Doug, Good analysis! Preston 4/20/93

Syed Preston, For review Doug

ESTIMATED COSTS FOR USING LOW SULFUR COAL
TECO POLK POWER STATION

In the site certification application for a 260 MW combined cycle combustion turbine (CT) unit fired with coal gas to be constructed in Polk County, TECO submitted data for the coal to be used based on a modified Illinois No. 6 Coal. The maximum sulfur content is 3.05 percent and the minimum heating value is 11,035 Btu/lb. Based on use of a Modified Illinois No. 6 coal, TECO estimated SO_2 emissions would be 0.247 lb/MMBtu from the CT.

In order to calculate the cost per ton for additional reduction of sulfur emissions by using coals with a lower sulfur content, 1992 average delivered cost data reported to FERC, Energy Information Administration, for coal delivered to Florida utilities was used. The average cost data for various sulfur content ranges are shown in Table 1. Cost data for the first quarter of 1993 are included in Table 1 for comparison with 1992 data. Although coal deliveries to Florida are shown in Table 1 for all ranges of sulfur content from less than 0.5 percent to over 3.0 percent, 58 percent of the coal delivered was in the 0.5 to 1.5 percent sulfur range and 39 percent was in the 2 to 3 percent sulfur range. These two sulfur content ranges account for 97 percent of the delivered coal. For 1992, the lowest cost per ton of coal delivered, $36.16 per ton, was for coals with a sulfur content greater than 3.0 percent. The average maximum price, $47.88 per ton, was for coals with a sulfur content of >1.0 to 1.5 percent.

The costs for reduction in SO_2 emissions using low sulfur coals were estimated based on the following factors.

a. In order to insure that the coal delivered would have a maximum sulfur content of 3.05 percent or less, coal from the >2.0 to 3.0 percent range was selected for comparison.

b. Coal gasification data (EPRI Reports AP-5029 and EPRI GS-7531) for a Shell gasifier indicate that a range of coals can be used in coal gasification systems. The EPRI perspective in Report GS-7531 states that "... utilities now have the opportunity to choose among economically attractive feed stocks."

c. Annual operation report data for 1991/1992 for TECO Big Bend and the Gulf Power Crist Plants indicate the plants used approximately 8,100,000 tons of coal with an average sulfur content of 2.67 percent. Therefore, these two facilities would account for a major portion of the Florida coal deliveries in the >2.0-3.0 percent at an average price of $44.32 per ton delivered.

d. An emissions reduction to 0.17 lb SO_2/MMBtu would require a reduction in coal sulfur content to approximately 2.0 percent. It is reasonable then to use the highest average 1992 coal cost of $47.88 per ton delivered to calculate the cost of the SO_2 removed. To be conservative in estimating the quantity of SO_2 reduced at $47.88 per ton of coal, a 1.5 percent coal sulfur content will be used. The MMBtu/ton for each coal category will be based on the average Btu content for 1992 coals as shown in Table 1.

The cost per ton of SO_2 removed is calculated in Table 2 (following the TECO format). The cost data from Table 2 are compared with the TECO cost data used by TECO, Attachment 1, in the following summary:

	Based on 1992 Ave Costs	TECO
Annual coal consumption for high sulfur coal, TPH:	84.71	92.50
Annual coal consumption for low sulfur coal, TPH:	80.03	78.27
SO_2 emissions rate for high sulfur coal, lb/hr:	398.1	563.3
SO_2 emissions rate for low sulfur coal, lb/hr:	211.3	326.9
Tons per year of SO_2 removed:	818.2	1035.4
Average cost per ton:		
High sulfur coal	$44.32	$33.823
Low sulfur coal	$47.88	$50.703
Increase in cost/ton	$ 3.56	$16.88
Annual cost increase for use of low sulfur coal:	$678,805	$7,357,379
$ per ton of SO_2 removed:	$830	$7,106

Based on the analysis using average 1992 cost data, use of low sulfur coal to reduce SO_2 emissions can be justified.

The cost analysis submitted by TECO is attached. The conclusion by TECO that the cost per ton of SO_2 removed will $7,106 per year is a quite significant difference. Comments regarding the TECO analysis are:

a. The analysis is limited to the two high sulfur coals included in the Cool Water coal gasification test program but no justification is submitted for excluding coals from other sources.

b. The 3.5 percent sulfur content of the Illinois No. 6 coal exceeds the maximum sulfur content requested in the site certification application (3.05 percent maximum). TECO did not include an analysis of coal blending or additional coal cleaning to reduce the maximum sulfur content.

c. Based on the 1992 average delivered coal cost data, the costs quoted by TECO for delivery of the Illinois No. 6 coal appears reasonable although the coal would not meet the maximum sulfur content limit.

d. TECO did not include an analysis of the costs for Illinois No. 6 coals with a lower sulfur content.

e. The Pittsburgh No. 8 coal with a sulfur content of 2.4 percent should not be used in the analysis because the reduction in SO_2 emissions will not be adequate to reduce the SO_2 emissions to 0.17 lb/MMBtu when compared to the maximum sulfur content requested in the application.

f. The TECO analysis is based on coals which have an extreme cost differential ($16.88 per ton) when delivered to Florida and has not demonstrated that the low sulfur coals currently delivered to Florida cannot be used with the proposed coal gasification system.

TABLE 1		Coal Cost Data from Energy Information Administration												
		Table 5, Administration/Cost and Quality of Fuels for Electric Utility Plants 1992												
		########	1992 Ave	########		########	1993 1st Quarter Av		########	########			1993 Qtr	1992 Ave
S, percent		Tons	$/MMBtu	$/Ton		Tons	$/MMBtu	$/MMBtu	$/MMBtu	$/Ton			Btu/lb	Btu/lb
		X1000	(cents)			xl000	High	Low	Ave	Ave				
0.5-		224	148.6	37.6		170	157.8	134.5	141.6271	34.07894			12031.23	12651.41
>0.5-1.0		8389	176.7	44.37		2099	177.2	169.7	174.3604	43.10245			12360.16	12555.18
>1.0-1.5		5801	188.3	47.88		742	199.8	159.9	195.8558	49.73652			12697.23	12713.75
>1.5 -2.0		92	197.4	47.67		254	147.3	124.2	138.4433	33.28575			12021.44	12074.47
>2.0-3.0		9552	184.5	44.32		2441	177.2	173	175.1918	42.1398			12026.76	12010.84
>3.0		329	153	36.16		47	159.9	154.8	157.9213	36.61894			11594.05	11816.99
		Cost Data From Electric Power Monthly , Energy Information Administration												
				First Quarter, 1993										
		########	Jan-93	########		########	Feb-93	########		########	Mar-93	########		
S, percent		Tons	$/MMBtu	$/Ton		Tons	$/MMBtu	$/Ton		Tons	$/MMBtu	$/Ton		
		X1000	(cents)			X1000	(cents)			X1000	(cents)			
0.5-		21	157.8	35.8		31	157.8	35.84		118	134.5	33.31		
>0.5-1.0		736	169.7	42.62		629	176.5	44.44		734	177.2	42.44		
>1.0-1.5		360	199.8	50.98		358	194.3	49.35		24	159.9	36.85		
>1.5-2.0		104	147.3	34.58		118	134.5	33.31		32	124.2	28.99		
>2.0-3.0		800	173	41.49		734	177.2	42.44		907	175.5	42.47		
>3.0		14	154.8	36.01		24	159.9	36.85		9	157.5	36.95		

Table 2: Estimates Costs for Reducing Sulfur Emissions Using Low Sulfur Coal

Annual coal consumption for high sulfur coal:

= 2,035 MMBTU/hr / (12,011 Btu/lb * 2000 lb/ton)

= 84.71 TPH

Annual coal consumption for low sulfur coal:

= (2,035 MMBtu/hr) / (12,714 Btu/lb * 2000 lb/ton)

= 80.03 TPH

SO_2 emissions rate high sulfur coal:

= 84.71 TPH * 2.67 lb S/100 lb coal * 2 lb SO_2/lb S * 2000 lb/ton * (1-0.956)

= 398.1 lb/hr

SO_2 emissions rate low sulfur coal:

= 80.03 TPH * 1.5 lb S/100 lb coal * 2 lb SO_2/lb S * 2000 lb/ton * (1-0.956)

= 211.3 lb/hr

Annual tons of SO_2 removed:

= (398.1 lb/hr - 211.3 lb/hr) * (8760 hrs/yr) / 2000 lb/ton

= 818.2 TPY

Annual cost increase:

= (($47.88/ton * 80.03 TPH) - ($44.32/ton * 84.71 TPH)) * 8760 hr/yr

= $678,805 per yr

$ per ton of SO_2 removed:

= $678,805 per yr / 818.2 TPY

= $830 per ton SO_2 removed

ECT
Environmental Consulting & Technology, Inc.

September 8, 1993
ECT No. 90263-0502-1300

Mr. Doug Outlaw
Florida Department of
Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Tampa Electric Company
Polk Power Station
Coal Cost Analysis

Dear Mr. Outlaw:

In response to your request, an incremental cost analysis for the use of lower sulfur coal for the Polk Power Station project is provided for your review.

Specific coal costs, including transportation charges, provided by Tampa Electric Company (TEC) are shown on Attachment I. These costs represent actual 1993 costs for spot market coals (Illinois #6 and Pittsburgh #8). Water transportation costs reflect charges incurred for shipment to TEC's Big Bend facility. The truck transportation charge, which is the same for both coals, is the estimated cost to transfer the coal from the Big Bend Station to the Polk Power Station site. TEC indicates that a coal contract for Polk Power Station negotiated at the present time would result in coal prices approximately the same as current spot market prices; transportation charges would remain the same for both contract and spot market coals. As can be seen from the data on Attachment I, there is a significant increase in transportation charges for the Pittsburgh #8 coal. The Pittsburgh #8 coal is obtained from coal mines located south of Pittsburgh, PA and is transported by barge on the Monongahela River to the Ohio River and then to the Mississippi River.

Tampa Electric Company considers the information shown on Attachment I to be confidential. It is therefore requested that Attachment I be placed in a separate, confidential file by the Florida Department of Environmental Protection.

(ATTACHMENT 1 Returned to TECO)

P.O. Box 8188
Gainesville, FL
32605-8188

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98TH Street
Gainesville, FL
32606

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332-0444

FAX (904)
332-6722

An incremental cost analysis, based on the coal costs shown on Attachment I, is provided on Attachment II. This analysis reflects the different heat values of the two coals and is based on the nominal heat input to the gasification process. The analysis shows an incremental cost increase of $7,100 per ton of sulfur dioxide (SO_2) removed resulting from the use of lower sulfur Pittsburgh #8 coal instead of the requested Illinois #6 coal.

Please call me at (904) 332-0444 or Greg Nelson of TEC at (813) 228-4847 if there are any questions.

Sincerely,

ENVIRONMENTAL CONSULTING & TECHNOLOGY, INC.

Thomas W. Davis, P.E.
Senior Engineer

TWD/tw
Attachments

Attachment II. SO_2 Incremental Cost Analysis

Data:

Parameter	Units	Value
Nominal IGCC Gasifier Heat Input (LHV)	MMBtu/hr	2,035
Illinois # 6 Coal Sulfur Content, dry	wt %	3.5
Heat Content (LHV)	Btu/lb	11,000
Cost (1993)	$/ton	33.823
Pittsburgh #8 Coal Sulfur Content, dry	wt %	2.4
Heat Content (LHV)	Btu/lb	13,000
Cost (1993)	$/ton	50.703
SO_2 Removal Efficiency	%	95.65

Calculations:

A. Coal Consumption

1. Illinois #6 Coal

Coal Usage = [(2,035 MMBtu/hr) * (10^6 Btu/MMBtu)] / [(11,000 Btu/lb) * (2,000 lb/ton)]

Coal Usage =	92.50 tons/hr

2. Pittsburgh #8 Coal

Coal Usage = [(2,035 MMBtu/hr) * (10^6 Btu/MMBtu)] / [(13,000 Btu/lb) * (2,000 lb/ton)]

Coal Usage =	78.27 tons/hr

B. SO_2 Emission Rates

1. Illinois #6 Coal

SO_2 = (92.50 ton/hr) * (3.5 lb S/100 lb coal) * (2,000 lb/ton) * (2 lb SO_2/lb S) * (1 – .9565)

SO_2 =	563.3 lb/hr

2. Pittsburgh #8 Coal

SO_2 = (78.27 ton/hr) * (2.4 lb S/100 lb coal) * (2,000 lb/ton) * (2 lb SO_2/lb S) * (1 – .9565)

SO_2 =	326.9 lb/hr

C. Annual Tons of SO_2 Removed

SO_2 = [(563.3 lb/hr – 326.9 lb/hr) * (8,760 hrs/yr)] / (2,000 lb/ton)

SO_2 =	1,035.4 tons/yr

D. Annual Cost Increase

Cost = [($50.703/ton * 78.27 ton/hr) – ($33.823/ton * 92.50 ton/hr)] * 8,760 hr/yr

Cost =	$7,357,379 per year

E. Incremental Cost Effectiveness

Cost Effectivness = ($7,357,379/yr) / (1,035.4 tons/yr)

Cost Effectivness =	$7,106 per ton of SO_2 removed

09/20/93 13:06 HOLLAND & KNIGHT ENVIRONMENTAL 001

LAW OFFICES

HOLLAND & KNIGHT

315 SOUTH CALHOUN STREET
P.O. DRAWER 810 (ZIP 32302-0810)
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WEST PALM BEACH
WASHINGTON, D.C.

OF COUNSEL
MASTRY, MARGER, DAVIS, ... BARTLETT & LYNN P.A.

SPECIAL COUNSEL LITIGATION & BANKRUPTCY
SHAW, LICITRA, PARENTE, ESERNIO & SCHWARTZ, P.C.

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FACSIMILE TRANSMISSION COVER SHEET

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WASHINGTON, D.C.

September 17, 1993

VIA FACSIMILE

Mr. Hamilton S. Oven, Jr., P.E.
Office of Siting Coordination
Department of Environmental
Protection
3900 Commonwealth Boulevard
Suite 953A
Tallahassee, FL 32399-3000

Re: Tampa Electric Company Polk Power Station

Dear Buck:

Enclosed for your information and use are proposed modifications to several tables that are in the draft conditions of certification. These tables reflect the changes that will need to be made due to the deletion of the option of placing the combustion turbine in service in advance of the in service date for the entire facility.

Please let me know if you have any questions or require additional information.

Sincerely,

HOLLAND & KNIGHT

Larry

Lawrence N. Curtin

LNC/mre
TAL-32434

cc w/enc: Mr. Clair Fancy (via facsimile)
Mr. Greg Nelson
Mr. Spence Autry
Mr. Steve Jenkins
Mr. Jack Doolittle

TEC Polk Power Station

Site Certification Condition H.1. Allowable Emission Table

Pollutant	Fuel	Basis[a]		Emission Limitations — 7FCT Post Demonstration Period	
		Value	Units	(lb/hr)[b]	(tpy)[c]
NO_x	Oil	42	ppmvd	311	N/A
	Syngas	25	ppmvd	222.5	1,016.3
VOC[d]	Oil	0.028	lb/MMBtu	32	N/A
	Syngas	0.0017	lb/MMBtu	3	38.6
CO	Oil	40	ppmvd	99	N/A
	Syngas	25	ppmvd	98	430.1
PM/PM_{10}[e]	Oil	0.009	lb/MMBtu	17	N/A
	Syngas	0.013	lb/MMBtu	17	74.5
Pb	Oil	6.30E−05	lb/MMBtu	0.101	N/A
	Syngas	2.41E−06	lb/MMBtu	0.0035	0.0657
SO_2	Oil	0.048	lb/MMBtu	92.2	N/A
	Syngas	0.247	lb/MMBtu	518	2,268.8
Visible Emissions	Oil	20 percent opacity			
	Syngas	10 percent opacity			

(a) Syngas lb/MMBtu values based on heat input (HHV) to coal gasifier and includes emissions from H_2SO_4 plant thermal oxidizer.

(b) Emission limitations in lb/hr are 30-day rolling averages.

(c) Annual emission limits (tpy) based on 10 percent maximum annual capacity factor firing fuel oil.

(d) Exclusive of background concentrations.

(e) Excluding sulfuric acid mist.

TEC Polk Power Station
Site Certification Condition H.1.
Post Demonstration Period
Basis For Annual Emission Rates

Pollutant	Fuel	Operating Period (hrs/yr)	Operating Load
NO_x	Oil	876	100
	Syngas	7,884	100
VOC	Oil	1,752	50
	Syngas	7,008	100
CO	Oil	1,752	50
	Syngas	7,008	100
PM/PM_{10}	Oil	876	100
	Syngas	7,884	100
Pb	Oil	1,752	50
	Syngas	7,008	100
SO_2	Oil	0	0
	Syngas	8,760	100

16

TEC Polk Power Station

Site Certification Condition XII.8.
Allowable Emission Table

Pollutant	Fuel	Emission Limitations — 7FCT Demonstration Period	
		(lb/hr)[a]	(tpy)[b]
NO_X	Oil	311	N/A
	Syngas	664.2	2,908.3
VOC[c]	Oil	32	N/A
	Syngas	3	38.5
CO	Oil	99	N/A
	Syngas	99	430.1
PM/PM_{10}[d]	Oil	17	N/A
	Syngas	17	74.5
Pb	Oil	0.101	N/A
	Syngas	0.023	0.10
SO_2	Oil	82.2	N/A
	Syngas	518	2,268.8
Visible Emissions	Oil	20 percent opacity	
	Syngas	10 percent opacity	

(a) Emission limitations in lb/hr are 30-day rolling averages.

(b) Annual emission limits (tpy) based 10 percent maximum annual capacity factor firing fuel oil.

(c) Exclusive of background concentrations.

(d) Excluding sulfuric acid mist.

TEC Polk Power Station
Site Certification Condition H.2.
Demonstration Period
Basis For Annual Emission Rates

Pollutant	Fuel	Operating Period (hrs/yr)	Operating Load
NO_x	Oil	0	0
	Syngas	8,760	100
VOC	Oil	1,752	50
	Syngas	7,008	100
CO	Oil	0	0
	Syngas	8,760	100
PM/PM_{10}	Oil	876	100
	Syngas	7,884	100
Pb	Oil	1,752	50
	Syngas	7,008	100
SO_2	Oil	0	0
	Syngas	8,760	100

ECT

Environmental Consulting & Technology, Inc.

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Division of Air Resources Management

September 17, 1993
ECT No. 90263-0502-1300

SENT BY FAX ON 9/17/93

Mr. Syed Arif
Florida Department of
Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Tampa Electric Company
Polk Power Station

Dear Mr. Arif:

The following information regarding the above referenced project is provided in response to your recent requests:

(1) Reference for Japanese SCR operating experience described in SCA.

Lowe, P.E., *et al.* (1989), "Assessment of Japanese SCR Technology for Oil-Fired Boilers and Its Applicability in the USA", Proceedings of the 1989 Joint Symposium on Stationary Source NO_x Control, San Francisco, March 1989.

(2) Derivation of lb/MMBtu basis for lead (Pb) emissions for oil and syngas.

Values of 5.30E-05 and 2.41E-06 lb Pb/MMBtu for oil and syngas, respectively were calculated using heat inputs to the coal gasifier (syngas) and 7FCT (oil), and emissions from both the 7FCT and the H_2SO_4 plant thermal oxidizer (TO) for syngas (the H_2SO_4 plant will not be in operation when the 7FCT is firing back-up oil). Details are provided as follows:

Data:

Parameter	Fuel	Units	Value
7FCT Pb Emission Rate	Oil	lb/hr	0.101
7FCT Pb Emission Rate	Syngas (CGCU)	lb/hr	0.0035
H_2SO_4 TO Pb Emission Rate	N/A	lb/hr	0.002
7FCT Heat Input	Oil	MMBtu/hr	1,907
Coal Gasifier Heat Input	Syngas	MMBtu/hr	2,280

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332-6722

Calculations:

Oil:

lb/MMBtu = (.101 lb/hr) / 1,907 MMBtu/hr

lb/MMBtu = 5.30E-05 lb/MMBtu

Syngas:

lb/MMBtu = (.0035 lb/hr + 0.002 lb/hr) / 2,280 MMBtu/hr

lb/MMBtu = 2.41E-06 lb/MMBtu

Please call me at (904) 332-0444 or Greg Nelson of TEC at (813) 228-4847 if there are any questions.

Sincerely,

ENVIRONMENTAL CONSULTING & TECHNOLOGY, INC.

Thomas W. Davis

Thomas W. Davis, P.E.
Senior Engineer

TWD/tw

ENGELHARD

ENGELHARD CORPORATION
101 WOOD AVENUE
ISELIN, NEW JERSEY 08830-0770
908-205-5000

VIA FAX **to:** ***904/922-6979***

September 17, 1993

Mr. Doug Outlaw
Florida Department of Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Subject: Vogt Inquiry No. 17343
GE-TPS/IGCC - Polk Co. Florida
Engelhard Quotation EP-4288

Dear Doug:

In response to your request for quotation, we have prepared the following SCR/NOx Abatement Catalyst System Summary, EP-4288, for your review.

The systems have been designed based upon the information provided to us, as noted in the summary under Customer Design Parameters. While our designs are consistent with your specification(s), we would like to highlight the following items:

1. Based upon the data provided and the NOx removal guarantees required, the frame dimensions for the SCR catalyst modules will be approximately 30.5 ft. wide by 55.0 ft. high. This meets the cross-section that was specified without the need for transitions.

2. The SCR catalyst system will meet the maximum catalyst housing depth/length specified of 10 ft.

3. Engelhard will guarantee 50% NOx conversion for case 1, and 64% conversion for case 2, while firing synthetic coal gas and no. 2 distillate oil, under the conditions specified.

We trust that it will satisfy your immediate needs. If you should have any questions or comments, please do not hesitate to contact either Abe Rosenstein at (908)-205-6642 or myself at (908)-205-7276.

ENGELHARD

Thanks for your interest in Engelhard Corporation.

Sincerely,
ENGELHARD CORPORATION

Patrick K. Osby
Proposal Engineer

cc: ABR
SSM

SCR NO_x ABATEMENT CATALYST SYSTEM

QUOTATION SUMMARY

Customer:	**HENRY VOGT MACHINE CO.**
Engelhard Quotation:	**EP-4288**
Project:	**Vogt Inquiry No. 17343/GE TPS** **IGCC - Polk County, FL**
Date:	**September 17, 1993**
Prepared By:	**Stan Mack**

1.0 <u>Customer Design Parameters</u>

Emissions Source:	G.E. Frame 7F Gas Turbine	
Fuel:	Syngas/Coal & #2 Fuel Oil	
Exhaust Flow (lb/hr):	4,105,331	
Exhaust Temperature (°F):	637 - 651	
Pressure Drop Constraint (in H_2O):	4	
Given Duct Dimensions, W x H (ft):	30.52′ x 55′	
	Case 1	Case 2
Inlet NO_x (ppmvd @ 15% O_2):	25	25
Max. NO_x Emissions (ppmvd @ 15% O_2):	12.5	9
Required NO_x Conversion (%):	50	64
NH_3 Slip (ppmvd @ 15% O_2):	2.5	2.5

ENGELHARD

2.0 Catalytic Converter Design

	Case 1	Case 2
Catalyst Type:	NO_xCat VNX™ (Vanadia/TiO_2)	
Substrate Type:	--- Ceramic Honeycomb ---	
Substrate Cell Density (cpsi):	64	64
Catalyst Module Configuration, (Modules W x Modules H)	9.5x16.4	9.5x16.4
Frame W x H, Inside Liner (ft):	- - - 30.5' x 55.0' - - -	
Catalyst Module Depth, Layer 1 (in):	22.6	16.2
Catalyst Module D epth, Layer 2 (in):	---	16.2
Total Frame Depth, approx. (ft):	3.3	3.5-4.0
Total Number of Modules:	340	340
Total Reactor Weight, approx. (lbs):	119,500	127,500

2.1 Catalytic Converter Performance

	Case 1	Case 2
NO_x Conversion (%):	50	64
Max. NO_x Emissions (ppmvd @ 15% O_2):	12.5	9
NH_3 Slip (ppmvd @ 15% O_2):	2.5	2.5
Approx. Aqueous NH_3 Consumption (lbs/hr):	44.8	56.1
Pressure Loss, warranted (in H_2O):	4.0	4.0
Pressure Loss, expected (in H_2O):	2.1	2.9

3.0 Scope of Supply

SCR Oxidation System: (Using Aqueous Ammonia)

- ENGELHARD NO_xCat™ VNX on NO_xCat™ ZNX SCR catalyst in modules
- Internal support structure for catalyst modules (frame), Includes all hardware and gaskets for catalyst module installation.
- Internally insulated housing for SCR converter with thermal expansion joint to prevent gas bypass, approximately 5 ft. flange to flange.
- Ammonia Injection Grid (AIG)
- AIG manifold with flow control valves
- NH_3/Air dilution feed system - skid mounted
  - Electric vaporizer system
  - Pre-piped & wired (including all valves and fittings)
  - Two (2) Dilution air fans, one for back-up purposes
  - Panel mounted system controls for:
    - Vaporizer (on/off/temp. indicator/reset)
    - Blowers (on/off/flow indicators)
    - System pressure indicators
    - Air/ammonia flow indicator and controller
    - Main power disconnect switch
- Five (5) days (max. 10 hrs/day) field supervision/operator training for catalyst installation and start-up

4.0 Commercial

Price (FOB Jobsite): One (1) Unit

	Case 1	Case 2
SCR NO_x Abatement System:	$1,398,000	$1,681,000
7-Ft. Mixing Duct From AIG to SCR Inlet:	140,000	140,000
Total:	$1,538,000	$1,821,000

5.0 Payment Terms (net 30 days):

- 10% with order
- 20% with release to fabricate
- 35% With shipment of frame and housing
- 35% with shipment of catalyst modules

6.0 Equipment Delivery

20 - 24 weeks after drawing approval for each unit

7.0 Catalyst Warranty Period:

SCR Catalyst: 3 years of operation or 3.5 years from delivery, whichever occurs first.

