Final Alignment Supplementary: Incremental Amendments

Incremental Revisions from Provisionally Approved baseline	
Title:	Chapter 0.9 Appendices – Settlements and Billing
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).	

Appendix 9.2 - Data Inputs and Variables

1 General/Overview

1.1 In MR Ch.9, and the appendices thereto, the following variables have the following meanings:

1.1.1 In regards to *class r reserve*, the following are the three types of *class r reserve*:

1.1.1.1 'r1' is ~~spinning~~synchronized *ten-minute operating reserve*;

1.1.1.2 'r2' is non-~~spinning~~synchronized *ten-minute operating reserve*; and

1.1.1.3 'r3' is *thirty-minute operating reserve*.

1.1.3 In regards to operating region 'd', the following are the three types of operating regions:

a. 'd1' is the *pseudo-unit* operating region quantity for the *minimum loading point* operating region, as defined in MR Ch.7 App.7.5;

b. 'd2' is the *pseudo-unit* operating region quantity for the *dispatchable* operating region, as defined in MR Ch.7 App.7.5; and

c. 'd3' is the *pseudo-unit* operating region quantity for the duct firing operating region, as defined in MR Ch.7 App.7.5.

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3 Day-Ahead Market Variables, Data and Information

3.1 The *IESO* shall determine the following *day-ahead market energy market prices* and scheduled *energy* quantities from the set of results from the *day-ahead market calculation engine*, unless otherwise specified, and provide them directly to the *settlement process*:

3.1.1 $DAM\_QSI^{i}_{k,h}$ = quantity of *energy* (in MWh and up to 1 decimal place) scheduled for injection by *market participant* 'k' for an import transaction at *intertie metering point* 'i' in *settlement hour* 'h'.

3.1.2 $DAM\_QSI^{m}_{k,h}$ = quantity of *energy* (in MWh and up to 1 decimal place) scheduled for injection by *market participant* 'k' at *delivery point* 'm' in *settlement hour* 'h'.

3.1.3 $DAM\_QSI^{p}_{k,h}$ = quantity of *energy* (in MWh and up to 1 decimal place) scheduled for injection by *market participant* 'k' at *pseudo-unit delivery point* 'p' in *settlement hour* 'h'.

3.1.4 $DAM\_QSI^{c}_{k,h}$ = quantity of *energy* (in MWh and up to 1 decimal place) scheduled for injection by *market participant* 'k' at combustion turbine *resource delivery point* 'c' in *settlement hour* 'h'.

3.1.5 $DAM\_QSI^{s}_{k,h}$ = quantity of *energy* (in MWh and up to 1 decimal place) scheduled for injection by *market participant* 'k' at steam turbine *resource delivery point* 's' in *settlement hour* 'h'.

3.1.6 $DAM\_QVSI^{v}_{k,h}$ = quantity of *energy* (in MWh and up to 1 decimal place) scheduled for injection by *market participant* 'k' at *virtual zonal resource* 'v' in *settlement hour* 'h'.

3.1.7 $DAM\_QSW^{m}_{k,h}$ = quantity of *energy* scheduled (in MWh and up to 1 decimal place) for withdrawal by *market participant* 'k' at *delivery point* 'm' in *settlement hour* 'h'.

3.1.8 $DAM\_QSW^{i}_{k,h}$ = quantity of *energy* scheduled (in MWh and up to 1 decimal place) for withdrawal by *market participant* 'k' for an export transaction at *intertie metering point* 'i' in *settlement hour* 'h'.

3.1.9 $DAM\_HDR\_QSW^{m}_{k,h}$ = quantity of *energy* (in MWh and up to 1 decimal place) scheduled for withdrawal by *market participant* 'k' at physical *hourly demand response resource* 'm' in *settlement hour* 'h'.

3.1.10 $DAM\_QVSW^{v}_{k,h}$ = quantity of *energy* (in MWh and up to 1 decimal place) scheduled for withdrawal by *market participant* 'k' at *virtual zonal resource* 'v' in *settlement hour* 'h'.

3.1.11 $DAM\_QSW^{d}_{k,h}$ = quantity of *energy* (in MWh and up to 1 decimal place) scheduled for withdrawal by *market participant* 'k' at *hourly demand response resource* 'd' in *settlement hour* 'h'.

3.1.12 $DAM\_QSI^{i,p1}_{k,h}$ = quantity of *energy* (in MWh and up to 1 decimal place) scheduled for injection by *market participant* 'k' at *intertie metering point* 'i' in *settlement hour* 'h', as scheduled by Pass 1: Market Commitment and Market Power Mitigation.

3.1.13 $DAM\_QSI_{k,h}^{i,p2}$ = quantity of *energy* (in MWh and up to 1 decimal place) scheduled for injection by *market participant* 'k' at *intertie metering point* 'i' in *settlement hour* 'h', as scheduled by Pass 2: Reliability Scheduling and Commitment.

3.1.14 $ST\_Portion_{k,d}^{p}$ = the steam turbine *resource* portion (in %) of the *energy* calculated by the ~~*day-ahead market*~~applicable calculation engine as being attributed to the steam turbine *resource* for *market participant* 'k' at *pseudo-unit delivery point* 'p' in operating region 'd'.

3.1.15 $DAM\_LMP_{h}^{z}$ = the *day-ahead market Ontario zonal price* for *energy* (in $/MWh and up to 2 decimal places) at electrical zone 'z' in *settlement hour* 'h', where the relevant electrical zone is Ontario.

3.1.16 $DAM\_LMP_{h}^{m}$ = the *day-ahead market locational marginal price* for *energy* (in $/MWh and up to 2 decimal places) at *delivery point* 'm' in *settlement hour* 'h'.

3.1.17 $DAM\_LMP_{h}^{c}$ = the *day-ahead market locational marginal price* for *energy* (in $/MWh and up to 2 decimal places) at combustion turbine *resource delivery point* 'c' in *settlement hour* 'h'.

3.1.18 $DAM\_LMP_{h}^{s}$ = the *day-ahead market locational marginal price* for *energy* (in $/MWh and up to 2 decimal places) at steam turbine *resource delivery point* 's' in *settlement hour* 'h'.

3.1.19 $DAM\_LMP_{h}^{i}$ = the *day-ahead market locational marginal price* for *energy* (in $/MWh and up to 2 decimal places) at *intertie metering point* 'i' in *settlement hour* 'h'.

3.1.20 $DAM\_LMP_{h}^{vz}$ = the *day-ahead market virtual zonal price* for *energy* (in $/MWh and up to 2 decimal places) at *virtual transaction zone* 'vz' in *settlement hour* 'h'.

3.1.21 $DAM\_PEC_{h}^{i}$ = the external congestion component (in $/MWh and up to 2 decimal places) of the *day-ahead market locational marginal price* at *intertie metering point* 'i' in *settlement hour* 'h'.

3.1.22 $DAM\_PNISL_{h}^{i}$ = the net interchange scheduling limit component (in $/MWh and up to 2 decimal places) of the *day-ahead market locational marginal price* at *intertie metering point* 'i' in *settlement hour* 'h'.

3.2 The *IESO* shall, for each of the three types "r" of *class r reserves*, determine the following *day-ahead market operating reserve market prices* and scheduled *operating reserve* quantities from the set of results from the *day-ahead market calculation engine*, unless otherwise specified, and provide them directly to the *settlement process*:

3.2.1 $DAM\_QSOR^{m}_{r,k,h}$=scheduled quantity (in MWh and up to 1 decimal place) of *class r reserve* for *market participant* 'k' at *delivery point* 'm' in *settlement hour* 'h', where r1, r2, and r3 are all applicable.

3.2.2 $DAM\_QSOR^{i}_{r,k,h}$= scheduled quantity (in MWh and up to 1 decimal place) of *class r reserve* for *market participant* 'k' at *intertie metering point* 'i' in *settlement hour* 'h' described in the *day-ahead schedule*, where only r2 and r3 are applicable.

3.2.3 $DAM\_QSOR^{c}_{r,k,h}$ = scheduled quantity (in MWh and up to 1 decimal place) of *class r reserve* for *market participant* 'k' at combustion turbine *resource delivery point* 'c' in *settlement hour* 'h' described in the *day-ahead schedule,* where r1, r2, and r3 are all applicable.

3.2.4 $DAM\_QSOR^{p}_{r,k,h}$ = scheduled quantity (in MWh and up to 1 decimal place) of *class r reserve* for *market participant* 'k' at *pseudo-unit delivery point* 'p' in *settlement hour* 'h' described in the *day-ahead schedule,* where r1, r2, and r3 are all applicable.

3.2.5 $DAM\_QSOR^{s}_{r,k,h}$ = scheduled quantity (in MWh and up to 1 decimal place) of *class r reserve* for *market participant* 'k' at steam turbine *resource delivery point* 's' in *settlement hour* 'h' described in the *day-ahead schedule,* where r1, r2, and r3 are all applicable.

3.2.6 $DAM\_QSOR^{i,p1}_{r,k,h}$ = scheduled quantity (in MWh and up to 1 decimal place) of *class r reserve* for *market participant* 'k' at *intertie metering point* 'i' in *settlement hour* 'h', as scheduled by Pass 1: Market Commitment and Market Power Mitigation, where r1, r2, and r3 are all applicable.

3.2.7 $DAM\_QSOR^{i,p2}_{r,k,h}$ = scheduled quantity (in MWh and up to 1 decimal place) of *class r reserve* for *market participant* 'k' at *intertie metering point* 'i' in *settlement hour* 'h', as scheduled by Pass 2: Reliability Scheduling and Commitment, where r1, r2, and r3 are all applicable.

3.2.8 $DAM\_PROR^{m}_{r,h}$ = the *day-ahead market locational marginal price* (in $/MWh and up to 2 decimal places) of *class r reserve* at *delivery point* 'm' in *settlement hour* 'h', where r1, r2, and r3 are all applicable.

3.2.9 $DAM\_PROR^{c}_{r,h}$ = the *day-ahead market locational marginal price* (in $/MWh and up to 2 decimal places) of *class r reserve* at combustion turbine *resource delivery point* 'c' in *settlement hour* 'h', where r1, r2, and r3 are all applicable.

3.2.10 $DAM\_PROR^{s}_{r,h}$ = the *day-ahead market locational marginal price* (in $/MWh and up to 2 decimal places) of *class r reserve* at steam turbine *resource delivery point* 's' in *settlement hour* 'h', where r1, r2, and r3 are all applicable.

3.2.11 $DAM\_PROR^{i}_{r,h}$ = the *day-ahead market locational marginal price* (in $/MWh and up to 2 decimal places) of *class r reserve* at *intertie metering point* 'i' in *settlement hour* 'h', where only r2 and r3 are applicable.

3.3 The *IESO* shall provide the following *dispatch data* directly to the *settlement process*:

3.3.1 $DAM\_BE^{m}_{k,h}$ = *energy offers* submitted in the *day-ahead market*, represented as an N-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at *delivery point* 'm' for *settlement hour* 'h' arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' (in $ and up to 2 decimal places) are in column 1 and *offered* quantities 'Q' (in MWh and up to 1 decimal place) are in column 2, as may be replaced by the *IESO* pursuant to MR Ch.7 App.7.5.

3.3.2 $DAM\_BE^{i}_{k,h}$ = *energy offers* submitted in the *day-ahead market*, represented as an N-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at *intertie metering point* 'i' for *settlement hour* 'h' arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' (in $ and up to 2 decimal places) are in column 1 and *offered* quantities 'Q' (in MWh and up to 1 decimal place) are in column 2.

3.3.3 $DAM\_BE^{p}_{k,h}$ = *energy offers* submitted in the *day-ahead market*, represented as an N-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at *pseudo-unit delivery point* 'p' for *settlement hour* 'h' arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' (in $ and up to 2 decimal places) are in column 1 and *offered* quantities 'Q' (in MWh and up to 1 decimal place)are in column 2, as may be replaced by the *IESO* pursuant to MR Ch.7 App.7.5.

3.3.4 $DAM\_BE\_SU^{m}_{k,h}$ = *start-up offer* submitted in the *day-ahead market* (in $/start and up to 2 decimal places) for the first *settlement hour* 'h' of the *day-ahead operational commitment* at *delivery point* 'm' for *market participant* 'k', as may be replaced by the *IESO* pursuant to MR Ch.7 App.7.5.

3.3.5 $DAM\_BE\_SU^{p}_{k,h}$ = *start-up offer* submitted in the *day-ahead market* (in $/start and up to 2 decimal places) for the first *settlement hour* 'h' of the *day-ahead operational commitment* at *pseudo-unit delivery point* 'p' for *market participant* 'k', as may be replaced by the *IESO* pursuant to MR Ch.7 App.7.5.

3.3.6 $DAM\_BE\_SU^{m}_{k,f}$ = *start-up offer* submitted in the *day-ahead market* (in $/start and up to 2 decimal places) at *delivery point* 'm' for *market participant* 'k' committed by the *day-ahead market calculation engine* for the *day-ahead operational commitment* that bridges with the *pre-dispatch operational commitment* that *generator failure* 'f' occurred in, as may be replaced by the *IESO* pursuant to MR Ch.7 App.7.5.

3.3.7 $DAM\_BE\_SU^{p}_{k,f}$ = *start-up offer* submitted in the *day-ahead market* (in $/start and up to 2 decimal places) at *pseudo-unit delivery point* 'p' for *market*

participant 'k' committed by the *day-ahead market calculation engine* for the *day-ahead operational commitment* that bridges with the *pre-dispatch operational commitment* that the combustion turbine *resource generator failure* 'f' occurred in, as may be replaced by the *IESO* pursuant to MR Ch.7 App.7.5.

3.3.8 $DAM\_BE\_SNL^{m}_{k,h}$ = *speed no-load offer* submitted in the *day-ahead market* (in $/start and up to 2 decimal places), subject to pro-rata reduction based on $N^{m}_{k,h}$, for *settlement hour* 'h' at *delivery point* 'm' for *market participant* 'k', as may be replaced by the *IESO* pursuant to MR Ch.7 App.7.5, where:

$N^{m}_{k,h}$ = the number of 5-minute *metering intervals* that *market participant* 'k' was injecting *energy* at *delivery point* 'm' within the *settlement hour* 'h'.

3.3.9 $DAM\_BE\_SNL^{p}_{k,h}$ = *speed no-load offer* submitted in the *day-ahead market* (in $/start and up to 2 decimal places) for *settlement hour* 'h' at *pseudo-unit delivery point* 'p' for *market participant* 'k', as may be replaced by the *IESO* pursuant to MR Ch.7 App.7.5.

3.3.10 $DAM\_BL^{m}_{k,h}$ = *energy bids* submitted in the *day-ahead market*, represented as an N-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at *delivery point* 'm' for *settlement hour* 'h' arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' (in $ and up to 2 decimal places)are in column 1 and *offered* quantities 'Q' (in MWh and up to 1 decimal place) are in column 2.

3.3.11 $DAM\_BL^{i}_{k,h}$ = *energy bids* submitted in the *day-ahead market*, represented as an N-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at *intertie metering point* 'i' for *settlement hour* 'h' arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' (in $ and up to 2 decimal places) are in column 1 and *offered* quantities 'Q' (in MWh and up to 1 decimal place) are in column 2.

3.3.12 $DAM\_HDR\_BL^{m}_{k,h}$ = *energy bids* submitted in the *day-ahead market*, represented as an N-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at physical *hourly demand response resource* 'm' for *settlement hour* 'h' arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' (in $ and up to 2 decimal places) are in column 1 and *offered* quantities 'Q' (in MWh and up to 1 decimal place) are in column 2.

3.3.13 $DAM\_BOR^{m}_{r,k,h}$ = *class r reserve offers* submitted in the *day-ahead market*, represented as an N-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at *delivery point* 'm' for *settlement hour* 'h' arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' (in $ and up to 2 decimal places) are in column 1 and *offered* quantities 'Q' (in MWh and up to 1 decimal place) are in column 2, where r1, r2, and r3 are all applicable, as may be replaced by the *IESO* pursuant to MR Ch.7 App.7.5.

3.3.14 $DAM\_BOR^{i}_{r,k,h}$ = *Class r reserve offers* submitted in the *day-ahead market*, represented as an N-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at *intertie metering point* 'i' for *settlement hour* 'h' arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' (in $ and up to 2 decimal places) are in column 1 and *offered* quantities 'Q' (in MWh and up to 1 decimal place) are in column 2, where only r2 and r3 are applicable.

3.3.15 $DAM\_BOR^{p}_{r,k,h}$ = *Class r reserve offers* submitted in the *day-ahead market* by *market participant* 'k' for *pseudo-unit delivery point* 'p' for *settlement hour* 'h', represented as an M-by-2 matrix (where M is M^{p}_{k}) of *price-quantity pairs* arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' (in $ and up to 2 decimal places) are in column 1 and *offered* quantities 'Q' (in MWh and up to 1 decimal place) are in column 2, where r1, r2, and r3 are all applicable, as may be replaced by the *IESO* pursuant to MR Ch.7 App.7.5.

3.3.16 MLP^{m}_{k} = *minimum loading point* (in MW and up to 1 decimal place) for a *resource* at *delivery point* 'm' for *market participant* 'k'.

3.3.17 MLP^{c}_{k} = *minimum loading point* (in MW and up to 1 decimal place) for a combustion turbine ~~*generation unit*~~*resource* at combustion turbine *resource delivery point* 'c' for *market participant* 'k'.

3.3.18 MLP^{s}_{k} = *minimum loading point* (in MW and up to 1 decimal place) for a steam turbine ~~*generation unit*~~*resource* at steam turbine *resource delivery point* 's' for *market participant* 'k'.

3.3.19 MLP^{p}_{k} = *minimum loading point* (in MW and up to 1 decimal place) for a *pseudo-unit* at *pseudo-unit delivery point* 'p' for *market participant* 'k'.

3.4 The *IESO* shall determine the following *day-ahead market* data in accordance with the following formulations, and provide them directly to the *settlement process*:

3.4.1 $DAM\_EOP^{m}_{k,h}$ = the *day-ahead market* economic operating point of *energy* for *market participant* 'k' at *delivery point* 'm' in *settlement hour* 'h', and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.2.6.

3.4.2 $DAM\_EOP^{i}_{k,h}$= the *day-ahead market* economic operating point of *energy* for *market participant* 'k' at *intertie metering point* 'i' in *settlement hour* 'h', and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.2.6.

3.4.3 $DAM\_EOP^{p}_{k,h}$= the *day-ahead market* economic operating point of *energy* for *market participant* 'k' at *pseudo-unit delivery point* 'p' in *settlement hour* 'h', and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.2.6.

