ATTACHMENT 4

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

New York Independent System Operator, Inc. **Docket No. ER14-500-000**

SUPPLEMENTAL AFFIDAVIT OF
EUGENE T. MEEHAN

Mr. Eugene T. Meehan declares:

1. I have personal knowledge of the facts and opinions herein and if called to testify could and would testify competently hereto.

I. Purpose of this Supplemental Affidavit

2. The purpose of my Supplemental Affidavit is to respond to the protests filed in this docket with respect to the NYISO's filing to request the Commission's approval of the Installed Capacity (ICAP) Demand Curves[1] for the three year period beginning on May 1, 2014 (the November Filing). I prepared an affidavit in support of the November Filing that introduced and briefly described the report of the independent consultant and that described various analyses underlying the recommended ICAP Demand Curves including the statistical and production cost modeling analysis of Energy and Ancillary Service revenues, an independent assessment of construction costs of peaking technologies, a methodology for determining an appropriate amortization period to reflect an equilibrium level of excess capacity that was integrated with the zero crossing points of the ICAP Demand Curves, and assumptions to implement the methodology for

[1] Capitalized terms that are not otherwise defined herein shall have the meaning specified in the pleading to which this Supplemental Affidavit is attached or the meaning set forth in the NYISO's Market Administration Services Tariff and if not defined in the Services Tariff, have the meaning set forth in the NYISO's Open Access Transmission Tariff.

determining an appropriate amortization period. Various parties including the New York Transmission Owners (NYTOs), the New York Public Service Commission (NYPSC), Multiple Interveners and the City of New York (MI/City), the Independent Power Producers of New York (IPPNY), the Electric Power Supply Association (EPSA), the Indicated Suppliers, and other generation interests have submitted comments protesting and critiquing the analyses and assumptions used in this ICAP Demand Curve reset. I will respond to points raised in those critiques and protests and explain why I believe the analyses and assumption that they protest and critique are reasonable and appropriate and the alternate assumptions advocated should not be adopted.

3. I organize my response in two ways. First, I devote a section of this Supplemental Affidavit to the issue of the economic analysis or amortization period as it is the major issues on which the parties take directly conflicting positions on both side of the assumptions and analyses that NERA has made and performed. I will discuss the issue, summarize the conflicting protests and explain why in my opinion the assumptions made by NERA with respect to the economic analysis period are appropriate. Second I address all other issues in a single subsequent section of the affidavit. I will describe why I believe the assumption or analysis made or performed by NERA is appropriate and why the critiques are misplaced. All of the protests and critiques in the filings of the various parties were presented during the 8 month process for developing the final report and have been carefully considered by NERA during that process. As the various protests contain no conflicts among the various load interests and various supplier

interests and contain numerous statements of cross support, I will sometimes refer to positions on issues as the position of "the load interests" or "supplier interests."

II. Qualifications

4. I am a Senior Vice President with NERA Economic Consulting (NERA) and have over thirty years of experience consulting with electric and gas companies. I have testified as an expert witness before numerous state and federal regulatory agencies, and in federal court and arbitration proceedings. My qualifications are further elaborated upon in, and my Curriculum Vitae is attached as Exhibit A to, the affidavit that supports the November Filing.

III. The Economic Analysis (Amortization) Period

5. The NYTOs,[2] MI/City and NYPSC all protest the use of economic analysis periods shorter than 30 years. The primary basis for the protest appears to be the fact that a substantial number of over 40 year old gas turbines continue to operate in New York City and participate in the energy and capacity market. Additionally, it is claimed that an economic analysis period of less than 30 years is an attempt to circumvent the tariff requirement that the average excess capacity level be set equal to the capacity of the proxy plant. The load interests[3] advocate that the economic analysis period should be 30 years, as opposed to the 20 year period used for Frame technology and the 25 year period used for the LMS 100, or that if the shorter periods recommended by NERA and NYISO are used, the residual value assumption be increased.

[2] The NYTOs only raise this issue for the Commission's consideration if the Commission decides not to approve the November Filing as a whole as filed.

[3] "Load interests" refers to the NYTOs, MI and NYDPS.

