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July 1, 1996

HAND DELIVERY

Ms. Blanca S. Bayo, Director
Division of Records and Reporting
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, FL 32399-0850

Re: Prudency Review to Determine Regulatory
Treatment of Tampa Electric Company's
Polk Unit; FPSC Docket No. 960409-EI

Dear Ms. Bayo:

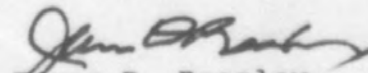
Enclosed for filing in the above docket on behalf of Tampa
Electric Company are fifteen (15) copies of each of the following:

1. Rebuttal Testimony of John R. Rowe, Jr. 07017-96
2. Rebuttal Testimony and Exhibits of Hugh W. Smith. 07018-96
3. Rebuttal Testimony and Exhibits of Stephen L. Thumb. 07019-96
4. Rebuttal Testimony and Exhibits of Thomas L. Hernandez. 07021-96
5. Rebuttal Testimony and Exhibits of Charles R. Black. 07020-96

Please acknowledge receipt and filing of the above by stamping
the duplicate copy of this letter and returning same to this
writer.

Thank you for your assistance in connection with this matter.

Sincerely,


James D. Beasley

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 LEG 1
 LIN 5 JDB/pp
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TAMPA ELECTRIC COMPANY

BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 960409-EI

REBUTTAL TESTIMONY
AND EXHIBITS OF

HUGH W. SMITH

BEFORE THE PUBLIC SERVICE COMMISSION

PREPARED REBUTTAL TESTIMONY

OF

HUGH W. SMITH

1
2
3
4
5
6 Q. Please state your name, address and occupation.

7
8 A. My name is Hugh W. Smith. My business address is 702 North
9 Franklin Street, Tampa, Florida 33602. I am Director
10 Environmental and Fuels for Tampa Electric Company.

11
12 Q. Have you previously filed testimony in this docket?

13
14 A. Yes. I filed direct testimony in this docket on May 7,
15 1996.

16
17 Q. Have you prepared an exhibit to support your rebuttal
18 testimony?

19
20 A. Yes. Exhibit _____ (HWS-2), entitled "Rebuttal exhibit of
21 Hugh W. Smith", consisting of five documents has been
22 prepared under my direction and supervision.

23
24 Q. What is the purpose of your rebuttal testimony?

25

1 A. The purpose of my rebuttal testimony is to demonstrate the
2 reasonableness of Tampa Electric's fuel forecast and
3 forecasting methodology, in light of the issues raised in
4 the testimony submitted by Mr. Jim Breman and Mr. Thomas
5 Ballinger on behalf of the Commission Staff ("Staff"). I
6 will also support Tampa Electric's decision to use as-
7 available natural gas assumptions in conjunction with light
8 oil versus firm natural gas assumptions in evaluating the
9 cost-effectiveness of a natural gas-fired combined cycle
10 alternative against IGCC technology. And finally, I will
11 address issues related to petroleum coke for Polk Unit One.
12

13 Q. Please summarize your position.
14

15 A. Tampa Electric's fuel forecasts were reasonable and prudent
16 throughout the time period in question (i.e. 1992 through
17 1995). As I will demonstrate, the forecasts are comparable
18 to those produced by other Florida utilities and fuel
19 forecast experts. While the Staff contends that Tampa
20 Electric has overestimated gas prices, Tampa Electric's
21 natural gas forecasts produced in the 1992 through 1995
22 time frame actually predicted lower gas prices for 1996
23 than are occurring in the marketplace. In addition, it is
24 inconsistent for the Staff to disagree with Tampa
25 Electric's forecasts given their previous endorsement of

1 the forecasts in past dockets. In the Need Hearing order,
2 Order No. PSC-92-0002-FOF-EI ("Need Order"), the Commission
3 advised Tampa Electric to pay close attention to the
4 differential between coal and natural gas given that this
5 differential contributes to the justification of IGCC
6 technology versus the combined cycle alternative. Tampa
7 Electric has been responsive to this advice and has
8 modified its forecast methodology and resulting forecasts
9 accordingly. As it relates to the combined cycle
10 alternative, as-available natural gas is the most cost-
11 effective alternative and, therefore, was a reasonable and
12 prudent assumption. And finally, Tampa Electric does not
13 have any reason to believe that there are "potential hidden
14 costs in TECO's use of pet coke" as stated by Mr. Breman.
15

16 Q. Staff witness Breman, in his testimony, challenges Tampa
17 Electric's forecast prices of natural gas in the 1992-1995
18 time period. Is there any merit to Mr. Breman's contention
19 that Tampa Electric's price forecasts were too high and not
20 reasonable at the time the forecasts were made?
21

22 A. No. Tampa Electric used sound judgment applied to the best
23 information available to forecast prices of natural gas in
24 the 1992-1995 time period. In each of those years, Tampa
25 Electric analyzed information from respected industry

1 forecasters and utilized that information as the basis for
2 the assumptions used to develop the company's forecast.

3
4 Q. How have Tampa Electric's gas forecasts compared to actual
5 gas prices?

6
7 A. While prices for natural gas have been lower than forecast
8 in 1992-1995, actual 1996 natural gas prices have increased
9 to levels even higher than we had forecast they would be in
10 the 1992 through 1995 forecasts. As shown in Document No.
11 1 of my Rebuttal exhibit, Tampa Electric's 1992, 1993, 1994
12 and 1995 forecast of 1996 prices of \$3.28, \$3.34, \$3.06 and
13 \$2.45 (in \$/MMBtu) are low compared to the actual value of
14 \$3.93/MMBtu year-to-date for 1996. In fact, if any
15 assessment were to be made of the four forecasted values
16 listed above, Tampa Electric appears to have forecast its
17 natural gas price too low.

18
19 Q. Mr. Ballinger, in his testimony asserts that "TECO relied
20 upon a fuel forecast that assumed an ever widening cost
21 differential between coal and natural gas". What is the
22 reason that Tampa Electric's forecasts reflect the price of
23 natural gas increasing over time versus the price of coal?

24
25 A. Fuel are typically forecast in the classical method of

1 using expectations of supply and demand relationships as
2 the basis to project price trends. If demand for natural
3 gas approaches supply capability, then there is a resultant
4 increase in price. On the other hand, if supply capability
5 significantly exceeds demand, stable or falling prices are
6 forecast. In each of the years 1992-1995, Tampa Electric
7 and experts in the field of fuel forecasting have projected
8 upward pressure on the prices of natural gas in the U.S.
9 while projecting the prices of coal to remain stable or
10 decline. There are several key market factors which have
11 led to this conclusion.

12
13 Q. What were some of the key market factors included in the
14 forecast that lead to the conclusion that there would be
15 upward pressure on gas prices in the future?

16
17 A. The most significant factor has been the expectation that
18 new gas reserve additions in the Gulf of Mexico and other
19 significant producing regions would not keep pace with
20 reserve depletions. This assumption was based on the fact
21 that the most easily accessible tracts had already been
22 extensively explored and that the existence of deeper water
23 reserves was not only speculative, but to the extent
24 discovered, they would be much less accessible and more
25 expensive to develop.

1 The Gulf of Mexico alone provides approximately 26% of
2 total U.S. production of natural gas and is the single most
3 significant supply area. The reserves in the Gulf can be
4 depleted at rates exceeding 25% per year. Therefore,
5 suppliers must maintain aggressive drilling and exploration
6 programs to continuously replace existing reserves.
7 Information which existed in the 1991-1994 time frame
8 indicated that drilling activity in the Gulf was near all-
9 time lows which further supported the skepticism that
10 production would not keep pace with demand.

11 Another key assumption in our natural gas forecast has been
12 the expectation that demand would gradually increase based
13 on anticipated higher industrial use and normal weather
14 patterns. Additionally, Tampa Electric's forecast
15 anticipated the end of the "gas bubble", the time when
16 demand for natural gas would come into balance with the
17 deliverability of natural gas.
18

19
20 Q. Are the forecasts Tampa Electric prepared for natural gas
21 during this time period reasonable compared to other
22 Florida utilities, such as Florida Power & Light, Florida
23 Power Corporation and Seminole Electric Cooperative?

