ORIGINAL

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

In re: Petition for Determination of Need for Hines Unit 4 Power Plant

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DIRECT TESTIMONY
OF ALFRED G. MCNEILL

ON BEHALF OF
PROGRESS ENERGY FLORIDA

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IN RE: PETITION FOR DETERMINATION OF NEED

BY PROGRESS ENERGY FLORIDA

FPSC DOCKET NO. _____

DIRECT TESTIMONY OF ALFRED G. MCNEILL

I. INTRODUCTION AND QUALIFICATIONS

Q. Please state your name, employer, and business address.

A. My name is Alfred G. McNeill and I am employed by Progress Energy Florida (PEF or the Company). My business address is 6565 38th Ave. North, St. Petersburg, Florida, 33710.

Q. Please state your position with the Company and describe your duties and responsibilities in that position.

A. I am a Senior Engineer in the Company's Transmission Planning Unit. One of my responsibilities includes evaluating transmission capability for Generator Interconnection Service (GIS) requests. I also perform generator siting studies, including analyzing transmission additions needed to accommodate future generation additions or asset procurement.

I am also the Florida Reliability Coordinating Council (FRCC) Loadflow Databank Coordinator and a member of the FRCC Transmission Working Group (TWG). I represent the FRCC on the NERC Multiregional Modeling Working

Group (MMWG). Additionally, I am a member of the Southern/Florida Reliability Coordination Agreement Working Group.

Q. Please summarize your educational background and work experience.

A. I joined Florida Power Corporation (later Progress Energy Florida) in August 1973. I was originally employed in the Company's Relay Design Department and worked there until 1978. From 1978 to the present I have been employed in the Transmission Planning Department. In Transmission Planning I am currently responsible for performing various power flow and stability studies to determine the future needs of the Company's Transmission System with regard to additional generation facilities and the constantly growing customer load. In December of 1984, I received my Bachelor of Science degree in Electrical Engineering from the University of South Florida.

II. PURPOSE AND SUMMARY OF TESTIMONY

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

A. I am testifying on behalf of Progress Energy Florida in support of its Petition for Determination of Need by explaining the transmission analyses performed on proposals submitted in response to the RFP for Hines 4 and the need for transmission facility modifications required by the addition of Hines 4 at the Hines Energy Complex (HEC) in December 2007.

Q. Are you sponsoring any sections of Progress Energy Florida's Need Study (SSW-1)?

A. Yes. I am sponsoring "Transmission and Distribution Facilities" in Section I and "Transmission Requirements" in Section II, which describe the transmission system and facility modifications and costs associated with the addition of Hines 4 at the HEC, respectively.

Q. Please summarize your testimony.

A. Progress Energy Florida regularly performs transmission planning analyses consistent with FRCC and NERC guidelines and processes and in compliance with sound transmission engineering practices in the utility industry. I will describe our processes and the sources of the data used in our analyses.

Using these standard processes, we evaluated the impact bidders' proposals would have on the PEF transmission system to determine what modifications would be necessary to incorporate the proposed generation into the PEF system. I will discuss the transmission analysis performed on the RFP proposals and the results of the analyses. Briefly, all but one of the proposals evaluated would have a substantial impact on PEF's transmission system, requiring extensive transmission modifications at substantial costs.

The addition of Hines 4 was also analyzed using the same standard processes. I will describe the transmission system and facility modifications required for the addition of Hines 4. In summary, the existing HEC substation must be expanded by adding one 230 kilovolt (kV) substation bay to

accommodate the interconnection of Hines 4 and a 230kV transmission line from the HEC substation to the West Lake Wales substation. Also, a total of 16 circuit breakers must be replaced due to increased fault current. I will describe those modifications and explain the need for them.

III. TRANSMISSION ANALYSIS PROCESS

Q. Please generally explain the process by which PEF determines that transmission facility upgrades or modifications might be required with the addition of generation to Progress Energy Florida's system?

A. On a yearly basis, Progress Energy Florida's Transmission Planning Department reviews the transmission facility additions or upgrades required on the Company's transmission system based on the latest FRCC load flow cases. These load flow cases reflect the planned generation additions as proposed in each utility's Ten-Year Site Plan (TYSP) as filed in April of each year, including PEF's TYSP showing its proposed generation additions. Since 1997, the Company has included Hines 4 in its TYSP, and the FRCC load flow cases have included a Hines 4 unit as a result.