6. The supplier interests[4] present a contradictory protest. Through IPPNY, they advocate a 14 year economic analysis period in NYC and an 18-year economic analysis period in New York Control Area and the LHV (the G-J Locality). The sole basis for this position appears to be historical examples of ratepayer-supported State sanctioned uneconomic entry that have suppressed capacity prices and the continued potential for capacity price suppression through ongoing State initiatives.

7. In my November 29, 2013 affidavit in this docket I explained that the selection of the 20- and 25- year economic analysis periods was made considering four factors. These are current circumstances with respect to technological change, environmental regulation, the risk allowances in other aspects of determining the value at the reference point and the corresponding assumption used by PJM in the past and approved by the Commission and underlying the PJM settlement demand curve that is currently in effect. I will not elaborate on these points in this Supplemental Affidavit, as this discussion is already well-developed in the November Filing.

8. I will, however, emphasize that the amortization period cannot be viewed in isolation of all of the parameters considered in the reset process. Ultimately, the ICAP Demand Curve must be at a sufficient level to attract new entry when such entry is required. As I stated in my November 2013 affidavit, the ICAP Demand Curve model reflects only a limited set of uncertainties. Everything would need to go exactly as modeled for the return on and of capital to be achieved over the economic analysis period, and an investor would be likely to require an economic analysis period not so long that if events

[4] "Supplier interests" refers to the IPPNY, EPSA and individual generating unit owners.

did not transpire exactly as expected, there would still be a chance to make up for some of the lost return on and of capital.

9. It is the case that a substantial number of older gas turbine units are operating and are continuing to earn revenue in NYISO markets, especially in the capacity market. This may indicate that there is a good chance that a new peaking unit installed now will be operating in 40 years. It does not, however, mean that the net revenues or earnings beyond a shorter economic analysis period of 20, 25 or 30 years would present returns that are additional to the return on and of capital that is modeled over the 20, 25 or 30 year economic analysis period. The returns beyond the economic analysis period, which have a very low present value, are one way that an investor may compensate for revenues during the economic analysis period not being exactly as forecast or added costs that may be incurred but are not modeled or explicitly accounted for. When the Commission approves PJM's reference point using a 20-year amortization period,[5] it surely is not saying that a new peaking unit will only physically operate and earn revenues for 20 years. When I used a 30-year economic analysis period in previous resets, I did not mean to imply that the units would no longer operate after 30 years. Even the load interests do not argue for a 40-year economic analysis period although the data show that many peaking units are still operating after 40 years. This is correct because the potential physical operating life and the amortization period or economic analysis period are different concepts. The economic analysis period is intended to capture the time frame over which a reasonable investor would plan to recover a return

[5] To remind the Commission, due to differences in levelization methodology alone, a 20-year amortization period in the PJM context is equivalent to 17 to 18 years using NYISO's economic carrying charge methodology.

on and of an investment for purposes of analyzing the investment under what are a reasonably neutral set of assumptions with respect to market conditions. If under neutral conditions the return can be achieved over this period, the risks of adverse conditions can be balanced by potential upside variations or net revenues that could accrue after the period.

10. Another example that illustrates the difference between the amortization period and the physical life is that of transmission. In my experience, a utility may depreciate transmission investment over up to 40 years, but it would not be unusual to be able to point to an individual transmission line that has been in service for a much longer period. Part of this may be attributable to the fact that individual elements of the line are retired earlier and capital additions are made to extend life. The same would apply to a combustion turbine. And as I noted before,[6] S&L's cost estimates do not include any capital projects intended to extend life.

11. The ICAP Demand Curve model employs a neutral set of assumptions with respect to market conditions.[7] It assumes an excess capacity level equal to the capacity of the proxy plant; it assumes that the net energy revenues that the plant earns will remain constant in real terms despite the fact that over time the proxy unit could become less competitive. The model is not capable of capturing all the risks that may occur. The excess capacity level is not intended to measure risk but to reflect that excess capacity is

[6] November Filing, Attachment III at P 19.

