



BEFORE THE  
FLORIDA PUBLIC SERVICE COMMISSION  
DOCKET NO. 030001-EI  
IN RE: FUEL & PURCHASED POWER COST RECOVERY  
AND  
CAPACITY COST RECOVERY  
PROJECTIONS  
JANUARY 2004 THROUGH DECEMBER 2004  
TESTIMONY AND EXHIBITS  
OF  
WILLIAM T. WHALE

DOCUMENT # 030001-EI

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BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

PREPARED DIRECT TESTIMONY

OF

WILLIAM T. WHALE

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4  
5  
6 Q. Please state your name, address, occupation and employer.

7  
8 A. My name is William T. Whale. My business address is 702  
9 North Franklin Street, Tampa, Florida 33602. I am employed  
10 by Tampa Electric Company ("Tampa Electric" or "company")  
11 as Vice President, Energy Supply - Operations.

12  
13 Q. Please provide a brief outline of your educational  
14 background and business experience.

15  
16 A. I received a Bachelor of Science degree from the United  
17 States Merchant Marine Academy in 1978, and a Master's of  
18 Business Administration from Florida Institute of  
19 Technology in 1986. I began my career with Tampa Electric  
20 in 1979 as a Boiler Engineer in the Production Department.  
21 From 1979 through 1991 I held various engineering and  
22 management positions within the Production Department. In  
23 1991 I transferred to TECO Power Services and from 1991  
24 through 1996 I held various position of increasing  
25 responsibility and oversight of power plant operations.

1 In 1996 I transferred to TECO Transport and Trade and from  
2 1996 through 2000 I held various management positions. In  
3 March 2000 I transferred back to Tampa Electric and became  
4 Vice President, Energy Supply. I am responsible for  
5 oversight of the operations and maintenance of Tampa  
6 Electric's power plants.  
7

8 **Q.** What is the purpose of your testimony?  
9

10 **A.** The purpose of my testimony is to describe the obligations  
11 that Tampa Electric has under the Consent Decree ("CD")  
12 entered into with the United States Environmental  
13 Protection Agency and Department of Justice and the  
14 Consent Final Judgment ("CFJ") entered into with the  
15 Florida Department of Environmental Protection as they  
16 relate to Gannon Station. I will also discuss the various  
17 factors that influenced Tampa Electric's shutdown schedule  
18 of the Gannon Units 1 through 4.  
19

20 **Q.** Have you prepared an exhibit to support your testimony?  
21

22 **A.** Yes. Exhibit \_\_\_\_ (WTW-1), consisting of one document,  
23 was prepared under my direction and supervision. Document  
24 No. 1 is titled "Gannon Station Performance and  
25 Reliability."

1 Q. Please describe Tampa Electric's obligations under the CFJ  
2 and the CD as they relate to Gannon Station.

3  
4 A. Under the CFJ, signed December 6, 1999, and the CD, signed  
5 February 29, 2000, Tampa Electric must cease operating its  
6 coal-fired generation at Gannon Station by December 31,  
7 2004. Specifically, the CD requires Tampa Electric to  
8 repower coal fired generating capacity at Gannon of no  
9 less than 200 megawatts ("MW") by May 1, 2003. As a  
10 result, Gannon Units 5 and 6 are being repowered from coal  
11 to natural gas fired Bayside Units 1 and 2, respectively.  
12 The shutdown schedules for Gannon Units 5 and 6 are driven  
13 by the in-service dates of Bayside Units 1 and 2.

14  
15 Q. Given the obligation under the CD and CFJ, what is Tampa  
16 Electric's conversion schedule?