8.0 Equipment Warranty Period:

For equipment supplied to Engelhard Corporation and installed in equipment sold by Engelhard Corporation, the warranty is limited to the warranty of the original manufacturer.

Typical: 1 year of operation or 1.5 years from delivery, whichever occurs first.

9.0 Quote Validity: Sixty (60) days from quotation date

NOTES:

1. All structural steel equipment is inspected and certified by a local professional structural engineer in accordance to all customer supplied applicable specifications.

2. 60°F, 1 atm assumed to be standard conditions.

3. Aqueous NH_3 is assumed to be 28% NH_3 by weight.

4. The proposed catalyst design allows a maximum 15% frontal velocity variation across the catalyst face.

5. <u>Excluded</u> from our scope of supply are:

   a. DCS Hardware & Programming (Programmable Controller)
   b. Emissions analysis equipment
   c. Ammonia storage tank system
   d. Interconnecting piping between:

      - NH_3 storage tank system and NH_3 dilution skid,
      - NH_3 dilution skid and NH_3 distribution manifold
      - NH_3 distribution manifold and AIG

   e. Routing of field Piping the Electrical
   f. Grounding equipment
   g. Utilities
   h. Foundations
   i. All other items not specifically listed in <u>Scope of Supply</u>

6. Drawings and Documentation provided ARO:

   a. Piping and Instrument Diagram
   b. Foundation Loads
   c. General arrangement drawings
   d. Equipment drawings
   e. Equipment and parts list
   f. Catalyst & Frame Installation/Instruction manuals
   g. Electrical schematic for dilution skid/vaporizer system
   h. Dilution skid/vaporizer Installation, Maintenance and Operating manuals

7. <u>Used Catalyst Disposal</u> - Engelhard will take back spent SCR catalyst provided:

   ► This spent catalyst is not damaged or contaminated in any way with elements/compounds that would alter its disposability, and,

- The laws and regulations regarding the handling, transportation, storage, disposal and/or treatment of the spent catalyst are unchanged from those in effect on the date of the order/sales contract.

The customer must deliver spent catalyst to site designated by Engelhard.

Engelhard will re-process spent Engelhard VNX catalyst at a cost of 60% of the price for new catalyst using our proprietary **CatKleen™** SCR process.

Please call your Engelhard representative for further details.

8. Salvage Value of Spent CO Catalyst - Engelhard will award 5-7% credit towards the purchase of new catalyst.

9. New regulations concerning the banking and trading of emissions credits should be considered as part of your emissions control strategy. We would be pleased to discuss with you options for (1) over control of emissions and the generation of emissions credits; (2) flexibility of design allowing for future increase in emissions; and (3) extended life catalyst maintenance agreements.

10. This proposal is made subject to Engelhard Standard Terms and Conditions (EC-2583, Rev. 4/83).

11. Engelhard Catalyst is manufactured entirely in the U.S.A.

ENGELHARD

TERMS AND CONDITIONS

1. REPRESENTATIONS — WARRANTIES

a) Seller warrants that the goods delivered hereunder shall be free from defects in workmanship or material and that such goods and any services performed hereunder shall conform to the specifications set forth herein.

Seller's liability for breach of warranty shall be limited to, at its option, (i) in the case of goods delivered hereunder that are proven to be defective or proven to be at variance with applicable specifications, either (1) repairing or replacing such goods, or (2) refunding the sales price received by Seller for such goods, (ii) in the case of any services performed hereunder that are proven to be at variance with applicable specifications, either (1) taking such corrective action as is necessary, or (2) refunding such service charges received by Seller for such services, provided, however, that (1) written notice of such defect or nonconformance is given to Seller within thirty (30) days of delivery to Buyer of such defective goods or nonconforming goods or services, and (2) where the defective or nonconforming goods are replaced by Seller or where Seller refunds the sales price received from Buyer for such goods, Buyer shall return the defective or nonconforming goods to Seller strictly in accordance with Seller's written instructions concerning handling, shipping, insurance, mode of transportation, etc.

b) Seller warrants that Seller complies with all applicable requirements of Sections 6, 7 and 12 of the Fair Labor Standards Act, as amended, and of the regulations and orders of the United States Department of Labor issued under Section 14 thereof.

c) Seller warrants to Buyer that goods sold by Seller to Buyer hereunder, other than goods manufactured by Seller for Buyer in accordance with Buyer's technology, will not infringe the claims of any U.S. Patent covering the product itself, and agrees to indemnify Buyer against liability of any such infringement; provided, however, that Buyer shall notify Seller within ten (10) days after receipt by it of any notice of commencement of any suit based upon such alleged infringement, and provided further, that Seller shall control and remain in control of any and all proceedings taken in defending such suit, including without limitation, utilization solely of counsel of Seller's own selection to defend such suit. Seller does not warrant against infringement by reason of the use of such goods by Buyer in combination with other materials or in the operation of any process.

d) Recommendations by Seller, if any, covering the use, utilization, properties or qualities of goods delivered hereunder or with respect to services performed hereunder are believed reliable, but Seller makes no warranty whatever with respect thereto. Use or application of goods sold by Seller to Buyer hereunder is at the discretion of the Buyer without any liability or obligation on the part of Seller except as expressly warranted by Seller in writing.

e) THESE WARRANTIES ARE EXCLUSIVE AND ARE IN LIEU OF ANY AND ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, ARISING BY LAW OR CUSTOM, INCLUDING BUT NOT BY WAY OF LIMITATION, THE IMPLIED WARRANTY OF MERCHANTABILITY AND THE IMPLIED WARRANTY OF FITNESS FOR PARTICULAR PURPOSE.

2. PRICES — SERVICE CHARGES

a) Unless other pricing arrangements are indicated on the face of this form, Seller reserves the right (i) to revise any price and any service charge quoted, without notice to Buyer, at any time prior to acceptance by Buyer, and (ii) to revise any precious metal prices quoted, without notice to Buyer, at any time in accordance with metal market prices published by Seller on the day after metal is shipped or credited to Buyer's account (or in the case of fabricated gold or silver products, such revision may be made in accordance with metal market prices published by Seller on the next day a price is published by Seller following the date of shipment).

b) Seller's prices and service charges do not include sales, use, excise or other taxes or duties, assessments, levies or other governmental charges, and accordingly in addition to the price and service charge specified herein, the amount of any sales, use, excise or other taxes or of any duties, assessments, levies or other governmental charges applicable to the transactions herein shall be paid by Buyer, or in lieu thereof, Buyer shall provide Seller with appropriate evidence of exemption from the proper governmental authority.

3. FORCE MAJEURE

a) Any delays in or any failure of performance by Seller shall not constitute default or give rise to any claims for damages if and to the extent caused by acts of God, acts of the Buyer, acts, rules or regulations of governmental authority (civil or military, executive, legislative, judicial or otherwise), strikes or other concerted acts of workmen, lockout, labor difficulties, fires, floods, storm, accident, epidemics, war, riots, rebellion, sabotage, insurrection, difficulties or delays in public transportation or in public or postal delivery services, car shortage, fuel shortage, inability to obtain from Seller's usual sources of supply, inability to obtain suitable or sufficient energy, labor, machinery, facilities, supplies or materials, as and when required, or by any other circumstances beyond Seller's reasonable control, whether of a similar or dissimilar nature.

b) Upon the occurrence of any of the circumstances set forth in 3 (a) above, Seller shall have no obligation whatsoever to make any allocation of its available production, deliveries, services, raw materials or other resources but may, at its option, elect to allocate its available production, deliveries, services, raw materials or other resources among any or all purchasers, as well as departments, divisions, subsidiaries and affiliates of the Seller, upon such basis as Seller, in its sole discretion, may determine, without liability whatsoever for any failure of performance which may result therefrom. In any event, Seller may determine not to allocate any of its available production, deliveries, services, raw materials or other resources to Buyer, without liability whatsoever for any failure of performance which may result therefrom.

4. LIMITATION OF DAMAGES

a) In no event shall Seller be liable for incidental, consequential or special damages incurred by Buyer arising out of or relating to the transactions herein.

b) In no event shall the aggregate liabilities of Seller to Buyer arising out of or relating to the transactions herein exceed the agregate purchase price to be paid by Buyer to Seller hereunder.

5. QUANTITIES

a) Over-runs or under-runs not exceeding ten percent (10%) of the quantity of goods ordered hereunder shall be accepted by Buyer unless otherwise stated herein.

b) Unless otherwise specified herein, all quantities of goods ordered hereunder shall be shipped together in one shipment.

6. SHIPMENTS

a) Shipment dates are based upon Seller's best judgment, are subject to factory schedules and production limitations, and hence are not guaranteed.

b) Goods will be shipped as indicated herein. When goods are shipped f.o.b. Seller's plant Buyer is responsible for notifying the carrier as to any damages to or loss in transit of such goods.

c) Claims for shortages, etc. shall not be accepted by Seller unless they are made by Buyer in writing within forty-eight hours after delivery of the goods and are accompanied by a reference to Seller's shipping slip number.

7. PERFORMANCE BY BUYER

a) In addition to any other legal remedy, if Buyer fails to fulfill the terms of payment, Seller may defer further performance of services hereunder and/or further delivery of goods hereunder or may, at its option, cancel further performance of services hereunder and/or further delivery of goods hereunder.

b) Seller reserves the right prior to performing any services hereunder and/or making any shipments of goods hereunder to request from Buyer satisfactory security for performance of Buyer's obligations hereunder.

8. SPECIFICATION CHANGES

Specification changes are subject to acceptance by Seller, to price revisions and to any adjustments necessary to cover material procured and processed and labor expended prior to receipt by Seller of revised specifications.

9. PRECIOUS METALS

a) Unless other arrangements have been made written notice of at least fifteen (15) days will be required in advance of any removal of platinum group metals from any metal account as unfabricated metal.

b) Some shipments of precious metals cannot be made via truck or rail. In such cases and unless otherwise instructed by Buyer, precious metals ordered by Buyer will be shipped via Parcel Post or such other method as Seller may choose.

10. GENERAL

a) The terms and conditions set forth herein contain the sole and entire agreement between Seller and Buyer and supersede all prior discussions, proposals, quotations, negotiations, representations and agreements and shall not be modified or amended except by an instrument in writing signed by or on behalf of both Buyer and Seller.

b) This Agreement shall be governed by and construed according the the laws of the state of Seller's facility shown on the face of this form.

Section C. - Preventive Maintenance Operating Procedures (continued):

ii. **Air/Oil Seperator Vent** - The air/oil vent gas should not contact the catalyst. It can be vented to the atmosphere or into the flue gas, **downstream** of the catalyst.

iii. **Oil Seals** - The turbine oil seals should be properly maintained so that leakage of the oil into the gas turbine exhaust does not exceed **0.033** gallons/week per pound/second of exhaust flow.

Section D. - Catalyst Disposal

Engelhard will take back spent **CO** & **SCR** catalyst* provided:

i. the spent catalyst is not damaged and/or contaminated in any way with elements and/or compounds that would alter its disposability.

ii. the laws and regulations regarding the handling, transportation, storage, disposal, and treatment of the spent catalyst are unchanged from those in effect on the date of the order/sales contract.

iii. the customer shall be responsible for the removal of spent catalyst, and for its delivery to a site designated by Engelhard. EC supervision will be available for our standard technical service charge.

Engelhard will take back spent Engelhard CO catalyst and will lower the price of new Engelhard CO catalyst by up to 5%.

*Note - We will only take back spent Engelhard catalyst.

For more information about the options for catalyst recycle and disposal, please contact:

Engelhard Corporation
Environmental Catalysts Group
101 Wood Ave. , Iselin, NJ 08830-0770
Tel: (908) 205-6641
Fax:(908) 205-6146

Engelhard West Inc.
2000 Powell St., Suite 1200
Emeryville, CA. 94608
Tel: (510) 596-1703
Fax:(510) 655-7887

ENGELHARD

ENGELHARD CORPORATION
101 WOOD AVENUE
ISELIN, NEW JERSEY 08830-0770
908-205-5000

CATALYST MANAGEMENT PROGRAM

Section A. - CO Catalyst Cleaning

Engelhard can increase activity levels of deactivated CO catalysts in power generation, chemical, industrial, and commercial process applications with the **CatKleen** tm catalyst cleaning service. This service uses proprietary chemical cleaning procedures to eliminate the contaminants that may gradually accumulate on the catalyst surface.

Cleaning can usually be accomplished many times, often at less than 10% of the cost of fresh catalyst. Cleaning will typically return the catalyst to its original activity, with life expectancies of up to 10 years or more.

For more information about our **CatKleen** tm catalyst cleaning service, please contact your Engelhard representative.

Section B. - SCR Catalyst Recycling

Engelhard will recycle spent Engelhard **VNX** tm catalyst using our proprietary **CatKleen** tm catalyst regeneration process, typically for 60% of the cost of fresh catalyst.

The catalyst recycling program enables power generation facilities to maintain optimum NO_x abatement levels while significantly reducing life-cycle costs. The **CatKleen** tm catalyst regeneration process typically restores the SCR catalyst to its original conversion level.

Please ask an Engelhard representative for details of recycling **VNX** tm SCR catalyst.

Section C. - Preventive Maintenance Operating Procedures

Three specific preventive maintenance operating procedures should be followed when using Engelhard CO oxidation catalyst on Gas Turbines which use lubricating oil containing phosphorous. These procedures are as follows:

i. Lubricating Oil - The phosphorous content in the lubricating oil should be minimized, with levels as low as **800 ppm** preferred..

Preston
Patty - Copy
Sign & file

LAW OFFICES

HOLLAND & KNIGHT

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NEW YORK, NY 10017
(212) 338-0970

September 16, 1993

RECEIVED

SEP 16 1993

Division of Air
Resources Management

VIA HAND DELIVERY

Mr. Hamilton S. Oven, Jr., P.E.
Office of Siting Coordination
Department of Environmental
Protection
Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Suite 953A
Tallahassee, FL 32399-3000

Re: Tampa Electric Company -- Polk Power Station
IGCC Unit

Dear Buck:

This will confirm recent telephone conversations with Greg Nelson of Tampa Electric Company concerning the Company's plans for the Polk Power Station. Tampa Electric Company will not be placing the combustion turbine (CT) associated with the integrated coal gasification combined cycle unit (IGCC) on line in 1995 as originally contemplated. The CT will come on line in 1996, along with the rest of the IGCC facilities. The Public Service Commission has been informed of this change to the Polk Power Station project.

As we understand it, this will require that certain of the conditions proposed by the Department for the air emissions from the CT be modified or dropped. We have asked ECT to provide a mark-up of the conditions with suggestions for those that should be modified as a result of this change, to facilitate your review. We will distribute the mark-up to you and to Clair Fancy by tomorrow.

Please let me know if you have any questions or require additional information.

Sincerely,

HOLLAND & KNIGHT

Larry

Lawrence N. Curtin

LNC/mre
TAL-32351

cc: All Counsel of Record
Mr. Greg Nelson
Mr. Spence Autry
Mr. Steve Jenkins
Mr. Jack Doolittle

TO: Steve Jenkins

From: Sherry for Doug Todd

CC: Doug Outlaw

GE Power Generation
Marketing

General Electric Company
1 River Road, Schenectady, NY 12345

September 13, 1993

Don Pless
Project Manager
Tampa Power Services
P.O. Box 111
Tampa, FL 33601-0111

POLK POWER STATION IGCC PROJECT
SYNGAS COMBUSTION DEVELOPMENT

Dear Don:

Our program for combustion development for IGCC is progressing well. We have finished the 7F mapping program funded by GE, EPRI, DOE, Shell and Texaco and now believe we understand the basic capabilities of our machines.

As you know, our laboratory in Schenectady, NY can simulate various syngas mixtures by mixing individual constituents and operating a single combustor at full pressure and temperature. The simulated syngas laboratory tests have been done on a combustor designed for burning natural gas; it is one of fourteen that would operate together in a 7F gas turbine. We cannot test the complete array with the integrated operation and its effects until we get to the field with a real gasifier in 1996.

It is on the basis of these mapping tests that we were able to provide Tampa Electric Company with the guarantee of 25 ppmvd NOx levels for the specified coal gas anticipated from the Texaco gasifier operating in a cold gas cleanup mode. We are now proceeding to test a modified combustor for the Polk Power Station IGCC unit and to make the necessary adjustments in the configuration to provide the reliability and life found in natural gas configurations.

The particular technology for your combustion turbine combines two different techniques for NOx control, so it will be the most advanced in the industry and we would expect it to set BACT levels after it goes into operation. In addition to syngas combustor development and the effect of CO_2 in the syngas we are injecting diluent nitrogen directly into the combustors. That combination gives excellent NOx reduction from the uncontrolled levels of 400-500 ppmvd down to 25 ppmvd. Our eventual goal for the technology development is to reach 9 ppmvd NOx at 15% O_2 and that appears possible sometime in the future. We have set the contractual guarantee based on the only results that can validly be used at this time to predict the performance of this unit when it begins operation in 1996. We cannot make a better guarantee for the Polk unit

Douglas M. Todd

Douglas M. Todd
Manager, Combined Cycle Programs

cc: C. Nelson
C. VanTine

COMPARISON OF COSTS FOR INSTALLATION OF SCR

TECO Polk Power Station

TECO submitted a revised cost estimate for installing SCR at their Polk Power Station in a letter from ECT dated September 29, 1993. The estimated cost per ton for NO_x removed due to the SCR system was reduced by $1337 per ton or a reduction in the cost estimated by TECO of 21 percent. The equipment costs are based on estimates from the Henry Vogt Machine Company, Inc. and GE costs for an ammonia storage tank/system software/data acquisition.

The BAR estimated costs for equipment using a vanadium catalyst are based on a generalized estimate developed by Engelhard Corporation for installation of an SCR system on a GE Frame 7 fired with coal gas. Costs for a zeolite catalyst based on an estimate provided by Atlas-Steuler are also attached. The zeolite catalyst has a broader operating temperature range and is not susceptible to trace metal poisoning.

QAQPS cost factors appropriate for a baghouse were used by TECO to develop most non-equipment costs. These factors were retained in the BAR estimate of costs where industry guidance was not available.

TECO and BAR estimated costs are summarized on the attached table. The primary differences in estimated costs remain

a. Cost of purchased equipment (the TECO estimate might include a second complete catalyst set; if so, TECO's use of cost factors would bias their estimate upward)

b. 20 percent contingency rate for the TECO estimate instead of the 10 percent rate used by BAR, and

c. 5 percent per year escalation in cost to 1995 in the TECO estimate

Table 1. Comparison of Estimated Costs for SCR Installation

	Estimated Costs (thousands)		
	TECO	Vanadium	Zeolite
Capital Costs:			
Purchased Equipment	3,345	1,603	2,124
Installation Cost	1,002	-- 543*	--
Site Preparation	163	-- 163	--
Indirect Costs (Engineering, etc.)	934	449	595
Contingency	667	160	212
Interest During Construction	610	302	343
	-----	-----	-----
Total Capital Investment	6,709	3,220	3,980
Annual Costs:			
Labor and Materials	49	-- 52	--
Catalyst Costs (Replacement)	604	268	384
Utilities and Raw Materials	70	-- 89	--
Energy Penalties	410	-- 410	--
Contingency	227	82	94
Indirect Costs (Overhead, etc.)	284	133	190
Fixed Charges on Capital	740	355	439
	-----	-----	-----
Total Annualized Cost	2,383	1,416	1,658
Tons NO_x Removed	482.9	489.2	489.2
Costs Per Ton	4935	2895	3389

* Same cost for vanadium and zeolite catalysts.

TECO SCR Annualized Cost Estimate

Review Comments

1. Will the SCR catalyst and duct module be manufactured by the Henry Vogt Machine Company? If not, can TECO provide a summary of estimate costs to Henry Vogt from the catalyst manufacturer?

2. Can TECO provide manufacturers' specs for the catalyst to be provided? to include composition, substrate cell density (pitch), space velocity, size and number of catalyst modules and operating temperature limits?

3. What insulation costs will be incurred beyond the internal insulation supplied with the unit, if any?

4. Now that the module size can be estimated, how were site preparation costs calculated? How do site preparation costs differ from foundation and supports costs?

5. Can TECO provide an expenditure schedule during construction showing costs of borrowed funds and interest received on borrowed funds until expenditure? Has TECO taken the 1 year delay in startup of the unit in account in calculating interest during construction?

6. Can TECO provide a list of the items included in the catalyst inventory and their estimated cost?

7. What is the catalyst manufacturer's return policy on the spent catalyst?

8. How were the downtime costs for catalyst replacement calculated? Will the catalyst be cleaned by the manufacturer and returned?

Note: TECO has adjusted the annualized cost to 1995 using a 5 per cent per year cost increase factor. While adjustment to the system initial startup date is in accordance with the cost estimating procedures in the QAQPS cost control manual, BACT economic impact analysis procedures require that a real interest rate (i.e., absent inflation) be used to express capital costs in present-day annual costs.

Table 1. SCR Performance & Cost Comparison

Parameter	Units	Value			
		Stanton No. 2	PPS – 7FCT	PPS – 7FCT	Indiantown
Fuel Type	N/A	Coal	Syngas	No. 2 Oil	Coal
Power Produced	MW	460	260	220	330
Maximum Heat Input	MMBtu/hr	4,286	1,762	1,907	3,422
Exhaust Gas Flow Rate	lb/hr	4,770,000	4,105,519	3,665,642	4,802,900
Inlet NO_x	lb/MMBtu	0.320	0.099 [1]	0.138 [1]	0.270
Inlet NO_x	lb/hr	1,371.5	222.5	311.0	923.9
Inlet NO_x	lb/MW–hr	2.98	0.87 [2]	1.43 [2]	2.80
Inlet NO_x, ppmv	ppmv	181	33	52	121
Inlet NO_x @ 15% O_2, dry	ppmvd	N/A	25	42	N/A
SCR Removal Efficiency	%	47	50	50	37
Outlet NO_x	lb/MMBtu	0.170	0.050 [1]	0.069 [1]	0.170
Outlet NO_x	lb/hr	728.6	111.3	132.2	581.7
Outlet NO_x	lb/MW–hr	1.58	0.44 [2]	0.72 [2]	1.76
Outlet NO_x @ 15% O_2, dry[3]	ppmv	37.6	12.5	21.0	29.6
NO_x Removed	tpy	2,816	483 [4] (prorated annual syngas/oil)	N/A	1,499
Ammonia Slip	ppmv	2	10	10	10
Total SCR Capital Cost	$	35,390,000	3,081,500	N/A	29,307,000
Total SCR Capital Cost	$/MW	76,935	11,852	N/A	88,809
Total SCR Capital Cost	$/MMBtu	8,257	1,735 (prorated annual syngas/oil)	N/A	8,564
Total SCR Annualized Operating Cost	$	9,120,000	3,028,755 (prorated annual syngas/oil)	N/A	8,961,400
Total SCR Annualized Operating Cost	$/MW	19,826	11,831 (prorated annual syngas/oil)	N/A	27,156
Total SCR Annualized Operating Cost	$/MMBtu	2,128	1,705 (prorated annual syngas/oil)	N/A	2,619
Cost Effectiveness	**$/ton**	3,239	6,272	**N/A**	5,979

Notes:
1. Based on heat input to coal gasifier and emissions from 7F CT and sulfuric acid plant thermal oxidizer.
2. Includes emissions from sulfuric acid plant thermal oxidizer.
3. Values for Stanton & Indiantown based on typical actual exhaust O_2 and H_2O concentrations of 3.8% and 9.7% by volume, respectively for pulverized coal units.
4. PPS prorated emission rates based on 100% load and 59°F ambient temperature.