24
25 A. Yes. Document No. 2 of my Rebuttal exhibit provides a

1 graphical comparison that shows Tampa Electric's forecasts
2 to be well within the reasonable bounds of the other
3 forecasts.
4

5 Q. Are the forecasts Tampa Electric prepared for natural gas
6 during this time period reasonable compared to other
7 forecasts such as the American Gas Association, the Energy
8 Information Association, Groppe, Long & Litell, Data
9 Resources, Inc., and the WEFA Group?
10

11 A. Yes. Document No. 3 of my Rebuttal exhibit provides a
12 graphical comparison that shows Tampa Electric's forecasts
13 to be within the reasonable bounds of the other forecasts.
14

15 Q. What conclusions can be drawn from the comparison of Tampa
16 Electric forecasts to other forecasts.
17

18 A. Tampa Electric has consistently generated forecasts which
19 compare favorably with both other utility forecasts as well
20 as leading expert's forecasts. These comparisons of
21 forecast with leading experts demonstrate in each year that
22 Tampa Electric's forecast are within a zone of
23 reasonableness. This indicates Tampa Electric forecasts
24 represented a well reasoned and balanced view of the
25 natural gas market. Tampa Electric relied upon a wide

1 range of credible information along with sound judgement to
2 develop forecasts which were consistent with the best
3 information available at the time. Tampa Electric's
4 forecasts in 1992 through 1995 were reasonable and
5 consistent with the thinking of well respected experts in
6 the field of fuel forecasting at the time the forecasts
7 were made.

8
9 Q. Why didn't the price of natural gas grow to the current
10 1996 levels as fast as Tampa Electric forecasted it would
11 in the 1992-1995 time period?

12
13 A. Several unexpected factors have influenced gas prices in
14 this period. The U.S. has experienced successive warm
15 winters prior to the winter of 1995-96. In fact, the
16 winter of 1994-95 was the fourth warmest winter on record.
17 Residential heating is a major consumer of natural gas and
18 weather patterns that vary from normal have major impacts
19 on the demand of natural gas. The Energy Information
20 Association reports that heating degree days were as much
21 as 12% below normal in 1991-1995. These significantly
22 warmer than normal winters in three out of the last five
23 years have played a significant role in reducing both the
24 actual demand and price of natural gas.

25

1 In addition, there has been a turnaround in the production
2 of gas from the Gulf of Mexico. This occurred due to the
3 development of technology previously nonexistent which has
4 allowed gas to be discovered more efficiently and cheaply,
5 including the ability to drill in increasingly deeper
6 water. This factor has made additional reserves available
7 which were not expected in earlier forecasts and has
8 contributed to the downward pressure on natural gas prices
9 throughout the early 1990's.

10
11 Another cause of lower than expected gas prices has been
12 the increase in natural gas imports from Canada. Since
13 1986, over 50% of the incremental increase in natural gas
14 demand in the U.S. has been met by increases in Canadian
15 gas. During that time period, reliance upon Canadian
16 imports has increased from 5% of U.S. supply to
17 approximately 13%. However this trend cannot continue.
18 Canada's productive capacity is being fully utilized and
19 pipeline capacity additions are not expected in the near
20 future.

21
22 An additional unexpected supply impact has been the
23 utilization of Section 29 tax credits for coal seam gas.
24 This tax incentive artificially increased the supply of
25 natural gas and created an unexpected amount of supply

1 growth during the period in question.

2
3 Q. What was the cumulative effect on the natural gas market of
4 these factors?

5
6 A. All of the above factors, which could not have reasonably
7 been expected, led to an extension of the "gas bubble"
8 beyond the time most forecasters predicted its end. After
9 the winter of 1995-1996, most notable experts believe that
10 a fundamental shift in the gas markets has occurred
11 signaling an end to the excess deliverability of natural
12 gas or "the gas bubble".

13
14 Q. What knowledge do you have of the Commission's expectations
15 of gas prices over the last few years?

16
17 A. During this time period, the Commission approved as
18 reasonable Tampa Electric's forecasts. Moreover, the
19 Commission emphatically stated that:

20 "...we certainly do not believe that
21 gas prices and coal prices will
22 maintain the constant differential..."
23

24 (See Order 92-1493 issued December 29, 1992 in Docket No.
25 920520-EQ).

26 On page 31 of the its 1995 Annual Report, issued in 1996,
27 the Commission stated that:

1 "In Florida, the primary impetus of
2 competition at both the wholesale and
3 retail levels is the unexpectedly low
4 price of natural gas coupled with the
5 new highly efficient gas-fired
6 combined cycle generating unit
7 technology." (Emphasis added.)
8

9
10 It appears from this statement that as recently as this
11 year the Commission recognized the unexpected nature of the
12 trends in gas prices that has been experienced over the
13 last several years.

14
15 Additionally, in the 1994 PSC Review of Ten Year Site Plans
16 the Commission stated that..

17
18 "However, developed gas reserves are
19 not keeping up with production. New
20 gas reserves needed to meet increased
21 production demand are expected to
22 result in rising gas prices".

23
24 "Current economic indicators predict
25 that the wellhead price for natural
26 gas will turn upward and rise steadily
27 toward the price of oil, a direct
28 reverse from previous declines."
29

30 Clearly this language indicates the Commission expectation
31 in 1994 that gas prices in the future would increase faster
32 than they had in the past. The Commission and Staff were
33 struggling with the same set of unanticipated market
34 factors which led many forecasters, including Tampa
35 Electric, to forecast an earlier end to the over-supply

1 situation than actually occurred. Nevertheless, Tampa
2 Electric's forecast and the Commission's endorsement are no
3 less reasonable as a result. Any attempt to paint a
4 different picture, based on hindsight, would be unfair.

5
6 Q. Both Staff witnesses Breman and Ballinger criticize the
7 increasing differential in Tampa Electric's forecast and
8 advocate the use of a constant differential analysis in
9 which the difference in the prices for coal and gas are
10 fixed and then held constant throughout the forecast. Is
11 this consistent with Staff's recommendation in Tampa
12 Electric's Need Hearing?

13
14 A. No. The Staff stated, in their recommendation in the Need
15 Hearing, that "no industry expert forecasts this to occur"
16 referring to a constant price differential. In this same
17 recommendation, the Staff concluded that "Staff finds
18 nothing unreasonable or inadequate with TECO's fuel price
19 forecast". While there may have been some concern on
20 Staff's part, they certainly did not indicate that Tampa
21 Electric's forecast predicting an ever widening
22 differential between coal and gas was unreasonable or
23 inadequate.

24
25 In addition, the Commission has supported Tampa Electric's

1 planning assumptions (including fuel) on numerous occasions
2 as outlined in Mr. Hernandez's rebuttal testimony in this
3 docket. While seemingly agreeing with Tampa Electric's
4 position on the trend in natural gas prices in other
5 dockets and publications, the Staff now challenges Tampa
6 Electric's forecast as being unreasonable based on a
7 hindsight analysis of a period with depressed pricing. The
8 direction taken by Staff in this case on fuel forecast
9 issues is inconsistent with previous statements made
10 throughout the period of Polk Unit One construction.
11 Staff's suggestion that Tampa Electric's forecasts are
12 unreasonable is without merit and difficult to understand
13 especially in light of the natural gas price trends
14 experienced in 1996 as previously discussed.

15
16 Q. How did Tampa Electric respond to the Commission's
17 statement in the 1991 Need Order that Tampa Electric should
18 pay close attention to the differential between the
19 forecast of coal and natural gas prices?

20
21 A. Following the Determination of Need Process, Tampa Electric
22 made an evaluation of the forecast methodology being used
23 at that time and made changes to its process of projecting
24 oil and natural gas prices. The change in methodology
25 incorporated the expanded use of inputs from a broader

1 group of forecast experts. This process modification
2 contributed to a lower price forecast for both oil and
3 natural gas than previously forecast, and therefore, a
4 correspondingly lower price differential between coal and
5 natural gas. Document No. 4 of my Rebuttal exhibit clearly
6 shows how Tampa Electric's forecast of the natural gas and
7 coal price differential was reduced over subsequent
8 forecast years as we incorporated this new methodology.
9 Mr. Breman stated on page 7 of his testimony that he did
10 "not know if TECO heeded the Commission's concerns". Tampa
11 Electric clearly paid close attention to those concerns and
12 specifically reacted by changing its forecast
13 methodologies. The resulting smaller differentials since
14 1991 provide clear evidence of Tampa Electric's response to
15 the Commission's concern.
16

17 Q. Mr. Ballinger asserts that Tampa Electric should have
18 considered cancellation of its Polk IGCC project based on
19 a sensitivity analysis using what Staff refers to as the
20 "acid test". How does the Staff's "acid test" sensitivity
21 differ from a fuel forecast like Tampa Electric's, that
22 incorporates fuel supply and demand fundamentals?
23

24 A. In Tampa Electric's Need Hearing, the "acid test" was
25 defined as a worst-case scenario calculated by forecasting

1 | prices four years into the future and holding the price
2 | differential calculated at that point, constant over the
3 | life of the IGCC. In this docket, the "acid test" has
4 | become an elusive and constantly changing sensitivity.
5 | Throughout the discovery process in this docket, Staff has
6 | requested that Tampa Electric analyze cost-effectiveness
7 | scenarios using four different "acid test" calculations.
8 | Each of these four different "acid tests" are different from
9 | the one which the Commission referenced in its 1991 Need
10 | Hearing. It's interesting to note, each successive "acid
11 | test" suggested by Staff dictated a lower coal/gas price
12 | differential.