17  
18 A. To achieve the required May 1, 2003 in-service date for  
19 Bayside Unit 1, Gannon Unit 5 was shut down on January 30,  
20 2003 to convert its steam turbine generator to the Bayside  
21 Unit 1 combined cycle configuration. Due to the planned  
22 January 15, 2004 in-service date for Bayside Unit 2, the  
23 shutdown date for Gannon Unit 6 will occur around  
24 September 30, 2003. Gannon Units 3 and 4 will be shut  
25 down around October 15, 2003 so that Bayside Unit 2 can

1 utilize the transmission facilities currently used for the  
2 operation of Gannon Unit 4. The existing transmission  
3 facilities cannot accommodate the operation of both  
4 Bayside Unit 2 and Gannon Unit 4; therefore, it will be  
5 necessary for Gannon Unit 4 to cease operations to allow  
6 for the tie-in and testing of Bayside Unit 2 prior to its  
7 commercial operation.

8  
9 **Q.** Please provide a description of the Gannon units.

10  
11 **A.** Gannon Station has been operational for over 46 years.  
12 Gannon Unit 1 was commissioned in 1957 and, prior to being  
13 shut down and placed on long-term reserve standby, had a  
14 net capacity rating of 94 MW. Gannon Unit 2 was  
15 commissioned in 1958 and, prior to being shut down and  
16 placed on long-term reserve standby, had a net capacity  
17 rating of 100 MW. Gannon Unit 3 was commissioned in 1960  
18 and has a net capacity rating of 155 MW. Gannon Unit 4  
19 was commissioned in 1963 and has a net capacity rating of  
20 100 MW. Each of the Gannon units has one boiler supplying  
21 steam to one steam turbine generator.

22  
23 **Q.** Please provide a description of the Bayside units.

24  
25 **A.** Bayside Unit 1 consist of three General Electric ("GE")

1 7FA gas turbines and three heat recovery steam generators  
2 ("HRSGs") supplying steam to one steam turbine generator;  
3 it reused the Gannon Unit 5 steam turbine generator and  
4 associated equipment. It went into commercial operation  
5 April 24 of this year. Bayside Unit 2 will consist of  
6 four GE 7FA gas turbines and four HRSGs that supply steam  
7 to one steam turbine generator unit; it will reuse the  
8 Gannon Unit 6 steam turbine generator and associated  
9 equipment. The unit is expected to be in service January  
10 15, 2004. Bayside Unit 1 has a net capacity of 690 MW and  
11 779 MW in the summer and winter, respectively. Bayside  
12 Unit 2 will have a net capacity of 908 MW and 1,022 MW in  
13 the summer and winter, respectively.

14  
15 **Q.** Please describe the process of converting coal-fired  
16 Gannon Units 5 and 6 to natural gas-fired Bayside Units.

17  
18 **A.** The process to bring each Bayside unit on line is similar  
19 in scope. Construction of the Bayside units has taken  
20 place while the existing Gannon units have continued to  
21 operate. This has significantly increased the complexity  
22 of bringing the units on line.

23  
24 Bayside construction can only be completed up to a certain  
25 point with the respective Gannon Units 5 and 6 operating.

1 At that point, the respective Gannon unit must be removed  
2 from service to allow the final construction tie-ins to  
3 take place. When the tie-in is complete, the start-up or  
4 commissioning phase begins. Systems are checked out;  
5 construction is verified; design is validated; and control  
6 systems are tuned. This is a dynamic process because the  
7 exact issues to be addressed are not known in advance.  
8 Scheduling the activities is primarily based upon  
9 experience with similar units.

10  
11 The gas turbines are fired individually to verify turbine  
12 integrity. The combustion system of each turbine is tuned  
13 to ensure emission performance. After all turbines have  
14 been tested and tuned, the steam section of the unit is  
15 put into service. This includes verification of control  
16 logic, construction correctness, steam piping hanger  
17 design, plant water balance and piping system expansion.  
18 Also, in this step the unit condenser, condensate and  
19 boiler feedwater systems are checked out and commissioned.

20  
21 The next step is to admit steam to the steam turbine.  
22 This step verifies that modifications to the steam turbine  
23 work as planned.

24  
25 Once the unit is producing electricity from both the gas

1 turbines and steam turbine in combined cycle mode, final  
2 tuning and testing is done. The final step is to run the  
3 unit performance and emission test to verify compliance.  
4 Upon completion of the aforementioned tests, the unit is  
5 released to operations and declared in service.

