

# **ATTACHMENT 1**

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

**New York Independent System Operator, Inc.**

**Docket No. ER14-500-000**

**SUPPLEMENTAL AFFIDAVIT OF  
MARC W. CHUPKA**

Mr. Marc W. Chupka 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 several issues raised in Protests filed in this docket regarding the work I conducted with Anthony Licata, which we summarize in our November 1, 2013 report submitted to the NYISO (hereafter the “Brattle Report”), and provide additional information regarding the applicability of the F class frame with SCR to serve as the proxy unit in southeastern New York. I prepared an affidavit that NYISO filed in the instant docket on November 29, 2013 that introduced and briefly described the Brattle Report. This supplemental affidavit responds to issues raised in Protests related to the process of preparing the Brattle Report; the concept of economic viability; whether the F class turbine with SCR and 45 second fuel switching capability should be considered a “first of a kind” plant for cost estimation purposes and how technical issues can inform a determination of the commercial status of a technology.

**II. Qualifications**

3. I am a Principal with The Brattle Group (Brattle), with over 25 years of experience analyzing the market impacts of both domestic and international energy and

environmental policy, both in the private and public sector. My consulting practice focuses on environmental issues in electricity markets, particularly litigation in Clean Air Act matters, along with utility integrated resource planning, electricity and fuel procurement policies, contract evaluation and litigation, renewable energy policy design, and climate change policy design and impacts. My qualifications were presented in the affidavit I prepared that the NYISO filed on November 29, 2013 and my Curriculum Vitae was attached to that affidavit as Exhibit A.

### **III. Process Issues**

4. Several Protests<sup>1</sup> speculate that The Brattle Group was hired not to perform an objective evaluation, but rather to provide a particular opinion. From my perspective, this conjecture simply is incorrect. I was directed to examine a single issue in an independent manner and to reach my own conclusions using my best judgment. That is what I did. Neither previous Brattle work done on behalf of PJM (in which I had no direct involvement), nor current or former clients' positions carried any weight in this evaluation. There is no such thing as a "Brattle Position" on this or any other issue. As stated inside the front cover of the Brattle Report, conclusions presented are those of the author(s) alone.
5. Protests also noted the relatively short timeframe of the analysis.<sup>2</sup> The Brattle/Licata analysis was in fact conducted in a relatively short period of time compared to the entirety of the NERA/S&L ICAP Demand Curve reset process. Over the course of the process, however, NERA/S&L addressed a much broader set of issues and thus it is

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<sup>1</sup> Indicated Suppliers at 17; IPPNY at 26-29; Ravenswood at 10-13.

<sup>2</sup> Indicated Suppliers at 18-19; IPPNY at 28.

misleading to imply that the question of economic viability for the F class frame with SCR was the focus of an in-depth, multi-year review by NERA/S&L. On the contrary, I believe that Mr. Licata and I were able to examine this issue in far greater depth than did S&L during the reset process, since our work focused solely on a specific narrow question. In the course of our evaluation we managed to bring significant new information to the attention of the NYISO, such as a discussion of the root causes of the SCR failures at Puerto Rico and Kentucky. Moreover, Mr. Licata and I continued to acquire additional information after the issuance of the Report, which has reinforced or confirmed our initial judgment. For example, Mr. Licata and I (and NYISO staff) held a half day-long meeting with ATCO Emission Management, an SCR supplier that (like Mitsubishi Power Systems Americas, Inc.) informed us that they are currently bidding on SCR projects for F class frame turbines. During this meeting we gathered additional supporting information regarding design considerations and SCR operation on ultra-low sulfur diesel (ULSD) that further confirmed the conclusions provided in the Brattle Report.

#### **IV. Economic Viability**

6. Some Protests suggested<sup>3</sup> that the F class frame with SCR is not economically viable because there are few examples of this configuration in operation and currently none in the NYISO queue. In my opinion, economic viability is not synonymous with widespread market acceptance, and the NYISO tariff does not require that a specific proxy unit be commonplace. Rather, a proxy unit should be able to economically supply

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<sup>3</sup> IPPNY at 23-26; Indicated Suppliers at 25-26.

energy and capacity to the relevant market and satisfy basic screening criteria such as those discussed in the NERA/S&L Report.<sup>4</sup>

7. The screening criteria S&L suggested are: 1) compliance with environmental standards, which the Marsh Landing station demonstrates by adherence to permit terms identical to or similar to those S&L assumed for southeastern New York; 2) the technology has to be commercially available and replicable, which clearly is the case with the four-unit Marsh Landing plant; 3) the unit must be of utility scale; 4) the unit must not be commercially restricted; and 5) the unit must be dispatchable (these last three criteria were not challenged by any Protests). Thus, I believe that the F class frame with SCR satisfies the basic requirements of economic viability and the NYISO tariff.
8. The NYISO's Market Administration and Control Area Services Tariff further states that a proxy unit is defined as "the unit with technology that results in the lowest fixed costs and highest variable costs among all other units that are economically viable." In this context, I believe that economically viable refers to technologies that can economically supply capacity and energy to the market. For example, a very low fixed cost technology that has prohibitively high variable costs may not be economically viable if it is never dispatched. The tariff does not require a technology to be "the most desirable" in the eyes of a developer or even be the most economic under current market conditions – the purpose of the ICAP Demand Curve Reset is to set the curves, such that at equilibrium it would be economic to build the technology in question when it is needed to meet reliability. The F class frame with SCR does satisfy the tariff conditions, as it has the lowest fixed costs and highest variable costs of the technologies examined, while the

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<sup>4</sup> NERA/S&L Report at 18.

