on their Bids, to maintain reliability.  The BME will not determine any prices, except, when the special

conditions described in Section 4.17 are applicable but will schedule on a least total Bid  Production

Cost basis.  Minimum run-time Constraints will be honored by BME only until midnight of the Dispatch

Day.

**4.15          ISO Real-Time Dispatch and Real-Time Lost Opportunity Cost Payments**

The ISO shall dispatch the NYS Power System consistent with the Bids that are submitted by

Suppliers and accepted by the ISO, while satisfying the actual system Load.  The ISO may, in order to

prevent or address an Emergency, dispatch Energy above Capacity Limited Resources' and Energy

Limited Resources' bid-in upper operating limits.  The ISO shall use Day-Ahead and Hour-Ahead Bids

and shall accommodate Bilateral Transaction schedules and schedule changes to the maximum extent

possible consistent with reliability and the Decremental Bids and Sink Price Cap Bids of Bilateral

Transaction parties.  The ISO shall run a SCD nominally every five (5) minutes to minimize the total Bid

Production Costs of meeting the system Load and maintaining scheduled interchanges with adjacent

Control Areas over the next SCD interval.  Bid Production Costs, for this purpose, will be calculated

using accepted Day-Ahead and Hour-Ahead Bids submitted into the Real-Time Market.  This dispatch

may cause the schedules of Generators providing Energy under Bilateral Transaction schedules to be

modified, depending upon the Decremental Bids submitted (or assigned) in association with these

schedules.

The ISO may, in order to prevent or address an emergency, dispatch Energy below a

Generator's economic base point.  During any interval in which the ISO is calculating Real-Time

Locational Based Marginal Prices under the procedures established in Subsections A.2. or A. 3. of

Attachment B of this Market Administration and Control Area Services Tariff , a Supplier that produces less Energy in real-time than it would have been economic for it to produce because of such an ISO dispatch will be paid a Lost Opportunity Costs Payment ("LOCP").  Provided that the Supplier follows the dispatch directives of the ISO within the tolerances established in Rate Schedule 3 of this Market Administration and Control Area Services Tariff  for avoiding persistent undergeneration charges , the Supplier shall receive a LOCP for each SCD interval computed by accumulating the positive difference between:  (i) the additional LBMP revenues that would have been realized by the Supplier had it been operating at its economic point; and (ii) the additional production cost that would have been incurred by the Supplier had it been operating at its economic point and multiplying the positive difference by the length of the SCD interval, in hours, and shall be accumulated for all SCD intervals during which special pricing is in effect.  LOCP in each interval shall be calculated as follows:

$$LOCP = \left( \Delta T \times \max\left[0, \left(\Delta LBMP - \Delta PC\right)\right]\right) - LOCP_{Other}$$

$$\Delta LBMP = LBMP_g \times \left(MW_2 - MW_1\right)$$

$$\Delta PC = \int_{MW_1}^{MW_2} Offer_g$$

where:

- LOCP, in dollars, is the lost opportunity cost payment for the SCD intervalinterval in dollars

- LOCP$_{Other}$, in dollars, is the Lost Opportunity Cost Payment for the SCD interval that the supplier would otherwise have received.

- ?T is the duration of the SCD interval in hours

- ?LBMP, in dollars per hour, is the additional LBMP revenue that the Supplier would realize had it been operating at its economic point in dollars per hour

- ?PC, in dollars per hour, is the higher of: (i) the additional production cost that the

Supplier would incur, calculated using the supplier's real-time offer, had it been operating at its economic point,; or (ii) the additional production cost that the Supplier would incur, calculated using the reference real-time offer for the supplier that is maintained by Market Monitoring, had it been operating at its economic point; or (iii) zero.

