# Attachment I

**UNITED STATES OF AMERICA**
**BEFORE THE**
**FEDERAL ENERGY REGULATORY COMMISSION**

New York Independent System Operator, Inc. ) Docket No. ER13-909-000

**Qualifications and Purpose**

**1.** My name is Robert Pike. I am the Director of Market Design for the New York Independent System Operator, Inc. ("NYISO"). My business address is 10 Krey Boulevard, Rensselaer, New York 12144.

**2.** I hold a Bachelor of Science in Electrical and Computer Engineering and Master of Science in Electrical Engineering from Clarkson University and a Master of Business Administration from Union College. I have worked for the NYISO and its predecessor organization, the New York Power Pool, for over twenty years. During that time I have held positions in Engineering, Market Operations, Information Technology and Product Management. For the last 15 years, I have been involved in the design and implementation of electric markets at the NYISO. My current responsibilities include the evaluation and evolution of the capacity, energy and congestion rights markets to achieve improved efficiencies, incorporate desired market features, and address regulatory obligations.

**3.** I am submitting this affidavit to answer questions one through seven as posed by the Commission in the deficiency letter dated April 9, 2013 in this docket.

**4.** **Question 1.** Please explain why NYISO excludes recallable External Installed Capacity (ICAP) energy sales from the scheduling and pricing of Operating Reserves if Security Constrained Unit Commitment (SCUC) curtails external energy sales from NYISO ICAP providers when it forecasts a shortage in the day-ahead market.

**5.** **Answer 1.** The description of SCUC curtailments, cited in the question, is unfortunately outdated and it should have been removed from the Emergency Operations Manual in 2005. The Day-Ahead Security Constrained Unit Commitment ("SCUC") market software no longer curtails, with out-of-market actions, ICAP backed external energy sales when it forecasts a reserves shortage in the Day-Ahead Market. Before 2005, the SCUC and Real-Time software was programmed to ensure that the NYISO had sufficient resources to meet its Operating Reserve requirements because to do otherwise would have presented an infeasible SCUC and real-time solution.[1] Thus, if SCUC could not procure

[1] *See*: *New York Independent System Operator, Inc.* ER03-230-000, Attachment I to the November 26, 2003 filing letter, Affidavit of Andrew P. Hartshorn, 11/4/2003 at ¶¶ 10 -12 wherein Mr. Hartshorn describes the use of penalty function costs high enough to ensure every scheduling option available to create the ancillary service was used "including commitment of internal resources, scheduling imports or not scheduling exports or price sensitive load

sufficient internal resources and imports to meet the reserves requirement, it would curtail exports in order to meet these ancillary service procurement requirements.

**6.** In 2005, the NYISO's introduced its standard market design ("SMD") and revised the Day-Ahead and real-time logic to set reserves prices during reserves shortages using demand curves.[2] With the introduction of SMD, the software can produce feasible market outcomes even when there are insufficient New York suppliers to meet the Operating Reserve requirements by establishing shortage prices during shortage conditions. This allowed the NYISO to stop including within the market solutions the use of recallable export transactions as providers of reserves services. The removal of recallable export transactions from the Available Reserves calculation aligns the market outcomes for scarcity pricing with the market solutions of SCUC and RTS with regard to reserve providers and prices. The NYISO has begun the process of revising the Emergency Operations Manual by taking a revision that would delete this language to stakeholders for approval.[3]

**7.** **Question 2.** In its filing, NYISO refers to real-time prices on July 21, 2011, when SCR and EDRP resources were activated, to illustrate how broader application of scarcity pricing would better reflect the costs of using SCR and EDRP resources to manage reliability. Please provide details of this example and show how the proposed Tariff changes would have addressed the shortage situation and/or would have adjusted LBMP and Operating Reserves and Regulation Services' (Ancillary Services) prices.