SCR Cost Comparison

Facility	Application Date	Rating (MW)	Fuels	Inlet NO_x (ppmvd)	Outlet NO_x (ppmvd)	NO_x Removal Efficiency (%)	Purchased Equipment SCR Capital ($)	Purchased Equipment SCR Capital ($/MW)	Total SCR Capital ($)	Total SCR Capital ($/MW)	Annualized SCR Cost ($/yr)	Annualized SCR Cost ($/MW)	Cost Effectiveness ($/ton)
PPS – 7F CT	7/92	260	Syngas/Oil	25/42	13/21	50/50	3,081,500	11,852	6,382,360	24,548	3,028,755	11,649	6,272
Polk Power Partners	4/3/92	84	Natural Gas/Oil	25/42	9/15	64/64	2,485,200	29,586	4,385,200	52,205	1,957,900	23,308	7,034
Auburndale	2/92	156	Natural Gas/Oil	25/42	9/13	64/70	2,275,000	14,583	4,717,075	30,238	2,283,326	14,637	6,900
Orlando Cogen	12/19/91	129	Natural Gas	15	9	40	2,572,100	19,939	4,694,300	36,390	1,900,300	14,731	14,308
Kissimmee Utility	11/14/91	80	Natural Gas/Oil	25/42	5/8	80/80	2,625,000	32,813	5,921,000	74,013	3,184,000	39,800	13,700
Pasco Cogen	5/1/91	108	Natural Gas/Oil	25/42	9/17	64/60	2,285,700	21,164	4,331,100	40,103	1,955,300	18,105	7,443
City of Lakeland	12/90	120	Natural Gas/Oil	25/42	9/15	64/64	2,190,000	18,250	3,330,000	27,750	2,190,000	18,250	7,960
FP&L Martin	11/89	200	Natural Gas/Oil	25/42	9/15	64/64	3,550,000	17,750	7,021,250	35,106	4,562,500	22,813	6,976

Attachment II. SO_2 Incremental Cost Analysis

Data:

Parameter	Units	Value
Nominal IGCC Gasifier Heat Input (LHV)	MMBtu/hr	2,035
Illinois # 6 Coal Sulfur Content, dry	wt %	3.5
Heat Content (LHV)	Btu/lb	11,000
Cost (1993)	$/ton	33.823
Pittsburgh #8 Coal Sulfur Content, dry	wt %	2.4
Heat Content (LHV)	Btu/lb	13,000
Cost (1993)	$/ton	50.703
SO_2 Removal Efficiency	%	95.65

Calculations:

A. Coal Consumption

1. Illinois #6 Coal

Coal Usage = [(2,035 MMBtu/hr) * (10^6 Btu/MMBtu)] / [(11,000 Btu/lb) * (2,000 lb/ton)]

Coal Usage =	92.50 tons/hr

2. Pittsburgh #8 Coal

Coal Usage = [(2,035 MMBtu/hr) * (10^6 Btu/MMBtu)] / [(13,000 Btu/lb) * (2,000 lb/ton)]

Coal Usage =	78.27 tons/hr

B. SO_2 Emission Rates

1. Illinois #6 Coal

SO_2 = (92.50 ton/hr) * (3.5 lb S/100 lb coal) * (2,000 lb/ton) * (2 lb SO_2/lb S) * (1 – .9565)

SO_2 =	563.3 lb/hr

2. Pittsburgh #8 Coal

SO_2 = (78.27 ton/hr) * (2.4 lb S/100 lb coal) * (2,000 lb/ton) * (2 lb SO_2/lb S) * (1 – .9565)

SO_2 =	326.9 lb/hr

C. Annual Tons of SO_2 Removed

SO_2 = [(563.3 lb/hr – 326.9 lb/hr) * (8,760 hrs/yr)] / (2,000 lb/ton)

SO_2 =	1,035.4 tons/yr

D. Annual Cost Increase

Cost = [($50.703/ton * 78.27 ton/hr) – ($33.823/ton * 92.50 ton/hr)] * 8,760 hr/yr

Cost =	$7,357,379 per year

E. Incremental Cost Effectiveness

Cost Effectivness = ($7,357,379/yr) / (1,035.4 tons/yr)

Cost Effectivness =	$7,106 per ton of SO_2 removed

COMPARISON OF SCR COSTS

Project	Date	Contingency Factor (%)	Catalyst Life (yrs)
PPS - 7F CT	7/92	25	3
Polk Power Partners	4/3/92	25	3
Auburndale	2/92	25	3
Orlando Cogen	12/19/91	20	3
Kissimmee Utility	11/14/91	15	2
Pasco Cogen	5/1/91	25	3
City of Lakeland	12/90	10	?
FPC Intercession City (CO Catalyst)	9/23/91	25	N/A
FPC UF Cogeneration (CO Catalyst)	11/5/91	25	N/A

Standard Vendor catalyst life guarantees:

Natural Gas - 3 yrs (longer periods available at additional cost)
Coal - 2 yrs

Contingency Factors

A. 10% - 50% for pollution control equipment.

U.S. Environmental Protection Agency, A Standard Procedure for Cost Analysis of Pollution Control Operations: Volume I, EPA 600/8-79-018a, June 1979.

B. 20% used by EPA in developing NSPS for industrial boilers and municipal waste combustors.

U.S. Environmental Protection Agency, Industrial Boiler SO_2 Cost Report, EPA 450/3-85-011, November 1984.

U.S. Environmental Protection Agency, Municipal Waste Combustors - Background Information for Proposed Standards: Control of NO_x Emissions, EPA 450/3-89-27d, August 1989.

ECT
Environmental Consulting & Technology, Inc.

September 8, 1993
ECT No. 90263-0502-1300

Mr. Doug Outlaw
Florida Department of
Environmental Protection
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Tampa Electric Company
Polk Power Station
Coal Cost Analysis

Dear Mr. Outlaw:

In response to your request, an incremental cost analysis for the use of lower sulfur coal for the Polk Power Station project is provided for your review.

Specific coal costs, including transportation charges, provided by Tampa Electric Company (TEC) are shown on Attachment I. These costs represent actual 1993 costs for spot market coals (Illinois #6 and Pittsburgh #8). Water transportation costs reflect charges incurred for shipment to TEC's Big Bend facility. The truck transportation charge, which is the same for both coals, is the estimated cost to transfer the coal from the Big Bend Station to the Polk Power Station site. TEC indicates that a coal contract for Polk Power Station negotiated at the present time would result in coal prices approximately the same as current spot market prices; transportation charges would remain the same for both contract and spot market coals. As can be seen from the data on Attachment I, there is a significant increase in transportation charges for the Pittsburgh #8 coal. The Pittsburgh #8 coal is obtained from coal mines located south of Pittsburgh, PA and is transported by barge on the Monongahela River to the Ohio River and then to the Mississippi River.

Tampa Electric Company considers the information shown on Attachment I to be confidential. It is therefore requested that Attachment I be placed in a separate, confidential file by the Florida Department of Environmental Protection.

P.O. Box 8188
Gainesville, FL
32605-8188

3701 Northwest
98TH Street
Gainesville, FL
32606

(904)
332-0444

FAX (904)
332-6722

An incremental cost analysis, based on the coal costs shown on Attachment I, is provided on Attachment II. This analysis reflects the different heat values of the two coals and is based on the nominal heat input to the gasification process. The analysis shows an incremental cost increase of $7,100 per ton of sulfur dioxide (SO_2) removed resulting from the use of lower sulfur Pittsburgh #8 coal instead of the requested Illinois #6 coal.

Please call me at (904) 332-0444 or Greg Nelson of TEC at (813) 228-4847 if there are any questions.

Sincerely,

ENVIRONMENTAL CONSULTING & TECHNOLOGY, INC.

Thomas W. Davis

Thomas W. Davis, P.E.
Senior Engineer

TWD/tw
Attachments

DESTEC ENERGY

RECEIVED
AUG 25 1993
Division of Air Resources Management

DESTEC ENERGY, INC.
2500 CITYWEST BLVD., SUITE 150
P.O. BOX 4411
HOUSTON, TEXAS 77210-4411
(713) 735-4000

FACSIMILE TRANSMITTAL

DATE: 25 August, 1993

TOTAL NO. OF PAGES: 9 including this page

SENT BY: Wendy Lessig

DESTEC ENVIRONMENTAL AFFAIRS FAX NO.: (713)735-4571

PLEASE DELIVER THE FOLLOWING PAGES TO:

PERSON	COMPANY	FAX NUMBER
Doug Outlaw	Florida DEP	(904) 922 - 6979
		( ) -
		( ) -
		( ) -

PROJECT: Wabash River Coal Gasification Repowering Project

PROJ NO.: 1162.

CC:

FILE NO.: 2.1.1.2.

SUBJECT: Wabash River Gasification Project Info — Re: TECO Project

MESSAGE: Per our telephone conversation, the following are answers to your questions:
① At Wabash River, max. estimated SO_2 emissions from turbine exhaust = 0.15 lb/MMBtu coal inp.
Overall, from all project sources the max. SO_2 emissions = 0.25 lb/MMBtu of coal input.
On a lb SO_2/MWhr basis, the max. SO_2 emissions correspond to 2.3 lb/MWhr for the overall Project.
② The minimum ("worst case") sulfur removal efficiency of the amine system = 98%
③ See attached excerpts from May 1993 Environmental Assessment, by U.S. DOE which describes the project.
④ Please call me if you have additional questions.

CONFIDENTIALITY NOTICE:

THE INFORMATION CONTAINED IN THIS FACSIMILE MESSAGE IS LEGALLY PRIVILEGED AND CONFIDENTIAL INFORMATION INTENDED ONLY FOR THE USE OF THE ADDRESSEE NAMED ABOVE. IF THE READER OF THIS MESSAGE IS NOT THE INTENDED RECIPIENT, YOU ARE HEREBY NOTIFIED THAT ANY DISSEMINATION, DISTRIBUTION OR COPYING OF THIS TELECOPY IS STRICTLY PROHIBITED. IF YOU HAVE RECEIVED THIS TELECOPY IN ERROR, PLEASE IMMEDIATELY NOTIFY US BY TELEPHONE AND RETURN THE ORIGINAL MESSAGE TO US AT THE ADDRESS ABOVE VIA UNITED STATES POSTAL SERVICE. WE WILL REIMBURSE ANY COSTS YOU INCUR IN NOTIFYING US AND RETURNING THE MESSAGE TO US.

IF THIS TRANSMISSION IS INCOMPLETE, PLEASE CALL 713/735-4091.

DOE/EA-0853

Environmental Assessment

Wabash River
Coal Gasification Combined Cycle
Repowering Project

Clean Coal Technology Program

A Project Proposed by
Wabash River Coal Gasification Repowering Project Joint Venture
at the
Wabash River Generating Station
West Terre Haute, Indiana

May 1993

U.S. Department of Energy
Assistant Secretary for Fossil Energy

forces. The GEP stack height criteria do not apply to sources with stacks of 65 meters (approximately 213 feet) or less. The GEP criteria define the stack height for each source that will safely prevent downwash and that represents the maximum creditable height allowed for assessing ambient impacts based on dispersion modeling.

3.1.3.2 Process Description

The proposed project would achieve reductions in the overall emissions of SO_2, NO_x, PM, particulate matter 10 microns or smaller (PM_{10}), lead, fluorides, and methane (CH_4) as compared with the existing operation of the Wabash Station. This project would involve the installation of a new gasifier, cleanup system, and advanced-cycle combustion turbine to replace the coal-fired boiler of existing Unit 1. This unit would operate on synthetic fuel gas (syngas) made from locally mined, high-sulfur (4.5 percent to 4.9 percent sulfur) coal. The syngas would be produced in an on-site gasification facility capable of processing approximately 2,600 tons of coal per day. Additionally, an HRSG would be installed in the combustion turbine exhaust to generate steam to repower the existing Unit 1 steam turbine. The coal-fired boiler that currently supplies steam to the Unit 1 turbine would be retired in place upon implementation of this project. There would be no plans to repower this boiler.

A diagrammatic representation of the CGCC process that would be utilized at the Wabash Station is shown in Figure 3-5. The two major components of the demonstration project would be the gasification island and the power island. In the gasification island, coal would be ground with water to form a slurry that would be pumped into the gasification vessel. Oxygen would be added to this gasification vessel to form a hot, raw gas through partial combustion of the coal. During this gasification process, the non-carbon materials in the coal would melt and flow out of the gasification unit. This material is the gasifier slag by-product, a black, glassy, non-leaching, and sand-like material. The hot raw gas would be cooled in a heat exchanger to generate high-pressure steam. Particulates, sulfur, and other impurities would be removed from the raw gas before combustion to make it an acceptable fuel for the combustion turbine in the power island.

In the gasification process, approximately 2,600 tons per day (tpd) of coal would be gasified at full load. Coal from the rod mill feed hopper would enter an open circuit feed hopper where coal slurry would be produced by wet grinding. The coal slurry process is designed to maximize solids concentration in the coal feed to the gasifier, producing high efficiency in the first stage gasifier and improved conversion in the second stage. Recycled water would be fed into the rod mill inlet along with the coal to produce the desired slurry solids. The Destec gasification process consists of two stages. The first would be

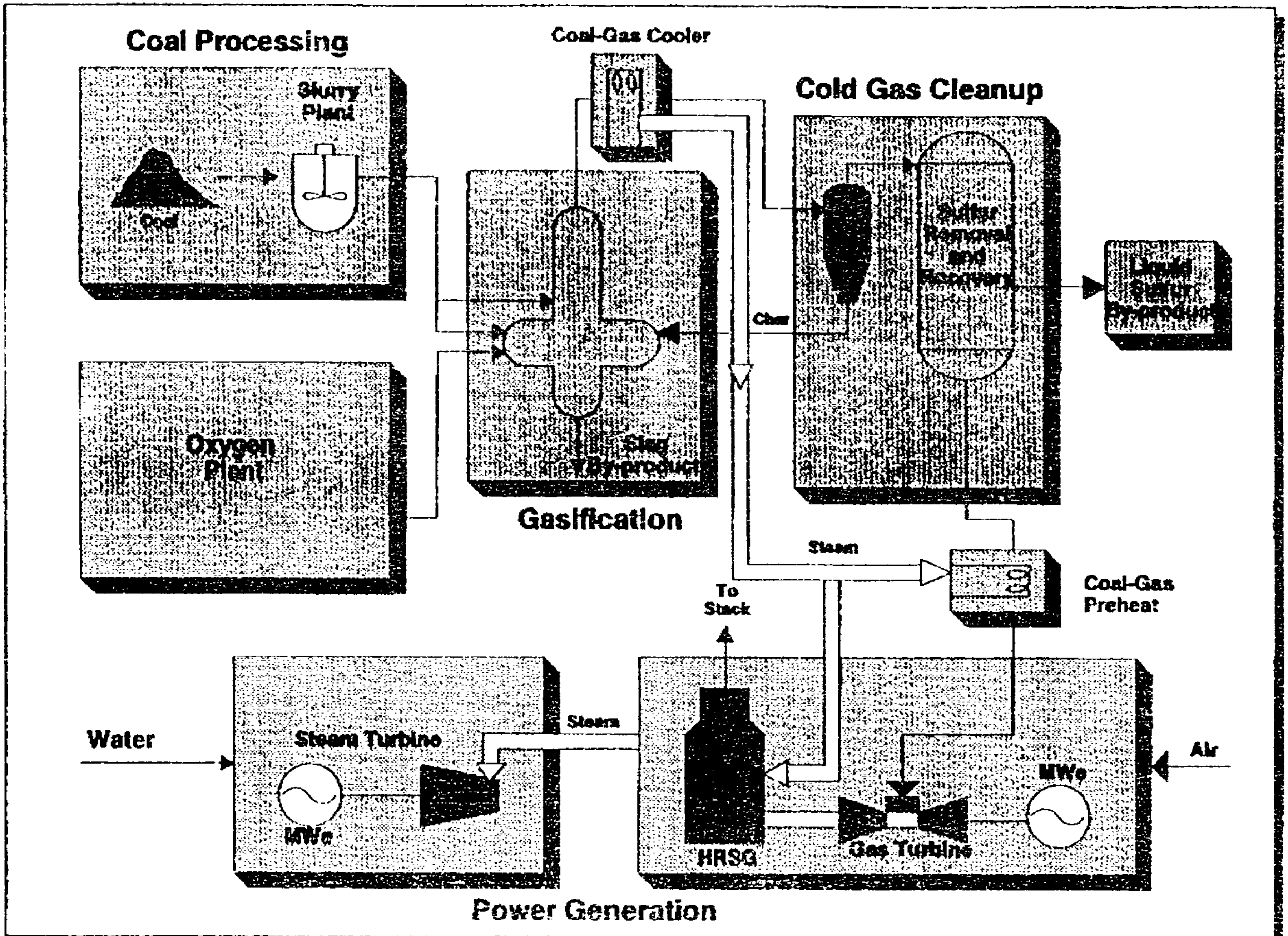


Figure 3-5. Diagrammatic representation of the CGCC process to be utilized at the Wabash Station.

an entrained flow slagging stage, and the second would be an entrained flow non-slagging stage. The slagging stage would be a horizontal refractory-lined vessel in which coal slurry and oxygen are combined in a partial combustion atmosphere at an elevated temperature and pressure to produce a high-temperature syngas. The coal would be almost totally gasified to syngas in this environment. All coal ash would flow out of the taphole in the bottom of the gasifier into a water-filled quench tank. Water quenching turns the molten ash into solidified slag, which would be continuously removed from the gasifier, crushed, dewatered, and stored for later disposition.

The raw syngas generated in the first stage would flow up from the horizontal section into the non-slagging stage (i.e., second stage) of the gasifier. This section would be a vertical, refractory-lined vessel in which additional coal slurry would be reacted with the hot syngas stream exiting the first stage. This additional slurry and some recycled cooled syngas serve to create and quench additional syngas. The cooled syngas would leave the reactor and move to a high-temperature heat recovery unit where it would be further cooled. The cooled syngas would then flow to a dry particulate removal section where particles would be separated from it and recycled to the gasifier. The syngas would be further cooled through a series of heat exchangers prior to hydrogen sulfide removal. As the gas cools, water containing ammonia, CO_2, and other dissolved gases would be collected and treated in a water treatment unit for recycling to the slurry preparation plant to make more coal slurry. Water treatment would separate the CO_2 and most of the dissolved hydrogen sulfide (H_2S) from the ammonia and remaining H_2S. The portion of the water not recycled for slurry would be treated to remove the remaining ammonia and H_2S, and would pass through filters designed to be the final barrier for removal of trace organics and solids. The hydrogen sulfide would be removed from the syngas by an acid gas removal (AGR) system that removes over 98 percent of the sulfur in the syngas. The syngas would then be reheated before being sent to the power plant.

The cleaned syngas would be routed to a combined cycle system for electric power production. The syngas would be piped to a combustion turbine to generate approximately 191 MWe of electricity. The HRSG would use heat from the combustion turbine exhaust to produce high-pressure steam. This steam, in combination with the steam generated in the gasification process, would be piped to the existing Unit 1 steam turbine to generate an additional 111 MWe of electricity. Addition of the gas and steam turbine generator outputs, less 34 MWe required for the proposed project's auxiliary power needs, would produce a total net output of 268 MWe for the project.

To protect against the uncontrolled release of syngas, a flare system is proposed to combust process stream components during cold startups, shut down, and during upset conditions when the combustion turbine is unavailable. Additionally, a tail gas incinerator (TGI) would be installed to destroy H_2S and other contaminants in the sulfur recovery system tail gas and process vent streams.

3.1.3.3 By-products

By-products of the proposed CGCC process would include elemental sulfur (35,280 tons per year at 90 percent capacity factor) and gasifier slag (93,838 tons per year (tpy) at 90 percent capacity factor). Both by-products are considered usable and would be actively marketed. Elemental sulfur can be sold as raw material to make agricultural fertilizer. The gasifier slag can be used as structural fill for construction projects and as an aggregate in asphalt roads. Testing of the gasifier slag produced in the LGTI facility (Section 1) has demonstrated that this by-product is not a hazardous waste as defined under Federal and State rules. The slag is a glassy, sand-like material that does not leach toxic concentrations of metal or organic contaminants, and would be stored in the southeast corner of the Wabash Station's existing ash pond system, pending off-site utilization. The sulfur would be stored on site in railroad tank cars pending shipment to a buyer.

3.1.3.4 Performance Characteristics

For the purpose of this EA, the performance of the Wabash Station proposed CGCC demonstration project is assessed based on a 90 percent annual capacity factor, since this is the maximum capacity of the permit being requested from the State. The term "90 percent capacity factor" means operation of combustion sources at 100 percent load for 90 percent of the hours in a year. At this capacity, approximately 861,000 tons of coal would be consumed by the CGCC process components (gasified and burned) annually, generating 191 MWe of electricity from the combustion turbine, and 111 MWe from the steam turbine. Approximately 34 MWe would be required for CGCC auxiliary equipment operation. Hence, the net power output from the CGCC system (steam and combustion turbines) would be 268 MWe, and the total net increase in power output for the Wabash Station from implementation of the CGCC demonstration project would be approximately 174 MWe. This represents a 23 percent increase over the existing gross permitted electrical generating capacity of the entire Wabash Station, and a 185 percent increase over the net capacity of Unit 1.

Table 3-5 identifies the estimated total quantities of pollutants emitted by the existing Wabash Station and the proposed CGCC demonstration project that are regulated under the Federal and State Prevention of Significant Deterioration (PSD) program. The table also indicates the total estimated emissions of greenhouse gases (e.g., CO_2, and CH_4) from the existing facility and proposed project. The annual emission numbers are based on annual capacity factors of 90 percent for the gasification plant, 90 percent for combustion turbine operation on syngas, plus 10 percent for combustion turbine operation on fuel oil.

Table 3-5. **Wabash River current and proposed CGCC Repowering Project air emissions (units are tons per year).**

Pollutant	Current Station Unit 1[a]	Current Station Units 1-6[a]	Proposed Project[b]	Proposed Project and Units 2-6[a,b]	Net Decrease/ Increase	% Change
SO_2	5,713	51,219	2,500.6	48,006.6	-3,212.4	-6.3
NO_x	1,370	11,732	1,101.7	11,463.7	-268.3	-2.3
PM[c]	126	1,133	100.8	1,107.8	-25.2	-2.2
PM_{10}	126	1,133	83.6	1,090.6	-42.4	-3.7
Lead	0.09	0.80	0.07	0.78	-0.02	-2.5
Fluoride	8.5	75.9	0	67.4	-8.5	-11.2
CO	94	842	2,046.6	2,794.6	+1,952.6	+232
VOCs	5	44.7	24.9	64.6	-19.9	+44.5
H_2SO_4 mist	63.5	569.3	154.7	660.5	+91.2	+16
TRS	0.23	2.07	8.54	10.38	+8.31	+401.5
CO_2	317,054	2,823,102	2,121,423	4,627,471	+1,804,369	+63.9
CH_4	2.2	19.4	1.9	19.1	-0.3	-1.5

[a] Based on a capacity factor of 39.3% for entire Station, 37.3% for Unit 1 (actual 1989-90).

[b] Based on a capacity factor of 90%.

[c] Includes PM_{10}.

[d] Percent change has been estimated on the basis of tons of pollutant emitted annually from the entire plant as it is projected to operate following repowering of Unit 1 versus current operations at the Wabash Station. Following completion of the proposed project, Units 2 through 6 would continue to operate at their existing generating capacity and level of utilization (approximately 39% capacity factor). However, the generation capacity of Unit 1 would increase from 99 MWe to 268 MWe and its capacity factor would increase from 37.3% to 90%. Since the repowered unit would not only have greater generation capacity, but also be operating at a higher capacity factor, the station as a whole would be consuming more fuel and be operating more hours annually. Therefore, if it were not for the pollution abatement/prevention aspects of the proposed repowering technology, including the ability to produce as much as 25% more electricity from a given amount of coal, there would be less of a decrease and more of an increase in the percentage changes associated with the various annual pollutant emissions. For example, due to the increased coal-to-electricity efficiency resulting from the proposed project, CO_2 emissions would be reduced by approximately 20% on the basis of coal per unit of electricity produced.

As shown in Table 3-5, the performance characteristics of the proposed CGCC demonstration unit allow the entire Wabash Station to achieve a 6.3 percent reduction in SO_2, and 2.3 percent reduction in NO_x from overall emissions (Units 2 through 6 plus the proposed CGCC unit). These reductions occur simultaneously with increased consumption of coal and increased production of electricity. However, as shown in Table 3-5, the proposed project would result in an overall increase in the amounts of [illegible] VOC, sulfuric acid (H_2SO_4) mist, TRS, and CO_2 emitted by the Wabash Station.

3.1.3.5 Construction Activities

Detailed engineering design of the proposed project is scheduled to be completed by the end of 1993, with on-site construction to be completed by mid-1995. The CGCC repowering project is scheduled to be in operation for approximately 25 years. The proposed DOE-assisted demonstration period covers the first 3 years of operation. Commercial operation of the plant is then slated to continue through the year 2020.

3.1.3.6 Resource Requirements

Net increases or decreases in resource requirements resulting from the proposed action are shown in Table 3-6.

Fuel. Based on 1990 operations, the Wabash Station consumed 1,456,900 tpy of Illinois Basin bituminous coal. Of this total the Unit 1 boiler used 164,900 tpy. The amount of coal required for the proposed action (based on 90 percent annual capacity factor) would be approximately 860,897 tpy, a net increase of approximately 695,997 tpy. Raw coal would be delivered from nearby mines to the proposed facility via the existing rail facilities. During the demonstration phase, the ability of the gasifier to operate on coals other than the design coal would be evaluated. At least two other coals would be tested for periods of 30 days each, and the results of the operations would be documented.

The proposed project would require construction of an 8-inch-diameter, approximately 1.5-mile natural gas pipeline from an existing transmission main west of Wabash Station, running parallel to Bolton Road (Figure 3-3), to supply approximately 1,320 million standard cubic feet per year (MMscf/yr) of natural gas for gasifier startups, flaring, and operation of the auxiliary boiler. The pipeline installation would include acquiring a 30-foot easement or right-of-way from the affected landowners along Bolton Road. The station currently utilizes No. 2 fuel oil for boiler startups. Approximately 11,300,000 gallons per year (gpy) of fuel oil would be used for the proposed project as the backup fuel for the CGCC combustion turbine, and for boiler startup.

Florida Department of
Environmental Protection

Lawton Chiles
Governor

Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Virginia B. Wetherell
Secretary

FAX TRANSMITTAL SHEET

TO: Brian Beals

DATE: 8-9-93 PHONE:

TOTAL NUMBER OF PAGES, INCLUDING COVER PAGE: 4

FROM: Clair Fancy
DIVISION OF AIR RESOURCES MANAGEMENT

COMMENTS: Revised BACT Determination
TECO Polk Power Station

PHONE: 904/488-1344 FAX NUMBER: 904/922-6979

If there are any problems with this fax transmittal, please call the above phone number.

Printed on recycled paper.

