Attachment VI

Responses to the IPPNY questions received by the NYISO on Tuesday November 5, 2013; regarding the "Independent Evaluation of SCR Systems for Frame-Type Combustion Turbines – Report for ICAP Demand Curve Reset" prepared by the Brattle Group.

Q1: When S&L did the cost estimates for the Frame 5, they included very specific caveats in Appendix B. They stated "Note that the costs below may be understated since no adjustments were made for failed catalysts, increased O&M due to unproven technology, EFORd impacts, etc." However, Brattle recommended that the Appendix B costs be the basis for the new curves. Brattle itself acknowledges in its report that these catalysts operating at higher temps are "more expensive, less efficient and less durable" (see page 6) and Brattle states that SCR manufacturers are giving (presumably for a fee) performance guarantees (see page 17). Therefore, explain why it is appropriate that the recommended curves be based on the unadjusted cost estimates from Appendix B? What impact would SCR use have on the EFORd?

A1: The Brattle report describes additional due diligence on the issues regarding "failed catalysts, increased O&M due to unproven technology, EFORd impacts" and concluded they did not impact the technical and economic viability of the F class frame turbine with SCR. The question mischaracterizes the comment on high-temperature catalysts, as the report on page 6 indicated that such catalysts "*tend to be* more expensive, less efficient and less durable." With input from MPSA, it was determined that the costs and performance parameters that S&L initially estimated for the Frame unit with SCR were accurate and within the cost estimation range for other technologies. There was no additional impact on EFORd from the SCR.

Q2: What grade of ULSD is acceptable to Mitsubishi so that the catalyst doesn't fail? The failure at PREPA was due to a "grade of fuel oil that did not meet the manufacturer's requirements". Marsh Landing is natural gas only. However, dual fuel capability is required in NYC, LHV and LI. Are there additional costs or risks associated with burning oil? If yes, how were these costs or risks reflected in the curves?

A2: During the October 25 meeting in Savannah, MPSA stated that no additional costs or risk arise for the SCR on frame-type units from burning ultra-low sulfur diesel (ULSD). Mitsubishi's specification for fuel oil is 0.5% sulfur by weight and for gaseous fuels 0.017 % sulfur by weight. Both LMS100 and Frame turbine SCR applications have the same risk exposure to firing ULSD. Frame applications may actually have a lower risk of oil fouling of the catalyst since they operate at a high gas temperature. Major catalyst and SCR vendors have indicated that that they provide performance guarantees for SCRs using ULSD.

Q3: Can the Frame swap to oil within the timeframe (45 seconds) required by ConEd? If not, how can this technology be installed in NYC? Are there any operational issues or costs for the SCR associated with quickly swapping from natural gas to oil and how were those addressed?

A3: S&L estimated the incremental cost to enable the Frame turbine to switch to oil firing within the 45-second required time, and included those costs in their estimates. Oil-firing would have similar impacts on SCRs installed on both types of turbines. An SCR on a Frame unit may actually have less impacts of fouling of the catalyst since they operate at a higher temperature and the higher temperature

exhaust gas can destroy some of the fouling material that deposits on the catalyst as a result of operating on ULSD.

Q4: The F5 is 18% larger than the Marsh Landing F4. Did the costs estimates account for this (i.e. increased land requirements, noise, etc.)?

A4: The siting assumptions of 6 acres in all zones (Table II-10 of NERA Report) enabled the construction of 2 LMS 100 turbines with SCR, and did not impose any identified space constraints for the single F5 frame unit with SCR. Therefore, no additional cost of land was included in the project cost estimates. Noise levels were assumed to be the same between the LMS 100 and Frame units. MPSA guarantees 85 dBA measured at three feet horizontal from the exhaust system and 5 feet above grade for SCR performance on Frame units.

Q5: What are the F5 costs based on? See page 19 email from MPSA to Brattle, wherein MPSA would only state that "…the resulting costs that were in the NERA [report] for the simple cycle SGT6-5000F(5) are comparable to what we would estimate." Is MPSA guaranteeing an estimate that is valid for construction in NYC? LI?

A5: We have been advised that S&L used a Class 4 estimate according to the classification system adopted by the Association for the Advancement of Cost Engineering (AACE) to determine the cost for all the units evaluated. Because owner's cost and contingencies were included in all estimates, they do not represent a vendor-provided guarantee cost. MPSA did review the cost data provided by S&L and stated that based on a scale-up of their cost on Marsh Landing and a recently submitted bid they were comfortable that an SCR could be built in New York City for the cost estimated by S&L.

Q6: The Brattle report notes that each SCR installation requires unique design and engineering. Please identify what steps were taken to assure that the estimated costs of the assumed SCR for the simple cycle frame unit captured all the unique design and engineering costs that would be encountered and that it could be accomplished at each of the proposed locations.

A6: The same design, modeling and engineering requirements apply to SCRs on LMS 100 as well as F5 applications. Once initially modeled and designed for a particular turbine, subsequent similar units do not need extensive re-modeling. Only major configuration changes, such as a 90° side entrance or a change in retention time would require additional computational fluid dynamics (CFD) or flow modeling and design work, with costs on the order of $100,000. MPSA based their determination in part on an outstanding proposal with similar site/regional cost considerations.

Q7: In light of Brattle's recommendation, has S&L changed its recommendations concerning any of the proxy units?

A7: The NERA Final Report, posted on August 2, 2013, has not been updated or revised and will remain available for the NYISO Board of Directors to consider along with the Brattle Group's Report on the question of proxy technology viability and selection.

Q8: If it is possible to put an SCR on a simple cycle Frame unit then please explain why the SCR would not be required as part of the siting process throughout NYCA?

