NEW YORK INDEPENDENT SYSTEM OPERATOR
10 Krey Boulevard Rensselaer, NY 12144

January 22, 2013

By Electronic Delivery

Honorable Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

Re: ***New York Independent System Operator, Inc.*****, Compliance Filing, Docket Nos. ER12-1653-000, RM11-7-000, AD10-11-000**

Dear Ms. Bose:

The New York Independent System Operator, Inc. ("NYISO") hereby submits a compliance filing in this docket to fulfill the Commission's directives in Ordering Paragraph C of the Commission's *Order on Compliance Filings*.[1] The Commission granted the NYISO an extension to January 22, 2013 for submitting this filing.[2]

In this filing, the NYISO addresses the following topics, as directed by the Commission's November Order: i) how resource response rates are used in the selection of resources;[3] ii) temporary adjustments to the Regulation Movement Multiplier;[4] and iii) how opportunity costs are reflected in the Bids and/or settlement of Regulation Service providers.[5] In response to the Commission's rejection of the temporary Regulation Movement Bid Cap, the NYISO is also proposing mitigation measures specific to Regulation Movement that will adequately mitigate any exercise of market power by Generators bidding Regulation Movement.

[1] 141 FERC 61,105 (2012) ("November Order").

[2] *New York Independent System Operator, Inc.* Docket No. ER12-1653. *Notice of Extension of Time*, November 29, 2012.

[3] *See*: November Order ¶ 60.

[4] *See*: November Order ¶ 64.

[5] *See*: November Order ¶¶ 75, 76

I. Documents Submitted

1. This filing letter;
2. Affidavit of Dr. Pallas LeeVanSchaick ("Attachment I").
3. A clean version of the proposed revisions to the NYISO's Market Administration and Control Area Services Tariff ("Services Tariff") ("Attachment II").
4. A blacklined version of the proposed revisions to the NYISO's Services Tariff ("Attachment III"); and

II. Communications

Communications and correspondence regarding this filing should be directed to:

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III. How Resource Response Rates Are Used in the Selection of Resources

A. The proposed term "Regulation Movement Response Rate" is equivalent to the Regulation Movement a resource can deliver in six seconds.

With one caveat, the NYISO confirms the Commission's understanding that the term Regulation Movement Response rate ("RMRR") is equivalent to the Regulation Movement a resource can deliver in six seconds.[6] The caveat is that the RMRR cannot be less than the six-

[6] Capitalized terms used but not defined in this filing shall have the meanings given to them in the Services Tariff.

second equivalent of the response a unit can deliver in five minutes (*i.e.* a unit's Regulation Capacity Response Rate). Should a Regulation Service provider submit a RMRR that is less than the six-second equivalent of its Regulation Capacity Response Rate, the NYISO would not accept it.

As the tariff definition indicates, a Regulation Service provider's Regulation Movement Response Rate is:

> The amount of Regulation Movement a Regulation Service provider is capable of delivering in six seconds which shall not be less than, but can be equal to or greater than, the Regulation Capacity Response Rate equivalent.[7]

B. **The NYISO uses the RMRR in Dispatching Resources**

A unit's RMRR is not factored into the commitment of Regulation Resources in the Day-Ahead and Real-Time Markets.[8] These commitment decisions are made as part of the NYISO's co-optimized energy and ancillary services using the sum of each bidder's Regulation Capacity price Bid and the product of its Regulation Movement Bid and the Regulation Movement Multiplier.

The Regulation Movement Response Rate is a factor, however, in the NYISO's dispatch of scheduled Regulation Service providers. The NYISO's algorithm for dispatching Regulation Service providers (the Automated Generator Control or "AGC" dispatch) allocates the megawatts needed (either as increased or decreased generation) over the next six second interval ("necessary dispatch") on a pro rata basis to scheduled resources weighted by their RMRR. Those with larger RMRRs receive a greater allocation of the ACE correction signal. Thus, the necessary AGC dispatch is allocated to all units, based upon their ability to provide the necessary correction.

The amount of the necessary dispatch allocated to Regulation Service Suppliers, ranked by their RMRR is limited, however, by several factors. For Limited Energy Storage Resources ("LESRs") scheduled to provide Regulation Service in an interval, the allocation of an AGC dispatch is limited by the capacity that is physically remaining as available on the unit in the next six seconds. That is, an LESR that has exhausted its available capacity will not be allocated any portion of the necessary AGC dispatch unless the dispatch directionally enables the unit to refill

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[7] Services Tariff Section 2.18.

