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TAMPA ELECTRIC COMPANY

BEFORE THE

FLORIDA PUBLIC SERVICE COMMISSION

DOCKET NO. 000007-EI

TESTIMONY
AND EXHIBIT OF

STANLEY J. MARTIN

DOCUMENT NUMBER-DATE
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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

PREPARED DIRECT TESTIMONY

OF

STANLEY J. MARTIN

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

A. My name is Stanley J. Martin. My mailing address is P.O. Box 111, Tampa, Florida 33601, and my business address is Big Bend Station, 13031 Wyandotte Road, Apollo Beach, Florida 33572. I am employed by Tampa Electric Company ("Tampa Electric" or "company") in the position of General Manager, Big Bend Station.

Q. Please provide a brief outline of your educational background and business experience.

A. I received a Bachelor of Science Degree in Electrical Engineering in 1971 from Rutgers University. I began my career with Public Service Electric and Gas Company where I held supervisory positions at both the Mercer and Bergen Generating Stations in maintenance and plant performance departments.

In April 1975, I began my employment with Tampa Electric at Gannon Station where I held successive positions of Plant Auxiliaries Engineer, Maintenance Planning Engineer and Manager of Maintenance. In September 1983 I was transferred to Big Bend Station as Operations Startup Manager for Big Bend Unit 4, and subsequently held the position of Administrative Manager. In November 1987 I was named General Manager of Production Engineering, responsible for engineering services for the Production Department. In November 1995 I was named to my current position of General Manager, Big Bend Station. I am responsible for directing the overall operations of the station's generating facility.

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

A. The purpose of my testimony is to describe the compliance activities being performed by Tampa Electric to comply with the Consent Final Judgment ("CFJ") and the Consent Decree that are included in the company's Environmental Cost Recovery Clause ("ECRC") factors for 2001. Specifically, I will describe the technical aspects and the expected costs associated with the activities which will achieve compliance with both the CFJ and the Consent Decree ("the Orders").

Q. Have you prepared an exhibit to support your testimony?

A. Yes I have. My Exhibit No. ___ (SJM-1) consists of three documents.

Q. Please describe the environmental activities required by the Orders for which Tampa Electric is seeking ECRC recovery in 2001.

A. In the projection filing for 2001 ECRC factors provided in Tampa Electric witness Karen O. Zwolak's direct testimony and exhibits, Tampa Electric has included costs for three new environmental activities required under the Orders. The first activity is the Flue Gas Desulfurization ("FGD") Optimization and Utilization Program that requires Tampa Electric to reduce SO_2 emissions through both improved reliability and higher removal efficiencies for the FGD systems at Big Bend Station. The second activity requires the company to reduce nitrogen oxide ("NO_x") emissions at Big Bend Station by evaluating and implementing commercially viable NO_x reduction technologies. The third activity is the Particulate Emission ("PM") Minimization and Monitoring Program that requires the company to perform

an optimization study and a Best Available Control Technology ("BACT") analysis of its electrostatic precipitators ("ESP"). Based upon the results of the study and analysis, Tampa Electric must make reasonable PM control upgrades at Big Bend Station.

In Docket No. 000685-EI, Tampa Electric filed with the Florida Public Service Commission for approval of the FGD Optimization and Utilization Program. Tampa Electric filed for approval of its PM and NO_x programs in Docket No. 001186-EI. The company's plans for meeting the Orders' requirements are detailed in the petitions filed in the dockets.

FGD Optimization and Utilization Program

Q. What are the improvements necessary to comply with the Orders related to the FGD Optimization and Utilization Program?

A. Several improvements are required to increase the utilization of the Big Bend Units 1 and 2 and Unit 3 FGD systems. Tampa Electric has identified three main areas requiring modifications necessary to comply with the Orders. The activities identified are to 1) perform modifications or upgrades to the Big Bend Unit 3 tower

modules, 2) make improvements to the Big Bend Units 1 and 2 tower module, and 3) make improvements to the support systems serving both FGD systems.