3.4.4 $DAM\_EOP^{c}_{k,h}$= the *day-ahead market* economic operating point of *energy* for *market participant* 'k' at combustion turbine *resource delivery point* 'c' in *settlement hour* 'h', and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.2.6.

3.4.5 $DAM\_OR\_EOP^{i}_{r,k,h}$= the *day-ahead market* economic operating point of *class r reserve* for *market participant* 'k' at *intertie metering point* 'i' in *settlement hour* 'h', where ~~r1,~~only r2~~,~~ and r3 are ~~all~~ applicable, and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.2.6.

3.4.6 $DAM\_OR\_EOP^{s}_{r,k,h}$= the *day-ahead market* economic operating point of *class r reserve* for *market participant* 'k' at steam turbine *resource delivery point* 's' in *settlement hour* 'h', where r1, r2, and r3 are all applicable, and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.2.6.

3.4.7 $DAM\_OR\_EOP^{c}_{r,k,h}$= the *day-ahead market* economic operating point of *class r reserve* for *market participant* 'k' at combustion turbine *resource delivery point* 'c' for *settlement hour* 'h', where r1, r2, and r3 are all applicable, and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.2.6.

3.4.8 $DAM\_OR\_EOP^{m}_{r,k,h}$= the *day-ahead market* economic operating point of *class r reserve* for *market participant* 'k' at *delivery point* 'm' in *settlement hour* 'h', where r1, r2, and r3 are all applicable, and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.2.6.

3.4.9 $DAM\_OR\_EOP^{p}_{r,k,h}$ = the *day-ahead market* economic operating point of *class r reserve* for *market participant* 'k' at *pseudo-unit delivery point* 'p' in *settlement hour* 'h', where r1, r2, and r3 are all applicable, and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.2.6.

3.4.10 $DAM\_DIPC^{c}_{k,h}$ = the *day-ahead market energy* price curve for a *non-quick start resource* for *market participant* 'k' at combustion turbine *resource delivery point* 'c' in *settlement hour* 'h', and determined in accordance with Appendix 9.3.

3.4.11 $DAM\_DIPC^{s}_{k,h}$ = the *day-ahead market energy* price curve for a *non-quick start resource*, for *market participant* 'k' at steam turbine *resource delivery point* 's' in *settlement hour* 'h', and determined in accordance with Appendix 9.3.

3.4.12 $DAM\_DIGQ^{s}_{k,h}$ = the portion of the *day-ahead market schedule* quantity of *energy* scheduled for injection for *market participant* 'k' at steam turbine *resource delivery point* 's' in *settlement hour* 'h', and determined in accordance with Appendix 9.3.

3.4.13 $DAM\_EOP\_DIGQ^{s}_{k,h}$ = the *day-ahead market* economic operating point of the portion of the *day-ahead market schedule* quantity of *energy* scheduled for

injection for *market participant* 'k' at steam turbine *resource delivery point* 's' in *settlement hour* 'h', and determined in accordance with Appendix 9.3.

3.4.14 $DAM\_OR\_DIPC^{c}_{r,k,h}$ = the *day-ahead market class r reserve* price curve for a *non-quick start resource* for *market participant* 'k' at combustion turbine *resource delivery point* 'c' during *settlement hour* 'h', and determined in accordance with Appendix 9.3.

3.4.15 $DAM\_OR\_DIPC^{s}_{r,k,h}$= the *day-ahead market class r reserve* price curve for a *non-quick start resource* for *market participant* 'k' at steam turbine *resource delivery point* 's' during *settlement hour* 'h', and determined in accordance with Appendix 9.3.

3.4.16 $DAM\_STP\_QSI^{p}_{k,h}$ = the steam turbine *resource* portion of the *day-ahead schedule* of *energy* for injection (in MWh and up to 1 decimal place) for *market participant* 'k' at *pseudo-unit delivery point* 'p' in *settlement hour* 'h', and derived as the difference between $DAM\_QSI^{p}_{k,h}$ and $DAM\_QSI^{c}_{k,h}$.

4 Pre-Dispatch Variables, Data and Information

4.1 The *IESO* shall determine the following pre-dispatch *energy market prices* and scheduled *energy* quantities from the last valid set of results from the *pre-dispatch calculation engine,* unless otherwise specified*,* and provide them directly to the *settlement process*:

4.1.1 $PD\_QSI^{i}_{k,h}$ = pre-dispatch quantity of *energy* scheduled for injection (in MWh and up to 1 decimal place) by *market participant* 'k' at *intertie metering point* 'i' in *settlement hour* 'h' by pre-dispatch run 'pd1'.

4.1.2 $PD\_QSI^{m,pdm}_{k,h}$ = pre-dispatch quantity of *energy* scheduled for injection (in MWh and up to 1 decimal place) by *market participant* 'k' at *delivery point* 'm' in *settlement hour* 'h' for pre-dispatch run 'pdm'.

4.1.3 $PD\_QSI^{p,pdm}_{k,h}$ = *pre-dispatch schedule* quantity of *energy* (in MWh and up to 1 decimal place) scheduled for injection by pre-dispatch run 'pdm' for *market participant* 'k' at *pseudo-unit delivery point* 'p' in *settlement hour* 'h'.

4.1.4 $PD\_QSI^{c,pdm}_{k,h}$ = *pre-dispatch schedule* quantity of *energy* (in MWh and up to 1 decimal place) scheduled for injection by pre-dispatch run 'pdm' for *market participant* 'k' at combustion turbine *resource delivery point* 'p' in *settlement hour* 'h'.

4.1.5 $PD\_QSW^{i}_{k,h}$ = pre-dispatch quantity of *energy* scheduled for withdrawal (in MWh and up to 1 decimal place) by *market participant* 'k' at *intertie metering point* 'i' in *settlement hour* 'h'.

4.1.6 $PD\_LMP_h^{m,pd1}$ = *pre-dispatch locational marginal price* for *energy* (in $/MWh and up to 2 decimal places) at *delivery point* 'm' in *settlement hour* 'h' for pre-dispatch run 'pd1'.

4.1.7 $PD\_LMP_h^{m,pdm}$ = *pre-dispatch locational marginal price* for *energy* (in $/MWh and up to 2 decimal places) at *delivery point* 'm' in *settlement hour* 'h' for pre-dispatch run 'pdm'.

4.1.8 $PD\_LMP_h^{c,pd1}$ = pre-dispatch *locational marginal price* for *energy* (in $/MWh and up to 2 decimal places) at combustion turbine *resource delivery point* 'c' in *settlement hour* 'h' for pre-dispatch run 'pd1'.

4.1.9 $PD\_LMP_h^{c,pdm}$ = pre-dispatch *locational marginal price* for *energy* (in $/MWh and up to 2 decimal places) at combustion turbine *resource delivery point* 'c' in *settlement hour* 'h' for pre-dispatch run 'pdm'.

4.1.10 $PD\_LMP_h^{s,pdm}$ = pre-dispatch *locational marginal price* for *energy* (in $/MWh and up to 2 decimal places) at steam turbine *resource delivery point* 's' in *settlement hour* 'h' for pre-dispatch run 'pdm'.

4.1.11 $PD\_LMP_h^{i}$ = pre-dispatch *locational marginal price* for *energy* (in $/MWh and up to 2 decimal places) at *intertie metering point* 'i' in *settlement hour* 'h'.

4.1.12 $PD\_IBP_h^{i}$ = the pre-dispatch *intertie border price* for *energy* (in $/MWh and up to 2 decimal places) at *intertie metering point* 'i' in *settlement hour* 'h'.

4.2 The *IESO* shall provide directly to the *settlement process*:

4.2.1 $PD\_BE_{k,h}^{m,pdm}$ = *energy offer* submitted in the *pre-dispatch process*, represented as an N-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at *delivery point* 'm' for *settlement hour* 'h' in a given pre-dispatch run 'pdm', arranged in ascending order by the *offered* price in each price-quantity pair where *offered* prices 'P' (in $ and up to 2 decimal places) are in column 1 and *offered* quantities 'Q' (in MWh and up to 1 decimal place) are in column 2.

4.2.2 $PD\_BE_{k,h}^{p,pdm}$ = *energy offer* submitted in pre-dispatch run 'pdm' by *market participant* 'k' at *pseudo-unit delivery point* 'p' for *settlement hour* 'h', represented as an M-by-2 matrix (where M is M_k^p) of *price-quantity pairs* arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' (in $ and up to 2 decimal places) are in column 1 and *offered* quantities 'Q' (in MWh and up to 1 decimal place) are in column 2.

4.2.3 $PD\_BE\_SU_{k,h}^{m}$ = *start-up offer* submitted in the *pre-dispatch process* (in $/start and up to 2 decimal places) for the first *settlement hour* 'h' of the *pre-dispatch operational commitment* at *delivery point* 'm' for *market participant* 'k'.

4.2.4 $PD\_BE\_SU_{k,h}^{p}$ = *start-up offer* submitted in the *pre-dispatch process* (in $/start and up to 2 decimal places) for the first *settlement hour* 'h' of the *pre-dispatch operational commitment* at *pseudo-unit* 'p' for *market participant* 'k'.

4.2.5 $PD\_BE\_SU_{k,f}^{p,pdm}$ = *start-up offer* submitted in the *pre-dispatch process* (in $/start and up to 2 decimal places) at *pseudo-unit* 'p' for *market participant* 'k' for the first *settlement hour* 'h' of the *pre-dispatch operational commitment* committed by the *pre-dispatch calculation engine* in pre-dispatch run 'pdm' that the *generator failure* 'f' occurred in.

4.2.6 $PD\_BE\_SU_{k,f}^{m,pdm}$ = *start-up offer* submitted in the *pre-dispatch process* (in $/start and up to 2 decimal places) at *delivery point* 'm' for *market participant* 'k' committed by the *pre-dispatch calculation engine* in pre-dispatch run 'pdm' that the *generator failure* 'f' occurred in.

4.2.7 $PD\_BE\_SNL_{k,h}^{m}$ = *speed no-load offer* submitted in the *pre-dispatch process* (in ~~$)~~$ and up to 2 decimal places) for *settlement hour* 'h' at *delivery point* 'm' for *market participant* 'k'.

4.2.8 $PD\_BE\_SNL_{k,h}^{p}$ = *speed no-load offer* submitted in the *pre-dispatch process* (in ~~$)~~$ and up to 2 decimal places) for *settlement hour* 'h' at *pseudo-unit delivery point* 'p' for *market participant* 'k'.

4.2.9 $PD\_BE\_SNL_{k,h}^{m,pdm}$ = *speed no-load offer* submitted in pre-dispatch run 'pdm' (in $~~)~~ and up to 2 decimal places) for *settlement hour* 'h' at *delivery point* 'm' for *market participant* 'k'.

4.2.10 $PD\_BE\_SNL_{k,h}^{p,pdm}$ = *speed no-load offer* submitted in pre-dispatch run 'pdm' (in $ and up to 2 decimal places) for *settlement hour* 'h' at *pseudo-unit delivery point* 'p' for *market participant* 'k'.

4.3 The *IESO* shall determine the following pre-dispatch data in accordance with the following formulations, and provide them directly to the *settlement process*:

4.3.1 $PD\_STP\_QSI_{k,h}^{p,pdm}$ = the steam turbine *resource* portion of the *pre-dispatch schedule* of *energy* for injection (in MWh and up to 1 decimal place) from pre-dispatch run 'pdm' for *market participant* 'k' at *pseudo-unit delivery point* 'p' in *settlement hour* 'h', and derived as the difference between $PD\_QSI_{k,h}^{p,pdm}$ and $PD\_QSI_{k,h}^{c,pdm}$.

4.3.2 $PD\_DIPC_{k,h}^{c,t}$ = *generator failure* charge – guarantee cost component *energy* price curve of a *GOG-eligible resource* for *market participant* 'k' at combustion turbine *resource delivery point* 'c' during *metering interval* 't' of *settlement hour* 'h', and determined in accordance with Appendix 9.3.

4.3.3 $PD\_DIPC_{k,h}^{s,t}$ = *generator failure* charge – guarantee cost component *energy* price curve of a *GOG-eligible resource* for *market participant* 'k' at steam turbine *resource delivery point* 's' during *metering interval* 't' of *settlement hour* 'h', and determined in accordance with Appendix 9.3.

4.3.4 $PD\_DIGQ_{k,h}^{s,t}$ = the *generator failure* charge – guarantee cost component portion of the *pre-dispatch schedule* quantity of *energy* of a *GOG-eligible resource* scheduled for injection for *market participant* 'k' at *steam turbine resource* 's' during *metering interval* 't' of *settlement hour* 'h', and determined in accordance with Appendix 9.3.

5 Real-Time Market Variables, Data and Information

5.1 The *IESO* shall determine the following *real-time market energy market prices* from the set of results from the *real-time calculation engine*, unless otherwise specified, and scheduled *energy* quantities from the *real-time schedules*~~, as may be modified by the *IESO*,~~ and provide them directly to the *settlement process*:

5.1.1 $RT\_QSI_{k,h}^{m,t}$ = quantity of *energy* scheduled for injection (in MWh and up to 1 decimal place) in the *real-time market* by *market participant* 'k' at *delivery point* 'm' in *metering interval* 't' of *settlement hour* 'h'.

5.1.2 $RT\_QSI_{k,h}^{c,t}$ = quantity of *energy* scheduled for injection (in MWh and up to 1 decimal place) in the *real-time market* by *market participant* 'k' at combustion turbine *resource delivery point* 'c' in *metering interval* 't' of *settlement hour* 'h'.

5.1.3 $RT\_QSI_{k,h}^{p}$ = quantity of *energy* (in MWh and up to 1 decimal place) scheduled for injection by *market participant* 'k' at *pseudo-unit delivery point* 'p' in *settlement hour* 'h'.

5.1.4 $RT\_QSW_{k,h}^{m,t}$ = quantity of *energy* scheduled for withdrawal (in MWh and up to 1 decimal place) in the *real-time market* by *market participant* 'k' at *delivery point* 'm' in *metering interval* 't' of *settlement hour* 'h'.

5.1.5 ~~$RT\_ST\_Portion_{k,h,d}^{p,t}$~~ $ST\_Portion\_INT_{k,h,d}^{p,t}$ = the real-time steam turbine *resource* portion (in %) of the *energy* calculated by the *real-time calculation engine* as being attributed to the steam turbine *resource* in *metering interval* 't' of *settlement hour* 'h' for *market participant* 'k' at *pseudo-unit delivery point* 'p' in operating region '~~d~~d1'.

5.1.6 $SQEW_{k,h}^{i,t}$ = quantity of *energy* scheduled for withdrawal (in MWh and up to 1 decimal place) in the *real-time market* by *market participant* 'k' at *intertie*

metering point 'i' in *metering interval* 't' of *settlement hour* 'h', as described in the *interchange schedule*.

5.1.7 $SQEI_{k,h}^{i,t}$ = quantity of *energy* scheduled for injection (in MWh and up to 1 decimal place) in the *real-time market* by *market participant* 'k' at *intertie metering point* 'i' in *metering interval* 't' of *settlement hour* 'h', as described in the *interchange schedule*.

5.1.8 $RT\_LMP_h^{m,t}$ = the *real-time market locational marginal price* for *energy* (in $/MWh and up to 2 decimal places) at *delivery point* 'm' in *metering interval* 't' of *settlement hour* 'h'.

5.1.9 $RT\_LMP_h^{z}$ = the *real-time market Ontario zonal price* for *energy* (in $/MWh and up to 2 decimal places) at electrical zone 'z' in *settlement hour* 'h', where the relevant electrical zone is Ontario.

5.1.10 $RT\_LMP_h^{vz,t}$ = the *real-time market locational marginal price* for *energy* (in $/MWh and up to 2 decimal places) at *virtual transaction zone* 'vz' in *metering interval* 't' of *settlement hour* 'h'.

5.1.~~10~~11 $RT\_LMP_h^{d,t}$ = the *real-time market locational marginal price* for *energy* (in $/MWh and up to 2 decimal places) at *hourly demand response resource* 'd' in *metering interval* 't' of *settlement hour* 'h'.

5.1.~~11~~12 $RT\_LMP_h^{c,t}$ = the *real-time market locational marginal price* for *energy* (in $/MWh and up to 2 decimal places) at combustion turbine *resource delivery point* 'c' in *metering interval* 't' of *settlement hour* 'h'.

5.1.~~12~~13 $RT\_LMP_h^{s,t}$ = the *real-time market locational marginal price* for *energy* (in $/MWh and up to 2 decimal places) at steam turbine *resource delivery point* 's' in *metering interval* 't' of *settlement hour* 'h'.

5.1.~~13~~14 $RT\_LMP_h^{i,t}$ = the *real-time market locational marginal price* for *energy* (in $/MWh and up to 2 decimal places) at *intertie metering point* 'i' in *metering interval* 't' of *settlement hour* 'h'.

5.1.~~14~~15 $RT\_PEC_h^{i,t}$ = the *real-time market* price of external congestion component (in $/MWh and up to 2 decimal places) of the *locational marginal price* at *intertie metering point* 'i' in *metering interval* 't' of *settlement hour* 'h'.

5.1.~~15~~16 $RT\_PNISL_h^{i,t}$ = the *real-time market* price of the net interchange scheduling limit component (in $/MWh and up to 2 decimal places) of the *locational marginal price* at *intertie metering point* 'i' in *metering interval* 't' of *settlement hour* 'h'.

5.1.~~16~~17 $RT\_IBP_h^{i,t}$ = the *real-time market intertie border price* for *energy* (in $/MWh and up to 2 decimal places) at *intertie metering point* 'i' in *metering interval* 't' of *settlement hour* 'h'.

5.2 The *IESO* shall provide the following *dispatch data* directly to the *settlement process*:

5.2.1 $BE_{k,h}^{m,t}$ = *energy offers* submitted in the *real-time market*, represented as an N-by-2 matrix of *price-quantity pairs* at *delivery point* 'm' for *market participant* 'k' for *metering interval* 't' of *settlement hour* 'h', arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' (in $ and up to 2 decimal places) are in column 1 and *offered* quantities 'Q' (in MWh and up to 1 decimal place) are in column 2, as may be replaced by the *IESO* pursuant to MR Ch.7 App.7.5A.

5.2.2 $BE_{k,h}^{i,t}$ = *energy offers* submitted in the *real-time market*, represented as an N-by-2 matrix of *price-quantity pairs* at *intertie metering point* 'i' for *market participant* 'k' for *metering interval* 't' of *settlement hour* 'h', arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' (in $ and up to 2 decimal places) are in column 1 and *offered* quantities 'Q' (in MWh and up to 1 decimal place) are in column 2.