- $MW_1$, in MW, is the higher of (i) actual output of the generating unit for the SCD interval; and (ii) the 5-minute base point sent to the unit

- $MW_2$, in MW, is the economic operating point of the generating unit,

- $LBMP_g$, in \$/MWH, is the LBMP at the supplier's bus

- $Offer_g$, in \$/MWH versus MW, is one of (i) the incremental energy offer of the supplier, (ii) the reference incremental energy offer, or (iii) zero

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Attachment B

## ATTACHMENT B

## I.      LBMP CALCULATION METHOD

The Locational Based Marginal Prices ("LBMPs") for Generators and Loads will be based on the system marginal costs produced by either the Security Constrained Dispatch ("SCD") program, or during intervals when certain conditions exist at Proxy Generator Buses, the Balancing Market Evaluation ("BME") program, for Real-Time Market prices, or the Security Constrained Unit Commitment ("SCUC") program for Day-Ahead Market prices.     A. Setting Real-Time LBMPs Other than at External Locations

The marginal cost of a Fixed Block Unit may set Real-Time LBMP, including intervals in which it forces more economic units to be backed down if it is in economic merit order and is needed to meet Load, displace higher cost Energy or meet Operating Reserve requirements. The marginal cost of a Fixed Block Unit will not set Real-Time LBMP at any other time including those times when it is scheduled solely to meet its minimum runtime requirements or because of other inflexibilities in its operation. The calculation of Real-Time LBMPs for External Locations is described elsewhere in this Attachment. For purposes of this Attachment B, prices calculated pursuant to this section I.A will be considered LBMPs determined by SCD.

    1. Calculating Real-Time LBMPs when LBMP is not determined using the pricing rules as set out in Subsections A. 2. and A. 3 below.

    When the ISO has not activated the reserve shortage pricing rule or the EDRP/SCR pricing rule as set out in Subsections A. 2. and A.3 below, the ISO shall calculate LBMPs in the Real-Time Market are calculated using the following four passes in the Security Constrained Dispatch:

Pass 1 consists of a least cost commitment decision ideal dispatch that blocks on all minimum runtime constrained Fixed Block Units at their maximum operating limits. All other Fixed Block Units are assumed to be Dispatchable on a flexible basis (they can be dispatched anywhere between zero (0) MW and their maximum Capacity). This step will determine if it is

necessary to turn a Fixed Block Unit on or off to provide Energy or Operating Reserves at least cost ("meet Bid Load").

Pass 2 consists of a least cost dispatch that determines final unit schedules, blocking on, at maximum Capacity all online Fixed Block Units and all Fixed Block Units selected in the first pass.

Pass 3 consists of a least cost dispatch that treats all Fixed Block Units as flexible regardless of their minimum runtime status.

Pass 4 consists of a least cost dispatch that blocks on at maximum Capacity any minimum runtime constrained Fixed Block Units dispatched in Pass 2 that were identified as uneconomic in Pass 3 and calculates prices with all other on-line or Dispatchable Fixed Block Units treated as flexible. These prices are used to settle transactions occurring in the Real-Time Market, with the exception of certain transactions in that market that are settled using prices calculated in BME, as described elsewhere in this Attachment.

2.  Setting Real-Time LBMPs pursuant to the reserves shortage pricing rule.

When the ISO has determined a that Persistent Ten Minute Reserves Shortage exists, the ISO shall calculate LBMPs for Load Zones and Generator buses using the reserves shortage pricing rule as set out in this subsection A.2. and shall use such prices to settle real-time transactions. The following tests shall determine how prices shall be calculated: when the ISO has determined that a Persistent Ten Minute Shortage exists statewide, prices shall be calculated as described in paragraph A.2.a below. Otherwise, when the ISO has determined that a Persistent Ten Minute Shortage exists east of central east, prices shall be calculated as described in paragraph A.2.b below.

a. The ISO shall calculate real-time LBMPs that include no congestion, and result in a

Load Zone J price equal to the current Bid Cap.  This is achieved by setting the real-time LBMP at the Reference Bus to a value that, in the absence of all transmission constraints, would create an LBMP in Load Zone J equal to the current Bid Cap.  The LBMPs determined in this subsection will be used for all locations provided, however, the ISO shall not set the LBMP for any location bus lower than the LBMP for that Load Zone or Generator bus set pursuant to Subsection A.1.