[8] For non-LESR resources a unit's Regulation Capacity Response Rate determines the maximum amount of capacity the unit is eligible to offer the NYISO as Regulation Capacity. For LESR resources the supplier's Upper Operating Limit establishes the maximum amount of Regulation Capacity the unit is eligible to offer as Regulation Capacity. The software tests the accuracy of the number of megawatts offered to verify the unit is not offering more capacity than it can make available in five minutes.

its capacity.[9] As well, the allocation of the necessary dispatch to all units is limited by system constraints. Units constrained from responding to the AGC signal by system limits (by sitting on the wrong side of a constraint, for instance) will not be allocated any portion of the required AGC dispatch in that interval. In addition, physical constraints of the resources themselves are considered (lower and upper operating limits) as is the five minute dispatch level.

C. Use of a Uniform Regulation Movement Multiplier ("RMM") Will Not Result in Under-Compensating a Unit That Provides More Regulation Movement Than Assumed by the Uniform RMM

As the Commission noted, the NYISO uses the RMM to commit resources and does not use the RMM in dispatch or settlements. As a result, all scheduled units will be dispatched and settled (*i.e.* compensated) in the same fashion whether their RMRR is the same as, slower, or faster than the uniform RMM.[10]

Since the determination of a unit's schedule depends on its price bids for Regulation Capacity and Regulation Movement, a uniform RMM treats each unit's price bid for Regulation Movement on the same, level field. By multiplying a unit's Regulation Movement Bid by a uniform RMM, the scheduling software treats a faster responder as no more expensive for Regulation Service than a slower responder if both have bid the same price for their Regulation Movement and Regulation Capacity.

In supporting a uniform RMM, Beacon Power LLC explained why a faster resource may reasonably benefit from a uniform RMM:

> Furthermore, Beacon Power supports NYISO's use of a uniform RMM. NYISO's proposal to apply the RMM equally, or uniformly, to all resources bidding to provide Regulation Service ensures that each resource's bid is compared on an "apples to apples" basis by comparing the cost-per-unit of Movement. On the other hand, if NYISO were to use a resource-specific RMM, it would always make slower-ramping resources look artificially less expensive than faster-ramping resources because the slower resources are providing a lower total quantity of Movement than faster-ramping resources, even if their cost-per unit is higher. Thus, Beacon Power supports NYISO's proposal to apply a uniform RMM to all resources since it allows Movement offers to be evaluated on a comparable cost per unit of Movement basis and thus, enables the selection of the least cost set of resources. [11]

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[9] The NYISO's AGC dispatch logic avoids completely exhausting such a Regulation Supplier's limited capacity by reducing the allocated AGC dispatch as such allocations move the unit away from its capacity mid-point (when it can provide its scheduled Regulation Capacity in either direction).

[10] November Order ¶ 9.

[11] *New York Independent System Operator, Inc.* Docket No. ER12-1653, *Comments and Protest of Beacon Power LLC* 9/7/2012

IV. Temporary Adjustments to the Regulation Movement Multiplier

The NYISO has reexamined its request for authority to temporarily adjust the RMM in the event that operational or reliability problems require an adjustment over a shorter period of time than would be available if all adjustments were to require a subsequent tariff filing. The RMM value is currently set at ten, a number, as the NYISO explained in its August 17 filing in this docket, that represents the 29 month average ratio of megawatts of Regulation Movement to Regulation Capacity provided each hour over this historic period.

In an abundance of caution NYISO had requested the ability to instantly adjust the RMM. After further consideration, it does not appear that specific operational or reliability issues would require an instantly adjusted RMM.

Thus the NYISO is including with this compliance filing, revised tariff sections that delete the proposed revision process and that set the RMM value to ten, to be constant over all hours, as approved by the Commission.[12] Any change to the RMM value will be pursued through the NYISO's stakeholder process as a tariff revision.

V. How Opportunity Costs Are Reflected In The Bids And/Or Settlement Of Regulation Service Providers

The Commission has asked the NYISO to explain how it will account for opportunity costs when committing resources and setting clearing prices in its Regulation Service market. Cross-product opportunity costs in the NYISO's Regulation Market are margins on the sale of Energy or Operating Reserves in the Day-Ahead or real-time markets that a Resource would forego if scheduling it to provide additional Regulation Service would lead to it being scheduled to provide less Energy or Operating Reserves. Cross-product opportunity costs are not expected to be bid by Regulation Service providers. Rather, they are included in the market price by the optimization software as a cost of scheduling the marginal Regulation Service provider. The NYISO's co-optimization of Energy and Ancillary Services reflects cross-product opportunity costs in the Day-Ahead and real-time market prices for Regulation Capacity.

