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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:

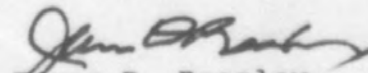
Enclosed for filing in the above docket on behalf of Tampa  
Electric Company are fifteen (15) copies of each of the following:

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

ACK  1  
 AFA 3  
 APP \_\_\_\_\_  
 CAF \_\_\_\_\_  
 CMU \_\_\_\_\_  
 CTR \_\_\_\_\_  
 (EAG) Dudley  
 LEG 1  
 LIN 5 JDB/pp  
 OPC \_\_\_\_\_ Enclosures

RCH cc: All Parties of Record (w/encls.)

SEC 1 RECEIVED & FILED

WAS [Signature]

OTM [Signature] BUREAU DE RECORDS

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# TAMPA ELECTRIC COMPANY

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

REBUTTAL TESTIMONY  
AND EXHIBITS OF

## CHARLES R. BLACK

DATE OF RECEIPT

07020 JUL-18

FPSC-RECORDS/REPORTING

1                                   BEFORE THE PUBLIC SERVICE COMMISSION

2   PREPARED REBUTTAL TESTIMONY

3   OF

4   CHARLES R. BLACK

5

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

7

8   A.   My name is Charles R. Black. My business address is 702  
9       North Franklin Street, Tampa, Florida 33602. I am Vice  
10      President-Project Management 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 in support of your rebuttal  
18       testimony?

19

20   A.   Yes. Rebuttal exhibit of Charles R. Black Exhibit No. \_\_\_  
21       \_\_\_ (CRB-2) consisting of 3 documents has been prepared  
22       under my direction and supervision.

23

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

25

1 A. The purpose of my testimony is several fold. First I will  
2 explain the serious flaws in Mr. Larkin's assertion that  
3 Tampa Electric did not build the plant that was approved by  
4 the Commission in Order No. PSC-92-0002-FOF-EI (the "Need  
5 Order" or "Order 92-0002"). In particular, I will explain  
6 why his concerns over changes in the construction schedule  
7 are misplaced. Next, I will explain why Mr. Ballinger's  
8 concerns about the bidding process used for the Polk IGCC  
9 Project and the difference between the Need Order estimate  
10 and the current estimate are groundless. Finally, I will  
11 explain why Mr. Breman's concerns regarding the viability  
12 of petroleum coke as a feedstock for the Polk IGCC Unit are  
13 not justified by the facts.

14  
15 Rebuttal of Mr. Hugh Larkin Jr. (OPC)

16  
17 Q. In his testimony, Mr. Larkin implies that Tampa Electric  
18 did not build the IGCC unit approved in the Need Order.  
19 Please describe your understanding of the IGCC unit that  
20 was approved in the Need Order.

21  
22 A. The Commission approved, in the Need Order, the  
23 construction of an Integrated Gasification Combined Cycle  
24 ("IGCC") Unit. The size of the approved unit was to be 220-  
25 260 MW with a heat rate of 8486-9060 BTU/KWH. The

1 integrated unit was to be placed in service in 1996 with  
2 the flexibility to bring the 150 MW combustion turbine into  
3 service in 1995 if, as was expected at the time of the Need  
4 Order, additional capacity was required to maintain system  
5 reliability in 1995. Since only preliminary engineering  
6 had been done at the time of the Need Order, clearly, the  
7 Need Order did not approve a particular detailed design.  
8 I believe the Commission expected Tampa Electric to build  
9 the unit described above exercising good project management  
10 to provide the most cost-effective unit for our customers.  
11 That is what Tampa Electric has done. As should be  
12 expected on a project utilizing new technology, it has been  
13 necessary to make adjustments in the unit's design and  
14 schedule to deal with eventualities that could not have  
15 been known at the time of the Need Order. However, these  
16 adjustments have not affect the unit's basic design.  
17

18 Q. Mr. Larkin asserts that Tampa Electric did not build the  
19 IGCC Unit approved by the Commission in the Need Order due  
20 to the fact that the generation capacity was not phased,  
21 that the size of the Hot Gas Clean Up System was changed,  
22 the basis for sulfur recovery was changed, and his  
23 assertion that the potential funding from the Electric  
24 Power Research Institute ("EPRI") did not occur. Do you  
25 agree with Mr. Larkin's conclusion that this represents a

1 material change to what the Commission approved?

2  
3 A. No. I can find no credible basis for Mr. Larkin's  
4 conclusions. His assertions may be the result of his lack  
5 of experience in the areas of engineering and construction  
6 of complex power plants based upon the review of his  
7 credentials presented in his testimony. I will address Mr.  
8 Larkin's concerns individually.

9  
10 Mr. Larkin states, on page 5 of his testimony that Tampa  
11 Electric did not bring the combustion turbine on first. I  
12 do not believe that Mr. Larkin understands the  
13 circumstances that caused Tampa Electric to propose the  
14 phased approach or its options in completing construction  
15 of the IGCC in 1996. His conclusions that by moving from  
16 a phased approach to an integrated approach Tampa Electric  
17 "...eliminated the option of completing the unit as a  
18 combined cycle..." is seriously flawed and simply wrong.