13 |
14 | The acid test is not a forecast. It is merely a
15 | calculation. It arbitrarily assumes that events in the
16 | recent past will predict the long-term future. A
17 | calculation of this sort ignores all the critical factors
18 | that are considered in a prudent analysis of the most
19 | likely future.

20 |
21 | To base a future forecast solely on the last few years of
22 | actual data, which represent a period of oversupply in the
23 | gas market, and which ignores basic economic principles
24 | that will impact future gas pricing dynamics, would be
25 | imprudent. In addition, as Tampa Electric witness Mr.

1 Stephen Thumb describes, any assumption of a direct
2 relationship between the price of natural gas and the price
3 of coal is totally unfounded.

4
5 Q. Are you aware of any credible forecaster who is forecasting
6 a constant price differential between natural gas and coal
7 as assumed in the acid test?

8
9 A. No.

10
11 Q. Aside from the obvious flaws in the "acid test" previously
12 mentioned, is the coal and natural gas differential of
13 \$0.51 per million Btu cited in Mr. Breman's Exhibit (JEB-2)
14 reasonable?

15
16 A. No. Both the coal prices and the gas prices used in his
17 analysis are not applicable to specific prices that relate
18 to Tampa Electric Company nor should they be linked in any
19 manner.

20
21 Q. Why aren't the coal prices used in Mr. Breman's Exhibit
22 (JEB-2) applicable to Tampa Electric Company?

23
24 A. The coal prices used in Mr. Breman's exhibit represent
25 average coal costs from the Florida utilities as reported

1 on FERC Form 423. The prices are overstated because they
2 include higher priced long-term contracts that were put in
3 place when conditions were much different, and they also
4 include low and medium sulfur coal purchases that are more
5 expensive than high sulfur coals available to Tampa
6 Electric for use in the IGCC. In addition, there are also
7 transportation differences that are not considered.
8 Therefore the prices used in Mr. Breman's analysis do not
9 reasonably reflect the type of coal and coal prices that
10 should be used in any analysis for the Polk Power Station.

11
12 Q. Why aren't the natural gas prices used in Mr. Breman's
13 Exhibit (JEB-2) applicable to Tampa Electric?

14
15 A. The natural gas prices used in Mr. Breman's exhibit
16 represent average natural gas costs from the Florida
17 utilities as reported on FERC form 423. The prices include
18 costs for both firm contracts and as-available gas. They
19 include understated transportation costs that result from
20 contracts signed many years ago under Florida Gas
21 Transmission tariffs (i.e. FTS-1) which are no longer
22 available today to buyers seeking to deliver gas in the
23 future. Therefore, the prices used are not an accurate
24 reflection of the prices that would apply to what would be
25 available to the Polk Power Station. The natural gas

1 prices used in his calculation of the \$0.51 per million Btu
2 by Mr. Breman are inappropriately low.

3
4 Q. Given that the Staff's acid test is inappropriate, what
5 would be the correct historical differential between coal
6 and natural gas if you used data applicable to Tampa
7 Electric Company?

8
9 A. Document No. 5 of my exhibit shows a widening differential
10 between the two prices. This is because Tampa Electric's
11 high sulfur coal prices, as reported to the FPSC since
12 1991, have declined and as-available natural gas prices
13 into FGT have increased.

14
15 Although it is inappropriate to base a forecast solely on
16 recent actual data, this recent actual data clearly refutes
17 Mr. Breman's testimony that the coal and natural gas
18 differential will be a constant \$0.51 per million Btu.

19
20 Q. Why did Tampa Electric Company choose to use an assumption
21 of as-available natural gas in evaluating the combined
22 cycle alternative rather than a firm natural gas supply in
23 its cost-effectiveness evaluations for Polk Unit One?

24
25 A. Tampa Electric believed it was obvious that firm gas

1 transportation for a combined cycle unit on the Polk site
2 was cost prohibitive based upon expected low capacity
3 factors for a combined cycle or combustion turbine as
4 dispatched on our system. As Mr. Hernandez describes in
5 his rebuttal testimony, Tampa Electric performed an
6 analysis of firm versus as-available natural gas combined
7 with light oil to verify the prudence of this assumption.
8 The analysis resulted in projected savings using the as-
9 available gas option compared to an option using firm gas,
10 of \$50-75 million dollars (CPW\$96) and verifies Tampa
11 Electric's planning assumptions. This significant
12 difference is generated by the relatively low capacity
13 factor which would be achieved by a natural gas-fired
14 combined cycle on Tampa Electric's system along with the
15 resulting impact of high take-or-pay charges for firm gas.

16
17 **Q.** Did Tampa Electric include, as part of its analysis of firm
18 versus as-available natural gas the possibility of selling
19 unused gas transportation capacity in the secondary market?

20
21 **A.** Tampa Electric's need for natural gas transportation in a
22 combined cycle unit on the Polk site would exist as the
23 very times that the gas transportation would be in the
24 greatest demand by others. Conversely, any excess gas
25 transportation capacity that might be sold into the

1 secondary market would be available at times of the lowest
2 demand. Under these circumstances, one could not
3 reasonably assume that there would be a viable market for
4 the excess gas transportation.

5
6 Q. Is it reasonable for a utility to purchase firm gas
7 transportation capacity which will not be utilized in a low
8 capacity factor combined cycle unit on the chance that the
9 excess transportation capacity can be sold?

10
11 A. No. It is not reasonable for any utility to make long-term
12 commitments for the purchase of firm natural gas for use in
13 low capacity factor units on the expectation that the
14 utility may be able to market the excess gas transportation
15 into the secondary market. At best, sellers often are
16 required to sell excess gas at prices below their cost, if
17 the gas transportation can be sold at all. In many cases,
18 the firm natural gas purchasers are simply required to
19 absorb the cost for the unused capacity.

20
21 Q. Mr. Breman testified regarding concerns that trucking,
22 transloading, short haul rail and special barge
23 requirements to get petroleum coke to transfer facilities
24 and to the Polk Power Station may represent potential
25 "hidden costs" in the use of petroleum coke. What validity

1 is there to these comments?
2

3 **A.** There is no validity to Mr. Breman's concerns about
4 transportation costs of petroleum coke. Our Polk Unit One
5 trucking contract explicitly includes both petroleum coke
6 and coal as fuels to be transported. There is no cost
7 difference, except for the fact that petroleum coke, being
8 higher in heat content, will require fewer tons, and
9 thereby reduce transportation costs.

10
11 Our contract for water delivery does not differentiate
12 between petroleum coke and coal, so barging and
13 transportation costs will not change, except for the
14 additional heat content benefit. Petroleum coke is
15 commonly handled and has been for years without difficulty
16 or unknown expenses. Additionally, petroleum coke has been
17 and currently is being delivered to our Big Bend Station
18 without creating problems or unexpected expenses.

19
20 Tampa Electric has been purchasing petroleum coke delivered
21 direct from refineries and through its coal transportation
22 system at comparable delivered prices, and at prices lower
23 than those assumed in our analysis. There is no evidence
24 to suggest we would incur additional or hidden costs.
25

1 Q. Does this conclude your testimony?

2

3 A. Yes.

4

TAMPA ELECTRIC COMPANY
DOCKET NO. 960409-EI
WITNESS: SMITH
EXHIBIT NO. _____ (HWS-2)

