Young, van Assenderp, Varnadoe & Benton, P. A. ATTORNEYS AT LAW

REPLY TO:

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Tallahassee

October 27, 1989

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Mr. Steve C. Tribble, Director Division of Records and Reporting Florida Public Service Commission 101 East Gaines Street Tallahassee, Florida 323091

> Tampa Electric Company vs. Florida Power Corporation PISC Docket No.: 899646-BI

Dear Mr. Tribble:

Enclosed for filing in the above docket are the original and fifteen (15) copies of Prepared Direct Testimony of Don R. Morrow; Bruce C. Kelsey; Kenneth R. BuShea, P.E.; and Graeme R. Addie, , P.E.

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FPSC-RECORDS/REPORTING

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EPSC-RECORDS/REPORTING

10658 OCT 27 1993

FPSC-RECORDS/REPORTING

AGRICO CHEMICAL COMPANY BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION DOCKET NO. 890646-EI

IN RE: PETITION OF TAMPA ELECTRIC COMPANY FOR RESOLUTION OF TERRITORIAL DISPUTE WITH FLORIDA POWER CORPORATION

Testimony of

Bruce C. Keisey

October 27, 1989

10659 OCT 27 ISSS FPSC-RECORDS/REPORTING

1		BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION:
2		RE: Tampa Electric Company Complaint
3		Concerning Territorial Boundaries
4		PREFILE TESTIMONY OF
5		BRUCE C. KELSEY
6		AGRICO CHEMICAL COMPANY
7		
8	Q.	Please state your name and address.
9	Α.	My name is Bruce Kelsey. My address is 87 Lake Otis Road, Winter
10		Haven, Florida 33884.
11	Q.	What is your occupation?
12	Α.	I am a registered professional electrical engineer and have been
13		employed by Agrico Chemical Company since 1978.
14	Q.	Briefly state your responsibilities at Agrico.
15	Α.	My job title is Electrical Superintendent for Agrico's Florida mining
16		operations. My responsibilities related to this complaint are the
17		planning, construction and maintenance of power distribution systems.
18	ନ୍.	Briefly outline your education and professional experience prior to
19		b≥ing employed by Agrico.
20	Α.	I have a Bachelor of Science Degree in Electrical Engineering from
21		the University of Florida. I was employed by Tampa Electric Company
22		for 18 years and held several senior engineer and manager positions
23		associated with the engineering, maintenance, and construction of
24		power transmission and distribution systems.
25	Q.	Do you have any exhibits to file with your testimony?

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- 1 A. Yes, I do. Exhibit _ (BCK-1), titled Agrico Properties; Exhibit _
- 2 (BCK-2), Fort Green Schematic; and Exhibit _ (BCK-4), Comparison
- 3 of Interruptible Rates.
- 4 Q. Describe the Fort Green power distribution system.
- 5 A. The Fort Green mine and processing plant are served on the time of
- 6 day IST-1 interruptible rates offered by Tampa Electric Company
- 7 (TECO) and Florida Power Corporation (FPC). Exhibit BCK-2 is a
- 8 schematic diagram showing the power distribution facilities and major
- 9 electrical equipment at the Fort Green Mine. This exhibit shows how
- the Fort Green mining equipment and the processing plant are served
- by a temporary TECO 4 kv meter at the north end of the property,
- 12 a 69 ky TECO meter in the center of the property, and a 69 ky FPC
- meter at the south end of the present mining area.
- 14 The temporary 4 ky meter was abandoned in October when the No. 13
- dragline moved west across high way 37. The TECO 69 kv meter now
- serves the processing plant, the No. 13 dragline, and the No. 13
- 17 pipeline. The FPC 69 kv meter serves the two southern draglines
- 18 and their associated pipelines.
- 19 The 69 ky received from the utilities is stepped down by Agrico-owned
- transformers to 34 kv, 13 kv, and 4 kv. Power is distributed at 34
- 21 ky throughout the mining areas and stepped down to 4 ky or less by
- numerous portable field substations. The portable field substations
- 23 serve the draglines, pumps associated with the pipelines, and other
- 24 field equipment. The draglines and all large pump motors shown on
- 25 the schematic, Exhibit BCK-2, are powered at 4 kv. Power for the