19 Tampa Electric's objective in placing the 150 MW combustion  
20 turbine into service in 1995 was not because the sequencing  
21 of the construction of plant components required it. Nor  
22 was it the most cost-effective method to implement the  
23 overall IGCC Unit. The phased approach was proposed to  
24 satisfy a system reliability need which we projected to  
25

1 exist at the time of the Need Order. As described in Mr.  
2 Hernandez's rebuttal testimony, in 1993, Tampa Electric  
3 determined that the integrated construction was the most  
4 cost-effective approach.

5  
6 Tampa Electric had also determined that due to the very  
7 extensive requirements of the Environmental Impact  
8 Statement, we expected that the environmental permits  
9 required to initiate construction were going to be obtained  
10 later than we anticipated. This situation was further  
11 complicated by the DOE's request to transfer Federal lead  
12 agency status from the DOE to the EPA. The actual delay in  
13 receiving those necessary permits was about 8 months.

14  
15 Given both these facts, Tampa Electric decided to defer the  
16 in-service date of the 150 MW combustion turbine to  
17 coincide with the integrated project. As described in Mr.  
18 Hernandez's rebuttal testimony, this deferral provided  
19 several benefits to our customers. The revenue  
20 requirements associated with additional plant in-service  
21 were deferred for one year. Additionally, constructing the  
22 unit as an integrated facility, as opposed to a phased  
23 facility, resulted in an overall savings to the project  
24 cost. Customers benefited from both deferred revenue  
25 requirements and a lower ultimate plant cost while having

1 no adverse affect on the reliability of their service.  
2 This explains why the schedule for placing the capacity in-  
3 service was modified.

4  
5 Q. Further, on page 13 and 14 of Mr. Larkin's testimony, he  
6 states that by ignoring Tampa Electric's original proposal  
7 to construct the unit in two phases and by proceeding to  
8 construct the coal gasifier "from the beginning", Tampa  
9 Electric eliminated the option of completing the combined  
10 cycle unit since these fixed costs were invested up front  
11 rather than at the end of the project. Did the schedule  
12 modification have any impact on Tampa Electric's options in  
13 the timing of the construction of gasification related  
14 assets?

15  
16 A. No. The schedule modification had absolutely no impact on  
17 options Tampa Electric may have had to change the  
18 generation technology for Polk Unit One after the Need  
19 Order.

20  
21 The group of activities that determine the minimum duration  
22 required to place an IGCC Unit into service have always  
23 been associated with the permitting for the overall  
24 facility and the engineering, procurement and construction  
25 of the gasification portion of the plant. The initial



1 project schedule indicated that the duration from the time  
2 Tampa Electric received the Need Order to the time that the  
3 IGCC Unit was placed in-service was approximately 51  
4 months. The engineering, procurement and construction of  
5 the gasification facilities set the overall duration of the  
6 construction schedule. The combustion turbine in-service  
7 date could have been accomplished anytime between month 39  
8 and month 51 of the overall project schedule. The timing  
9 of the combustion turbine in-service date, within that  
10 window, had no impact on the timing of the engineering and  
11 procurement commitments for the gasification systems.

12  
13 Q. Mr. Larkin points out, on page 13 of his testimony, that  
14 Tampa Electric was incurring steam and combustion turbine  
15 cost before it started incurring gasification-related cost.  
16 Is this an accurate characterization?

17  
18 A. Mr. Larkin's conclusions in this regard are incorrect. Mr.  
19 Larkin has apparently misread my deposition exhibits. The  
20 cost incurred for the gasification assets involve both  
21 direct and indirect costs. Tampa Electric did incur  
22 indirect cost for the gasification systems early in the  
23 project at the same time as combustion turbine and steam  
24 turbine costs. As I have described above, Tampa Electric  
25 was required to expend engineering effort and to make

1 procurement commitments very early in the project. I  
2 believe that Mr. Larkin's conclusions seem to be based on  
3 a lack of understanding of what our actual commitments  
4 were.

5  
6 Q. If Tampa Electric had proposed, at the Need Hearing, to  
7 place the entire 250 MW IGCC facility in-service in mid-  
8 1996, would the required schedule for commitments and  
9 expenditures for the gasification portion of the plant be  
10 any different from the plan that called for 150 MW to be  
11 placed in service in 1995?

12  
13 A. No. Timing of commitments and expenditures for the  
14 gasification facilities would be exactly the same.

15  
16 Q. Did the deferral of the 150 MW combustion turbine eliminate  
17 the option of completing the unit as a combined cycle as  
18 Mr. Larkin suggests?

