Rate Schedule 4

Payments for Supplying Operating Reserves

This Rate Schedule applies to payments to Suppliers who provide Operating Reserves to the ISO. Transmission Customers will purchase Operating Reserves from the ISO under the ISO OATT.

1.0 General Responsibilities and Requirements

1.1 ISO Responsibilities

The ISO shall provide procedures to establish adequate Operating Reserves that comply with the Reliability Rules. The ISO shall satisfy at least fifty (50) percent of the applicable 10-Minute Reserve requirements with Spinning Reserve. If the ISO satisfies all of the 10-Minute Reserve requirement through Spinning Reserve, it does not have to maintain 10-Minute NSR. The ISO shall establish additional categories of Operating Reserves if necessary to ensure reliability.

The ISO shall ensure that providers of Operating Reserves are properly located electrically so that transmission constraints resulting from either commitment or dispatch of units do not limit the ability to deliver Energy to Loads in the case of a Contingency. The ISO will ensure that Capacity counted toward meeting Operating Reserve requirements is not simultaneously counted toward meeting Regulation and Frequency Response Service requirements.

1.2 Supplier Eligibility Criteria

The ISO shall enforce the following criteria, which define which types of Suppliers are eligible to supply particular Operating Reserve products.

a. **Spinning Reserve**: Generators that are Dispatchable, or Self-Scheduled Flexible, and operating within the Dispatchable portion of their operating range, and Interruptible Load Resources that meet the criteria set forth in the ISO Procedures shall be eligible to supply Spinning Reserve.

b. **10-Minute NSR:** Off-line Generators and Demand-Side Resources that meet the criteria set forth in the ISO Procedures and that are capable of being started, synchronized, and either changing their output level, or curtailing their Energy usage, as appropriate, within ten (10) minutes shall be eligible to supply 10-Minute NSR.

c. **Synchronous 30-Minute Reserves:** Generators that are Dispatchable, or Self-Scheduled Flexible and operating within the Dispatchable portion of their operating range, and Interruptible Load Resources that meet the criteria set forth in the ISO Procedures, shall be eligible under this Rate Schedule to supply 30-Minute Reserves from synchronous Resources.

d. **Non-Synchronous 30-Minute Reserves:** Off-line Generators and Demand-Side Resources that meet the criteria set forth in the ISO Procedures, that are capable of being started, synchronized, and either changing their output level, or Curtailing their Energy usage, as appropriate, within thirty (30) minutes shall be eligible under this Rate Schedule to supply non-synchronous 30-Minute Reserves..

e. **Generators Operating in Self-Scheduled Fixed Mode:** Shall not be eligible to provide any kind of Operating Reserve.

For purposes of Rate Schedule 4, Suppliers of Synchronous 30-Minute Reserves and Non-Synchronous 30-Minute Reserves are 30-Minute Reserves Suppliers.

1.3 Other Supplier Requirements

All Suppliers of Operating Reserve must be located within the NYCA, must be under ISO Operational Control, and must satisfy any applicable locational reserve requirement. Each Supplier bidding to supply Operating Reserve must be able to provide Energy consistent with the Reliability Rules and the ISO Procedures when called upon by the ISO. All Suppliers that are selected to provide Operating Reserves shall ensure that their Resources maintain and deliver the appropriate quantity of Energy when called upon by the ISO during any interval in which they have been selected.

Suppliers that are selected to provide Operating Reserve in the Day-Ahead Market or any supplemental commitment may not increase their Energy Bids for portions of their Resources that have been scheduled through those processes, or reduce their commitments, in real-time except to the extent that they are directed to do so by the ISO. Subject to the limitations on Installed Capacity Suppliers, if applicable, they may enter into alternate sales arrangements utilizing any Capacity that has not been scheduled to provide Operating Reserve.

2.0 General Day-Ahead Market Rules

2.1 Bidding and Bid Selection

Resources capable of providing Spinning Reserve, 10-Minute NSR and/or 30-Minute Reserve, in the Day-Ahead commitment may submit Availability Bids for each hour of the upcoming day. If a Supplier offers Resources to supply Operating Reserves but does not submit an Availability Bid it will be assigned a Day-Ahead Availability bid of $0/MWh. The ISO shall select Operating Reserve Suppliers for each hour of the upcoming day through its Day-Ahead commitment, using Bids provided by the Suppliers pursuant to Article ___ of the Services Tariff.

