference levels* associated with the profile with the highest costs.

5.3 Real-Time Market Reference Level Settlement Charge

5.3.1 The *real-time market reference level settlement* charge *settlement amount* for *market participant* 'k' at *delivery point* 'm' in *settlement hour* 'h' ("$RT\_RLSC_{k,h}^{m}$") shall be calculated in each instance a *dispatchable generation resource* or *dispatchable electricity storage resource* that is ~~injecting~~registered to inject meets the conditions set out in section 5.3.1.1 and collected from the *market participant* for such *resources* as follows:

$$RT\_RLSC_{k,h}^{m} = -1 \times \sum^{T} (RT\_QSI_{k,h}^{m,t} \times (RT\_LMP_{h}^{m,t} - RT\_PLCP_{k,h}^{m}) \times PM\_RLSC_{mcepw}^{\square})$$

~~$$RT\_RLSC_{k,h}^{m} = -1 \times \sum^{T} (RT\_QSI_{k,h}^{m,t} \times (RT\_LMP_{h}^{m,t} - RT\_PLCP_{k,h}^{m}) \times PM\_RLSC_{mcepw}^{\square})$$~~

~~Where~~

Where for the purposes of this section 5.3.1:

a. $RT\_PLCP_{k,h}^{m}$ is the price component P_n of N-by-2 matrix $(RT\_RLL_{k,h}^{m})$ of *price-quantity pairs* where 'n' is the highest indexed row of the matrix such that $RT\_QSI_{k,h}^{m} \leq Q_n$~~; and~~.

~~b. $PM\_RLSC_{mcepw}^{\square}$ is the persistence multiplier for *market control entity for physical withholding* 'mcepw' of the relevant *resource* for the relevant *settlement hour,* determined as the number of *trading days* in which any *resource* associated with the *market control entity for physical withholding* is subject to a *day-ahead market reference level settlement* charge *settlement amount* or a *real-time market reference level settlement* charge *settlement amount* within the last 18 months, up to a maximum of 3.~~

Conditions

5.3.1.1 The *IESO* shall apply the *real-time market reference level settlement* charge each *settlement hour* for which a *resource* meets all of the following conditions for any *metering interval* within the *settlement hour*:

5.3.1.1.1 $RT\_PHCP_{k,h}^{m} >= RT\_LMP_{h}^{m,t}$;

~~a.~~ Where:

a. RT_PHCP_{k,h^m} is the price component P_n of N-by-2 matrix $(\mathrm{RT\_RLH}_{\mathrm{k,h}}^{\mathrm{m}})$ of *price-quantity pairs* where 'n' is the highest indexed row of the matrix such that $RT\_QSI_{k,h}^{m} \leq Q_n$,

5.3.1.1.2 $RT\_LMP_{h}^{m,t} > RT\_PLCP_{k,h}^{m}$; and

5.3.1.1.3 where either of the following conditions is true:

a. where the *registered market participant* for the *resource* has requested a change to its fuel cost component for the *real-time market* in accordance with MR Ch.7 ss.22.5.5 and 22.5.7.2, the *IESO* is not satisfied that the fuel cost component will not reflect the *resource's short-run marginal costs* for fuel in one or more hours of a *dispatch day;* ~~and~~or

b. ~~5.3.1.1.4~~ where the *registered market participant* for the *resource* has requested to use its higher cost profile *reference levels* for the *real-time market* in accordance with MR Ch.7 ss.22.5.6 and 22.5.7.2, the *registered market participant* for such *resource* failed to provide the documentation required pursuant to MR Ch.7 s.22.5.11 within two *business days* of the *trading day* for which the request was made or the *IESO* is not satisfied that the *resource* needed to use the set of *reference levels* associated with the profile with the highest costs.