[7] *See* "Independent Study to Establish Parameters of the ICAP Demand Curve for the New York Independent System Operator" (Aug. 2, 2013), *available at*: http://www.nyiso.com/public/webdocs/markets_operations/committees/bic_icapwg/meeting_materials/2013-08-13/Demand Curve FINAL Report 8-2-13.pdf.

the condition to be expected on average, given the existence of the NYISO's Comprehensive Reliability Planning Process, which is intended to avoid any reliability shortfall.[8] Hence, it is appropriate that the amortization period reflect a reasonable economic life that is shorter than the full potential physical life of the equipment.

12. In this reset, I considered all these factors and exercised my judgment to select a 25-year economic life for the LMS 100. This is in the middle of the range of 30 years advocated by the NYTOs and the 20-year period that the supplier interests concede may be appropriate if there was no risk of excess related to entry that occurs as a result of State actions as opposed to the decisions of private investors. In my opinion, the 20- and 30-year economic analysis period bound the reasonable range of economic analysis periods and neither the load nor supplier interests are advocating unreasonable positions with respect to amortization period. However, in my opinion 20 and 30 years are at the boundaries of the reasonable range and I recommend using a value that is in the middle of that range.

13. The recommendation of a 25-year amortization period for LMS 100 plants is not intended to be a way to reflect a higher level of excess capacity than is specified in the tariff.

14. Examples exist where both 20 and 30 years are used for economic life. As noted before PJM uses 20 years in a very similar application to the instant application. Additionally

[8] *See* "NYISO Comprehensive Reliability Planning Process Manual" (Nov. 20, 2007), *available at*: <http://www.nyiso.com/public/webdocs/markets_operations/documents/Manuals_and_Guides/Manuals/Planning/CRPPManual120707.pdf>.

PJM sets its average excess capacity level at 1%.[9] On a pool wide basis, this is approximately 1700 MW, given the size of PJM. NERA conducted a literature search to find examples of assumptions used by other entities. The Environmental Protection Agency (EPA) uses a book life of 30 years for new combustion turbines and combined cycle units.[10] The Department of Energy (DOE) uses an economic analysis period of 30 years.[11] The Northwest Power Planning Council also uses an economic analysis period of 30 years.[12] The EPA, DOE and NWPPC are not necessarily analyzing only merchant investment and hence may tend toward a longer view. Nonetheless, I believe that these examples provide added support for 20 and 30 years bounding the reasonable range of amortization periods and that the choice of 25 years, which is in the middle of that range is appropriate.

15. The supplier interests advocate for a period below 20 years based upon the claimed historic occurrence and potential future occurrence of State intervention. I have not accounted for that based on the NYISO's continuing review of its mitigation rules and proposals to improve those rules. Stakeholders vet those proposals in a stakeholder process and, if there is adequate support that a proposal is an enhancement, such a proposal would progress to the filing of a mitigation rule revision. During the reset

[9] *See* "Manual 18: PJM Capacity Market" Section 3: Demand in the Reliability Pricing Model, Page 19 (Nov. 21, 2013) *available at:* <http://www.pjm.com/~/media/documents/manuals/m18.ashx>.

[10] Table 8-4, Book Life, Debt Life and Depreciation Schedules for EPA Base Case v. 5.13, Documentation for v.5.13, *available at:* <http://www.epa.gov/airmarket/progsregs/epa-ipm/BaseCasev513.html#documentation>.

[11] Exhibit 2-18, NETL, Cost and Performance Baseline for Fossil Energy Plants Volume 1, Rev. 2 (Nov. 2010), *available at*: <http://www.netl.doe.gov/energy-analyses/pubs/BitBase_FinRep_Rev2.pdf>.

[12] Appendix B, Northwest Power Planning Council. New Resource Characterization for the Fifth Power Plan, Natural Gas Combined-cycle Gas Turbine Power Plants (Aug. 2002).

process, load interests indicated that the buyer-side mitigation process is imperfect and may in some cases deter entry that may be economic.