To Patty
Date 8/5 Time 2:56

WHILE YOU WERE OUT

M Brian Beals
of
Phone
Area Code Number Extension

✓	TELEPHONED	✓	PLEASE CALL
	CALLED TO SEE YOU		WILL CALL AGAIN
	WANTS TO SEE YOU		URGENT
			RETURNED YOUR CALL

Message have only recieved 2 copy of the tidal title page please fax again

SB
Operator

404/347-3059

Call Brian Beals see if they have copies of TECO Polk
~~see if it~~ FAX BACT-

Brian Beals
404/347-5014

MESSAGE CONFIRMATION

AUG-09-93 MON 14:35

TERM ID: DIV OF AIR RES MGMT

TEL NO: 904-922-5979

NO.	DATE	ST TIME	TOTAL TIME	ID	DEPT CODE	OK	PG
512	08-09	[illegible]	00:00:[illegible]	4043473059		02	00

I N T E R O F F I C E   M E M O R A N D U M

Date: 23-Aug-1993 02:02pm ES
From: Richard Donelan TAL
DONELAN_R
Dept: Office General Counsel
Tel No: 904/488-9730
SUNCOM:

TO: Hamilton Buck Oven TAL (OVEN_H)

CC: Clair Fancy TAL (FANCY_C)
CC: Syed Arif TAL (ARIF_S)
CC: Preston Lewis TAL (LEWIS_P)

Subject: RE: Meeting Re TECO Polk

Larry Curtain wants to stage a conference call about the TEC grant with Department of Energy people to discuss our proposed BACT between 1 and 3 on Tuesday the 24th. I think it would be important that we discuss the situation amongst ourselves before then.

I have recently reviewed a Destec Energy document which discusses its Wabash repowering project in Indiana. This IGCC is to achieve So2 emissions of .20 lb/MMBTU with 5.9% coal. Why can't the TEC plant do as well?

This case has significant policy problems. If we accept a "clean coal" plant which is dirtier than "dirty coal" plants like OUC of Cedar Bay, we will be backsliding on our efforts to permit ever-cleaner units. If we deny, then TEC will crucify us for hindering "clean coal" utilization. If we litigate the lower limits and win, then TEC walks and blames us. If we litigate and lose, then the Siting Board will be unhappy. No good deed goes unpunished.

I N T E R O F F I C E   M E M O R A N D U M

Date: 23-Aug-1993 01:51pm EST
From: Hamilton Buck Oven TAL
OVEN_H
Dept: Office of Secretary
Tel No: 904/487-0472
SUNCOM: Room 953-A

TO: Clair Fancy TAL (FANCY_C)
TO: Syed Arif TAL (ARIF_S)
TO: Preston Lewis TAL (LEWIS_P)

CC: Richard Donelan TAL (DONELAN_R)

Subject: Meeting Re TECO Polk

Based on a preliminary meeting with TEC, Richard and I would like to talk to you and your staff on Tues. 8/24 at 1:00 or 3:00 about the Conditions and BACT for the Polk Power Station. Whatever we decide may affect FPC as well. I understand some of us are to meet with Ross McVoy re Dade RRF at 2:00 as well.

THE TAMPA TRIBUNE

Published Daily
Tampa, Hillsborough County, Florida

State of Florida } ss.
County of Hillsborough }

Before the undersigned authority personally appeared R. Putney, who on oath says that he is Accounting Manager of The Tampa Tribune, a daily newspaper published at Tampa in Hillsborough County, Florida; that the attached copy of advertisement being a

LEGAL NOTICE(POLK)

in the matter of

LA#3607

was published in said newspaper in the issues of

7/29/93

Affiant further says that the said The Tampa Tribune is a newspaper published at Tampa, in said Hillsborough County, Florida, and that the said newspaper has heretofore been continuously published in said Hillsborough County, Florida, each day and has been entered as second class mail matter at the post office in Tampa, in said Hillsborough County, Florida, for a period of one year next preceding the first publication of the attached copy of advertisement; and affiant further says that he has neither paid nor promised any person, firm, or corporation any discount, rebate, commission or refund for the purpose of securing this advertisement for publication in the said newspaper.

R Putney

JAMES M. WILLIAMS, JR.
Notary Public, State of Florida
My comm. expires Mar. 22, 1996
No. CC187732

Sworn to and subscribed before me, this 3 *day of* August *, A.D. 19*93

James M. Williams Jr.

Lak and Ledger 7/29/93

"NOTICE OF CERTIFICATION HEARING ON AN APPLICATION TO CONSTRUCT AND OPERATE AN ELECTRICAL POWER PLANT ON A SITE TO BE LOCATED NEAR BARTOW, FLORIDA"

1. Application number PA 92-32 for certification to authorize construction and operation of electrical power plant facilities in Polk County, Florida, and associated transmission lines described more fully in paragraph 2 of this notice, is now pending before the Florida Department of Environmental Protection, pursuant to the Florida Electrical Power Plant Siting Act, Part II, Chapter 403, F.S. Certification of this power plant would allow construction and operation of a new source of air pollution which would consume an increment of air quality resources. The Department's review has resulted in an assessment of the prevention of significant deterioration impacts and a determination of the best available control technology necessary to control the emission of air pollutants from this source. The applicant is Tampa Electric Company. Comments on the air quality aspects of the project should be submitted to Bureau of Air Quality, Florida Department of Environmental Protection, Twin Towers Office Building, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, (904) 488-1344.

2. The Tampa Electric Company Polk Power Station site is located approximately 17 miles south of the city of Lakeland, approximately 11 miles south of the city of Mulberry, and 13 miles southwest of the city of Bartow in Southwest Polk County, Florida. The general location of the site is depicted in the map accompanying this notice. The site consists of approximately 4,348 acres and is bordered by the Hillsborough County line along the western boundary; Fort Green Road (County Road 663) on the east; County Road 630, Bethlehem and Albritton Roads along the north; and State Road 674 and several phosphate clay settling ponds on the south. State Road 37 bisects the property, running in a southwest to northeast direction. In general, lands surrounding the site and in the region have been impacted by previous and ongoing phosphate mining operations. The ultimate capacity of the site is proposed to be approximately 1,150 megawatts (MW). The first generating unit proposed for this site is an Integrated Coal Gasification Combined Cycle (IGCC) unit developed by Tampa Electric Company supported in part through funding from the U.S. Department of Energy under the Clean Coal Technology Demonstration Program. The coal fueled facilities will consist of a nominal net 160 MW advanced combustion turbine with heat recovery steam generator, steam turbine, and coal gasification facilities, comprising the nominal net 260 MW IGCC unit. Tampa Electric Company's current long range power resources planning efforts indicate that later facilities will consist to two nominal net 220 MW combined cycle generating units and six stand alone nominal net 75 MW combustion turbines fueled primarily by natural gas [illegible] the Tampa Electric Company and the Florida Transmission Grid. Two of the circuits will run northeast from the on-site Polk Power Station substation to interconnect with Tampa Electric Company's existing Hardee Power Station – Pebbledale 230 kV transmission line adjacent to the Power Power Station site along Fort Green Road. The corridor for these two circuits will be located within the site boundaries. The other two circuits will run west from the on-site substation to State Road 37, then north along state road 37 approximately 5 miles to interconnect with Tampa Electric Company's existing Mines – Pebbledale 230 KV transmission line at a point to the west of the community of Bradley Junction. These two circuits will be located within a new transmission line corridor adjacent to State Road 37.

3. The application for certification of the proposed power plant facilities is available for public inspection and copying at the addresses listed below.

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

STATE OF FLORIDA DEPARTMENT OF ENVIRONMENTAL PROTECTION
Southwest District Office
4520 Oak Fair Road
Tampa, Florida 33610-7347

TAMPA ELECTRIC COMPANY
702 North Franklin Street
Tampa, Florida 33602

HOLLAND & KNIGHT
92 Lake Wire Drive
Lakeland, Florida 33801

CENTRAL FLORIDA REGIONAL PLANNING COUNCIL
[illegible]

4. Pursuant to Section 403.508, Florida Statutes, a certification hearing will be held by the Division of Administrative Hearings on September 13, 1993, at the Davis Brothers Motor Lodge at 1035 North Broadway, Bartow, in Polk County, Florida, beginning at 10:00 a.m., in order to take written or oral testimony on the effects of the proposed electrical power plant or any other matter appropriate to the consideration of the site. Need for the facility has been predetermined by the Public Service Commission at a separate hearing. The certification hearing will continue on September 14-17, 1993, at the same location, as required. Written comments may be sent to Hearing Officer Diane D. Kiesling, Division of Administrative Hearings, The Desoto Building, 1230 Apalachee Parkway, Tallahassee, Florida 32399-1550, on or before September 7, 1993.

5. Pursuant to Section 403.508(4), F.S.:

(4)(a) Parties to the proceedings shall include:
1. The applicant.
2. The Public Service Commission.
3. The Department of Community Affairs.
4. The Department of Natural Resources.
5. The Game and Fresh Water Fish Commission.
6. The water management district.
7. The department.
8. The regional planning council.
9. The local government.

(b) Any party listed in paragraph (a) other than the Department or the applicant may waive its right to participate in these proceedings. If such listed party fails to file a notice of its intent to be a party on or before the 90th day prior to the certification hearing, such party shall be deemed to have waived its right to be a party.

(c) Upon the filing with the Hearing Officer of a notice of intent to be a party at least 15 days prior to the date of the land use hearing, the following shall also be parties to the proceeding:
1. Any agency not listed in paragraph (a) as to matters within its jurisdiction.
2. Any domestic nonprofit corporation or association formed, in whole or in part, to promote conservation or natural beauty; to protect the environment, personal health, or other biological values; to preserve historical sites; to promote consumer interests; to represent labor, commercial, or industrial groups; or to promote comprehensive planning or orderly development of the area in which the proposed electrical power plant is to be located.

(d) Notwithstanding paragraph (e), failure of an agency described in subparagraph (c) 1. to file a notice of intent to be party within the time provided herein shall constitute a waiver of the right of that agency to [illegible]

(e) Other parties may include any person, including those persons enumerated in paragraph (c) who have failed to timely file a notice of intent to be a party, whose substantial interests are affected and being determined by the proceeding and who timely file a motion to intervene pursuant to this paragraph may be granted at the discretion of the designated hearing officer and upon such conditions as he may prescribe any time prior to 30 days before the commencement of the certification hearing.

(f) Any agency, including those whose properties or works are being affected pursuant to s. 403.509(4), shall be made a party upon the request of the Department or the applicant.

6. When appropriate, any person may be given an opportunity to present oral or written communication to the designated Hearing Officer. If the designated Hearing Officer proposes to consider such communication, then all parties shall be given an opportunity to cross-examine or challenge or rebut such communications.

7. Pursuant to Section 403.511(2), Florida Statutes, Tampa Electric Company seeks a variance from the requirements of Rule 16C-16.0051(5) (9) (c), Florida Administrative Code, for the construction of the proposed cooling reservoir from Rule 16C-16.0051(11), Florida Administrative Code, governing the time schedule for reclamation to accommodate construction of the facilities, and Rule 17-550.320(1), Florida Administrative Code, containing the secondary drinking water standards for color and iron in groundwater discharges to the surficial aquifer due primarily to existing groundwater quality. The Hearing Officer will receive comments and testimony on the variance request from the parties, the public and the affected agencies at the certification hearing.

8. Notice or petitions made prior to the hearing should be made in writing to:

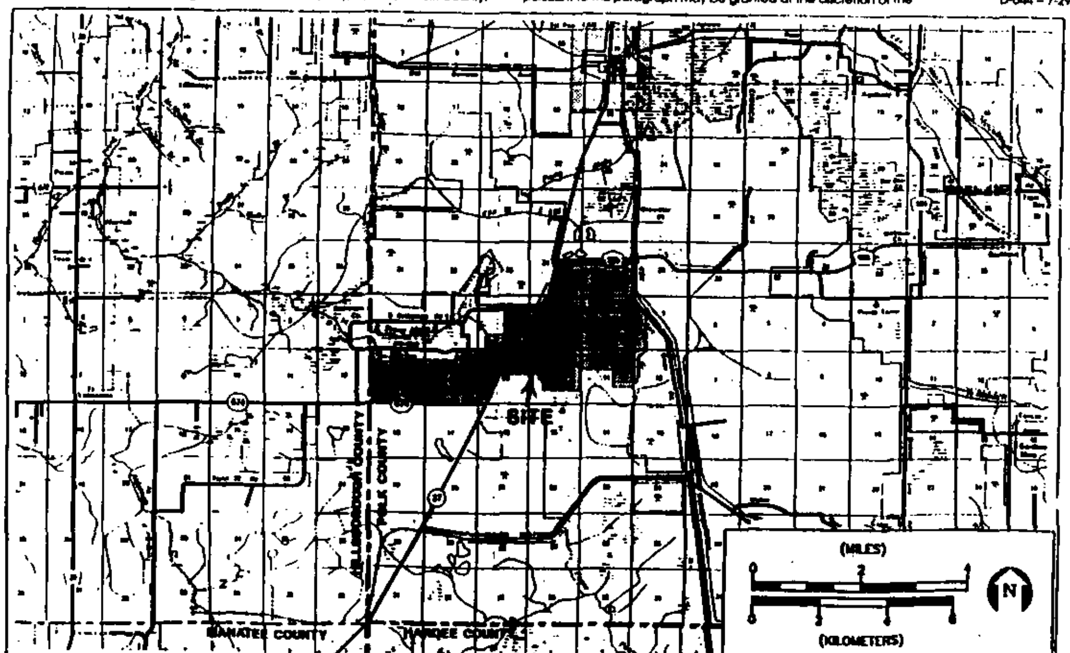
Ms. Diane Kiesling (DOAH Case. No. 92-4696-EPP)
The Division of Administrative Hearings
The DeSoto Building
1230 Apalachee Parkway
Tallahassee, Florida 32399-1550

Copies of such submittals should be forwarded by mail to existing parties, including the Department of Environmental Protection.

9. Those wishing to intervene in these proceedings, unless appearing on their own behalf, must be represented by an attorney or other person who can be determined to be qualified to appear in Administrative Hearings pursuant to Chapter 120, Florida Statutes, or Chapter 17-103.020, Florida Administrative Code.

10. This public notice is also provided in compliance with the Federal Coastal Zone Management Act, as specified in 15 CFR Part 930, Subpart D. Public comments on the applicants federal consistency certification should be directed to the Federal Consistency Coordinator, Office of [illegible] Marjory Stoneman Douglas Building, 3900 Commonwealth Boulevard, Tallahassee, Florida 32399-3000. TAL-26806

D-544 – 7-29; 1993



Notice of certification hearing on an application to construct and operate electric power plant on a site to be located near Bartow, Florida

Mulberry Press 7/29/93

1. Application number PA 92-32 for certification to authorize construction and operation of electrical power plant facilities in Polk County, Florida, and associated transmission lines described more fully in paragraph 2 of this notice, is now pending before the Florida Department of Environmental Protection, pursuant to the Florida Electrical Power Plant Siting Act, Part II, Chapter 403, F.S. Certification of this power plant would allow construction and operation of a new source of air pollution which would consume an increment of air quality resources. The Department's review has resulted in an assessment of the prevention of significant deterioration impacts and a determination of the best available control technology necessary to control the emission of air pollutants from this source. The applicant is Tampa Electric Company. Comments on the air quality aspects of the project should be submitted to Bureau of Air Quality, Florida Department of Environmental Protection, Twin Towers Office Building, 2600 Blair Stone Road, Tallahassee, Florida 32399-2400, (904) 488-1344.

2. The Tampa Electric Company Polk Power Station site is located approximately 17 miles south of the city of Lakeland, approximately 11 miles south of the city of Mulberry, and 13 miles southwest of the city of Bartow in Southwest Polk County, Florida. The general location of the site is depicted in the map accompanying this notice. The site consists of approximately 4,348 acres and is bordered by the Hillsborough County line along the western boundary; Fort Green Road (County Road 663) on the east; County Road 630, Bethlehem and Albritton Roads along the north; and State Road 674 and several phosphate clay settling ponds on the south. State Road 37 bisects the property, running in a southwest to northeast direction. In general, lands surrounding the site and in the region have been impacted by previous and ongoing phosphate mining operations. The ultimate capacity of the site is proposed to be approximately 1,150 megawatts (MW) The first generating unit proposed for the site is an Integrated Coal Gasification Combined Cycle (IGCC) unit developed by Tampa Electric Company supported in part through funding from the U.S. Department of Energy under the Clean Coal Technology Demonstration Program. The coal fueled facilities will consist of a nominal net 150 MW advanced combustion turbine with heat recovery steam generator, steam turbine, and coal gasification facilities, comprising the nominal net 260 MW IGCC unit. Tampa Electric Company's current long range power resources planning efforts indicate that later facilities will consist to two nominal net 220 MW combined cycle generating units and six stand alone nominal net 75 MW combustion turbines fueled primarily by natural gas with low sulfur no. 2 fuel oil as the back up fuel. Four 230 kilo-Volt (kV) electric transmission circuits will be needed to connect the Polk Power Station with the Tampa Electric Company and the Florida Transmission Grid. Two of the circuits will run northeast from the on-site Polk Power Station substation to interconnect with Tampa Electric Company's existing Hardee Power Station - Pebbledale 230 kV transmission line adjacent to the Polk Power Station site along Fort Green Road. The corridor for these two circuits will be located within the site boundaries. The other two circuits will run west from the on-site substation to State Road 37, then north along state road 37 approximately 5 miles to interconnect with Tampa Electric Company's existing Mines - Pebbledale 230 kV transmission line at a point to the west of the community of Bradley Junction. These two circuits will be located within a new transmission line corridor adjacent to State Road 37.

3. The application for certification of the proposed power plant facilities is available for public inspection and copying at the addresses listed below.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION
Twin Towers Office Building
2600 Blair Stone Road

4520 Oak Fair Road
Tampa, Florida 33610-7347

TAMPA ELECTRIC COMPANY
702 North Franklin Street
Tampa, Florida 33602

HOLLAND & KNIGHT
92 Lake Wire Drive
Lakeland, Florida 33801

CENTRAL FLORIDA REGIONAL PLANNING COUNCIL
490 East Davidson Street
Bartow, Florida 33830

4. Pursuant to Section 403.508, Florida Statutes, a certification hearing will be held by the Division of Administrative Hearings on September 13, 1993, at the Davis Brothers Motor Lodge at 1035 North Broadway, Bartow, in Polk County, Florida, beginning at 10:00 a.m., in order to take written or oral testimony on the effects of the proposed electrical power plant or any other matter appropriate to the consideration of the site. Need for the facility has been predetermined by the Public Service Commission at a separate hearing. The certification hearing will continue on September 14-17, 1993, at the same location, as required. Written comments may be sent to Hearing Officer Diane D. Kiesling, Division of Administrative Hearings, The DeSoto Building, 1230 Apalachee Parkway, Tallahassee, Florida 32399-1550, on or before September 7, 1993.

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(4)(a) Parties to the proceedings shall include:

1. The applicant.
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3. The Department of Community Affairs.
4. The Department of Natural Resources.
5. The Game and Fresh Water Fish Commission.
6. The water management district.
7. The department.
8. The regional planning council.
9. The local government.

(b) Any party listed in paragraph (a) other than the Department or the applicant may waive its right to participate in these proceedings. If such listed party fails to file a notice of its intent to be a party on or before the 90th day prior to the certification hearing, such party shall be deemed to have waived its right to be a party.

(c) Upon the filing with the Hearing Officer of a notice of intent to be a party at least 15 days prior to the date of the land use hearing, the following shall also be parties to the proceeding:

1. Any agency not listed in paragraph (a) as to matters within its jurisdiction.

2. Any domestic nonprofit corporation or association formed, in whole or in part, to promote conservation or natural beauty; to protect the environment, personal health, or other biological values; to preserve historical sites; to promote consumer interests; to represent labor, commercial, or industrial groups; or to promote comprehensive planning or orderly development of the area in which the proposed electrical power plant is to be located.

(d) Notwithstanding paragraph (e), failure of an agency described in subparagraph (c)1. to file a notice of intent to be party within the time provided herein shall constitute a waiver of the right of that agency to participate as a party in the proceeding.

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8. Notice or petitions made prior to the hearing should be made in writing to:

Ms. Diane Kiesling (DOAH Case No. 92-4896-EPP)
The Division of Administrative Hearings
The DeSoto Building
1230 Apalachee Parkway
Tallahassee, Florida 32399-1500

Copies of such submittals should be forwarded by mail to existing parties, including the Department of Environmental Protection.

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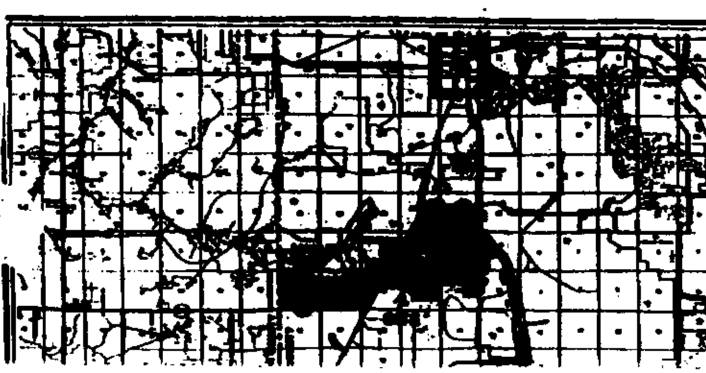
TAL-26808

Published Mulberry Press July 29, 1993



Mulberry Press

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Tallahassee, Florida 32399-2400

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION
Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION
Southwest District Office

702 North Franklin Street
Tampa, Florida 33602

HOLLAND & KNIGHT
92 Lake Wire Drive
Lakeland, Florida 33801

CENTRAL FLORIDA REGIONAL PLANNING COUNCIL
450 East Davidson Street
Bartow, Florida 33830

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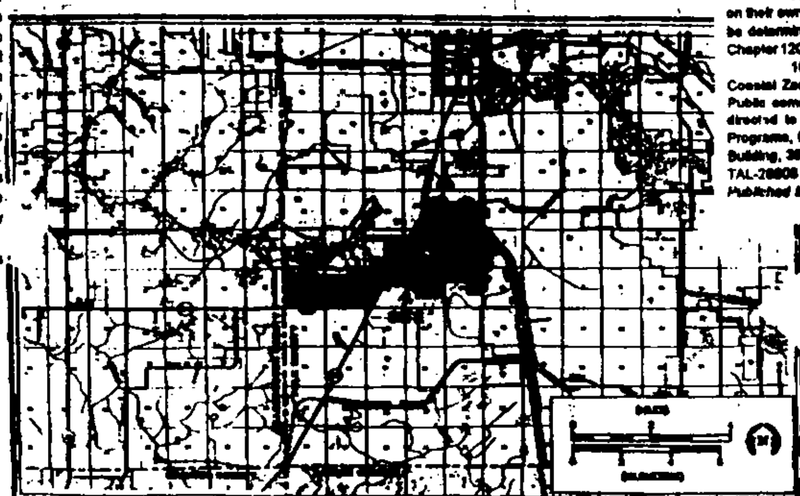

FIGURE 1.4.2-2

VICINITY MAP AND BOUNDARIES OF POLK POWER STATION SITE

TAMPA ELECTRIC

POLK POWER STATION

[illegible] comprehensive planning or orderly development of the area in which the proposed electrical power plant is to be located.

(d) Notwithstanding paragraph (c), failure of an agency described in subparagraph (c)1. to file a notice of intent to be party within the time provided herein shall constitute a waiver of the right of that agency to participate as a party in the proceeding.

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The Division of Administrative Hearings
The DeSoto Building
1230 Apalachee Parkway
Tallahassee, Florida 32399-1550

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TAL-26808

Published Mulberry Press July 29, 1993

RECEIVED

JUL 29 1993

Division of Air
Resources Management

July 26, 1993

Mr. Heinz J. Mueller, Chief
Environmental Policy Section
Environmental Protection Agency
345 Courtland St., NE.
Atlanta, Georgia 30365

Dear Mr. Mueller:

We have completed our initial review of the Tampa Electric Company (TECO) Site Certification Application (SCA) for the proposed 1,150 MW Polk Power Station in Polk County, near Mulberry, Florida. The project would be located approximately 120 km southeast of the Chassahowitzka Wilderness Area (WA), a Class I air quality area administered by the Fish and Wildlife Service.

Modeling Analysis

The modeling analysis for the SCA calculated the impacts from the proposed nine turbines and the coal gasification facility which will be built on the site during a phased construction period.

The modeling was first performed with the Environmental Protection Agency (EPA) ISCST2 and ISCLT2 dispersion models. The modeling was performed for 5 years, using surface meteorological data from Tampa, Florida, and upper air data from Ruskin, Florida. The ISCST2 model was used to estimate the 3-hour and 24-hour average pollutant concentrations, while the ISCLT2 model was used to estimate the annual average impacts. The ISC modeling was performed for both the proposed Polk Station, and for all increment consuming or expanding sources. The modeling predicted that the proposed Polk Station alone would exceed the Fish and Wildlife Service significant impact levels for total suspended particulate (TSP), sulfur dioxide (SO_2), and nitrogen dioxide (NO_2) annual averages, and the 24-hour TSP average. However, the cumulative analysis indicated that the Class I increment would not be exceeded for these averaging periods. The SO_2 annual impact was reported as negative (less than zero) due to the increment expanding sources. The cumulative ISCST2 analysis did indicate that the 3-hour and 24-hour Class I increments for SO_2 would be exceeded.

Therefore, the EPA MESOPUFF II model was run to determine whether the proposed Polk Station would significantly contribute to the 3-hour and 24-hour Class I SO_2 increment exceedances. In this analysis MESOPUFF II was run for only 1986, using 3 surface and 2 upper air meteorological stations. MESOPUFF II was run for all SO_2 PSD increment consuming or expanding sources beyond 50 km from Chassahowitzka WA, and ISCST2 for all increment consuming sources less than 50 km from the wilderness area. The cumulative MESOPUFF II/ISCST2 modeling indicated that both the 3-hour and the 24-hour increment was exceeded, but the proposed Polk Station did not significantly contribute to those exceedances. The second-high maximum predicted 24-hour impact was 5.0 micrograms per cubic meter ($\mu g/m^3$), equal to the 24-hour Class I increment for SO_2; the proposed Polk Station contributed significantly to this concentration (0.39 $\mu g/m^3$). This indicates that the increment, while not violated, would in effect be totally consumed by this and existing projects.