19  
20 A. No, it did not. However, the absolute requirement that  
21 commitments and expenditures for the construction of  
22 gasification assets began to impact the cost-effectiveness  
23 of this option from the outset. Mr. Larkin seems to be  
24 saying that Tampa Electric should have placed in service  
25 the 150 MW combustion turbine, without spending the first

1 dollar for the IGCC facilities and then Tampa Electric  
2 could have analyzed the situation in mid-1995 without any  
3 gasification-related sunk cost assigned to the combined  
4 cycle. This concept is neither practical nor cost-  
5 effective for several reasons. The construction sequence  
6 that Mr. Larkin suggested is technically impossible. As I  
7 have described above, the critical path activities for the  
8 Polk Power Station have always been tied directly to the  
9 gasification portion of the plant. In the first instance  
10 the combustion turbine had to be designed from the  
11 beginning to ultimately accommodate the later syngas  
12 firing. In addition to gasification engineering and  
13 design, the manufacture of the actual gasification  
14 equipment had the longest lead time of any of the plant's  
15 major equipment. There was no feasible way to defer  
16 commitments for gasification capability to mid-1995 and  
17 then be able to place the IGCC facility in-service in 1996.  
18 The necessary time required to implement an IGCC facility  
19 is discussed in a letter from Bechtel Power  
20 Corporation, (attached as Document No. 1 of my rebuttal  
21 exhibit) and is consistent with the 51-month duration  
22 discussed above.

23 Finally, the Commission did specifically condition its Need  
24 Order upon Tampa Electric securing approximately \$120  
25

1 million in funding from the U.S. Department of Energy. As  
2 Mr. Bechtel testified at the Need Hearing, the timing of  
3 the Polk IGCC project was critical to the DOE's commitment  
4 to provide the funding. Therefore, in order for Tampa  
5 Electric to comply with the Commission's requirement to  
6 specifically insure DOE funding, it was absolutely  
7 necessary to engineer, design, commit and expend funds for  
8 the integrated facility, in a manner that caused the  
9 complete integrated facility to be placed in service in  
10 1996, which is exactly what the company did.

11  
12 Q. Mr. Larkin's basic premise is that had Tampa Electric  
13 constructed the IGCC unit in a phased manner, the company  
14 would have had an opportunity to change generation  
15 technology without incurring any gasification-related sunk  
16 costs. Do you agree?

17  
18 A. No. Mr. Larkin's basic premise is flawed. Under either a  
19 phased or an integrated approach, we would not have had the  
20 opportunity to change technology without incurring  
21 significant gasification-related sunk costs.

22  
23 Q. Mr. Larkin implies that the change in the size of the Hot  
24 Gas Clean-Up system represented a significant change from  
25 the unit the Commission approved. Do you agree with this

1 conclusion?

2  
3 A. No. The Hot Gas Clean-Up System size was changed from 120  
4 MW to about 25 MW. It has always been the case that the  
5 Hot Gas Clean-Up System technology was the most  
6 developmental in the plant. That is why the prudent  
7 decision was made to have a 100% capacity Cold Gas Clean-Up  
8 system. From the inception of the project, the Polk One  
9 unit has always been capable of obtaining full capacity  
10 even with the Hot Gas Clean-Up system out of service.  
11 Therefore, the amount of syngas treated by the Hot Gas  
12 Clean-up System does not affect the cost-effectiveness of  
13 the IGCC Unit described by the Need Order. The Need Order  
14 did represent that it was explicitly conditioned upon Tampa  
15 Electric receiving \$120 million of funding from the DOE.  
16 It is important to note that the DOE fully supported Tampa  
17 Electric's decision to reduce the size of the Hot Gas  
18 Clean-Up system. In fact, the DOE continued to provide the  
19 full funding support. Tampa Electric and the DOE agree  
20 that the current size of the Hot Gas Clean-Up system will  
21 produce the same level of technical data and results as the  
22 larger system. The system also retains the capability of  
23 providing operating benefits to the Polk IGCC unit if the  
24 Hot Gas Clean-Up system is proved to be successful. The  
25 change in the size of the Hot Gas Clean-Up system that Mr.

1 Larkin suggests is a big change is nothing more than a  
2 design adjustment to test the Hot Gas Clean-Up capability  
3 more cost-effectively.

4  
5 Q. Mr. Larkin characterized the change in the method of sulfur  
6 recovery as being inconsistent with the unit the Commission  
7 approved in the Need Order. Do you agree?

8  
9 A. No. Mr. Larkin points out that the original design  
10 provided for sulfur recovery in the form of elemental  
11 sulfur. Recovery as elemental sulfur is the standard  
12 method generally utilized for gasifiers used in industry  
13 today. However, due to Tampa Electric's unique proximity  
14 to phosphate based fertilizer production facilities which  
15 utilize very large amounts of sulfuric acid, Tampa Electric  
16 determined that recovery of sulfur in the form of sulfuric  
17 acid was a more cost-effective solution. This design  
18 change resulted in a lower capital cost for the Polk IGCC  
19 unit and also assured that there was a ready market for our  
20 sulfur byproduct. This change had no impact at all on any  
21 of the basic functions of the IGCC unit. In fact, this  
22 change in by-product form increased the value of the by-  
23 product. Based upon current pricing, we would expect to  
24 get about three times as much revenue for sulfuric acid  
25 than we would have for elemental sulfur on a per pound of

1 sulfur recovered basis.