The co-optimization software solves for the lowest bid production cost of meeting all the Energy and Ancillary Services required over the optimization period. The Day-Ahead commitment software optimizes over a day, the real-time commitment software optimizes over a two and one-half hour time frame and the real-time dispatch software optimizes over approximately the next hour.[13] When the lowest bid production cost for the necessary Energy

[12] See proposed revision to Section 2.18 and the November Order at ¶ 57.

[13] Services Tariff Section 4.4.2.1: Each Real-Time Dispatch run will co-optimize to solve simultaneously for Load, Operating Reserves, and Regulation Service and to minimize the total cost of production over its bid optimization horizon (which may be fifty, fifty-five, or sixty minutes long depending on where the run falls in the hour.)

and Ancillary Services requires the marginal resource to be scheduled for Operating Reserve or Regulation Service instead of Energy, and such a trade-off results in lost opportunity costs for the marginal resource, these cross-product opportunity costs are reflected in the market price for Regulation Capacity and, in some instances, also in the price of Energy and Operating Reserves.

Rate Schedule 3 of the Market Services Tariff explains how the cross-product opportunity cost of the marginal Resource selected to provide Regulation Service is included in the Day-Ahead Shadow Price (15.3.4.1) of the NYISO's Regulation Service constraint for the given hour, and in the Real-Time Shadow Price (15.3.5.1) of the Regulation Service constraint for the given RTD interval:

> Each hourly Day-Ahead Shadow Price shall equal the marginal Bid cost of scheduling Resources to provide additional Regulation Service in that hour, including any impact on the Bid Production Cost of procuring Energy or Operating Reserves that would result from procuring an increment of Regulation Service in that hour, as calculated during the fifth SCUC pass described in Section 17.1.3 of Attachment B to this ISO Services Tariff. As a result, the Shadow Price shall include the Day-Ahead Regulation Service Bids of the marginal Resource selected to provide Regulation Service, plus any margins on the sale of Energy or Operating Reserves in the Day-Ahead Market that the Resource would forego if scheduling it to provide additional Regulation Service would lead to it being scheduled to provide less Energy or Operating Reserves ..... [14]

> Each Real-Time Shadow Price in each RTD interval shall equal the marginal Bid cost of scheduling Resources to provide additional Regulation Service in that interval, including any impact on the Bid Production Cost of procuring Energy or Operating Reserves that would result from procuring an increment of Regulation Service in that interval. As a result, the Shadow Price shall include the Real-Time Regulation Service Bids of the marginal Resource selected to provide Regulation Service, plus any margins on the sale of Energy or Operating Reserves in the Real-Time Market that Resource would forego if scheduling it to provide additional Regulation Service would lead to it being scheduled to provide less Energy or Operating Reserves..... [15]

In addition, as explained in Attachment B of the Market Services Tariff, cross-product opportunity costs are also considered when determining the LBMP. As such, LBMPs will include the cross-product opportunity costs of the marginal Regulation Service provider:

> LBMPs calculated by SCUC and RTD will incorporate the incremental dispatch costs of Resources that would be scheduled to meet an increment of Load and, to the extent that tradeoffs exist between scheduling providers to produce Energy or reduce demand, and scheduling them to provide Regulation Service or Operating Reserves, LBMPs shall

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[14] Services Tariff Section 15.3.4.1 (Rate Schedule 3)

[15] Services Tariff Section 15.3.5.1 (Rate Schedule 3).

> reflect the effect of meeting an increment of Load, given those tradeoffs, at each location on the Bid Production Cost associated with those services. As such, those LBMPs may incorporate: (i) Availability Bids for Regulation Service or Operating Reserves ..... [16]

Inter-temporal opportunity costs are similarly accounted for in the NYISO's multi-period optimization process which, when making its Energy vs. Ancillary Services trade-off decisions, looks ahead either over the day (in the Day-Ahead Market) or over two and one-half hours in the real-time market. As mentioned, the optimization software represents inter-temporal or lost opportunity costs as a component of the marginal cost of dispatching a resource and thus reflects these costs in the Regulation Capacity clearing price and, in some instances in the LBMP. [17]

If a Regulation Service Supplier has inter-temporal costs associated with providing Regulation Service for time periods outside of the optimization horizon (for example, a large storage facility which could fully discharge or charge over a 36 hour period), it is expected that the Supplier would include those costs in its Regulation Capacity and/or Regulation Movement Bids. If such a Resource is the marginal unit, these bid-in costs will be reflected in the Regulation Service clearing price and/or in the LBMP. Moreover, bid costs, including these bid-in inter-temporal opportunity costs, will be protected across the day in each Resource's Bid Production Cost Guarantee.[18]

The NYISO's Market Monitoring and Analysis group reviews a unit's bid costs when developing reference levels in consultation with a Market Participant pursuant to Section 23.3.1.4.1.3 or when developing cost-based reference levels pursuant to Section 23.3.1.4.2.1 Factors and adjustments that the NYISO reasonably determines to be appropriate, including appropriate inter-temporal costs, are allowed.