2.2 ISO Notice Requirement

The ISO shall notify each Operating Reserve Supplier that has been selected in the Day-Ahead Schedule of the amount of each Operating Reserve product that it has been scheduled to provide.

2.3 Responsibilities of Suppliers Scheduled to Provide Operating Reserves in the Day-Ahead Market

Suppliers of Spinning Reserve scheduled Day-Ahead shall either provide Spinning Reserve or shall generate Energy in real-time when requested by the ISO to do so, in all hours for which they have been selected to provide Spinning Reserve.

Suppliers of 10-Minute NSR and/or 30-Minute Reserve scheduled Day-Ahead shall provide 10-Minute NSR and/or 30-Minute Reserve or shall generate Energy in real-time for all hours in which they have been scheduled to provide 10-Minute NSR and/or 30-Minute Reserve.

3.0 General Real-Time Market Rules

3.1 Bid Selection

The ISO will automatically select Operating Reserves Suppliers in real-time from eligible Energy Resources that have submitted real-time Energy Bids pursuant to Sections ___ of the Services Tariff. All Suppliers will automatically be assigned a real-time Operating Reserves Availability bid of $0/Mwh. Suppliers will thus be selected on the basis of their ramp rates, their applicable upper operating limit, and their Energy Bid (which will reflect their opportunity costs).

3.2 ISO Notice Requirement

The ISO shall notify each Supplier of Operating Reserve that has been selected in the real-time schedule dispatch of the amount of Operating Reserve that it must provide.

3.3 Obligation to Make Resources Available to Provide Operating Reserves

Any Supplier that offers to make a Resource available to the ISO for dispatch in Real-

Time must also make that Resource available to provide Operating Reserves.

3.4 Activation of Operating Reserves

All Suppliers that are selected by the ISO to provide Operating Reserves shall respond to the ISO's directions to activate in real-time.

3.5 Performance Tracking and Supplier Disqualifications

When a Supplier of Operating Reserves is activated, the ISO shall measure and track its actual Energy production against its expected performance in real-time. The ISO may disqualify Suppliers that consistently fail to provide Energy when called upon to do so in real-time from providing Operating Reserves in the future. If a Supplier has been disqualified, the ISO shall require it to pass a re-qualification test before accepting any additional Bids to supply Operating Reserves from it. Disqualification and re-qualification criteria shall be set forth in the ISO Procedures.

4.0 Operating Reserves Settlements – General Rules

4.1 Establishing Locational Reserve Prices

Except as noted below, the ISO shall calculate separate Day-Ahead Market and Real-Time Market prices for each of the three Operating Reserve products at each of three locations: (i) the NYCA west of central-east ("West" or "Western"); (ii) east of central-east excluding Long Island ("East" or "Eastern"); and (iii) Long Island. The ISO will thus calculate nine different locational reserve prices in both the Day-Ahead Market and the Real-Time Market. Day-Ahead locational reserve prices shall be calculated pursuant to Section 5.0 of this Rate Schedule. Real-Time locational reserve prices shall be calculated pursuant to Section 6.0 of this Rate Schedule.

4.2 Settlements Involving Suppliers of Operating Reserves Located on Long Island

Suppliers of Operating Reserves located on Long Island shall receive settlement payments as if they were providing Operating Reserves located in the East. The ISO will calculate separate locational Long Island Operating Reserves prices but will not use them in settlements or post them.

4.3 "Cascading" of Ancillary Services

The ISO will substitute higher quality Operating Reserves in place of lower quality Operating Reserves, when doing so lowers the total as-bid cost, *i.e.*, when the marginal cost for the higher quality Operating Reserve product is lower than the marginal cost for the lower quality Operating Reserve product. To the extent, however, that reliability standards require the use of higher quality Operating Reserves, substitution cannot be made in the opposite direction.