- processing plant is supplied by two 7,500 kva, 69/13 kv transformers,
- distributed at 13 kv, and stepped down further to 4 kv and 480 volt
- 3 by 25,000 kva of transformers within the plant but not shown on the
- 4 schematic.
- 5 Q. What facilities has TECO or FPC provided past the meters at Fort
- 6 Green?
- 7 A. Agrico owns all power distribution equipment, transformers,
- substations, and power lines past the meters with one exception.
- 9 TECO owns approximately 1-1/2 miles of transmission lines from the
- 10 69 kv meter to Agrico-owned substations. FPC does not own
- 11 equipment past their 69 liv meter.
- 12 Q. What facilities did FPC provide or enlarge in order to serve the mining
- 13 facilities in Hardee County?
- 14 A. FPC built approximately 1-1/2 miles of 69 kv transmission lines from
- their existing lines and terminated them at a 69 kv meter on Agrico's
- property in Hardee County. FPC enclosed the meter and associated
- disconnect switches with a chain link fence. To my knowledge, this
- is all that was provided by FPC and no substations were enlarged as
- 19 alleged in the TECO complaint.
- 20 Q. Comment on the duplication of utility facilities that TECO claims would
- 21 be prevented if the territorial agreement is interpreted in the manner
- 22 requested by TECO.
- 23 A In my opinion there will be a greater duplication of facilities if the
- 24 ferritorial agreement is interpreted in the manner requested by TECO
- 25 than if Agrico is served by only FPC. This is because each of the

ì utilities will have to provide transmission facilities to serve part of the load even though FPC's facilities are capable of serving the entire 2 3 load. Eventually the Fort Green mine will also extend into Manatee County and at that time three utilities would have to provide facilities S to serve the load that could be served by facilities from one utility. Is the transmission line built by FPC to serve the Agrico Fort Green G Q facilities in Hardee County a duplication of TECO's facilities? 7 8 Yes, the territory boundary line has caused this duplication of Α transmission lines. The FPC transmission line was built to serve the 9 existing load in Hardee County but it is capable of serving the entire 10 load in Polk and Harder Counties. The FPC line will serve 25 square 11 miles of Agrico mining area in Hardee County even if no FPC power 12 is ever used in Polk County. Agrico proposes to use the capacity of 13 FPC's transmission line and eliminate a duplication of facilities by 14 serving the Fort Green processing plant and the all of the mining 15 equipment in Polk and Hardee Counties from the one FPC transmission 16 17 line. How does Agrico propose to serve the entire Fort Green mine from 18 Q 19 the FPC transmission line? Agrico has purchased the material and has plans to build a 69 kv 20 Α power line that would originate at the existing FPC 69 kv meter 21 located two and a quarter miles inside of the FPC territory. The 22 power line would be built entirely on Agrico land and terminate at 23 the existing Fort Green Main Plant substation in Polk County. The 24

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route of the power line can be seen on exhibit BCK-1. All of the

- 1 Fort Green facilities would be served by FPC and TECO would serve
- the remaining meters shown at Pierce, South Pierce, and Payne
- 3 Creek.
- 4 Q. Are there other duplication of facilities because the Agrico Fort
- 5 Green Mine is served from two utilities?
- 6 A. Yes. Dividing the Fort Green Mine between FPC and TECO also
- 7 causes the utilities to provide approximately 11 mva more than the
- actual peak load. This is due to the diversity lost by not serving the
- 9 load from one FPC source. The sum of peak demands served by both
- companies will be approximately 56 mva by the end of 1989. However,
- 11 the actual peak for the mine will only be about 45 mva because the
- 12 peak demands served by the two companies do not occur
- simultaneously. The 11 mva difference represents 24 percent more
- peak load that must be supplied by both utilities.
- 15 Q. Will TECO have to abandon existing transmission facilities if all of the
- 16 Fort Green load is transferred to FPC?
- 17 A. No, with one possible exception. About two miles of TECO's
- 18 transmission line on Agrico's property along the entrance road to the
- 19 processing plant might be abandoned if the entire load is transferred
- 20 to FPC. This power line could be salvaged or perhaps sold to Agrico.
- 21 I suspect it has been paid for many times over. The remainder of
- 22 TECO's transmission facilities that serve the Agrico Fort Green Mine
- 23 would continue to be used to serve a much larger mining operation at
- 24 the IMC Four Corners Mine.