TAMPA ELECTRIC COMPANY
REBUTTAL EXHIBIT OF HUGH W. SMITH

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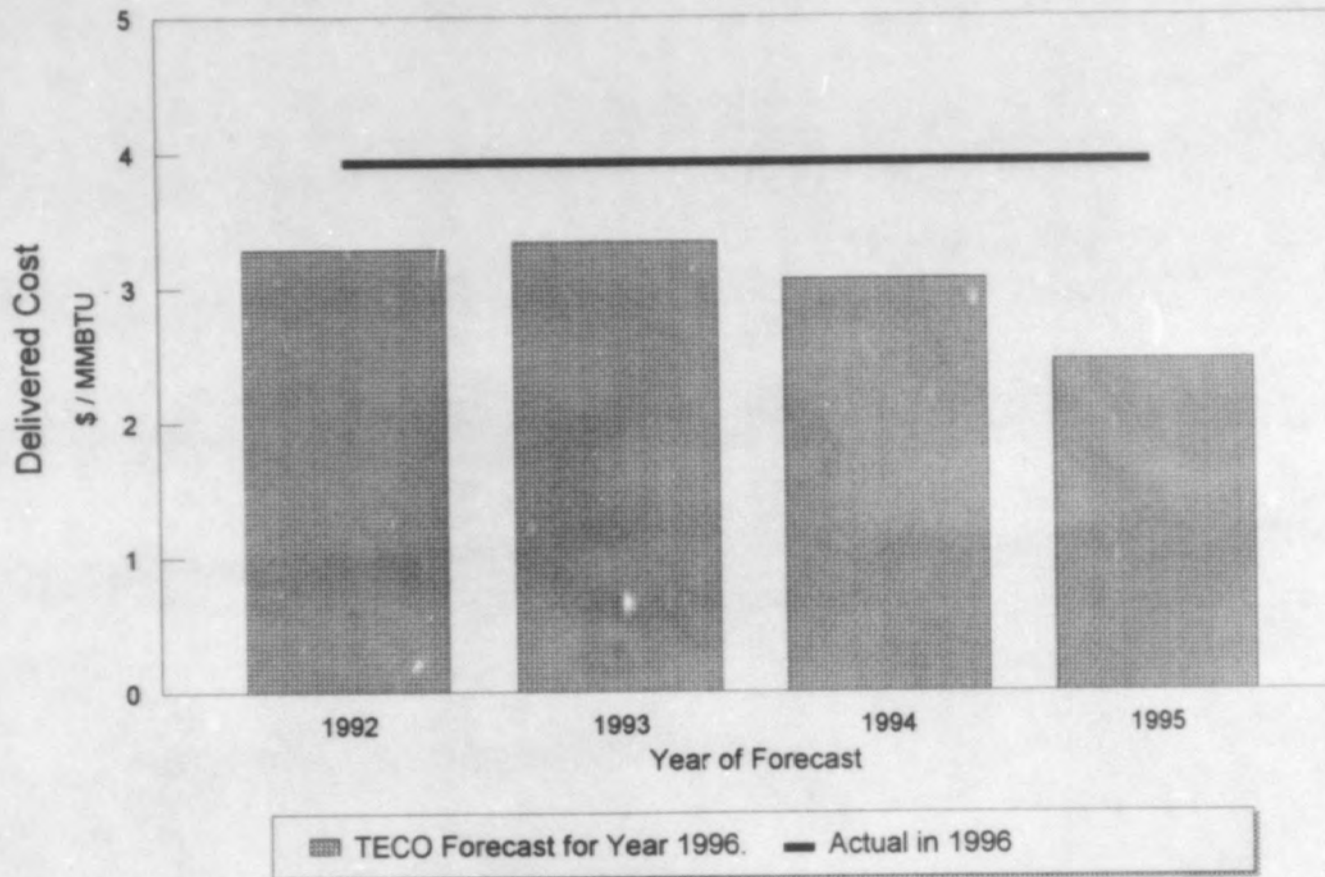
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TAMPA ELECTRIC COMPANY
DOCKET NO. 960409-EI
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EXHIBIT NO. _____ (HWS-2)
DOCUMENT NO. 1
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DOCUMENT NO. 1
(3 PAGES)

Actual vs. Tampa Electric Company Forecast
Gas Price Comparison

Actual vs. TECO Forecast Gas Price Comparison



2

1. Source of data is the TECO Forecasts and published pricing in Natural Gas Week (June 24, 1996) for the months January through May.
2. Each bar represents TECO's forecast for year 1996 forecasted in years 1992 through 1995.

TECO Forecast vs. Actual Gas Price Comparison Year 1996

Year of Forecast	Forecast for 1996	1996 Actual
1992	3.28	3.93
1993	3.34	3.93
1994	3.06	3.93
1995	2.45	3.93

Source of data is the TECO Forecasts and published pricing in Natural Gas Week (June 24, 1996) for the months January through May.

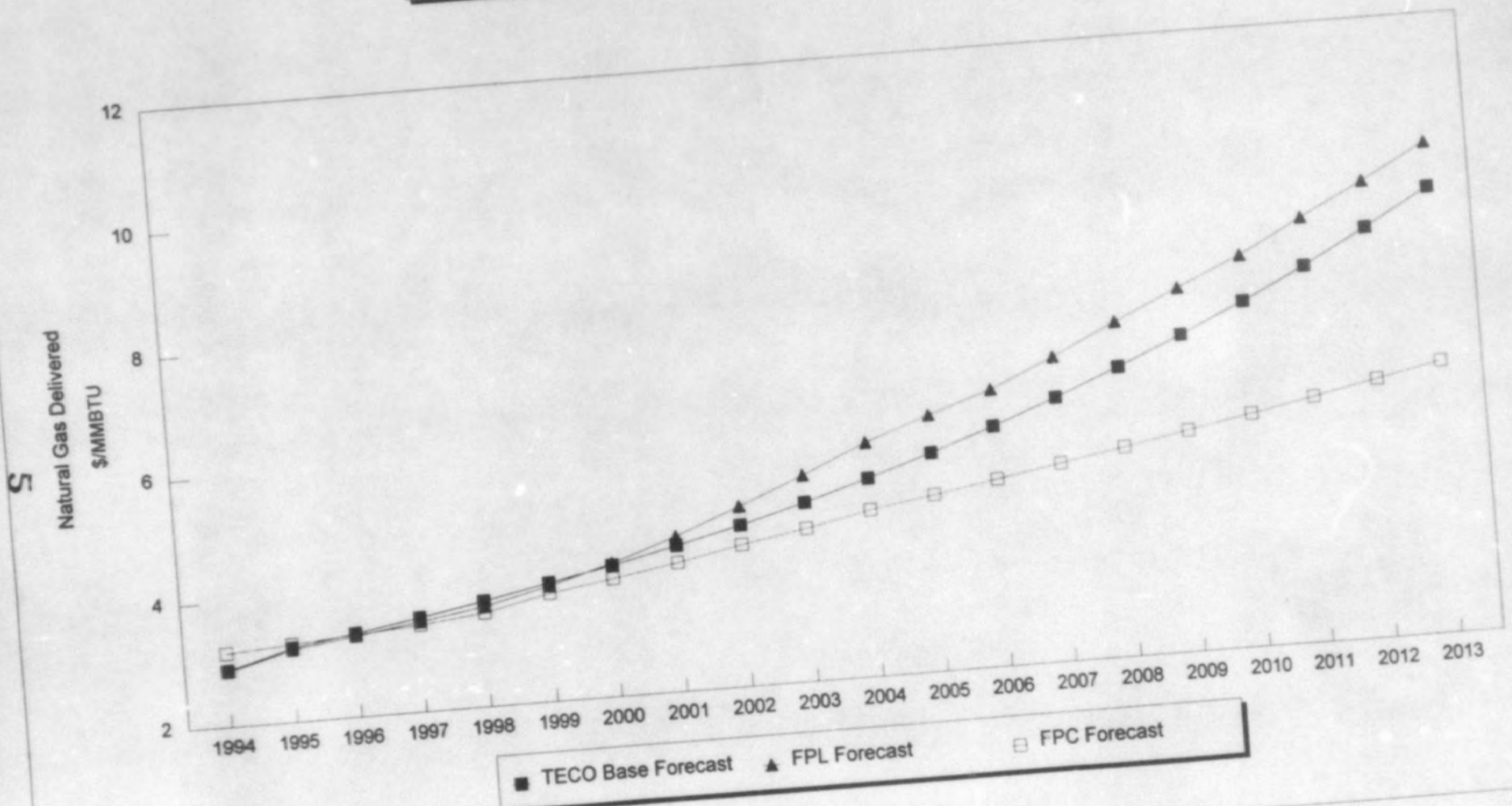
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DOCUMENT NO. 2
(4 PAGES)