When the ISO has determined a Persistent Ten Minute Reserve Shortage both in the East and statewide the LBMPs will be set according to the rules set forth in this sub-section for a statewide Persistent Ten Minute Reserve Shortage.

b. -The ISO shall use the real-time LBMPs determined in Subsection A.3 of this Attachment for all Western locations. The ISO shall calculate real-time LBMPs for locations East of Central East using: i) the LBMP at the Reference Bus from Subsection A.3 of this Attachment, ii) the Marginal Loss Components determined in Subsection A.3 of this Attachment and iii) a congestion component calculated including only one constraint where every location in the East has a shift factor of 1 relative to this constraint and a shadow price determined such that the LBMP in load zone J would equal the current Bid Cap. The LBMPs determined in this subsection will be used for all locations provided, however, the ISO shall not set the LBMP for any location bus lower than the LBMP for that Load Zone or Generator bus set pursuant to Subsection A.1.  LBMPS for all Load Zones and Generator buses located west of central east shall be set pursuant to subsection A.1. above.

When the ISO has declared a Persistent Ten Minute Reserves Shortage statewide, the ISO shall set the LBMP in Load Zone J to the current Bid Cap.  That price shall be used to set the system marginal price at the Reference Bus to a value that, in the absence of other constraints, would create an

~~LBMP in Load Zone J equal to the current Bid Cap.   This new system marginal price at the Reference Bus shall be used to calculate LBMPS for all Load Zones and Generator buses provided, however, the ISO shall not set the LBMP for any Load Zone or Generator bus lower than the LBMP for that Load Zone or Generator bus set pursuant to Subsection A.1.~~

3.  Setting Real-Time LBMPs pursuant to the SCR/EDRP Pricing Rule

When the ISO has activated the Emergency Demand Response Program or has requested Load reductions from Special Case Resources, and has not determined a Persistent Ten Minute Reserves Shortage statewide, the ISO shall calculate LBMPs using the EDRP/SCR pricing rule as set out in this subsection A.3. and such prices will settle real-time transactions.  ~~When the ISO has activated the Emergency Demand Response Program or has requested Load reductions from Special Case Resources, it shall use the~~ The following tests ~~to~~ shall determine how prices shall be calculated:

When ($RACT_{NYCA}$ - $ELR_{NYCA}$) is less than $RREQ_{NYCA}$ prices shall be determined as described in paragraph A.3.a. below.   ~~W~~ Otherwise, when ~~($RACT_{NYCA}$ - $ELR_{NYCA}$) is equal to or greater than $RREQ_{NYCA}$  but the quantity~~ ($RACT_{East}$ - $ELR_{East}$) is less than $RREQ_{East}$ and the ISO has activated the Emergency Demand Response Program east of central east or has requested Load reductions from Special Case Resources located east of central east then prices shall be determined as described in paragraph A.3.b. below.

where:

$RACT_{NYCA}$                         equals the quantity of Available Reserves in any SCD interval;

$RREQ_{NYCA}$                         equals the reserve requirement set by NYISO for the Control Area; and

$ELR_{NYCA}$                         equals the quantity of Expected Load Reduction in the interval;

RACT$_{East}$ equals the Available Reserves located east of central east;

RREQ$_{East}$ equals the 10-minute reserve requirement set by NYISO for that portion of the Control Area east of central east; and

ELR$_{East}$ equals the Expected Load Reduction east of central east.