5.2.3 $BE_{k,h}^{p,t}$ = *energy offers* submitted in the *real-time market*, represented as an N-by-2 matrix of *price-quantity pairs* at *pseudo-unit delivery point* 'p' for *market participant* 'k' for *metering interval* 't' of *settlement hour* 'h', arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' (in $ and up to 2 decimal places) are in column 1 and *offered* quantities 'Q' (in MWh and up to 1 decimal place) are in column 2, as may be replaced by the *IESO* pursuant to MR Ch.7 App.7.5A.

5.2.4 $BL_{k,h}^{m,t}$ = *energy bids* submitted in the *real-time market*, represented as an N-by-2 matrix of *price-quantity pairs* at *delivery point* 'm' for *market participant* 'k' for *metering interval* 't' of *settlement hour* 'h', arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' (in $ and up to 2 decimal places) are in column 1 and *offered* quantities 'Q' (in MWh and up to 1 decimal place) are in column 2.

5.2.5 $BL_{k,h}^{i,t}$ = *energy bids* submitted in the *real-time market*, represented as an N-by-2 matrix of *price-quantity pairs* at *intertie metering point* 'i' for *market participant* 'k' for *metering interval* 't' of *settlement hour* 'h', arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' (in $ and up to 2 decimal places) are in column 1 and *offered* quantities 'Q' (in MWh and up to 1 decimal place) are in column 2.

5.2.6 $BOR_{r,k,h}^{m,t}$ = *class r reserve offers* submitted in the *real-time market*, represented as an N-by-2 matrix of *price-quantity pairs* at *delivery point* 'm' for *market participant* 'k' for *metering interval* 't' of *settlement hour* 'h', arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' (in $ and up to 2 decimal places) are in column 1 and *offered* quantities 'Q' (in MWh and up to 1 decimal place) are in column 2, where r1, r2, and r3 are all applicable, as may be replaced by the *IESO* pursuant to MR Ch.7 App.7.5A.

5.2.7 $BOR_{r,k,h}^{i,t}$ = *class r reserve offers* submitted in the *real-time market*, represented as an N-by-2 matrix of *price-quantity pairs* at *intertie metering point* 'i' for *market participant* 'k' for *metering interval* 't' of *settlement hour* 'h', arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' (in $ and up to 2 decimal places) are in column 1 and *offered* quantities 'Q' (in MWh and up to 1 decimal place) are in column 2, where only r2 and r3 are applicable.

5.2.8 $BOR_{r,k,h}^{p,t}$ = *class r reserve offers* submitted in the *real-time market*, represented as an N-by-2 matrix of *price-quantity pairs* at *pseudo-unit delivery point* 'p' for *market participant* 'k' for *metering interval* 't' of *settlement hour* 'h', arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' (in $ and up to 2 decimal places) are in column 1 and *offered* quantities 'Q' (in MWh and up to 1 decimal place) are in column 2, where r1, r2, and r3 are all applicable, as may be replaced by the *IESO* pursuant to MR Ch.7 App.7.5A.

5.2.9 $RT\_GOG\_SU_{k,h}^{m}$ = *start-up offer* submitted in the *real-time market* (in $/start and up to 2 decimal places) for the real-time *generator offer* guarantee *settlement amount*, at *delivery point* 'm' for *market participant* 'k' in *settlement hour* 'h', as may be replaced by the *IESO* pursuant to MR Ch.7 App.7.5A.

5.3 The *IESO* shall, for each of the three types "r" of *class r reserves,* determine the following *real-time market operating reserve market prices* from the set of results from the *real-time calculation engine*, unless otherwise specified, and scheduled *operating reserve* quantities from the *real-time schedules* and provide them directly to the *settlement process*:

5.3.1 $RT\_PROR_{r,h}^{m,t}$ = the *real-time market locational marginal price* (in $/MWh and up to 2 decimal places) of *class r reserve* at *delivery point* 'm' in *metering interval* 't' of *settlement hour* 'h', where r1, r2, and r3 are all applicable.

5.3.2 $RT\_PROR_{r,h}^{c,t}$ = the *real-time market locational marginal price* (in $/MWh and up to 2 decimal places) of *class r reserve* at combustion turbine *resource delivery point* 'c' in *metering interval* 't' of *settlement hour* 'h', where r1, r2, and r3 are all applicable.

5.3.3 $RT\_PROR_{r,h}^{s,t}$ = the *real-time market locational marginal price* (in $/MWh and up to 2 decimal places) of *class r reserve* at steam turbine *resource delivery point* 's' in *metering interval* 't' of *settlement hour* 'h', where r1, r2, and r3 are all applicable.

5.3.4 $RT\_PROR_{r,h}^{i,t}$ = the *real-time market locational marginal price* (in $/MWh and up to 2 decimal places) of *class r reserve* at *intertie metering point* 'i' in *metering interval* 't' of *settlement hour* 'h', where only r2 and r3 are applicable.

5.3.5 $RT\_QSOR^{m,t}_{r,k,h}$ = scheduled quantity (in MWh and up to 1 decimal place) of *class r reserve* in the *real-time market* at *delivery point* 'm' for *market participant* 'k' in *metering interval* 't' of *settlement hour* 'h', where r1, r2, and r3 are all applicable.

5.3.6 $RT\_QSOR^{c,t}_{r,k,h}$ = scheduled quantity (in MWh and up to 1 decimal place) of *class r reserve* in the *real-time market* at combustion turbine *resource delivery point* 'm' for *market participant* 'k' in *metering interval* 't' of *settlement hour* 'h', where r1, r2, and r3 are all applicable.

5.3.7 $RT\_QSOR^{s,t}_{r,k,h}$ = scheduled quantity (in MWh and up to 1 decimal place) of *class r reserve* in the *real-time market* at steam turbine *resource delivery point* 's' for *market participant* 'k' in *metering interval* 't' of *settlement hour* 'h', where r1, r2, and r3 are all applicable.

5.3.8 $RT\_QSOR^{p,t}_{r,k,h}$ = scheduled quantity (in MWh and up to 1 decimal place) of *class r reserve* in the *real-time market* at *pseudo-unit delivery point* 'p' for *market participant* 'k' in *metering interval* 't' of *settlement hour* 'h', where r1, r2, and r3 are all applicable.

5.3.9 $RT\_QSOR^{i,t}_{r,k,h}$ = scheduled quantity (in MWh and up to 1 decimal place) of *class r reserve* in the *real-time market* at *intertie metering point* 'i' for *market participant* 'k' in *metering interval* 't' of *settlement hour* 'h' as described in the *interchange schedule*, where only r2 and r3 are applicable.

5.4 The *IESO* shall determine the following *real-time market* data in accordance with the following formulations, and provide them directly to the *settlement process*:

5.4.1 $RT\_LC\_EOP^{m,t}_{k,h}$ = the *real-time market* lost cost economic operating point of *energy* for *market participant* 'k' at *delivery point* 'm' in *metering interval* 't' of *settlement hour* 'h', and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.3.5.

5.4.2 $RT\_LC\_EOP^{i,t}_{k,h}$ = the *real-time market* lost cost economic operating point of *energy* for *market participant* 'k' at *intertie metering point* 'i' in *metering interval* 't' of *settlement hour* 'h', and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.3.5.

5.4.3 $RT\_LC\_EOP^{p,t}_{k,h}$ = the *real-time market* lost cost economic operating point of *energy* for *market participant* 'k' at *pseudo-unit delivery point* 'p' in *metering interval* 't' of *settlement hour* 'h', and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.3.5.

5.4.4 $RT\_LC\_EOP^{c,t}_{k,h}$ = the *real-time market* lost cost economic operating point of *energy* for *market participant* 'k' at combustion turbine *resource delivery point* 'c' in *metering interval* 't' of *settlement hour* 'h', and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.3.5.

5.4.5 $RT\_LOC\_EOP_{k,h}^{m,t}$ = the *real-time market* lost opportunity cost economic operating point of *energy* for *market participant* 'k' at *delivery point* 'm' in *metering interval* 't' of *settlement hour* 'h', and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.4.5.

5.4.6 $RT\_LOC\_EOP_{k,h}^{p,t}$ = the *real-time market* lost opportunity cost economic operating point of *energy* for *market participant* 'k' at *pseudo-unit delivery point* 'p' in *metering interval* 't' of *settlement hour* 'h', and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.4.5.

5.4.7 $RT\_LOC\_EOP_{k,h}^{i,t}$ = the *real-time market* lost opportunity cost economic operating point of *energy* for *market participant* 'k' at *intertie metering point* 'i' in *metering interval* 't' of *settlement hour* 'h', and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.4.5.

5.4.8 $RT\_LOC\_EOP_{k,h}^{c,t}$ = the *real-time market* lost opportunity cost economic operating point of *energy* for *market participant* 'k' at combustion turbine *resource delivery point* 'c' in *metering interval* 't' of *settlement hour* 'h', and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.4.5.

5.4.8 $RT\_OR\_LC\_EOP_{r,k,h}^{m,t}$ = the *real-time market* lost cost economic operating point of *class r reserve* for *market participant* 'k' at *delivery point* 'm' in *metering interval* 't' of *settlement hour* 'h', where r1, r2, and r3 are all applicable, and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.3.5.

5.4.9 $RT\_OR\_LC\_EOP_{r,k,h}^{p,t}$ = the *real-time market* lost cost economic operating point of *class r reserve* for *market participant* 'k' at *pseudo-unit delivery point* 'p' in *metering interval* 't' of *settlement hour* 'h', where r1, r2, and r3 are all applicable, and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.3.5.

5.4.10 $RT\_OR\_LC\_EOP_{r,k,h}^{i,t}$ = the *real-time market* lost cost economic operating point of *class r reserve* for *market participant* 'k' at *intertie metering point* 'i' in *metering interval* 't' of *settlement hour* 'h', where only r2 and r3 are applicable, and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.3.5.

5.4.11 $RT\_OR\_LC\_EOP_{r,k,h}^{c,t}$ = the *real-time market* lost cost economic operating point of *class r reserve* for *market participant* 'k' at combustion turbine *resource delivery point* 'c' in *metering interval* 't' of *settlement hour* 'h', where r1, r2, and r3 are all applicable, and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.3.5.

5.4.12 $RT\_OR\_LC\_EOP_{r,k,h}^{s,t}$ = the *real-time market* lost cost economic operating point of *class r reserve* for *market participant* 'k' at steam turbine *resource delivery*

point 's' in *metering interval* 't' of *settlement hour* 'h', where r1, r2, and r3 are all applicable, and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.3.5.

5.4.13 $RT\_OR\_LOC\_EOP_{r,k,h}^{m,t}$ = the *real-time market* lost opportunity cost economic operating point of *class r reserve* for *market participant* 'k' at *delivery point* 'm' in *metering interval* 't' of *settlement hour* 'h', where r1, r2, and r3 are all applicable, and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.4.5.

5.4.14 $RT\_OR\_LOC\_EOP_{r,k,h}^{i,t}$ = the *real-time market* lost opportunity cost economic operating point of *class r reserve* for *market participant* 'k' at *intertie metering point* 'i' in *metering interval* 't' of *settlement hour* 'h', where only r2 and r3 are applicable, and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.4.5.

5.4.15 $RT\_OR\_LOC\_EOP_{r,k,h}^{c,t}$ = the *real-time market* lost opportunity cost economic operating point of *class r reserve* for *market participant* 'k' at combustion turbine *resource* *delivery point* 'c' in *metering interval* 't' of *settlement hour* 'h', where r1, r2, and r3 are all applicable, and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.4.5.

5.4.16 $RT\_OR\_LOC\_EOP_{r,k,h}^{s,t}$ = the *real-time market* lost opportunity cost economic operating point of *class r reserve* for *market participant* 'k' at steam turbine *resource* *delivery point* 's' in *metering interval* 't' of *settlement hour* 'h', where r1, r2, and r3 are all applicable, and determined in accordance with ~~the applicable *market manual*~~MR Ch.7 App.7.8 s.4.5.

5.4.17 $RT\_STP\_QSI_{k,h}^{p,t}$ = the steam turbine *resource* portion of the *real-time schedule* of *energy* for injection (in MWh and up to 1 decimal place) for *market participant* 'k' at *pseudo-unit delivery point* 'p' in *metering interval* 't' of *settlement hour* 'h', and derived as the difference between $RT\_QSI_{k,h}^{p,t}$ and $RT\_QSI_{k,h}^{c,t}$.

5.4.18 $RT\_STP\_QSOR_{r,k,h}^{p,t}$ = the steam turbine *resource* portion of the *real-time schedule* of *class r reserve* (in MWh and up to 1 decimal place) for *market participant* 'k' at steam turbine *resource delivery point* 's' in *metering interval* 't' of *settlement hour* 'h', and derived as the difference between $RT\_QSOR_{r,k,h}^{p,t}$ and $RT\_QSOR_{r,k,h}^{c,t}$.

5.4.19 $PB\_IM_h^t$ = the price bias adjustment factor (in up to 2 decimal places) for import transactions in effect for *metering interval* 't' of *settlement hour* 'h', as *published* by the *IESO* in accordance with MR Ch.9 s.3.7.2.

5.4.~~19~~20 $PB\_EX_h^t$ = the price bias adjustment factor (in up to 2 decimal places) for export transactions in effect for *metering interval* 't' of *settlement hour* 'h', as *published* by the *IESO* in accordance with MR Ch.9 s.3.7.2.

5.4.~~20~~21 $RT\_DIPC_{k,h}^{c,t}$ = the *real-time market energy* price curve for a *non-quick start resource* for *market participant* 'k' at combustion turbine *resource delivery point* 'c' in *metering interval* 't' of *settlement hour* 'h', as determined in accordance with Appendix 9.3.

~~5.4.21 $RT\_CMT\_DIPC_{k,h}^{c,t}$ = the *real-time market energy* price curve for a combustion turbine that is associated with the *pseudo-unit* that was operationally constrained by the *pre-dispatch calculation engine* for *market participant* 'k' at combustion turbine *delivery point* 'c' in *metering interval* 't' of *settlement hour* 'h', as determined in accordance with Appendix 9.3.~~

5.4.22 $RT\_DIPC_{k,h}^{s,t}$ = the *real-time market energy* price curve for a *non-quick start resource* for *market participant* 'k' at steam turbine *resource delivery point* 's' in *metering interval* 't' of *settlement hour* 'h', as determined in accordance with Appendix 9.3.

5.4.23 $RT\_CMT\_DIPC_{k,h}^{s,t}$ = the *real-time market energy* price curve of a *non-quick start resource* for *market participant* 'k' at steam turbine *resource delivery point* 's' in *metering interval* 't' of *settlement hour* 'h', as determined in accordance with Appendix 9.3.

5.4.24 $RT\_QSI\_DIGQ_{k,h}^{s,t}$ = the portion of the *real-time schedule* quantity of *energy* scheduled for injection for *market participant* 'k' at steam turbine *resource delivery point* 's' in *metering interval* 't' of *settlement hour* 'h', as determined in accordance with Appendix 9.3.

5.4.25 $RT\_CMT\_DIGQ_{k,h}^{s,t}$ = the portion of the *real-time schedule* quantity of *energy* scheduled for injection that is eligible for the real-time *generator offer* guarantee *settlement amount* for the steam turbine *resource* that is associated with the *pseudo-unit* that was operationally constrained by the *pre-dispatch calculation engine* for *market participant* 'k' at steam turbine *resource delivery point* 's' in *metering interval* 't' of *settlement hour* 'h', as determined in accordance with Appendix 9.3.

5.4.26 $RT\_LC\_EOP\_DIGQ_{k,h}^{s,t}$ = the portion of the steam ~~turbine's~~turbine *resource*'s $RT\_LC\_EOP_{k,h}^{p,t}$ that is eligible for the real-time make-whole payment *settlement amount* for *market participant* 'k' at steam turbine *resource delivery point* 's' in *metering interval* 't' of *settlement hour* 'h', as determined in accordance with Appendix 9.3.

5.4.27 $RT\_LOC\_EOP\_DIGQ_{k,h}^{s,t}$ = the portion of the steam ~~turbine's~~turbine *resource*'s $RT\_LOC\_EOP_{k,h}^{p,t}$ that is eligible for the real-time make-whole payment *settlement amount* for *market participant* 'k' at steam turbine *resource delivery point* 's' in *metering interval* 't' of *settlement hour* 'h', as determined in accordance with Appendix 9.3.

5.4.28 $RT\_OR\_DIPC^{c,t}_{r,k,h}$ = *real-time market class r reserve* price curve for a *non-quick start resource* for *market participant* 'k' at combustion turbine *resource delivery point* 'c' during *metering interval* 't' of *settlement hour* 'h', as determined in accordance with Appendix 9.3.

5.4.29 $RT\_OR\_DIPC^{s,t}_{r,k,h}$ = the *real-time market class r reserve* price curve for a *non-quick start resource* for *market participant* 'k' at steam turbine *resource delivery point* 's' during *metering interval* 't' of *settlement hour* 'h' as determined in accordance with Appendix 9.3.

5.4.30 $RT\_OR\_CMT\_DIPC^{s,t}_{r,k,h}$ = the *real-time market class r reserve* price curve of a steam turbine *resource* that is associated with the *pseudo-unit* that was operationally constrained by the *pre-dispatch calculation engine* for *market participant* 'k' at steam turbine *resource delivery point* 's' during *metering interval* 't' of *settlement hour* 'h' as determined in accordance with Appendix 9.3.

5.4.31 $RT\_OR\_CMT\_DIGQ^{s,t}_{r,k,h}$ = the portion of the *real-time schedule* quantity of *class r reserve* scheduled for injection that is eligible for the real-time *generator offer* guarantee *settlement amount* for *market participant* 'k' at steam turbine *resource delivery point* 's' in *metering interval* 't' of *settlement hour* 'h', as determined in accordance with Appendix 9.3.

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7 Transmission Rights Variables, Data and Information

7.1 The *IESO* shall provide the following *TR* data directly to the *settlement process*:

7.1.1 ~~$QTR^{i,j}_{k,h}$~~ $QTR^{iz,jz}_{k,h}$ = quantity of ~~*TR*~~*transmission rights* (in MW and whole numbers) assigned to *market participant* 'k' for transmission from injection *TR zone* '~~i~~iz' to withdrawal *TR zone* '~~j~~jz' for *settlement hour* 'h'.