2  
3 Q. Do you agree with Mr. Larkin's assertion that since the  
4 potential EPRI funding referenced in the Need Order did not  
5 occur, that the IGCC unit is significantly different than  
6 the unit approved in the Need Order?

7  
8 A. No I do not. Mr. Larkin points out that the EPRI funding  
9 was expected to offset some of the costs of the unit. As  
10 the Need Order points out on page 9, the hoped-for funding  
11 from EPRI was not considered in determining the cost-  
12 effectiveness of Polk Unit One, but was anticipated only as  
13 a potential benefit. In fact, EPRI did provide significant  
14 support and value to the project. EPRI assigned their  
15 Texaco gasification expert to the project for over two  
16 years at no cost to Tampa Electric. In addition, EPRI  
17 products, such as the EPRI Coolwater Video Archive, were  
18 used to assist in the initial design of the unit. EPRI  
19 also provided thermodynamic software which Tampa Electric  
20 used in the development of our IGCC process simulator.  
21 While EPRI did not ultimately provide any direct cash  
22 funding offset, the IGCC project has benefited in a  
23 significant way by virtue of EPRI's participation. At the  
24 time of the Need Order, the exact nature and extent of EPRI  
25 support was undefined. Since their support was identified

1 as potential funding, I do not agree that the lack of  
2 direct EPRI funding constitutes a significant change in the  
3 project.

4  
5 Q. Does Mr. Larkin examine the Polk Unit One design changes in  
6 the proper perspective?

7  
8 A. No. In reviewing all these design improvements, it is  
9 important to keep in perspective the overall time frame  
10 involved and the amount of definitive engineering available  
11 at the time of the Need Order. The project configuration  
12 that existed at the time of the Need Order was based on  
13 very preliminary engineering. As the design developed,  
14 Tampa Electric identified that the actual cost for some of  
15 the plant systems was more than our estimate while some of  
16 the systems cost less. The Project Management team's  
17 objective was to prudently manage the overall cost to the  
18 lowest level possible. The changes cited by Mr. Larkin  
19 represent necessary and beneficial refinements to the IGCC  
20 Unit design as opposed to designing a "different unit" as  
21 Mr. Larkin asserts. All of the decisions noted above were  
22 reasonable, prudent, and fully supported by the DOE.  
23  
24  
25



Rebuttal of Tom Ballinger (Staff)

1  
2  
3 Q. In Mr. Ballinger's testimony he states that the Polk IGCC  
4 Unit was not the result of a competitive bidding process.  
5 Does this accurately characterize Tampa Electric's  
6 management of procurement decisions, for the Polk IGCC?

7  
8 A. First of all, if this comment was intended to be critical  
9 of the process which was specifically approved in the Need  
10 Order, the comment is shown to be irrelevant in Mr. Rowe's  
11 rebuttal testimony. Secondly, if it was intended to  
12 describe the procurement procedures used by Tampa Electric  
13 to construct the Polk IGCC unit the statement is incorrect.

14  
15 As I described on pages 44 through 48 of my direct  
16 testimony, procurement decisions for the Polk IGCC Unit  
17 were managed utilizing procedures modeled after Tampa  
18 Electric's standard procurement procedures. All  
19 significant purchases for the project were made through the  
20 competitive bidding process except the technology purchases  
21 that were required by our Cooperative Agreement with the  
22 DOE. Those contracts were awarded to Texaco for the  
23 gasification technology, General Electric for the  
24 combustion turbine and related equipment, and to General  
25 Electric Environmental Services Inc., for the Hot Gas Clean

1 Up system. All other significant orders were awarded  
2 through competitive bidding. The process was managed by an  
3 integrated team of Bechtel and Tampa Electric procurement  
4 professionals. In addition to the use of bidding  
5 procedures which secured the demonstrated low evaluated  
6 price for all of the components of the Polk IGCC Unit,  
7 Tampa Electric compiled impressive results relative to our  
8 use of minority, small, and women-owned businesses. These  
9 companies were awarded 550 orders valued at over \$26.8  
10 million; all accomplished through the Polk IGCC competitive  
11 bidding process.

12 In fact, the results of the Commission's own staff audit of  
13 Tampa Electric's competitive bidding procedures utilized on  
14 the Polk IGCC project (Control No. 94-014-2-1) stated  
15 "Tampa Electric Company's formal and informal internal  
16 procedures are sufficient to control the bidding and award  
17 of the audited contracts".