The price of higher quality Operating Reserves will not be set at a price below the price of lower quality Operating Reserves. For example, the price of Spinning Reserves will not be below the price for 10-Minute NSR and the clearing price for 10-Minute NSR will not be below the clearing price for 30-Minute Reserves.

5.0 Operating Reserve Settlements – Day-Ahead Market

5.1 Calculation of Day-Ahead Market Clearing Prices

The ISO shall calculate hourly Day-Ahead Market Clearing Prices for each Operating Reserve product at each location. Each Day-Ahead Market Clearing Price shall equal the sum of the relevant Day-Ahead locational Shadow Prices for that product, subject to the restriction described in Section 4.3 of this Rate Schedule.

The sum of relevant Day-Ahead Shadow Prices for a particular Operating Reserve product shall reflect the Shadow Prices associated with all of the locational Operating Reserve requirements that a particular product may be used to satisfy in a given hour. The ISO shall calculate the sum of relevant shadow prices using the following formulae:

Sum of Relevant Shadow Prices for Western 30-Minute Reserves = SP1

Sum of Relevant Shadow Prices for Western 10-Minute-NSR = SP1 + SP2

Sum of Relevant Shadow Prices for Western Spinning Reserves = SP1 + SP2 + SP3

Sum of Relevant Shadow Prices for Eastern 30-Minute Reserves = SP1 + SP4

Sum of Relevant Shadow Prices for Eastern 10-Minute NSR = SP1 + SP2 + SP4 + SP5

Sum of Relevant Shadow Prices for Eastern Spinning Reserves = SP1 + SP2 + SP3 + SP4 + SP5 + SP6

Sum of Relevant Shadow Prices for L.I. 30-Minute Reserves = SP1 + SP4 + SP7

Sum of Relevant Shadow Prices for L.I. 10-Minute NSR = SP1 + SP2 + SP4 + SP5 + SP7 + SP8

Sum of Relevant Shadow Prices for L.I. Spinning Reserves = SP1 + SP2 + SP3 + SP4 + SP5 + SP6 + SP7 + SP8 + SP9

Where:

SP1 = Shadow Price for Western 30-Minute Reserve requirement constraint for the hour

SP2 = Shadow Price for Western 10-Minute NSR requirement constraint for the hour

SP3 = Shadow Price for Western Spinning Reserve requirement constraint for the hour

SP4 = Shadow Price for Eastern 30-Minute Reserve requirement constraint for the hour

SP5 = Shadow Price for Eastern 10-Minute NSR requirement constraint for the hour

SP6 = Shadow Price for Eastern Spinning Reserve requirement constraint for the hour

SP7 = Shadow Price for Long Island 30-Minute Reserve requirement constraint for the hour

SP8 = Shadow Price for Long Island 10-Minute NSR requirement constraint for the hour

SP9 = Shadow Price for Long Island Spinning Reserve requirement constraint for the hour

Day-Ahead locational shadow prices will be calculated by the ISO's SCUC program. Each sum of relevant Day-Ahead locational shadow prices will reflect Suppliers' Availability Bids and opportunity costs. Shadow Prices will also reflect the Operating Reserve Demand Curves described in Section 7.0 of this Rate Schedule, which will ensure that Operating Reserves are not procured at a cost greater than the relevant Operating Reserve Demand Curve indicates

should be paid. If there is more Operating Reserve of the required quality than is needed to meet a particular locational Operating Reserve requirement then the Shadow Price for that Operating Reserve requirement constraint shall be zero.

Each Supplier that is scheduled Day-Ahead to provide Operating Reserve shall be paid the applicable Day-Ahead Market Clearing Price, based on its location and the quality of reserve scheduled, multiplied by the amount of Operating Reserve that the Supplier is scheduled to provide in each hour.

5.2. Other Day-Ahead Payments

As is provided in Article 4 and Attachment C of the Services Tariff, the ISO shall compensate each Displaceable or Self-Scheduled Flexible Generator providing Operating Reserves if its Bid Production Cost to provide the Energy and Ancillary Services it is scheduled to supply in the Day-Ahead Market, including start-up costs, minimum Load costs, and Availability Bids, exceeds the revenues it receives from the sale of Energy and Ancillary Services.