5.4 Ex-Post Mitigation for Physical Withholding

5.4.1 The ex-post mitigation for *physical withholding settlement amount* for *energy* and *operating reserve* shall be calculated for *market participants* of *dispatchable generation resources, dispatchable loads,* and *dispatchable electricity storage resources* each *trading day* for which the *IESO* issues a second notice of *physical withholding* to such *market participant* pursuant to MR Ch.7 s.22.15.~~26~~25. The mitigation for *physical withholding settlement amount* for *energy* or *operating*

reserve shall be calculated and collected from such *market participant* 'k' for such *resource* at *delivery point* 'm' for such *trading day* ("$EXP\_PWSC_k^m$") as follows:

$$EXP\_PWSC_k^m = -1 \text{ x } (PW\_E_k^m + PW\_OR_k^m)$$

Where:

a. $PW\_E_k^m$ is determined in accordance with section 5.4.1.1; and

b. $PW\_OR_k^m$ is determined in accordance with section 5.4.1.2.

5.4.1.1 The *IESO* shall determine $PW\_E_k^m$ as follows:

$$PW\_E_k^m = \sum^{H} Max(DAM\_PW_{k,h}^m, RT\_PW_{k,h}^m) \times PM\_PW_{mcepw}$$

Where:

a. 'H' is the set of *settlement hours* 'h' of the *trading day* for which the *IESO* determined that the *market participant* engaged in *physical withholding* in ~~either~~ the *day-ahead market*, ~~or~~ the *real-time market*, or both;

~~a.~~b. PM_PW_{mcepw} is the persistence multiplier applicable to the relevant *trading day* for the *market control entity for physical withholding* 'mcepw' that the *registered market participant* for the applicable *resource* designated, as determined in accordance with the applicable *market manual*;

c. $DAM\_PW_{k,h}^m = 1.5 \times (MWhs\ Failed_{k,h}^m) \times (DAM\_LMP_{k,h}^m)$

~~c.~~ $DAM\_PW_{k,h}^m = 1.5 \times (MWhs\ Failed_{k,h}^m) \times (DAM\_LMP_{~~k,~~h}^m)$

Where:

i. 'h' is the *settlement hour* in the relevant *trading day* for which the *IESO* determined that the *market participant* engaged in *physical withholding* in the *day-ahead market*; and

ii. 'MWhs $Failed_{k,h}^m$' is the quantity of *energy* (in MWhs) for *market participant* 'k' at *delivery point* 'm' for *settlement hour* 'h', as determined in accordance with the following:

a. if the *IESO* is assessing *physical withholding* in only the *real-time market*, it is deemed to be zero; and

b. otherwise, it is determined by subtracting the *market participant's energy offer* from the *energy reference quantity value* or ~~*alternate*~~*alternative reference quantity value*, as the case may be, of the *resource* associated with the *offer*.

d. $RT\_PW^{m}_{k,h} = 1.5 \times \sum^{T}\left(MWhs\ Failed^{m,t}_{k,h}\right) \times \left(RT\_LMP^{m,t}_{k,h}\right)$

d. $RT\_PW^{m}_{k,h} = 1.5 \times \sum^{T}\left(MWhs\ Failed^{m,t}_{k,h}\right) \times \left(RT\_LMP^{m,t}_{k,h}\right)$

Where:

i. 'T' is the set of all *metering intervals* 't' in *settlement hour* 'h' for which the *IESO* determined that the *market participant* engaged in *physical withholding* in the *real-time market;* and

ii. '$MWhs\ Failed^{m,t}_{k,h}$' is the quantity of *energy* (in MWhs) for *market participant* 'k' at *delivery point* 'm' in *metering interval* *'t'* of *settlement hour 'h'*, as determined ~~by subtracting the *market participant's energy offer* from the *energy reference quantity value* of the *resource* associated with the *offer*.~~ in accordance with the following:

a. if the *IESO* is assessing *physical withholding* in only the *day-ahead market,* it is deemed to be zero; and

b. otherwise, it is determined by subtracting the *market participant's energy offer* from the *energy reference quantity value* or *alternative reference quantity value,* as the case may be, of the *resource* associated with the *offer.*

5.4.1.2 The *IESO* shall determine $PW\_OR^{m}_{k}$ as follows:

$$PW\_OR^{m}_{k} = \sum^{H} Max(DAM\_PW^{m}_{k,h}, RT\_PW^{m}_{k,h}) \times PM\_PW_{mce}$$

$$PW\_OR^{m}_{k} = \sum^{H} Max(DAM\_PW^{m}_{k,h}, RT\_PW^{m}_{k,h}) \times PM\_PW_{mcepw}$$