We have several comments regarding the analysis. For future PSD permit analyses, applicants should follow the recommendations found in the recently published Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 1 Report. This report discusses the options in MESOPUFF II to employ in such an analysis. For example, the IWAQM report requires that the PSD permit analysis with MESOPUFF II be run with full chemistry, for 5 years, for all averaging periods, with a switch to time dependent dispersion coefficients at 10 km. At this time, we recommend that increment expanding sources (negative emission rates) be modeled separately, first as positive emission rates, and then post processed as negative concentrations to the predicted concentrations of the positively emitting source's impacts. This is necessary because MESOPUFF II cannot address the concept of negative deposition or negative chemistry. This concept also applies to a NO_2 cumulative increment analysis.

The visibility analysis performed with the EPA VISCREEN model indicates that there should be no impact of a coherent visible plume at Chassahowitzka WA.

Control Technology Analysis

The proposed acid gas removal and sulfur recovery processes are estimated to achieve an overall sulfur removal efficiency of 95.6 percent. Nitrogen oxide (NO_x) emissions from the future combined cycle and simple cycle combustion turbines will be controlled by dry low-NO_x combustion technology, resulting in NO_x concentrations of 9 and 42 parts per million (ppm) for gas and oil firing, respectively. We agree that the proposed sulfur removal systems and dry-low NO_x technology represent best available control technology to minimize sulfur dioxide and NO_x emissions from the TECO facility.

Air Quality Related Values Analysis

TECO failed to adequately assess the potential effects of sulfate deposition from the proposed Polk Station on freshwater wetlands and related wildlife in the Chassahowitzka WA. These wetlands have a thin veneer of organic soil over a porous limestone base. As precipitation containing sulfate percolates through the soil, the organic matter in the soil may be oxidized. Such oxidation could cause erosion of the thin soil veneer. Many types of vegetation and invertebrates depend upon this veneer, and its loss would seriously alter and impair the function of the wetland ecosystem.

TECO also failed to adequately assess the potential effects of nitrate deposition on the saltwater habitat of Chassahowitzka WA. Nitrogen has been found to be the critical limiting nutrient to algal growth and eutrophication in coastal marine waters. Nitrogen enrichment has led to nuisance algal blooms; subsequent algal die-off can result in depleted dissolved oxygen concentrations in the water. In addition, algal blooms increase the turbidity of the water, decreasing light levels to rooted aquatic plants. Shallow coastal waters are particularly vulnerable to this process. Such changes in the patterns and magnitudes of phytoplankton production, changes in the production of rooted aquatic macrophytes, and changes in concentrations of dissolved oxygen can lead to alterations in the entire food web.

Atmospheric deposition of nitrogen, in the form of nitrates from emissions of nitrogen oxides, has been shown to be a significant source of nitrogen loading to coastal marine ecosystems, notably the Chesapeake Bay. Recently, atmospheric deposition of nitrogen to the Apalachicola River watershed in northern Florida was found to be sufficient to account for essentially all the dissolved nitrate and ammonium and total organic nitrogen flow in the river. The Apalachicola River empties into the Apalachicola Bay, where it is likely that these nitrogen compounds cause nutrient enrichment of the phytoplankton, with its associated problems of turbidity and decreased dissolved oxygen. Similar processes may be occurring in the Chassahowitzka WA ecosystem.

In addition, we are concerned about the deposition of mercury and beryllium in the wilderness area. These metals have the potential to bioaccumulate and biomagnify in the environment, and both are very toxic. Atmospheric pollutants from combustion sources have been shown to be important sources of metal contamination in fish and other wildlife in many regions of the country; deposition of metals may occur either near or far from the source, depending on atmospheric conditions. Atmospheric deposition of mercury has contributed significantly to mercury contamination in the Everglades; this contamination has been implicated in the decline of the endangered Florida panther. In addition, fish consumption advisories have been issued in many areas of the country because of mercury contamination. Beryllium, also deposited from the atmosphere, can cause gill abnormalities in fish, leading to death. Acidic deposition may exacerbate these problems, by increasing the solubility and mobilization of heavy metals present in the environment, thus facilitating their uptake by organisms.

TECO should perform a cumulative analysis, using the revised MESOPUFF II model, to predict deposition and concentration of sulfate, nitrate, mercury, and beryllium at the Chassahowitzka WA. In addition, TECO should perform an Air Quality Related Values Analysis based on the results of the deposition modeling.

Thank you for giving us the opportunity to comment on this Site Certification Application. We look forward to reviewing additional information regarding this matter. We appreciate your cooperation in notifying us of proposed projects with the potential to impact the air quality and related resources of our refuges.

If you have any questions regarding this matter, please contact Ms. Ellen Porter of our Air Quality Branch in Denver at 303/969-2071.

Sincerely yours,

James W. Pulliam, Jr.
Regional Director

cc:
Ms. Jewell Harper, Chief
Air Enforcement Branch
Air, Pesticides and Toxic Management Division
Environmental Protection Agency
345 Courtland Street, NE.
Atlanta, Georgia 30365

Mr. Clair Fancy
Chief, Bureau of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

cc: S. Arif
M. Zehn
B. Oven
B. Thomas, SW Dist.

RECEIVED
JUL 29 1993
Division of Air
Resources Management

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HOLLAND & KNIGHT

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P.O. DRAWER 810 (ZIP 32302-0810)
TALLAHASSEE, FLORIDA 32301
(904) 224-7000
FAX (904) 224-8832

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LAKELAND
MIAMI
ORLANDO
ST. PETERSBURG
TALLAHASSEE
TAMPA
WEST PALM BEACH
WASHINGTON, D.C.

OF COUNSEL
MASTRY, MARGER, DAVIS
JOHNSON, BARTLETT & LYNN, P.A.
360 CENTRAL AVENUE
P.O. BOX 3542 (ZIP 33731)
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(813) 896-7171 FAX (813) 822-8048

SPECIAL COUNSEL
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ESERNIO & SCHWARTZ, P.C.
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GARDEN CITY, NY 11530
(516) 742-0610 FAX (516) 742-2670
300 EAST 42ND STREET
NEW YORK, NY 10017
(212) 338-0970

July 1, 1993

Mr. Hamilton S. Oven, Jr., P.E.
Florida Department of
Environmental Protection
Marjory Stoneman Douglas Building
3900 Commonwealth Boulevard
Suite 953A
Tallahassee, Florida 32399-3000

Re: Polk Power Station -- Public Notice

Dear Buck:

As we discussed, I have enclosed for your information and review a copy of the notice we propose to place in the newspaper concerning the certification hearing for the Polk Power Station. I will appreciate any comments or revisions you may have on the draft notice.

As we discussed, we will need to coordinate the public notices for the certification hearing. After our discussion, I checked the statute and found that the notice period is 45 days for the certification hearing rather than 30. Consequently, we will not be in a position to wait until August 6, 1993, to publish the notice. I will instead ask that the hearing notice be published by July 30, 1993.

Please let me know if you have any questions.

Sincerely,

HOLLAND & KNIGHT

Larry

Lawrence N. Curtin

RECEIVED

JUL 01 1993

D. E. R.
SITING COORDINATION

LNC/mre
TAL-28857

cc w/enc: Richard Donelan, Esquire
Mr. Greg Nelson
Mr. Steve Jenkins

"NOTICE OF CERTIFICATION HEARING ON
AN APPLICATION TO CONSTRUCT AND OPERATE
AN ELECTRICAL POWER PLANT ON A SITE TO BE LOCATED
NEAR BARTOW, FLORIDA"

1. Application number PA 92-32 for certification to authorize construction and operation of electrical power plant facilities in Polk County, Florida, and associated transmission lines described more fully in paragraph 2 of this notice, is now pending before the Florida Department of Environmental Protection, pursuant to the Florida Electrical Power Plant Siting Act, Part II, Chapter 403, F.S. Certification of this power plant would allow construction and operation of a new source of air pollution which would consume an increment of air quality resources. The Department's review has resulted in an assessment of the prevention of significant deterioration impacts and a determination of the best available control technology necessary to control the emission of air pollutants from this source. The applicant is Tampa Electric Company.

2. The Tampa Electric Company Polk Power Station site is located approximately 17 miles south of the city of Lakeland, approximately 11 miles south of the city of Mulberry, and 13 miles southwest of the city of Bartow in Southwest Polk County, Florida. The general location of the site is depicted in the map accompanying this notice. The site consists of approximately 4,348 acres and is bordered by the Hillsborough County line along the western boundary; Fort Green Road (County Road 663) on the east; County Road 630, Bethlehem and Albritton Roads along the north; and

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D. E. R.
SITING COORDINATION

State Road 674 and several phosphate clay settling ponds on the south. State Road 37 bisects the property, running in a southwest to northeast direction. In general, lands surrounding the site and in the region have been impacted by previous and ongoing phosphate mining operations. The ultimate capacity of the site is proposed to be approximately 1,150 megawatts (MW). The first generating unit proposed for the site is an Integrated Coal Gasification Combined Cycle (IGCC) unit developed by Tampa Electric Company supported in part through funding from the U.S. Department of Energy under the Clean Coal Technology Demonstration Program. The coal fueled facilities will consist of a nominal net 150 MW advanced combustion turbine with heat recovery steam generator, steam turbine, and coal gasification facilities, comprising the nominal net 260 MW IGCC unit. Tampa Electric Company's current long range power resources planning efforts indicate that later facilities will consist to two nominal net 220 MW combined cycle generating units and six stand alone nominal net 75 MW combustion turbines fueled primarily by natural gas with low sulfur no. 2 fuel oil as the back up fuel. Four 230 kilo-Volt (kV) electric transmission circuits will be needed to connect the Polk Power Station with the Tampa Electric Company and the Florida Transmission Grid. Two of the circuits will run northeast from the on-site Polk Power Station substation to interconnect with Tampa Electric Company's existing Hardee Power Station - Pebbledale 230 kV transmission line adjacent to the Polk Power Station site along Fort Green Road. The corridor for these two circuits will be located within the site boundaries. The other two circuits will run west from the on-site substation to State Road 37, then north along state road 37 approximately 5 miles to interconnect with Tampa Electric Company's existing Mines - Pebbledale 230 kV transmission line at a point to the west of the community of Bradley Junction. These two circuits will be located within a new transmission line corridor adjacent to State Road 37.

3. The application for certification of the proposed power plant facilities is available for public inspection and copying at the addresses listed below.

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

STATE OF FLORIDA DEPARTMENT
OF ENVIRONMENTAL PROTECTION
Southwest District Office
4520 Oak Fair Road
Tampa, Florida 33610-7347

TAMPA ELECTRIC COMPANY
702 North Franklin Street
Tampa, Florida 33602

HOLLAND & KNIGHT
92 Lake Wire Drive
Lakeland, Florida 33801

CENTRAL FLORIDA REGIONAL PLANNING COUNCIL
490 East Davidson Street
Bartow, Florida 33830

4. Pursuant to Section 403.508, Florida Statutes, a certification hearing will be held by the Division of Administrative Hearings on September 13, 1993, at the Davis Brothers Motor Lodge at 1035 North Broadway, Bartow, in Polk

County, Florida, beginning at 10:00 a.m., in order to take written or oral testimony on the effects of the proposed electrical power plant or any other matter appropriate to the consideration of the site. Need for the facility has been predetermined by the Public Service Commission at a separate hearing. The certification hearing will continue on September 14-17, 1993, at the same location, as required. Written comments may be sent to Hearing Officer Diane D. Kiesling, Division of Administrative Hearings, The DeSoto Building, 1230 Apalachee Parkway, Tallahassee, Florida 32399-1550, on or before September 7, 1993.

5. Pursuant to Section 403.508(4), F.S.:

(4)(a) Parties to the proceedings shall include:

1. The applicant.
2. The Public Service Commission
3. The Department of Community Affairs.
4. The Department of Natural Resources.
5. The Game and Fresh Water Fish Commission.
6. The water management district.
7. The department.
8. The regional planning council.
9. The local government.

(b) Any party listed in paragraph (a) other than the Department or the applicant may waive its right to participate in these proceedings. If such listed party fails to file a notice of its intent to be a party on or before the 90th day prior to the certification hearing, such party shall be deemed to have waived its right to be a party.

(c) Upon the filing with the Hearing Officer of a notice of intent to be a party at least 15 days prior to the date of the land use hearing, the following shall also be parties to the proceeding:

1. Any agency not listed in paragraph (a) as to matters within its jurisdiction.

2. Any domestic nonprofit corporation or association formed, in whole or in part, to promote conservation or natural beauty; to protect the environment, personal health, or other biological values; to preserve historical sites; to promote consumer interests; to represent labor, commercial, or industrial groups; or to promote comprehensive planning or orderly development of the area in which the proposed electrical power plant is to be located.

(d) Notwithstanding paragraph (e), failure of an agency described in subparagraph (c)1. to file a notice of intent to be party within the time provided herein shall constitute a waiver of the right of that agency to participate as a party in the proceeding.

(e) Other parties may include any person, including those persons enumerated in paragraph (c) who have failed to timely file a notice of intent to be a party, whose substantial interests are affected and being determined by the proceeding and who timely file a motion to intervene pursuant to chapter 120 and applicable rules. Intervention pursuant to this paragraph may be granted at the discretion of the designated hearing officer and upon such conditions as he may prescribe any time prior to 30 days before the commencement of the certification hearing.

(f) Any agency, including those whose properties or works are being affected pursuant to s. 403.509(4), shall be made a party upon the request of the Department or the applicant.

6. When appropriate, any person may be given an opportunity to present oral or written communication to the designated Hearing Officer. If the designated Hearing Officer proposes to consider such communication, then all parties shall be given an opportunity to cross-examine or challenge or rebut such communications.

7. Pursuant to Section 403.511(2), Florida Statutes, Tampa Electric Company seeks a variance from the requirements of Rule 16C-16.0051(5), Florida Administrative Code, for the construction of the proposed cooling reservoir, from Rule 16C-16.0051(11), Florida Administrative Code, governing the time schedule for reclamation to accommodate construction of the facilities, and Rule 17-550.320(1), Florida Administrative Code, containing the secondary drinking water standards for color and iron in groundwater discharges to the surficial aquifer due primarily to existing groundwater quality. The Hearing Officer will receive

comments and testimony on the variance request from the parties, the public and the affected agencies at the certification hearing.

8. Notice or petitions made prior to the hearing should be made in writing to:

Ms. Diane Kiesling (DOAH Case No. 92-4896-EPP)
The Division of Administrative Hearings
The DeSoto Building
1230 Apalachee Parkway
Tallahassee, Florida 32399-1500

Copies of such submittals should be forwarded by mail to existing parties, including the Department of Environmental Protection.

9. Those wishing to intervene in these proceedings, unless appearing on their own behalf, must be represented by an attorney or other person who can be determined to be qualified to appear in Administrative Hearings pursuant to Chapter 120, Florida Statutes, or Chapter 17-103.020, Florida Administrative Code.

10. This public notice is also provided in compliance with the Federal Coastal Zone Management Act, as specified in 15 CFR Part 930, Subpart D. Public comments on the applicants federal consistency certification should be directed to the Federal Consistency Coordinator, Division of Environmental Permitting, Department of Environmental Protection.

TAL-28808

Florida Department of
Environmental Protection

Lawton Chiles
Governor

Marjory Stoneman Douglas
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Virginia B. Wetherell
Secretary

FOR IMMEDIATE RELEASE:
July 30, 1993

CONTACT: Buck Oven, P.E. Administrator
(904) 487-0472

POWER PLANT SITE HEARING

TALLAHASSEE--The Florida Department of Environmental Protection will have a public hearing on September 13 at 10:00 a.m. at the Davis Brothers Lodge Banquet Room, 1035 N. Broadway, Bartow, Florida to consider the environmental effects of a proposed Power Plant Site Certification Application from Tampa Electric Company (TECO) for construction and operation on a new electrical power plant near Bradley Junction in Polk County. The 4,348 acre site is bordered on the west by Hillsborough County, on the east by Fort Green Road (CR 663), CR 630 and Bethlehem and Albritton on the North.

The new power plant will initially include a 260 megawatt (MW) integrated coal gasification, combined cycle facility, with a cooling pond, coal pile, solid waste disposal areas and other related facilities. Ultimately the site is proposed to have two additional combined cycle generating units and six simple cycle natural gas-fired combustion turbines for a total site capacity of 1150 MW.

(CONTINUED)

Printed on recycled paper.

Additional information is available from the Tampa Electric Company, or from Buck Oven, Department of Environmental Protection, Siting Coordination Office, 3900 Commonwealth Blvd., Tallahassee, Florida 32399 or call (904) 487-0472.

# # #

I N T E R O F F I C E   M E M O R A N D U M

Date:	25-Jun-1993 02:57pm EST
From:	Hamilton Buck Oven TAL OVEN_H
Dept:	Office of Secretary
Tel No:	904/487-0472
SUNCOM:	Room 612-D

TO: See Below

Subject: TECO Polk Admendments

Distribution:

TO:	Richard Donelan TAL	(DONELAN_R)
TO:	Syed Arif TAL	(ARIF_S)
TO:	Trudie Bell TAL	(BELL_T)
TO:	Patty Adams TAL	(ADAMS_P)
TO:	Preston Lewis TAL	(LEWIS_P)
TO:	Max Linn TAL	(LINN_M)
TO:	Al Rushanan TAL	(RUSHANAN_A)
TO:	Michael Hickey TPA	(HICKEY_M @ A1 @ TPA)
TO:	Raoul Clarke TAL	(CLARKE_R)
TO:	Mary Jean Yon TAL	(YON_MJ)
CC:	Pam McVety TAL	(MCVETY_P)

For Routing To Other Than The Addressee	
To:	Location:
To:	Location:
To:	Location:
From:	Date:

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

Interoffice Memorandum

TO: Power Plant Siting Review Committee

FROM: Buck Oven 9/13 O

DATE: June 25, 1993

SUBJECT: TECO Polk Power Station - Admendments
PA 92-32, Module 8042

On June 21st, TECO filed amendments to their Polk County site certification application. I distributed some copies of the admendment before the move interrupted. Attached is a summary of the potential changes. TECO was previously advised to contact the applicable sections to provide answers to any questions that may arise. These admendments were discussed in my Memo of June 4th. Please use this info for your final review. If the admendments make the project deniable or if they raise a need for new information, please let me know by 7/9/93. If you need additional copies of the admendment or if you did not yet get a copy, please let me know. My telephone is still 487-0472. I will be over in Twin Towers for a while on Monday.

cc: Richard Donelan
Steve Palmer
Pam McVety

Attach:

TO: Power Plant Siting Review Committee

FROM: Buck Oven

DATE: June 4, 1993

SUBJECT: TECO Polk Power Station - Admendments
PA 92-32, Module 8042

In the near future, TECO will be filing amendments to the site certification application. Attached is a summary of the potential changes. TECO has been advised to contact the applicable sections to provide answers to any questions that may arise. I see three areas which could affect our ability to complete an initial report by July 9th. They are the revised air modelling due to site layout/sulfuric acid production changes; the zone of discharge/variance requests for antimony, color and iron; and the revised reclammation plan(and maybe wetland mitigation?).

cc: Richard Donelan
Steve Palmer
Pam McVety

Attach:

EPRI

FAX FORM

(Please type or use pen and do not staple)

Please provide all information requested.

Date	June 17, 1993
From	Neville Holt x 2503
Dept/Div	AFPS/G&S
No. Pages	__1_ (Including cover)

EPRI FAX NUMBERS

DEX 6300	(415) 856-6621
Pitney Bowes 9200	(415) 855-2954
Ricoh 105	(415) 855-2266
Verification No.	(415) 855-2717

Destination: (Multiple transmissions limited to 15)

Name	Company	Country Code	Fax Number
D. Outlaw	Florida Dept. of Enviromental Protection		(904) 922-6979

Message:

Dear Doug,

Here is copy of the Technical Brief on the Cool Water project and a couple of pages from a report on the Shell SCGP-1 project.

Cool Water used the Selexol process for sulfur species removal and the results are shown on the 3rd page of the Technical Brief.

The Shell SCGP-1 pilot plant at Houston used the Sulfinol process and routinely achieved sulfur removals 99.6 - 99.8%.

For further details see EPRI reports GS-6806 (Cool Water Final Report) and GS-7531 (Shell Coal Gasification Project—Gasification of Eleven Diverse Feeds).

Sulfur removal systems can readily be designed to remove sulfur species from fuel gas to <1ppm.

Please do not hesitate to contact me if you think we can be of further assistance.

Yours sincerely,

Neville A. Holt
Sr. Program Manager
Gasification and Advanced Cycle Power Plants
Generation & Storage Division

Attachment(s)

cc: Holt, file

NAH.9952.F/slo

JUN 17 '92 05:25PM EPRI P.2

EPRI *Leadership in Science and Technology*

RP1459-1

Technical Brief

GENERATION AND STORAGE DIVISION

Cool Water Coal Gasification Program: Commercial-Scale Demonstration of IGCC Technology Completed

Figure 1. This overall view looking northeast shows the Cool Water IGCC plant near Daggett, California.

Background

In 1984, the first commercial-scale prototype of an integrated-gasification-combined-cycle (IGCC) power plant began operation near Daggett, California. Built adjacent to Southern California Edison's (SCE's) existing Cool Water generating station, the 100-MW power plant used a Texaco gasifier to convert coal to clean fuel gas for a General Electric (GE) combined-cycle unit (Figure 1). The goal of this undertaking was to demonstrate the economic and technical feasibility of IGCC technology and to provide utilities with a foundation for the future construction and operation of coal gasification-based power plants. Completed ahead of schedule and under budget, the plant has provided a firm basis for designing commercial IGCC plants based on the Texaco Coal Gasification Process.

The Cool Water Coal Gasification Program (CWCGP) was a collaborative effort of utilities, research bodies, and private industry. Sponsors included EPRI, SCE, Texaco, GE, Bechtel Power Corp., Japan Cool Water Program Partnership (JCWP), Empire State Electric Energy Research Corporation (ESEERCO), and Standard Oil of Ohio. The key benefit to utilities from this program is the minimization of risk in the design, construction and operation of future IGCC facilities. More specifically, the Cool Water project demonstrated the following attributes of a gasification power plant:

- Low SO_2, NO_x, and particulate emissions
- No solid waste from sulfur removal
- Competitive capital and electricity costs
- Feedstock flexibility
- Dual-fuel capability of a combustion turbine, which allows the power generation portion of an IGCC to be designed for high availability

This document summarizes the successful operation of Cool Water, highlighting the plant's performance, flexibility, and minimal environmental impact. The comprehensive efforts to transfer the lessons learned from this project to the utility industry are outlined, and the future of the plant and of IGCC technology are then discussed.

Plant Performance

Cool Water's 41/2 years of operation was sufficient time to obtain significant operating experience with IGCC technology. In fact, a cumulative total of 1.1 million tons (dry basis) of coal was gasified to produce 2.8 million gross MWh of electricity.

Cool Water's cumulative on-stream and capacity factors were 67.5 and 58.7%, respectively. Figure 2 shows that modifications made as a result of operating experience increased the on-stream and capacity factors from 43.1 and 35.1% in 1984 to 79.3 and 70.5% in 1987, and 75.7 and 69.6 in 1988. Because the lessons learned at Cool Water can be applied to future IGCC plants, these plants will realize higher on-stream and capacity factors beginning in the first years of operation than they would have achieved without the benefit of the Cool Water experience.

Plant heat rate improved over the life of the program. During the alternate coal tests on Illinois No. 6 and Pittsburgh No. 8 coals that occurred in the first half of 1986, heat rates of 11,770 Btu/kWh and 11,730 Btu/kWh were measured. In late 1986 and 1987, modifications were made that increased low level heat recovery in the syngas saturator and heat recovery steam generator (HRSG), and reduced steam leaks through traps and normally closed valves. Subsequent testing on SUFCo and Lemington coals in 1988 showed heat rates of 10,950 Btu/kWh and

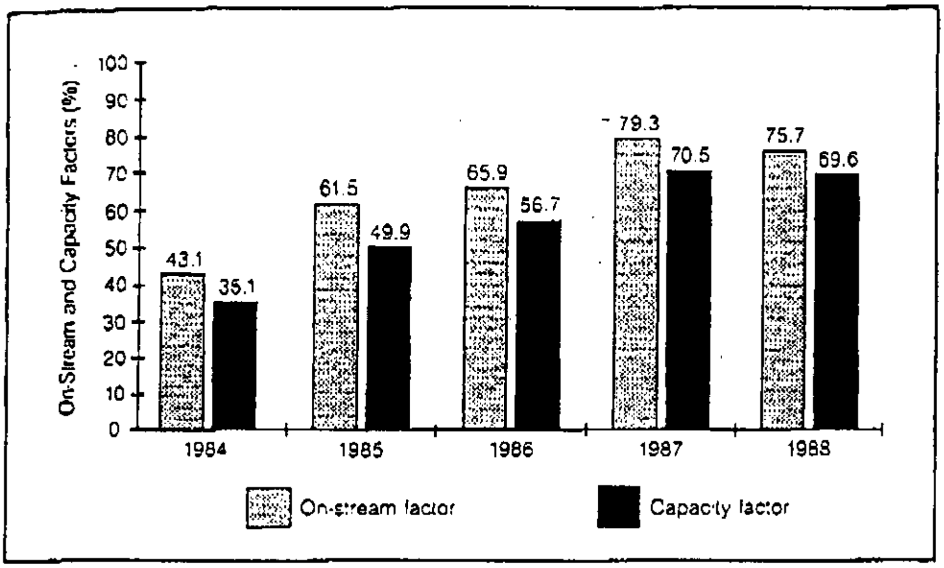

Figure 2 On-stream and capacity factors increased throughout the project as improvements were made in equipment and operating procedures.