**8.** **Answer 2.** The NYISO has reviewed prices and Available Reserves for July 21, 2011 and determined that, pursuant to the proposed revisions to the term "Available Reserves" and the enhanced scarcity pricing rules for LBMPs proposed in this docket, scarcity pricing for LBMPs would have applied in the Load Zones shown below on July 21, 2011. The NYISO-provided chart below shows the details of the prices as they were set for July 21, 2011 (in **blue**) and as they would have been set, had these proposed revisions been in effect (in **red**).

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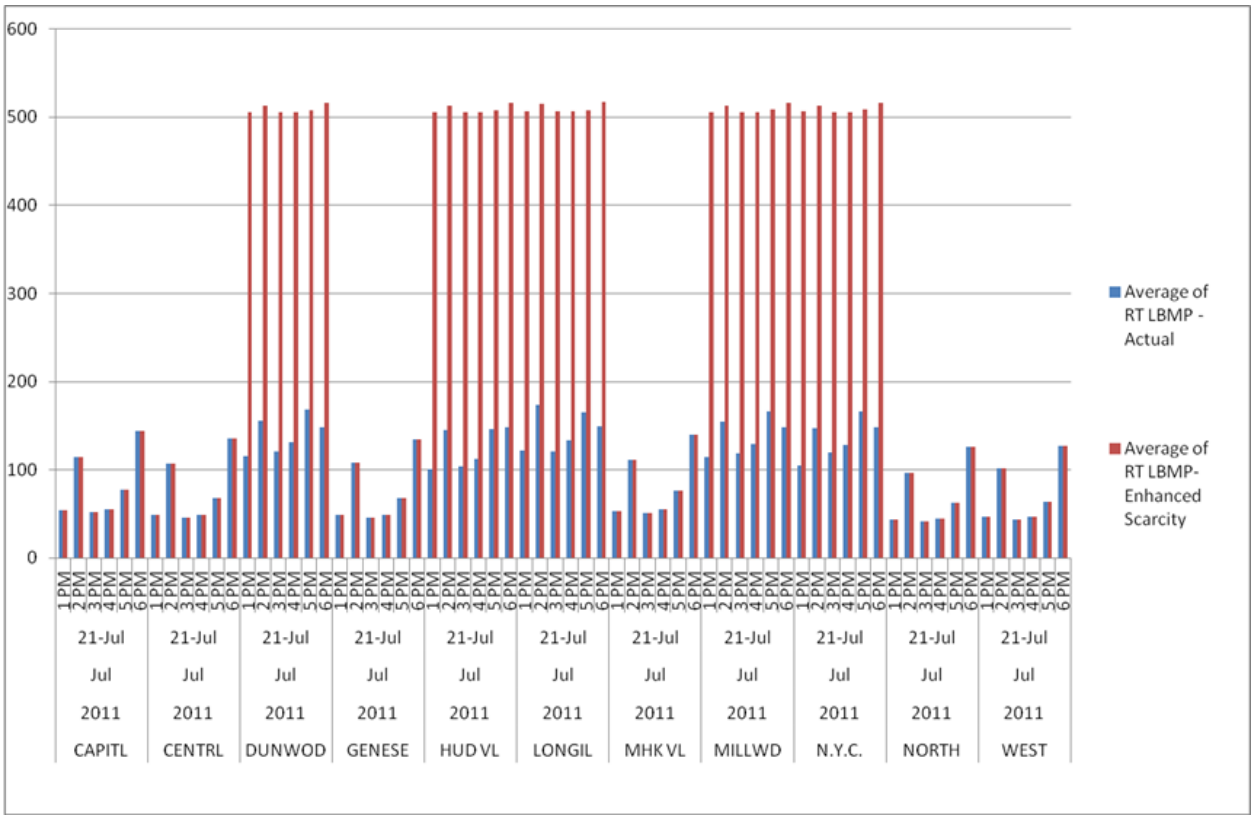
. . ." These penalty functions allow the commitment / pricing software to converge on a solution without any constraint violations. While these penalty function costs were used to essentially force the commitment (or curtailment) of resources, they were not used to price the ancillary services being scheduled.