VI. Proposed Tariff Revisions to Enhance Existing Market Mitigation Measures for Regulation Movement Bids

As the attached affidavit from Dr. Pallas LeeVanSchaick makes clear, the NYISO and its Market Monitoring Unit believe that the rejection of NYISO's proposed temporary Regulation Movement Bid Cap requires an enhancement to the Regulation Movement mitigation measures currently in place.[19] Even with the revisions to Section 23.3.1.2.1.2 and 23.3.1.4.6 that

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[16] Services Tariff Section 17.1 (Attachment B)

[17] See Sections 4.4.1.1 and 4.4.2.1 of the Market Services Tariff:

> RTC will co-optimize to solve simultaneously for all Load, Operating Reserves and Regulation Service and to minimize the total as-bid production costs over its optimization timeframe.

[18] Services Tariff Section 15.3.4.2, 15.3.5.4; *see also*, November Order ¶ 63.

[19] The NYISO is assuming, however, that the Commission approved the proposed Bid floor of zero for both Regulation Capacity and Regulation Movement Bids, as described in the revisions proposed for Section 21.5.2. Pursuant to the Commission's rejection of the temporary Bid Restriction, the NYISO is deleting the proposed revisions to Section 21.5.3 which renders moot the Commission's request in Paragraph 78 for an errata change to this Section.

were accepted in the Commission's November Order, existing measures will be insufficient to address concerns about the potential for market power in the Regulation Services market with respect to bidding Regulation Movement. Therefore, in addition to deleting the previously proposed revisions to Section 21.5.3, the Section that had authorized a temporary Regulation Movement Bid Cap, the NYISO is proposing a revision to the manner in which reference levels for Regulation Movement are developed. The proposed changes will ameliorate the concerns expressed by Dr. LeeVanSchaick and better ensure that Loads are protected from the exercise of market power in Regulation Movement bidding behavior.

The NYISO's uses conduct and impact assessments to evaluate and mitigate market power. Conduct and impact assessments depend on the development of adequate and appropriate reference levels for each market product being sold. As documented in Services Tariff Section 23.3.1.4, a reference level based on a Generator's accepted Bids during competitive periods is the preferred calculation method, provided the NYISO has adequate data.[20] As Dr. LeeVanSchaick observes, the preference for Bid-based reference levels is based on the theory that a resource is incented to bid competitively - *i.e.* to bid its marginal costs - during competitive periods.[21] Therefore, it can be deterred from exercising market power by comparing its actions during any period to those it takes during competitive periods.

The Regulation market design crafted by the NYISO in response to Order 755 creates incentives, even during competitive periods, that are different than those created by the market design for other market products like Operating Reserves and Energy. Because the ISO combines a unit's offer for Regulation Capacity and Regulation Movement for purposes of scheduling, but then pays each scheduled Resource for each MW of Regulation Movement that it provides in response to the NYISO's dispatch, Resource owners, even when they do not have market power (*i.e.* during competitive periods), have little incentive to offer their marginal Regulation Movement costs. As Dr. David Patton explained in his September 7, 2012 Comments in this proceeding:

> Any time a market selects the least cost resources using one criteria and then pays them based on a different criteria, firms may have incentives that lead to inefficient market outcomes.[22]

Dr. LeeVanSchiack also explained why bid-based references are not likely to accurately represent a unit's marginal cost of Regulation Movement:

> Fast resources (ie. resources that usually move more than 10 MW per MWh of Regulation Capacity) will have strong incentives to raise their Regulation Movement Bid

[20] Services Tariff Sections 23.3.1.4.1 and 23.3.1.4.1.1.

[21] MMU Affidavit, ¶¶ 19-22.