Utility Natural Gas Forecast Comparison

1993 Utility Natural Gas Forecast Comparison

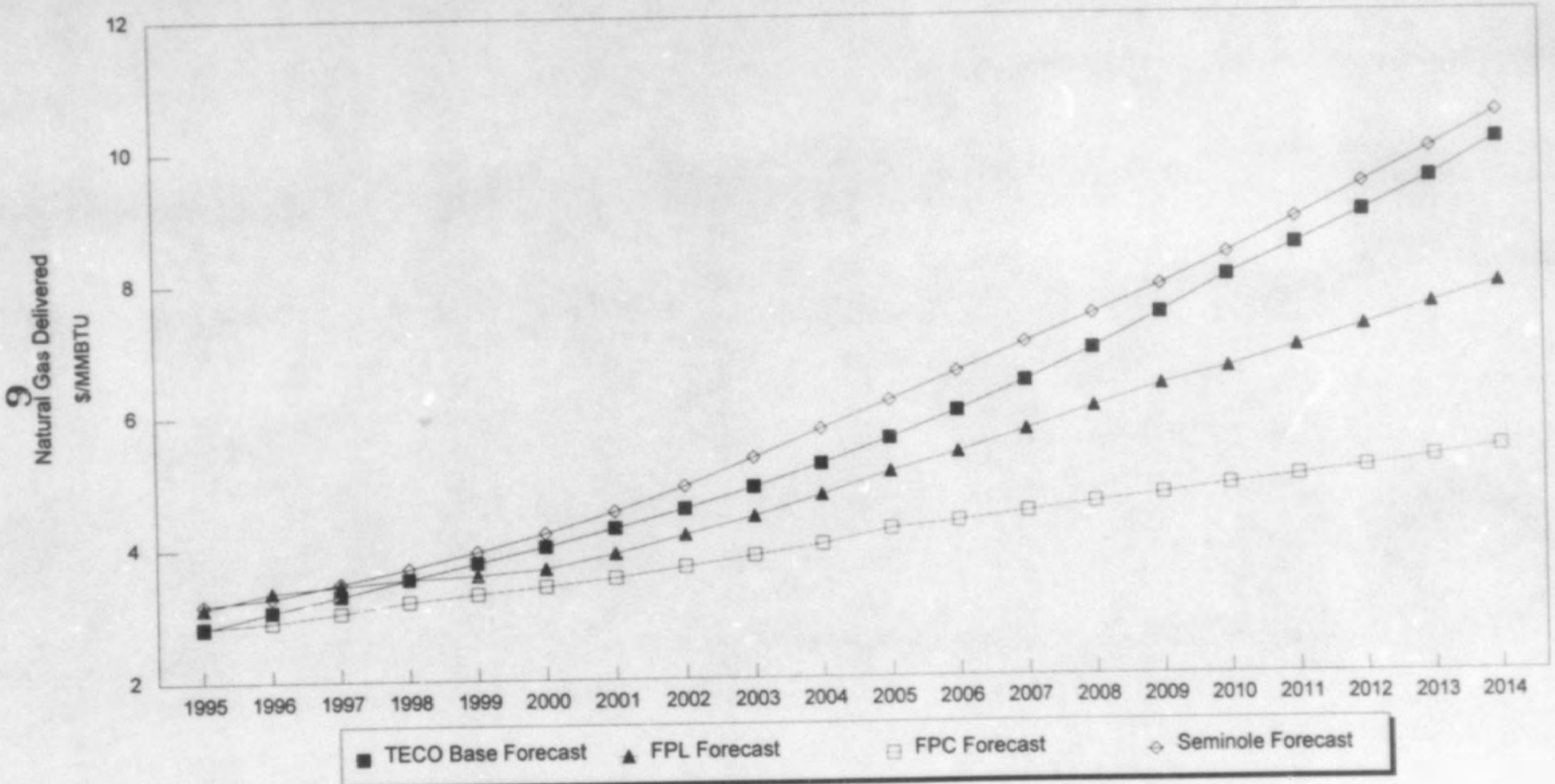
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Data Source: PSC Supplemental Data Request for Ten Year Site Plans

1994 Utility Natural Gas Forecast Comparison

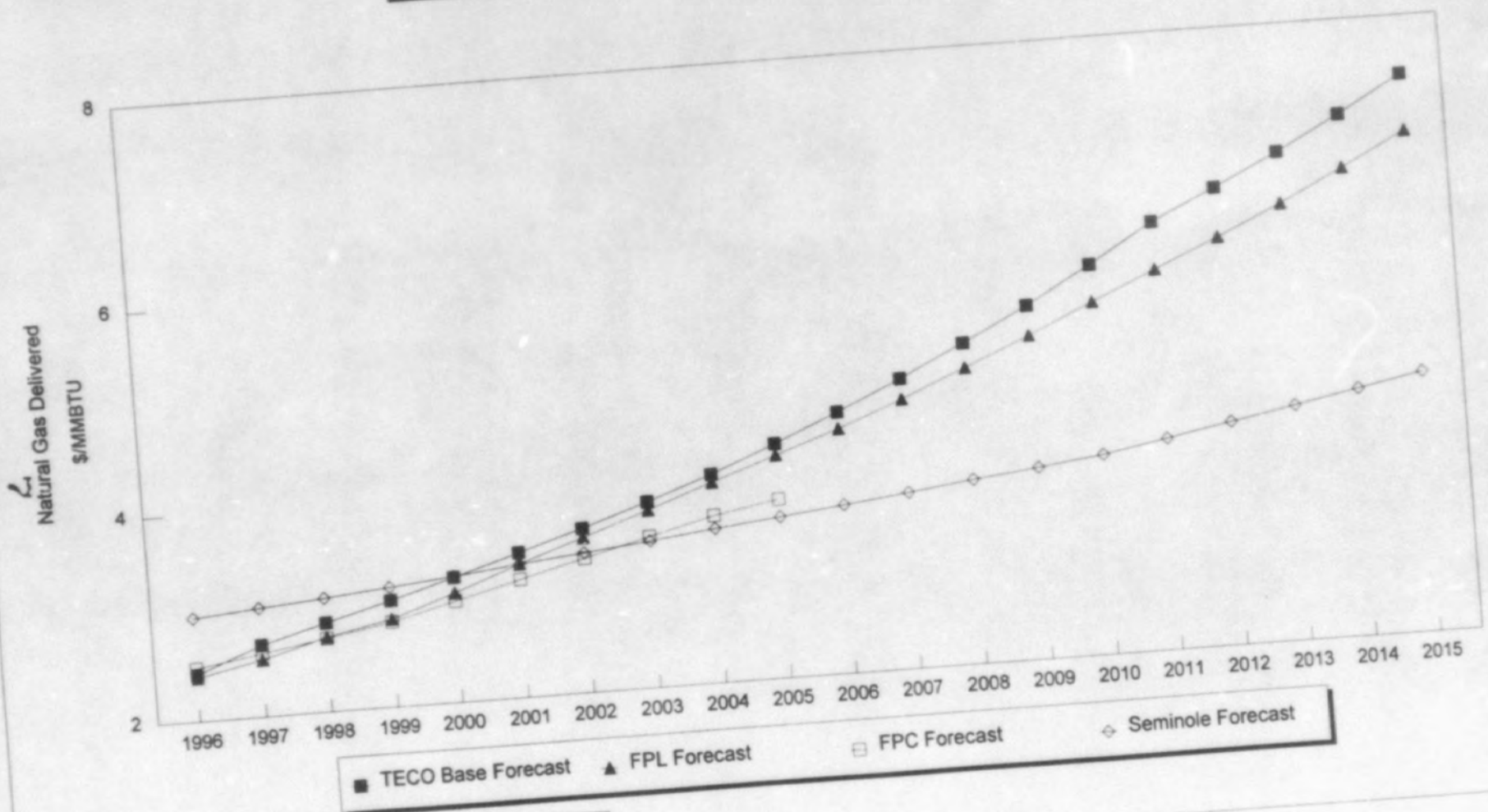
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Data Source: PSC Supplemental Data Request for Ten Year Site Plans