[2] *See*: Affidavit of Andrew P. Hartshorn at ¶ 29 wherein Mr. Hartshorn stated that Operating Reserves and Regulation Service under SMD would be priced at levels consistent with economic theory and operating practice even when insufficient quantities of that ancillary service could be scheduled to meet the purchase targets. He continued by stating that during shortage conditions, the price of ancillary services would be set by the demand curves.

[3] *See:* Revisions proposed to the Systems Operations Subcommittee May 7, 2013 at https://www.nyiso.com/secure/webdocs/markets_operations/committees/oc_soas/meeting_materials/2013-05-07/M-15_Emergency%20Operations_05-01-13_Redline.pdf

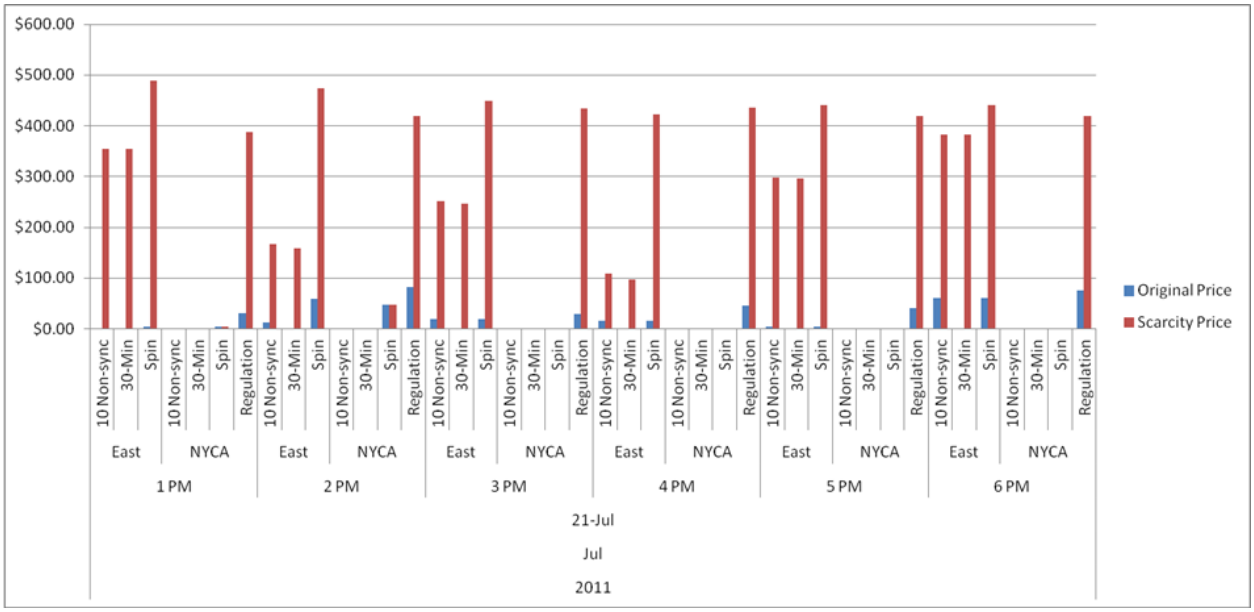



**9.** The chart below indicates the NYISO's best estimate of how enhanced scarcity pricing would have applied to reserves and regulation products on July 21, 2011. The NYISO applied the newly proposed trigger for scarcity that is included in this May 9, 2013 filing[4] as it is no longer proposing the trigger it proposed in its Feb. 8 filing in this docket. Using the newly proposed trigger, the NYISO determined that all reserves products and Regulation Service were eligible to be scarcity priced under the tests described in Section 15.4.6.2 and 15.3.5.2 respectively.