- 1 Q. Will there be a duplication of generating equipment and production
 2 plant investment if Agrico transfers service from TECO to FPC?
- In my opinion, there would be no physical duplication of generating 3 Α. equipment because Agrico is an interruptible customer and by 4 definition no generating equipment is planned or built for 5 interruptible customers. TECO claims the Equivalent Peaker method G used to design TECO's rates has allocated \$17MM of production plant 7 investment to serve Agrico. However, TECO's power plants were 8 planned or built prior to adopting the Equivalent Peaker method and 9 therefore were not built to serve interruptible customers such as 10 Agrico. The Equivalent Peaker method has not been adopted for any 11 other utilities and should not be used to resolve this boundary 12 dispute. 13
- Mr. Rowe stated on page 8, lines 19 through 24 of his testimony, that allowing Agrico to switch power companies would totally frustrate the planning, development and maintenance of a cost effective, coordinated electric power grid throughout Florida. How does an interruptible customer such as Agrico affect the power grid?
- 19 A. It is my understanding that no power generation is planned for interruptible customers. The power sold to these customers comes from the reserve capacity that each utility is required to maintain for the grid. It shouldn't matter to the grid who serves the interruptible load since it can be interrupted at any time.
- Q. How would other customers be affected if Agrico transfers Fort Green from TECO to FPC?

I suspect there would be little or no noticeable impact on other TECO 1 A. customers. Most of TECO's loss of revenue would be for fuel, which 2 would mostly be nullified because the fuel would not be burned. 3 There may be an impact on fuel costs for a few years because less fuel 4 5 would be purchased at the present low spot market cost. However, the few customers who qualify for the SSI special service rider would 6 probably be the only ones affected. The SSI program passes on 80 7 percent of the savings in spot market fuel purchases to interruptible 8 customers who have increased their use of power. Those companies 9 with an increase in power consumption receive \$4 or \$5 credit per 10 mwh. I suspect these are the only customers that would be 11 significantly affected if Agrico transfers to FPC. Agrico should not 12 13 be required to continue purchasing power from TECO so that a few customers with increased consumption can receive a benefit that 14 15 Agrico itself does not receive.

16 Q. Would the fixed costs in the base rates now being collected from17 Agrico be passed on to other customers?

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A. It is questionable whether or not fixed cost collected from Agrico would be eventually passed on to other customers. New rates would have to be established in a future full rate case in order to pass these costs on to other customers. The loss of Agrico's contribution to fixed cost may be offset by customer growth or increased earnings, and existing customers may never be impacted. If other customers are required to bear the loss in fixed cost collected from Agrico, this would eventually happen anyway when all of the Fort Green mining

- facilities are moved into Hardee County. In fact, the Fort Green
- 2 mining area in TECO's territory would have been depleted in 1990 if
- 3 2,265 acres had not first been mined in Hardee County. This area is
- in FPC territory but the power used was purchased from TECO.
- 5 Therefore TECO has already collected fixed cost that should have
- 6 been collected from FPC.
- 7 Q. Mr. Rowe mentioned the Payne Creek facilities on page 6 of his
- 8 testimony and again on page 10 he mentioned a \$2.7 million lose of
- 9 base revenues if Agrico is permitted to continue to take power from
- 10 FPC for Polk County facilities. What does this have to do with Agrico's
- intent to serve Fort Green from FPC?
- 12 A. Payne Creek has nothing to do with this case. This mine is now
- 13 entirely in Polk County and there are no plans to use Agrico's
- 14 proposed 69 kv power line from FPC to serve Payne Creek. The
- 15 Payne Creek dragline was in Hardee County but moved back into Polk
- 16 County in March of 1989. While the dragline was in Hardee County,
- part of the \$2.7 million of base rates collected by TECO was for
- 18 power used in FPC's Hardee County area. Furthermore, Payne Creek
- 19 will be mined out in one to two years and the revenue will be lost
- 20 regardless of how it is served.
- 21 Q. Mr. Rowe stated on page 18, line 20, in his concluding remarks, that
- TECO would lose \$6.5 million in base revenues if Agrico is served
- 23 from FPC. Is this correct?
- 24 A. No, it is not. He has included \$2.7 million of base revenue lost from
- 25 Payne Creek which I mentioned earlier has nothing to do with this