1995 Utility Natural Gas Forecast Comparison

Delivered



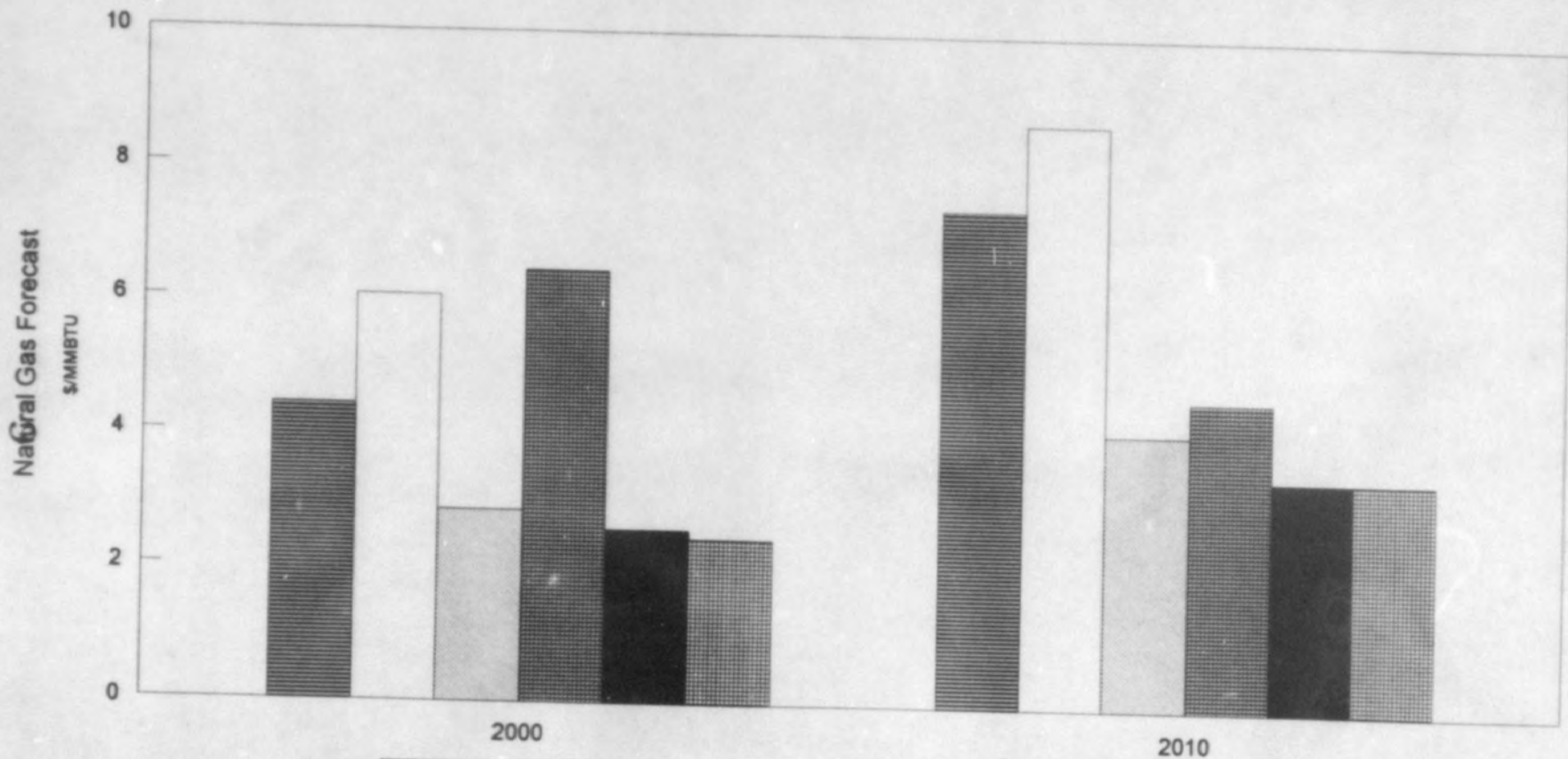
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DOCUMENT NO. 3
(6 PAGES)

Industry Natural Gas Wellhead Forecast Comparison

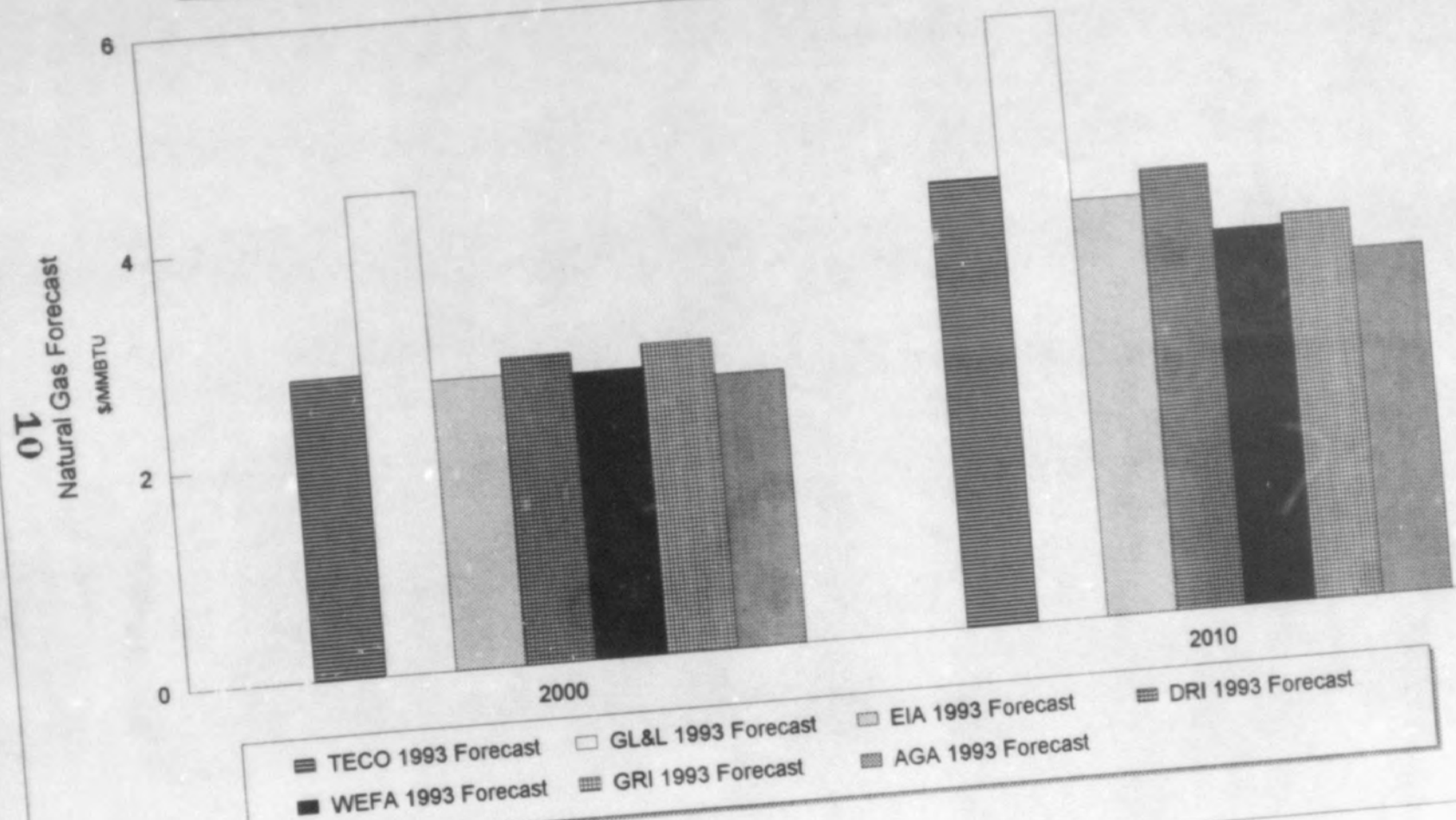
1992 Industry Natural Gas Wellhead Forecast Comparison



TECO 1992 Forecast
 GL&L 1992 Forecast
 EIA 1992 Forecast
 DRI 1992 Forecast
 WEFA 1992 Forecast
 GRI 1992 Forecast