8 Allocated Quantities

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

metering interval, the *IESO* shall, if for *settlement* purposes the *IESO* is comparing hourly and interval data, determine the hourly amounts defined below by multiplying the interval amounts by twelve:

8.1.1 $AQEI_{k,h}^{m,t}$ = allocated quantity (in MWh and up to 3 decimal places) of *energy* injected by *market participant* 'k' at primary *registered wholesale meter* 'm' in *metering interval* 't' of *settlement hour* 'h'.

8.1.2 $AQEI_{k,h}^{c,t}$ = allocated quantity (in MWh and up to 3 decimal places) of *energy* injected by *market participant* 'k' at combustion turbine *resource* primary *registered wholesale meter* 'c' in *metering interval* 't' of *settlement hour* 'h'.

8.1.3 $AQEI_{k,h}^{s,t}$ = allocated quantity (in MWh and up to 3 decimal places) of *energy* injected by *market participant* 'k' at steam turbine *resource* primary *registered wholesale meter* 's' in *metering interval* 't' of *settlement hour* 'h'.

8.1.4 $AQEW_{k,h}^{m,t}$ = allocated quantity (in MWh and up to 3 decimal places) of *energy* withdrawn by *market participant* 'k' at primary *registered wholesale meter* 'm' in *metering interval* 't' of *settlement hour* 'h'.

8.1.5 $AQOR_{r,k,h}^{m,t}$ = allocated quantity (in MW) of *class r reserve* for *market participant* 'k' at primary *registered wholesale meter* or *intertie metering point* 'm' in *metering interval* 't' of *settlement hour* 'h'.

8.1.6 $GSSR\_AQEW_{k,h}^{m,t}$ = qualified allocated quantity (in MWh) of *energy* withdrawn by *market participant* 'k' at *registered wholesale meter* 'm' in *metering interval* 't' of *settlement hour* 'h' by an eligible *generation resource*.

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11 Capacity Auction

11.1 The *IESO* shall provide the following *capacity auction* information directly to the *settlement process*:

11.1.1 $CACP^{z}$ = the *capacity auction clearing price* (in $/MW per day) for the relevant *trading day* in electrical zone 'z'.

11.1.2 $CACP^{z}_{h}$ = the *capacity auction clearing price* for *settlement hour* 'h' (in $/MW per hour) within the *availability window* in electrical zone 'z', determined by taking the *capacity auction clearing price* for the applicable *obligation period* and electrical zone and dividing by the number of *settlement hours* within the *availability window* of all *trading days* within the *obligation period.*

11.1.3 $CAEO^{m}_{h,k}$ = the quantity of *auction capacity* for *settlement hour* 'h' (in MW) made available by *capacity auction resource* for *capacity market participant* 'k' at *delivery point* or *intertie metering point* 'm' in the relevant *settlement*

hour of the *availability window* determined as the lesser of the *resource's energy offers* submitted in the *day-ahead market*, *pre-dispatch process*, and *real-time market*, as applicable.

11.1.4 $CARC_k^m$ = the quantity of *energy* (in MW) of the *hourly demand response resource's demand response contributors* total registered capability for *capacity market participant* 'k' at *delivery point* 'm', as registered with the *IESO* in accordance with the applicable *market manual;*

11.1.5 $CBOC^m_k$ = the buy-out capacity is an amount (in MW) by which the *capacity obligation* for the *obligation period* for a *capacity auction resource* for *capacity market participant* 'k' at *delivery point* or *intertie metering point* 'm' is being reduced as per the *capacity market participant's* election pursuant to MR Ch.9 s.4.13.9.

11.1.6 $CCO^m_{k,h}$ = the *capacity obligation* (in MW) for the *obligation period* per *capacity auction resource* for *capacity market participant* 'k' at *delivery point* or *intertie metering point* 'm' in the relevant *settlement hour* 'h', as may be adjusted pursuant to the *market rules*.

11.1.7 $CICAP^m_k$ = the *Cleared ICAP* (in MW) for *capacity auction resource* at *delivery point* or *intertie metering point* 'm' for *capacity market participant* 'k' in the applicable *obligation period*, as determined in accordance with the applicable *market manual*.

11.1.8 $CNPF_{tm}$ = for a given *energy market billing period* 'tm' within the relevant *obligation period*, the non-performance factor as listed in the applicable *market manual*.

11.1.9 $DREBQ^m_{k,h}$ = the quantity (in MW) of *auction capacity* made available by an *hourly demand response resource* or *capacity dispatchable load resource* for *capacity market participant* 'k' at *delivery point* 'm' in *settlement hour* 'h' of the *availability window*, determined as the lesser of the *resource's energy bids* submitted in the *day-ahead market*, *pre-dispatch process*, and *real-time market*, as applicable, and where such value exceeds the $CARC_k^m$ for the *resource* in the relevant *energy market billing period*, the $DREBQ^m_{k,h}$ shall equal such $CARC_k^m$.

11.1.10 $DRSQty^m_{k,h}$ = the quantity of *energy* (in MW) scheduled for withdrawal in the *real-time market* by *market participant* 'k' at *delivery point* 'm' for an *hourly demand response resource* in *settlement hour* 'h' of the *availability window*, as described in all *real-time schedules* for such *settlement hour.*

11.1.11 $HDRBP^m_{k,h}$ = the price component (in $) of the *energy bid* submitted in the *real-time market* for *hourly demand response resource* by *capacity market participant* 'k' at *delivery point* 'm' for *settlement hour* 'h' within the *availability window.*

11.1.12 $HDRDC^{m}_{k,h}$= the delivered capacity (in MWh) by *hourly demand response resource* for *capacity market participant* 'k' at *delivery point* 'm' in *settlement hour* 'h' within the *activation window* of the applicable test activation, calculated as follows:

$$\text{Min}\left(\text{Curtailed MW}^{m}{}_{k,h}, \sum_{t=1}^{12}\left(\frac{\text{Min}(\text{TBQ}^{m}{}_{k,h}, \text{CARC}_{k}{}^{m}, \text{CCO}^{m}{}_{k,\text{h}})) - DQSW_{k,h}^{m,t}}{12}\right)\right)$$

Where:

(a) "Curtailed $MW^{m}_{k,h}$" is the difference (in MWh) between baseline value, calculated in accordance with the applicable *market manual*, and actual consumption measurement data by *capacity market participant* 'k' at *delivery point* 'm' for an *hourly demand response resource* for *settlement hour* 'h', as calculated in accordance with the applicable *market manual*.

(b) "$TBQ^{m}_{k,h}$" is the offered quantity of *energy* (in MW) contained in the last lamination of the *price quantity pair* of the *energy bid* submitted in the *real-time market* by *capacity market participant* 'k' at *delivery point* 'm' for an *hourly demand response resource* in *settlement hour* 'h'.

11.1.13 HDRTAPR = the out of market test activation rate (in $/MWh), as set out in the applicable *market manual.*

11.1.14 $OCMW^{i}_{k}$ = the *over committed capacity* (in MW) of a *generator-backed capacity import resource* for *capacity market participant* 'k' at *intertie metering point* 'i', as determined by the *IESO* in accordance with MR. Ch.9 s.4.13.7.1.

11.1.15 RAC^{m}_{k} = the available capacity (in MW) of a *capacity auction resource* at *delivery point* or *intertie metering point* 'm' for *capacity market participant* 'k' in the applicable *obligation period*, and is determined in accordance with the following:

(a) For *capacity dispatchable load resources* and *hourly demand response resources*:

$$RAC^{m}_{k} = \text{MIN}(DREBQ^{m}_{k,h}, (1.15 * CCO^{m}_{k,h}), CICAP^{m}_{k}, CARC_{k}{}^{m})$$

Where:

(i) $CARC_{k}{}^{m}$ is only applicable to virtual *hourly demand response resources*

(b) For *capacity generation resources, system-backed capacity import resources, generator-backed capacity import resources* and *capacity storage resources*:

$$RAC^{m}_{k} = \text{MIN}(CAEO^{m}_{h,k}, (1.15 * CCO^{m}_{k,h}), CICAP^{m}_{k})$$

Appendix 9.3 - Pseudo-Unit Translation

1.1 Introduction/General

1.1.1 In this Appendix 9.3, the following variables have the following meanings:

~~1.1.1.1 In regards to operating region 'd', the following are the three types of operating regions:~~

~~a. 'd1' is the *pseudo-unit* operating region quantity for the *minimum loading point* operating region, as defined in MR Ch.7 App 7.5;~~

~~b. 'd2' is the *pseudo-unit* operating region quantity for the *dispatchable* operating region, as defined in MR Ch.7 App 7.5; and~~

~~c. 'd3' is the *pseudo-unit* operating region quantity for the duct firing operating region, as defined in MR Ch.7 App 7.5;~~

1.1.1.1~~2~~ M_k^p = the maximum number of *price-quantity pairs* in an *energy offer* or *operating reserve offer,* as the case may be, that may be submitted by *market participant* 'k' in the *day-ahead market*, *pre-dispatch process*, and *real-time market* at *pseudo-unit delivery point* 'p'~~;~~. For *energy offers* it is set equal to 20 divided by the number of combustion ~~turbines~~turbine *resources* and rounded down to the nearest whole number. For *operating reserve offers* it is set equal to 5*;* and

1.1.1.~~3~~2 N_k^s = the number of combustion turbine *resource delivery points* registered as associated with steam turbine *resource delivery point* 's' for *market participant* 'k'.

1.2 Day-Ahead Market – Energy

1.2.1.4 $DAM\_DRRQ_{k,h}^p$ = the *day-ahead market dispatchable* region range quantity (in MW), which is the portion of the greater of the $DAM\_QSI_{k,h}^c$ and $DAM\_EOP_{k,h}^c$ associated with *pseudo-unit delivery point* 'p' that is in the *minimum loading point* operating region 'd1' and *dispatchable* operating region 'd2' for *market participant* k' in *settlement hour* 'h', and is derived as follows:

$$DAM\_DRRQ^{p}_{k,h} = Min\left(DAM\_CRRQ^{p}_{k}, DAM\_MRRQ^{p}_{k,h} + \frac{Max\left(0, Max\left(DAM\_QSI^{c}_{k,h}, DAM\_EOP^{c}_{k,h}\right) - MLP^{c}_{k}\right)}{\left(1 - ST\_Portion^{p}_{k,d2}\right)}\right)$$

Where:

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

1.2.1.6 $DAM\_ST\_Q^{p}_{k,h}$ = an M-by-1 matrix (where M is M^{p}_{k}) of steam turbine *resource* quantity values (in MW), calculated from the $DAM\_BE^{p}_{k,h}$ and $ST\_Portion^{p}_{k,d}$ for *market participant* 'k' at *pseudo-unit delivery point* 'p' during *settlement hour* 'h', and is derived as follows:

1.2.1.8 $DAM\_ST\_PC^{s}_{k,h}$ = a Y-by-2 matrix (where $Y \leq \sum_{p=1}^{N} M^{p}_{k}$) of *price-quantity pairs* calculated from the price component and the quantity component from all the calculated $DAM\_ST\_PC^{p}_{k,h}$ for *market participant* 'k' associated with steam turbine *resource* *delivery point* 's' during *settlement hour* 'h', and is derived as follows:

Where:

a. For a *pseudo-unit* to be included in the $DAM\_ST\_PC^{s}_{k,h}$ matrix, for the relevant *settlement hour*:

   i. it must not have *offered* in the *day-ahead market* in *single cycle mode*; and

   ii. the associated combustion turbine *resource* must have received a *day-ahead schedule* greater than or equal to its *minimum loading point.*

b. $DAM\_ST\_PC^{s}_{k,h}$ matrix will be modified in the following order:

   i. any *price-quantity pairs* with the same price shall have their quantities aggregated into a single *price-quantity pair*;

   ii. any *price-quantity pairs* with a zero quantity shall be removed from the $DAM\_ST\_PC^{s}_{k,h}$ matrix;

   iii. the *price-quantity pairs* shall be sorted by increasing price; and

   iv. a new first row will be added and a *price-quantity pair* will be inserted into the first row. The inserted *price-quantity pair* will

have a quantity value of zero and its price value will be equal to the price value of the *price-quantity pair* in the new row 2.

c. m1 is the number of rows in $DAM\_ST\_PC^{p}_{k,h}$ from *PSU1.*

d. m2 is the number of rows in $DAM\_ST\_PC^{p}_{k,h}$ from *PSU2.*

e. m3 is the number of rows in $DAM\_ST\_PC^{p}_{k,h}$ from *PSU3.*

f. m4 is the number of rows in $DAM\_ST\_PC^{p}_{k,h}$ from *PSU4.*

DIPC

1.2.1.9 $DAM\_DIPC^{s}_{k,h}$= the *day-ahead market energy* price curve for a *non-quick start resource*, represented as an N-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at steam turbine *resource delivery point* 's' in *settlement hour* 'h', arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' are in column 1 and *offered* quantities 'Q' are in column 2, and where 'i' is the current row of the matrix of *price-quantity pairs,* and is derived as follows:

Derived Interval Price Curve Matrix	=	Price [Row 'i', Column 1]	Quantity [Row 'i', Column 2]
$DAM\_DIPC^{s}_{k,h}$	Row i	$DAM\_ST\_PC[i,1]^{s}_{k,h}$	$\sum_{j=1}^{i} DAM\_ST\_PC[j,2]^{s}_{k,h}$

1.2.1.10 $DAM\_DIPC^{c}_{k,h}$= the *day-ahead market energy* price curve for a *non-quick start resource*, represented as an N-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at combustion turbine *resource delivery point* 'c' in *settlement hour* 'h', arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' are in column 1 and *offered* quantities 'Q' are in column 2, and where 'i' is the current row of the matrix of *price-quantity pairs,* and is derived as follows:

DIGQ

1.2.1.11 $DAM\_DIGQ^{s}_{k,h}$= the portion of the *day-ahead schedule* quantity of *energy* (in MW) scheduled for injection for *market participant* 'k' at steam turbine *resource delivery point* 's' in *settlement hour* 'h', and is derived as follows:

$$DAM\_QSI\_DIGQ^{s}_{k,h} = \sum_{p=1}^{N} DAM\_STP\_QSI^{p}_{k,h}$$

Where:

a. N is the set of all *pseudo-units* associated with steam turbine *resource delivery point* 's' that for the relevant *settlement hour*:

i. did not *offer* in the *day-ahead market* in *single cycle mode*; and

ii. had a *day-ahead schedule* greater than or equal to its *minimum loading point*.

1.2.1.12 $DAM\_EOP\_DIGQ^{s}_{k,h}$= the *day-ahead market* economic operating point of the portion of the *day-ahead schedule* quantity of *energy* scheduled for injection for *market participant* 'k' at steam turbine *resource delivery point* 's' in *settlement hour* 'h', and is derived as follows:

$$DAM\_EOP\_DIGQ^{s}_{k,h} = \sum_{p=1}^{N} \left[DAM\_EOP^{p}_{k,h} - DAM\_EOP^{c}_{k,h} \right]$$

Where:

a. N is the set of all *pseudo-units* associated with steam turbine *resource delivery point* 's' that for the relevant *settlement hour* 'h':

i. did not *offer* in the *day-ahead market* in *single cycle mode*; and

ii. had a *day-ahead schedule* greater than or equal to its *minimum loading point*.

1.3 Day-Ahead Market – Operating Reserve

1.3.1 The *IESO* shall determine the following *day-ahead market* data in accordance with the following, and provide them directly to the *settlement process:*

1.3.1.1 $OR\_DAM\_DRRQ^{p}_{r,k,h}$ = the *day-ahead market dispatchable* region range quantity for *operating reserve* (in MW), which is the portion of the greater of the $DAM\_QSOR^{c}_{r,k,h}$ and $DAM\_OR\_EOP^{c}_{r,k,h}$ associated with *pseudo-unit delivery point* 'p' that is in the *dispatchable* operating region 'd2' for *market participant* 'k' in *settlement hour* 'h', and is derived as follows:

$$OR\_DAM\_DRRQ^{p}_{r,k,h} = \frac{Max\left(DAM\_QSOR^{c}_{r,k,h}, DAM\_OR\_EOP^{c}_{r,k,h}\right)}{\left(1 - ST\_Portion^{p}_{k,d2}\right)}$$

Where:

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

1.3.1.3 $DAM\_OR\_ST\_Q^{p}_{r,k,h}$ = an M-by-1 matrix (where M is M^{p}_{k}) of steam turbine *resource* quantity values (in MW) calculated from the $DAM\_BOR^{p}_{r,k,h}$ and the $ST\_Portion^{p}_{k,d}$ for *market participant* 'k' at *pseudo-unit delivery point* 'p' during *settlement hour* 'h', and is derived as follows:

$$DAM\_ST\_Q^{p}_{r,k,h} = Min\left(OR\_DAM\_DRRQ^{p}_{r,k,h}, DAM\_BOR[i,2]^{p}_{r,k,h}\right) \times ST\_Portion^{p}_{k,d2} + Max\left[0, Min\left(OR\_DAM\_DFRRQ^{p}_{k,r,h}, DAM\_BOR[i,2]^{p}_{r,k,h}\right) - OR\_DAM\_DRRQ^{p}_{r,k,h}\right] \times ST\_Portion^{p}_{k,d3}$$

1.3.1.5 $DAM\_OR\_ST\_PC^{s}_{r,k,h}$ = a Y-by-2 matrix (where Y ≤ $\sum^{N}_{p=1}$ (M^{p}_{k})) of *price-quantity pairs*, calculated from the price component and the quantity component from all the calculated $DAM\_OR\_ST\_PC^{p}_{r,k,h}$ for *market participant* 'k', associated with steam turbine *resource delivery point* 's' during *settlement hour* 'h', and is derived as follows:

DIPC

1.3.1.6 $DAM\_OR\_DIPC^{s}_{r,k,h}$= the *day-ahead market class r reserve* price curve for a *non-quick start resource*, represented as an X-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at steam turbine *resource delivery point* 's' during *settlement hour* 'h' arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' are in column 1 and *offered* quantities 'Q' are in column 2, where r1, r2, and r3 are all applicable, and is derived as follows:

1.3.1.7 $DAM\_OR\_DIPC^{c}_{r,k,h}$= the *day-ahead market class r reserve* price curve for a *non-quick start resource*, represented as an X-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at combustion turbine *resource delivery point* 'c' during *settlement hour* 'h' arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' are in column 1 and *offered* quantities 'Q' are in column 2, where r1, r2, and r3 are all applicable, and is derived as follows:

1.4 Pre-Dispatch – Energy

1.4.1 The *IESO* shall determine the following *pre-dispatch process* data in accordance with the following, and provide them directly to the *settlement process:*

Intermediate Variables

1.4.1.1 $PD\_MRRQ_{k,h}^{p,t}$= the pre-dispatch *minimum loading point* region range quantity (in MW), which is the portion of the $PD\_QSI_{k,h}^{p,pdm}$ associated with *pseudo-unit delivery point* 'p' in the *minimum loading point* operating region 'd1' for *market participant* 'k' in *metering interval* 't' of *settlement hour* 'h', and is derived as follows:

$$PD\_MRRQ_{k,h}^{p,t} = Min\left(ORRQ_{k,d1}^{p}, PD\_QSI_{k,h}^{p,pdm}\right)$$

Where:

a. $PD\_MRRQ_{k,h}^{p,t}$ is only calculated for *pseudo-units* whose associated combustion turbine *resource* was determined to have experienced a *generator failure*.