- case. The remaining \$3.8 million for Fort Green is also too high because it is an estimate of the revenue collected before the facilities
- 3 in Hardee County were transferred to FPC.
- 4 Q. What is the difference in cost of the TECO and FPC interruptible
 5 rates?
- It is difficult to compare the rates due to the volatility of fuel costs 6 Α. and TECO's uncertain mechanism for refunding over collected federal 7 income taxes. However, I have estimated TECO's rate to be an 8 average of nearly 19 percent greater than FPC's during 1989, 1990, 9 and 1991. The billing determinates and itemized components for this 10 calculation are shown on .ixhibit _ (BCK-4). This exhibit assumes all 11 Fort Green facilities are served from one meter and is based on fuel 12 cost projections provided by both companies. Fuel makes up the 13 14 greatest portion of the bills, but the major difference in TECO's and FPC's interruptible rates is due to base rates and other non fuel 15 The three year average non fuel related cost, shown on 16 Exhibit (BCK-4), are \$15.16/mwh for TECO and an average of 17 \$10.89 for FPC, a difference of 39 percent. The three-year average 18 total difference in cost, including sales tax, is \$6.54 per mwh. Only 19 \$1.90 of this difference is due to fuel, and the remainder, \$4.27 plus 20 sales tax, is due to base rates and non fuel items. The bottom line 21 of Exhibit (BCK-4) indicates Agrico would pay annually an average 22 of nearly \$1,600,000 more than the cost of the same amount of power 23 Served from FPC. Most of the difference is due to the Equivalent 24 Peaker cost of service methodology applied to TECO's rates. This 25

- method charges a much greater portion of TECO's production plant
- 2 investment to the energy portion of base rates than any other utility
- 3 in Florida.
- 4 Q. What safety problems would be caused by serving Fort Green from two
- 5 utilities?
- 6 A. Mr. Morrow and Mr. Addie have discussed the hazard of water hammer
- 7 that can develop in a pipeline due to a partial loss of power from
- 8 either utility. There is also an electrical safety problem due to the
- 9 confusion that arises from having more than one source of power.
- The draglines and other portable equipment are served by 5,000-volt
- power cables that are a few hundred feet to 5,000 feet long. Agrico's
- employees must work in adverse conditions of mud, water, and piles
- of overburden that make it difficult to trace the source of power for
- 14 the cables. The overhead power lines are also being continually
- relocated to serve the portable substations. Employees are required
- 16 to handle and make connections to these cables, and power lines and
- 17 service from two utilities will definitely add to the confusion of
- determining when a cable or power line is energized.
- 19 Q. Are there devices that can detect a partial power outage and shut
- 20 down pipeline pumps in order to prevent the water hammer hazard?
- 21 A. The technology exists but I am not aware of any off the shelf devices
- 22 that will function quickly enough with the radio controls used on
- 23 Agrico's pipelines. Each of the pumps has a radio and
- 24 Microprocessor that is remotely controlled by an operator with a
- 25 master radio control from the last pump in the pipeline: It took 3

years and nearly \$400,000 to develope and install a reliable radio control system on two of the pipelines at Fort Green. Another system is being installed on the third pipeline this year and the total investment in radio controls will exceed \$500,000. Given enough time and money, the system could be modified to sense a partial power outage and shut down the remaining pumps but it is doubtful that the system could send a stop command to each of the pumps quickly enough to prevent water hammer.

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- 9 Q. What about the devices Mr. Rowe mentioned on page 12 of his testimony that other companies use to prevent water hammer?
 - A. Other companies do install such devices with varying success but those companies have sho ter pumping distances and/or fewer pumps installed in their pipelines. The longer pipelines used by Agrico are more susceptible to water hammer. Mr. Addie is a recognized authority on slurry pumping systems and stated in his testimony that he is not aware of a reliable device to prevent water hammer at Agrico. The longer pipelines also require staggered start up and shut down sequences in order to prevent a build up of excessive pressure. For example, the first pump may be programed to shut down first, next the tenth pump, next the third pump, next the sixth pump etc. Obviously, this sequence cannot be duplicated if all the pumps lose power on one side of an arbitrary boundary line between two power companies.
- 24 Q. Now is the number of power outages affected if Fort Green is served
 25 by more than one utility?