16. Mr. Younger presents information that purports to show that economic analysis periods of 14 years in NYC and 18 years in the NYCA and the G-J Locality are needed to offset State intervention with uneconomic entry. I have not verified those analyses and solely for purposes of this affidavit, I will assume for the sake of argument that they are numerically correct. It is not surprising that if capacity revenues are limited to 75% of the cost of a new entrant, it would be unlikely that a new entrant would earn a full return on capital within any reasonable period of time. This is essentially all that his comment on a 1000-year amortization period implies. However, in my opinion, there are limits to what can and should be accomplished through the ICAP Demand Curve reset process. The supplier interests would like to use this Demand Curve reset to address New York State entities' actions in relation to the electricity market and suppliers by adjusting the ICAP Demand Curve in the reset to remove the impact of such intervention on existing suppliers. As the independent ICAP Demand Curve reset consultant, I do not recommend making that adjustment. While I do not take a view as to whether Mr. Younger is right or wrong with respect to whether or the degree to which State intervention has affected and might affect the capacity market, I believe that adjusting the ICAP Demand Curve reference point to neutralize the impact of State intervention is neither a practical nor an appropriate solution to such intervention. Such an adjustment requires analyses and judgments that I believe the reset process is not well suited for. For example, it requires an assessment and prediction of the governmental policies and the trend in such policies over the duration of the life of the plant and not just the reset

period, the availability of funding and support for such intervention, the certainty of the governmental actions and the implications of the actions that might arise therefrom, and the time in which those implications might be realized. This would inject a very high degree of subjectivity in to the reset process.

17. I use a shorter (20 year) economic analysis period for a Frame combustion turbine. The shorter period for the Frame unit is intended to reflect the higher heat rate and higher emissions associated with such a unit and the fact that a unit with a higher heat rate and higher emissions faces a more uncertain future – higher risk due to potential displacement from future alternative energy sources or technological improvements. The literature search revealed that the EPA, in its economic analysis base case for its Integrated Planning Model, takes a similar view, noting the added risk of peaking capacity. The EPA states

> The selection of new technology investment options is partially driven by the risk profile of these technology investments. For instance, in a deregulated merchant market, an investment in a combustion turbine is likely to be much more risky than an investment in a combined cycle unit because while a combustion turbine operates as a peaking unit and is able to generate revenues only in times of high demand, a combined cycle unit is able to generate revenues over a much larger number of hours in a year. An investor in a combined cycle unit, therefore, would require a lower risk premium than an investor in a combustion turbine.[13]

While the EPA adjusts for this by using a less levered capital structure and hence a higher weighted average costs of capital, I rely on the same logic but adjust the economic analysis period as opposed to the weighted average cost of capital. Additionally, I note that the IRS MACRS depreciation schedule allows 15 years for combustion turbines and

[13] Chapter 8 of EPA Base Case, EPA's Power Sector Modeling Platform v.5.13, Integrated Planning Model, *available at*: <http://www.epa.gov/airmarket/progsregs/epa-ipm/BaseCasev513.html#documentation>.

20 years for combined cycles. In the event that the Commission disagrees with my recommended amortization period of 25 years for the LMS 100 unit and extends the period to 30 years, I would recommend that it still recognizes the increased risks faced by Frame type simple cycle combustion turbines and adopts a 20 year amortization period for that technology. I note that the LMS 100 unit has a heat rate between a Frame unit and a combined cycle.

18. The load interests contend that life cycles longer than 20-25 years are more appropriate citing the commonality of New York City peaking units currently operating beyond 40 years. The load interests go on to calculate that the net present value (NPV) of hypothetical net cash flows spanning years 26-40 would result in revenue in the amount of 60% of the initial investment. This seems implausible given that lengthy cash flows contribute exponentially less to NPV compared to earlier cash flows. As a result, I have provided a table below that shows the expected net present value of capacity market cash flows of regions and units during years 26-40 less fixed O&M costs, site leasing and property taxes. I provide these calculations using the after-tax real weighted average cost of capital (WACC) and the real cost of equity as the discount rate. Since residual cash flow is a risk that would be difficult to finance, the equity based discount rate is also a way that the present value of the residual cash flow can be viewed. The results are in the table below.