1.4.1.2 $PD\_DRRQ_{k,h}^{p,t}$= the pre-dispatch *dispatchable* region range quantity (in MW), which is the portion of the $PD\_QSI_{k,h}^{p,pdm}$ associated with *pseudo-unit delivery point* 'p' in the *minimum loading point* operating region 'd1' and *dispatchable* operating region 'd2' for *market participant* 'k' in *metering interval* 't' of *settlement hour* 'h', and derived as follows:

$$PD\_DRRQ_{k,h}^{p,t} = Min\left(CRRQ_{k}^{p}, PD\_MRRQ_{k,h}^{p,t} + \frac{Max\left(PD\_QSI_{k,h}^{c,pdm} - MLP_{k}^{c}, 0\right)}{\left(1 - ST\_Portion_{k,d2}^{p}\right)}\right)$$

Where:

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

b. $PD\_DRRQ_{k,h}^{p,t}$ is only calculated for *pseudo-units* whose associated combustion turbine *resource* was determined to have experienced a *generator failure*.

1.4.1.3 $PD\_DFRRQ_{k,h}^{p,t}$ = the pre-dispatch duct firing region range quantity (in MW), which is the portion of the $PD\_QSI_{k,h}^{p,pdm}$ associated with *pseudo-unit delivery point* 'p' that is in the *minimum loading point* operating region 'd1', *dispatchable* operating region 'd2', and duct firing operating region

'd3' of the *pseudo-unit* for *market participant* 'k' in *metering interval* 't' of *settlement hour* 'h', and derived as follows:

$$PD\_DFRRQ_{k,h}^{p,t} = Min\Big(ORRQ_{k,d1}^{p} + ORRQ_{k,d2}^{p} + ORRQ_{k,d3}^{p}, Max\big(PD\_QSI_{k,h}^{p,pdm} + CRRQ_{k}^{p} - PD\_DRRQ_{k,h}^{p,t}, CRRQ_{k}^{p}\big)\Big)$$

Where:

a. $PD\_DFRRQ_{k,h}^{p,t}$ is only calculated for *pseudo-units* whose associated combustion turbine *resource* was determined to have experienced a *generator failure*.

1.4.1.4 $PD\_ST\_Q_{k,h}^{p,t}$= an M-by-1 matrix (where M is M_{k}^{p}) of steam turbine *resource* quantity values (in MW) calculated from the $PD\_BE_{k,h}^{p,pdm}$ and $ST\_Portion_{k,d}^{p}$ for *market participant* 'k' at *pseudo-unit delivery point* 'p' during *metering interval* 't' of *settlement hour* 'h', and derived as follows:

1.4.1.6 $PD\_S\_ST\_PC_{k,h}^{s,t}$ = a Y-by-2 matrix (where $Y \leq \sum_{p=1}^{N} M_{k}^{p}$) of *price-quantity pairs,* calculated from the price component and the quantity component from all calculated $PD\_ST\_PC_{k,h}^{p,t}$ for *market participant* 'k' associated with steam turbine *resource delivery point* 's' during *metering interval* 't' of *settlement hour* 'h', and is derived as follows:

DIPC

1.4.1.7 $PD\_DIPC_{k,h}^{s,t}$= *generator failure* charge – guarantee cost component *energy* price curve of a *GOG-eligible resource*, represented as a N-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at steam turbine *resource delivery point* 's' during *metering interval* 't' of *settlement hour* 'h', arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' are in column 1 and the *offered* quantities 'Q' are in column 2, and is derived as follows:

Price Curve Matrix	=	Price [Row 'i', Column 1]	Quantity [Row 'i', Column 2]
$PD\_DIPC_{k,h}^{s,t}$	Row i	$PD\_S\_ST\_PC[i,1]_{k,h}^{s,t}$	$\sum_{j=1}^{i} PD\_S\_ST\_PC[j,2]_{k,h}^{s,t}$

Where:

a. the $PD\_DIPC_{k,h}^{s,t}$ price curve matrix shall only be constructed for each combustion turbine *resource* determined to have experienced a *generator failure*.

1.4.1.8 $PD\_DIPC_{k,h}^{c,t}$ = *generator failure* charge – guarantee cost component *energy* price curve of a *GOG-eligible resource*, represented as an N-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at combustion turbine *resource delivery point* 'c' during *metering interval* 't' of *settlement hour* 'h', arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' are in column 1 and the *offered* quantities 'Q' are in column 2, and is derived as follows:

Derived Interval Price Curve Matrix	=	Price [Row 'i', Column 1]	Quantity [Row 'i', Column 2]
$PD\_DIPC_{k,h}^{c,t}$	Row i	$PD\_BE[i,1]_{k,h}^{p,pdm}$	$Min\left(PD\_BE[i,2]_{k,h}^{p,pdm}, PD\_DRRQ_{k,h}^{p,t}\right)$ $-\left[Min\left(PD\_MRRQ_{k,h}^{p,t}, PD\_BE[i,2]_{k,h}^{p,pdm}\right)\right.$ $\times ST\_Portion_{k,d1}^{p}$ $+ Max\left(0, Min\left(PD\_DRRQ_{k,h}^{p,t}, PD\_BE[i,2]_{k,h}^{p,pdm}\right)\right.$ $\left.\left. - PD\_MRRQ_{k,h}^{p,t}\right) \times ST\_Portion_{k,d2}^{p}\right]$

Where:

a. any *price-quantity pairs* in the $PD\_DIPC_{k,h}^{c,t}$ price curve matrix that have the same quantity value as a prior quantity value in the price curve matrix shall have their price component and quantity component set to zero; and

b. the $PD\_DIPC_{k,h}^{c,t}$ price curve matrix shall only be constructed for each combustion turbine *resource* determined to have experienced a *generator failure*.

DIGQ

1.4.1.9 $PD\_DIGQ_{k,h}^{s,t}$ = the *generator failure* charge – guarantee cost component portion of the *pre-dispatch schedule* quantity of *energy* of a *GOG-eligible resource* scheduled for injection for *market participant* 'k' at *steam turbine resource delivery point* 's' during *metering interval* 't' of *settlement hour* 'h', and is derived as follows:

$$PD\_DIGQ_{k,h}^{s,t} = \sum_{p=1}^{F} PD\_STP\_QSI_{k,h}^{p,pdm}$$

Where:

a. the $PD\_DIGQ_{k,h}^{s,t}$ price curve matrix shall only be constructed for each combustion turbine *resource* determined to have experienced a *generator failure*.

b. 'F' is the set of all *pseudo-units* associated with steam turbine *resource delivery point* 's' associated with the combustion ~~turbines~~turbine *resources* determined to have experienced a *generator failure*.

1.5 Real-Time Market – Energy

1.5.1 The *IESO* shall determine the following *real-time market* data in accordance with the following, and provide them directly to the *settlement process*:

1.5.1.4 $RT\_DRRQ_{k,h}^{p,t}$ = the *real-time market dispatchable* region range quantity (in MW), which is the portion of the greater of the $RT\_QSI_{k,h}^{c,t}$ and $RT\_LC\_EOP_{k,h}^{c,t}$ associated with *pseudo-unit delivery point* 'p' that is in the *minimum loading point* operating region 'd1' and *dispatchable* operating region 'd2' for *market participant* 'k' in *metering interval* 't' of *settlement hour* 'h', and is derived as follows:

$$RT\_DRRQ_{k,h}^{p,t} = Min\left(RT\_CRRQ_{k}^{p}, RT\_MRRQ_{k,h}^{p,t} + \frac{Max\left(0, Max\left(RT\_LC\_EOP_{k,h}^{c,t}, RT\_QSI_{k,h}^{c,t}\right) - MLP_{k}^{c}\right)}{\left(1 - \sout{RT\_}ST\_Portion_{k,h,d2}^{p,t}\right)}\right)$$

Where:

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

1.5.1.5 $RT\_DFRRQ_{k,h}^{p,t}$ = the *real-time market* duct firing region range quantity (in MW), which is the portion of the greater of the $RT_QSI_{k,h}^{p,t}$and $RT\_LC\_EOP_{k,h}^{p,t}$ associated with *pseudo-unit delivery point* 'p' that is in the *minimum loading point* operating region 'd1', *dispatchable* operating region 'd2', and duct firing operating region 'd3', plus any quantity of *energy* associated with a combustion turbine *resource* derate on the *pseudo-unit* for *market participant* 'k' in *metering interval* 't' of *settlement hour* 'h', and is derived as follows:

$$RT\_DFRRQ_{k,h}^{p,t} = Min\left(RT\_ORRQ_{k,d1}^{p} + RT\_ORRQ_{k,d2}^{p} + RT\_ORRQ_{k,d3}^{p}, Max\left(Max\left(RT\_LC\_EOP_{k,h}^{p,t}, RT\_QSI_{k,h}^{p,t}\right) + RT\_CRRQ_{k}^{p} - RT\_DRRQ_{k,h}^{p,t}, RT\_CRRQ_{k}^{p}\right)\right)$$

~~1.5.1.6 $RT\_LC\_EOP\_DRRQ_{k,h}^{p,t}$ = the portion of the $RT\_LC\_EOP_{k,h}^{c,t}$ associated with *pseudo-unit delivery point* 'p' that is in the *minimum loading point* operating region 'd1' and *dispatchable* operating region 'd2' for *market participant* 'k' in *metering interval* 't' of *settlement hour* 'h', and is derived as follows:~~

$$RT\_LC\_EOP\_DRRQ_{k,h}^{p,t} = Min\left(RT\_CRRQ_{k}^{p}, RT\_MRRQ_{k,h}^{p,t} + \frac{Max\left(0, RT\_LC\_EOP_{k,h}^{c,t} - MLP_{k}^{c}\right)}{\left(1 - RT\_ST\_Portion_{k,h,d2}^{p,t}\right)}\right)$$

~~1.5.1.7 $RT\_LOC\_EOP\_DRRQ_{k,h}^{p,t}$ = the portion of the $RT\_LOC\_EOP_{k,h}^{c,t}$ associated with *pseudo-unit delivery point* 'p' that is in the *minimum loading point* operating region 'd1' and *dispatchable* operating region 'd2' for *market participant* 'k' in *metering interval* 't' of *settlement hour* 'h', and derived as follows:~~

$$RT\_LOC\_EOP\_DRRQ_{k,h}^{p,t} = Min\left(RT\_CRRQ_{k}^{p}, RT\_MRRQ_{k,h}^{p,t} + \frac{Max\left(0, RT\_LOC\_EOP_{k,h}^{c,t} - MLP_{k}^{c}\right)}{\left(1 - RT\_ST\_Portion_{k,h,d2}^{p,t}\right)}\right)$$

~~Where:~~

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

1.5.1.~~6.8~~ $RT\_ST\_Q_{k,h}^{p,t}$ = An M-by-1 matrix (where M is M_k^p) of steam turbine *resource* quantity values (in MW) calculated from the $BE_{k,h}^{p}$ and ~~*RT*~~ $ST\_Portion_{k,h,d}^{p,t}$ for *market participant* 'k' at *pseudo-unit delivery point* 'p' during *metering interval* 't' of *settlement hour* 'h', and derived as follows:

$$\begin{aligned} RT\_ST\_Q_{k,h}^{p,t} = {} & Min\left(RT\_MRRQ_{k,h}^{p,t}, BE[i,2]_{k,h}^{p}\right) \times ST\_Portion_{k,h,d1}^{p,t} \\ & + Max\left(0, Min\left(RT\_DRRQ_{k,h}^{p,t}, BE[i,2]_{k,h}^{p}\right) - RT\_MRRQ_{k,h}^{p,t}\right) \\ & \times ST\_Portion_{k,h,d2}^{p,t} \\ & + Max\left(0, Min\left(RT\_DFRRQ_{k,h}^{p,t}, BE[i,2]_{k,h}^{p}\right) - RT\_CRRQ_{k}^{p}\right) \\ & \times ST\_Portion_{k,h,d3}^{p,t} \end{aligned}$$

1.5.1.~~9~~7 $RT\_ST\_PC_{k,h}^{p,t}$ = An M-by-2 matrix (where M is M_k^p) of *price-quantity pairs* representing the incremental quantity of *energy* at each price for each *pseudo-unit*, calculated from the price component of $BE_{k,h}^{p}$ and the quantity component of $RT\_ST\_Q_{k,h}^{p,t}$ for *market participant* 'k' at *pseudo-unit delivery point* 'p' during *metering interval* 't' of *settlement hour* 'h', and is derived as follows:

PQ Pair Matrix	=	Price [Row 'i', Column 1)	Quantity [Row 'i', Column 2]
$RT\_ST\_PC_{k,h}^{p,t}$	Row i = 1	$BE[i,1]_{k,h}^{p}$	0
	Row i ≥ 2	$BE[i,1]_{k,h}^{p}$	$RT\_ST\_Q[i]_{k,h}^{p,t} - RT\_ST\_Q[i-1]_{k,h}^{p,t}$

1.5.1.~~108~~ $RT\_ST\_PC_{k,h}^{s,t}$ = A Y-by-2 matrix (where $Y \leq \sum_{p=1}^{N} M_k^p$) of *price-quantity pairs,* calculated from the price component and the quantity component from all calculated $RT\_ST\_PC_{k,h}^{p,t}$ for *market participant* 'k' associated with steam turbine *resource delivery point* 's' during *metering interval* 't' of *settlement hour* 'h', and is derived as follows:

PQ Pair Matrix (assuming 4 included *PSUs*)	=	Price [Row 'i', Column 1]	Quantity [Row 'i', Column 2]
$RT\_ST\_PC_{k,h}^{s,t}$	Rows i=1 to m1, j=1 to m1	$RT\_ST\_PC[j,1]_{k,h}^{p1,t}$	$RT\_ST\_PC[j,2]_{k,h}^{p1,t}$
	Rows i=(m1+1) to (m1+m2), j=1 to m2	$RT\_ST\_PC[j,1]_{k,h}^{p2,t}$	$RT\_ST\_PC[j,2]_{k,h}^{p2,t}$
	Rows i=(m2+1) to (m1+m2+m3), j=1 to m3	$RT\_ST\_PC[j,1]_{k,h}^{p3,t}$	$RT\_ST\_PC[j,2]_{k,h}^{p3,t}$
	Rows i=(m3+1) to (m1+m2+m3+m4), j=1 to m4	$RT\_ST\_PC[j,1]_{k,h}^{p4,t}$	$RT\_ST\_PC[j,2]_{k,h}^{p4,t}$

Where:

a. *For* a *pseudo-unit* to be included in the $RT\_ST\_PC_{k,h}^{s,t}$ matrix, for the relevant *metering interval*:

i. it must not have *offered* in the *real-time market* in *single cycle mode*; and

ii. the associated combustion turbine *resource* received a *real-time schedule* greater than or equal to its *minimum loading point;*

b. $RT_ST_PC_{k,h}^{s,t}$matrix will be modified in the following order:

i. any *price-quantity pairs* with the same price shall have their quantities aggregated into a single *price-quantity pair*;

ii. any *price-quantity pairs* with a zero quantity shall be removed from the $RT_ST_PC_{k,h}^{s,t}$matrix;

iii. the *price-quantity pairs* shall be sorted by increasing price; and

iv. a new first row will be added and a *price-quantity pair* will be inserted into the first row. The inserted *price-quantity pair* will have a quantity value of zero and its price value will be equal to the price value of the *price-quantity pair* in the new row 2.

c. m1 is the number of rows in $RT\_ST\_PC_{k,h}^{p,t}$ from *PSU1.*

d. m2 is the number of rows in $RT\_ST\_PC_{k,h}^{p,t}$ from *PSU2.*

e. m3 is the number of rows in $RT_ST_PC_{k,h}^{p,t}$from *PSU3.*

f. m4 is the number of rows in $RT_ST_PC_{k,h}^{p,t}$from *PSU4.*

1.5.1.~~11~~9 $RT\_CMT\_ST\_PC_{k,h}^{s,t}$= A Y-by-2 matrix (where $Y \leq \sum_{p=1}^{N} M_{k,h}^{p,t}$) of *price-quantity pairs*, calculated from the price component and quantity component from all calculated $RT\_ST\_PC_{k,h}^{p,t}$ for *market participant* 'k' associated with steam turbine *resource delivery point* 's' during *metering interval* 't' of *settlement hour* 'h', and is derived as follows:

PQ Pair Matrix (assuming 4 included *PSUs*)	=	Price [Row 'i', Column 1]	Quantity [Row 'i', Column 2]
$RT\_CMT\_ST\_PC_{k,h}^{s,t}$	Rows i=1 to m1, j=1 to m1	$RT\_ST\_PC[j,1]_{k,h}^{p1,t}$	$RT\_ST\_PC[j,2]_{k,h}^{p1,t}$
	Rows i=(m1+1) to (m1+m2), j=1 to m2	$RT\_ST\_PC[j,1]_{k,h}^{p2,t}$	$RT\_ST\_PC[j,2]_{k,h}^{p2,t}$
	Rows i=(m2+1) to (m1+m2+m3), j=1 to m3	$RT\_ST\_PC[j,1]_{k,h}^{p3,t}$	$RT\_ST\_PC[j,2]_{k,h}^{p3,t}$
	Rows i=(m3+1) to (m1+m2+m3+m4), j=1 to m4	$RT\_ST\_PC[j,1]_{k,h}^{p4,t}$	$RT\_ST\_PC[j,2]_{k,h}^{p4,t}$

Where:

a. For a *pseudo-unit* to be included in the $RT\_CMT\_ST\_PC_{k,h}^{s,t}$ matrix, for the relevant *metering interval*:

i. it must be operationally constrained greater than or equal to its *minimum loading point* by the *pre-dispatch calculation engine;*

ii. it must not have *offered* in the *real-time market* in *single cycle mode*; and

iii. the associated combustion turbine *resource* must have received a *real-time schedule* greater than or equal to its *minimum loading point*.

b. $RT_CMT_ST_PC_{k,h}^{s,t}$matrix will be modified in the following order:

i. any *price-quantity pairs* with the same price shall have their quantities aggregated into a single *price-quantity pair*;

ii. any *price-quantity pairs* with a zero quantity shall be removed from the $RT\_CMT\_ST\_PC_{k,h}^{s,t}$ matrix;

iii. the *price-quantity pairs* shall be sorted by increasing price; and

iv. a new first row will be added and a *price-quantity pair* will be inserted into the first row. The *price-quantity pair* will have a quantity value of zero and its price value will be equal to the price value of the *price-quantity pair* in the new row 2.

c. m1 is the number of rows in $RT\_ST\_PC_{k,h}^{p,t}$ from PSU1.

d. m2 is the number of rows in $RT\_ST\_PC_{k,h}^{p,t}$ from PSU2.

e. m3 is the number of rows in $RT\_ST\_PC_{k,h}^{p,t}$ from PSU3.

f. m4 is the number of rows in $RT\_ST\_PC_{k,h}^{p,t}$ from PSU4.