18  
19 Mr. Ballinger's testimony, which implies that the Polk  
20 Unit One costs were not minimized because of a lack of  
21 competitive bidding, wrongfully portrays the procurement  
22 procedures used on the Polk IGCC project in a negative  
23 light. In reality our competitive bidding procurement  
24 procedure achieved demonstrated, outstanding results.  
25

1 These procurement procedures were an integral part of Tampa  
2 Electric's overall prudent management of the project.

3  
4 Q. Mr. Ballinger has expressed some interest in understanding  
5 the differences between the Need Hearing estimate and the  
6 company's current estimate. Please explain the  
7 differences.

8  
9 A. As described in detail in response to Interrogatory No. 2,  
10 which is Document No. 2 of Exhibit (CRB-1) of my direct  
11 testimony, when reviewed on a comparable basis, which  
12 excludes the estimated land acquisition and site  
13 development cost, the comparative costs of the Polk Power  
14 Station have remained relatively unchanged (4.3% above the  
15 December 9, 1991 Need Hearing estimate).

16  
17 The Need Order references a system savings for the IGCC  
18 Unit of \$195 million. This \$195 million savings was  
19 determined using the \$413 million capital cost estimate  
20 submitted on December 9, 1991 in the revisions to the  
21 prepared rebuttal testimony of John B. Ramil filed in the  
22 Need Determination Docket on November 20, 1991. The  
23 difference between the \$413 million estimate and the \$506  
24 million estimate is primarily associated with land  
25 acquisition and site development costs. At the time of

1 the Need Hearing neither the detailed technical  
2 requirements for the site nor the final environmental  
3 permitting requirements for the site had been determined.  
4 Moreover, the comparison among various alternatives did not  
5 require consideration of these costs since each alternative  
6 would have required a similar site. Therefore, the cost of  
7 land acquisition and site development costs were not  
8 included in the Need Hearing estimate. When the Need  
9 Hearing estimate is compared to our current estimate on a  
10 comparable basis it can be seen the cost have increased  
11 only 4.3%. This represents a significant accomplishment  
12 when considering the unique nature of the technology being  
13 implemented and the preliminary nature of the engineering  
14 that existed at the time of the Need Hearing estimate. A  
15 reconciliation of Polk Power Station estimates from the  
16 Need Hearing estimate to the company's most recent estimate  
17 is included as Document 2 of my Rebuttal Exhibit (CRB-2).

18  
19 Q. What is the current estimate for the land acquisition and  
20 site development costs?

21  
22 A. The current estimate for land acquisition is \$19.8 million.  
23 The current estimate for site development is \$46 million.

24  
25 Q. How was the land and site development cost managed?

1 A. As indicated above, the site development requirements could  
2 only be determined after the necessary engineering and  
3 environmental permitting had been completed. Once the  
4 requirements had been defined, the site development work  
5 was competitively bid. The site had been previously mined  
6 for phosphate. Therefore the magnitude of the site  
7 development activities were significant. Ultimately, over  
8 25 million cubic yards of material was excavated. Our  
9 current estimate of land and site development cost is  
10 \$65,835,000. As stated in Mr. Eric Major's Deposition in  
11 this docket, Florida Power Corporation ("FPC") is currently  
12 estimating expenditures of \$85 million for the land and  
13 site development of their Polk County site. While the FPC  
14 site is larger than Tampa Electric's Polk site, this  
15 initial site development accomplished by their expenditure  
16 of \$85 million was represented to support about 1500 MW of  
17 capacity. When compared to the \$65 million expended by  
18 Tampa Electric to support an ultimate site capacity of 1150  
19 MW, Tampa Electric's cost per MW of installed capacity  
20 compares very favorably.

21 Q. Is an increase in plant cost of 4.3% for a unit employing  
22 a unique technology over a five year period a good result?  
23

24 A. Yes it is. The cost management of the Polk Power station  
25

1 project has achieved a remarkable result. Tampa Electric  
2 has done an outstanding job in managing the overall Polk  
3 Power Station Project. Tampa Electric has assembled a  
4 project team comprised of all areas of the company. Tampa  
5 Electric has dedicated a full time corporate officer, the  
6 Vice President - Project Management, to lead this team.  
7 The Polk Power Station Project has been the full time job  
8 for this officer since late 1991. All the necessary  
9 resources of Tampa Electric Company have been made  
10 available to the support this important effort. This team  
11 has effectively managed the Polk Power Station Project  
12 through the requirements of environmental permitting, site  
13 selection, engineering, technology development, integration  
14 of various proprietary technologies, and management of our  
15 relationship with the DOE. In spite of these formidable  
16 challenges, the results have been outstanding. The Polk  
17 Project team will bring into service a unique technology at  
18 a brand new site, with an innovative multi-skilled  
19 operations staff, on schedule, at performance levels  
20 consistent with our expectations at the time of the Need  
21 Order and within 4.3% of the construction cost estimate,  
22 which excluded land and site development costs, provided in  
23 1991.  
24  
25

Rebuttal of Mr. Jim Breman (Staff)

1  
2  
3 Q. Mr. Breman implies, on pages 9 and 10 of his testimony,  
4 that the successful utilization of blends of petroleum coke  
5 and coal as a feedstock for the Polk IGCC unit is  
6 speculative and untested. Does Tampa Electric have any  
7 current experience utilizing petroleum coke/coal blends in  
8 Tampa Electric's existing generating units?