The improvements necessary for the Big Bend Unit 3 FGD system are more extensive and much more time critical. They must be performed to improve the availability of the Big Bend Unit 3 FGD system to 92 percent from a historical availability of 80 percent and to improve its sulfur dioxide ("SO_2") removal efficiency to 95% as required under the Orders. These upgrades include making improvements to tower internals, ductwork and dampers, fans, absorber and quencher systems, and electrical and control systems. Some of these improvements have already been performed during a unit outage in March and April 2000.

Improvements for the Big Bend Units 1 and 2 FGD system are not expected to be as significant. They primarily include adding a back-up reagent feed system.

Common support systems will need considerable improvements to ensure the reliability of both FGD systems. The company has identified necessary upgrades

for the limestone supply, gypsum dewatering, and stack and wastewater treatment systems.

Q. Why are these improvements necessary?

A. Tampa Electric has always had flexibility in operating the Big Bend Unit 3 FGD system so that if a tower or support system were down, the FGD system had enough capacity and redundancy to continue operating Big Bend Unit 4 and operating Unit 3 unscrubbed until the spare tower was returned to service. Likewise, Tampa Electric's anticipated compliance with the Title IV Clean Air Act Amendments ("CAAA") compliance requirements provided operating flexibility that allowed for Big Bend Unit 1 and 2 to operate unscrubbed if a problem occurred in its FGD system.

The Orders now remove that flexibility and require, with some exceptions, that Big Bend Units 1, 2 and 3 FGD systems operate essentially at all times that their associated generating units are operating. This change in operating requirements, combined with an evaluation of the existing system and review of the FGD operating history, resulted in the identification of specific areas

that require the most needed improvements to ensure compliance with the Orders.

Q. What are the projected costs that Tampa Electric expects to incur for the FGD Optimization and Utilization Program in 2000 and 2001?

A. Tampa Electric has projected that capital expenditures will be $3 million and $9.4 million for 2000 and 2001, respectively. For O&M expenses, Tampa Electric has projected that approximately $1.3 million will be spent in 2000 and $1.2 million in 2001. Details of these projected expenditures are provided in Document No. 1 of my exhibit.

Q. In Tampa Electric's petition requesting recovery of the FGD Optimization and Utilization Program, the company projected $5.1 million of capital expenditures and $1.6 million of O&M expenses. Why is Tampa Electric requesting an additional $7.6 million in capital expenditures and another $1.3 million in O&M expenses?

A. Tampa Electric's estimates included in its petition were initial estimates based on the activities that the company had identified through May 2000. At that time,

Tampa Electric anticipated additional compliance activities would be required, but had not yet fully inspected and identified the additional areas which may cause FGD outages nor had it developed engineering solutions, performed thorough cost reviews and performed feasibility analyses. It was not until recently that a more comprehensive evaluation including cost estimates for the FGD optimization could be finalized. At this time, the costs presented above are Tampa Electric's best estimates and may be slightly modified as the detailed engineering is finalized and actual bids for labor and equipment are received.

Q. How were the estimated costs determined for the FGD Optimization and Utilization Program?

A. Tampa Electric's estimated costs were determined by the plant engineering team that utilized 15 years of FGD operational and maintenance experience. The company also utilized suppliers' bids and consultants' expertise in assessing the required work along with related cost estimates.

Q. Will there be on-going capital and O&M costs attributable to the requirements of the FGD Optimization and Utilization Program?

A. Perhaps. Tampa Electric has attempted to identify the key components of the FGD systems that could likely result in FGD outages causing unit unavailability. As components fail or capital improvements are deemed necessary to ensure the required FGD system efficiencies, those costs will be identified and filed with the Commission in future ECRC filings.

Q. What are the consequences of not performing the upgrades and improvements to the FGD systems for Big Bend Units 1, 2 and 3?

A. The FGD systems were designed to meet Title IV of the CAAA requirements which do not require the continuous operation of the systems. Tampa Electric anticipated that in the event of a scrubber malfunction, the company could continue to operate Big Bend Units 1, 2 and 3 unscrubbed. Now, however, the Consent Decree essentially requires these units to operate only when the FGD systems are operating. Therefore, in the event of a malfunction or outage on either FGD system, Tampa Electric would be

severely restricted in its unit operations. This could result in significant impacts to Tampa Electric's system through restricted generation and higher fuel and purchased power costs. If the planned program were not implemented, Tampa Electric would not be able to meet the requirements of the Consent Decree.