6  
7 **Q.** How has the company evaluated the schedule of shutting  
8 down the coal fired Gannon Units?

9  
10 **A.** Although the CFJ and CD require that all coal fired  
11 operations cease by December 31, 2004, the company never  
12 anticipated or planned for the shutdown of the units to  
13 occur exactly on December 31, 2004. Since the CD and CFJ  
14 were signed, the company has continued to evaluate various  
15 conditions in determining when the Gannon coal fired units  
16 would be shut down. These considerations include, but are  
17 not limited to, the engineering and construction of the  
18 repowered Gannon Units 5 and 6 to Bayside Units 1 and 2,  
19 respectively, the reliability and safety of Gannon Units 1  
20 through 4, necessary maintenance costs and planned outage  
21 time for acceptable levels of unit availability, employee  
22 redeployment and retraining schedules, reserve margin  
23 requirements, outage schedules (statewide and system-wide)  
24 and transmission constraints. Over time, the status of  
25 these conditions has been and continues to be monitored



1 and updated.

2

3 In late January and early February of this year, the  
4 company was in a position to further refine the dates for  
5 ceasing operation of Gannon Units 1 through 4. At that  
6 time, the company determined that the shutdown of Gannon  
7 Units 1 and 2 should occur around March 15, 2003 and the  
8 shutdown of Gannon Units 3 and 4 should occur in September  
9 2003 to coincide with the Bayside Unit 2 tie-in  
10 activities. Due to necessary modifications to the  
11 company's outage schedule and unforeseen system and  
12 statewide operational issues, the company continued  
13 operating Gannon Units 1 and 2 beyond the previously  
14 scheduled mid-March 2003 shutdown. Once Bayside Unit 1  
15 produced energy reliably, generating units returned from  
16 outages and system conditions warranted, Tampa Electric  
17 finalized the dates to shut down Gannon Units 1 and 2.

18

19 **Q.** What have been the primary parameters affecting the  
20 decision on when to shut down the Gannon units?

21

22 **A.** Since signing the CFJ and CD, Tampa Electric has worked  
23 with an engineering, construction, and shutdown schedule  
24 that has consisted of legal and operational parameters.  
25 The legal parameters have been primarily driven by

1 obligations under the CFJ and CD. The primary operational  
2 parameters have been the engineering, construction, and  
3 testing schedules for Bayside Units 1 and 2, the  
4 reliability and availability of the Gannon Station units,  
5 the safety concerns for operating personnel and an optimal  
6 schedule for reassigning and retraining employees  
7 currently working at Gannon Station for other positions  
8 within the company. The company has always considered  
9 this process to be fluid, recognizing there would be  
10 matters that would arise that would require flexibility.

11  
12 **Q.** What considerations ultimately influenced Tampa Electric's  
13 selection of appropriate shutdown dates for Gannon Units 1  
14 through 4?

15  
16 **A.** As I previously stated, the company never anticipated or  
17 planned for the shutdown of Gannon Units 1 through 4 to  
18 occur exactly on December 31, 2004. In fact, Tampa  
19 Electric made a determination that it would attempt to  
20 keep the units running as long as reliably possible  
21 without incurring significant expenditures given the age  
22 of the units, the short remaining life and the associated  
23 outage time necessary for any planned maintenance work.

24  
25 The maintenance process became more deliberate and defined

1 as the construction of Bayside Units 1 and 2 advanced.  
2 Forced outages became and continue to be more frequent due  
3 to equipment issues such as weakened boiler cyclone and  
4 furnace tubes. The weakened tubes have caused external  
5 tube failures and gas leaks which have resulted in  
6 decreased reliability and availability as well as an  
7 increased potential for safety incidents. In light of  
8 Tampa Electric's obligations to cease coal-fired  
9 generation at the station and the age of the units, the  
10 company determined that the most prudent approach to  
11 maintenance was to use a "patch and go" approach which  
12 required limited investment with minimal planned outage  
13 time. The performance decline has impacted the company's  
14 ability to plan and execute optimal operational strategies  
15 that serve customers in the most cost-effective manner.