Where:

a. 'H' is the set of *settlement hours* 'h' of the *trading day* for which the *IESO* determined that the *market participant* engaged in *physical withholding* in either the *day-ahead market* or the *real-time market*;

~~b.~~ PM_PW_{mcepw}

b. ~~PM_PW_{mce}~~ is the persistence multiplier applicable to the relevant *trading day* for the *market control entity for physical withholding* ~~*'mce'*~~ *'mcepw'* that the *registered market participant* for the applicable *resource* designated, as determined in accordance with the applicable *market manual*;

c. $DAM\_PW^{m}_{k,h} = 1.5 \times \sum_{R}(MWs\ Failed^{m}_{r,k,h} \times DAM\_PROR^{m}_{r,h})$

Where:

i. 'h' is the *settlement hour* in the relevant *trading day* for which the *IESO* determined that the *market participant* engaged in *physical withholding* in the *day-ahead market*; and

ii. '$MWs\ Failed^{m}_{r,k,h}$' is the quantity of *class r reserve* (in MWs) for *market participant* 'k' at *delivery point* 'm' for *settlement hour* 'h', as determined ~~by subtracting the *market participant's operating reserve offer* from the *operating reserve reference quantity value* of the *resource* associated with the *offer*.~~ in accordance with the following:

a. if the *IESO* is assessing *physical withholding* in only the *real-time market*, it is deemed to be zero; and

b. otherwise, it is determined by subtracting the *market participant's operating reserve offer* from the *operating reserve reference quantity value* or *alternative reference quantity value*, as the case may be, of the *resource* associated with the *offer*.

d. $RT\_PW^{m}_{k,h} = 1.5 \times \sum_{R}^{T}(MWs\ Failed^{m,t}_{r,k,h} \times RT\_PROR^{m,t}_{r,h})$

Where:

i. 'T' is the set of all the *metering intervals* 't' in *settlement hour* 'h' for which the *IESO* determined that the *market participant* engaged in *physical withholding* in the *real-time market;* and

ii. '$MWs\ Failed^{m,t}_{r,k,h}$' is the quantity of *class r reserve* (in MWs) for *market participant* 'k' at *delivery point* 'm' in *metering interval* 't' of *settlement hour* 'h', as determined in accordance with the following:

a. if the *IESO* is assessing *physical withholding* in only the *day-ahead market*, it is deemed to be zero; and

~~a.~~b. otherwise, it is determined by subtracting the *market participant's operating reserve offer* from the *operating reserve reference quantity value* or *alternative reference quantity value*, as the case may be, of the *resource* associated with the *offer*.

5.5 Ex-Post Mitigation for Intertie Economic Withholding ~~on Uncompetitive Interties~~

5.5.1 The ex-post mitigation for *intertie economic withholding* ~~on uncompetitive interties~~ *settlement amount* for *energy* and *operating reserve* shall be calculated for each

trading day for which the *IESO* issues a second notice of *intertie economic withholding* pursuant to MR Ch.7 s.22.19.8. The mitigation for *intertie economic withholding* ~~on uncompetitive *interties*~~ *settlement amount* for *energy* and *operating reserve* shall be calculated and collected from such *market participant* 'k' at *intertie metering point* 'i' for the relevant *trading day* ("$EXP\_EWSC_k^i$") as follows:

$$EXP\_EWSC_k^i = -1 \times (EW\_E_k^i + EW\_MWP_k^i + EW\_OR_k^i)$$

Where:

a. $EW\_E_k^i$ is determined in accordance with section 5.5.1.1;

b. $EW\_MWP_k^i$ is determined in accordance with section 5.5.1.2; and

c. $EW\_OR_k^i$ is determined in accordance with section 5.5.1.3.