Q. What alternatives to the options proposed were considered?

A. Alternatives considered included the addition of a spare tower module, with and without additional tower module back-up support systems, and purchasing power in the event of FGD systems and/or support systems failure. To purchase power in the event of failure would put native load customers at risk given the potential loss of up to 1,320 MW and the wholesale market conditions. All of the alternative options were determined to be significantly more costly than the planned program.

The company did not consider the option to operate the generating units without the associated FGD systems because it would be in direct violation of the Consent Decree. The option to shut the units down in the event of an extended FGD outage was not considered as an

alternative to the work plan due to the severe impact that the potential loss of up to 1,320 MW would have on Tampa Electric's system and the Florida grid.

Big Bend NO_x Emissions Reduction Program

Q. Describe the projected costs to comply with the requirements of the Orders to reduce NO_x emissions.

A. The Orders require Tampa Electric to spend up to $3 million with the goal to reduce NO_x emissions at Big Bend Station. The Consent Decree requires that by December 31, 2002, the company must achieve at least a 30 percent reduction below 1998 levels for Big Bend Units 1 and 2 and at least a 15 percent reduction in NO_x emissions from Big Bend Unit 3. Tampa Electric has identified projects which are the first steps to decrease NO_x emissions in these units such as burner and windbox modifications and the installation of a neural network system on each of the Big Bend units.

Q. What are the projected costs that Tampa Electric expects to incur for the Big Bend NO_x Emissions Reduction Program in 2000 and 2001?

A. Tampa Electric has estimated capital expenditures of $130,000 and $1,068,000 in 2000 and 2001, respectively. The company does not expect to incur any O&M expenses in 2000 but expects to incur $50,000 in 2001. Details of these projected expenditures are provided in Document No. 2 of my exhibit.

Q. How were the estimated costs determined?

A. The costs for the NO_x projects were developed based on data gathered through vendor presentations and quotations. Tampa Electric had several presentations by suppliers of various NO_x reduction technologies. In most cases, the vendors were provided with the details of the Consent Decree and were requested to provide a plan that would allow Tampa Electric to meet those requirements. Most vendors provided such a plan and many provided estimates of how much their plan would cost.

Q. How has Tampa Electric determined that these activities are the most cost-effective means to meet the required NO_x reductions?

A. The costs used in the company's forecast were costs presented during the vendor presentations. Based upon

the responses Tampa Electric determined that the best way to meet the early NOx reduction requirements was to model and modify the burners, and install a neural network on Big Bend Unit 1 in 2001. Accordingly, the company selected a consulting firm to do the burner modeling based upon their experience and their competitive pricing. The consultant provided the cost estimate for the burner modifications.

Q. Are the activities that Tampa Electric is proposing for reducing NO_x emissions compatible with previous NO_x reduction programs?

A. Yes. Tampa Electric has been very successful in achieving NO_x emissions reductions at Big Bend Units 1 through 3 through the use of combustion tuning and optimization in order to meet the requirements of Title IV of the CAAA. In Tampa Electric's previous ECRC filings, the company indicated, based on current technology available, the next step to further decrease NO_x emissions would be the installation of a neural network system. A neural network is a data collection system that monitors the various boiler and combustion operating parameters and the NO_x emissions which result from those operating parameters. A database is

established which develops relationships between those operating parameters and the NO_x emissions to optimize combustion to achieve lower NO_x emissions. In addition to the neural network, Tampa Electric expects those modifications to the burner and windbox of each unit will aid in the control of airflow to the boiler, improving combustion and reducing NO_x emissions.

Q. What other alternatives were considered for lowering NO_x emissions?

A. Tampa Electric consulted with various experts in the industry to determine the best means to achieve the reductions required. Alternatives considered included the over-fire air system, soot blower optimization and pulverizer optimization using neural networks, coal flow monitoring, reducing flame temperature by water spray, low NO_x burners, coal re-burning and other non-proven technologies. As part of the modeling study, these technologies will be reviewed and evaluated further.

Q. What are the consequences of not performing the NO_x reduction activities?

A. Tampa Electric has no other option but to move forward with the early NO_x reductions at Big Bend Station. If these activities are not performed, Tampa Electric will be in violation with the requirements of the Orders.