16  
17 By the summer of 2002, Tampa Electric began to perform  
18 detailed evaluations, considering numerous options, for  
19 possible shutdown dates for Gannon Units 1 through 4 given  
20 the successful implementation of the Bayside construction  
21 schedule, Gannon units' declining reliability, the  
22 potential for safety incidents and decreased output of the  
23 units. The company ran multiple scenarios to evaluate  
24 ratepayer impacts (including fuel and purchased power  
25 costs), operation and maintenance ("O&M") impacts, and

1 wholesale sales opportunities for off-system sales.  
2 Although the scenarios provided estimated dollar impacts  
3 given various shutdown dates, the company remained  
4 cognizant of the fact that the exact shutdown dates would,  
5 to a certain extent, remain flexible.  
6

7 By late 2002, it became apparent that the units needed to  
8 be shut down in 2003. This realization was driven  
9 primarily by four factors: the declining availability and  
10 reliability of the units; the significant expenditures  
11 that would need to be incurred in an effort to keep the  
12 units running reliably; the potential for safety  
13 incidents; and, the short window of time until the units  
14 would be required to shut down under the CFJ and CD,  
15 regardless of how much the company might invest in an  
16 effort to keep them operating.  
17

18 A formalized plan was developed that took into account all  
19 of these considerations. On February 6, 2003, Tampa  
20 Electric notified its employees that it planned to shut  
21 down Gannon Units 1 and 2 on March 15, 2003 and Gannon  
22 Units 3 and 4 in September 2003. On February 7, 2003, the  
23 company notified the Florida Department of Environmental  
24 Protection, the Environmental Protection Agency, and the  
25 Department of Justice of its refined plans. On February

1 24, 2003 the company filed a petition for a fuel mid-  
2 course correction, which included the shutdown of the  
3 Gannon Units 1 through 4 as part of its system operations  
4 plan for 2003.

5  
6 **Q.** What are the safety concerns that have prompted early  
7 closure of the Gannon units?

8  
9 **A.** The majority of the operational and equipment concerns,  
10 such as structural steel fatigue, boiler cyclone and  
11 furnace tube deterioration, gas duct and boiler casing  
12 deterioration that impact the units' reliability and  
13 availability are directly related to the equipment age and  
14 hours of service. As operational restrictions and  
15 equipment failures have increased, the company has become  
16 more concerned with potential safety incidents. For  
17 example, all four units have experienced increased boiler  
18 cyclone and furnace tube failures. Increased occurrences  
19 of boiler furnace tube separation have led to external  
20 leaks, which have increased the potential for harmful  
21 gases such as SO<sub>2</sub>, NO<sub>x</sub> and carbon monoxide to be released  
22 into work areas. Two of the units have experienced  
23 external tube leaks, thereby increasing the potential for  
24 exposure to steam leaks. In addition, boiler casing and  
25 duct damage have the potential to expose asbestos

1 insulation. The company has taken steps to modify  
2 operating parameters in an attempt to reduce the potential  
3 for safety incidents while keeping the equipment  
4 operating.

5  
6 **Q.** On a unit-by-unit basis, what are the relevant reliability  
7 concerns that have prompted the decision to shut down  
8 Gannon Units 1 through 4?

9  
10 **A.** As I have stated, the age of the equipment and hours of  
11 operation are key factors impacting the units' performance  
12 and reliability. Even though the company has taken steps  
13 to modify operating parameters, boiler cyclone and furnace  
14 tube failures pose significant reliability concerns for  
15 the company. Over the last calendar year, boiler cyclone  
16 and furnace tube failures have increased 300 percent at  
17 Gannon Station. These failures along with equipment  
18 fatigue and structural damage have resulted in significant  
19 lost generation due to unplanned outages and have resulted  
20 in the company modifying the operating parameters for each  
21 unit.

22  
23 Gannon Unit 1 was commissioned with a boiler design header  
24 pressure of 1,750 pounds per square inch ("psi"). Prior  
25 to being shut down, this unit operated at 1,200 psi to

1        reduce the likelihood of tube failures due to material  
2        degradation and thinning, which reduces the boiler tubes'  
3        ability to withstand pressure ("tube metal safety  
4        factor"). Tube failures increased 1,025 percent from 2001  
5        to 2002.