DIPC

1.5.1.~~12~~10 $RT\_DIPC_{k,h}^{s,t}$ = the *real-time market energy* price curve for a *non-quick start resource*, represented as an N-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at steam turbine *resource delivery point* 's' in *metering interval* 't' of *settlement hour* 'h', arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' are in column 1 and *offered* quantities 'Q' are in column 2, and is derived as follows:

Price Curve Matrix	=	Price [Row 'i', Column 1]	Quantity [Row 'i', Column 2]
$RT\_DIPC_{k,h}^{s,t}$	Row i	$RT\_CMT\_ST\_PC[i,1]_{k,h}^{s,t}$	$\sum_{j=1}^{i} RT\_CMT\_ST\_PC[j,2]_{k,h}^{s,t}$

1.5.1.~~13~~11 $RT\_CMT\_DIPC_{k,h}^{s,t}$ = the *real-time market energy* price curve of a *non-quick start resource*, represented as an N-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at steam turbine *resource delivery point* 's' in *metering interval* 't' of *settlement hour* 'h', arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' are in column 1 and *offered* quantities 'Q' are in column 2, and is derived as follows:

Price Curve Matrix	=	Price [Row 'i', Column 1]	Quantity [Row 'i', Column 2]
$RT\_CMT\_DIPC_{k,h}^{s,t}$	Row i	$RT\_CMT\_ST\_PC[i,1]_{k,h}^{s,t}$	$\sum_{j=1}^{i} RT\_CMT\_ST\_PC[j,2]_{k,h}^{s,t}$

1.5.1.~~14~~12 $RT\_DIPC_{k,h}^{c,t}$ = the *real-time market energy* price curve for a *non-quick start resource*, represented as an N-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at combustion turbine *resource delivery point* 'c' in

metering interval 't' of *settlement hour* 'h', arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' are in column 1 and *offered* quantities 'Q' are in column 2, and is derived as follows:

Derived Interval Price Curve Matrix	=	Price [Row 'i', Column 1]	Quantity [Row 'i', Column 2]
$RT\_DIPC_{k,h}^{c,t}$	Row i	$BE[i,1]_{k,h}^{p}$	$Min\left(BE[i,2]_{k,h}^{p}, RT\_DRRQ_{k,h}^{p,t}\right)$ $-\left[Min\left(RT\_MRRQ_{k,h}^{p,t}, BE[i,2]_{k,h}^{p}\right)\right.$ $\times$ ~~*RT*~~ $ST\_Portion_{k,h,d1}^{p,t}$ $+ Max\left(0, Min\left(RT\_DRRQ_{k,h}^{p,t}, BE[i,2]_{k,h}^{p}\right)\right.$ $\left.- RT\_MRRQ_{k,h}^{p,t}\right) \times$ ~~*RT*~~ $\left.ST\_Portion_{k,h,d2}^{p,t}\right]$

Where:

a. any *price-quantity pairs* in the $RT\_DIPC_{k,h}^{c,t}$ price curve matrix that have the same quantity value as a prior quantity value in the price curve matrix shall have their price component and quantity component set to zero.

DIGQ

1.5.1.~~15~~13 $RT\_QSI\_DIGQ_{k,h}^{s,t}$ = the portion of the *real-time schedule* quantity of *energy* scheduled for injection for *market participant* 'k' at steam turbine *resource delivery point* 's' in *metering interval* 't' of *settlement hour* 'h', and is derived as follows:

$$RT\_QSI\_DIGQ_{k,h}^{s,t} = \sum_{p=1}^{N} RT\_STP\_QSI_{k,h}^{s,p,t}$$

Where:

a. 'N' is the set of all *pseudo-units* associated with steam turbine *resource delivery point* 's' that for the relevant *metering interval* 't' of *settlement hour* 'h':

i. are operating in combined cycle mode; and

ii. whose associated combustion turbine *resource* has a *real-time schedule* greater than or equal to its *minimum loading point.*

1.5.1.~~16~~14 $RT\_CMT\_DIGQ_{k,h}^{s,t}$ = the portion of the *real-time schedule* quantity of *energy* scheduled for injection that is eligible for the real-time *generator offer* guarantee *settlement amount* for *market participant* 'k' at steam turbine *resource delivery point* 's' in *metering interval* 't' of *settlement hour* 'h', and is derived as follows:

$$RT\_CMT\_DIGQ_{k,h}^{s,t} = \sum_{p=1}^{N} RT\_STP\_QSI_{k,h}^{s,p,t}$$

Where:

a. 'N' is the set of all *pseudo-units* associated with steam turbine *resource delivery point* 's' that for the relevant *metering interval* 't' of *settlement hour* 'h':

i. are operating in combined cycle mode;

ii. were operationally constrained greater than or equal to its *minimum loading point* by the *pre-dispatch calculation engine;* and

iii. whose associated combustion turbine *resource* must have received a *real-time schedule* greater than or equal to its *minimum loading point*.

1.5.1.~~17~~15 $RT\_LC\_EOP\_DIGQ_{k,h}^{s,t}$ = the portion of the steam ~~turbine's~~turbine *resource's* $RT\_LC\_EOP_{k,h}^{p,t}$ that is eligible for the real-time make-whole payment *settlement amount* for *market participant* 'k' at steam turbine *resource delivery point* 's' in *metering interval* 't' of *settlement hour* 'h', and derived as follows:

$$RT\_LC\_EOP\_DIGQ_{k,h}^{s,t} = \sum_{p=1}^{N} \left[RT\_LC\_EOP_{k,h}^{p,t} - RT\_LC\_EOP_{k,h}^{c,t}\right]$$

Where:

a. 'N' is the set of all *pseudo-units* associated with *steam turbine resource delivery point* 's' that for the relevant *metering interval*:

i. are operating in combined cycle mode; and

ii. whose associated combustion turbine *resource* has received a *real-time schedule* greater than or equal to its *minimum loading point*.

1.5.1.~~18~~16 $RT\_LOC\_EOP\_DIGQ_{k,h}^{s,t}$ = the portion of the steam ~~turbine's~~turbine *resource's* $RT\_LOC\_EOP_{k,h}^{p,t}$ that is eligible for the real-time make-whole payment *settlement amount* for *market participant* 'k' at steam turbine *resource delivery point* 's' in *metering interval* 't' of *settlement hour* 'h', and derived as follows:

$$RT\_LOC\_EOP\_DIGQ_{k,h}^{s,t} = \sum_{p=1}^{N} \left[RT\_LOC\_EOP_{k,h}^{p,t} - RT\_LOC\_EOP_{k,h}^{c,t}\right]$$

Where:

a. 'N' is the set of all *pseudo-units* associated with *steam turbine* *resource* *delivery point* 's' that for the relevant *metering interval* 't' in *settlement hour* 'h':

i. are operating in combined cycle mode; and

ii. whose associated combustion turbine *resource* received a *real-time schedule* greater than or equal to its *minimum loading point*.

1.6 Real-Time Market – Operating Reserve

1.6.1 The *IESO* shall determine the following *real-time market* data in accordance with the following, and provide them directly to the *settlement process:*

Intermediate Variables

1.6.1.1 $OR\_RT\_DRRQ^{p,t}_{r,k,h}$ = the *real-time market dispatchable* region range quantity for *operating reserve* (in MW), which is the portion of the greater of the $RT\_QSOR^{c,t}_{r,k,h}$ and $RT\_OR\_LC\_EOP^{c,t}_{r,k,h}$, associated with *pseudo-unit delivery point* 'p' that is in the *dispatchable* operating region 'd2' for *market participant* 'k' during *metering interval* 't' of *settlement hour* 'h', and is derived as follows:

$$OR\_RT\_DRRQ^{p,t}_{r,k,h} = \frac{Max\left(RT\_QSOR^{c,t}_{k,r,h}, RT\_OR\_LC\_EOP^{c,t}_{k,r,h}\right)}{\left(1 - \sout{RT\_}ST\_Portion^{p,t}_{k,h,d2}\right)}$$

Where:

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

1.6.1.2 $OR\_RT\_DFRRQ^{p,t}_{r,k,h}$ = the *real-time market* duct-firing region range quantity for *operating reserve* (in MW), which is the portion of the greater of the $RT\_QSOR^{p,t}_{r,k,h}$ and $RT\_OR\_LC\_EOP^{p,t}_{r,k,h}$ associated with *pseudo-unit delivery point* 'p', that is in the *dispatchable* operating region 'd2' and duct firing operating region 'd3' for *market participant* 'k' during *metering interval* 't' of *settlement hour* 'h', and is derived as follows:

$$OR\_RT\_DFRRQ^{p,t}_{r,k,h} = Max\left(OR\_RT\_DRRQ^{p,t}_{r,k,h}, Max\left(RT\_QSOR^{p,t}_{r,k,h}, RT\_OR\_LC\_EOP^{p,t}_{r,k,h}\right)\right)$$

1.6.1.3 $RT\_OR\_ST\_Q^{p,t}_{r,k,h}$ = An M-by-1 matrix (where M is M^{p}_{k}) of steam turbine *resource* quantity values (in MW) calculated from the $BOR^{p}_{r,k,h}$, $\sout{RT\_}ST\_Portion^{p,t}_{k,h,d2}$, and $\sout{RT\_}ST\_Portion^{p,t}_{k,h,d3}$ for *market participant* 'k' at *pseudo-unit delivery point* 'p' during *metering interval* 't' of *settlement hour* 'h', and is derived as follows:

$$RT\_OR\_ST\_Q^{p,t}_{r,k,h} = Min\left(RT\_OR\_DRRQ^{p}_{r,k,h}, BOR[i,2]^{p}_{r,k,h}\right) \times \text{~~RT~~}\_ST\_Portion^{p}_{k,d2} + Max\left[0, Min\left(RT\_OR\_DFRRQ^{p}_{r,k,h}, BOR[i,2]^{p}_{r,k,h}\right) - RT\_OR\_DRRQ^{p}_{r,k,h}\right] \times \text{~~RT~~}\_ST\_Portion^{p}_{k,d3}$$

1.6.1.4 $RT\_OR\_ST\_PC^{p,t}_{r,k,h}$ = An M-by-2 matrix (where M is M^{p}_{k}) of *price-quantity pairs*, calculated from the price component of $BOR^{p}_{r,k,h}$and the quantity Dcomponent of $RT\_OR\_ST\_Q^{p,t}_{r,k,h}$ for *market participant* 'k' at *pseudo-unit delivery point* 'p' during *metering interval* 't' of *settlement hour* 'h', and is derived as follows:

PQ Pair Matrix	=	Price [Row 'i', Column 1)	Quantity [Row 'i', Column 2]
$RT\_OR\_ST\_PC^{p,t}_{r,k,h}$	Row i = 1	$BOR[i,1]^{p}_{r,k,h}$	0
	Row i ≥ 2	$BOR[i,1]^{p}_{r,k,h}$	$RT\_OR\_ST\_Q[i]^{p,t}_{r,k,h} - RT\_OR\_ST\_Q[i-1]^{p,t}_{r,k,h}$

1.6.1.5 $RT\_OR\_ST\_PC^{s,t}_{r,k,h}$ = A Y-by-2 matrix (where $Y \leq \sum_{p=1}^{N} M^{p}_{k}$) of *price-quantity pairs*, calculated from the price component and quantity component from all the calculated $RT\_OR\_ST\_PC^{p,t}_{r,k,h}$ for *market participant* 'k' at steam turbine *resource delivery point* 's' for during *metering interval* 't' of *settlement hour* 'h', and is derived as follows:

1.6.1.6 $RT\_OR\_CMT\_ST\_PC^{s,t}_{r,k,h}$ = A Y-by-2 matrix (where $Y \leq \sum_{p=1}^{N} M^{p}_{k}$) of *price-quantity pairs*, calculated from the price component and the quantity component from all calculated $RT\_OR\_ST\_PC^{p,t}_{k,r,h}$ for *market participant* 'k' at steam turbine *resource delivery point* 's' during *metering interval* 't' of *settlement hour* 'h', and is derived as follows:

PQ Pair Matrix (assuming 4 included *PSUs*)	=	Price [Row 'i', Column 1]	Quantity [Row 'i', Column 2]
$RT\_OR\_CMT\_ST\_PC^{s,t}_{r,k,h}$	Rows i=1 to m1, j=1 to m1	$RT\_OR\_CMT\_ST\_PC[j,1]^{p1,t}_{r,k,h}$	$RT\_OR\_CMT\_ST\_PC[j,2]^{p1,t}_{r,k,h}$
	Rows i=(m1+1) to (m1+m2), j=1 to m2	$RT\_OR\_CMT\_ST\_PC[j,1]^{p2,t}_{r,k,h}$	$RT\_OR\_CMT\_ST\_PC[j,2]^{p2,t}_{r,k,h}$
	Rows i=(m2+1) to (m1+m2+m3), j=1 to m3	$RT\_OR\_CMT\_ST\_PC[j,1]^{p3,t}_{r,k,h}$	$RT\_OR\_CMT\_ST\_PC[j,2]^{p3,t}_{r,k,h}$
	Rows i=(m3+1) to (m1+m2+m3+ m4), j=1 to m4	$RT\_OR\_CMT\_ST\_PC[j,1]^{p4,t}_{r,k,h}$	$RT\_OR\_CMT\_ST\_PC[j,2]^{p4,t}_{r,k,h}$

Where:

a. For a *pseudo-unit* to be included in the $RT\_OR\_CMT\_ST\_PC^{s,t}_{r,k,h}$ matrix, for the relevant *metering interval* 't' of *settlement hour* 'h':

i. it must not have *offered* in the *real-time market* in *single cycle mode*;

ii. the associated combustion turbine *resource* must have received a *real-time schedule* for *energy* greater than or equal to its *minimum loading point;* and

iii. it must be operationally constrained greater than or equal to its *minimum loading point* by the *pre-dispatch calculation engine*.

DIPC

1.6.1.7 $RT\_OR\_DIPC^{c,t}_{r,k,h}$= *real-time market class r reserve* price curve for a *non-quick start resource*, represented as an X-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at combustion turbine *resource delivery point* 'c' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' are in column 1 and *offered* quantities are in column 2, and is derived as follows:

Derived Interval Price Curve Matrix	=	Price [Row 'i', Column 1]	Quantity [Row i, Column 2]
$RT\_OR\_DIPC_{k,r,h}^{c,t}$	Row i	$BOR[i,1]_{k,r,h}^{p}$	$Min\left(BOR[i,2]_{k,r,h}^{p}, OR\_RT\_DRRQ_{r,k,h}^{p,t}\right) \times \left(1 - \sout{RT\_}ST\_Portion_{k,h,d2}^{p,t}\right)$

Where:

a. Any *price-quantity pairs* in the $RT\_OR\_DIPC_{r,k,h}^{c,t}$ price curve matrix that have the same quantity value as a prior quantity value in the price curve matrix shall have their price component and quantity component set to zero.

1.6.1.8 $RT\_OR\_DIPC_{r,k,h}^{s,t}$= the *real-time market class r reserve* price curve for a *non-quick start resource*, represented as an X-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at steam turbine *resource delivery point* 's' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' are in column 1 and *offered* quantities are in column 2, and is derived as follows:

Price Curve Matrix	=	Price [Row 'i', Column 1]	Quantity [Row 'i', Column 2]
$RT\_OR\_DIPC_{r,k,h}^{s,t}$	Row i	$RT\_OR\_ST\_PC[i,1]_{r,k,h}^{s,t}$	$\sum_{j=1}^{i} RT\_OR\_ST\_PC[j,2]_{r,k,h}^{s,t}$

1.6.1.9 $RT\_OR\_CMT\_DIPC_{r,k,h}^{s,t}$ = the *real-time market class r reserve* price curves of a *non-quick start resource*, represented as an X-by-2 matrix of *price-quantity pairs* for *market participant* 'k' at steam turbine *resource delivery point* 's' during *metering interval* 't' of *settlement hour* 'h' arranged in ascending order by the *offered* price in each *price-quantity pair* where *offered* prices 'P' are in column 1 and *offered* quantities are in column 2, and is derived as follows:

Price Curve Matrix	=	Price [Row 'i', Column 1]	Quantity [Row 'i', Column 2]
$RT\_OR\_CMT\_DIPC_{r,k,h}^{s,t}$	Row i	$RT\_OR\_CMT\_ST\_PC[i,1]_{r,k,h}^{s,t}$	$\sum_{j=1}^{i} RT\_OR\_CMT\_ST\_PC[j,2]_{r,k,h}^{s,t}$

DIGQ

1.6.1.10 $RT\_OR\_CMT\_DIGQ_{r,k,h}^{s,t}$ = the portion of the *real-time schedule* quantity of *class r reserve* scheduled for injection that is eligible for the *real-time generator offer* guarantee *settlement amount* for *market participant* 'k' at steam turbine *resource delivery point* 's' in *metering interval* 't' of *settlement hour* 'h', and is derived as follows:

$$RT\_OR\_CMT\_DIGQ_{r,k,h}^{s,t} = \sum_{p=1}^{N} RT\_STP\_QSOR_{r,k,h}^{\sout{s,}p,t}$$

Where:

a. 'N' is the set of all *pseudo-units* associated with steam turbine *resource delivery point* 's' that, for the relevant *metering interval* 't' of *settlement hour* 'h':

   i. are operating in combined cycle mode;

   ii. were operationally constrained greater than or equal to its *minimum loading point* by the *pre-dispatch calculation engine;* and

   iii. whose associated combustion turbine *resource* must have received a *real-time schedule* greater than or equal to its *minimum loading point*.