The Fort Green Mine is served on an interruptible rate, so we expect to be interrupted when the power company has insufficient capacity to serve firm load customers. Fortunately this is not a frequent occurrence. However, weather-related and other accidental outages are recorded by TECO and occur on an average of once or twice a month. As Mr. Morrow mentioned in his testimony, Fort Green will be in double jeopardy of being interrupted if served by two utilities. There would be many additional miles of power lines exposed to lightning and interruptions on the second utility's system. The number of outages may increase to four or more times a month. The actual number will be greater because the outages mentioned above do not include all the momentary blinks that are not recorded by the power companies. A blink in the lights due to a lightning strike on either company may go unnoticed by other customers but can shut down an entire phosphate mine or processing plant.

16 Q. Do you have any concluding remarks?

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A. The territorial agreement is supposed to prevent a duplication of facilities but the contrary would be true in this case if TECO's interpretation of the agreement is adopted. Serving the Agrico Fort Green Mine from two utilities causes duplication of facilities and imposes serious operating and safety hazards. A three year average cost analysis shows Agrico would pay TECO nearly \$1,600,000 more annually for the same amount of power than competing phosphate dompanies pay FPC. One of these same competitors is also paying TECO approximately \$1,000,000 less for a similar amount of power due

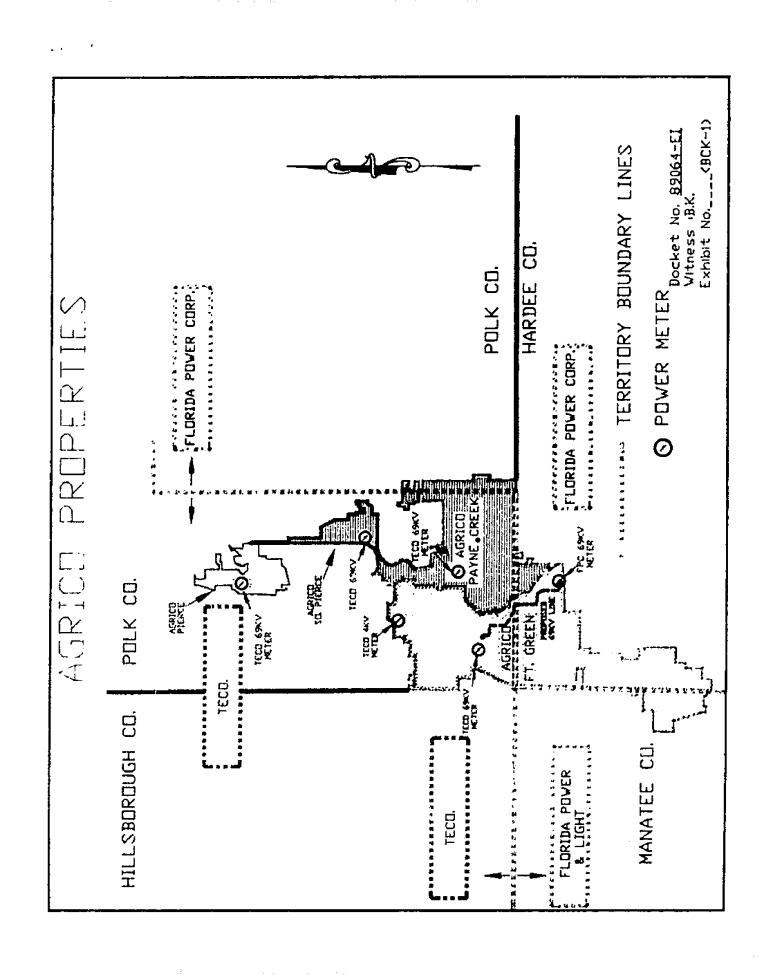
to the SSI service rider program. That same company has built 69 kv power lines in order to use TECO's power in FPL's area and additional 69 kv power lines to use FPC's power in TECO's area. Using power from a utility in another utility's area has been common practice in the phosphate industry. Teco has been a party to this practice and has no basis to complain at this late date. Furthermore, Agrico should not be held hostage to the Equivalent Peaker cost of service method in settling this dispute when this method has not been applied to any utility except TECO.