A8: As was done in the past demand curve resets, the proxy plant that meets the tariff requirement of "lowest fixed, highest variable costs among all other units' technology that are economically viable" is an F class frame turbine without an SCR that has accepted a federally enforceable annual operating limit. This annual operating limit reduces the project's potential to emit below project significance

thresholds provided in 6 NYCRR Part 231, which, in turn, would allow the project -- with annual emissions of NOx below 40 tpy -- to be constructed without post combustion emission controls.

Q9: Please explain how the assumed total costs estimated for the Frame plus SCR account for the increased risk of failure that results from this new technology? If the SCR manufacturers are guaranteeing against any business interruption costs that result from failure of the SCR then please provide a description of those guarantees. If they are not accounted for in the SCR guarantees then please explain where the cost estimates account for these additional risks?

A9: Brattle has concluded that Frame plus SCR it is not a "new technology" but rather a combination of existing, mature technologies. Brattle examined likely failure mechanisms from specific elements of the Frame plus SCR (e.g., fans, high temperature seals) and determined that, with proper engineering design and construction techniques, there is no incremental failure risk. The nature of guarantees for "failure of the SCR" are considered to be standard in the industry, consistent with Brattle instructions to MPSA reported on p. 18.

Q10: In their analysis, did Brattle incorporate costs for the larger air attenuation fan size and 2x 100% redundancy and account for the resulting station net-output penalty of at least 1MW? Did the O&M costs account for accelerated masking w/distillate operation and the potential hot catalyst poisoning?
A10: S&L included the cost of cooling air fans with redundancy in their estimate and an adjustment to the station net output was made for the Frame unit. Catalyst replacement cost was included in the overall life cycle cost methodology. Brattle did not see any additional cost or risk beyond the catalyst life used in the S&L model, and we obtained confirmation from various catalyst manufacturers that they will provide guarantees and warrantees for performance and life including oil firing.

Q11: Please describe the selection process utilized in selecting Brattle, including providing the request for proposals that was issued and the selection criteria utilized to make the ultimate selection.

A11: The NYISO Board engaged the Brattle Group with Licata Energy & Environmental Consulting to conduct additional due diligence on a single issue – choice of proxy unit technology – that the NYISO Board concluded was necessary to help it to determine which ICAP Demand Curves to "approve" for filing under Section 5.14.1.2.11 of the Services Tariff. The Board's selection of the Brattle Group with Licata Energy & Environmental Consulting was distinct from the process used to retain consultants to determine "recommended values" for all ICAP Demand Curve parameters under Section 5.14.1.2.1.

The NYISO Board's decision to request additional due diligence was in keeping with its authority to "review any matter . . . on its own motion" under Article 5.07 of the ISO Agreement. It was also consistent with the NYISO Board's "ultimate responsibility for the operation of the ISO and the effective implementation of its basic responsibilities" and with its authority to "appoint from time to time such employees and other agents as it deems necessary" under Article 5.08 of that agreement. Nothing in Section 5.14.1.2.1 or the ICAP Manual prevents, or could reasonably be construed to prevent, the NYISO Board from requesting additional due diligence necessary to its making fully informed and independent decisions.

Q12: Did Brattle review actual emissions data for the SMUD McClellan and MID McClure facilities or did they rely on some other data source? If the latter, what was the source of this data?

A12: No CEMS data was available for either because they both are simple-cycle turbines that came online before November 15, 1990 and therefore are exempt from the CEMS requirements as per 40

CFR 72.6 (b)(1). McClellan began commercial operation in 1986, and McClure in 1980/81. For McClellan, Brattle reviewed the emissions compliance test data referenced in answer 13 below.

Q13: What data was used by Brattle or what other basis does Brattle have for its statement concerning the SCR operation on the SMUD McClellan unit?

A13: Brattle relied primarily on MPSA who was the contractor for SCR work at McClellan. Robert McGinty of MPSA was part of the project team for the McClure project when he worked at AUS, and provided the information on the unit that was used in the analysis. In addition, the most recent emission compliance test for McClellan (Emission Compliance Test And Relative Accuracy Test Audit For The General Electric (GE), Pg 7931 Frame 7E, Unit #1 Prepared For Sacramento Power Authority At The McClellan GTF Sacramento, California September 19, 2013) indicates that the unit is operating within its permit terms.

Q14: What is the source of Brattle's operational hours for the Marsh Landing units for the period 3/1/2013 – 9/30/2013? Were any of these units run in tandem and if so, which ones, when and for how long? Has the facility operated at its maximum levels and if so, when and for how long?

A14: The operational hour data was derived from CEMS data. Units ran in tandem on two occasions: on June 5 between hour ending 8 and hour ending 13 (6 hours), and on June 8 between hour ending 14 and hour ending 18 (5 hours). The entire facility ran at or above 760 MW for 4 hours on June 5. Maximum hourly outputs are shown on Table 2 of the Brattle Report. Given the nominal 190 MW rating for each turbine, the number of hours each unit ran at or above their maximum is also shown on Table 2. Since EPA CEMS data is reported on an average hourly basis, it is not possible to determine the maximum output achieved on a sub-hourly basis.

Q15 Can Brattle provide additional documentation of the hourly emission concentration data (in ppm) to support their conclusions for Marsh Landing?

A15: Brattle used CEMS hourly data on million Btu of fuel consumed and pounds of NO_x generated emitted to derive an hourly ppm measure, using the relationship ppm = 274.02 x lb.NO_x /mmBtu + 0.016.

Q16: Has Brattle considered the costs of SCR replacement over time in their analysis?

A16: S&L used life cycle replacement cost for the SCR. These costs were included in the levelized cost using the embedded fixed cost portion and the variable cost portion of the SCR O&M. The magnitude of the SCR O&M cost is low relative to other O&M cost items.