Appendix 9.4 – Settlement Mitigation

1 Introduction

1.1 Interpretation

1.1.1 In this Appendix 9.4:

1.1.1.1 the applicable *thermal state* for a *start-up offer* shall be the *thermal state* assigned to the *resource* at the time of the *start-up notice* in accordance with MR Ch.7 App.7.5A s.8.6.3.8 for the relevant *settlement hour*. Notwithstanding the foregoing, the applicable *thermal state* for all *settlement hours* within a *day-ahead ~~market~~ commitment period* or a *real-time market commitment period*, as the case may be, shall be the *thermal state* of the first *settlement hour* of the *day-ahead ~~market~~ commitment period* or *real-time market commitment period*, as the case may be, as determined at the time of the *start-up notice* in accordance with MR Ch.7 App.7.5A s.8.6.3.8; ~~and~~

1.1.1.2 notwithstanding sections 2.1 and 3.1, if an as-*offered financial dispatch data parameter* for an *offer* is less than its corresponding *reference level value,* the *reference level value offer* for the relevant variable defined in section 2.1 or 3.1, as the case may be, shall be the value of the as-*offered financial dispatch data parameter*~~.~~*;* and

1.1.1.3 The following lists the conduct tests in order of their restrictiveness, from most restrictive to least restrictive, for the purpose of determining which conduct test applies for a specific *settlement hour*:

a. the local market power mitigation process for *operating reserve* set out in section 2.4.12 for the *day-ahead market* and section 3.4.12 for the *real-time market;*

b. the *reliability* conditions conduct test for *energy* set out in sections 2.4.10 and 2.4.11 for the *day-ahead market* and sections 3.4.10 and 3.4.11 for the *real-time market;*

c. the global market power mitigation process conduct test for *operating reserve* set out in section 2.4.13 for the *day-ahead market* and section 3.4.13 for the *real-time market;*

d. the *narrow constrained area* conduct test for *energy* set out in sections 2.4.2 and 2.4.3 for the *day-ahead market* and sections 3.4.2 and 3.4.3 for the *real-time market;*

e. the *dynamic constrained area* conduct test for *energy* set out in sections 2.4.4 and 2.4.5 for the *day-ahead market* and sections 3.4.4 and 3.4.5 for the *real-time market;*

f. the broad constrained area conduct test for *energy* set out in sections 2.4.6 and 2.4.7 for the *day-ahead market* and sections 3.4.6 and 3.4.7 for the *real-time market;* and

g. the global market power mitigation process conduct test for *energy* set out in sections 2.4.8 and 2.4.9 for the *day-ahead market* and sections 3.4.8 and 3.4.9 for the *real-time market.*

2 Day-Ahead Market Mitigation

2.2 Constrained Area Conditions

2.2.1 The *IESO* shall apply the conditions set out in this section 2.2 to determine whether and which conduct tests set out in section 2.4 apply.

2.2.2 In regards to *energy*:

Constrained Area Condition Test for a Narrow Constrained Area

2.2.2.1 Where the conditions set out in MR Ch.7 App.7.5 s.10.4.1.1.1 are true, or any *resource* meets the conditions outlined in ss.2.3.2.2 or 2.3.2.3, the *IESO* shall apply the *narrow constrained area* conduct test set out in sections 2.4.2 and 2.4.3;

Constrained Area Condition Test for a Dynamic Constrained Area

2.2.2.2 Where the conditions set out in MR Ch.7 App.7.5 s.10.4.1.1.2 are true, or any *resource* meets the conditions outlined in ss.2.3.3.2 or 2.3.3.3, the *IESO* shall apply the *dynamic constrained area* conduct test set out in sections 2.4.4 and 2.4.5;

Constrained Area Condition Test for a Broad Constrained Area

2.2.2.3 Where the conditions set out in MR Ch.7 App.7.5 s.10.4.2.1 are true, or any *resource* meets the conditions outlined in ss.2.3.4.2 or 2.3.4.3, the *IESO* shall apply the broad constrained area conduct test set out in sections 2.4.6 and 2.4.7;

Constrained Area Condition Test for Global Market Power Mitigation for Energy

2.2.2.4 Where the conditions set out in MR Ch.7 App.7.5 s.10.5.1 are true, or any *resource* meets the conditions outlined in ss.2.3.5.2, the *IESO* shall apply

the global market power mitigation process conduct test set out in sections 2.4.8 and 2.4.9; and

Constrained Area Condition Test for Reliability

2.2.2.5 Notwithstanding the foregoing, the *IESO* shall apply the *reliability* conditions conduct test set out in sections 2.4.10 and 2.4.11 where any of the conditions set out in the applicable *market manual* are true.

2.2.3 In regards to *operating reserve*:

Constrained Area Condition Test for Local Market Power Mitigation for Operating Reserve

2.2.3.1 Where the conditions set out in MR Ch.7 App.7.5 s.10.6.1 are true, or any *resource* meets the conditions outlined in s.2.3.7(b), the *IESO* shall apply the local market power mitigation process conduct test set out in section 2.4.12; and

Constrained Area Condition Test for Global Market Power Mitigation for Operating Reserve

2.2.3.2 Where the conditions set out in MR Ch.7 App.7.5 s.10.7.1 are true, or any *resource* meets the conditions outlined in ss.2.3.8(b), the *IESO* shall apply the global market power mitigation process conduct test set out in sections 2.4.13.

2.3 Applicable Resources

2.3.1 The *IESO* shall apply the conduct tests described in section 2.4 for transactions scheduled in the *day-ahead market* to the *resources* identified in this section 2.3.

Constrained Area Condition Test for a Narrow Constrained Area

2.3.2 Subject to section 2.3.9, in regards to the conduct test for local market power mitigation process in a *narrow constrained area* in the *energy market* outlined in sections 2.4.2 and 2.4.3, the *IESO* shall apply such conduct tests to the following *resources*:

2.3.2.1 All *resources* that have a *day-ahead schedule* for *energy* and are identified as having met the *narrow constrained area* condition in the Outputs of the Constrained Area Conditions Test produced in accordance with MR Ch.7 App.7.5 s.10.8.1; ~~and~~

2.3.2.2 Any *GOG-eligible resource* that is part of the *narrow constrained area,* that received a *day-ahead operational commitment,* and where any binding constraint from the same *narrow constrained area* causes an increase in the congestion component of the *resource's day-ahead market locational marginal price;*

2.3.2.3 Any *GOG-eligible resource* that is part of the *narrow constrained area* and received a *day-ahead operational commitment,* such *resource* has a *generator* sensitivity factor ~~greater~~that is less than -0.02 on an active constraint that is a *narrow constrained area* constraint, and such constraint would have been binding or would have been violated but for the *day-ahead operational commitment* received by the *resource* except for when the difference between the flow and constraint value is less than or equal to 10MW.

Constrained Area Condition Test for a Dynamic Constrained Area

2.3.3 Subject to section 2.3.9, in regards to the conduct test for local market power mitigation process in a *dynamic constrained area* in the *energy market* outlined in sections 2.4.4 and 2.4.5, the *IESO* shall apply such conduct tests to the following *resources*:

2.3.3.1 All *resources* that have a *day-ahead schedule* for *energy* and are identified as having met the *dynamic constrained area* condition in the Outputs of the Constrained Area Conditions Test produced in accordance with MR Ch.7 App.7.5 s.10.8.1; ~~and~~

2.3.3.2 Any *GOG-eligible resource* that is part of the *dynamic constrained area,* that received a *day-ahead operational commitment,* and where any binding constraint from the same *dynamic constrained area* causes an increase in the congestion component of the *resource's day-ahead market locational marginal price*; and

2.3.3.3 Any *GOG-eligible resource* that is part of the *dynamic constrained area* and received a *day-ahead operational commitment,* such *resource* has a *generator* sensitivity factor ~~greater~~that is less than -0.02 on an active constraint that is a *dynamic constrained area* constraint, and such constraint would have been binding or would have been violated but for the *day-ahead operational commitment* received by the *resource* except for when the difference between the flow and constraint value is less than or equal to 10MW.

Constrained Area Condition Test for a Broad Constrained Area

2.3.4 Subject to section 2.3.9, in regards to the conduct test for local market power mitigation process in a broad constrained area in the *energy market* outlined in sections 2.4.6 and 2.4.7, the *IESO* shall apply such conduct tests to the following *resources*:

2.3.4.1 All *resources* that have a *day-ahead schedule* for *energy* and are identified as having met the broad constrained area condition in the Outputs of the Constrained Area Conditions Test produced in accordance with MR Ch.7 App.7.5 s.10.8.1;

2.3.4.2 Any *GOG-eligible resource* that received a *day-ahead operational commitment* and ~~the congestion component of the applicable *day-ahead*~~

~~*market locational marginal price* is greater than $0/MWh on~~where any binding constraint that was not a *narrow constrained area* or a *dynamic constrained area* binding constraint~~; and~~ causes an increase in the congestion component of the *resource's day-ahead market locational marginal price*; and

2.3.4.3 Any *GOG-eligible resource* that received a *day-ahead operational commitment,* such *resource* has a *generator* sensitivity factor ~~greater~~that is less than -0.02 on an active constraint that is not a *narrow constrained area* or a *dynamic constrained area* constraint, and such constraint would have been binding or would have been violated but for the *day-ahead operational commitment* received by the *resource* except for when the difference between the flow and constraint value is less than or equal to 10MW.

Constrained Area Condition Test for Local Market Power Mitigation for Operating Reserve

2.3.7 Subject to section 2.3.9, in regards to the local market power mitigation process in the *operating reserve market* outlined in section 2.4.12, the *IESO* shall apply such conduct tests to the following *resources*:

~~a.~~2.3.7.1 all *resources* that have a *day-ahead schedule* for *operating reserve* and are identified as having met the local power mitigation conditions for *operating reserve* in the Outputs of the Constrained Area Conditions Test produced in accordance with MR Ch.7 App.7.5 s.10.8.1; and

~~b.~~2.3.7.2 all *resources* that ~~have a *day-ahead schedule* for *operating reserve* whom are located~~meet the condition outlined in ~~a region with a binding maximum constraint~~MR Ch.7 App7.5 s. 10.6.1.3.

Constrained Area Condition Test for Global Market Power Mitigation for Operating Reserve

2.3.8 Subject to section 2.3.9, in regards to the global market power mitigation process in the *operating reserve market* outlined in section 2.4.13, the *IESO* shall apply such conduct tests to the following *resources:*

~~a.~~2.3.8.1 all *resources* that have a *day-ahead schedule* for *operating reserve* and are identified as having met the global power mitigation conditions for *operating reserve* in the Outputs of the Constrained Area Conditions Test produced in accordance with MR Ch.7 App.7.5 s.10.8.1; and

~~b.~~2.3.8.2 all *resources* that ~~have a *day-ahead schedule* for *operating reserve* whom are located~~meet the condition outlined in ~~a region with a binding maximum constraint~~section MR Ch.7 App7.5 s. 10.7.3.

2.3.9 Notwithstanding the foregoing, *non-committable resources* may only be subject to the conduct tests described in sections 2.4.2, 2.4.4, 2.4.6, 2.4.8, and 2.4.10. For greater certainty, *GOG-eligible resources* may, depending on the outcome of this section 2.3, be subject to any conduct test set out in section 2.4.

2.4 Conduct Test

2.4.1 Subject to section 2.4.14, the *IESO* shall apply the conduct tests as set out in this section 2.4. For the purpose of the conduct tests set out in this section 2.4:

2.4.1.1 where a *resource* has not submitted a *minimum loading point,* the applicable *minimum loading point* is deemed to be zero MW, and all *offer laminations* for such *resource* will be considered to be above the *energy offer* lamination that includes its *minimum loading point;*

2.4.1.2 the maximum quantity of the *offer laminations* that form part of $EMFC\_DAM\_BE_{k,h}^{m}$ will be equal to the maximum quantity of the *resource's* submitted *offer laminations*; and

2.4.1.3 $EMFC\_DAM\_BE_{k,h}^{m}$ shall not exceed 20 laminations for a *resource* that is not a *pseudo-unit* or the number of laminations specified in MR. Ch.7 s.3.5.5.6 for a *resource* that is a *pseudo-unit*. Where the outcome of the conduct test set out in this section 2.4 would otherwise violate this requirement, the IESO shall:

(i) for conduct tests applicable to laminations that are above the *energy offer* lamination that includes its *minimum loading point,* delete the laminations in order from the highest price to the lowest price, except maintaining the lamination with the highest price, until the number of laminations is equal to the maximum number of laminations permitted; and

(ii) for conduct tests applicable to laminations that are up to and including the *energy offer* lamination that includes its *minimum loading point,* replace all laminations with one lamination where the price is equal to the highest price lamination of the relevant *reference level* and the quantity is equal to the submitted *minimum loading point.*

Local Market Power Mitigation Process in a Narrow Constrained Area for Energy Offers up to and Including the Offer Lamination That Includes Minimum Loading Point

2.4.3 The *IESO* shall apply the following conduct test in the circumstances outlined in section 2.2.2.1 to the *resources* identified in section 2.3.2. For each *settlement hour* 'h' within a *day-ahead ~~market~~ commitment period* that contains a *settlement hour* that qualified to be tested under section 2.2.2.1 and for each such *resource* the *IESO* shall:

Local Market Power Mitigation Process in a Dynamic Constrained Area for Energy Offers up to and Including the Offer Lamination That Includes Minimum Loading Point

2.4.5 The *IESO* shall apply the following conduct test in the circumstances outlined in section 2.2.2.2 to the *resources* identified in section 2.3.3. For each *settlement hour* 'h ′within a *day-ahead ~~market~~ commitment period* that contains a *settlement hour* that qualified to be tested under section 2.2.2.2 and for each such *resource* the *IESO* shall:

Local Market Power Mitigation Process in a Broad Constrained Area for Energy Offers Up to and Including the Offer Lamination That Includes Minimum Loading Point

2.4.7 The *IESO* shall apply the following conduct test in the circumstances outlined in section 2.2.2.3 to the *resources* identified in section 2.3.4. For each *settlement hour* 'h' within a *day-ahead ~~market~~ commitment period* that contains a *settlement hour* that qualified to be tested under section 2.2.2.3 and for each such *resource* the *IESO* shall:

Global Market Power Mitigation Process for Energy Offers Up to and Including the Offer Lamination That Includes Minimum Loading Point

2.4.9 The *IESO* shall apply the following conduct test in the circumstances outlined in section 2.2.2.4 to the *resources* identified in section 2.3.5. For each *settlement hour* 'h' within a *day-ahead ~~market~~ commitment period* that contains a *settlement hour* that qualified to be tested under section 2.2.2.4 and for each such *resource* the *IESO* shall:

Local Market Power Mitigation Process Due to Reliability Constraints for Energy Offers Up to and Including the Offer Lamination That Includes Minimum Loading Point

2.4.11 The *IESO* shall apply the following conduct test in the circumstances outlined in section 2.2.2.5 to the *resources* identified in section 2.3.6. For each *settlement hour* 'h' within a *day-ahead ~~market~~ commitment period* that contains a *settlement hour* that qualified to be tested under section 2.2.2.5 and for each such *resource* the *IESO* shall:

2.4.14 If multiple conduct tests set out in section 2.4 apply in regards to the same *settlement hour*, then the *IESO* shall apply the following:

~~a.~~2.4.14.1 where multiple conduct tests for *energy* greater than *minimum loading point* apply in regards to the same *settlement hour,* the conduct test with the most restrictive threshold, as determined in accordance with ~~the applicable *market manual*~~section 1.1.1.3*,* shall apply to such *settlement hour*;

~~b.~~2.4.14.2 where multiple conduct tests for *energy* up to and including *minimum loading point* apply in regards to the same *settlement hour*, the conduct test with the most restrictive threshold, as determined in accordance with ~~the applicable *market manual*~~section 1.1.1.3*,* shall apply to all *settlement hours* within the *day-ahead ~~market~~ commitment period* that contains such *settlement hour;*

~~c.~~2.4.14.3 where both a conduct test for *energy* up to and including *minimum loading point* and *energy* greater than *minimum loading point* apply with respect to the same *settlement hour,*

a. the greater than *minimum loading point* conduct test with the most restrictive threshold, as determined in accordance with ~~the applicable *market manual*~~section 1.1.1.3*,* shall apply to such *settlement hour;* and

b. if the *resource* does not fail such greater than *minimum loading point* conduct test, the up to and including *minimum loading point* conduct test with the most restrictive threshold, as determined in accordance with ~~the applicable *market manual*~~section 1.1.1.3*,* shall apply to such *settlement hour.*

~~d.~~2.4.14.4 where multiple conduct tests for *operating reserve offers* apply in regards to the same *settlement hour,* the conduct test with the most restrictive threshold, as determined in accordance with ~~the applicable *market manual*~~section 1.1.1.3*,* shall apply to such *settlement hour*;

~~e.~~2.4.14.5 where multiple conduct tests for *start-up offer* or *speed no-load offers*, as the case may be, apply in regards to the same *settlement hour*, the conduct test with the most restrictive threshold, as determined in accordance with ~~the applicable *market manual*~~section 1.1.1.3*,* shall apply to all *settlement hours* within the *day-ahead ~~market~~ commitment period* that contains such *settlement hour.*

3 Real-Time Mitigation

3.2 Constrained Area Conditions

3.2.1 The *IESO* shall apply the conditions set out in this section 3.2 to determine whether and which conducts tests set out in section 3.4 apply:

3.2.2 In regards to *energy*,

Constrained Area Condition Test for a Narrow Constrained Area

3.2.2.1 The *IESO* shall apply:

a. the *narrow constrained area* conduct test set out in section 3.4.2 when at least one transmission constraint for a *narrow constrained area* is binding in the 'pd1' pre-dispatch run; and

b. the *narrow constrained area* conduct test set out in section 3.4.3 when at least one transmission constraint for a *narrow constrained area* is binding in the 'pdi' pre-dispatch run or any *resource* meets the conditions outlined in 3.3.2.3 or 3.3.2.4.

Constrained Area Condition Test for a Dynamic Constrained Area

3.2.2.2 The *IESO* shall apply:

a. the *dynamic constrained area* conduct test set out in section 3.4.4, when at least one transmission constraint for a *dynamic constrained area* is binding in the 'pd1' pre-dispatch run; and

b. the *dynamic constrained area* conduct test set out in section 3.4.5, when at least one transmission constraint for a *dynamic constrained area* is binding in the 'pdi' pre-dispatch run or any *resource* meets the conditions outlined in 3.3.3.3 or 3.3.3.4.