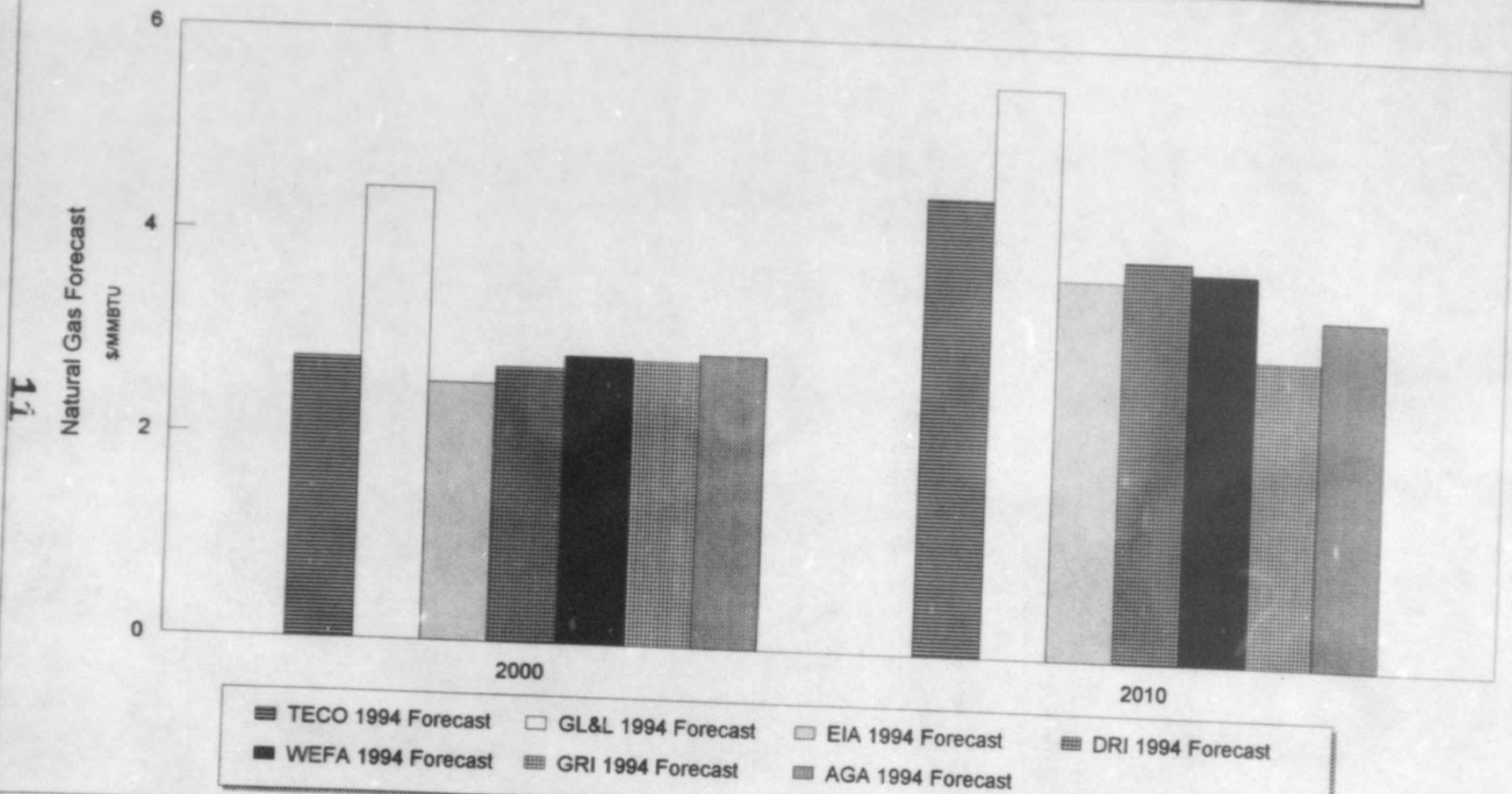
Forecasts are in Constant Year Dollars

1993 Industry Natural Gas Wellhead Forecast Comparison



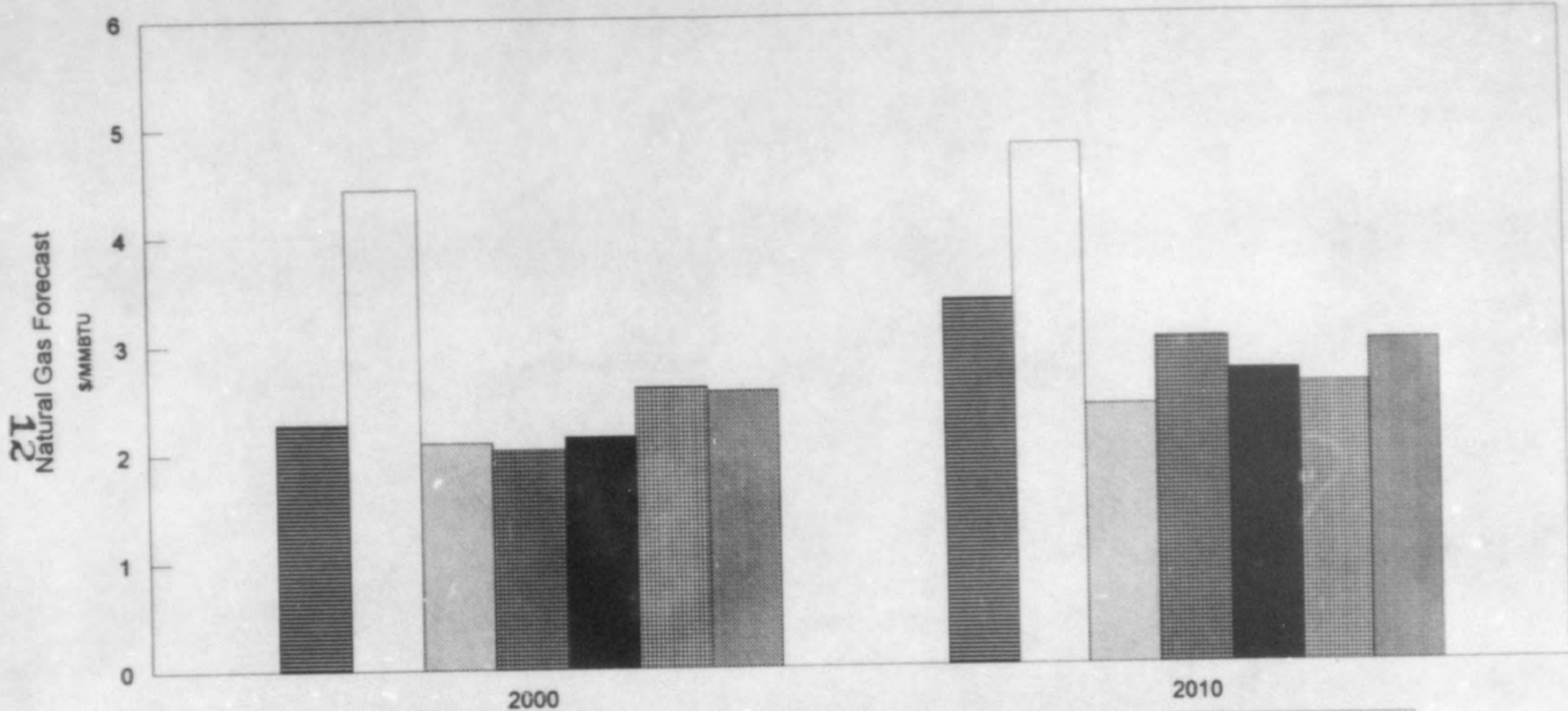
Forecasts are in Constant Year Dollars

1994 Industry Natural Gas Wellhead Forecast Comparison



Forecasts are in Constant Year Dollars

1995 Industry Natural Gas Wellhead Forecast Comparison



TECO 1995 Forecast
 GL&L 1995 Forecast
 EIA 1995 Forecast
 DRI 1995 Forecast
 WEFA 1995 Forecast
 GRI 1995 Forecast
 AGA 1995 Forecast

Forecasts are in Constant Year Dollars

Forecast Comparison Data
(\$/MMBTU Wellhead)

1992 Forecasts								1993 Forecasts							
Year	TECO Base	AEO92	DRI	WEFA	GRI	AGA	Groppe	Year	TECO Base	AEO93	DRI	WEFA	GRI	AGA	Groppe
2000	4.42	2.85	6.44	2.57	2.45	2.47	6.05	2000	2.78	2.69	2.84	2.65	2.86	2.53	4.44
2010	7.42	4.10	4.60	3.45	3.44	3.73	8.71	2010	4.12	3.85	4.08	3.47	3.57	3.21	5.60

1994 Forecasts								1995 Forecasts							
Year	TECO Base	AEO94	DRI	WEFA	GRI	AGA	Groppe	Year	TECO Base	AEO95	DRI	WEFA	GRI	AGA	Groppe
2000	2.76	2.54	2.71	2.83	2.81	2.89	4.44	2000	2.28	2.10	2.03	2.14	2.60	2.55	4.44
2010	4.50	3.74	3.95	3.85	3.01	3.43	5.60	2010	3.37	2.39	3.00	2.70	2.57	2.96	4.80

Data Source: AEO, DRI, WEFA, GRI, and AGA forecasts are from the Department of Energy Energy Information Administration's Annual Energy Outlook publication for years 1992, 1993, 1994, and 1995. Groppe, Long & Little forecast data are from the July 8, 1992 Analysis and Forecast prepared for TECO Energy, Inc. the November, 1993 Analysis and Forecast prepared for TECO Energy, Inc. the September 2, 1994 30-yr Price Forecast prepared for Tampa Electric Company, and the August 21, 1995 30-yr Price Forecast prepared for Tampa Electric Company.

TAMPA ELECTRIC COMPANY
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EXHIBIT NO. _____ (HWS-2)
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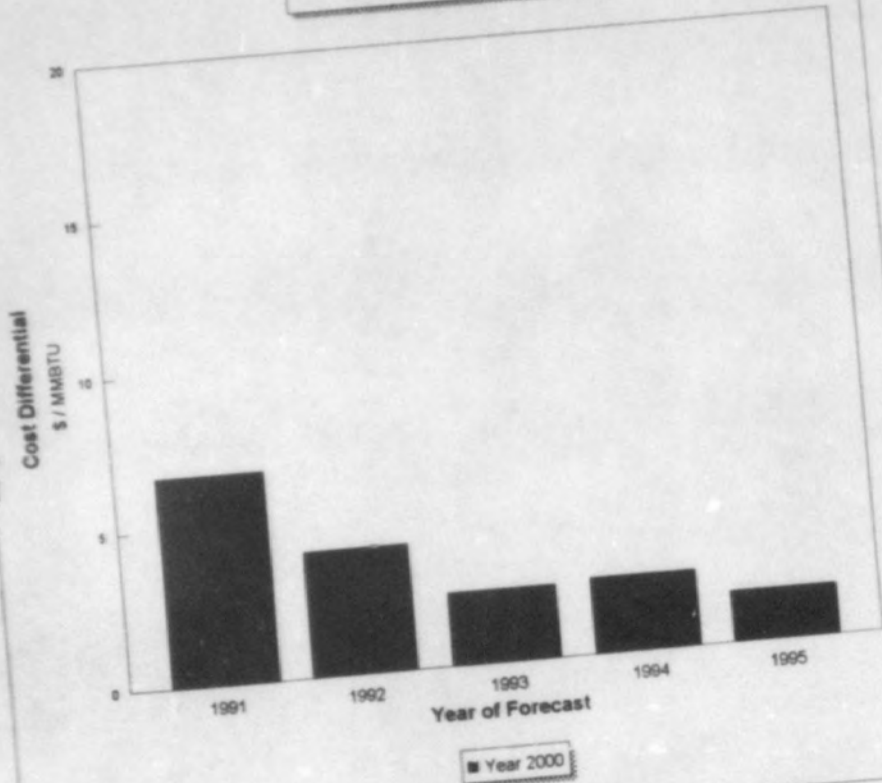
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(3 PAGES)