6  
7        Gannon Unit 2 was commissioned with a boiler design header  
8        pressure of 1,750 psi. Prior to being shut down, this  
9        unit only operated at 1,000 psi to increase tube metal  
10       safety factor. Tube failures increased by 832 percent  
11       from 2000 to 2002. Another reliability concern was the  
12       deteriorated condition of the last stage turbine blades,  
13       which resulted in the tips of blades breaking off in  
14       service. The third point feedwater heater had over 30  
15       percent of its tubes plugged and the tube leaks presented  
16       operational problems. Additionally, due to age, the  
17       control wiring insulation at the turbine front standard  
18       was in poor condition and continued to lead to electrical  
19       grounds and problems with resetting the turbine prior to  
20       startup.

21  
22       Gannon Unit 3 was commissioned with a boiler design header  
23       pressure of 2,175 psi. Currently the unit operates at  
24       1,800 psi to increase tube metal safety factor. Tube  
25       failures increased 1,450 percent from 2000 to 2002 and

1 boiler casing leaks have resulted in reduced generating  
2 load because of carbon monoxide gas leaks in work areas  
3 over the last three years. Also, the third point  
4 feedwater heater has holes in the shell due to  
5 deterioration and internal erosion.

6  
7 Gannon Unit 4 was commissioned with a boiler design header  
8 pressure of 2,250 psi. Currently the unit operates at  
9 1,000 psi of pressure to increase tube metal safety  
10 factor. Tube failures have increased 1,188 percent over  
11 the last three years. The water walls and nose arch have  
12 permanent internal hydrogen damage. Boiler casing leaks  
13 have resulted in reduced generating load because of carbon  
14 monoxide gas leaks in work areas and the third and fourth  
15 point feedwater heaters are continually experiencing tube  
16 failures which increase the risk of water induction damage  
17 to the steam turbine. The fifth point heater has holes  
18 through the shell that have resulted in water leaking into  
19 the condenser. In addition, the last stage turbine blades  
20 are in poor condition due to long-term erosion from  
21 moisture in the steam.

22  
23 Document No. 1 of Exhibit \_\_\_\_ (WTW-1) are graphs which  
24 illustrate the aforementioned increasing number of tube  
25 repairs, gas leak outages and structural work orders due



1 to material fatigue and erosion by unit.

2

3 **Q.** What are the estimated necessary expenditures to keep  
4 Gannon Units 1 through 4 operating through 2004?

5

6 **A.** Given the current condition of these units, Tampa Electric  
7 estimates that it would need to incur additional O&M  
8 expense of approximately \$57 million to try to keep Gannon  
9 Units 1 through 4 operating somewhat reliably beyond the  
10 actual and currently planned shutdown dates and through  
11 2004. Even this significant level of investment is not a  
12 guarantee that Gannon Units 1 through 4 would operate at  
13 planned availability levels due to the age of the units  
14 and the performance declines that have been experienced,  
15 as previously described.

16

17 **Q.** Are there additional costs that would need to be incurred  
18 to keep the units running through 2004?

19

20 **A.** Yes. To the extent that the performance of the units  
21 continues to decline despite investment in repairs and  
22 maintenance, there would be additional costs incurred to  
23 replace power during forced unplanned outages.

24

25 **Q.** Is there any flexibility in the planned shutdown schedule

1 for the units?  
2

3 **A.** While the planned dates are relatively precise, the  
4 company continues to recognize the need for the exact  
5 shutdown dates to remain flexible to the extent that is  
6 possible. For example, if there is a significant failure  
7 of a unit prior to the planned shutdown of that unit, the  
8 company will evaluate the failure and determine whether it  
9 is prudent to make the necessary repairs. Similarly, if  
10 the units are running and there are system or statewide  
11 operational concerns that should be considered, the  
12 company will reevaluate its decisions and may refine the  
13 dates if appropriate.