PM Minimization and Monitoring

Q. Please describe the activities and costs projected for ECRC recovery related to the reduction of PM.

A. The Consent Decree requires Tampa Electric to undertake a performance optimization study and BACT analysis of its ESP at Big Bend Station by May 1, 2003. The company must report on the technical feasibility of installing a PM continuous emissions monitor ("CEM") on one unit at Big Bend Station by March 1, 2002. Specifically, the Consent Decree requires Tampa Electric to:

- Complete an optimization study to recommend the best operational practices to minimize emissions from each ESP within 12 months after entry into the Consent Decree and implement the recommendations within 60 days after EPA has approved them.
- Complete a BACT analysis for upgrading each existing ESP at Big Bend within 12 months after entry into the Consent Decree and complete the installation of

the recommendations of the BACT analysis by no later than May 1, 2004.

- Revise previous optimization studies to incorporate new requirements resulting from the BACT analysis.
- Install and operate a PM monitor by March 2002 and evaluate the possibility to install a second monitor.

Tampa Electric has begun the optimization study and the BACT analysis. To accomplish these two activities, Tampa Electric has contracted with Southern Research Institute and Electric Power Research Institute. In addition, Tampa Electric is retaining an environmental consultant to assist in the BACT analysis and is utilizing contractors to perform any physical modifications to facilitate the study and/or analysis. Tampa Electric also plans to utilize its in-house stack test team to perform sampling and testing as necessary.

Tampa Electric has also identified improvements that are necessary to optimize ESP performance such as modifications to the turning vanes and precipitator distribution plates, and upgrades to the controls and software system of the precipitators on Big Bend Unit 1.

Q. What environmental costs has Tampa Electric included in its projections for its 2001 ECRC factors related to PM emission reduction?

A. Capital costs are estimated to be $165,000 in 2000 and $928,000 in 2001. O&M expenses for 2000 are estimated to be approximately $215,000 and $115,000 in 2001. Additionally, $168,000 of capital expenditures are expected to be incurred in 2001 to begin the installation of the PM CEM monitor. Details of these projected expenditures are provided in Document No. 3 of my exhibit.

Q. How were the projected costs determined for the PM minimization program?

A. Tampa Electric solicited bids for the ESP optimization study and the BACT analysis and selected the most cost-effective approach. Engineering experience and outside consultants were also used to determine costs and activities that needed to be addressed.

Q. Why are costs for ESP performance improvements and control and software upgrades being incurred prior to the

completion and approval of the optimization study and BACT analysis recommendations?

A. The activities being performed prior to the completion and approval of the optimization study and BACT analysis recommendations are activities which are already known and will be included in the optimization study's recommendation. The control and software upgrades from Solvera and ESPert systems will facilitate the collection of meaningful data for these requirements. Modifications to the Big Bend Unit 1 are currently being engineered and are planned to be completed in the upcoming 2001 outage. Tampa Electric expects the requirements for Big Bend Unit 2 to be similar to those of Big Bend Unit 1.

Q. What are the consequences of not performing the optimization study and the BACT analysis?

A. The requirements of the Orders are very specific regarding the actions Tampa Electric must take to comply with PM emissions reductions. The company must perform the studies and implement the recommendations. If Tampa Electric did not perform these activities, it would be in violation of the Orders.

Q. Please summarize your testimony.

A. Tampa Electric has done extensive work to develop the most prudent and cost effective means to comply with the new requirements of the Orders. In a very short time frame, Tampa Electric has had to begin to assess work to be completed, to plan for opportunities to perform the compliance activities and to provide the best estimates of the costs. As a result, Tampa Electric has identified immediate and essential steps to achieve compliance with the Orders' requirements to reduce SO_2, NO_x and PM.