5.5.1.1 The *IESO* shall determine $EW\_E_k^i$ as follows:

$$EW\_E_k^i = \sum^{H} Max(DAM\_EWUI_{k,h}^i, RT\_EWUI_{k,h}^i)$$

Where:

a. 'H' is the set of *settlement hours* 'h' of the *trading day* for which the *IESO* determined that the *market participant* engaged in *intertie economic withholding* in the *day-ahead market,* the *real-time market,* or both;

b. $DAM\_EWUI_{k,h}^i = (MWhs\ Failed_{k,h}^i) \times DAM\_LMP_{k,h}^i$

b. $DAM\_EWUI_{k,h}^i = (MWhs\ Failed_{k,h}^i) \times DAM\_LMP_{\sout{k,}h}^i$

Where:

i. 'h' is the *settlement hour* for which the *IESO* determined that the *market participant* engaged in *intertie economic withholding* in the *day-ahead market*; and

ii. '$MWhs\ Failed_{k,h}^i$' is the quantity of *energy* (in MWhs) for *market participant* 'k' at *intertie metering point* 'i' for *settlement hour* 'h', as determined in accordance with the following:

a. if the *IESO* is assessing *intertie economic withholding* in only the *real-time market,* it is deemed to be zero; and

~~a.~~b. otherwise, it is determined by subtracting the *market participant's energy offer* from the *energy*

reference quantity value of the *resource* associated with the *offer*.

c. $RT\_EWUI^{i}_{k,h} = \sum^{T}(MWhs\ Failed^{i,t}_{k,h}) \times (RT\_LMP^{i,t}_{k,h})$

c. $RT\_EWUI^{i}_{k,h} = \sum^{T}(MWhs\ Failed^{i,t}_{k,h}) \times (RT\_LMP^{i,t}_{~~k~~,h})$

Where:

i. 'T' is the set of all *metering intervals* 't' in *settlement hour* 'h' for which the *IESO* determined that the *market participant* engaged in *intertie economic withholding* in the *real-time market*; and

ii. '$MWhs\ Failed^{i,t}_{k,h}$' is the quantity of *energy* (in MWhs) for *market participant* 'k' at *intertie metering point* 'i' for *settlement hour* 'h', as determined in accordance with the following:

a. if the *IESO* is assessing *intertie economic withholding* in only the *day-ahead market*, it is deemed to be zero; and

~~a.~~b. otherwise, it is determined by subtracting the *market participant's energy offer* from the *energy reference quantity value* of the *resource* associated with the *offer*.

5.5.1.3 The *IESO* shall determine $EW\_OR^{i}_{k}$ as follows:

$$EW\_OR^{i}_{k} = \sum^{H} Max(DAM\_EWUI^{i}_{k,h}, RT\_EWUI^{i}_{k,h})$$

Where:

a. 'H' is the set of *settlement hours* 'h' of the *trading day* for which the *IESO* determined that the *market participant* engaged in *intertie economic withholding* in either the *day-ahead market* or the *real-time market*;

b. $DAM\_EWUI^{i}_{k,h} = \sum_{R}(MWs\ Failed^{i}_{r,k,h} \times DAM\_PROR^{i}_{r,h})$

Where:

i. 'h' is the *settlement hour* for which the *IESO* determined that the *market participant* engaged in *intertie economic withholding* in the *day-ahead market*; and

ii. '$MWs\ Failed^{i}_{r,k,h}$' is the quantity of *class r reserve* (in MWs) for *market participant* 'k' at *intertie metering point* 'i' for

settlement hour 'h', as determined in accordance with the following:

a. if the *IESO* is assessing *intertie economic withholding* in only the *real-time market*, it is deemed to be zero; and

~~a.~~b. otherwise, it is determined by subtracting the *market participant's operating reserve offer* from the *operating reserve reference quantity value* of the *resource* associated with the *offer.*

c. $RT\_EWUI^{i}_{k,h} = \sum_{R}^{T}(MWs\ Failed^{i,t}_{r,k,h} \times RT\_PROR^{i,t}_{r,h})$

Where:

i. 'T' is the set of all *metering intervals* 't' in *settlement hour* 'h' for which the *IESO* determined that the *market participant* engaged in *intertie economic withholding* in the *real-time market*; and

ii. '$MWs\ Failed^{i,t}_{r,k,h}$' is the quantity of *class r reserve* (in MWs) for *market participant* 'k' at *intertie metering point* 'i' for *metering interval* 't' in *settlement hour* 'h', as determined in accordance with the following:

a. if the *IESO* is assessing *intertie economic withholding* in only the *day-ahead market*, it is deemed to be zero; and

~~a.~~b. otherwise, it is determined by subtracting the *market participant's operating reserve offer* from the *operating reserve reference quantity value* of the *resource* associated with the *offer*.