Table 1. Estimated 2014 Net Present Value of Revenue Years 26-40

Unit	Region	Real Discount Rate	NPV of Net Revenue	CONE	NPV Net Revenue as % of CONE
Frame 7 SCR	LHV	6.24%	$134.51	$950	14.16%
	LI		$54.50	$1,040	5.24%
	NYC		$196.27	$1,176	16.69%
LMS100	LHV	6.24%	$202.84	$1,624	12.49%
	LI		$111.23	$1,739	6.40%
	NYC		$277.77	$1,899	14.63%
Frame 7 SCR	LHV	9.97%	$44.03	$950	4.63%
	LI		$17.88	$1,040	1.72%
	NYC		$61.65	$1,176	5.24%
LMS100	LHV	9.97%	$66.39	$1,624	4.09%
	LI		$36.46	$1,739	2.10%
	NYC		$90.94	$1,899	4.79%

1) NPV of Net Revenue in 2014$/kW-y
2) CONE in 2014$/kW Installed

The table clearly shows that the claimed 60% of investment as a NPV resulting from capacity revenue after 25 years is incorrect and that the present value of net capacity revenues would be much lower than 60% of the original investment.

IV. Other Protests/Critiques Raised by Load or Supplier Interests

19. The load interests protest the use of a 12.5% return on equity. The protest is based on the fact that the CAPM analysis showed an 11.29% cost of equity and they consider the adjustment to 12.5% to be an unwarranted risk allowance. This is incorrect. As I explained in the November 2013 affidavit, the addition of 1.21% to the 11.29 percent to arrive at the cost of equity is a calibration adjustment and not a risk adder. The adjustment is conservative and a higher adjustment could easily be justified. It calibrates to regulated returns even lower than allowed New York returns which are

among the lowest in the country. The protestors fail to properly address the issue or to acknowledge that the CAPM method and data that I use produces equity costs of lower than 8% for regulated entities and is clearly in need of a calibration adjustment.

20. The load interests take issue with way in which scarcity pricing and new ancillary service rules are reflected in the net energy revenue estimates. On scarcity pricing, they acknowledge that GE MAPS based adjustment will account for the increase in scarcity as the level of capacity is adjusted to reflect the installed capacity requirement plus the capacity of the proxy peaking plant, but argue that it does not present a complete solution with regard to changes in the rules for scarcity prices, which came into effect too recently to be reflected in the historical period. As explained in the ICAP Demand Curve report,[14] there are various factors and nuances of the energy and ancillary service markets that are impossible to model with any degree of certainty. Because the market has no experience with the new scarcity pricing rules, any attempt to adjust the net energy revenue estimates to reflect the new market rules would be speculative. NERA did not make such a speculative estimate, but rather has attempted to balance the factors not modeled (including the new scarcity pricing rules) in its econometric analysis so that there are impacts that go in both directions and that directionally offset each other. This balancing strategy was discussed with the ICAP Working Group. To the extent that revised scarcity pricing has an impact on energy prices it will be captured in the next reset. The change to ancillary services rules was discussed with the independent Market

[14] *See* "Independent Study to Establish Parameters of the ICAP Demand Curve for the New York Independent System Operator" at 65-67, 77-78 (Aug. 2, 2013), prepared by NERA Economic Consulting; also available at: <http://www.nyiso.com/public/webdocs/markets_operations/committees/bic_icapwg/meeting_materials/2013-08-13/Demand Curve FINAL Report 8-2-13.pdf>.

Monitoring Unit (MMU). Although it also falls in the category of being impossible to model and being a market change that will eventually work in to the reset process, the MMU expressed the view that the change was unlikely to have any material impact with respect to the ancillary service revenues of the proxy unit.

21. Embedded in the comments of the NYTOs is an observation by Con Edison that the GE MAPS econometric process should be adjusted to reflect the actual availability of Astoria 2 and 4 in the historical period. I note that this is a comment that was presented during the ICAP Working Group review sessions and Con Edison's concern was addressed in the final GE MAPS modeling.

22. The Payment in Lieu of Tax (PILOT) rate used outside of NYC (0.75%) is contested by the load interests as too high relative to rates that some generation units have been able to obtain and by supplier interests as too low after a 15 year abatement period ends. Both critiques are reasonable, but offset each other, and were considered in developing this assumption. I reviewed information on four abatement agreements and while they all differ in terms, I believe that based on those agreements a rate of 0.75% would be on the high end of what could be obtained over the PILOT period. However it is also correct that the PILOTs do end and that the property tax rate reverts to the prevailing rate. I purposely chose a PILOT rate on the high end of what would be obtained over the PILOT period to account for the reversion to the prevailing rate yet not require that the entire pattern and timing of an abatement agreement be specified and modeled. The rate of 0.75% is a reasonable measure of the effective rate that could be obtained over a 20- to 30- year period on a present value basis. It does likely result in carrying charges that are somewhat too low for an amortization period under 20 years and too high for

periods over 30 years, but these values are not used in the analysis. A single rate of 0.75% accounts for the lower PILOTs that will prevail for 15 years and the higher rates after that in a reasonable fashion.