9  
10 A. Yes, we do. Tampa Electric is currently utilizing a  
11 petroleum coke/coal blend in our Big Bend Unit No. 4.  
12 Operation to date has been very successful. Tampa Electric  
13 has also successfully test-burned petroleum coke in Big  
14 Bend Unit No. 3. The company is currently requesting  
15 modification of the required environmental permits to allow  
16 long term operation of Big Bend Unit No. 3 on petroleum  
17 coke/coal blends.

18  
19 The technology being implemented in the Polk IGCC can  
20 utilize a much wider range of fuels than boilers of a  
21 design similar to our Big Bend Unit Nos. 3 and 4.  
22 Therefore, the successful use of petroleum coke in these  
23 units is significant. It should be noted that the chemical  
24 and physical properties of coal and petroleum coke are very  
25 similar. Utilization of petroleum coke at Big Bend has

1 allowed Tampa Electric to become very familiar with the  
2 requirements for petroleum coke utilization.

3  
4 Q. Are any other utilities in the state pursuing the use of  
5 petroleum coke?

6  
7 A. Yes there are. The City of Lakeland is currently utilizing  
8 petroleum coke in their McIntosh Unit 3. Florida Power  
9 Corporation has indicated they are investigating the use of  
10 petroleum coke in Crystal River 1 and 2. The City of  
11 Jacksonville has requested modification of their  
12 environmental permits to allow the use of petroleum coke at  
13 the St. Johns River Power Park facility. Seminole Electric  
14 has received authorization to conduct a test burn of  
15 petroleum coke at it's Palatka Units.

16  
17 Q. Mr. Breman raises several points regarding the use of  
18 petroleum coke from a memorandum prepared by one of TECO's  
19 design consultants that was provided as an exhibit to your  
20 direct testimony. Mr. Breman seems to imply that based on  
21 this memorandum, that petroleum coke/coal blends should not  
22 be considered as a feedstock for the Polk IGCC Unit. Do  
23 you agree?

24  
25 A. No. The memorandum Mr. Breman references is one of many



1 inputs considered by Tampa Electric's Project Management in  
2 determining that the use of petroleum coke is viable for  
3 the Polk IGCC Unit. Based upon this input as well as input  
4 from Texaco and General Electric, Tampa Electric's position  
5 is that the use of petroleum coke in the Polk IGCC unit is  
6 most certainly viable. While we will conduct a test burn  
7 of the petroleum coke/coal blends at the Polk Power Station  
8 in order to optimize the plant systems, the test burn is  
9 not required to determine the viability of petroleum coke.  
10 Tampa Electric has the utmost confidence that petroleum  
11 coke/coal blends will operate extremely well in the Polk  
12 IGCC unit.

13 It should also be pointed out that while Mr. Breman  
14 references the memorandum from our design consultant in his  
15 testimony he fails to reference the eleven documents  
16 included in my direct testimony exhibit supporting the  
17 proven fuel flexibility of the Texaco gasification  
18 technology in general and its ability to utilize petroleum  
19 coke in particular.  
20

21  
22 Q. Are the savings associated with the use of petroleum coke  
23 "speculative" as suggested by Mr. Breman?

24  
25 A. The savings are not speculative. Petroleum coke/coal

1 blends have been utilized for many years in Texaco  
2 gasification systems. The Ube Ammonia Plant in Japan,  
3 which utilizes a Texaco gasification system, is currently  
4 operating on a petroleum coke/coal blend of 90% petroleum  
5 coke and 10% coal. Petroleum coke has been utilized at  
6 Ube, in varying ratios, since 1986.

7  
8 Q. Has Texaco specifically advised Tampa Electric as to the  
9 suitability of the Polk IGCC System to utilize petroleum  
10 coke/coal blends?

11  
12 A. Yes. Texaco has advised Tampa Electric, from the project's  
13 inception, that the Polk Unit One IGCC will be capable of  
14 utilizing a wide range of coals as well as petroleum  
15 coke/coal blends. Our technology license with Texaco is  
16 for the utilization of "solid carbonaceous fuel". This  
17 specific wording was selected to include the use of  
18 petroleum coke. Texaco has also provided a letter dated  
19 June 17, 1996 outlining the experience at other facilities  
20 utilizing petroleum coke and which specifically states that  
21 the Polk IGCC unit can utilize petroleum coke/coal blends  
22 in ratios up to 90% petroleum coke. This letter is  
23 included as Document No. 3 of my Exhibit (CRB-2).