**10.** The NYISO applied the proposed pricing rule in Section 15.4.6.2.1 as indicated and developed scarcity prices for Eastern 10-Minute Non-Synchronized Reserves, Eastern 30-Minute Reserves and Eastern Spinning Reserves . Even though Western reserves were eligible to be repriced under Section 15.4.6.2.1, they were not because scarcity LBMP prices were not established for any reserve suppliers in a Western Load Zone. Without scarcity LBMP prices in a Western Load Zone, there were no reserve suppliers with higher lost opportunity costs with which a new scarcity reserve clearing price would have been established.

**11.** Applying the pricing scarcity rules for Regulation Service under Section 15.3.5.2 produced the prices shown. The highest Lost Opportunity Cost of any scheduled Regulation Service provider was located in a Load Zone for which LBMP scarcity prices applied.

[4] The revised trigger is located in proposed amendments to Services Tariff Section 15.4.6.2.




12. **Question 3.** Please explain how there can be a reserve shortage that triggers scarcity pricing in a load zone if there are no transmission constraints that limit the ability to deliver Operating Reserves from other zones that are able to provide the necessary level of reserves such that together there would be no reserve shortage.

13. **Answer 3.** The NYISO understands this question as referring to the NYISO's original proposal to apply scarcity pricing to reserves products when applying it to Energy. The NYISO's proposal to trigger scarcity pricing for reserves has changed since this question was written and the revised proposal is described below. At the time the question was asked, however, the trigger was not tied to a reserves shortage as measured by maintaining a necessary level of reserves but rather was tied only to a determination that scarcity pricing for Energy should be invoked. Therefore the ability to import reserves from outside the scarcity region to the scarcity region in order to provide the necessary level of reserves was immaterial to the determination of reserves shortage. That said, this question, as well as the advice of Dr LeeVanSchaick and Dr Patton of the NYISO's MMU, Potomac Economics, convinced the NYISO to revise the trigger for applying scarcity pricing to Operating Reserves and Regulation Service.

14. A determination that scarcity-pricing is necessary for pricing Energy in a Load Zone may not usefully indicate that the NYISO's Operating Reserves or Regulation Service ("Ancillary Services" in this affidavit) should also be priced using scarcity pricing formulations. The NYISO's revised proposal for applying scarcity pricing of Operating Reserves and Regulation Service would trigger when Available Reserves in the region from which supplies of reserves and regulation can be obtained[5] (reserves and regulation

[5] As the Services Tariff amendments provided with this affidavit describe, scarcity pricing for Eastern Reserves products would be triggered when Available Reserves East of Central East would be insufficient to

regions) are insufficient, but for the Load Reduction expected from SCR / EDRP resources. If Available Reserves in the regions from which Operating Reserves and Regulation Service providers are eligible to be scheduled were insufficient but-for the Load Reductions expected from SCR/ EDRP resources, then reserve and regulation products should also be priced using scarcity pricing methodologies. The repriced reserves and regulation products would apply to all Suppliers of the product without regard to their location within the applicable reserve or regulation region. For instance, all Suppliers of Eastern Reserve products would receive a scarcity priced Eastern reserve product if scarcity for Eastern reserves products triggered. All suppliers of statewide reserves products (or Western reserves products as the pricing rules of Section 15.4.6.2.1 describe them) and regulation would receive a scarcity priced product if scarcity for statewide reserves triggered. This proposed new trigger recognizes that providers of reserve, or "Available Reserve," throughout the reserve region are able to provide the necessary levels of service. Only if the totality of supply in the reserves region was insufficient to meet the identified reliability need but for the load reductions expected from SCR / EDRP Resources would the NYISO determine that scarcity prices should apply to these Ancillary Services, under this revised approach.

**15.** The NYISO also recognizes that pricing and scheduling consistency is best achieved through use of the real-time optimization engine and that the practice of applying prices administratively after schedules have been established by the real-time dispatch ("RTD") will never duplicate RTD's pricing and scheduling efficiency. However, the proposal set forth herein can be accomplished in the short-term, addresses the recommendation from the Independent Market Monitor to "set efficient prices when demand response resources are needed to satisfy reliability needs…"[6] and reduces the scheduling / pricing inefficiencies that the NYISO's initial proposal did not while retaining the uniform market price/MW principle that is fundamental to the NYISO Markets.