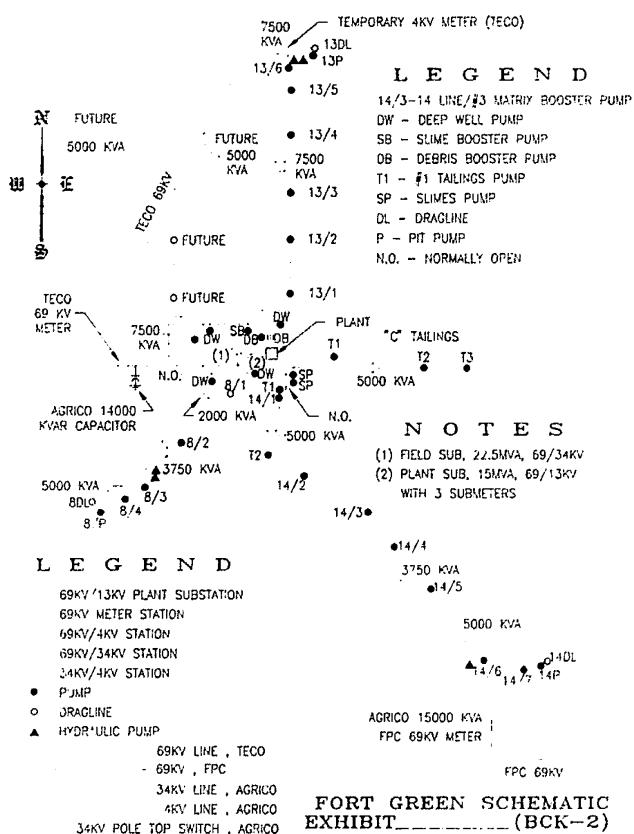
COMPARISON OF INTERRUPTIBLE RATES

AVERAGE POWER COST FOR YEARS 1989, 1990, 1991

	FPC	'TECO	DIFFERENCE
MW	42.00	42.00	
MWH	20,000	20,000	
Power Factor	97.0%	97.0%	
% On Peak	20.0%	20.0%	
Customer Charge	\$0.02	\$0.05	\$0.03
Demand Charge \$/HW	\$2.29	\$2.73	\$0.44
Base Rate STD	\$8.71	\$13.74	\$5.03
Base Rate On Peak	\$14.97	NA	NA
Base Rate Off Peak	\$5.84	NA	NA
Composite of Base Rate	\$7.67	\$13.74	\$6.07
Conservation / MWH	\$1.96	\$0.00	(\$1.96)
Oil Back Out / MWH	\$0.00	\$1.32	\$1.32
Fuel, Peak, \$/MWH	\$28.31	\$26.80	
Fuel, Off Peak, \$/MWH	\$20.75	\$23.50	
Composite of Fuel	\$22.26	\$24.16	\$1.90
FPC Billing Credit	\$0.04	\$0.00	(\$0.04)
TECO Tax Refund	\$0.00	(\$1.61)	(\$1.61)
Power Factor Credit	(\$0.17)	(\$0.69)	(\$0.52)
Transformer Credit	\$0.00	(\$0.21)	(\$0.21)
Voltage Credit	(\$0.92)	(\$0.16)	\$0.76
Total Non Fuel	\$10.89	\$15.16	\$4.27
Total Fuel	\$22.26	\$24.16	\$1.90
Total Bill	\$33.15	\$39.32	\$6.17
Sales Tax	\$1.99	\$2.36	\$0.37
Total with Sales Tax	\$35.14	\$41.68	\$6.54
Annual Cost	\$8,433,600	\$10,002,166	\$1,568,566
Percent Difference			18.6%

Pocket No. 89064-EI Witness BK Exhibit (BCK-4)





BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

TAMPA ELECTRIC COMPANY,)		
Complainant,) }		
vs.	DOCKET	NO.	890646-EI
FLORIDA POWER CORPORATION,	,		
Respondent.	;)		

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a true copy of the foregoing Prepared Direct Testimony of Don R. Morrow; Bruce C. Kelsey; Kenneth R. BuShea, P.E.; and Graeme R. Addie, P.E. has been furnished by U.S. Mail to the following parties of record, this 27th day of October, 1989:

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