10,970 Btu/kWh, respectively. If the high-sulfur Illinois No. 6 and Pittsburgh No. 8 coals could have been run again after the efficiency improvements were implemented, heat rates of around 11,000 Btu/kWh would also have been achieved.

Table 1 summarizes plant performance on the test coals. The results lend credibility to EPRI studies that project a heat rate of 9000 Btu/kWh for a mature, commercial plant*. The improvement over Cool Water in efficiency that could be realized by a commercial plant would come primarily from scaling up to 360 MW (net) and the use of a combustion turbine with a higher firing temperature and a steam reheat cycle.

In some repowering applications, combusting a portion of the synthesis gas (syngas) in an existing boiler may be advantageous. Testing with IGCC plant syngas in SCE's adjacent fossil-fired generating unit demonstrated the feasibility of this concept. SCE designed a burner that would burn the syngas without boiler sidewall impingement or burner overheating. After burner modifications were made in January 1987, SCE successfully fired the unit over its entire operating range on syngas (20–69 MW). When combusting syngas, NO_x emissions were less than 90 ppmv—at the low end of the typical range of emissions when firing natural gas (90–115 ppmv), and less than SCE's permit limit of 125 ppmv.

Another key aspect of Cool Water's successful operation was the ability of SCE's plant operators and maintenance personnel to adapt to the new technology. In accordance with the labor agreement between SCE and the International Brotherhood of Electrical Workers bargaining unit, personnel frequently moved between the facility and SCE's other fossil-fired power plants. Each operator transferred to Cool Water received three days of classroom instruction and six to eight weeks of on-the-job training, a training period similar to that required when transferring between SCE's other fossil-fired plants.

Flexibility

The Cool Water plant demonstrated the flexibility of IGCC technology. The gasifier's ability to efficiently use a variety of bituminous coals provides utilities with considerable freedom to purchase feedstocks. In addition, the ability of modern combustion turbines to burn syngas, natural gas, or liquid fuels increases power plant reliability. Moreover, dynamic testing indicates that IGCC plants can meet the load following requirements of most utilities.

The Cool Water program verified that a wide range of bituminous coals are acceptable feedstocks for a Texaco IGCC power plant. In addition, the plant demonstrated its ability to change coal types while on-line. Four coals were tested (a low-sulfur bituminous coal, two high-sulfur eastern U.S. coals, and a high ash-fusion temperature coal), and all proved to be acceptable feedstocks. The low-sulfur bituminous coal was supplied by the Southern Utah Fuel Company (SUFCo) and was used during most of the program. In 1986, two commercially significant high-sulfur eastern coals were demonstrated. 32,600 t of Illinois No. 6 coal in an EPRI-sponsored test, and

Table 1
Cool Water Coal Gasification Plant: Test Coal Performance

Coal	SUFCo (low sulfur)	Illinois No. 6 (high sulfur)	Pittsburgh No. 8 (high sulfur)	Lemington (high ash-fushion temperature)
Feed rate (dry t/d)	1000	1000	934	980
Higher heating value (MBtu/h)	1030	1080	1098	1040
Power summary (MW)				
Gas turbine	69.8	73.7	76.5	69.9
Steam turbine	49.2	42.5	42.5	50.4
Auxiliary power consumed	(7.0)	(6.9)	(7.6)	(7.0)
Power consumed for oxygen production	(16.4)	(16.5)	(17.4)	(16.9)
Net power	95.2	92.9	94.9	95.9
Heat rate (Btu/kWh)	10,950	11,770*	11,730*	10,970

*A number of modifications made between the high-sulfur coal tests in 1986 and the SUFCo and Lemington tests in 1988 improved plant efficiency. Heat rates of around 11,000 Btu/kWh could have been realized for the Illinois No. 6 and Pittsburgh No. 8 coals, respectively, after the improvements were implemented.

21,300 t of Pittsburgh No. 8 in an ESEERCO-sponsored test. These high-sulfur coals (about 3.1% S) demonstrated the sulfur removal and recovery equipment's ability to comply with stringent sulfur emissions limits. In January 1988, JCWP sponsored a 20,000-t test of a high ash-fusion temperature coal from Australia (Lemington). This successful test supports the potential use of U.S. high ash-fusion temperature coal reserves in IGCC plants. EPRI reports AP-5931 and GS-6806 (to be published in mid 1990) contain detailed information on the plant's performance while firing the test coals.

The clean syngas produced by the plant proved to be an excellent fuel for the GE MS 7001E combustion turbine. In general, the life expenditure of its hot-section parts was similar to that of GE Frame 7 machines in natural gas service after about the same number of starts and stops. Using steam injection and/or syngas saturation, the GE turbine consistently met the permitted NO_x limitation of 25 ppmv while firing syngas.

The Cool Water machine also demonstrated the burning of both liquid (distillate) and gaseous (syngas) fuels in a combustor, enabling the power generation portion of an IGCC plant to be designed for high availability. For example, to continue producing power when syngas is unavailable, the combustion turbine in an IGCC can be designed to fire natural gas, methanol, or distillate in addition to syngas.

Although most IGCC plants will be primarily baseloaded to maximize efficiency, Cool Water showed that these plants can be used for load following; the plant met 20% load change demands at an average 5% load change per minute. The plant also showed considerable fuel feed rate flexibility. Designed for 1000 dry t/d of coal throughput, the plant was able to operate at coal feed rates from 400 to 1200 t/d.

A load-shedding test proved that the plant could continue to operate as a power island after an instantaneous break from the power grid. In this test, the tie line to the SCE grid was opened while the plant operated at full load. The plant automatically reduced its electrical output to meet the in-house auxiliary load and that of the oxygen plant. After about 25 minutes of isolated operation, the plant was resynchronized to the grid.

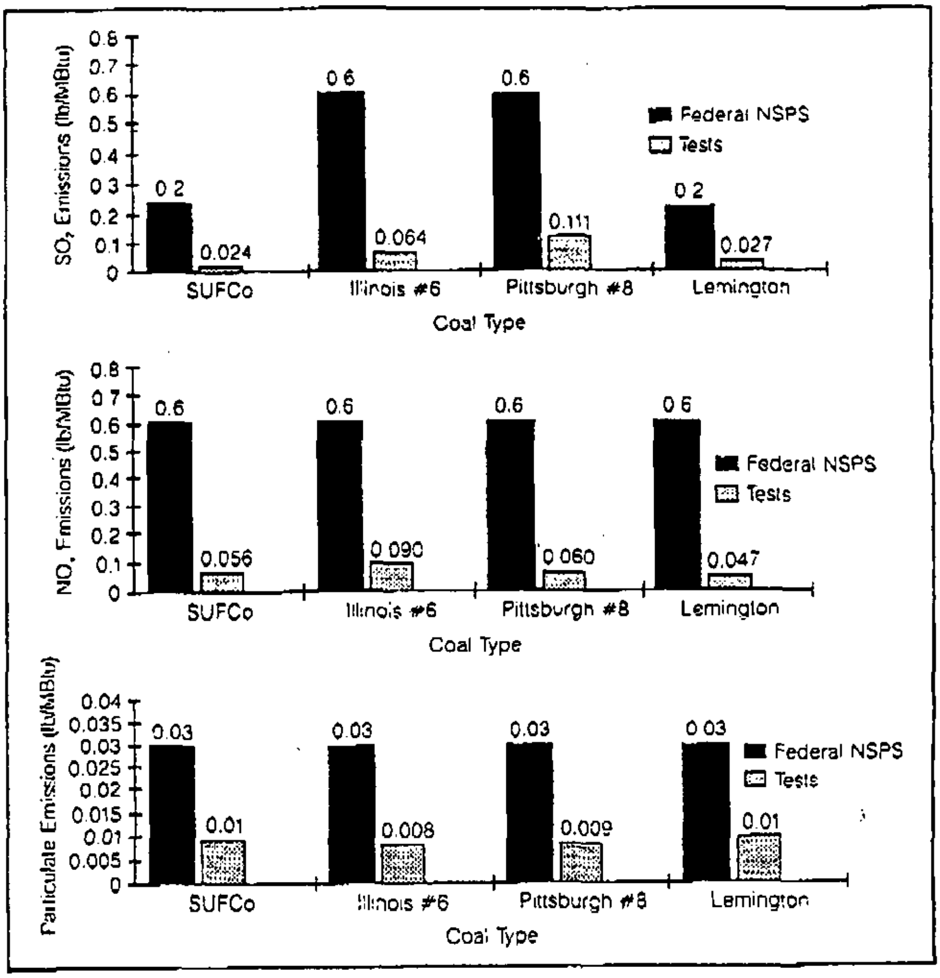

Figure 3. For the four coals tested, Cool Water HRSG emissions of SO_2, NO_x, and particulates were substantially below the Federal New Source Performance Standards.[7]

Minimal Environmental Impacts

The Cool Water program demonstrated that IGCC technology has few potential negative environmental effects. During gasification of the SUFCo, Illinois No. 6, Pittsburgh No. 8 and Lemington coals, emissions monitoring revealed no areas of major environmental concern.[2] The program will help facilitate the permitting of future IGCC power plants in the following ways.

- An environmental database has been established for two high-sulfur eastern U.S. coals, a high ash-fusion temperature coal, and a low-sulfur western U.S. coal.
- The plant demonstrated compliance with all permit-mandated emissions limitations, including the stringent requirements of the San Bernardino County Air Pollution Control District. When operating on both the low-sulfur western coal and the higher-sulfur eastern coals, the plant achieved 97% sulfur removal. The plant emitted not more than 15% of the Federal New Source Performance Standards (NSPS) level for NO_x, 19% of the SO_2 NSPS level, and 33% of the particulate NSPS level for coal-fired power plants (Figure 3). Even while injecting steam into the gas turbine for NO_x abatement, carbon monoxide emissions were consistently low, averaging only 2 ppmv in the HRSG stack. Comparable operation of a combustion turbine on natural gas with steam injection would typically result in CO emissions exceeding 50 ppmv.
- Results of groundwater monitoring conducted near the evaporation pond and the slag pit showed that neither source affected groundwater quality.
- Measurements from an ambient air monitoring station showed that Federal and state of California air quality standards were consistently met for most measured parameters. On the basis of data gathered before the original startup, the only exceptions—ozone and particulate matter—appeared to be due to sources other than the plant.
- Fugitive emissions—monitoring results showed that emissions of hydrogen sulfide, ammonia, and carbon monoxide from leaking valves, pump and compressor seals, connections, and so on,

did not present a significant hazard to operating personnel or to persons living near the plant site.

- The performance of the major pollution control systems installed at the plant (Selexol acid gas removal, SCOT/Claus sulfur recovery, incinerator, and sour water stripper) met or exceeded design pollutant removal efficiencies.
- The plant's location in the Mojave Desert enabled process wastewater routing to evaporation ponds. Because most IGCC facilities will not be located in an arid climate, other wastewater disposal options may be utilized. In 1988 Texaco constructed a pilot plant at Cool Water to refine their wastewater treatment process for IGCC power plants. The pilot plant reduced wastewater contaminants to levels that would allow effluent discharge into most receiving waters. Under EPRI contract, Radian Corp. analyzed the test unit's influents and effluents and has prepared a final report on the water treatment effort with Texaco (EPRI GS-6819).

Plant operation also produced two solid by-products: sulfur and gasifier slag. The plant's high-quality sulfur was consistently sold at the prevailing market price. Hence, instead of paying for sludge disposal from wet scrubbers (necessary at pulverized-coal units) the Cool Water plant generated income from sulfur sales. Tests showed that the slag from all the coals fired at Cool Water was nonhazardous, according to both federal and state of California criteria. EPRI-funded work conducted at Cool Water by Praxis Engineers indicated that slag from a commercial IGCC could be used in the production of lightweight aggregates or as a secondary coarse roadbed material (see EPRI AP-5048 and GS-6833).

Technology Transfer

EPRI has established several ways to pass on the lessons learned at Cool Water to member utilities. Throughout the Cool Water project, an observer program enabled EPRI-member utilities to have a representative on site for an extended period. In this way, several Potomac Electric Power Company (PEPCo), Tennessee Valley Authority, and Puget Sound Power & Light personnel obtained firsthand exposure to IGCC operations, and many other utilities sent personnel to the plant for short-term visits.

Public documentation of the program is extensive. Radian prepared reports on environmental monitoring and occupational health and safety, which are available from the National Technical Information Service, (703) 487-4650. EPRI's annual and final reports on Cool Water cover all aspects of plant construction and operations, and are available from the EPRI Research Reports Center, (415) 965-4081. In addition, EPRI enhanced the applicability of the Cool Water demonstration by sponsoring projects on several related topics, such as IGCC water treatment, slag use, plant availability, and oxygen plants. Table 2 lists the EPRI reports on Cool Water and associated projects.

EPRI has developed a real-time training simulator for IGCC power plant operation. Developed by adapting existing generic IGCC simulation models to Cool Water's configuration, the simulator incorporates all the principal tasks of plant operation, including startup and shutdown. Preprogrammed malfunctions simulate the problems typically encountered during plant operation. Thus, the simulator enables operators to become competent in IGCC plant operation before initial startup. Utilities will be able to quickly recover the investment in the computer model through improved plant reliability and efficiency. EPRI GS-6173 contains the approach and methodology EPRI used to develop the simulator.

EPRI worked with the other program participants to retain and archive for future reference all important technical documentation, including specifications, vendor drawings, maintenance records, and performance test results. At the end of the program, key documents, such as operating manuals, piping and instrumentation drawings, and event reports, were updated.

Recognizing that good technology transfer is not facilitated by paper documentation alone, EPRI is funding development of a Cool Water visual database. Videotape and still photographs are being incorporated into a rapid-access interactive laser disk system, which will walk the user through the plant on video. An accompanying narrative describes the design, layout, and operational features of the facility. Topics covered by the system include operating and maintenance activities unique to an IGCC plant, a plant startup viewed from both inside and outside the control room, the site's analytical laboratory, and the safety systems. To aid design engineers, the software for the

Table 2
EPRI Reports on Cool Water and Related Projects

Report Number	Description
AP-2487	CWCGP 1st Annual Progress Report, July 1982
AP-3232	CWCGP 2nd Annual Progress Report, October 1983
AP-3876	CWCGP 3rd Annual Progress Report, January 1985
AP-4832	CWCGP 4th Annual Progress Report, October 1986
AP-5029	Pilot Plant Evaluation of Illinois No. 6 and Pittsburgh No. 8 coal for the Texaco Coal Gasification Process, February 1987
AP-5048	Potential Uses for the Slag From CWCGP, June 1987
AP-5276	Availability Analysis of an IGCC, June 1987
AP-5432	Oxygen Plants for Coal Gasification: Experience at CWCGP, September 1987
AP-5829	CWCGP Availability Analysis, July 1988
AP-5893	Treatability Testing of KILnGAS and Texaco Coal Gasification Wastewaters, July 1988
AP-5931	CWCGP 5th Annual Progress Report, October 1988
AP-5966-S	Downtime Corrosion in Syngas Coolers of Entrained Slagging Gasifiers, September 1988
GS-6173	Development of an IGCC Power Plant Simulator, February 1989
GS-6806	CWCGP Final Report (available mid 1990)
GS-6819 Vol. 1 and 2	Texaco Coal Gasification Wastewater Handling and Treatment Pilot Plant, Vol. 1: Performance Summary, Vol. 2. Wastewater Sampling and Analysis (available mid 1990)
GS-6833	Synthetic Lightweight Aggregate from Cool Water Slag: Bench Scale Confirmation Tests

interactive laser disk is designed so that videotapes and still photographs of specific topics and equipment can be accessed quickly without watching an entire tape.

The electric power industry also benefited from the participation of three major vendors in the Cool Water program. GE obtained experience with combustion turbine dual-fuel operation—syngas and distillate—in a location where low NO_x emissions were mandatory. Texaco learned how to better integrate its gasification process into a combined cycle for power production, while Bechtel gained expertise in the engineering, construction, and contract maintenance of an IGCC facility.

Plant and Technology Outlook

In accordance with program agreements, the Cool Water plant became the property of SCE on June 23, 1989. SCE opted to offer the plant for sale, and following a bidding process, Texaco was awarded the right to negotiate with the utility for the purchase and operation of the facility. Studies conducted at Texaco's Montebello gasification pilot plant have demonstrated the feasibility of converting a mixture of sewage sludge and coal to produce a clean synthesis gas. Hence, Texaco intends to modify the plant to operate on such a mixture. Acquisition of the plant is conditional upon finalizing the terms of the purchase agreement, completion of negotiations with SCE for the sale of electricity, and favorable treatment of Texaco's plan by municipalities and other government entities. After the plant resumes operation (currently targeted for early 1992) the industry will continue to learn from this prototype unit.

Cool Water results were made available to Tokyo Electric Power Company (TEPCO)—Japan's largest electric power company (41,000 MW)—through their participation in JCWP. Because of the success of Cool Water and some smaller-scale gasification development work in Japan, TEPCO perceives IGCC as a primary power generating option for the next century and has made the technology an important part of its fuel diversification program.[3]

A number of U.S. utilities are preparing for the addition of IGCC generating capacity. PEPCo is planning to incorporate two 375-MW gasification-combined-cycle units at its Dickerson station. The plant will be built in stages to allow PEPCo to match construction to the growth in electricity demand better than would be possible with a large conventional coal-fired plant. The plant's combustion turbines have been ordered, with the commissioning of the first machine scheduled for 1992. Florida Power & Light is currently seeking permits to add 800 MW of IGCC power generation at its Martin Station site. In Massachusetts, Commonwealth Energy is participating with Texaco and GE in the joint development of a 440-MW coal gasification-based generating facility that will be located in Freetown. Another gasification project, being developed by Texaco, Delmarva Power & Light Co., and others, will use petroleum coke (a solid refinery by-product) and other waste streams, to produce clean syngas for use in several existing boilers and a new gas turbine generator. The project will reduce overall emissions at the Delaware City facilities while generating an additional 125 MW of electric power.

For more information on Cool Water or IGCC technology, contact EPRI's Ed Clark, (415) 855-2098; John McDaniel, (415) 855-8991; or Neville Holt, (415) 855-2503.

References

1. M. J. Gluckman, D. F. Spencer, D. H. Watts, and V. R. Shorter. *A Reconciliation of the Cool Water IGCC Plant Performance and Cost Data With Equivalent Projections for a Mature 360 MW Commercial IGCC Facility.* EPRI AP-6007-SR, October 1988.
2. D. M. Rib. *Cool Water Environmental Performance Utilizing Four Coal Feedstocks.* EPRI GS-6485, August 1989, p. 18–13.
3. *Tokyo Electric Power Company, Annual Report*, April 1987 to March 1988, p. 9.

FROM: GS-7531
SHELL COAL GASIFICATION PROJECT

gasifier conditions. This is a desirable heating value in the medium-Btu gas range (MBG), making SCGP-1 product gas suitable for gas turbine and boiler applications. This gas has been used in Shell's Central Power Station boiler, as a substitute fuel for natural gas during all campaigns.

SULFUR CONCENTRATIONS AND ACID GAS REMOVAL SYSTEM

As shown in Figure 2-5, the coals gasified in this phase of the SCGP-1 program contain a wide range of sulfur levels, from 0.6%MF sulfur in Newlands to 5.2%MF sulfur in Petroleum Coke. In the SCGP gasifier, the sulfur in the coal is converted primarily to H_2S and a little COS. The H_2S + COS concentrations in syngas for the eleven feedstocks is shown in Figure 7-23. The variation in the concentration of H_2S + COS was primarily due to variation in the sulfur content of the incoming feed.

The SCGP-1 acid gas removal system demonstrated sufficient flexibility in near-complete removal of the H_2S + COS from syngas in all of the above cases. The sulfur removal efficiency was generally in the range of 99.6-99.8%, resulting in product gas sulfur concentration of 20 ppm or less.

Sulfur removal at SCGP-1 is accomplished by the use of the Sulfinol-D® solvent. The Sulfinol process has been well-proven in the petrochemical, natural gas and oil refining industries. Shell has licensed more than 140 Sulfinol plants worldwide. The solvent flow rate was kept between 65,000 and 110,000 lb/hr depending on the level of H_2S, COS , and CO_2 in the sour gas. The steam consumption of the solvent stripper reboiler was about 7-8% of the solvent circulation rate, or 5,000 to 7,500 lb/hr. The acid gas was sent to one of the sulfur recovery plants in the Deer Park complex, contributing to the production of saleable sulfur.

The sulfur removal system emphasizes a key strength of the SCGP technology. Sulfur in the coal is converted to H_2S in the reducing atmosphere of the gasifier, and is easily and reliably removed by the use of conventional technology.

FROM: GS-7531
SHELL COAL GASIFICATION PROJECT

TABLE 7-19

GASIFIER PERFORMANCE FOR POCAHONTAS NO. 3

		PERIOD 1	PERIOD 2	PERIOD 3	PERIOD 4	PERIOD 5	PERIOD 6	PERIOD 7
Coal Composition								
Moisture	%wt-AR	8.20	8.20	8.20	8.20	8.20	8.20	8.20
Ash	%wt-MF	5.24	5.24	5.24	5.24	5.24	5.24	5.24
Carbon	%wt-MAF	91.12	91.12	91.12	91.12	91.12	91.12	91.12
Hydrogen	%wt-MAF	4.52	4.52	4.52	4.52	4.52	4.52	4.52
Oxygen	%wt-MAF	2.05	2.05	2.05	2.05	2.05	2.05	2.05
Nitrogen	%wt-MAF	1.26	1.26	1.26	1.26	1.26	1.26	1.26
Sulfur	%wt-MAF	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Chlorine	%wt-MAF	0.12	0.12	0.12	0.12	0.12	0.12	0.12
Higher Heating Value	Btu/lb-MAF	15797	15797	15797	15797	15797	15797	15797
Oxygen/MAF Coal Ratio	lb/lb	1.021	1.023	1.048	1.052	1.056	1.069	1.071
Burner Steam/Oxygen	lb/lb	0.217	0.219	0.219	0.220	0.220	0.218	0.218
Flyslag Recycled	Yes/No	Yes	No	Yes	Yes	Yes	Yes	Yes
Flux Added	Yes/No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sour Syngas Flow Rate	lb/hr	30150	29930	29869	29233	29177	29879	29909
Gasifier Offgas Composition (Dry)								
CO	%v	62.80	64.38	64.46	64.62	64.75	63.68	63.74
H2	%v	28.39	27.90	28.02	27.78	27.71	27.15	27.10
N2	%v	6.66	5.25	5.06	5.12	5.07	6.36	6.36
CO2	%v	1.86	2.17	2.16	2.15	2.17	2.51	2.51
H2S + COS	%v	0.230	0.219	0.228	0.240	0.239	0.241	0.242
CH4	%v	0.020	0.015	0.014	0.013	0.013	0.011	0.012
Sweet Gas Production								
Mass Basis	lb/hr	28598	28030	28074	27592	27366	27776	27879
Volume Basis	MMSCFD	12.7	12.3	12.3	12.1	12.0	12.1	12.2
Energy Basis	MMBtu/hr	159.9	153.7	155.0	153.0	152.1	151.3	151.0
Sulfur Removal	%	99.6	99.8	99.7	99.6	99.6	99.7	99.6
Carbon Conversion								
Overall	%	99.3	96.9	99.8	99.9	99.8	99.9	99.9
Cold Gas Efficiency								
Sweet Gas Basis (HHV)	%	82.4	79.1	81.6	81.3	81.2	80.7	80.6
Total Steam Make	Mlb/hr	26.9	29.8	29.3	28.7	28.7	29.3	29.2
Slagging Efficiency								
Overall	%	85.0	60.3	95.0	96.6	94.6	95.4	91.4

IAT
CC: Syed

Howard Rhodes

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

To Chaw
John Proctor xc: Larry
Patty - file

Howard 6/7

RECEIVED
JUN 07 1993
Division of Air
Resources Management

RECEIVED
JUN 01 1993
OFFICE OF THE SECRETARY

RECEIVED
JUN 03 1993
Division of Air
Resources Management

May 27, 1993

Ms. Chris Shaver
Chief, Permit Review and Technical
Support Branch
Air Quality Division
National Park Service
12795 West Alameda Parkway
Denver, CO 80228

Dear Ms. Shaver:

RE: Class I Area Air Quality Coordination for Proposed EPA EIS; Proposed Tampa Electric Polk Power Station; Polk County, FL

Dear Ms. Shaver:

The U.S. Environmental Protection Agency (EPA) is developing an Environmental Impact Statement (EIS) for the 1,150 MW Polk Power Station in Polk County, Florida proposed by Tampa Electric Company. EPA will prepare the EIS with the U.S. Department of Energy (DOE) and the Jacksonville District of the U.S. Army Corps of Engineers (COE) as Cooperating Agencies. EPA has published its Federal Register Notice of Intent (NOI) to prepare an EIS on May 21, 1993. As the federal Lead Agency for this EIS, we request National Park Service input in the EIS process regarding potential air quality concerns on nearby Class I area vegetation, soils, wildlife and visibility related to this proposed project.

Tampa Electric has submitted its Site Certification Application (SCA) to the State of Florida in late summer of 1992 to initiate the State of Florida site certification process under the Power Plant Siting Act. Tampa Electric has also applied for §404 wetland permitting from the COE and new-source National Pollutant Discharge Elimination System (NPDES) and Prevention of Significant Deterioration (PSD) permitting from EPA. DOE is primarily involved in the EIS development since the proposed power station includes a 260 MW Integrated Coal Gasification Combined Cycle Unit which is being considered for cost-shared financial assistance by DOE under the Clean Coal Technology (CCT) Demonstration Program.

Tampa Electric has identified its preferred site for the proposed power station. This Tampa Electric-preferred site is located in Polk County near Lakeland, Mulberry and Bartow, Florida, and is approximately 4,348 acres in size. We are aware of one relatively nearby Class I area, i.e., the Chassahowitzka Wilderness Area area located approximately 120 km from the site.