**16.** The need for enhanced scarcity pricing for LBMPs, Operating Reserves and Regulation Service outweighs the few remaining real-time market inefficiencies that may exist under the NYISO's proposed administrative application of scarcity pricing. Scarcity-priced LBMPs are necessary to ensure continued reliable service by signaling shortages in the capacity available from generation currently on the system. Scarcity pricing of energy and these ancillary service products indicates additional supply of these products would be valuable. Scarcity pricing assists in maintaining long-term relaibility by signaling the need for new investment in transmission, generator resources and additional demand reduction in the areas where the existing energy is in short supply.

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maintain load reliably but for the expected Load Reductions from SCR/EDRP resources. Similarly, scarcity pricing for all Operating Reserves Products and Regulation Service would be triggered when Available Reserves statewide would be insufficient to maintain load reliably but for the expected Load Reductions from SCR/EDRP resources.

[6] *See: 2012 State of the Market Report for the New York ISO Markets*, David B. Patton, Ph.D., Pallas LeeVanSchaick, Ph.D., Jie Chen, Ph.D., April 2013, page 85 at: http://www.nyiso.com/public/webdocs/markets_operations/documents/Studies_and_Reports/Reports/Market_Monitoring_Unit_Reports/2012/NYISO2012StateofMarketReport.pdf,

17. **Question 4.** In its March 20, 2013 answer to the Protest of the New York Transmission Owners (NYTOs), NYISO states that it pays all suppliers of Ancillary Service product a uniform price/MW for each product scheduled.

    Since Ancillary Service prices are based on lost opportunity costs which are based on LBMPs, why would it be appropriate for Ancillary Service prices not to reflect locational differences to the extent LBMPs reflect locational differences?

18. **Answer 4.** Energy is priced in New York using Locational Based Marginal Prices (LBMPs) to recognize the cost of the marginal resource – the least-cost resource that is needed to reliably meet the next MW of demand for Energy, or secure the next MW of transmission. The choice of the marginal resource is impacted by transmission constraints and other physical realities implicating the availability of any particular Resource to serve Load. However, it is typical that a single resource is establishing the marginal cost of solving a constraint and LBMPs throughout a region only vary by the relative differences in physical impact each location has on the constraint being solved. LBMPs are designed to signal consumers and potential suppliers of the value of energy in that interval and at that location.

19. Similarly, Eastern Operating Reserves can be provided by a Supplier located in any Load Zone East of Central East. The market signal to provide Eastern Operating Reserves is common throughout this region. Thus, whereas Energy may be valued differently in the Load Zones East of Central East, particularly when transmission constraints exist, Eastern Operating Reserves would have the same value everywhere in the area regardless of the location of the supplier within the area East of Central East. The value of that service will be set by the marginal provider of that service and includes both the location- specific lost opportunity costs of the marginal Resource and the offer supplied by that Resource for providing the service. The location-specific lost opportunity costs of the marginal Resource are associated with the Resource's inability to be scheduled for two products using the same capacity.

20. The single locational difference that impacts the value of Operating Reserves statewide is the eligibility requirement that resources must be located in a Load Zone F through K to provide an Eastern reserves product. This locational requirement often does separate the price for Eastern reserves from Western (or statewide) reserves.

21. **Question 5.** Why is it reasonable to have zonal pricing of energy but regional pricing of reserves in locations other than the scarcity load zone?

22. **Answer 5.** When scarcity pricing is applied to LBMPs because Available Reserves in that Load Zone would be insufficient to resolve the identified reliability need "but-for" the Load Reduction expected from SCR / EDRP Resources, the NYISO is not applying a 'zonal pricing' methodology for Energy. Rather it performs separate calculations for each LBMP bus where energy prices inside the Load Zone will still separate due to the marginal cost of losses and may still separate due to transmission constraints with shadow

prices that exceed $500. These calculations are defined in Section 17.1.2.2 as proposed in the NYISO's Feb. 8 Filing.