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25 Q. While Mr. Breman has characterized the successful operation

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using petroleum coke/coal blends as "speculative", has he presented any credible evidence that the Polk IGCC facility cannot successfully utilize petroleum coke blends?

A. Neither Mr. Breman nor any other witness in this docket has provided any credible evidence that the Polk IGCC unit cannot utilize petroleum coke blends. Both Tampa Electric and Texaco have concluded, based on engineering and experience, that petroleum coke blends can be utilized and have supported that conclusion in such a definitive manner, that the successful use of petroleum coke as a feedstock in the Polk IGCC unit should no longer be an issue.

Q. Does that conclude your testimony?

A. Yes it does.

TAMPA ELECTRIC COMPANY  
DOCKET NO. 960409-EI  
WITNESS: BLACK  
EXHIBIT NO. \_\_\_\_\_ (CRB-2)

TAMPA ELECTRIC COMPANY  
REBUTTAL EXHIBIT OF CHARLES R. BLACK

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PAGE 1 OF 2

DOCUMENT NO. 1

BECHTEL LETTER ON IGCC CONSTRUCTION LEAD TIMES

**Bechtel**

June 28, 1996

9995 SR 37 South  
P.O. Box 775  
Mulberry, Florida 33860-0775

Mr. Don K. Pless  
Project Manager  
TECO Power Services  
P.O. Box 111  
Tampa, Florida 33601-0111

Dear Don:

In accordance with our discussions, this letter summarizes some of the key considerations associated with first building a simple cycle combustion turbine and then adding a gasifier and associated equipment to create an Integrated Gasification Combined Cycle plant.

Assuming that the simple cycle combustion turbine project had been designed, delivered, constructed, started up and commissioned by July 1995, and then work on the balance of the IGCC plant begun, we estimate that the total plant could be completed within an additional 3-4 years. This additional duration assumes that a site had been determined and that permitting efforts for an IGCC had already begun prior to July 1995; if not, the 3-4 year duration would be longer. It is also worth noting that the simple cycle machine must be designed from the beginning to ultimately accommodate later syngas firing.

The key reason for the 3-4 year duration is that the critical path of the IGCC project is through the detailed design of the gasification block, purchase and delivery of major equipment, installation and commissioning. These activities have also been the critical path for the Polk Project and so that provides a real world example of such a schedule -- that is, the combustion turbine has not been a restraint to the Polk Project schedule, but rather the completion date has been a function of the gasification block completion.

An additional consideration is that the simple cycle facility would have to be shutdown for some weeks or months to allow the interconnection with the new, added facilities, and allow for modifications to accommodate syngas firing, therefore there would be some loss of system output to Tampa Electric for the shutdown period.

Should you have any questions on this information, please call

Very truly yours,

*Gary R. Miehle* for

Gary R. Miehle  
Project Manager



Bechtel Power Corporation A unit of Bechtel Corporation

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06/28 '96 14:59

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**DOCUMENT NO. 2**

**POLK PROJECT COST ESTIMATE COMPARISONS**

**POLK PROJECT COST ESTIMATE COMPARISONS**  
(\$000)

INTERROGATORY REFERENCE:	(1a)	(1b)	(1c)	(1c)
	Need Hearing 12/91 Estimate	Fall 1993 Estimate	Fall 1994 Estimate	Fall 1995 Estimate
Plant Components				
Plant	\$472,062	\$488,016	\$495,523	\$503,331
DOE Funding	(100,000)	(111,146)	(110,253)	(115,395)
Subtotal without AFUDC & Land	372,062	376,870	385,270	387,936
% Variance from 12/91 Estimate		1.3%	3.5%	4.3%
Land Acquisition & Site Development	0	56,353	64,535	65,835
AFUDC	40,976	56,563	53,513	52,394
<b>TOTAL PROJECT ESTIMATE:</b>	<u>\$413,038</u>	<u>\$489,786</u>	<u>\$503,318</u>	<u>\$506,165</u>

Key Estimate Clarifications

1. The 12/91 Need Hearing estimate (Column 1a) excluded Land Acquisition & Site Development costs in installed cost.
2. The Fall 1993, Fall 1994, and Fall 1995 estimates included Land Acquisition & Site Development costs.
3. Through time, as estimates were developed with more engineering data, component costs were captured more accurately and consistently utilizing the project work break-down structure developed during the preliminary engineering stage of the project in 1992.
4. The Fall 1994 and Fall 1995 estimates (Columns 1c) were prepared as a budget estimates using flow sheets, layout, and equipment details.