Cost Differential - TECO Gas and Coal Forecast

15

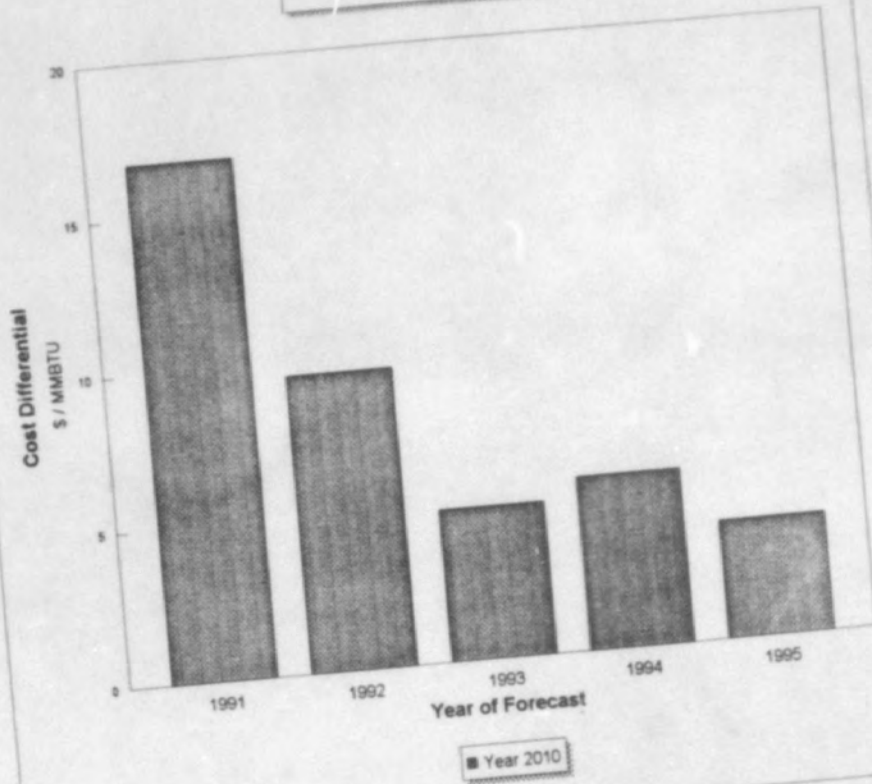
Cost Differential

TECO Gas and Coal Forecasts



Cost Differential

TECO Gas and Coal Forecasts



Source of data is the TECO 1991, 1992, 1993, 1994, and 1995 Coal and Natural Gas forecasts. Cost differentials are calculated from forecast delivered pricing for Coal and Natural Gas for the years 2000 and 2010.

**Gas / Coal Cost Differential
(\$/MMBTU)**

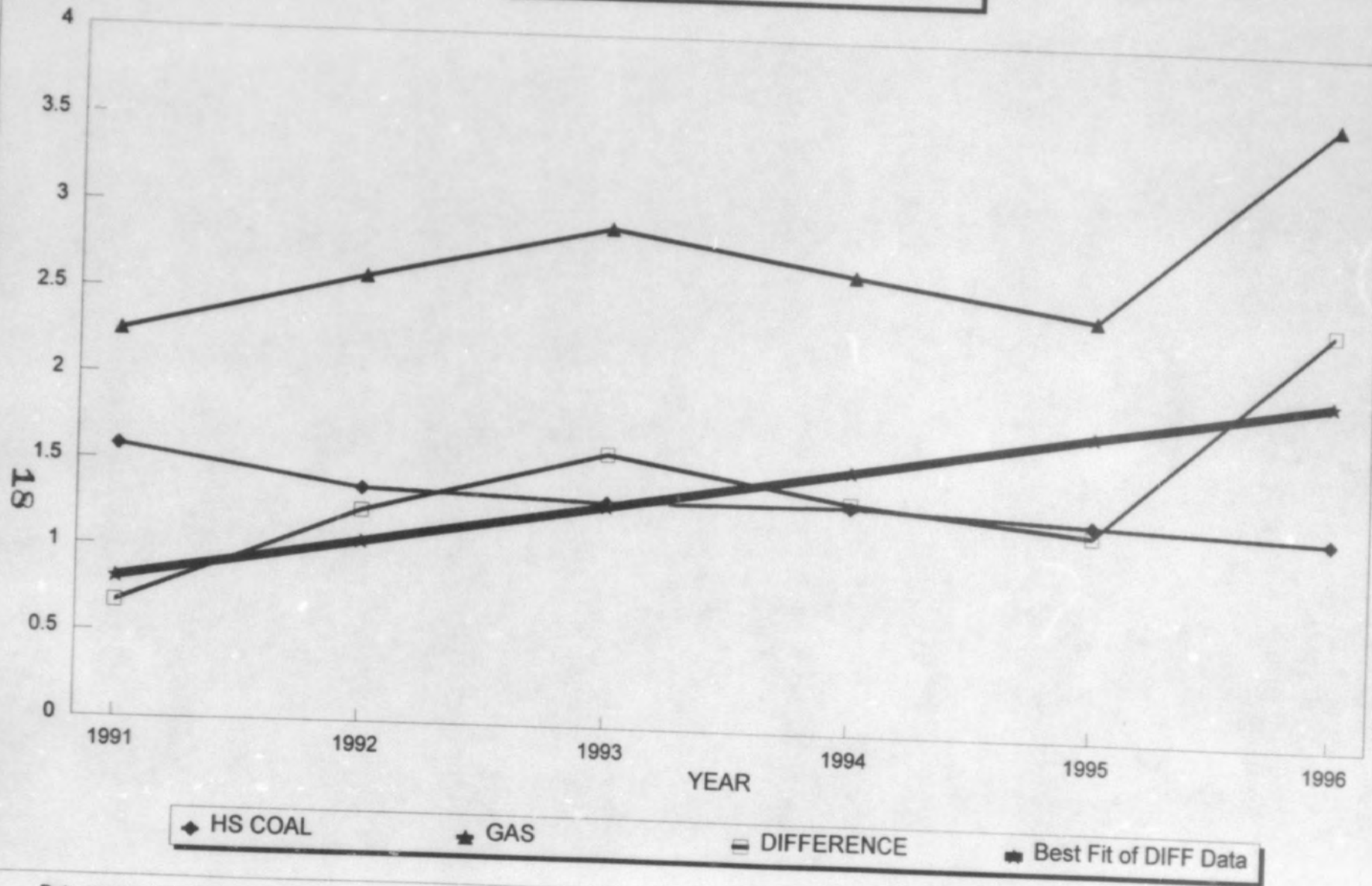
Year of Forecast	Forecast in Year 2000	Forecast in Year 2010
1991	6.72	16.76
1992	4.01	9.61
1993	2.34	4.92
1994	2.44	5.62
1995	1.66	3.81

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Actual Tampa Electric Coal & Gas Prices

Actual Coal & Gas Prices



Data source: High Sulfur Coal prices from Tampa Electric Company FPSC Supplemental Data Request, Review of Ten Year Site Plan. Natural gas pricing from Natural Gas Week.

Actual Coal & Gas Prices

YEAR	TECO HS Coal	TECO GAS	DIFF	2 Yr Rolling Avg.
1991	1.58	2.25	0.67	0.950
1992	1.36	2.59	1.23	1.410
1993	1.31	2.90	1.59	1.465
1994	1.32	2.66	1.34	1.265
1995	1.25	2.44	1.19	1.800
1996	1.19	3.60	2.41	

Regression Output:

Constant	-473.048
Std Err of Y Est	0.410573
R Squared	0.595161
No. of Observations	6
Degrees of Freedom	4
X Coefficient(s)	0.238
Std Err of Coef.	0.098146

Data Plot ↗

$Y = 0.238 X - 473.048$

1991	0.810
1992	1.048
1993	1.286
1994	1.524
1995	1.762
1996	2.000
2000	2.952
2010	5.332