Based on the FRCC load flow cases, the Company's Transmission Planning Department performs load flow, stability, and short-circuit analyses and determines the need for transmission facility additions or upgrades based on meeting PEF's "Transmission Planning Reliability Criteria," Section 4, as filed on FERC Form No. 715 "Annual Transmission Planning and Evaluation Report."

The purpose of a load flow analysis is to determine the impact of a generating unit on the PEF system by running a computer simulation model to compare the performance of the system with and without the unit. Load flow studies analyze the effects of common single contingency events on the transmission system. The typical events that are simulated include loss of a single line or transformer. If overload situations are encountered in the simulations, determinations are made as to what corrective actions would be required to integrate the proposed unit into the PEF transmission system.

Stability studies analyze the effects of major events on the transmission system. The typical events that are simulated are the loss of one or more major transmission lines (e.g., 230 kV lines).

The purpose of the short circuit analysis is to determine if the addition of a generating unit causes the fault current in the immediate area to exceed the rating of the affected circuit breakers.

Q. What models do you use to perform these analyses?

A. For the load flow and short circuit analysis the cases from the current FRCC load flow database are used for analysis. The cases are developed on an annual basis using Power Technologies Incorporated's (PTI) load flow simulation program, a simulation package widely used in the industry. For the stability analysis, the most current version of the stability base cases was used. The cases are developed on an as needed basis by the FRCC stability working group using PTI's dynamics simulation program, a simulation package widely used in the industry.

Q. What databases do you use to perform these analyses?

A. The load flow analysis was performed using modified versions of the FRCC 2003 cases for 2007 & 2008 winter and 2008 & 2009 summer. FRCC 2003 cases are the most current cases available. The modifications to the published standard FRCC cases were to correct known database errors identified by PEF after final publication of the database and contained in the FRCC database correction files.

For the stability portion of my analysis, a 2005 winter peak case was used. This was the most current FRCC Stability work group base case available. Modifications to the base case were made to reflect transmission and generation additions from 2005 winter up to 2007 winter, the planned in-service date for Hines 4.

For the short-circuit analysis portion of this study, the FRCC 2003 cases for 2007 and 2008 winter and 2008 and 2009 summer were used. The FRCC 2003 cases are the most current cases available for short-circuit analyses.

IV. TRANSMISSION ANALYSIS OF RFP PROPOSALS

Q. Please describe the analyses performed in the evaluation of the RFP proposals.

A. The analyses of the RFP proposals were either performed by me or under my direction. The analyses consisted of load flow, stability, and short-circuit analyses to determine the need for transmission facility additions or upgrades, and followed our standard evaluation process. To evaluate the proposals, we first had

to remove Hines 4 and its associated transmission facilities out of the FRCC cases. The bidder-proposed facilities were then added to the cases and their impacts analyzed. If overload situations were encountered in the simulations, determinations were made as to what corrective actions would be required to integrate the proposed unit into the PEF transmission system.

Q. What were the results of your analyses?

A. The load flow study for Bidder A's proposal resulted in an overload of the Higgins-to-Griffin 115 kV line and two transformers. The Higgins-Griffin line is a 44-mile line that would need to be upgraded to a 230 kV line. The time to design, permit, and construct this line is estimated to be 84 months. The total construction cost of the transmission modifications was estimated to be $51 million (2004 dollars). Since Bidder A's proposal was an off-system project, no stability or short circuit analyses were performed, as this analysis would be performed by the host utility, and the costs of transmission modifications, if any, should have been reflected in the proposal.

Due to its close proximity to critical interfaces between utilities, the load flow study for Bidder B's proposal was performed as an inter-utility power transfer, consistent with FRCC/NERC transfer analyses. The analysis found a number of overloads, including the Econ-Rio Pinar, Barwick Tap to Turner, Rio Pinar-Stanton East, Higgins-Griffin, Econ-Winter Park, and Curry Ford-Stanton West lines, in addition to potential problems on other utility systems. As with Bidder A's proposal, the longest lead-time project is the upgrading of the

Higgins-Griffin line. The time to design, permit, and construct this line is estimated to be 84 months. The total construction cost of the transmission modifications on the PEF transmission system was estimated to be $68 million. Since Bidder B's proposal was an Existing Unit Proposal, stability and short circuit analyses were not required, as they would have been performed when the units were initially installed. As mentioned above, potential problems were indicated on other utility systems. No cost or time estimates were developed to address these potential problems.