23. A segment of suppliers protest the fact that the financing assumptions do not account for the cost of an issue discount on debt. The examples that they give of original issue discount and their costs are, however, based on different financing assumptions than the ICAP Demand Curve reset analysis uses. They are based on project financing assumptions and much larger and more leveraged investments. This is addressed in the November Filing. Moreover, as also addressed in the November Filing, the yield to maturity method is based on the market, not the face value of debt, and the interest rate would account for any discount between the face and market value. Additionally, none of the bond issues examined by NERA to develop the interest assumption had an original issue discount. The protesting generators provide no evidence that an original issue discount would apply if corporate financing was used to finance the proxy plant.

24. The NYTOs also include a comment that a "dummy variable" approach should not have been used to adjust for the addition of AE2 and the Bayonne Energy Center (BEC) during the historical period, however they offer no alternative. The fact is that the dummy variables had strong statistical properties and the results were carefully examined and in NERA's opinion are reasonable. AE2 was added roughly halfway through the period and BEC was added midway through the last year. In both cases, the regression was able to measure the impacts with strong statistical measures. The only exception was for Long Island for the BEC 2 dummy variable. The outage of the Neptune cable in the summer when BEC was added caused LI prices to be extremely

high that summer. This was examined and the BEC dummy was not used for LI prices. Ignoring the impact of the addition of AE2 and BEC is not reasonable as these plants have a large impact on NYC, G-J Locality and NYCA energy prices. The NYTOs provide no statistical or intuitive critique of the particular results and offer no alternative for recognizing the impact of these new plants on energy prices.

25. The NYTOs protest the nodal adjustment, and in particular alleged differences between the points chosen for the nodal adjustment and the points where interconnection costs were examined. For NYC and the G-J Locality NERA specifically selected interconnection points that were consistent with the locations where NYISO and S&L examined whether the new unit would require System Delivery Upgrades (SDUs). Hence the NYTOs are wrong that there is any inconsistency. For the Zone F locations used for the NYCA ICAP Demand Curve, there was no pricing node at the SDU location. We used factors that reflected the nodal prices at the locations where the most recent two large units in Zone F were added. Additionally, Zone F 345 KV nodal prices are very similar at the various nodes. For the LI Locality, we also did not have a node corresponding to the SDU locations and chose a node on the 138 KV system that had an existing peaking plant. This produced a small nodal adjustment. I would note that during the review session there was no concern expressed over the node chosen for LI. In summary, the nodal adjustment is consistent with points at which SDUs are examined and there is no reason to not employ a nodal adjustment.

26. The Indicated Suppliers critique the assumption that tax abatement in NYC should be recognized. The logic for this assumption is simple and is explained in the NERA/S&L report. Abatement would apply to any unit that would come in to service during the

reset period as abatement is available to any unit that obtains a building permit by May 2015. While it is correct that absent a change in law units that start construction in the reset period, but have not obtained a building permit until after May 2015, would not receive abatement, I view that as an issue for the next reset when such units would begin operation.

27. IPPNY recommends eliminating 10-minute non-spinning revenues for the LMS 100 proxy plant as it would require an air permit that would relax emission limits during start up. It is my understanding that such permit allowances can be obtained and that it is reasonable to assume that a new unit of this type could obtain such an allowance and earn 10 minute non-spinning reserve revenues.

This concludes my Supplemental Affidavit.

ATTESTATION

I am the witness identified in the foregoing 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.

Eugene T. Meehan

Subscribed and sworn to before me
This 6th day of January, 2014.

Notary Public

My commission expires: 6/7/14

ALFRED MEDINA
Notary Public
Maricopa County, Arizona
My Comm. Expires 08-07-14