Q. Does this conclude your testimony?

A. Yes it does.

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TAMPA ELECTRIC COMPANY

EXHIBIT OF STANLEY J. MARTIN

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BIG BEND FGD UNIT 1, 2 AND 3
2000/2001 RELIABILITY AND PERFORMANCE IMPROVEMENT PROJECTS

UNIT 3 TOWER MODULE PROJECTS				
ITEM #	DESCRIPTION	COMPLETION DATE	COSTS($K)	
			CAPITAL	O&M
#1	TOWER PIPING, NOZZLE, AND INTERNAL IMPROVEMENTS	6/1/01	1,003	523
#2	DUCT WORK IMPROVEMENTS	10/1/00	497	1,476
#3	ELECTRICAL SYSTEM RELIABILITY IMPROVEMENTS	12/1/00	236	90
#4	TOWER CONTROL IMPROVEMENTS	12/1/00		16
#5	DBA SYSTEM IMPROVEMENTS	6/1/01	120	
#6	BOOSTER FAN RELIABILITY IMPROVEMENTS	6/1/01	1,069	95
#7	ABSORBER SYSTEM IMPROVEMENTS	6/1/01	2,649	103
#8	QUENCHER SYSTEM IMPROVEMENTS	10/1/00	13	
#9	TOWER DEMISTER (PACKING) IMPROVEMENTS	6/1/01	380	
		$ TOTALS=	5,967	2,303

UNIT 1 & 2 TOWER MODULE PROJECTS				
ITEM #	DESCRIPTION	COMPLETION DATE	COSTS($K)	
			CAPITAL	O&M
#10	PREVENTATIVE MAINTENANCE	12/1/00		25
#11	OXIDATION AIR CONTROL IMPROVEMENT	12/1/00		10
#12	TOWER WATER,AIR,REAGENT AND START-UP PIPING UPGRADES	12/1/00	171	20
		$ TOTALS=	171	55

TOWER MODULE SUPPORT SYSTEM PROJECTS				
ITEM #	DESCRIPTION	COMPLETION DATE	COSTS($K)	
			CAPITAL	O&M
#13	LIMESTONE SUPPLY RELIABILITY IMPROVEMENTS	6/1/01	2,566	24
#14	GYPSUM DEWATERING IMPROVEMENTS	6/1/01	1,583	0
#15	STACK RELIABILITY IMPROVEMENTS	6/1/01	154	69
#16	WASTE WATER TREATMENT PLANT RELIABILITY IMPROVEMENTS	12/1/01	1,952	0
		$ TOTALS=	6,255	93
	GRAND TOTAL $=		12,393	2,450

Big Bend Station Forecast of Costs for Reductions of NO_x Emissions

Year 2001

Activity	January	February	March	April	May	June	July	August	Septem	October	Novem	Decem	Total
O&M Activities													
BB1 Boiler Tuning and Balancing				10,000	10,000	10,000	10,000	10,000					50,000
Capital Activities													
Big Bend 1 - Outage Spring of 2001													
BB1 Neural net	98,000	15,000	280,000	15,000	5,000	5,000	5,000	6,000	5,000	110,000	5,000	5,000	554,000
BB1 Burner and Windbox mods	105,000	14,000	104,000	150,000	12,000	4,000	4,000	3,000	3,000	3,000	3,000	4,000	409,000
Big Bend 2 - Outage Spring 2002													
BB2 Neural net								5,000	15,000	5,000	5,000	5,000	35,000
BB2 Burner and Windbox mods								5,000	45,000	5,000	5,000	10,000	70,000

Total Capital = $ 1,068,000

Total O&M = $ 50,000

Total Expenditures = $ 1,118,000

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Big Bend Station Forecast of Costs for Reductions of Particulate Matter

Year 2001

Activity	January	February	March	April	May	June	July	August	Septem	October	Novem	Decem	Total
O&M Activity													
Install turning vanes on BB1	10,000	10,000	60,000	35,000									115,000
Capital Activity													
Big Bend 1 Spring Outage 2001													
Perforated Plates for BB1 precipitator	70,000	5,000	195,000	270,000	5,000								545,000
Pariculate Matter CEM	14,500	7,000	7,500	6,000	6,000	4,000	4,000	90,000	20,000	15,000	2,000	2,000	178,000
Big Bend 2 Outage Spring 2002													
Perform Eng/Procure BACT items				5,000	6,000	7,000	10,000	10,000	210,000	6,000	6,000	5,000	265,000

Total Capital =	**$**	**988,000**
Total O&M =	**$**	**115,000**
Total Expenditures =	**$**	**1,103,000**

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