Bidder C's project would require the construction of a two-mile line to connect the project to the PEF transmission system. The load flow analysis of Proposal C2 resulted in the overload of the Barwick Tap-Turner line and three transformers. The construction cost for these modifications and the two-mile line was estimated to be $11 million and would take 43 months to complete. The stability analysis showed no stability issues with the projects and the short circuit analysis did not show a need to replace any equipment due to increases in fault current.

Bidder D is an existing facility of the Progress Energy Florida system. A brief inspection of the facilities surrounding this existing plant did not indicate any problems with increasing the output of the plant as proposed. Due to the small increase and the nature of the facilities around the plant and their existing load levels, PEF determined that a detailed study was not required. Since Bidder D is an existing facility, stability and short circuit analyses were not required, as they would have been performed when the unit was initially installed.

Q. What are the construction cost and construction time estimates based on?

A. Transmission line project costs were estimated on a per mile basis. PEF uses the same cost estimate(s) every day for screening site studies, Generator Interconnection Service (GIS) requests, and initial-phase planning projects. The cost estimates have been developed based on years of actual experience on the PEF system.

For 230 kV transmission line projects, the cost estimate is $1 million per mile. For 115 kV and 69 kV transmission line projects, the cost estimate is $300,000 per mile. The estimate of the construction duration is based on the following: transmission line projects that are from one to three miles in length are estimated to take 36 months; transmission line projects greater than three miles are estimated to take 42 months, plus one month for every mile over the three miles. These project duration estimates, again, have been developed through years of actual experience on the PEF system.

V. TRANSMISSION ANALYSIS OF HINES 4

Q. What kind of transmission analysis was performed on Hines 4?

A. The analysis consisted of load flow, stability, and short-circuit analyses to determine the need for transmission facility additions or upgrades using the same processes, models, and data used in the analyses on the bidders' proposals.

Q. What were the results of the analyses?

A. The load flow analysis found that, with the addition of Hines 4, the loss of the Barcola to Pebble Dale 230 kV line results in overloading of the Ft Meade to Tiger Bay 230 kV line and the Ft Meade to West Lake Wales line. In PEF's initial petition for the Hines Energy Complex, the Hines to West Lake Wales 230 kV line was identified as a needed transmission facility. Recent load flow analysis confirmed the need for the Hines to West Lake Wales 230 kV line with the addition of Hines 4. The stability analysis did not find any problems with the addition of Hines 4. In the short circuit analysis, with Hines 4 dispatched, sixteen 230 kV breakers were found to be over-dutied. Replacement of these breakers is required prior to the in-service operation of Hines 4.

In summary, the results of all evaluated criteria indicate the need to expand the Hines substation, construct the Hines to West Lake Wales 230 kV line, and replace 16 circuit breakers.

Q. Why does the HEC 230 kV Substation need to be expanded for Hines 4?

A. To accommodate the Hines 4 power block connection to the Progress Energy Florida transmission grid.

Q. How much will the 230 kV substation expansion for the Hines 4 unit cost?

A. The transmission facility expansion is currently estimated to cost $4.0 million, which includes the cost to tie the generator into the substation. This is the amount

presently estimated by Progress Energy Florida's Substation and Relay Engineering Departments.

Q. How much will the 230 kV line from Hines to West Lake Wales cost?

A. The engineering estimate for the 230 kV line from Hines to West Lake Wales is $26.5 million. This is the amount presently estimated by Progress Energy Florida's Substation and Transmission Departments.

Q. How much will it cost to replace the sixteen 230 kV breakers?

A. The engineering estimate is $2.9 million. This is the amount presently estimated by Progress Energy Florida's Substation and Transmission Departments.

Q. What is the total cost of the transmission modifications required for Hines 4?

A. The total cost of the transmission work associated with the addition of Hines 4 is estimated to be $33.4 million in nominal dollars, excluding AFUDC. The total installed cost including AFUDC is $37.6 million.

VI. CONCLUSION

Q. In your opinion, are the results of the analyses that you have performed for the addition of the Bidders' proposed projects and the Hines 4 unit to Progress Energy Florida's system reasonable and accurate?

A. Yes. In my professional opinion, and based on my experience and evaluation of the impact of adding the Bidders' proposed projects and the Hines 4 unit to Progress Energy Florida's systems, respectively, these results are accurate and reasonable. The costs and duration of the transmission and substation facility modifications discussed in my testimony are also what will be reasonably required to add the Bidders' proposed projects and the Hines 4 unit, respectively, to the Progress Energy Florida transmission system.

Q. Does this conclude your testimony?

A. Yes, it does.