Notwithstanding anything to the contrary in this Rate Schedule, no payments shall be made to any Supplier providing Operating Reserves in excess of the amount of Operating Reserves scheduled by the ISO in the Day-Ahead Market.

6.0 Operating Reserve Settlements – Real-Time Market

6.1 Calculation of Real-Time Market Clearing Prices

The ISO shall calculate Real-Time Market Clearing Prices for each Operating Reserve product for each location in every interval. Each real-time Market-Clearing Price shall equal the sum of the relevant real-time locational Shadow Prices for that product, subject to the restriction described in Section 4.3 of this Rate Schedule.

The sum of relevant real-time Shadow Prices for a particular Operating Reserve product shall reflect the Shadow Prices associated with all of the locational Operating Reserve requirements that a particular product may be used to satisfy in a given interval. The ISO shall calculate the sum of relevant shadow prices using the following formulae:

Sum of Relevant Shadow Prices for Western 30-Minute Reserves = SP1

Sum of Relevant Shadow Prices for Western 10-Minute-NSR = SP1 + SP2

Sum of Relevant Shadow Prices for Western Spinning Reserves = SP1 + SP2 + SP3

Sum of Relevant Shadow Prices for Eastern 30-Minute Reserves = SP1 + SP4

Sum of Relevant Shadow Prices for Eastern 10-Minute NSR = SP1 + SP2 + SP4 + SP5

Sum of Relevant Shadow Prices for Eastern Spinning Reserves = SP1 + SP2 + SP3 + SP4 + SP5 + SP6

Sum of Relevant Shadow Prices for L.I. 30-Minute Reserves = SP1 + SP4 + SP7

Sum of Relevant Shadow Prices for L.I. 10-Minute NSR = SP1 + SP2 + SP4 + SP5 + SP7 + SP8

Sum of Relevant Shadow Prices for L.I. Spinning Reserves = SP1 + SP2 + SP3 + SP4 + SP5 + SP6 + SP7 + SP8 + SP9

Where:

SP1 = Shadow Price for Western 30-Minute Reserve requirement constraint for the interval

SP2 = Shadow Price for Western 10-Minute NSR requirement constraint for the interval

SP3 = Shadow Price for Western Spinning Reserve requirement constraint for the interval

SP4 = Shadow Price for Eastern 30-Minute Reserve requirement constraint for the interval

SP5 = Shadow Price for Eastern 10-Minute NSR requirement constraint for the interval

SP6 = Shadow Price for Eastern Spinning Reserve requirement constraint for the interval

SP7 = Shadow Price for Long Island 30-Minute Reserve requirement constraint for the interval

SP8 = Shadow Price for Long Island 10-Minute NSR requirement constraint for the interval

SP9 = Shadow Price for Long Island Spinning Reserve requirement constraint for the interval

Real-time locational shadow prices will be calculated by the ISO's RTD and RTD-CAM programs. Each sum of relevant real-time locational shadow prices will reflect Suppliers'

opportunity costs (real-time Availability Bid Prices will be considered but shall always equal zero pursuant to Section 3.1 of this Rate Schedule). Shadow Prices will also reflect the Operating Reserve Demand Curves described in Section 7.0 of this Rate Schedule, which will ensure that Operating Reserves are not procured at a cost greater than the relevant Operating Reserve Demand Curve indicates should be paid. If there is more Operating Reserve of the required quality than is needed to meet a particular locational Operating Reserve requirement then the Shadow Price for that Operating Reserve requirement constraint shall be zero.

Each Supplier that is scheduled Day-Ahead to provide Operating Reserve shall be paid the applicable Day-Ahead Market Clearing Price, based on its location and the quality of reserve scheduled, multiplied by the amount of Operating Reserve that the Supplier is scheduled to provide in each hour.

6.2 Operating Reserve Balancing Payments

Any deviation in performance from a Supplier's Day-Ahead schedule to provide Operating Reserves, including deviations that result from schedule modifications made by the ISO, shall be settled pursuant to the following rules.