14  
15 **Q.** What action was taken or will be taken regarding the  
16 employees at the various Gannon Station units?  
17

18 **A.** Employees at Gannon Station are in International  
19 Brotherhood of Electrical Workers ("IBEW") covered  
20 operating positions. The Gannon/Bayside employee  
21 transition plan involves employees located at Gannon  
22 Station, Big Bend Station and TECO Stevedoring because  
23 IBEW contractual agreements govern seniority and position  
24 reclassification. Therefore, the company has entered into  
25 an agreement with the IBEW to facilitate the

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Gannon/Bayside staffing transition of covered employees.  
Based on the required number of positions needed after the  
transition, early retirement offers, voluntary separation  
offers and re-deployment of employees into positions  
within the company, there are no plans for lay-offs.

Q. Does this conclude your testimony?

A. Yes it does.

EXHIBITS TO THE TESTIMONY OF  
WILLIAM T. WHALE

DOCUMENT NO. 1

GANNON STATION PERFORMANCE AND REALIABILITY

### Tube Repairs

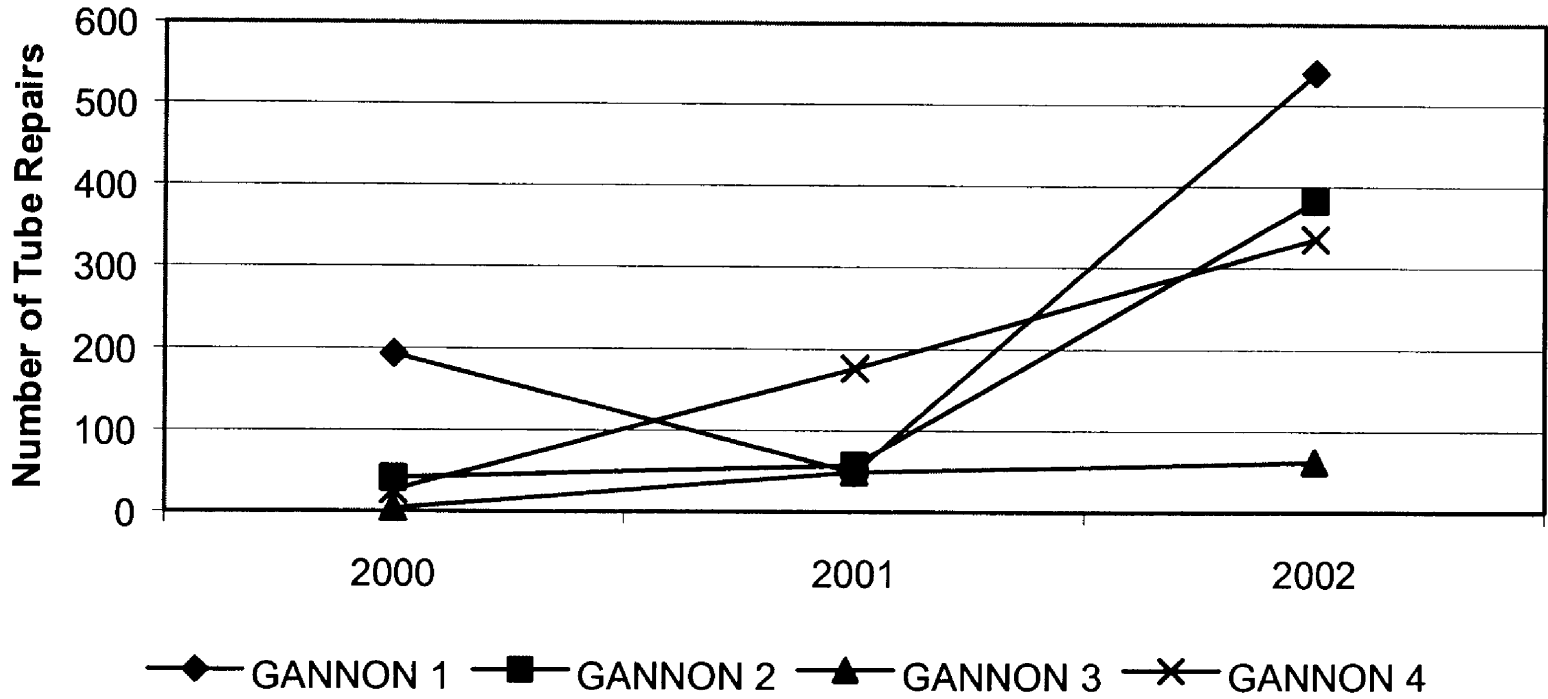
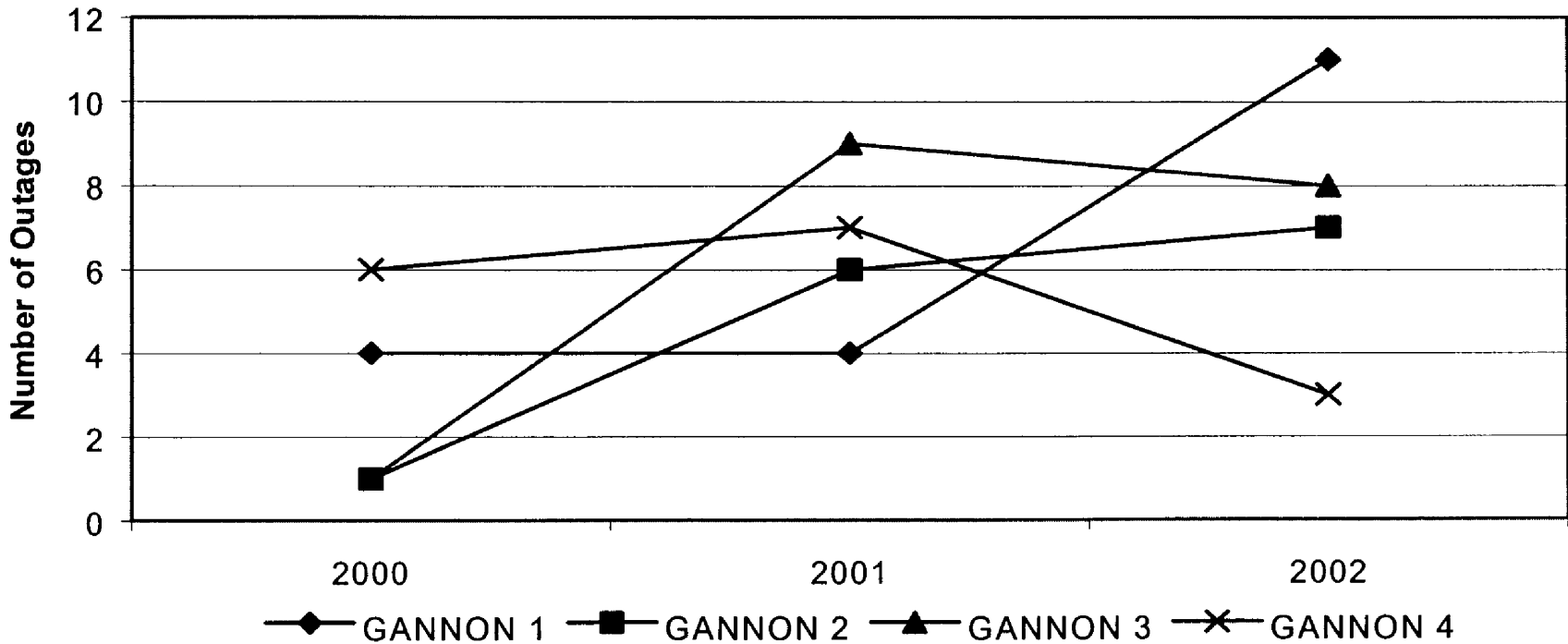


EXHIBIT NO. \_\_\_\_\_  
TAMPA ELECTRIC COMPANY  
DOCKET NO. 030001-EI  
(WTW-1)  
DOCUMENT NO. 1  
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FILED: 9/12/03

# Gas Leaks



### Structural Issues