6 Settlement Statements

6.3 Settlement Cycles

Day-Ahead Market and Real-Time Market

6.3.16 After the *final settlement statement* referred to in section 6.3.15 is issued, each *market participant* shall have ~~six~~ten *business days* in which to notify the *IESO* of errors or omissions in the *final settlement statement* in accordance with section 6.8.

6.3.18 After a *recalculated settlement statement* referred to in section 6.3.17 is issued, other than in respect of a *final recalculated settlement statement*, each *market*

participant shall have ~~six~~ten *business days* in which to notify the *IESO* of errors or omissions in the *recalculated settlement statement* in accordance with section 6.8.

Delays

6.3.28 Where the *IESO* intends to invoke the estimated *invoice* procedure referred to in section 6.3.27 or to delay the issuance of *invoices* pursuant to section 6.3.33, the *IESO* shall *publish* a notice indicating whether the *IESO* intends, in accordance with section 6.3.31, to delay each of the *market participant payment date* and the *IESO payment date* associated with such *invoices* or estimated *invoices* and, if so, the revised payment dates.

6.3.29 The amount of an estimated *invoice* issued to a *market participant* pursuant to section 6.3.27 shall, subject to section 6.3.30, be ~~equal to the aggregate of~~determined in accordance with the following:

6.3.29.1 The amount referred to in section 6.4.2.1 shall be equal to the aggregate of:

6.3.29.1.1 the net total amount for that *market participant* for all *trading days* that occurred during the *energy market billing period* prior to the date on which the issuance of *preliminary settlement statements* commenced to be delayed pursuant to section 6.3.24 or 6.3.25.1, as the case may be;

6.3.29.1.2 for each *trading day* in the *energy market billing period* that occurred subsequent to the date referred to in section 6.3.29.1, the net total amount for that *market participant* as set forth in the *final settlement statements* issued to that *market participant* in the preceding *energy market billing period*, commencing with the *final settlement statement* issued for the last *trading day* of such preceding *energy market billing period* and using a number of *final settlement statements* equal to the number of *trading days* in the current *energy market billing period* occurring subsequent to the date referred to in section 6.3.29.1; and

6.3.29.1.3 for greater certainty, any net total amount for that *market participant* reflected on a *recalculated settlement statement* which would have otherwise been included on the *invoice* for the relevant *energy market billing period* shall not be reflected on the estimated *invoice.*

6.3.29.2 The amount referred to in section 6.4.2.2 shall be equal to:

6.3.29.2.1 the net total amount for that *market participant* reflected on the relevant post-auction report issued pursuant to MR

Ch.8 s.3.16.1 for the aggregate of the amounts for the purchase of *TRs* by the *market participant* in all rounds of any *TR auction* that is concluded within the relevant financial market *billing period*.

6.3.30 Where the data required to determine the amount of an estimated *invoice* in accordance with section 6.3.29.1 is not readily available at the relevant time, the *IESO* shall issue to each applicable *market participant* an estimated *invoice* in an amount equal to:

6.3.30.1 the net amount of the *invoice* issued to the *market participant* for the preceding *energy market billing period* minus any amounts on such *invoice* included on a *recalculated settlement statement*; or

6.3.30.2 zero, if no *invoice* was issued to the *market participant* for the preceding *energy market billing period*.

6.4 Settlement Statement Process

6.4.1 The *IESO* shall issue *settlement statements* to each *market participant* to cover each *trading day* in accordance with sections 6.5 to 6.7, and shall provide the *settlement* data included in such *settlement statements* into the *settlement process*.