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DOCUMENT NO. 3

TEXACO LETTER ON PETROLEUM COKE  
EXPERIENCE AND VIABILITY



Texaco Inc  
Alternate Energy and  
Resources Department

2000 Westchester Avenue  
White Plains NY 10650  
914 253 4000

June 17, 1996

Mr. Don Pless  
Director  
TECO Power Services  
9995 State Road 37  
P.O. Box 775  
Mulberry, FL 33860-0775

**Subject:** Texaco Gasification Power Systems  
Information Request Support: Petroleum Coke Operations

Dear Mr. Pless:

Please refer to your request regarding the status of operations of the Texaco Coal Gasification Process Plant located in Ube City, Japan and licensed to Ube Industries, Ltd. This facility is a coal and petroleum coke feedstocks gasification facility that produces synthesis gas for the production of ammonia. This facility initiated operations in July of 1984. This facility's initial operations were with coal as the only feedstock.

Beginning in 1986, the facility changed its operation to a blend of coal and petroleum coke. The facility was able to gasify this new feedstock without significant capital investment. Initial blends were at approximately 90% coal and 10% petroleum coke. In each successive year since 1986, Ube Industries has increased its consumption of petroleum coke while decreasing its consumption of coal. Currently, the facility's feedstock is a blend of approximately 10% coal and 90% petroleum coke.

Between 1986 and 1<sup>st</sup> quarter 1990, the facility operations with petroleum coke blended with coal, approximately 544,000 metric tons of petroleum coke has been consumed and approximately 2,030,000 metric tons of coal has been consumed. Between 2<sup>nd</sup> quarter 1990 and 1995, the facility has consumed approximately 1,543,200 metric tons of petroleum coke and 1,296,000 metric tons of coal.

In addition to Ube Industries, Ltd.'s facility, Eastman Chemical Company has evaluated operations on coal and petroleum coke feedstock blends. Eastman Chemical Company has been operating a Texaco Coal Gasification Process plant in Kingsport, TN since 1984. In 1994, a test run of petroleum coke blended with coal (approximately a 50/50 mixture) was gasified to determine the impacts on the existing plant configuration, both investment and product quality. It was determined investment in new equipment and modifications would be minimum and that product quality was not affected. The Eastman Chemical Company facility makes methanol from the synthesis gas. This methanol is used as a building block for numerous chemical applications.

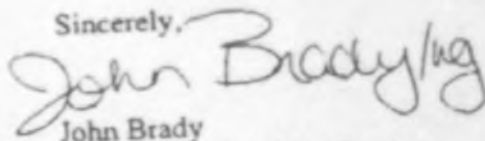
Based in part upon the successful operations of the facilities above and other solids feedstock facilities, several new facilities utilizing petroleum coke in its feedstock mix have been developed and constructed. For example, Texaco Refining and Marketing, Inc. has completed construction of a 166 short ton per day of petroleum coke gasification facility utilizing Texaco Development Corporation's Texaco Gasification Power Systems technology at its El Dorado Kansas refinery. The facility will, in addition to the petroleum coke, utilize between 6 and 16 tons per day of secondary (low value or negative value) refinery fuel streams. The clean synthesis gas produced will be fed to a combustion turbine-generator along with natural gas. Products for the refinery are 35 megawatts net electric power, 1,809,000 pounds per hour of steam, pressurized air, nitrogen, and oxygen, pure sulfur and fuel grade solids. This amounts to the total electric power needs of the refinery, about 40% of the refinery's steam needs and all the refinery's requirements for nitrogen, supplementary oxygen and instrument air. Precommissioning activities are ongoing and the facility is expected to begin operations during the summer of 1996.

New petroleum coke feedstock projects or coal/petroleum coke blend feedstock projects that are under development include: a Texaco Gasification Power Systems / Texaco Hydrogen Generation Process facility for Koch Refining Company; a Texaco Gasification Power Systems facility for Exxon Chemical Company, a Texaco Gasification Power System facility for Star Enterprise; and a Texaco Hydrogen Gasification Process facility for COGA Industries. Recognizing each owner of these projects has their respective project schedule constraints, these projects are expected to complete engineering design and construction and start-up in the 1998 to 1999 timeframe.

With respect to potential petroleum coke and coal feedstock operations at TECO's Polk Power Station Unit-1 Texaco Gasification Power Systems facility, per our earlier meetings on this subject and the experiences outlined above, such operations at this coal based feedstock facility are possible. The Polk Power Station Unit-1 is capable of operations on blends of coal and petroleum coke. Additional equipment and modifications to the facilities current configuration may be necessary. After TECO has completed its Department of Energy Clean Coal III Demonstration, Texaco Development would welcome the opportunity to work with TECO's staff to define parameters for orderly transfer from 100% coal feedstock operations to petroleum coke/coal feedstock blends. Operations at Polk Power Station of up to a 90% petroleum coke and 10% coal feedstock blends are possible.

Please contact me if further information is required. I can be reach at (914) 253-4005. Texaco Development looks forward to working with your staff and appreciates TECO's continued cooperation and interest in Texaco's gasification technology.

Sincerely,



John Brady  
Director-Technology Services

JMB(TF:DJ)ng  
0617b doc

cc: Mr. Charles Black

Tampa Electric Company, Tampa, FL