**23.** Operating Reserves (but for Eastern Reserves as described in the Answer to Question 4 above) and Regulation Service can be obtained from Suppliers anywhere in the state. Therefore these products are priced uniformly across the region from which they can be derived (*i.e.* they are regionally priced). The NYISO's amended scarcity pricing methodology for Operating Reserves and Regulation Service, as described in the Answer to Question 3 and in the revised Tariff Sections 15.4.6.2.1, 15.4.6.2.2 and 15.3.5.2 submitted with this May 9, 2013 filing, will better preserve the regional pricing of reserves. The new methodologies will not price Ancillary Services at scarcity prices outside the Load Zones in which Energy is being scarcity priced, unless Available Reserves in the relevant reserves and/ or regulation regions are also insufficient. Therefore, the independent triggers separately validate the appropriateness of applying scarcity pricing to the Energy and reserve prices.

**24.** **Question 6.** In its answer submitted on March 20, 2013, NYISO states that there is no possibility that loads will have to pay for "windfall" payments because the real time reserves supply obligation is that of generators, not load (NYISO Answer at 8). Would load pay through the Day-Ahead Margin Assurance Payments (DAMAP) or some other uplift mechanism?

**25.** **Answer 6.** The NYISO purchases on behalf of statewide Load all the Operating Reserves and Regulation Service it needs to meet its reliability-based requirements in the Day-Ahead Market. The only time the NYISO needs to purchase real-time reserves or regulation is to replace Day-Ahead-scheduled reserves or regulation capacity. The Day-Ahead scheduled generator whose unavailability in real-time results in the need to procure real-time replacement reserves or regulation will pay a real-time balancing obligation that is identical, MW for MW, to the cost of procuring replacement ancillary services at real-time prices. Thus, the NYISO has sufficient funds to buy these replacement real-time Ancillary Services and Load has no obligation in that regard.

**26.** On the other hand, Load has always been responsible for the cost of procuring real-time Energy when changes on the transmission system leave the Day-Ahead-scheduled generation insufficient or unavailable to serve all real-time Load. Real-time transmission system events, such as the reduction in import capability to Load Zone J during thunder storm alerts[7] may require upstate generation to be backed down and more expensive real-time replacement generation to be scheduled. In these instances, Loads would be charged for the difference between, among other sources of revenue, the balancing revenue received and the cost of procuring real-time energy.

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[7] *See*: The description of operating during a thunderstorm alert at Section 4.2.9 of the *Transmission and Dispatching Operations Manual* at http://www.nyiso.com/public/webdocs/markets_operations/documents/Manuals_and_Guides/Manuals/Operations/trans_disp.pdf:

**27.** Loads fund DAMAP when the NYISO compensates a Day-Ahead scheduled energy supplier facing a balancing obligation because the NYISO reduced its schedule for Energy or Ancillary Services in real-time for reasons including reliability needs, to procure ancillary services or to reflect changes in energy economics from the Day-Ahead schedule, and the generator's hourly net balancing obligation erodes or erases its Day-Ahead profit.[8] Scheduling decisions made consistent with the offer prices of Resources do not typically result in the need for a DAMAP. The Generator described above whose schedule was reduced in real-time because of a thunder-storm alert faces a balancing obligation. If that balancing obligation erodes the Day-Ahead profit it earned on those MW, the generator may be entitled to a DAMAP, funded by Loads, to make it whole.

**28. Question 7.** NYISO claims that utilizing the revised pricing approach advocated by the NYTOs would create a windfall revenue stream payable to loads (NYISO Answer at 10).Under what mechanism would such a revenue stream be passed along to load?