[22] *Motion To Intervene And Comments Of The New York ISO's Market Monitoring Unit,* ER12-1653, page 4.

in order to be the marginal resource and, thereby, cause the distribution to be favorable towards fast resources. [23]

He then provides an example which illustrates that "the returns from raising offers above marginal cost can be quite large for fast regulation suppliers."[24] Dr LeeVanSchiack also concludes that "the benefits of raising offer prices above marginal cost will be particularly large during regulation shortages."[25] Thus, bid-based references may not be a reliable indicator that a Resource is bidding its Regulation Movement competitively.

Therefore, in the absence of a temporary Regulation Movement Bid Cap, the NYISO is proposing to modify the manner in which reference levels for Regulation Movement are to be determined. Pursuant to these proposed revisions, the NYISO will use only the calculation methods described in Sections 23.3.1.4.1.3 and 23.3.1.4.2.1 and will not use a calculation method based on accepted bids as described in Section 23.3.1.4.1.1.[26] Accordingly, the NYISO is proposing to amend Section 23.3.1.4.6 to indicate that it will not establish real-time or Day-Ahead Reference Levels for Regulation Movement using the provisions found in Section 23.3.1.4.1.1.

In addition, the NYISO is clarifying Section 23.3.1.4.1.3 to indicate that reference levels for Ancillary Services Bids, as well as Energy Bids, are intended to reflect a Generator's marginal costs. The NYISO is also clarifying this Section to indicate that "other factors or adjustments as the ISO shall reasonably determine to be appropriate" can be included in the Reference levels for for Ancillary Services, as well as Energy, set pursuant to Section 23.3.1.4.1.3 or 23.3.1.4.2.1.

The NYISO is also clarifying that the calculation of the Regulation Capacity Market Price (both Day-Ahead and real-time) as demonstrated in the revisions to Services Tariff Sections 15.3.4.1 and 15.3.5.1 already approved in the Commission's November Order is also the price calculation employed during periods of shortage when the Regulation Service Demand Curve is activated. As these Tariff revisions demonstrate, when the Regulation Service Demand Curve is activated, the Shadow Price for the ISO's Regulation Service constraint for that interval either Day-Ahead or in real-time will be the appropriate Demand Curve price. In addition, these approved revisions demonstrate that the final Day-Ahead and real-time Regulation Capacity Market Price during periods of shortage when the Regulation Service Demand Curve is activated will reflect a subtraction of the marginal Resource's Day-Ahead or real-time Regulation Movement Bid, as appropriate. There are no new proposed tariff revisions being submitted in support of this clarification.

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[23] MMU Affidavit ¶¶ 18-19.

[24] MMU Affidavit ¶ 19.

[25] MMU Affidavit ¶ 22.

[26] *See also*: MMU Affidavit ¶¶ 27-31 for an explanation of how these consultations will occur and why they are unlikely to result in over-mitigation.

VII. Effective Date

The NYISO had developed and tested extensive software changes across a wide variety of its market and settlement systems in relation to the original changes proposed in its 755 response. These changes were ready to be activated, consistent with the original filing at the end of October 2012. The revisions to the proposal, described above, require additional software changes. While not as extensive as the initial set of software revisions, these changes likewise require a fully integrated set of testing and regression testing, as they are part of an overall larger integrated software solution. This process allows the NYISO to ensure its market and settlement results are of the highest quality while minimizing errors within these processes.

Thus, the NYISO proposes that these changes become effective on or about June 14, 2013, to be designated by a two week notice to FERC and the NYISO's Market Participants. A major software installation, of which the changes in the Regulation Service market design are a part, is currently scheduled for June 12. Schedules are subject to change, however, and if the testing protocols expose flaws, the resolution of which takes additional time, or if the electric grid is exposed to system conditions that make any revisions to the scheduling and dispatch system a risk to reliability, the installation will be delayed.

Therefore, the NYISO proposes to provide the FERC and its Market Participants with a two week notice of the effective date for this new Regulation Service redesign which actual effective date is expected to fall between June 12 and June 26, 2013.[27]

[27] Accordingly, the e-tariff system will show the effective date / year for these proposed revisions as 12/31/9998 in recognition that a two-week notice indicating the precise effective date needs to be filed.

VIII. Conclusion

Wherefore, for the foregoing reasons, the New York Independent System Operator, Inc. respectfully requests that the Commission accept this compliance filing.

Respectfully submitted,

/s/ Mollie Lampi

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CERTIFICATE OF SERVICE

I hereby certify that I have this day served the foregoing document upon each person designated on the official service list compiled by the Secretary in this proceeding in accordance with the requirements of Rule 2010 of the Rules of Practice and Procedure, 18 C.F.R. §385.2010.

Dated at Rensselaer, NY this 22nd day of January, 2013.

/s/ Mohsana Akter

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