BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

DOCKET NO. 130007-EI
FLORIDA POWER & LIGHT COMPANY

JUNE 28, 2013

ENVIRONMENTAL COST RECOVERY

TESTIMONY & EXHIBITS OF:

MARTIN P. DOMENECH

IN SUPPORT OF PETITION FOR APPROVAL OF NO_2 COMPLIANCE PROJECT

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Q. **Please state your name and business address.**

A. My name is Martin P. Domenech. My business address is 700 Universe Boulevard, Juno Beach, Florida, 33408.

Q. **By whom are you employed and what is your position?**

A. I am employed by Florida Power & Light Company ("FPL") as the General Manager of Due Diligence and Technical Valuation.

Q. **Please describe your duties and responsibilities in your current position.**

A. I am responsible for providing support on technical questions from the FPL Development team for new projects or acquisitions, either through internal resources within the team or by leveraging subject experts across the FPL Technical Services organization.

Q. **Please describe your education and professional experience.**

A. I hold a Bachelor of Science degree from Michigan State University. I worked 14 years at Pratt & Whitney's engine test and field support department designing repair procedures for jet engines that are similar to the gas turbine peaker units in operation at FPL. I have been employed at FPL since 2000. Prior to my current position, I spent 12 years in various roles within the FPL Technical Services Combustion Turbine fleet team, in support of all aspects of plant operations, maintenance, and leadership accountability for the team. I also hold a Six Sigma Black Belt certification.

Q. Are you sponsoring an exhibit in this case?

A. No.

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to describe the evaluation that was performed to determine whether it is technically feasible to retrofit the existing gas turbine peaker units ("GTs") at the Lauderdale ("PFL"), Port Everglades ("PPE") (together PFL and PPE will be referred to as "Broward") and Fort Myers ("PFM") plants with emission controls that would allow them to meet the Florida Department of Environmental Protection's new 1-hour NO_2 air emission standard; and, if feasible, to provide the estimated cost of such retrofits.

Q. Please summarize your testimony.

A. In order to determine whether it is technically feasible to meet the new 1-hour NO_2 standard by retrofitting the existing GTs, a range of case studies were reviewed by a team under my direction to identify the best available emission control equipment to reduce NO_2 emissions. The team determined that it is technically feasible to achieve adequate NO_2 emission reductions by installing selective catalytic reduction equipment ("SCRs") on the PFM GTs, but that due to differences in the design and layout of the GTs at Broward, retrofitting is not technically feasible for the GTs at those plants. The team then conducted a detailed scoping analysis of the work that would be involved in installing SCRs on the PFM GTs, including modifications to the GTs necessary to function compatibly with the SCRs. From this analysis, the team estimated an in-service cost of $162 million for purchasing and installing the SCRs and making the necessary modifications to the GTs. The team also estimated an annual levelized cost of \$17.5 million for ongoing maintenance activities such as catalyst replacements, SCR system maintenance, and other maintenance activities.

Q. What was the process used for determining the most technically-feasible option to meet the new emission requirements?

A. The process began with inputs received from an emission dispersion modeling study prepared by FPL's Environmental Services Department that was conducted for PFL, PPE, and PFM, which identified the limiting level of nitrogen oxide ("NOx") emissions from the GTs that would have to be achieved at the property boundary in order to remain compliant with the new 1-hour NO_2 standard at each site (*i.e.*, the "Target NOx"). Then, NOx measurements taken at the GT stacks from PFL, PPE, and PFM were compiled to determine the current emissions profile ("Baseline NOx"). Using the Baseline NOx for each site, a technical analysis was conducted to determine if available emissions control technology could reduce emissions for the existing GTs enough to achieve the Target NOx.

Q. Why did the emission dispersion modeling study utilize NOx values if the emission standard is for NO_2?

A. NO_2 and NO are the two compounds that comprise NOx. Control of NOx emissions through the installation of emission controls such as SCRs removes both NO_2 and NO. Emission monitoring requirements and emission standards for stationary sources such as the GTs focus on total NOx emitted from the source. Therefore the evaluation of available control technologies focused on guarantees for NOx control capability, which includes removal of both NO_2 and NO.