**29. Answer 7.** When the NYISO procures more revenue from the reserves or regulation balancing obligations of Day-Ahead scheduled generators, whose ancillary service was unavailable in real-time, than it costs to provide replacement real-time Ancillary Services, the balance is passed to Loads and exports pursuant to Rate Schedule 5 (reserves) and 3 (regulation) in the OATT. The tariff amendments the NYISO is proposing in this filing will not increase or decrease these costs. Some examples will assist in this description.

**30.** Assume the proposal described in the Protest of the New York Transmission Owners is implemented,[9] and the NYISO calls for scarcity-priced Energy in a single Load Zone. Two reserves prices would be imposed– a scarcity reserves price would be imposed inside the single scarcity-priced Load Zone and a RTD-determined reserves price would be applicable everywhere else. Also assume one supplier in the Day-Ahead market carries all necessary reserves and it is located inside the single scarcity-priced Load Zone.

**31.** If the NYISO converts to Energy the reserves schedule on the supplier in the scarcity-priced Load Zone, that supplier will have a balancing obligation priced at the real-time scarcity cost of reserves. Replacement reserves, purchased from outside that Load Zone will be priced at the RTD-determined reserves price. The difference in revenue between the balancing obligation and the purchase obligation will result in a surplus in the Real-Time balancing accounts for reserve and will be shared with load through the Rate Schedule 5 OATT cost allocations.

**32.** Use the same example, but assume the NYISO proposal being offered in this filing is implemented instead. A second test for scarcity is conducted before reserves are scarcity priced. However, whether scarcity for reserves is triggered or not, the buy-out obligation of a supplier will equal the purchase obligation for replacement reserves where-ever the two suppliers are located. The NYISO proposal will have no impact on the Rate Schedule

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[8] *See:* Services Tariff Attachment J, Section 25.

[9] *New York Independent System Operator, Inc., New York Independent System Operator, Inc., Motion To Intervene and Protest of the New York Transmission Owners,* March 1, 2013 ("Protest")

5 OATT allocations because in all cases the cost of the reserves-suppliers' buy-out obligations will always equal the cost of replacement reserves.

**33.** That is not to say Loads will have no obligations. If reserves scarcity were to be triggered in more Load Zones than energy scarcity was triggered, suppliers outside the Load Zones where Energy is scarcity priced will have inconsistent energy and reserves prices. If the NYISO converts reserves schedules to energy on these generators, they may face reserve balancing obligations that exceed their real-time energy revenues. If the negative difference between the balancing obligation and the real-time revenue erodes the Day-Ahead margin earned on these MWs, the Generators would be eligible for a DAMAP which the Loads would fund.

**34.** Given the actual SCR/EDRP activations over the last two summers and the more immediate concern with the sufficiency of capacity in the Southeast New York (SENY) region, it is reasonable to expect that SCR/EDRP activation will continue to occur for large portions of the existing reserve regions. For example an UPNY/SENY transmission limitation can impact reliability in Load Zones G, H, I, J and possibly K. In such an event, the NYISO would call on SCR/EDRP resources from some or all these Load Zones. The only Load Zone East of Central East not likely to be implicated by an UPNY/SENY transmission limitation is Load Zone F. As a result, if energy scarcity were called to resolve a relaibility issue related to the UPNY/SENY transmission limitation, the only Resources that would be exposed to an inconsistency in the energy and reserve prices would be located in Load Zone F (and possibly K) and the exposure of Loads to fund DAMAP payment would be equally limited.

**35.** This concludes my affidavit.

ATTESTATION

I am the witness identified in the foregoing Affidavit of Robert Pike, dated May 9, 2013 (the "Affidavit"). I have read the Affidavit and am familiar with its contents. The facts set forth therein are true to the best of my knowledge, information, and belief.

Robert Pike

May 9, 2013

Subscribed and sworn to before me
this 9th day of May, ~~2012~~ 2013

Notary Public

My commission expires: 9/26/2014

LINDA J. MOORE
Notary Public, State of New York
No. 01MO5033807
Qualified in Schenectady County
Commission Expires September 26, 20 14