NERA modeling demonstrates that it would supply both energy and capacity economically into the market.

9. Given that the F class frame with SCR satisfies the five NERA/S&L screening criteria, and the NERA model shows that it would supply both energy and capacity economically into the market, I found the F class frame with SCR technology to be economically viable.

**V. First-of-a-Kind Technology**

10. Mr. Niemann suggests that additional risk premiums could be embedded in the cost of capital for a “first-of-a-kind” (FOAK) plant.<sup>5</sup> For a genuine “first-of-a-kind” design, I agree that such methodology may be applicable – but that description does not apply to an F class frame turbine combined with SCR, even with the addition of 45-second fuel switching capability. The Brattle Report relied on S&L’s judgment regarding the availability and cost of dual fuel capability on the Frame unit. I understand that some F class frames are currently offered with this capability.
11. In my experience, FOAK typically refers to an entirely unique and innovative technology such as a next generation nuclear plant or carbon capture and storage (CCS) that demonstrates completely new design principles or that translates R&D or pilot-scale project to commercial scale. History suggests that substantial departures from current technology may be prone to substantial cost overruns, performance issues or both. However, FOAK does not usually apply to the initial combination of proven components in a slightly new configuration. Many individual generating units employ unique combinations of existing, proven technologies, or are constructed to meet idiosyncratic

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<sup>5</sup> Indicated Suppliers, Niemann Affidavit at PP 22, 23 and 27.

local requirements. These are not generally considered FOAK in the development spectrum.

12. For units that combine existing proven elements in relatively newer ways, a more common (and prudent) approach to mitigating risk is to apply conservative engineering and construction principles, *e.g.*, 100% redundancy on dilution air fans, additional catalyst layers, tempering to 750 °F to achieve emission performance with normal or mid-range catalysts, *etc.*, and for equipment suppliers to offer standard warranties on such initial configurations. Roughly speaking, this approach transfers performance risk to the supplier, with the costs borne by the developer. Such conservatism in design and construction are already reflected in the S&L costs, and therefore it would be redundant and incorrect to add risk premiums to the cost of capital. The Brattle Report, along with the S&L cost model that assumed a more conservative engineering and design philosophy for the SCR on a Frame unit compared to an aeroderivative unit, reflects the conventional approach to addressing performance risk.

## **VI. Determination of Commercial Status**

13. Many of the technical issues raised in Protests regarding SCR on Frame units are equally applicable to SCRs on aeroderivative units, the economic viability of which is not disputed. For example, Mr. Ott states that he has “been involved in over 100 simple cycle SCR systems with non-performance issues, some of which led to formal warranty claims against the SCR vendors. Some of these non-performance issues involved systems that include tempering air (cooling air) applications. In those systems, problems I identified involved catalyst failure, ammonia maldistribution, tempering air

maldistribution, seals issues/bypass, high ammonia slip, high inlet NOx and many other issues.”<sup>6</sup>

14. Given the prevalence of SCR on aeroderivative units compared to frame units, the experience that Mr. Ott cites above reflects issues that arise with SCR applications on actual aeroderivative units. This implies three things: (1) that the issues he ascribes primarily to SCR on Frame units are generic to all high-temperature SCR applications, *i.e.*, Mr. Ott does not identify technical or operational challenges unique to SCR on F class frame technology; (2) significant issues can and do arise at units that are commercially proven; and (3) when they arise they can be identified, addressed and presumably fixed in most cases.
15. Mr. Ott incompletely cites the Brattle Report to imply that we could not identify causes of underperformances of the system at Riverside.<sup>7</sup> The full quote states clearly that we could not identify public information (this is not the type of information that generally is made public) but that we obtained sufficient non-public information that suggested that improper engineering and construction led to the failure of the SCR system. This is entirely consistent with the view expressed in the Brattle Report that combining the frame unit with an SCR poses challenges that require good engineering to overcome, but that Marsh Landing has demonstrated that combination.
16. Mr. Ott presents a misleading comparison when he notes that Marsh Landing only operated for 82 hours in Q3 2013 versus a single LMS 100 operating for 584 hours in 2007, while earlier noting that four units at Marsh Landing ran for a total of 507 hours in

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<sup>6</sup> IPPNY, Ott Affidavit at P 8.

<sup>7</sup> *Id.* at P 27.



7 months.<sup>8</sup> Given that Marsh Landing is comprised of four units, each with a high-temperature SCR (compared to a single LMS 100 unit), which combined ran for over 500 hours in about a half year, I believe it provides as valid basis for comparison as did the LMS 100 operating hours in an earlier ICAP Demand Curve reset.

17. Finally, Mr. Ott applies a much more conservative criterion for assessing performance than S&L (which would require one year of operating data) as he opines that “a full catalyst life cycle is needed before the technology is proven.”<sup>9</sup> Assuming that the four Marsh Landing units each ran 1,000 hours per year and that they successfully attained 25,000 hours of catalyst life, Mr. Ott would wait for a quarter of a century before arriving at a conclusion regarding the commercial status of the technology. If prior to that time, the SCR systems encountered the types of problems apparently quite common to SCR systems on aeroderivative turbines, it is not clear what conclusion Mr. Ott would arrive at, if any.

This concludes my Supplemental Affidavit.


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<sup>8</sup> IPPNY, Ott Affidavit at P 8.

<sup>9</sup> *Id.* at P 10.

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.

  
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Marc W. Chupka

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

  
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Notary Public

My commission expires: November 14, 2015  
**Nichole Heath**  
**Notary Public, District of Columbia**  
**My Commission Expires 11/14/2015**