(a) When the Supplier's real-time Operating Reserves schedule is less than it Day-Ahead Operating Reserves award, the Supplier shall pay a charge for the imbalance equal to the product of: (a) the Real-Time Market Clearing Price for the relevant Operating Reserves Product in the relevant location; and (b) the difference between the Supplier's scheduled Day-Ahead Operating Reserves award and its real-time Operating Reserves schedule.

(b) When the Supplier's real-time Operating Reserves schedule is greater than its Day-Ahead Operating Reserves award, the ISO shall pay the Supplier an amount to compensate it for the imbalance equal to the product of: (a) the Real-Time

Market Clearing Price for the relevant Operating Reserve product in the relevant location; and (b) the difference between the Supplier's scheduled Day-Ahead Operating Reserves award and its real-time Operating Reserves schedule.

6.3. Other Real-Time Payments

The ISO shall pay Generators that are selected to provide Operating Reserves, but are directed to convert to Energy production in real-time, the applicable Real-Time LBMP for all Energy they are directed to produce in excess of their Day-Ahead schedule. Demand-Side Resources that are instructed to "produce" Energy by reducing demand shall be paid the applicable Real-Time LBMP.

As is provided in Article 4 and Attachment C of the Services Tariff, the ISO shall compensate each Dispatchable or Self-Scheduled Flexible Generator providing Operating Reserves if its Bid Production Cost to provide the Energy and Ancillary Services it is scheduled to supply in the Real-Time Market, including start-up costs, minimum Load costs, and Availability Bids, exceeds the revenues it receives from the sale of Energy and Ancillary Services.

Notwithstanding anything to the contrary in this Rate Schedule, no payments shall be made to any Supplier providing Operating Reserves in excess of the amount of Operating Reserves scheduled by the ISO in the Real-Time Market.

7.0 Operating Reserve Demand Curves

The ISO shall establish nine Operating Reserve Demand Curves for each category of Operating Reserves and for each locational area. Specifically, there shall be a demand curve for: (i) Eastern Spinning Reserves; (ii) Western Spinning Reserves, (iii) Long Island Spinning Reserves; (iv) Eastern 10-Minute NSR; (v) Western 10-Minute NSR; (vi) Long Island !0-Minute NSR; (vii) Eastern 30-Minute Reserve; (viii) Western 30-Minute Reserve; and (ix) Long Island

30-Minute Reserve Each Operating Reserve Demand Curve will apply to both the Day-Ahead and real-time market for that product and location.

The Market Clearing Prices for Operating Reserves calculated pursuant to Sections 5.1 and 6.1 of this Rate Schedule, shall reflect the demand curves established in this Section so that Operating Reserves are not purchased at a cost higher than the relevant demand curve indicates should be paid.

The Operating Reserve Demand Curves shall be established at the following points . . . . . **(Numbers to be added)** The ISO, however, shall have the authority to temporarily modify these points to operational or reliability problems that arise in real-time. In the event that it is necessary to temporarily modify these points, the ISO will post the modified points as soon as possible. It will also be required to report on the reasons for and duration of the modification to the Business Issues Committee.

A periodic independent review of the Operating Reserve Demand Curves will be performed in accordance with the ISO Procedures to determine whether the parameters of the each Operating Reserve Demand Curve should be adjusted.

8.0 Self-Supply

Transactions may be entered into to provide for Self-Supply of Operating Reserves. Except as noted in the next paragraph, Customers seeking to Self-Supply Operating Reserves must place the Generator(s) supplying any one of the Operating Reserves under ISO control. The Generator(s) must meet ISO rules for acceptability. The amount that any such Customer will be charged for Operating Reserves will be reduced by the market value of the services provided by the specified Generator(s) as determined in the ISO Services Tariff.

Alternatively, Customers, including LSEs, may enter into Day-Ahead Bilateral financial Transactions, *e.g.*, contracts-for-differences, in order to hedge against price volatility in the

Operating Reserves markets.

(Note: Changes to this Section are under consideration as a result of the Commission's recent order in Docket No. ER03-836 on NSR market power mitigation.)