6.4.2 For each *settlement statement*, the *IESO* shall calculate a net *settlement amount* for each *market participant* for the *trading day*. The net *settlement amount* shall be comprised of:

6.4.2.1 the aggregate of the trading amounts from each transaction in each *settlement hour* in the *trading day*; and

6.4.2.2 the aggregate of the amounts for the purchase of *TR*s in all rounds of any *TR auction* that is concluded on the *trading day*,adjusted to reflect any fees payable by the *market participant* and any other adjustment amounts payable or receivable pursuant to these *market rules.*

6.16 Payment Default

6.16.6 If the *IESO* borrows short-term funds pursuant to section 6.16.5, it shall recover this borrowing:

6.16.6.3 The portion of any short-term funds borrowed by the *IESO* to be recovered from *market participant* 'k' in the current *energy market billing period* shall be calculated as follows:

6.16.6.3.1 For *market participants* that have paid provincial *transmission services charges* in the current *energy market billing period*:

$$TRCAC_k = TRCAD_L \times \sum_H{}^{M,T} [(AQEW_{k,h}{}^{m,t}) / \sum_{K,H}{}^{M,T} (AQEW_{k,h}{}^{m,t})$$

6.16.6.3.2 For *market participants* that have paid export *transmission services charges* in the current *energy market billing period*:

$$TRCAC_k = TRCAD_E \times \sum_H{}^{I,T} [(SQEW_{k,h}{}^{i,t}) / \sum_{K,H}{}^{I,T} (SQEW_{k,h}{}^{i,t})]$$

Where:

i. $TRCAD_L = (\sum_K TD_C / \sum_K TD_{C,C1}) \times TRCAR$

ii. $TRCAD_E = (\sum_K TD_{C1} / \sum_K TD_{C,C1}) \times TRCAR$

iii. TRCAR = the total dollar value of TR shortfall recovery from the *TR clearing account* authorized by the *IESO Board* in the current *energy market billing period.*

$TRCAC_k = TRCAD_E \times \sum_H{}^{I,T} [(SQEW_{k,h}{}^{i,t}) / \sum_{K,H}{}^{I,T} (SQEW_{k,h}{}^{i,t})]$

Where:

i. $TRCAC_k$ = the *TR clearing account* credit (in $ and up to 2 decimal places) collected from *market participant* 'k' in the current *energy market billing period;*

~~i.~~ii. $TRCAD_L = (\sum_K TD_C / \sum_K TD_{C,C1}) \times TRCAR$

~~ii.~~iii. $TRCAD_E = (\sum_K TD_{C1} / \sum_K TD_{C,C1}) \times TRCAR$

~~iii.~~iv. TRCAR = the total dollar value (in $ and up to 2 decimal places) of TR shortfall recovery from the *TR clearing account* authorized by the *IESO Board* in the current *energy market billing period*

v. C = the set of all monthly service *charge types* 'c' as follows: 650,651,652; and

vi. C1 = the set of all monthly export transmission *charge types* 'c' as follows: 653.

6.20 Settlement Accounts

6.20.5 The *IESO* shall open and maintain the *IESO adjustment account*, which *account* shall operate as follows:

6.20.5.1 the *IESO adjustment account* shall be a single bank account established to receive and disburse payments related to penalties, damages, fines and payment adjustments arising from resolved *settlement* disputes, and to reimburse the *IESO* for any associated costs or expenses;

6.20.5.2 any amounts paid into the *IESO adjustment account* by *market participant*s shall first be applied to reimburse the *IESO* in respect of any costs or expenses described in section 6.20.5.1 which it has or will incur. Any remaining amount shall be credited to the *IESO adjustment account;* and

6.20.5.3 the *IESO Board* shall review, at least annually, the allocation of any credit balance of the *IESO adjustment account*, and may:

a. establish an amount to be retained in the *IESO adjustment account*;
b. direct that some or all of the credit balance be applied to special education projects or initiatives; and/or
c. direct that some or all of the balance be distributed to *market participants* on a basis to be determined by the *IESO ~~b~~Board*.