Constrained Area Condition Test for a Broad Constrained Area

3.2.2.3 The *IESO* shall apply:

a. the broad constrained area conduct test set out in section 3.4.6 when the congestion component of the *locational marginal price* of a *resource* is greater than $25/MWh in the 'pd1' pre-dispatch run; and

b. the broad constrained area conduct test set out in section 3.4.7 when the congestion component of the *locational marginal price* of a

resource is greater than $25/MWh in the 'pdi' pre-dispatch run or any *resource* meets the conditions outlined in 3.3.4.2 or 3.3.4.3.

Constrained Area Condition Test for Global Market Power Mitigation for Energy

3.2.2.4 The *IESO* shall apply:

c. the global market power mitigation conduct test set out in section 3.4.8 when the following circumstances are true in the 'pd1' pre-dispatch run, as applicable:

i. ~~the~~ the *intertie border prices* at the *global market power reference intertie zones* are greater than $100/MWh for the relevant *settlement hour*; and

---

c. the global market power mitigation conduct test set out in section 3.4.9 when ~~the following circumstance is true more than two hours prior to the 'pdi' pre-dispatch run:~~

i. ~~the *intertie border prices* at the *global market power reference intertie zones* are greater than $100/MWh for the relevant *settlement hour*~~any *resource* meets the conditions outlined in 3.3.5.2 or 3.3.5.3.

Constrained Area Condition Test for Reliability

3.2.2.5 Notwithstanding the foregoing, the *IESO* shall apply the *reliability* conditions conduct tests set out in section 3.4.10 and 3.4.11 where any of the conditions set out in the applicable *market manual* are true.

3.2.3 In regards to *operating reserve*:

Constrained Area Condition Test for Local Market Power Mitigation for Operating Reserve

3.2.3.1 The *IESO* shall apply the local market power mitigation process conduct test set out in section 3.4.12 if a reserve area has a non-zero minimum requirement in the 'pd1' pre-dispatch run or the 'pdi' pre-dispatch run~~;~~ ~~and~~ or any *resource* meets the condition outlined in 3.3.7(b).

Constrained Area Condition Test for Global Market Power Mitigation for Operating Reserve

3.2.3.2 The *IESO* shall apply the global market power mitigation process conduct test set out in section 3.4.13 when a *locational marginal price* for any class of *operating reserve* is greater than $15/MW in the 'pd1' pre-dispatch run or the 'pdi' pre-dispatch run or any *resource* meets the conditions outlined in 3.3.8.2, 3.3.8.3, or 3.3.8.4.

3.3 Applicable Resources

3.3.1 The *IESO* shall apply the conduct tests described in section 3.4 for transactions scheduled in the *real time market* to the *resources* identified in this section 3.3.

Constrained Area Condition Test for a Narrow Constrained Area

3.3.2 Subject to section 3.3.9, in regards to the conduct test for local market power mitigation process in a *narrow constrained area* in the *energy market* outlined in sections 3.4.2 and 3.4.3, the *IESO* shall apply the conduct tests to the following *resources*:

3.3.2.1 Any *non-committable resources* located in the *narrow constrained area* that had at least one binding constraint in the 'pd1' pre-dispatch run;

3.3.2.2 Any *GOG-eligible resources* located in the *narrow constrained area* that had at least one binding constraint in the 'pdi' pre-dispatch run;

3.3.2.3 Any *GOG-eligible resource* that is part of the *narrow constrained area,* that received a *pre-dispatch operational commitment* in the 'pdi' pre-dispatch run, and where any binding constraint from the same *narrow constrained area* causes an increase in the congestion component of the applicable*resource's real-time market locational marginal price* is greater than $0/MWh on any *narrow constrained area* binding constraint; and

3.3.2.4 Any *GOG-eligible resource* that is part of the *narrow constrained area* and received a *pre-dispatch operational commitment* in the 'pdi' pre-dispatch run, such *resource* has a generator sensitivity factor greaterthat is less than -0.02 on an active constraint that is a *narrow constrained area*, and the following condition is true:

$RT\_QSI_{k,h}^{m} > (Max\_ACL^{c} - Act\_ACL^{c}) / GSF_{k}^{m,c}$ such constraint would have been binding or would have been violated but for the *pre-dispatch operational commitment* received by the *resource* except for when the difference between the flow and constraint value is less than or equal to 10MW.

Where:

Max_ACL^{c} is the maximum acceptable quantity of *energy* that can be injected on constraint 'c' in *settlement hour* 'h';

Act_ACL^{c} is the actual quantity of *energy* injected on constraint 'c' in *settlement hour* 'h'; and

d. $GSF_{k}^{m,c}$ is the generator sensitivity factor for the *resource* for *market participant* 'k' at *delivery point* 'm' on constraint 'c'.

Constrained Area Condition Test for a Dynamic Constrained Area

3.3.3 Subject to section 3.3.9, in regards to the conduct test for local market power mitigation process in a *dynamic constrained area* in the *energy market* outlined in sections 3.4.4 and 3.4.5 the *IESO* shall apply the conduct tests to the following *resources:*

3.3.3.1 Any *non-committable resources* located in the *dynamic constrained area* that had at least one binding constraint in the 'pd1' pre-dispatch run;

3.3.3.2 Any *GOG-eligible resources* located in the *dynamic constrained area* that had at least one binding constraint in the 'pdi' pre-dispatch run;

3.3.3.3 Any *GOG-eligible resource* that is part of the *dynamic constrained area,* that received a *pre-dispatch operational commitment,* and where any binding constraint from the same *dynamic constrained area* causes an increase in the congestion component of the ~~applicable~~*resource's real-time market locational marginal price* ~~is greater than $0/MWh on any *dynamic constrained area* binding constraint~~; and

3.3.3.4 Any *GOG-eligible resource* that is part of the *dynamic constrained area* and received a *pre-dispatch operational commitment,* such *resource* has a generator sensitivity factor ~~greater~~that is less than -0.02 on an active constraint that is a *dynamic constrained area*, and such constraint would have been binding or would have been violated but for the *pre-dispatch operational commitment* received by the *resource* except for when the difference between the flow and constraint value is less than or equal to 10MW.

Constrained Area Condition Test for a Broad Constrained Area

3.3.4 Subject to section 3.3.9, in regards to the conduct test for local market power mitigation process in a broad constrained area in the *energy market* outlined in section 3.4.6 and 3.4.7, the *IESO* shall apply such conduct tests to the following *resources*:

3.3.4.1 All *resources* that have a *real time market schedule* for *energy* and are identified as having met the broad constrained area condition in the Outputs of the Constrained Area Conditions Test produced in accordance with MR Ch.7 App.7.5A s.10.8.1;

3.3.4.2 Any *GOG-eligible resource* that received a *pre-dispatch operational commitment* in the 'pdi' pre-dispatch run and ~~congestion component of the applicable *locational marginal price* is greater than $0/MWh on~~where any binding constraint that was not a *narrow constrained area* or a *dynamic constrained area* binding constraint causes an increase in the congestion component of the *resource's real-time market locational marginal price*; and

3.3.4.3 Any *GOG-eligible resource* that received a *pre-dispatch operational commitment* in the 'pdi' pre-dispatch run, such *resource* has a generator sensitivity factor ~~greater~~that is less than -0.02 on an active constraint that is not a *narrow constrained area* or a *dynamic constrained area* constraint, and such constraint would have been binding or would have been violated but for the *pre-dispatch operational commitment* received by the *resource* except for when the difference between the flow and constraint value is less than or equal to 10MW.

Constrained Area Condition Test for Local Market Power Mitigation for Operating Reserve

3.3.7 Subject to section 3.3.9, in regards to the local market power mitigation process in the *operating reserve market* outlined in section 3.4.12, the *IESO* shall apply such conduct tests to the following *resources:*

~~a.~~3.3.7.1 all *resources* that have a *real-time market schedule* for *operating reserve* and are identified as having met the local market power mitigation condition for *operating reserve* in the Outputs of the Constrained Area Conditions Test produced in accordance with MR Ch.7 App.7.5A s.10.8.1; and

~~b.~~3.3.7.2 all *resources* that ~~have a *real-time market schedule* for *operating reserve* whom are located~~meet the condition outlined in ~~a region with a binding maximum constraint~~MR Ch.7 App7.5 s.10.6.2.

Constrained Area Condition Test for Global Market Power Mitigation for Operating Reserve

3.3.8 Subject to section 3.3.9, in regards to the global market power mitigation process in the *operating reserve market* outlined in section 3.4.13, the *IESO* shall apply such conduct tests to the following *resources*:

3.3.8.1 All *resources* that have a *real-time market schedule* for *operating reserve* and are identified as having met the global market power mitigation condition for *operating reserve* in the Outputs of the Constrained Area Conditions Test produced in accordance with MR Ch.7 App.7.5A s.10.8.1;

3.3.8.2 Any *GOG-eligible resource* that has a *real-time schedule* for *operating reserve*;

3.3.8.3 all *resources* that ~~have a *real-time market schedule* for *operating reserve* whom are located~~meet the condition outlined in ~~a region with a binding maximum constraint~~MR Ch.7 App7.5 s. 10.7.3; and

3.3.8.4 Any *resource* that, either as permitted in accordance with MR Ch.7 ss.3.3.4B, 3.3.8, 3.3.9.2, 3.3.11 and 21.6 or as approved by the

IESO in accordance with MR Ch.7 s.3.3.6, a new *operating reserve offer* within the *real-time market mandatory window*.

3.3.9 Notwithstanding the foregoing*, non-committable resources* may only be subject to the conduct tests described in sections 3.4.2, 3.4.4, 3.4.6, 3.4.8, and 3.4.10. For greater certainty, *GOG-eligible resources* may, depending on the outcome of this section 3.3, be subject to any conduct test set out in section 3.4.

3.4 Conduct Test

3.4.1 Subject to section 3.4.14, the *IESO* shall apply the conduct tests as set out in this section 3.4. For the purpose of the conduct tests set out in this section 3.4:

3.4.1.1 where a *resource* has not submitted a *minimum loading point,* the applicable *minimum loading point* is deemed to be zero MW, and all *offer laminations* for such *resource* will be considered to be above the *energy offer* lamination that includes its *minimum loading point;*

3.4.1.2 the maximum quantity of the *offer laminations* that form part of $EMFC\_RT\_BE^{m}_{k,h}$ will be equal to the maximum quantity of the *resource's* submitted *offer laminations*; and

3.4.1.3 $EMFC\_RT\_BE^{m}_{k,h}$ shall not exceed 20 laminations for a *resource* that is not a *pseudo-unit* or the number of laminations specified in MR. Ch.7 s.3.5.5.6 for a *resource* that is a *pseudo-unit*. Where the outcome of the conduct test set out in this section 3.4 would otherwise violate this requirement, the *IESO* shall:

(i) for conduct tests applicable to laminations that are above the *energy offer* lamination that includes its *minimum loading point,* delete the laminations in order from the highest price to the lowest price, except maintaining the lamination with the highest price, until the number of laminations is equal to the maximum number of laminations permitted; and

(ii) for conduct tests applicable to laminations that are up to and including the *energy offer* lamination that includes its *minimum loading point,* replace all laminations with one lamination where the price is equal to the highest price lamination of the relevant *reference level* and the quantity is equal to the submitted *minimum loading point.*

Local Market Power Mitigation Process in a Narrow Constrained Area for Energy Offers Up to and Including the Offer Lamination That Includes Minimum Loading Point

3.4.3 The *IESO* shall apply the following conduct test in the circumstances outlined in section 3.2.2.1(b) to the *resources* identified in ~~section~~ ss.3.3.2.2 to 3.3.2.4. For each *settlement hour* 'h' within a ~~*pre-dispatch*~~*real-time commitment period* and/or

real-time reliability commitment period that contains a *settlement hour* that qualified to be tested under section 3.2.2.1(b) and for each such *resource* the *IESO* shall:

Local Market Power Mitigation Process in a Dynamic Constrained Area for Energy Offers Up to and Including the Offer Lamination That Includes Minimum Loading Point

3.4.5 the *IESO* shall apply the following conduct test in the circumstances outlined in section 3.2.2.2(b) to the *resources* identified in ~~section~~ ss.3.3.3.2 to 3.3.3.4. For each *settlement hour* 'h' within a ~~*pre-dispatch*~~*real-time commitment period* and/or *real-time reliability commitment period* that contains a *settlement hour* that qualified to be tested under section 3.2.2.2(b) and for each such *resource* the *IESO* shall:

Local Market Power Mitigation Process in a Broad Constrained Area for Energy Offers Greater Than the Offer Lamination That Includes Minimum Loading Point

3.4.6 The *IESO* shall apply the following conduct test in the circumstances outlined in section 3.2.2.3(a) to the *resources* identified in section 3.3.4. For each *settlement hour* 'h' that qualified to be tested under section 3.2.2.3(a) and for each such *resource* the *IESO* shall:

3.4.6.1 Evaluate *energy offer* laminations that are above the *energy offer* lamination that includes its *minimum loading point* as follows:

a. a *resource* at *delivery point* 'm' fails the conduct test for *settlement hour* 'h' if the following is true for any *offer* lamination '*a*':

For all $a \in A_{k,h}^{GTMLP,m}$, if

i. $PGTMLP_{k,h,a}^{m} > 25$; and

ii. $PGTMLP_{k,h,a}^{m} > min\left(\left(PGTMLPRef_{k,h,a'}^{m} + abs\left(PGTMLPRef_{k,h,a'}^{m}\right) \times 3\right), PGTMLPRef_{k,h,a'}^{m} + 100\text{~~25~~}\right)$

b. where such *resource* fails the conduct test and for the *settlement hour* that failed the conduct test, $EMFC\_RT\_BE_{k,h}^{m}$ shall equal $PLTMLPRef_{k,h,a'}^{m}$ for all *offer* laminations $a \in A_{k,h}^{LTMLP,m}$ and $PGTMLPRef_{k,h,a'}^{m}$ for all *offer* laminations $a \in A_{k,h}^{GTMLP,m}$;

Local Market Power Mitigation Process in a Broad Constrained Area for Energy Offers up to and Including the Offer Lamination That Includes Minimum Loading Point

3.4.7 The *IESO* shall apply the following conduct test in the circumstances outlined in section 3.2.2.3(b) to the *resources* identified in ~~section~~sections 3.3.4.2 or 3.3.4.3. For each *settlement hour* 'h' within a ~~*pre-dispatch*~~*real-time commitment period*

and/or *real-time reliability commitment period* that contains a *settlement hour* that qualified to be tested under section 3.2.2.3(b) and for each such *resource* the *IESO* shall:

3.4.7.1 Evaluate *energy offer* laminations that are up to and including the *energy offer* lamination that includes its *minimum loading point* as follows:

a. a *resource* at *delivery point* 'm' fails the conduct test for *settlement hour* 'h' if the following is true for any *offer* lamination '*a*':

For all $a \in A_{k,h}^{LTMLP,m}$, if

i. $PLTMLP_{k,h,a}^{m} > 25$; and

ii. $PLTMLP_{k,h,a}^{m} > min\left((PLTMLPRef_{k,h,a'}^{m} + abs(PLTMLPRef_{k,h,a'}^{m}) \times 3), PLTMLPRef_{k,h,a'}^{m} + 100\text{~~25~~}\right)$

Global Market Power Mitigation Process for Energy Offers Up to and Including the Offer Lamination That Includes Minimum Loading Point

3.4.9 The *IESO* shall apply the following conduct test in the circumstances outlined in section 3.2.2.4(b) or 3.2.2.4(c) to the *resources* identified in ~~section~~ ss.3.3.5.2 or 3.3.5.3. For each *settlement hour* 'h' within a ~~*pre-dispatch*~~*real-time commitment period* and/or *real-time reliability commitment period* that contains a *settlement hour* that qualified to be tested under section 3.2.2.4(b) or 3.2.2.4(c) and for each such *resource* the *IESO* shall:

Local Market Power Mitigation Process Due to Reliability Constraints for Energy Offers Up to and Including the Offer Lamination That Includes Minimum Loading Point

3.4.11 The *IESO* shall apply the following conduct test in the circumstances outlined in section 3.2.2.5 to the *resources* identified in section 3.3.6. For each *settlement hour* 'h' within a ~~*pre-dispatch*~~*real-time commitment period* and/or *real-time reliability commitment period* that contains a *settlement hour* that qualified to be tested under section 3.2.2.5 and for each such *resource* the *IESO* shall:

3.4.14 If multiple conduct tests set out in section 3.4 apply in regards to the same *settlement hour*, then the *IESO* shall apply the following:

a. where multiple conduct tests for *energy* greater than *minimum loading point* apply in regards to the same *settlement hour,* the conduct test with the most restrictive threshold, as determined in accordance with ~~the applicable *market manual*~~section 1.1.1.3, shall apply to such *settlement hour*;

b. where multiple conduct tests for *energy* up to and including *minimum loading point* apply in regards to the same *settlement hour*, the conduct test with the most restrictive threshold, as determined in accordance with ~~the applicable *market manual*~~section 1.1.1.3*,* shall apply to all *settlement hours* within the ~~*pre-dispatch*~~*real-time commitment period* and/or *real-time reliability commitment period* that contains such *settlement hour;*

c. where both a conduct test for *energy* up to and including *minimum loading point* and *energy* greater than *minimum loading point* apply with respect to the same *settlement hour,*

   i. the greater than *minimum loading point* conduct test with the most restrictive threshold, as determined in accordance with ~~the applicable *market manual*~~section 1.1.1.3*,* shall apply to such *settlement hour;* and

   ii. if the *resource* does not fail such greater than *minimum loading point* conduct test, the up to and including *minimum loading point* conduct test with the most restrictive threshold, as determined in accordance with ~~the applicable *market manual*~~section 1.1.1.3*,* shall apply to such *settlement hour.*

d. where multiple conduct tests for *operating reserve offers* apply in regards to the same *settlement hour,* the conduct test with the most restrictive threshold, as determined in accordance with ~~the applicable *market manual*~~section 1.1.1.3*,* shall apply to such *settlement hour*;

e. where multiple conduct tests for *start-up offer* or *speed no-load offers*, as the case may be, apply in regards to the same *settlement hour*, the conduct test with the most restrictive threshold, as determined in accordance with ~~the applicable *market manual*~~section 1.1.1.3*,* shall apply to all *settlement hours* within the ~~*pre-dispatch*~~*real-time commitment period* and/or *real-time reliability commitment period* that contains such *settlement hour.*