Although we understand that Tampa Electric has provided you with a copy of the original SCA, we have enclosed excerpted sections of the SCA prepared by Tampa Electric to facilitate your review. These sections are:

- 1.4.3 General Project Description (Volume 1)
- 5.6 Air Quality Impacts (including: "Other Potential Impacts on the Chassahowitzka Wilderness Area;" page 5.6.1-24) (Volume 2)
- 9.0 Analysis of Potential Impacts on the Chassahowitzka National Wilderness Area Prevention of Significant Deterioration Class I Area (Volume 4)

We have also enclosed our initial air quality comments on the SCA dated October 9, 1992.

At this time, EPA/Region IV has not identified substantive concerns regarding the air quality effects of the proposed project on the Chassahowitzka Wilderness Class I Area. Should you wish to further discuss this matter with EPA, Mr. Stan Kukier of the EPA Air Enforcement Branch, Source Evaluation Unit may be called at (404) 347-5014 as the initial point of contact. In regard to any State of Florida Class I Area concerns, you may wish to contact Mr. Hamilton (Buck) Oven, Jr. with the Florida Department of Environmental Regulation at (904) 487-0472.

We look forward to your coordination on this project. Specifically, as the federal Lead Agency for this EIS, EPA requests a comment letter from your agency regarding any potential air quality concerns on the Chassahowitzka Class I area related to the proposed Polk Power Station. Should you have questions, please contact Chris Hoberg (Project Monitor) at (404) 347-3776. Questions regarding the SCA may be addressed to Mr. Greg Nelson of Tampa Electric at (813) 228-4847. Since we are pursuing a rather tight schedule, we would appreciate hearing from you by July 1, 1993, and plan to include substantive correspondence on this matter in the EIS.

Sincerely,

Heinz J. Mueller, Chief
Environmental Policy Section

Enclosures

cc (w/o enclosures):

Mr. Hamilton Oven, Jr.
Florida Department of
Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Mr. Gregory M. Nelson, P.E.
Tampa Electric Company
Consulting Engineer
Environmental Planning
P.O. Box 111
Tampa, FL 33601-0111

Patty
Preston
John B

pls make
sure these
schedules
are met. no crisis, please.
Clay

INTEROFFICE MEMORANDUM

Date: 27-Apr-1993 03:40pm EST
From: Hamilton Buck Oven TAL
OVEN_H
Dept: Office of Secretary
Tel No: 904/487-0472
SUNCOM: Room 612-D

TO: See Below

Subject: New Schedule

Here is a tenative new schedule for the TECO Polk County power plant siting application.

Distribution:

TO:	Pam McVety TAL	(MCVETY_P)
TO:	Jeremy Craft	(PAPER MAIL)
TO:	Clair Fancy TAL	(FANCY_C)
TO:	Al Rushanan TAL	(RUSHANAN_A)
TO:	Michael Hickey TPA	(HICKEY_M @ A1 @ TPA)
TO:	Trudie Bell TAL	(BELL_T)
TO:	Raoul Clarke TAL	(CLARKE_R)

cc: S. Arif
D. Outlaw
M. Zenn
} 5/3/93

TECO POLK POWER STATION
PA 92-32

SCHEDULE OF DATES
(revised 4/23/93)

ACTION	DATE
TECO files sufficiency info	April 12, 1993
DER determines sufficiency	May 12, 1993
Agencies Must File to be a Party	May 24, 1993
Agencies File Reports	July 9, 1993
DER Report Filed	August 9, 1993
Certification Hearing*	September, 13, 1993

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

For Routing To Other Than The Addressee	
To	Location
To	Location
To	Location
From	Date

Interoffice Memorandum

TO: Power Plant Siting Review Committee

FROM: Buck Oven BO

DATE: April 12, 1993

SUBJECT: TECO Polk Power Station Response to Sufficiency Questions Module 8042

We have received TECO's responses to our March 1993, insufficiency determination. Legally we have 30 days to determine if the response provides us sufficient information to proceed with our review. Please let me know ASAP or by 5/7, if we have enough information to review and have reasonable assurance that air and water quality regulations will be complied with. If they have not addressed all our previous questions, please let me know. TECO's failure to adequately answer our questions will allow us to keep the processing clock stopped.

I will be hand delivering copies in the Central Office today. Copies should be already delivered to the District.

cc: S. Arif
D. Outlaw
M. Fenn

TAMPA ELECTRIC
A TECO ENERGY COMPANY

April 9, 1993

Mr. Hamilton S. Oven, Jr., P.E.
Administrator, Siting Coordination Section
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Re: Tampa Electric Company
Polk Power Station
Site Certification Sufficiency Responses--Third Round

Dear Mr. ~~Oven~~ Buck:

Enclosed please find twelve (12) of responses to the third round of sufficiency comments on Tampa Electric Company's Polk Power Station Site Certification Application received from the following agencies:

- Florida Department of Environmental Regulation (FDER)
  and
- Southwest Florida Water Management District (SWFWMD)

Your expeditious review of these responses would be greatly appreciated. Should you have any questions, please call Greg Nelson at (813) 228-4847.

Sincerely,

A. Spencer Autry /gaw

A. Spencer Autry
Director
Environmental

gt\LL663

Enclosures

cc: Mr. S.L. Palmer, P.E.-FDER, Tallahassee

RECEIVED

APR 12 1993

D. E. R.
SITING COORDINATION

TAMPA ELECTRIC
A TECO ENERGY COMPANY

RECEIVED

MAR 17 1993

Division of Air
Resources Management

March 15, 1993

Mr. Doug Outlaw, P.E.
Bureau of Air Regulation
Division of Air Resources Management
Florida Department of Environmental
Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Certified Mail P 231 800 627
Return Receipt Requested

Re: Tampa Electric Company
Polk Power Station
IGCC NO_x Emissions

Dear Mr. Outlaw:

In response to your recent request, the following describes the gasification and syngas cleanup processes that will be utilized on the Tampa Electric Company Polk Power Station Integrated Coal Gasification Combined Cycle (IGCC) unit. Descriptions of the NO_x emissions for both the Hot Gas Cleanup (HGCU) and Cold Gas Cleanup (CGCU) systems are also included.

The Texaco system to be utilized at the Polk Power Station operates as an oxygen-blown, entrained-flow gasifier. In this system, the coal slurry and oxygen enter the gasification vessel under pressure. In the gasifier, the carbon in the coal, along with the water in the slurry, are converted to carbon monoxide and hydrogen gases. In addition, a portion of the nitrogen that is chemically bound in the coal is converted to ammonia. This conversion to ammonia is very dependent on both the type of gasifier and the nitrogen form and content in the coal.

The syngas from the gasifier is cooled in the syngas coolers. In the 100 percent CGCU mode of operation the syngas exits the last syngas cooler and enters the carbon scrubber. There, the gas is further cooled by water. In that process, some of the ammonia in the syngas is absorbed into the scrubber water, which is routed to the black water (slag handling) system. Further into the low temperature gas cooling system, the syngas is cooled to about 105° F. In this area, an ammonia stripper is used to remove most of the ammonia in the syngas before it goes to the acid gas removal system. This ammonia stream is sent to a specially designed reactor in the sulfur removal unit, where the ammonia exits in the form of nitrogen. This stream flows to the tail gas treating unit, after which the treated stream, containing the nitrogen, exits to the atmosphere.

The cooled syngas, after ammonia and sulfur removal and reheating, is sent to the combustion turbine. The ammonia is, therefore, not available for conversion to NO_x in the combustion process.

Ammonia is a less stable gas than nitrogen. It is much more readily oxidized and converted to NO_x than is nitrogen. Even though the amount of nitrogen in the gas stream is much greater than the amount of ammonia, the ammonia can have a considerably greater overall effect on the formation of NO_x.

When syngas is routed to the HGCU system, the sulfur removal occurs without the gas first being cooled. This is, of course, one of the advantages of HGCU in that the irreversible losses attributed to gas cooling are not necessary as they are with CGCU. The HGCU is expected to provide a more efficient power cycle.

In the 50/50 case, half of the raw syngas goes to CGCU and half to HGCU. The half that goes through CGCU has both ammonia and sulfur compounds removed. The gas that goes through HGCU has only sulfur compounds removed. Upon mixing of the two cleaned streams, any ammonia that is present in the HGCU stream goes to the combustion turbine. The ammonia is converted both to nitrogen and to NO_x. Therefore, when in the 50/50 mode the NO_x emissions are expected to be higher than when in the 100 percent CGCU mode.

As part of the cooperative agreement with the U.S. Department of Energy (DOE), a 2-year demonstration period is required. Testing will be done to determine IGCC performance, efficiency and emissions. The HGCU system will undergo an intensive test program in order to determine its sulfur removal capabilities along with its potential to enhance the IGCC plant cycle efficiency. All of these tests will be performed using various coals and at various operating conditions. One of the primary intents of the cooperative agreement between Tampa Electric and DOE is to form a data base for future reference for utilities that are considering their options for compliance with Phase II of the Clean Air Act Amendments of 1990. Since the ammonia levels are dependent on the coal burned and the gasifier operations, tests will be done for the purpose of determining the ammonia and resulting NO_x levels in both 100 percent CGCU and 50/50 modes under the varying operational scenarios. Part of that evaluation will be to determine what technical options are available to reduce HGCU NO_x emissions. If HGCU is found to be technologically and economically viable, Tampa Electric and DOE could then agree to modify and continue operation of the HGCU system on the basis that emission rates using HGCU will be equivalent to, or less than, those achieved by conventional CGCU for all regulated pollutants. If HGCU is not found to be technologically and economically viable, the cooperative agreement indicates that the HGCU will be shutdown and the Polk Power Station IGCC unit will operate using 100 percent CGCU.

I hope that the above information adequately addresses your request.

Thank you for your interest in this project. Should you have any further questions, please contact Mr. Greg Nelson at (813) 2~~6~~8-4847.
2

Sincerely,

A. Spencer Autry
Director
Environmental

gt\LL662

cc: Mr. H.S. Oven, Jr., P.E.--FDER, Tallahassee
Mr. S.L. Palmer, P.E.--FDER, Tallahassee

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

OCT - 9 1992

4APT-AEB

Mr. Clair H. Fancy, P.E., Chief
Bureau of Air Regulation
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RE: Tampa Electric Company, Polk County, Florida (PSD-FL-194)

Dear Mr. Fancy:

This is to acknowledge receipt of an application for a Prevention of Significant Deterioration (PSD) permit for the above referenced facility by your letter dated August 27, 1992. Tampa Electric Company (TECO) proposes to construct a new electric generating power plant at the above referenced location. TECO's new facility will be known as the Polk Power Station. As discussed between Mr. Syed Arif of your staff and Mr. Stan Kukier of my staff on September 15, 1992, we have reviewed the application as submitted and have the following comments related to the air quality analysis:

1. In the modeling analysis, a composite five year meteorological period was used for <u>annual</u> SO_2, PM, and NO_x modeling, as well as for the quarterly lead modeling. It is suggested that the applicant review the "Guideline on Air Quality Models" which recommends annual modeling for SO_2, PM, and NO_x using five individual years of meteorological data, and quarterly modeling for lead using twenty quarters of meteorological data. Composite meteorological data sets can not be used for regulatory analysis. We suggest the source perform the annual and quarterly analyses using the individual years/quarters of meteorological data. As an alternative, the annual values for SO_2, PM, and NO_x may be taken directly from the short term modeling which has already been prepared.

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2. The ISCST2 modeling using the 1982 to 1986 meteorological data set shows modeled exceedances of the Class I 3-hour and 24-hour increments in all five years. Our review shows that only the predicted exceedances in 1986 were remodeled with the MESOPUFF II long range transport model. We recommend that the MESOPUFF II model be used to model the exceedances that were predicted with the 1982 to 1985 meteorological data. The application was not clear as to what steps would be taken to resolve any exceedance issues.

Thank you for the opportunity to comment on this application. If you have any questions concerning modeling or monitoring, please contact Mr. Lew Nagler of my staff at (404) 347-5014. Any other questions may be directed to Mr. Stan Kukier of my staff also at (404) 347-5014.

Sincerely yours,

Jewell A. Harper, Chief
Air Enforcement Branch
Air, Pesticides, and Toxics
Management Division

cc: S. Arif
M. Finn
B. Owen
B. Thomas, SW Dist.
B. Mitchell, NPS
CHF/PL

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

For Routing To Other Than The Addressee	
To:	Location:
To:	Location:
To:	Location:
From:	Date:

Interoffice Memorandum

TO: Buck Oven

THRU: Clair Fancy
Preston Lewis

FROM: Syed Arif SA

DATE: September 22, 1992

SUBJECT: TECO Polk Power Station - PA92-32, Mod 8042
PSD-FL-194

The Bureau of Air Regulation finds the above referenced application package insufficient. Based on our initial review of their proposal, we have determined that additional information is needed in order to process the application. The following information is required:

1. The emission calculations for the criteria and non-criteria pollutants are not adequately shown in the application. All calculations affecting emissions should be shown in their entirety, and not just summarized in tabular form. This includes showing the equations used, assumptions made and any supporting documents used for emission calculations.

2. Please provide a maximum value for fuel bound nitrogen for both natural gas and fuel oil. Also, calculate the maximum NOx emissions based upon your maximum value for fuel bound nitrogen for the Integrated Coal Gasification Combined Cycle (IGCC), Combined Cycle (CC) and the Simple Cycle combustion turbines.

3. Please submit a detailed process flow diagram for the IGCC unit showing the volumetric air flow rates for each stream when burning fuel oil and the different scenarios for syngas combustion. Also, submit the same for the CC, Simple Cycle and the auxiliary boiler when burning natural gas and fuel oil.

4. What is the efficiency of the combustion turbine for the IGCC, CC and the Simple Cycle units? Calculate Y (refer to NSPS 40 CFR 60, Subpart GG) in kilojoules per watt hour, showing all the calculations.

5. Submit manufacturer's name, model number, generator name plate rating (gross MW), maximum steam production rate for the Heat Recovery Steam Generator (HRSG) for the IGCC and the CC units.

6. What is the maximum and nominal power (MW) output of the steam turbine generator for the IGCC and the CC units? What is the steam input to these turbines?

7. Please submit the manufacturer's design specification for the proposed IGCC General Electric 7F combustion turbine (CT), GE 7EA CTs and also for the auxiliary boiler.

8. What is the estimated annual throughput and the type of air pollution control for the fuel oil storage tanks? What are the estimated emissions?

9. Please submit a detailed listing of all the continuous emission monitoring systems (CEMs) required for this project. This should include the type of the CEM (in-situ or extractive), the make and model number, the pollutant it will monitor, and any associated data acquisition system.

10. What kind of control and monitoring equipment is proposed for continuously recording power generation, coal feed rate, fuel injection rate of syngas, natural gas and fuel oil, nitrogen and the water injection rate for the IGCC unit.

11. Please provide the names and addresses of all the manufacturers and suppliers that were contacted for budgetary quotations and engineering estimates in developing capital and annualized cost estimates for this project. Also, provide a summary of all the equipment, raw material and the fuel costs.

12. Does the applicant propose to do simultaneous fuel (natural gas and fuel oil) firing for the CC and Simple Cycle units? If so, provide details on how this will be accomplished.

13. Please submit the information requested in Rule 17-256.600(3) regarding Industrial, Commercial, Municipal, and Research Open Burning as it relates to this project.

14. Please quantify the nitrogen quantity in the soot blowing and purging process as outlined in the Air Separation Unit schematic of Figure 2-5, page 2-15 of Volume 4.

15. The uncondensed gas (tail gas) is routed either to the tail gas treating unit or to the thermal oxidizer depending on the tail gas sulfur content. What is the determining sulfur content and what is the maximum load (cfm) of tail gas that the thermal oxidizer can treat. Also, what is the efficiency of the thermal oxidizers for both the tail gas treating unit and the sulfuric acid plant?

16. The emission information provided for the IGCC, CC and the Simple Cycle combustion turbines different load conditions and ambient temperatures are based on which measurement methods? Please identify any differences between the measurement methods employed and the EPA test methods. Also, provide stack test information and data for each pollutant tested, and fuel analysis data for the fuel burned during the test.

17. Please provide more information on the flare, whether its steam assisted, air assisted or non-assisted. Also, submit the net heating value of the gas being combusted, the exit velocity of the flare and what device will be used to detect the presence of a flame.

18. Explain the basis for the stack exit temperature to be higher for Simple Cycle and CC CTs when firing natural gas compared to fuel oil as shown in Tables 2-26 to 2-29, pages 2-73 to 2-76 of Volume 4.

19. The hot gas clean up technology for the IGCC facility will improve overall efficiency as well as lower SO2 emissions in comparison to cold gas clean-up controls as suggested by the applicant on page 4-3 of Volume 4. Table 2-8, page 2-53 of Volume 4 does not reflect lower SO2 emissions but a considerable increase in NOx emissions during the demonstration period. Please quantify the decrease in SO2 emissions as well as improvement in the overall efficiency in terms of increased power production.

20. Table 4-24, page 4-58 of Volume 4 gives a cost effectiveness figure of $5643/ton for a Simple Cycle CT with Oxidation catalyst. Please explain the steps in arriving at this figure.

21. In Appendix A.2 of Volume 4 which deals with particulate matter emissions from coal handling sources, the moisture content of the coal was assumed to be 15%. AP-42, Section 11.2.3 suggests a mean moisture content for the coal to be 4.5%. Please explain the deviation from this value.

22. Please re-submit the State permit application to operate/construct air pollution sources with all the items completely filled. The application included in Volume 5 has not been completely filled out and makes references to different sections of the Site Certification Application.

23. The 49.5 MMBtu/hr auxiliary boiler is not exempt from the permitting requirements unless it is fired exclusively by natural gas based on 17-2.210(3)(a). Please submit a state permit application for the auxiliary boiler.

24. The projected Maximum Individual Risk (MIR) is estimated to be 1.9 x 10-6 for the project. Please state how many people in the shaded area as shown in Figure 7-7, page 7-52 of Volume 4 are exposed to levels greater than 1.0 x 10-6.

SA:ch

TAMPA ELECTRIC
A TECO ENERGY COMPANY

RECEIVED

AUG 24 1992

D.E.R.

RECEIVED

AUG 26 1992

Division of Air
Resources Management

August 20, 1992

Ms. Chris Shaver
Chief, Permit Review and Technical
Support Branch
Air Quality Division
National Park Service
12795 West Alameda Parkway, Room 215
Denver, Colorado 80228

Re: Tampa Electric Company (TEC)
Polk Power Station
Site Certification Application

Dear Ms. Shaver:

In accordance with the provisions of Chapter 403.501-.519, Florida Statutes and Chapter 17-17, Florida Administrative Code, enclosed please find one (1) copy of the site certification application for an 1150 megawatt generating facility, transmission lines, and associated facilities to be located in Polk County, Florida. The Site Certification Application has been submitted to the Florida Department of Environmental Regulation which will coordinate the review of the proposed project under the Florida Electrical Power Plant Siting Act.

Please address any questions or comments that you may have on this project to:

Mr. Hamilton S. Oven, Jr., P.E.
Administrator of Siting Coordination
Florida Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Road
Tallahassee, Florida 32399-2400
Telephone: 904/487-0472

Thank you for your cooperation.

Sincerely,

A. Spencer Autry/gw

A. Spencer Autry
Director
Environmental

gt\LL611

Enclosure

cc: Mr. H.S. Oven, Jr., P.E.--FDER, Tallahassee
Mr. S.L. Palmer, P.E.--FDER, Tallahassee

Engineers
Planners
Economists
Scientists

CH2M HILL

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AUG 06 1992

Division of Air
Resources Management

August 3, 1992

Mr. Steve Smallwood
Director, Air Resources Management Div.
Dept. Of Environmental Regulation
2600 Blairstone Road
Tallahassee, FL 32399-2400

Dear Mr. Smallwood,

Subject: Announcement of Public Scoping Meeting for a Proposed Coal-Fixed Integrated Gasification Combined Cycle (IGCC) Project

Acting on behalf of the U.S. Department of Energy (DOE), CH2M HILL is sending you this advance notice of an upcoming public scoping meeting for a proposed project.

The U.S. Department of Energy (DOE) is preparing an Environmental Impact Statement (EIS) to evaluate the environmental effects of construction and operation of a proposed coal-fired IGCC project to be located at a Tampa Electric Company site in Polk County, Florida. As one component of EIS preparation, DOE is conducting a scoping meeting to be held:

August 12, 1992 (7:00 PM)	Ft. Meade Community Center
Registration (6:00 PM)	Ft. Meade, Florida

The proposed project involves the construction and operation of a new coal-fired nominal 260-megawatt electric (MWe) (approximately 1,900 tons per day) IGCC power plant and associated transmission lines in Polk County, Florida. The proposed project would be fueled with medium- to high-sulfur content eastern bituminous coal.

The project is part of the national Clean Coal Technology Program, a $5 billion effort co-funded by government and industry, that is demonstrating the best of a new generation of clean and efficient coal technologies in "showcase" facilities across the nation. Cost, environmental, and technical data from the project would be used to evaluate this technology as a commercially viable power generation alternative.

As part of the public scoping process to ensure that the full range of issues relating to this proposal is addressed, DOE invites your attendance at the public meeting and solicits your oral and written comments. Enclosed are the Notice of Intent (published in the *Federal Register* on July 28, 1992), a display ad published in several local newspapers, and a "What is a Scoping Meeting?" fact sheet. These items provide further details on the project and on the scoping meeting. For additional information, please contact Mr. Bruce J. Buvinger, Environmental Specialist, U.S. Department of Energy, Morgantown Energy Technology Center, Post Office Box 880, Morgantown, West Virginia 26507-0880, (304) 291-4379.

Sincerely,

CH2M HILL Southeast, Inc.

Donald S. Holmes

TPC13167.51
Enclosure

UNITED STATES DEPARTMENT OF ENERGY

PUBLIC SCOPING MEETING

PROPOSED COAL-FIRED INTEGRATED

GASIFICATION COMBINED CYCLE (IGCC) PROJECT

ENVIRONMENTAL IMPACT STATEMENT

On July 28, 1992 the U.S. Department of Energy (DOE) issued a Notice of Intent in the *Federal Register*, to prepare an Environmental Impact Statement (EIS) to assess the environmental effects of construction and operation of the proposed Coal-Fired IGCC Project to be located at a Tampa Electric Company (TEC) site in Polk County, Florida. DOE invites interested agencies, organizations, and individuals to a public scoping meeting to submit comments or suggestions on the environmental issues or recommended scope of this EIS. The public scoping meeting will be held:

August 12, 1992 (7:00 p.m.)
Fort Meade Community Center
Fort Meade, Florida

The public may register to speak at the scoping meeting beginning at 6:00 p.m. DOE also invites written comments from those individuals who are not able to attend the public scoping meeting in person. To ensure that everyone who wishes to speak has a chance to do so, five minutes will be allotted to each speaker. Comments presented at the meeting, or written comments postmarked by August 27, 1992 will be considered in the preparation of the EIS. Written comments after that date will be considered to the degree practicable. Written comments on the scope of the EIS should be addressed to Mr. Bruce J. Buvinger, Environmental Specialist, Morgantown Energy Technology Center (METC), P.O. Box 880, Morgantown, West Virginia, 26507-0880. Envelopes should be marked "Scoping for TEC EIS."

M92002268

Notice of Intent

U.S. DEPARTMENT OF ENERGY

Notice of Intent to Prepare an Environmental Impact Statement and Conduct a Public Scoping Meeting for the Proposed Tampa Electric Coal-Fired Integrated Gasification Combined Cycle Project

AGENCY: U.S. Department of Energy (DOE)

ACTION: Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) to assess the environmental effects of the construction and operation of the proposed coal-fired Integrated Gasification Combined Cycle (IGCC) power plant and associated transmission lines at a Tampa Electric Company (TEC) site in Polk County, Florida, and to conduct a public scoping meeting.

SUMMARY: DOE announces its intent to prepare an EIS pursuant to the National Environmental Policy Act (NEPA) of 1969, as amended, to evaluate the environmental impacts of the proposed construction and operation of a project proposed by TEC. The Region IV Office of the U.S. Environmental Protection Agency (EPA) has requested "Cooperating Agency" status because of their responsibilities pursuant to the Clean Water Act and the likelihood that the proposed project would require a National Pollutant Discharge Elimination System (NPDES) permit.

The proposed project involves the construction and operation of a new coal-fired nominal 260-megawatt electric (MWe) (approximately 1900 tons per day) IGCC power plant and associated transmission lines in Polk County, Florida. TEC is the utility servicing the area. DOE is proposing to provide cost-shared financial assistance for the project. However, no EPA financing is involved in the project.

Preparation of the EIS will be in accordance with NEPA, the Council on Environmental Quality (CEQ) NEPA regulations (40 CFR Parts 1500-1508), and the DOE regulations for compliance with NEPA (57 FR 15122, April 24, 1992). The purpose of this Notice is to invite public participation in the process that DOE will follow to comply with NEPA and to solicit public comments on the proposed scope and content of the EIS.

INVITATION TO COMMENT AND DATES: To ensure that the full range of issues related to this proposal are addressed, DOE invites comments on the proposed scope and content of the EIS from all interested parties. Written comments or suggestions to assist DOE in identifying significant environmental issues and the appropriate scope of the EIS will be considered in preparing the draft EIS and should be postmarked by

Thursday, August 27, 1992. Written comments postmarked after that date will be considered to the degree practicable.