Q. How was the technical analysis conducted to determine the feasibility of retrofitting the existing GTs?

A. The first step in the analysis was to calculate the current total amount of emissions at PFL, PPE, and PFM over a one-hour period to establish Baseline NOx. This calculation was based on stack test results that were collected over the past 10 to 15 years while operating on liquid fuel, since liquid fuel operation represents the worst-case scenario for NO_x emissions. Since only a small number of the GTs are fitted with the emissions measurement systems needed for stack testing, statistics were applied to provide the required confidence that the Baseline NOx formed a representative dataset under all operating and ambient conditions.

The second step was to analyze the time period required after the GTs start up and before the SCR technology begins to operate at full effectiveness ("Time to Full SCR Effectiveness"). Information on Time to Full SCR Effectiveness is needed because, during startup of the GT, NOx emissions are at their highest levels while the SCR takes time to warm up. To determine Time to Full SCR Effectiveness, representative NOx startup data was obtained from a GT peaker in the NextEra Energy Resources fleet which currently operates on liquid fuel and is already fitted with an SCR. Using that data which included many startups, the Time to Full SCR Effectiveness was calculated at 24 minutes.

The final step was to determine the amount of NOx reduction that would be needed to reduce Baseline NOx to below Target NOx. Baseline NOx produced during the first transient hour was compared with the Target NOx for 1 hour and a percentage of needed NOx reduction was obtained ("Percent NOx Reduction"). This Percent NOx Reduction was then used to size the SCR (*i.e.*, determine the amount of catalyst required) and determine if it can sufficiently reduce emissions to comply with the new NO_2 standard. The analysis takes into account the initial 24-minute startup period of uncontrolled emissions until reaching Time to Full SCR Effectiveness, and the remaining 36 minutes when the SCR is operating at full capability. To determine feasibility of retrofitting with SCRs, if the required Percent NOx Reduction was greater than 95%, and Baseline NOx could not be reduced below Target NOx for the 1 hour period, then it was determined that an SCR was not a technically feasible solution.

Q. **Why was a threshold of 95% used for the Percent NOx Reduction?**

A. There are physical limitations to the level of NOx emissions reduction that can practically be achieved with catalyst in an SCR. Typically a 95% NOx reduction represents the maximum practical ability of catalyst to reduce emissions.

Q. **What was the result of the technical analysis for the Broward GTs?**

A. The analysis showed that Baseline NOx for the Broward GTs could not be reduced below the Target NOx with currently available SCR technology.

Q. **What was the result of the technical analysis for the PFM GTs?**

The technical analysis showed that retrofitting the PFM GTs with SCRs at the maximum 95% achievable control effectiveness would be marginally sufficient to reduce the Baseline NOx to below the Target NOx.

Q. **Why did the technical analysis produce different results regarding the ability to retrofit the PFM GTs?**

A. The GT combustion technology at PFM is different than Broward. GTs have different emissions profiles based on their combustion system design, configurations, and size. As a result, the Broward GTs emit higher NOx than the PFM GTs, and SCRs cannot achieve the necessary Percent NOx Reduction to reach the required Target NOx levels. This problem was compounded by the fact that the physical layout of GTs and the relative distance of the GT stacks to the property boundary resulted in lower Target NOx values for Broward.

Q. Please provide an overview of the scope of work required to retrofit the existing PFM GTs.

A. An assessment of the existing plant equipment was conducted, along with a walkdown to evaluate feasibility of installing the required emissions controls technology, while also ensuring continued reliable operation of the GTs. The scope required would include, but not be limited to, installing an SCR system and ammonia tanks, ammonia storage tank containment area, foundation design, construction to properly support the new structures, new SCR controls system, and modifications to existing plant equipment as required to maintain long term reliable service.

Q. Did you estimate the costs for this scope of work?

A. Yes. The team estimated an in-service cost of $162 million for purchasing and installing SCRs and making the necessary modifications to the PFM GTs. The team also estimated an annual levelized cost of $17.5 million for ongoing maintenance activities such as catalyst replacements, SCR system maintenance, and other maintenance activities. This information was provided to FPL witness Enjamio as an input to his economic evaluation of compliance alternatives.

Q. Does this conclude your testimony?

A. Yes.