In all other instances prices shall be determined pursuant to subsection A.1. above.

a. ~~When (RACT$_{NYCA}$ – ELR$_{NYCA}$) is less than RREQ$_{NYCA}$, the ISO shall set the LBMP in Load Zone J to the highest offer price submitted by that portion of Expected Load Reductions equal to: (RREQ$_{NYCA}$ – RACT$_{NYCA}$);~~. The ISO shall calculate real-time LBMPs that include no congestion, and result in a Load Zone J price equal to the lowest offer price at which the quantity of Special Case Resources offered is equal to (RREQ$_{NYCA}$ – RACT$_{NYCA}$), or $500/MWh if the total quantity of Special Case Resources offered is less than (RREQ$_{NYCA}$ – RACT$_{NYCA}$). This is achieved by setting the real-time LBMP at the Reference Bus to a value that, in the absence of all transmission constraints, would create an LBMP in Load Zone J equal that offer price. The LBMPs determined in this subsection will be used for all locations provided, however, the ISO shall not set the LBMP for any location bus lower than the LBMP for that Load Zone or Generator bus set pursuant to Subsection A.1.

~~The system marginal price at the Reference Bus shall be set to a value that, in the absences of other constraints, would create a Load Zone J LBMP equal to the offer price determined above. This new system marginal price at the Reference Bus shall be used to calculate LBMPS for all NYCA Load Zones and Generator buses provided,~~

~~however, the ISO shall not set the LBMP for any Load Zone or Generator bus lower than the LBMP for that Load Zone or Generator bus calculated pursuant to Subsection A.1.~~

b.  ~~When (RACT$_{NYCA}$ – ELR$_{NYCA}$) is equal to or greater than RREQ$_{NYCA}$, but the quantity (RACT$_{East}$ – ELR$_{East}$) is less than RREQ$_{East}$ and the NYISO has activated the Emergency Demand Response Program east of central east or has requested Load reductions from Special Case Resources located east of central east,~~<u>T</u>he ISO shall use the real-time LBMPs determined in Subsection A.1 of this Attachment for all Western locations. The ISO shall calculate real-time LBMPs for locations East of Central East using: i) the LBMP at the Reference Bus from Subsection A.1 of this Attachment, ii) the Marginal Loss Components determined in Subsection A.1 of this Attachment and iii) a congestion component calculated including only one constraint where every location in the East has a shift factor of 1 relative to this constraint and a shadow price determined such that the LBMP in load zone J would equal the lowest offer price at which the quantity of Special Case Resources offered is equal to (RREQ$_{East}$ - RACT$_{East}$), or $500/MWh if the total quantity of Special Case Resources offered is less than (RREQ$_{East}$ - RACT$_{East}$). The LBMPs determined in this subsection will be used for all locations provided, however, the ISO shall not set the LBMP for any location bus lower than the LBMP for that Load Zone or Generator bus set pursuant to Subsection A.1. LBMPS for all Load Zones and Generator buses located west of central east shall be set pursuant to Subsection A.1. above.

~~the ISO shall set the LBMP in Load Zone J to the highest offer price submitted by the portion of the Expected Load Reductions equal to the following: (RREQ$_{East}$ – RACT$_{East}$).  That LBMP in Load Zone J shall be used to determine the shadow price~~

of an eastern constraint that, in the absence of other constraints, would create a Load Zone J LBMP equal to the offer price determined above. The shadow price of that eastern constraint shall be used to calculate LBMPS for Load Zones and Generator buses located east of central east, provided, however, the ISO shall not set the LBMP for any Load Zone or Generator bus lower than the LBMP for that Load Zone or Generator bus calculated pursuant to section A-1. LBMPS for Load Zones and Generator buses located west of central east shall be calculated pursuant to section A.1.

Setting Day-Ahead LBMPs

The marginal cost of a Fixed Block Unit may set Day-Ahead LBMP, including intervals in which it forces more economic units to be backed down if it is in economic merit order and needed to meet Load, displace higher cost Energy or meet Operating Reserve requirements.

LBMPs in the Day-Ahead Market are calculated using six passes.  The first three passes are commitment and dispatch passes, Passes 4, 5 and 6 are dispatch only passes.

Pass 1 consists of a least cost commitment and ideal dispatch to meet Bid Load that assumes that all Fixed Block Units are Dispatchable on a "flexible basis" (they can be dispatched anywhere between zero (0) MW and their maximum Capacity).