DOE will also hold a public scoping meeting at which agencies, organizations, and the general public are invited to present oral comments or suggestions with regard to the range of actions, alternatives, and impacts to be considered in the EIS. The location, date, and time for the scoping meeting are provided in the section of this Notice entitled SCOPING MEETING. Written and oral comments will be given equal weight and will be considered in determining the scope of the draft EIS. When the draft EIS is completed, its availability will be announced in the Federal Register, and public comments will again be solicited. Comments on the draft EIS will be considered in preparing the final EIS. Requests for copies of the draft and/or final EIS, or questions concerning the project, should be sent to Mr. Bruce J. Buvinger at the address noted below.

ADDRESS: Written comments or suggestions on the scope of the EIS, requests to speak at the scoping meeting, or questions concerning the project, should be directed to:

Mr. Bruce J. Buvinger
Environmental Specialist
U.S. Department of Energy
Morgantown Energy Technology Center (METC)
P. O. Box 880
Morgantown, WV 26507-0880
Telephone: (304) 291-4379

Envelopes should be labeled "Scoping for TEC EIS".

FOR FURTHER INFORMATION CONTACT: For general information on the EIS process, please contact:

Ms. Carol M. Borgstrom
Director, Office of NEPA Oversight (EH-25)
U.S. Department of Energy
1000 Independence Avenue S.W.
Washington, D.C. 20585
Telephone: (202) 586-4600 or (800) 472-2756

SUPPLEMENTARY INFORMATION:

Background and Need for the Proposed Action. Under terms of Public Law No. 100-446, Congress provided approximately $575 million to DOE to support the construction and operation of demonstration facilities selected for cost-shared financial assistance as part of DOE's Clean Coal Technology (CCT) Demonstration Program. The CCT projects cover a broad spectrum of technologies having the following in common: (1)

all are intended to increase the use of coal in an environmentally acceptable manner, and (2) all are ready to be proven at the demonstration scale.

On May 1, 1989, DOE issued Program Opportunity Notice (PON) Number DE-PS01-89FE61825 for Round III of the CCT program, soliciting proposals to conduct cost-shared projects to demonstrate innovative, energy efficient, economically competitive technologies. These technologies must be capable of (1) achieving significant reductions in the emissions of sulfur dioxide and/or the oxides of nitrogen from existing facilities to minimize environmental impacts such as transboundary and interstate pollution and/or (2) providing for future energy needs in an environmentally acceptable manner. The PON provided that candidate technologies must be capable of either retrofitting or repowering existing facilities. Such existing facilities currently may be designed to use any fuel (e.g., coal, oil, gas, etc.) and may be either stationary (e.g., power plants) or mobile (e.g., transportation applications). The demonstration projects, however, can be at new facilities, provided the technology is capable of retrofitting or repowering applications. In response to the solicitation, 48 proposals were received.

From these 48 proposals, 13 projects were selected by DOE for negotiation in December 1989, including a project proposed by CRSS Capital, Inc., and TECO Power Services Corp., known as the Air-Blown IGCC Demonstration Project. After selection, CRSS Capital and TECO Power Services formed a partnership entity called Clean Power Cogeneration, Inc. (CPC). At that time, the proposed project site was the City of Tallahassee, Florida's Arvah B. Hopkins power station. DOE published a Federal Register NOI for the CPC project on March 7, 1991 (56 FR 9691). However, uncertainties regarding the project resulted in the publication of a notice of postponement of the scoping meeting (April 26, 1991: 56 FR 19354).

In September 1991, the site of the proposed project was relocated to Polk County, Florida. Additionally, the CPC Limited Partnership was restructured. CRSS Capital has ceased its participation in the project, and TEC has assumed all of CRSS Capital's and TECO Power Services' previous obligations.

TEC has requested financial assistance from DOE for the design, construction, and demonstration of an approximately 1900 tons-per-day (nominal 260 MWe) IGCC plant. The proposed project would occupy about one-third of the 4,348-acre site in west-central Florida, in the southwestern corner of Polk County, approximately 28 miles southeast of Tampa. Much of the site and surrounding region in this part of Florida has been used for phosphate mining, which is still continuing in this area. The proposed IGCC project would be fueled with medium- to high-sulfur content eastern bituminous coal to produce electric power for the utility grid. Cost, environmental, and technical data from the project would be developed for use by the utility industry in evaluating this technology as a commercially viable power generation alternative. After the anticipated 24-month Federally-assisted demonstration period of operation, TEC intends to continue operating the plant commercially to meet customer needs for power.

Proposed Action. The proposed Federal action is for DOE to provide cost-shared financial assistance to TEC for the construction and operation of the IGCC Project. The objective of the project is to demonstrate the integration of technologically advanced subsystems, including a gasifier, gas turbine, steam boiler/turbine, and a hot gas cleanup system, to produce power in an efficient, economical, and environmentally sound manner. In addition, TEC would install a cold gas cleanup system which could be operated in parallel with the hot gas cleanup system. DOE will not share in costs associated with the cold gas cleanup system. The estimated cost-shared portion of the proposed demonstration project is approximately $242 million, of which DOE's share would be 50 percent. The total estimated cost for TEC's entire project, including aspects associated with cold gas cleanup design, construction and operation, is in excess of $500 million. The project would last approximately 84 months, including design, construction, and demonstration. Construction would commence in January 1994; however, no DOE funds would be provided for construction until the NEPA process has been completed. Operation of the project during the anticipated 24-month demonstration period would provide the information and experience needed for future applications and commercialization of the IGCC technology. Once DOE's involvement is completed, TEC intends to continue operating the plant.

The TEC site is located in southwestern Polk County, Florida, about 17 miles south of the City of Lakeland, 11 miles south of the City of Mulberry, 11 miles west of Fort Meade, and 13 miles southwest of the City of Bartow. The site consists of 4,348 acres, and is bounded by the Hillsborough County line along the western boundary; Fort Green Road (County Road 663) on the east; portions of County Road 630, Bethlehem Road, and Albritton Road on the north; and State Road 674 and several phosphate mine settling ponds on the south. State Road 37 bisects the site, running in a southwest-northeast direction. In general, lands surrounding the site and in the region have been used for previous and ongoing surface phosphate mining operations. The portion of the property to the east of State Road 37 consists primarily of unreclaimed land from previous phosphate mines. The area west of State Road 37 is currently being mined for phosphate, and these operations are scheduled to continue into 1994.

The proposed coal-fired IGCC Project would occupy approximately one-third of the existing 4,348 acre site and would include the following facilities:

- A handling system to receive, store, crush, and convey coal.
- A gasifier that converts solid coal into coal gas to be used as a fuel in a combustion (gas) turbine.
- An air separation unit which produces 95 percent pure oxygen to use in the gasifier.
- A Hot Gas Cleanup (HGCU) System that will remove sulfur from the coal gas at high temperatures.
- A parallel Cold Gas Cleanup (CGCU) System that will remove sulfur from the coal gas at lower temperatures.
- A combustion turbine to burn the clean coal gas and generate electricity.
- A Heat Recovery Steam Generator (HRSG) to make steam.

- A steam turbine that generates electricity from steam.
- A stack to handle exhaust gases produced by combustion of the coal gas.

The proposed project would require the construction of two short transmission lines to tie into TEC's existing 230 kilovolt (kV) system. A northern transmission line corridor would extend about 5 miles north of the site, running through rural and phosphate mining areas. An eastern transmission line corridor would be approximately one mile long and would lie within the proposed site.

Alternatives. Under its authority pursuant to Public Law No. 100-446, DOE is presented with only two alternatives: (1) to cooperatively fund the proposed project; and (2) to decline to fund it (the "no action" alternative). In the latter case, the project would not contribute to the objective of the CCT program, which is to make available to the U.S. energy marketplace a number of advanced, more efficient, economically feasible, and environmentally acceptable coal technologies. The facility probably would not be constructed and operated; therefore, neither potential environmental impacts related to facility construction and operation, nor potential environmental benefits resulting from commercialization of the technology, would occur.

DOE acknowledges the obligation to examine reasonable alternatives which are beyond its immediate authority to implement, but which could also meet the objectives of the CCT Program. DOE is requesting public comment on reasonable alternatives to the TEC IGCC Demonstration Project.

A Final Programmatic Environmental Impact Statement (PEIS) for the CCT Program was issued by DOE in November 1989 (DOE/EIS-0146). Two alternatives were evaluated in the PEIS: (1) the "no action" alternative, which assumed that the CCT Program was not continued and that conventional coal-fired technologies with flue gas desulfurization and oxides of nitrogen controls to meet New Source Performance Standards would continue to be used; and (2) the proposed action, which assumed that CCT projects were selected and funded, and that successfully demonstrated technologies would undergo widespread commercialization by the year 2010.

Identification of Environmental Issues. The following issues associated with the construction and operation of the proposed TEC Project will be considered in detail by DOE during its evaluation. This list is neither intended to be all inclusive, nor is it a predetermination of potential impacts. Additions to or deletions from this list may occur as a result of the scoping process.

(1) Air Quality: The effects of air emissions within the region surrounding the site.

(2) Water Resources and Water Quality: The qualitative and quantitative effects on water resources and other water users in the region.

(3) Floodplains: The 100-year floodplain for the pre-mining condition has been documented by the Federal Emergency Management Agency. The vast majority of the floodplain areas on-site have been mined and generally are no longer connected to the stream drainage basins. The main plant site area would be developed at elevations well above the 100-year flood stage. After development and reclamation of the site and project construction, no facilities will be located in areas subject to the 100-year flood.

(4) Wetlands: The majority of the site and adjacent properties have been disturbed through past and current mining operations. The site would be reclaimed in accordance with Florida Department of Natural Resources requirements to restore equivalent acreages of wetland habitat that existed prior to mining. If required, formal wetland jurisdictional determinations by both state and federal agencies would be conducted on-site for wetland areas which may be affected by the project.

(5) Socioeconomics: Potential bearing on communities that might be affected by the project.

(6) Land Use: The potential consequences to land, utilities, transportation routes, and traffic patterns resulting from the project.

(7) Solid Waste: The environmental effects of generation, treatment, transport, storage, and disposal of solid wastes.

(8) Biological Resources: There are several federally endangered, threatened, or candidate species which are either present or potentially present on the site. Potential disturbance or destruction of species, including the potential effects on threatened or endangered species of flora and fauna will be evaluated.

(9) Cultural Resources: Potential effects on historical, archaeological, scientific, or culturally important sites.

(10) Cumulative Impacts: CEQ NEPA regulations require that the EIS evaluate the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Cumulative impacts will be evaluated within the EIS for all important issues in the vicinity of the site. DOE currently is aware of several energy-related facilities proposed for the vicinity of the TEC project, including TEC's plans for additional capacity at the site of the proposed project.

Issues that are significant will be addressed in detail; issues that are not significant will be discussed in less detail, or as appropriate to clarify and distinguish among alternatives.

NEPA and the Scoping Process. DOE will comply with the NEPA process as outlined in the Council on Environmental Quality's Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (40 CFR Parts 1500-1508) and DOE's regulations for compliance with NEPA (57 FR 15122, April 24, 1992).

Scoping, which is an integral part of the NEPA process, is a procedure that solicits public input to the EIS process to ensure that: (1) issues are identified early and properly studied; (2) issues of little significance do not consume time and effort; (3) the draft EIS is thorough and balanced; and (4) delays occasioned by an inadequate draft EIS are avoided (40 CFR 1501.7). DOE's NEPA Guidelines require that the scoping process commence as soon as practicable after a decision has been reached to prepare an EIS in order to provide an early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. The scope of issues to be addressed in a Draft EIS will be determined, in part, from written comments submitted by mail, and comments presented orally or in writing at a public scoping meeting (see below). The results of the scoping process will be incorporated into a document called an Implementation Plan (IP), which provides guidance for the preparation of an EIS.

The above preliminary identification of reasonable alternatives and environmental issues is not meant to be exhaustive or final. DOE identified the reasonable alternatives and potential environmental issues shown above based on its experience with similar subjects that have been raised for other comparable DOE projects. DOE considers the scoping process to be open and dynamic in the sense that alternatives other than those given above may warrant examination, and new matters may be identified for potential evaluation. The scoping process will involve all interested agencies (Federal, State, County, and local), groups, and individual members of the public. Interested parties are invited to participate in the scoping process by providing comments on both the alternatives and the issues to be addressed in the EIS. DOE will consider all comments in preparing the IP, which will specify the reasonable alternatives, identify the significant environmental issues to be analyzed in depth, and eliminate from detailed study those alternatives and environmental issues that are not significant or pertinent. When complete, the IP will be available for public review at the locations identified below.

Scoping Meeting. A public scoping meeting will be held at the location, on the date, and at the time indicated below. This scoping meeting will be informal, with a presiding officer designated by DOE who will establish procedures governing the conduct of the meeting.

The meeting will not be conducted as an evidentiary hearing, and those who choose to make statements may not be cross-examined by other speakers. To ensure that everyone who wishes to speak has a chance to do so, five minutes will be allotted to each speaker. Depending on the number of persons requesting to be heard, DOE may allow longer times for representatives of organizations. Persons wishing to speak on behalf of an organization should identify that organization in their request to speak. Persons who have not submitted a request to speak in advance may register to speak at the scoping meeting. They will be called on to present their comments as time permits. Oral and written comments will be given equal weight by DOE. Written comments may also be submitted after the scoping meeting, but should be postmarked by Thursday, August 27, 1992, and forwarded to Mr. Bruce J. Buvinger, Environmental Specialist, Morgantown Energy Technology Center, as provided in the ADDRESS section of this Notice. Written comments postmarked after that date will be considered to the degree practicable.

The meeting is scheduled as follows:

DATE:	Wednesday, August 12, 1992
TIME:	7:00 p.m. (Registration opens at 6:00 p.m.)
PLACE:	Fort Meade Community Center Fort Meade, Florida 33841

A complete transcript of the public scoping meeting will be retained by DOE and made available for inspection during business hours, Monday through Friday, at the Department of Energy Freedom of Information Reading Room, Forrestal Building, 1000 Independence Avenue S.W., Washington, D.C. 20585, and at the Department of Energy, Morgantown Energy Technology Center, 3610 Collins Ferry Road, Morgantown, West Virginia 26505. Additional copies of the public scoping meeting transcript will also be made available during normal business hours at the following locations:

1. Tampa Hillsborough Public Library
   900 North Ashley Drive
   Tampa, Florida 33602

2. Tampa Electric Company
   Mulberry Customer Service Office
   101 2nd Street N.W.
   Mulberry, Florida 33860

In addition, copies of the public scoping meeting transcript will be made available for purchase. Those interested parties who do not wish to submit comments or suggestions at this time, but who would like to receive a copy of the Draft EIS when it is prepared, should notify Mr. Bruce J. Buvinger, Environmental Specialist, Morgantown Energy Technology Center, at the address given in the INVITATION TO COMMENT AND DATES section of this Notice.

WHAT IS A SCOPING MEETING?

A Scoping Meeting is a key step in the public process of writing an environmental statement concerning the potential environmental impacts that may be associated with an action that is being proposed by the Federal Government. In this case, the proposed Federal action is to provide cost-shared funding support to a Clean Coal Technology demonstration project.

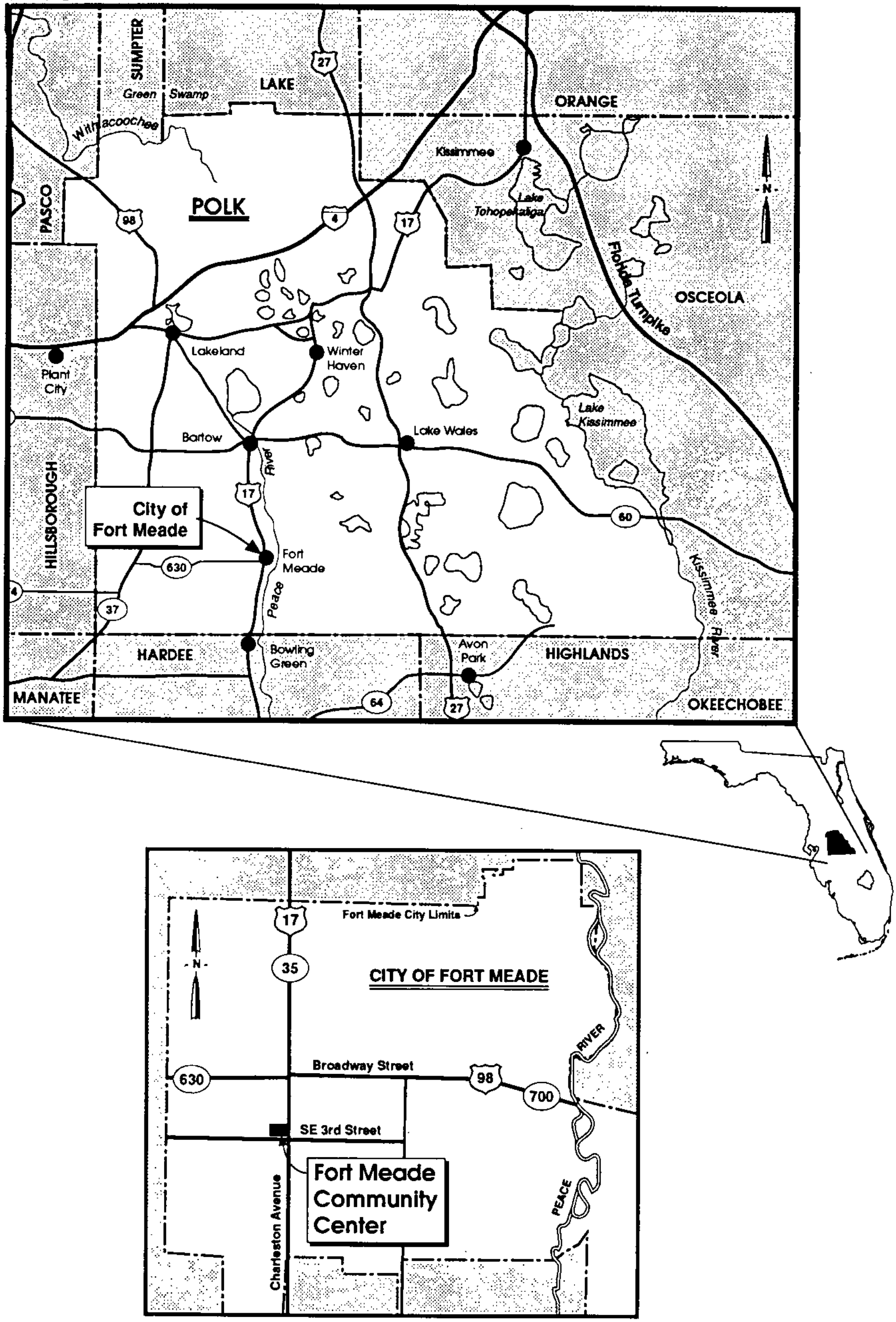
The principal goal of a Scoping Meeting is to obtain public input into the document, called an "Environmental Impact Statement" (EIS), that the Government will prepare.

The Scoping Meeting is the first opportunity to make sure that all of the environmental impacts that reasonably may be associated with the proposed action, and all reasonable alternatives to the proposed action, including the environmental impacts that would be associated with those alternatives, are made known to the best of our ability. The time for discussing the actual environmental impacts and alternatives themselves will come when the draft EIS is available for public review and a Public Hearing, like today's Scoping Meeting, is called to obtain your reaction to the contents of the draft EIS.

We seek your participation and input at this Scoping Meeting so that we will better be able to identify the environmental aspects of the proposed Tampa Electric Company Project, and the reasonable alternatives to the Project, including the "no action" alternative. It is important to make your views known now, during the Scoping Meeting or in writing before the comment period closes on August 27, 1992, so as to help ensure that the Department of Energy (DOE) fully addresses all of the appropriate environmental issues and concerns.

What does the Government do with the final EIS? The National Environmental Policy Act (NEPA), the President's Council on Environmental Quality's regulations for implementing NEPA, and DOE's own NEPA regulations, require DOE to use the information provided in the EIS when it decides the outcome of the proposed project. DOE's rules state that during the decisionmaking process, DOE shall consider the relevant NEPA documents, public and agency comments (if any) on those documents, and DOE responses to those comments, as part of its consideration of the proposal, including the alternatives analyzed in that EIS, before rendering a decision on the proposal.

Finally, when DOE issues its "Record of Decision" (ROD) for the proposed action, DOE will include the relevant NEPA documents, public and agency comments (if any) on those documents, and DOE's responses to those comments as part of the ROD.



SUMPTER
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Florida Turnpike
OSCEOLA
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Lakeland
Winter Haven
Plant City
Lake Kissimmee
Bartow
Lake Wales
River
17
60
HILLSBOROUGH
City of Fort Meade
Fort Meade
630
Peace
Kissimmee River
37
HARDEE
Bowling Green
Avon Park
HIGHLANDS
MANATEE
64
27
OKEECHOBEE
17
Fort Meade City Limits
35
N
CITY OF FORT MEADE
RIVER
Broadway Street
630
98
700
SE 3rd Street
Fort Meade Community Center
Charleston Avenue
PEACE

State of Florida
DEPARTMENT OF ENVIRONMENTAL REGULATION

For Routing To Other Than The Addressee	
To:	Location:
To:	Location:
To:	Location:
From:	Date:

Interoffice Memorandum

TO: Power Plant Siting Review Committee

FROM: Buck Oven

DATE: July 31, 1992

SUBJECT: TECO Polk Power Station - PA 92-32
Mod 8042

The power plant siting application for the Tampa Electric Company Polk Power Station was received on July 30, 1992. Copies of the application are being distributed. The completeness determination is due to be sent to the Hearing Officer on August 14, 1992. Any completeness comments should be sent to me by August 13, 1992. A copy of the preliminary review schedule will accompany the application.

TAMPA ELECTRIC
A TECO ENERGY COMPANY

RECEIVED

JUL 30 1992

D. E. R.
SITING COORDINATION

July 30, 1992

HAND DELIVERED

Mr. Hamilton S. Oven, Jr., P.E.
Administrator of Siting Coordination
Florida Department of
Environmental Regulation
2600 Blairstone Road
Twin Towers Office Building
Tallahassee, Florida 32399-2400

Re: Tampa Electric Company
Polk Power Station
Site Certification Application

Dear Buck:

In accordance with the provisions of Chapter 403.501-.517, Florida Statutes, and Chapter 17-17, Florida Administrative Code (F.A.C.), enclosed for filing are 12 copies of the site certification application for an 1,150 megawatt generating facility, transmission lines, and associated facilities to be located in Polk County, Florida. We have enclosed a check in the amount of $147,500.00 representing the application fee required by Rule 17-17.051(2)(b), F.A.C.

Also enclosed are air dispersion modeling results (computer printouts), which are bound as follows:

- SCREEN model screening outputs;
- ISC2 model significant impact area (SIA) outputs for SO_2;
- ISC2 model SIA outputs for NO_x and PM;
- ISC2 model SIA outputs for CO and lead;
- ISC2 model ambient air quality standards (AAQS) outputs for SO_2;
- ISC2 model AAQS outputs for NO_x and PM;
- ISC2 model PSD Class II outputs for SO_2;
- ISC2 model PSD Class II outputs for NO_x and PM;
- ISC2 model outputs for H_2SO_4, fluorides, and mercury;
- ISC2 model outputs for beryllium, arsenic, cadmium, and chromium;
- ISC2 model PSD Class I outputs for SO_2;
- ISC2 model PSD Class I outputs for NO_x and PM;

- MESOPUFF-II model PSD Class I outputs for SO_2 (24-hour); and
- MESOPUFF-II model PSD Class I outputs for SO_2 (3-hour) (2 binders).

Each model output provided in hard copy is also provided in diskette format. In addition to the model outputs, the diskettes contain copies of the Tampa meteorological data (1982 to 1986) used with the ISC2 models, and output files associated with the building wake effects downwash analysis.

In addition, we have enclosed water modeling results, in diskette and printout forms, for modeling efforts done on both the surficial and Floridan aquifers and the HEC-1 Hydrologic Model. Model results for the EMF runs for the associated transmission lines have been included in this submittal as well.

Finally, in accordance with Chapter 17-17.121, F.A.C., enclosed are three copies of the applicable portions of the Polk County Comprehensive Plan, the Polk County Zoning Ordinance, the State Comprehensive Plan, and the Central Florida Comprehensive Regional Policy Plan, as well as a summary of Tampa Electric Company's efforts to date to comply with these existing land use plans and zoning ordinances.

For purposes of this project, information requests, notices, and other correspondence should be directed to the following:

Gregory M. Nelson, P.E.
Consulting Engineer
Tampa Electric Company
P.O. Box 111
Tampa, Florida 33601-0111
(813) 228-4847

As you are aware, we have been attempting to define ways to compress the review schedule. We will be contacting you in the near future to schedule a meeting to discuss the site certification application in general and also any thoughts you may have as to how we might best expedite the review of this project.

Please let me know if you have any questions.

Sincerely.

A. Spencer Autry /ew

A. Spencer Autry
Director
Environmental

ASA/edd

Enclosures

cc: Mr. Steve Palmer, DER, Tallahassee

TECO POLK COUNTY PROJECT
PA 92-32

SCHEDULE OF DATES

ACTION	DATE
Application Filed	July 30, 1992
Hearing Officer Requested	August 6, 1992
List of Parties Distributed	August 6, 1992
Completness Determined	August 14, 1992
Application Distributed	August 21, 1992
Schedule Distributed	August 21, 1992
Notice of Filing of Application	August 28, 1992
Notice of Land Use Hearing	Sept. 13, 1992
Agency Sufficiency Recommendations	Sept. 20, 1992
Sufficiency Determined	October 5, 1992
Agency Preliminary Statements of Issues	October 19, 1992
Land Use Hearing	October 29, 1992
Agencies File Reports	January 18, 1993
DER Report Filed	Feb. 25, 1993
Agencies Must File to be a Party	Feb. 25, 1993
Persons must file to be a party	April 27, 1993
Certification Hearing	May 27, 1993